



# **Agilent X-Series Wireless Communications Test Set**

This manual provides documentation  
for the following test sets:

EXT Test Set E6607A/B/C

**U9063A Analog Demod  
Measurement Application:  
User's and Programmer's  
Reference**



# Notices

© Agilent Technologies, Inc.  
2010-2013

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

## Trademark Acknowledgements

Microsoft® is a U.S. registered trademark of Microsoft Corporation.

Windows® and MS Windows® are U.S. registered trademarks of Microsoft Corporation.

Adobe Acrobat® and Reader® are U.S. registered trademarks of Adobe Systems Incorporated.

Java™ is a U.S. trademark of Sun Microsystems, Inc.

MATLAB® is a U.S. registered trademark of Math Works, Inc.

Norton Ghost™ is a U.S. trademark of Symantec Corporation.

Wikipedia® is a registered trademark of the Wikimedia Foundation.

## Manual Part Number

U9063-90008

Supersedes: U9063-90004 and U9063-90006

## Print Date

February 2013

Supersedes: N/A

Printed in USA

Agilent Technologies Inc.  
1400 Fountaingrove Parkway  
Santa Rosa, CA 95403

## Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

## Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

## Restricted Rights Legend

If software is for use in the performance of a U.S. Government

prime contract or subcontract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies’ standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

## Safety Notices

### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

## Warranty

This Agilent technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Agilent Technologies will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies, and Agilent Technologies shall pay shipping charges to return the product to Buyer. For products returned to Agilent Technologies from another country, Buyer shall pay all shipping charges, duties, and taxes.

## Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

<http://www.agilent.com/find/ext>

To receive the latest updates by email, subscribe to Agilent Email Updates at the following URL:

<http://www.agilent.com/find/emailupdates>

Information on preventing test set damage can be found at:

<http://www.agilent.com/find/tips>

## Is your product software up-to-date?

Periodically, Agilent releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at:

<http://www.agilent.com/find/techsupport>



---

# Contents

## 1. Using Help

How Help is Organized.....	38
Front Panel Keys used by the Help System.....	41
Navigating the Help Files.....	43
Basic Help Window Operations.....	44
Navigating Help with a Mouse.....	45
Navigating Help Without a Mouse.....	46
Definition of Terms.....	51
Viewing Help Files on a separate Computer.....	53
Other Help Resources.....	55

## 2. About the Test Set

How the Test Set Is Used.....	58
Receiver Testing.....	58
Transmitter Testing.....	58
Hardware Elements of the Test Set.....	59
Software Elements of the Test Set.....	64
Methods of Operating the Source.....	67
Waveform Segment Files.....	67
Methods of Operating the Analyzer.....	67
Creating Sequences.....	67
Executing Sequences.....	68
Installing Application Software.....	69
Viewing a license key.....	69
Obtaining and installing a license key.....	69
Missing and old Measurement application software.....	70
X-Series options and accessories.....	71
Front-Panel Features (E6607A/B).....	72
Overview of key types.....	74
Front-Panel Features (E6607C).....	79
Overview of key types.....	81
Display Annotations.....	85
Test Set Display Indicators.....	87
Rear-Panel Features.....	88
Window Control Keys.....	90
Multi-Window.....	90
Zoom.....	90
Next Window.....	91
Mouse and Keyboard Control.....	93
Right-Click.....	93
Virtual Front Panel.....	95
PC Keyboard.....	96
Instrument Security & Memory Volatility.....	100

## 3. Introduction

## 4. Programming the Test Set

What Programming Information is Available?.....	104
---	-----

---

# Contents

IEEE Common GPIB Commands .....	105
Calibration Query .....	105
Clear Status .....	105
Standard Event Status Enable .....	105
Standard Event Status Register Query .....	106
Identification Query .....	106
Instrument Model Number .....	107
Operation Complete .....	107
Query Instrument Options .....	108
Recall Instrument State .....	108
Save Instrument State .....	109
Service Request Enable .....	109
Status Byte Query .....	110
Trigger .....	110
Self Test Query .....	110
Wait-to-Continue .....	110

## 5. System Functions

File .....	114
File Explorer .....	114
Page Setup .....	115
Print .....	116
Maximize/Restore Down .....	116
Minimize .....	117
Exit .....	117
Mode Preset .....	118
Restore Mode Defaults .....	120
Meas Preset .....	121
Preset Type (Remote Command Only) .....	121
*RST (Remote Command Only) .....	121
Print .....	123
Quick Save .....	124
Recall .....	126
State .....	126
Trace (+State) .....	132
Sequences .....	134
Data (Import) .....	136
Save .....	138
State .....	138
Trace (+State) .....	142
Sequences .....	145
Data (Export) .....	147
Screen Image .....	148
Mass Storage Catalog (Remote Command Only) .....	152
Mass Storage Change Directory (Remote Command Only) .....	152
Mass Storage Copy (Remote Command Only) .....	152
Mass Storage Delete (Remote Command Only) .....	153
Mass Storage Data (Remote Command Only) .....	153
Mass Storage Make Directory (Remote Command Only) .....	154

---

# Contents

Mass Storage Move (Remote Command Only) . . . . .	154
Mass Storage Remove Directory (Remote Command Only) . . . . .	154
System. . . . .	155
Show . . . . .	155
Power On. . . . .	161
Alignments . . . . .	170
I/O Config . . . . .	210
Restore Defaults . . . . .	219
Control Panel. . . . .	223
Licensing. . . . .	224
Security . . . . .	226
Diagnostics . . . . .	226
Service. . . . .	237
Internet Explorer. . . . .	237
System Remote Commands (Remote Commands Only) . . . . .	237
User Preset . . . . .	241
User Preset. . . . .	241
User Preset All Modes. . . . .	242
Save User Preset . . . . .	243

## 6. AM Demod Measurement

## 7. FM Demod Measurement

## 8. PM Demod Measurement

## 9. Metrics

## 10. Measurement Functions

AMPTD Y Scale . . . . .	263
Ref Value . . . . .	263
Attenuation . . . . .	265
Scale / Div . . . . .	265
Ref Position. . . . .	267
Internal Preamp . . . . .	268
Auto Couple . . . . .	271
BW . . . . .	273
RF Res BW . . . . .	273
Channel BW . . . . .	274
AF Res BW . . . . .	274
Cont (Continuous Measurement/Sweep) . . . . .	277
FREQ Channel . . . . .	279
Center Frequency . . . . .	279
CF Step . . . . .	280
AF Start Freq. . . . .	280
AF Stop Freq. . . . .	281
Input/Output . . . . .	283
RF Input. . . . .	285

---

# Contents

RF Calibrator	288
External Gain	290
Restore Input/Output Defaults	293
Data Source	294
Corrections	295
Freq Ref In	307
RF Output & Test Set Config	310
Output Config	342
Marker	351
Select Marker	351
Normal	351
Delta	352
Fixed	352
Marker X	353
Marker Y	353
Off	354
Properties	354
All Markers Off	358
Marker Function	359
Marker To	361
Mkr->CF	361
Meas	363
Meas Setup	365
Average/Hold Num	366
Modulation Rate Periodic Yes/No	368
Filters	368
Demod to Speaker	376
Auto Scale	376
Meas Preset	377
Mode	379
Application Mode Number Selection (Remote Command Only)	381
Application Mode Catalog Query (Remote Command Only)	382
Application Identification (Remote Commands Only)	382
Application Identification Catalog (Remote Commands Only)	384
Detailed List of Modes	386
Global Settings	389
Mode Setup	391
Radio Standard	391
Enable Non-Std Measurements	400
EMC Standard	400
CISPR presets	402
Noise Reduction	403
Global Settings	405
Legacy Compatibility	405
Peak Search	407
Next Peak	407
Pk-Pk Search	407
Min Search	408
Recall	409



---

# Contents

Amplitude Correction . . . . .	409
Restart . . . . .	415
Save . . . . .	417
Export/Import Data . . . . .	417
Single (Single Measurement/Sweep) . . . . .	423
Source (Internal) . . . . .	425
RF Output . . . . .	425
Amplitude . . . . .	425
Modulation . . . . .	430
Frequency . . . . .	430
Modulation Setup . . . . .	460
Multiport Adapter Output Port Amplitude Correction Configuration Validation (Remote Command Only)	
506	
List Sequencer . . . . .	507
Source Preset . . . . .	546
Source Self Test . . . . .	546
Recall . . . . .	547
Save . . . . .	547
Signal Studio Commands . . . . .	547
Sequence Studio Commands . . . . .	549
SPAN X Scale . . . . .	551
Span . . . . .	551
Sweep/Control . . . . .	553
Demod Wfm Sweep Time . . . . .	553
Demod Time . . . . .	553
Trace/Detector . . . . .	555
Trigger . . . . .	557
Free Run . . . . .	565
Video (IF Envelope) . . . . .	566
Line . . . . .	570
External 1 . . . . .	572
External 2 . . . . .	575
RF Burst . . . . .	578
Periodic Timer (Frame Trigger) . . . . .	583
Baseband I/Q . . . . .	591
TV . . . . .	601
Auto/Holdoff . . . . .	607
View/Display AM/FM/PM . . . . .	611
Display . . . . .	611
Quad View . . . . .	619
RF Spectrum & Metrics View . . . . .	621
Demod Waveform & Metrics View . . . . .	622
AF Spectrum & Metrics View . . . . .	623
Distortion & THD Unit . . . . .	624
Metrics Settings . . . . .	624



# List of Commands

This list includes every SCPI command described in this document. To find a command in the list, search according to its first alphanumeric character, ignoring any leading "\*", ":" or "[" characters.

*CAL?	179
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:LINEs[:STATE] OFF ON 0 1	358
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:LINEs[:STATE]?	358
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MAXimum	407
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MAXimum:NEXT	407
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MINimum	408
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE POSition DELTA FIXed OFF	351
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE?	351
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:PTPeak	408
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:REFerence <int>	354
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:REFerence?	354
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12[:SET]:CENTer	361
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:TRACe RFSpectrum AFSpectrum DEMod DAVerage DMAXimum DMINimum	355
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:TRACe?	355
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:TRACe:AUTO OFF ON 0 1	357
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:TRACe:AUTO?	357
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X <time> <freq>	353
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X?	353
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:Y <real>	353
:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:Y?	353
:CALCulate:AM FM PM:MARKer:AOFF	358
:CALibration[:ALL]?	178
:CALibration[:ALL]	178
:CALibration:AUTO ON PARTial OFF	171
:CALibration:AUTO?	171
:CALibration:AUTO:ALERT TTEMPerature DAY WEEK NONE	174
:CALibration:AUTO:ALERT?	174
:CALibration:AUTO:MODE ALL NRF	174
:CALibration:AUTO:MODE?	174

:CALibration:AUTO:TIME:OFF? .....	186
:CALibration:DATA:BACKUp <filename> .....	196
:CALibration:DATA:DEFault .....	189
:CALibration:DATA:REStore <filename> .....	196
:CALibration:EMIXer? .....	182
:CALibration:EMIXer .....	182
:CALibration:EXPIred? .....	177
:CALibration:FREQuency:REFerence:COARse <integer> .....	201
:CALibration:FREQuency:REFerence:COARse? .....	201
:CALibration:FREQuency:REFerence:FINE <integer> .....	200
:CALibration:FREQuency:REFerence:FINE? .....	200
:CALibration:FREQuency:REFerence:MODE CALibrated USER .....	199
:CALibration:FREQuency:REFerence:MODE? .....	199
:CALibration:INTernal:SOURce[:ALL]? .....	182
:CALibration:INTernal:SOURce[:ALL] .....	182
:CALibration:MPADapter:CABLEs:TEST .....	236
:CALibration:MPADapter:GAIN? .....	199
:CALibration:MPADapter:GAIN .....	199
:CALibration:NRF? .....	180
:CALibration:NRF .....	180
:CALibration:RF? .....	181
:CALibration:RFPSelector:ALERt ON OFF 0 1 .....	206
:CALibration:RFPSelector:ALERt? .....	206
:CALibration:RFPSelector:CONDUCTed? .....	202
:CALibration:RFPSelector:CONDUCTed .....	202
:CALibration:RFPSelector:FULL? .....	205
:CALibration:RFPSelector:FULL .....	205
:CALibration:RFPSelector:RADiated? .....	203
:CALibration:RFPSelector:RADiated .....	203
:CALibration:RFPSelector:SCHeduler:RECurrence DAY WEEK OFF .....	208
:CALibration:RFPSelector:SCHeduler:RECurrence? .....	208
:CALibration:RFPSelector:SCHeduler:RECurrence:DAY SUN MON TUE WED THU FRI SAT .....	209
:CALibration:RFPSelector:SCHeduler:RECurrence:DAY? .....	209
:CALibration:RFPSelector:SCHeduler:RECurrence:WEEK <integer> .....	209

:CALibration:RFPSelector:SCheduler:RECCurrence:WEEK?	209
:CALibration:RFPSelector:SCheduler:STATe ON OFF 0 1	210
:CALibration:RFPSelector:SCheduler:STATe?	210
:CALibration:RFPSelector:SCheduler:TASK T1 T2 T3	206
:CALibration:RFPSelector:SCheduler:TASK?	206
:CALibration:RFPSelector:SCheduler:TIME:NEXT?	188
:CALibration:RFPSelector:SCheduler:TIME:START "date","time"	207
:CALibration:RFPSelector:SCheduler:TIME:START?	207
:CALibration:RF.	181
:CALibration:SOURce:STATe OFF ON 0 1	289
:CALibration:SOURce:STATe?	289
:CALibration:TEMPerature:CURRent?	184
:CALibration:TEMPerature:LALL?	184
:CALibration:TEMPerature:LPReselector?	186
:CALibration:TEMPerature:LRF?	185
:CALibration:TEMPerature:RFPSelector:LCONducted?	187
:CALibration:TEMPerature:RFPSelector:LRADIated?	187
:CALibration:TEMPerature:SOURce:LALL?	185
:CALibration:TIME:LALL?	184
:CALibration:TIME:LPReselector?	186
:CALibration:TIME:LRF?	185
:CALibration:TIME:RFPSelector:LCONducted?	187
:CALibration:TIME:RFPSelector:LRADIated?	187
:CALibration:TIME:SOURce:LALL?	185
:CALibration:YTF?	197
:CALibration:YTF	197
*CLS	105
:CONFigure:<Measurement>	121
:CONFigure?	245
:CONFigure?	249
:CONFigure?	253
:CONFigure:AM.	245
:CONFigure:AM:NDEFault	245
:CONFigure:FM	249

:CONFigure:FM:NDEFault . . . . .	249
:CONFigure:PM. . . . .	253
:CONFigure:PM:NDEFault . . . . .	253
:CONTRol:COMPatible:TRACe ON OFF 1 0 . . . . .	406
:CONTRol:COMPatible:TRACe?. . . . .	406
:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> . . . . .	615
:DISPlay:<measurement>:ANNotation:TITLe:DATA? . . . . .	615
:DISPlay:ACTivefunc[:STATe] ON OFF 1 0. . . . .	614
:DISPlay:ACTivefunc[:STATe]? . . . . .	614
:DISPlay:AM FM PM:VIEW:DISTortion:UNIT DB PCT . . . . .	624
:DISPlay:AM FM PM:VIEW:DISTortion:UNIT? . . . . .	624
:DISPlay:AM FM PM:VIEW:METRics:DISTortion? . . . . .	627
:DISPlay:AM FM PM:VIEW:METRics:DISTortion[:STATe] ON OFF 1 0 . . . . .	627
:DISPlay:AM FM PM:VIEW:METRics:MMAgNitude ALL PPK PNPK RMS RMSRatio . . . . .	625
:DISPlay:AM FM PM:VIEW:METRics:MMAgNitude? . . . . .	625
:DISPlay:AM FM PM:VIEW:METRics:MRATe[:STATe] ON OFF 1 0 . . . . .	627
:DISPlay:AM FM PM:VIEW:METRics:MRATe[:STATe]? . . . . .	627
:DISPlay:AM FM PM:VIEW[:SElect] QUAD RFSPectrum DEMod AFSPectrum . . . . .	611
:DISPlay:AM FM PM:VIEW[:SElect]? . . . . .	611
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:PDIVision <real> . . . . .	265
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:PDIVision? . . . . .	265
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RLEVel <real> . . . . .	263
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RLEVel? . . . . .	263
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOStition TOP CENTer BOTTom. . . . .	267
:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOStition? . . . . .	267
:DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 . . . . .	612
:DISPlay:ANNotation:MBAR[:STATe]? . . . . .	612
:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1. . . . .	613
:DISPlay:ANNotation:SCReen[:STATe]? . . . . .	613
:DISPlay:ANNotation:TRACe[:STATe] ON OFF 1 0 . . . . .	613
:DISPlay:ANNotation:TRACe[:STATe]? . . . . .	613
:DISPlay:BACKlight ON OFF. . . . .	618
:DISPlay:BACKlight? . . . . .	618
:DISPlay:BACKlight:INTensity <integer> . . . . .	619

:DISPlay:BACKlight:INTensity?	619
:DISPlay:THEME TDColor TDMonochrome FCOLor FMONochrome	618
:DISPlay:THEMe?	618
:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1	617
:DISPlay:WINDow[1]:ANNotation[:ALL]?	617
:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1	616
:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?	616
:DISPlay:WINDow[1]:TRACe:Y:DLINe <ampl>	616
:DISPlay:WINDow[1]:TRACe:Y:DLINe?	616
:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe OFF ON 0 1	616
:DISPlay:WINDow[1]:TRACe:Y:DLINe:STATe?	616
:DISPlay:WINDow:FORMat:TILE	91
:DISPlay:WINDow:FORMat:ZOOM	91
:DISPlay:WINDow[:SELeCt] <number>	91
:DISPlay:WINDow[:SELeCt]?	91
*ESE <integer>	106
*ESE?	106
*ESR?	106
:FEED:RF:PORT:OUTP RFIO1	311
:FETCh:AM[n]?	245
:FETCh:FM[n]?	249
:FETCh:PM[n]?	253
:GLOBal:FREQuency:CENTer[:STATe] 1 0 ON OFF	390
:GLOBal:FREQuency:CENTer[:STATe]?	390
:HCOPy:ABORT	123
:HCOPy[:IMMediate]	123
*IDN?	107
:INIT	68
:INITiate:AM	245
:INITiate:CONTInuous OFF ON 0 1	277
:INITiate:CONTInuous?	277
:INITiate:FM	249
:INITiate[:IMMediate]	415
:INITiate:PM	253

:INITiate:REStart	415
:INPut:MIXer EXTErnal INTErnal	284
:INPut:MIXer?	284
:INSTrument:CATalog?	382
:INSTrument:COUPle:DEFault	390
:INSTrument:COUPle:FREQuency:CENTEr ALL NONE	390
:INSTrument:COUPle:FREQuency:CENTEr?	390
:INSTrument:DEFault	120
:INSTrument:NSElect <integer>	382
:INSTrument:NSElect?	382
:INSTrument[:SElect] SEQAN BASIC WCDMA EDGE GSM WIMAX OFDMA ADEMOD BT Tooth TDSCDMA CDMA2K CDMA1X EV LTE LTETDD	379
:INSTrument[:SElect]?	379
:MEASure:AM[n]?	245
:MEASure:FM[n]?	249
:MEASure:PM[n]?	253
:MEMMory:RDIREctory <directory_name>	154
:MEMory[:SOURce]	548
:MEMory[:SOURce]:DATA <file_name>, <data>	548
:MEMory[:SOURce]:DATA:APPend <file_name>, <data>	549
:MMEMory:CATalog? [<directory_name>]	152
:MMEMory:CDIREctory [<directory_name>]	152
:MMEMory:CDIREctory?	152
:MMEMory:COpy <string>,<string>[,<string>,<string>]	152
:MMEMory:DATA <file_name>, <data>	153
:MMEMory:DATA? <file_name>	153
:MMEMory:DELEte <file_name>[,<directory_name>]	153
:MMEMory:HEADer:ID? "<file name>"	501
:MMEMory:LOAD:CORREction 1 2 3 4 5 6, <filename>	409
:MMEMory:LOAD:MPADapter:CORREction 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16, <filename>	411
:MMEMory:LOAD:SEQuences: SLISt ALISt SAALISt  "MySequence.txt"	135
:MMEMory:LOAD:STATe <filename>	127
:MMEMory:LOAD:TRACe TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6,<filename>	133
:MMEMory:LOAD:TRACe:REGISter TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6,<integer>	133



:MMEMory:MDIRectory <directory_name> .....	154
:MMEMory:MOVE <string>,<string>[,<string>,<string>] .....	154
:MMEMory:REGister:STATe:LABel <reg number>,"label" .....	141
:MMEMory:REGister:STATe:LABel? <reg number> .....	141
:MMEMory:STORe:RESults <filename> .....	421
:MMEMory:STORe:SCReen <filename> .....	149
:MMEMory:STORe:SCReen:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome .....	150
:MMEMory:STORe:SCReen:THEMe? .....	150
:MMEMory:STORe:STATe <filename> .....	138
:MMEMory:STORe:TRACe TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6 ALL,<filename> ...	143
:MMEMory:STORe:TRACe:DATA RFSpectrum DEMod DAverage DMAXimum DMINimum AFSPec- trum,<filename> .....	421
:MMEMory:STORe:TRACe:REGister TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6 ALL,<integer> 143	
:MMEM:STOR:SEQuences: SLIS ALIS SAALIS SSTep "MySequence.txt" .....	145
:MPAD:PORT:INP RFIO1 .....	314
*OPC? .....	107
*OPC .....	107
*OPT? .....	108
:OUTPut:ANALog OFF SVIDeo LOGVIdIo LINVIdIo DAUDIo .....	346
:OUTPut:ANALog? .....	346
:OUTPut:ANALog:AUTO OFF ON 0 1 .....	347
:OUTPut:ANALog:AUTO? .....	347
:OUTPut[:EXTernal][:STATe] ON OFF 1 0 .....	425
:OUTPut[:EXTernal][:STATe]? .....	425
:OUTPut:MODulation[:STATe] ON OFF 1 0 .....	430
:OUTPut:MODulation[:STATe]? .....	430
*RCL <register #> .....	109
:READ:AM[n]? .....	245
:READ:FM[n]? .....	249
:READ:PM[n]? .....	253
*RST .....	122
*SAV <register #> .....	109
[:SENSe]:<measurement>:TRIGger:SOURce IF .....	558

[:SENSe]:<measurement>:TRIGger:SOURce. . . . .	558
[:SENSe]:AM FM PM:AFSPectrum:BANDwidth <freq> . . . . .	275
[:SENSe]:AM FM PM:AFSPectrum:BANDwidth?. . . . .	275
[:SENSe]:AM FM PM:AFSPectrum:BANDwidth:AUTO OFF ON 0 1 . . . . .	275
[:SENSe]:AM FM PM:AFSPectrum:BANDwidth:AUTO? . . . . .	275
[:SENSe]:AM FM PM:AFSPectrum:FREQuency:STARt <freq>. . . . .	281
[:SENSe]:AM FM PM:AFSPectrum:FREQuency:STARt? . . . . .	281
[:SENSe]:AM FM PM:AFSPectrum:FREQuency:STOP <freq> . . . . .	281
[:SENSe]:AM FM PM:AFSPectrum:FREQuency:STOP? . . . . .	281
[:SENSe]:AM FM PM:AVERAge:COUNt <integer> . . . . .	367
[:SENSe]:AM FM PM:AVERAge:COUNt? . . . . .	367
[:SENSe]:AM FM PM:AVERAge[:STATe] ON OFF 1 0 . . . . .	367
[:SENSe]:AM FM PM:AVERAge[:STATe]? . . . . .	367
[:SENSe]:AM FM PM:BANDwidth:CHANnel <freq>. . . . .	274
[:SENSe]:AM FM PM:BANDwidth:CHANnel?. . . . .	274
[:SENSe]:AM FM PM:BANDwidth[:RESolution] <freq> . . . . .	273
[:SENSe]:AM FM PM:BANDwidth[:RESolution]? . . . . .	273
[:SENSe]:AM FM PM:BANDwidth[:RESolution]:AUTO OFF ON 0 1 . . . . .	273
[:SENSe]:AM FM PM:BANDwidth[:RESolution]:AUTO? . . . . .	273
[:SENSe]:AM FM PM:BPFilter OFF CCITT . . . . .	372
[:SENSe]:AM FM PM:BPFilter?. . . . .	372
[:SENSe]:AM FM PM:DEMod:TIME <time> . . . . .	554
[:SENSe]:AM FM PM:DEMod:TIME? . . . . .	554
[:SENSe]:AM FM PM:DEMod:TIME:AUTO OFF ON 0 1 . . . . .	554
[:SENSe]:AM FM PM:DEMod:TIME:AUTO?. . . . .	554
[:SENSe]:AM FM PM:DWSWeep:TIME <time>. . . . .	553
[:SENSe]:AM FM PM:DWSWeep:TIME? . . . . .	553
[:SENSe]:AM FM PM:FREQuency:SPAN <freq> . . . . .	551
[:SENSe]:AM FM PM:FREQuency:SPAN? . . . . .	551
[:SENSe]:AM FM PM:HPFilter OFF HPF20 HPF50 HPF300 . . . . .	368
[:SENSe]:AM FM PM:HPFilter?. . . . .	368
[:SENSe]:AM FM PM:LPFFilter OFF LPF300 LPF3K LPF15K LPF30K LPF80K LPF300K . . . . .	370
[:SENSe]:AM FM PM:LPFFilter?. . . . .	370
[:SENSe]:AM FM PM:PERIodic[:STATe] ON OFF 1 0 . . . . .	368

[[:SENSe]:AM FM PM:PERIodic[:STATe]?	368
[[:SENSe]:AUToscale	376
[[:SENSe]:BANDwidth BWIDth[:RESolution]:MODE EMI SAN OFF	401
[[:SENSe]:BANDwidth BWIDth[:RESolution]:MODE?	401
[[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl>	292
[[:SENSe]:CORRection:BTS[:RF]:GAIN?	292
[[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_ampl>	293
[[:SENSe]:CORRection:BTS[:RF]:LOSS?	293
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:COMMeNt "text"	300
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:COMMeNt?	300
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DATA <freq>, <ampl>, ...	306
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DATA?	306
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DATA:MERGe <freq>, <ampl>, ...	307
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DELete	305
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DESCRiption "text"	300
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:DESCRiption?	300
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT RFIN RFIO1 RFIO2 RFOut	301
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT?	301
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT:RFIO1 SOURce   ANALyzer   BOTH	301
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT:RFIO1?	301
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT:RFIO2 SOURce   ANALyzer   BOTH	302
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:RF:PORT:RFIO2?	302
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6[:STATe] ON OFF 1 0	297
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6[:STATe]?	297
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:X:SPACing LINear LOGarithmic	298
[[:SENSe]:CORRection:CSET[1] 2 3 4 5 6:X:SPACing?	298
[[:SENSe]:CORRection:CSET:ALL:DELete	306
[[:SENSe]:CORRection:CSET:ALL[:STATe] ON OFF 1 0	306
[[:SENSe]:CORRection:CSET:ALL[:STATe]?	306
[[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50 75	286
[[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?	286
[[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>	291
[[:SENSe]:CORRection:MS[:RF]:GAIN?	291
[[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl>	292

[:SENSe]:CORRection:MS[:RF]:LOSS?	292
[:SENSe]:CORRection:NOISe:FLOOr ON OFF 1 0	404
[:SENSe]:CORRection:NOISe:FLOOr?	404
[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>	290
[:SENSe]:CORRection:SA[:RF]:GAIN?	290
[:SENSe]:EMC:STANdard[:SElect] NONE CISPr MIL	401
[:SENSe]:EMC:STANdard[:SElect]?	401
[:SENSe]:FEED RF AIQ EMIXer	283
[:SENSe]:FEED?	283
[:SENSe]:FEED:AREFERENCE REF50 REF4800 OFF	288
[:SENSe]:FEED:AREFERENCE?	288
[:SENSe]:FEED:DATA INPut STORed	294
[:SENSe]:FEED:DATA?	294
[:SENSe]:FEED:DATA:STORe	295
[:SENSe]:FEED:RF:PORT[:INPut] RFIN RFIN2 RFIO1 RFIO2	287
[:SENSe]:FEED:RF:PORT[:INPut]?	287
[:SENSe]:FEED:RF:PORT:OUTPut RFOut RFIO1 RFIO2	311
[:SENSe]:FEED:RF:PORT:OUTPut?	311
[:SENSe]:FM:DEEMphasis OFF US25 US50 US75 US750	374
[:SENSe]:FM:DEEMphasis?	374
[:SENSe]:FREQuency:CENTer <freq>	279
[:SENSe]:FREQuency:CENTer?	279
[:SENSe]:FREQuency:CENTer:STEP:AUTO OFF ON 0 1	280
[:SENSe]:FREQuency:CENTer:STEP:AUTO?	280
[:SENSe]:FREQuency:CENTer:STEP[:INCRement] <freq>	280
[:SENSe]:FREQuency:CENTer:STEP[:INCRement]?	280
[:SENSe]:FREQuency:CISPr:BAND A B C D E	402
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:ANTenna[:UNIT] GAUSs PTES- la UVM UAM NOConversion	323
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:ANTenna[:UNIT]?	323
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:COMMeNT "text"	327
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:COMMeNT?	327
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA <freq>, <ampl>, . . .	341
[:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA?	341

[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA:MERGe <freq>, <ampl>, .....	342
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DELeTe .....	340
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DESCription "text" .....	327
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DESCription? .....	327
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT RFIO RFIO1 RFIO2 RFIO3 RFIO4 RFIO5 RFIO6 RFIO7 .....	328
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT? .....	328
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO0 SOURce  AN- ALyzer BOTH .....	328
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO0? .....	328
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO1 SOURce  AN- ALyzer  BOTH .....	329
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO1? .....	329
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO2 SOURce  AN- ALyzer  BOTH .....	331
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO2? .....	331
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO3 SOURce  AN- ALyzer  BOTH .....	332
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO3? .....	332
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO4 SOURce  AN- ALyzer  BOTH .....	333
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO4? .....	333
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO5 SOURce  AN- ALyzer  BOTH .....	334
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO5? .....	334
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO6 SOURce  AN- ALyzer  BOTH .....	335
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO6? .....	335
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO7 SOURce  AN- ALyzer  BOTH .....	336
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO7? .....	336
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16[:.STATe] ON OFF 1 0 .....	321
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16[:.STATe]? .....	321
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:X:SPACing LINear LOGarith- mic .....	325
[.:SENSe]:MPADapter:CORRection:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:X:SPACing? .....	325
[.:SENSe]:MPADapter:CORRection:CSET:ALL:DELeTe .....	341

[:SENSe]:MPADapter:CORRection:CSET:ALL[:STATe] ON OFF 1 0	340
[:SENSe]:MPADapter:CORRection:CSET:ALL[:STATe]?	340
[:SENSe]:MPADapter:GAIN[:STATe] ON OFF 1 0	320
[:SENSe]:MPADapter:GAIN[:STATe]?	320
[:SENSe]:MPADapter:PORT:INPut OFF	314
[:SENSe]:MPADapter:PORT:INPut OFF RFIO0  RFIO1  RFIO2  RFIO3  RFIO4  RFIO5  RFIO6  RFIO7	314
[:SENSe]:MPADapter:PORT:INPut RFIO0	315
[:SENSe]:MPADapter:PORT:INPut?	314
[:SENSe]:MPADapter:PORT:OUTPut:BITMap <integer>	317
[:SENSe]:MPADapter:PORT:OUTPut:BITMap?	317
[:SENSe]:MPADapter[:STATe] ON OFF 1 0	314
[:SENSe]:MPADapter[:STATe]?	314
[:SENSe]:POWer[:RF]:ATTenuation <rel_ampl>	265
[:SENSe]:POWer[:RF]:ATTenuation?	265
[:SENSe]:POWer[:RF]:GAIN:BAND LOW FULL	268
[:SENSe]:POWer[:RF]:GAIN:BAND?	268
[:SENSe]:POWer[:RF]:GAIN[:STATe] OFF ON 0 1	268
[:SENSe]:POWer[:RF]:GAIN[:STATe]?	268
[:SENSe]:RADio:STANdard:BAND:CLASs BC0 BC1	396
[:SENSe]:RADio:STANdard:BAND:CLASs?	396
[:SENSe]:RADio:STANdard:DEvice BTS MS	394
[:SENSe]:RADio:STANdard:DEvice?	394
[:SENSe]:RADio:STANdard:EAMeas YES NO	400
[:SENSe]:RADio:STANdard:EAMeas?	400
[:SENSe]:RADio:STANdard:PACKet DH1 DH3 DH5	398
[:SENSe]:RADio:STANdard:PACKet?	398
[:SENSe]:RADio:STANdard[:SElect]	
NONE JSTD IS95a IS97D IS98D GSM W3GPP CDMA2000MC1 C20001X NADC PDC BLUEtooth TETRa WL802DOT11A WL802DOT11B WL802DOT11G HIPERLAN2 DVBTLN DVBTPN DVBTPN FCC15 SDMBS E UWBINDOOR	391
[:SENSe]:RADio:STANdard[:SElect]?	391
[:SENSe]:ROSCillator:EXTernal:FREQuency <freq>	310
[:SENSe]:ROSCillator:EXTernal:FREQuency?	310
[:SENSe]:ROSCillator:SOURce INTernal EXTernal	309
[:SENSe]:ROSCillator:SOURce?	308

[:SENSe]:ROSCillator:SOURce:TYPE INTernal EXTernal SENSe	308
[:SENSe]:ROSCillator:SOURce:TYPE?	308
[:SENSe]:SPEaker[:STATe] ON OFF 1 0	376
[:SENSe]:SPEaker[:STATe]?	376
:SERVice[:PRODUCTION]:SIQuery:SCPI:LIST?	549
:SOURce:AM[:DEPTH][:LINear]?	503
:SOURce:AM[:DEPTH][:LINear]	503
:SOURce:AM:INTernal:FREQuency?	504
:SOURce:AM:INTernal:FREQuency	504
:SOURce:AM:STATe?	503
:SOURce:AM:STATe	503
:SOURce:FM[:DEViation]?	504
:SOURce:FM[:DEViation]	504
:SOURce:FM:INTernal:FREQuency?	505
:SOURce:FM:INTernal:FREQuency	505
:SOURce:FM:STATe?	504
:SOURce:FM:STATe	504
:SOURce:FREQuency:CHANnels:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BAND DII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BAND XIII BANDXIV USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMT EXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BA ND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21  BAND24 BAND25 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 B AND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF	442
:SOURce:FREQuency:CHANnels:BAND?	442
:SOURce:FREQuency:CHANnels:NUMBer <int>	432
:SOURce:FREQuency:CHANnels:NUMBer?	432
:SOURce:FREQuency[:CW] <freq>	431
:SOURce:FREQuency[:CW]?	431
:SOURce:FREQuency:OFFSet <freq>	460
:SOURce:FREQuency:OFFSet?	460
:SOURce:FREQuency:REFerence <freq>	459
:SOURce:FREQuency:REFerence?	459
:SOURce:FREQuency:REFerence:SET	458
:SOURce:FREQuency:REFerence:STATe OFF ON 0 1	459

:SOURce:FREQuency:REFerence:STATe? . . . . .	459
:SOURce:LIST:INITiation:ARMed? . . . . .	546
:SOURce:LIST:MPADapter:CORRection:ERRor? . . . . .	545
:SOURce:LIST:MPADapter:PORT:OUTPut:BITMap:MODE LIST   FIXed . . . . .	544
:SOURce:LIST:MPADapter:PORT:OUTPut:BITMap:MODE? . . . . .	544
:SOURce:LIST:NUMBer:STEPs <integer> . . . . .	509
:SOURce:LIST:NUMBer:STEPs? . . . . .	509
:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, . . . . .	541
:SOURce:LIST:SETup:AMPLitude? . . . . .	541
:SOURce:LIST:SETup:CLear . . . . .	544
:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, . . . . .	540
:SOURce:LIST:SETup:CNFRequency? . . . . .	540
:SOURce:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, . . . . .	542
:SOURce:LIST:SETup:DURation:TYPE? . . . . .	542
:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, . . . . .	538
:SOURce:LIST:SETup:INPut:TRIGger? . . . . .	538
:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, . . . . .	544
:SOURce:LIST:SETup:OUTPut:TRIGger ? . . . . .	544
:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, . . . . .	539
:SOURce:LIST:SETup:RADio:BAND? . . . . .	539
:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, . . . . .	540
:SOURce:LIST:SETup:RADio:BAND:LINK? . . . . .	540
:SOURce:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, . . . . .	543
:SOURce:LIST:SETup:TOCount? . . . . .	543
:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, . . . . .	538
:SOURce:LIST:SETup:TRANSition:TIME? . . . . .	538
:SOURce:LIST:SETup:WAVeform <string>, <string>, <string>, . . . . .	542
:SOURce:LIST:SETup:WAVeform? . . . . .	542
:SOURce:LIST[:STATe] ON OFF 1 0 . . . . .	507
:SOURce:LIST[:STATe]? . . . . .	507
:SOURce:LIST:STEP[1] 2 3 4..1000:SETup IMMEDIATE INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMT EXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 B	



AND21 BAND24 BAND25 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTInuous, <time>, ON OFF 1 0, [<int>], .....	536
:SOURce:LIST:STEP[1] 2 3 4...1000:SETup?	536
:SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND? .....	513
:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> .....	530
:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude? .....	530
:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency <double> .....	528
:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency <double> .....	529
:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency? .....	528
:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRequency? .....	529
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt <double> .....	534
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt <double> .....	535
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt? .....	534
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOunt? .....	535
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME COUNt CONTInuous .....	533
:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE? .....	533
:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE INternal EXternal2 KEY BUS .....	510
:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger? .....	510
:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON OFF 1 0 .....	536
:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger .....	536
:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMT EXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25 BAND33 BAND34 BAND35 BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND43 BANDA BANDB BANDC BANDD BANDE BANDF .....	513
:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK DOWN UP .....	528
:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND:LINK? .....	528
:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> .....	512
:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME? .....	512
:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform <string> .....	530
:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform? .....	530
:SOURce:LIST:TRIG .....	68
:SOURce:LIST:TRIGger[:IMMEDIATE] .....	508

:SOURce:LIST:TRIGger:INITiate[:IMMediate]. . . . .	508
:SOURce:PM[:DEViation]? . . . . .	506
:SOURce:PM[:DEViation]. . . . .	506
:SOURce:PM:INternal:FREQuency? . . . . .	506
:SOURce:PM:INternal:FREQuency . . . . .	506
:SOURce:PM:STATe? . . . . .	505
:SOURce:PM:STATe . . . . .	505
:SOURce:POWer:ALC[:STATe] ON OFF 1 0 . . . . .	430
:SOURce:POWer:ALC[:STATe]? . . . . .	430
:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> . . . . .	426
:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]? . . . . .	426
:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl>. . . . .	429
:SOURce:POWer[:LEVel][:IMMediate]:OFFSet? . . . . .	429
:SOURce:POWer:REFerence <ampl>. . . . .	428
:SOURce:POWer:REFerence? . . . . .	428
:SOURce:POWer:REFerence:STATe OFF ON 0 1 . . . . .	428
:SOURce:POWer:REFerence:STATe? . . . . .	428
:SOURce:PRESet. . . . .	546
:SOURce:RADio:ARB: DEFault:DIRectory? . . . . .	465
:SOURce:RADio:ARB:BASeband:FREQuency:OFFSet <freq> . . . . .	469
:SOURce:RADio:ARB:BASeband:FREQuency:OFFSet? . . . . .	469
:SOURce:RADio:ARB:CATalog? . . . . .	467
:SOURce:RADio:ARB:DEFault:DIRectory <string>. . . . .	465
:SOURce:RADio:ARB:DELete <string> . . . . .	466
:SOURce:RADio:ARB:DELete:ALL . . . . .	466
:SOURce:RADio:ARB:FCATalog? . . . . .	467
:SOURce:RADio:ARB:HEADer:CLEar . . . . .	500
:SOURce:RADio:ARB:HEADer:INformation? . . . . .	502
:SOURce:RADio:ARB:HEADer:SAVE . . . . .	500
:SOURce:RADio:ARB:LOAD <string> . . . . .	463
:SOURce:RADio:ARB:LOAD:ALL <string>. . . . .	464
:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 . . . . .	499
:SOURce:RADio:ARB:MDEStination:ALCHold? . . . . .	499
:SOURce:RADio:ARB:MDEStination:PULSe NONE M1 M2 M3 M4 . . . . .	497

:SOURce:RADio:ARB:MDEStination:PULSe? .....	497
:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed? .....	494
:SOURce:RADio:ARB:MPLicensed:UID:LOCKed? .....	494
:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative .....	495
:SOURce:RADio:ARB:MPOLarity:MARKer1? .....	495
:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative .....	495
:SOURce:RADio:ARB:MPOLarity:MARKer2? .....	495
:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative .....	496
:SOURce:RADio:ARB:MPOLarity:MARKer3? .....	496
:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative .....	496
:SOURce:RADio:ARB:MPOLarity:MARKer4? .....	496
:SOURce:RADio:ARB:RETRigger ON OFF IMMediate .....	471
:SOURce:RADio:ARB:RETRigger? .....	471
:SOURce:RADio:ARB:RSCaling <real> .....	469
:SOURce:RADio:ARB:RSCaling? .....	469
:SOURce:RADio:ARB:SCLock:RATE <freq> .....	468
:SOURce:RADio:ARB:SCLock:RATE? .....	468
:SOURce:RADio:ARB:SEQuence[:MWAVEform] <filename>, <waveform1>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M 1M2M3M4 ALL, {<waveform2>, <reps>, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M1M2M4 M1M3M4 M2M3M4 M 1M2M3M4 ALL, } .....	479
:SOURce:RADio:ARB:SEQuence[:MWAVEform]? <filename> .....	479
:SOURce:RADio:ARB[:STATe] ON OFF 1 0 .....	461
:SOURce:RADio:ARB[:STATe]? .....	461
:SOURce:RADio:ARB:TRIGger:INITiate .....	503
:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 .....	473
:SOURce:RADio:ARB:TRIGger[:SOURce]? .....	473
:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE .....	470
:SOURce:RADio:ARB:TRIGger:TYPE? .....	470
:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE TRIGger RESet .....	470
:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]? .....	470
:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE CONTInuous .....	472
:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]? .....	472
:SOURce:RADio:ARB:WAVEform <string> .....	462

:SOURce:RADio:ARB:WAVeform? .....	462
:SOURce:RADio:BAND:LINK DOWN UP .....	458
:SOURce:RADio:BAND:LINK? .....	458
:SOURce:RADio:MPADapter:CORRection:ERRor? .....	506
:SOURce:SELF:TEST[:ALL] .....	547
*SRE <integer> .....	109
*SRE? .....	109
*STB? .....	110
:SYSTem:APPLication:CATalog[:NAME]? .....	384
:SYSTem:APPLication:CATalog[:NAME]:COUNt? .....	384
:SYSTem:APPLication:CATalog:OPTion? <model> .....	385
:SYSTem:APPLication:CATalog:REVision? <model> .....	385
:SYSTem:APPLication[:CURRent][:NAME]? .....	383
:SYSTem:APPLication[:CURRent]:OPTion? .....	384
:SYSTem:APPLication[:CURRent]:REVision? .....	383
:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRes <integer> .....	211
:SYSTem:COMMunicate:GPIB[1][:SELF]:ADDRes? .....	211
:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTRoller[:ENABle] ON OFF 0 1 .....	211
:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTRoller[:ENABle]? .....	211
:SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF ON 0 1 .....	214
:SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle? .....	214
:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF ON 0 1 .....	214
:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle? .....	214
:SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTRol? .....	215
:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF ON 0 1 .....	213
:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle? .....	213
:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF ON 0 1 .....	213
:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle? .....	213
:SYSTem:COMMunicate:USB:CONNection? .....	217
:SYSTem:COMMunicate:USB:PACKets? .....	218
:SYSTem:COMMunicate:USB:STATus? .....	218
:SYSTem:CONFiGure[:SYSTem]? .....	160
:SYSTem:CSYStem? .....	160
:SYSTem:DATE “<year>,<month>,<day>” .....	239

:SYSTem:DATE? .....	239
:SYSTem:DEFault [ALL] ALIGn INPut MISC MODEs PON .....	219
:SYSTem:ERRor[:NEXT]? .....	156
:SYSTem:ERRor:OVERload[:STATe] 0 1 OFF ON .....	158
:SYSTem:ERRor:VERBoSe OFF ON 0 1 .....	158
:SYSTem:ERRor:VERBoSe? .....	158
:SYSTem:HELp:HEADers? .....	239
:SYSTem:HID? .....	225
:SYSTem:IDN <string> .....	216
:SYSTem:IDN? .....	216
:SYSTem:KLOCK OFF ON 0 1 .....	238
:SYSTem:KLOCK? .....	238
:SYSTem:LIcense:EXTernal:LIST? .....	547
:SYSTem:LIcense[:FPACK]:WAVEform:ADD <string> .....	488
:SYSTem:LIcense[:FPACK]:WAVEform:CLEar <int> .....	491
:SYSTem:LIcense[:FPACK]:WAVEform:FREE? .....	492
:SYSTem:LIcense[:FPACK]:WAVEform:LOCK <int> .....	491
:SYSTem:LIcense[:FPACK]:WAVEform:NAME? <int> .....	493
:SYSTem:LIcense[:FPACK]:WAVEform:REPLace <int>, <string> .....	489
:SYSTem:LIcense[:FPACK]:WAVEform:STATus? <int> .....	492
:SYSTem:LIcense[:FPACK]:WAVEform:UID? <int> .....	493
:SYSTem:LIcense[:FPACK]:WAVEform:USED? .....	493
:SYSTem:LIcense:LIST:DETail? .....	548
:SYSTem:LKEY <"OptionInfo">, <"LicenseInfo"> .....	224
:SYSTem:LKEY? <"OptionInfo"> .....	225
:SYSTem:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo"> .....	224
:SYSTem:LKEY:LIST? .....	225
:SYSTem:LKEY:WAVEform:ADD <string> .....	488
:SYSTem:LKEY:WAVEform:CLEar <int> .....	491
:SYSTem:LKEY:WAVEform:FREE? .....	492
:SYSTem:LKEY:WAVEform:LOCK <int> .....	491
:SYSTem:LKEY:WAVEform:NAME? <int> .....	493
:SYSTem:LKEY:WAVEform:REPLace <int>, <string> .....	489
:SYSTem:LKEY:WAVEform:STATus? <int> .....	492

:SYSTem:LKEY:WAVeform:UID? <int> . . . . .	493
:SYSTem:LKEY:WAVeform:USED?. . . . .	493
:SYSTem:MRELay:COUnT?. . . . .	228
:SYSTem:OPTions? . . . . .	238
:SYSTem:PDOWn [NORMal FORCe] . . . . .	238
:SYSTem:PON:APPLication:LLISt <string of INSTrument:SElect names>. . . . .	168
:SYSTem:PON:APPLication:LLISt?. . . . .	168
:SYSTem:PON:APPLication:VMEMory[:AVAILable]? . . . . .	169
:SYSTem:PON:APPLication:VMEMory:TOTal? . . . . .	169
:SYSTem:PON:APPLication:VMEMory:USED?. . . . .	169
:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SElect name> . . . . .	169
:SYSTem:PON:ETIME?. . . . .	229
:SYSTem:PON:MODE SA BASIC ADEMOD NFIGURE PNOISE CDMA2K TDSCD- MA VSA VSA89601 WCDMA WIMAXOFDMA . . . . .	164
:SYSTem:PON:MODE? . . . . .	164
:SYSTem:PON:TIME? . . . . .	184
:SYSTem:PON:TYPE MODE USER LAST . . . . .	162
:SYSTem:PON:TYPE? . . . . .	162
:SYSTem:PRESet. . . . .	118
:SYSTem:PRESet:TYPE FACTory MODE USER . . . . .	121
:SYSTem:PRESet:TYPE? . . . . .	121
:SYSTem:PRESet:USER . . . . .	242
:SYSTem:PRESet:USER:ALL . . . . .	243
:SYSTem:PRESet:USER:SAVE . . . . .	243
:SYSTem:PRINt:THEMe TDColor TDMonochrome FCOLOR FMONochrome. . . . .	115
:SYSTem:PRINt:THEMe?. . . . .	115
:SYSTem:PUP:PROCCess . . . . .	167
:SYSTem:SHOW OFF ERRor SYSTem HARDware LXI HWStatistcs ALIGNment SOFTware CAPPLication . . . . .	155
:SYSTem:SHOW? . . . . .	155
:SYSTem:TEMPerature:HEXTreme? . . . . .	228
:SYSTem:TEMPerature:LEXTreme? . . . . .	228
:SYSTem:TEST:WCTS:[ALL] . . . . .	230
:SYSTem:TEST:WCTS:FEC . . . . .	231
:SYSTem:TEST:WCTS:FEC:RESult?. . . . .	235

:SYSTem:TEST:WCTS:MPADapter	230
:SYSTem:TEST:WCTS:MPADapter:RESult?	234
:SYSTem:TEST:WCTS:SHOW:RESult FEC	234
:SYSTem:TEST:WCTS:SHOW:RESult MPADapter	233
:SYSTem:TEST:WCTS:SHOW:RESult SOURce	232
:SYSTem:TEST:WCTS:SOURce	230
:SYSTem:TEST:WCTS:SOURce:RESult?	233
:SYSTem:TIME "<hour>,<minute>,<second>"	240
:SYSTem:TIME?	240
:SYSTem:VERSion?	239
*TRG	110
:TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTernal1 EXTernal2 IMMediate IQMag IDEMod QDE-Mod IINPut QINPut AIQMag	563
:TRIGger:<measurement>[:SEQuence]:IQ:SOURce?	563
:TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1 EXTernal2 IMMediate LINE FRAME RF-Burst VIDeo IF ALARm LAN TV	562
:TRIGger:<measurement>[:SEQuence]:RF:SOURce?	562
:TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1 EXTernal2 IMMediate LINE FRAME RFBurst VIDeo IF ALARm LAN IQMag IDEMod QDEMod IINPut QINPut AIQMag TV	557
:TRIGger:<measurement>[:SEQuence]:SOURce?	557
:TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut HSWP MEASuring MAIN GATE GTRigger OEV-en SPOint SSWeep SSETtled S1Marker S2Marker S3Marker S4Marker OFF	342
:TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut?	342
:TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut:POLarity POSitive NEGative	343
:TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut:POLarity?	343
:TRIGger[:SEQuence]:AIQMag:BANDwidth <freq>	601
:TRIGger[:SEQuence]:AIQMag:BANDwidth?	601
:TRIGger[:SEQuence]:AIQMag:CENTer <freq>	600
:TRIGger[:SEQuence]:AIQMag:CENTer?	600
:TRIGger[:SEQuence]:AIQMag:DELay <time>	600
:TRIGger[:SEQuence]:AIQMag:DELay?	600
:TRIGger[:SEQuence]:AIQMag:DELay:STATe OFF ON 0 1	600
:TRIGger[:SEQuence]:AIQMag:DELay:STATe?	600
:TRIGger[:SEQuence]:AIQMag:LEVel <ampl >	599
:TRIGger[:SEQuence]:AIQMag:LEVel?	599

:TRIGger[:SEQuence]:AIQMag:SLOPe POSitive   NEGative	599
:TRIGger[:SEQuence]:AIQMag:SLOPe?	599
:TRIGger[:SEQuence]:ATRigger <time>	607
:TRIGger[:SEQuence]:ATRigger?	607
:TRIGger[:SEQuence]:ATRigger:STATe OFF ON 0 1	607
:TRIGger[:SEQuence]:ATRigger:STATe?	607
:TRIGger[:SEQuence]:DELay <time>	569
:TRIGger[:SEQuence]:DELay?	569
:TRIGger[:SEQuence]:DELay:STATe OFF ON 0 1	569
:TRIGger[:SEQuence]:DELay:STATe?	569
:TRIGger[:SEQuence]:EXTernal1:DELay <time>	574
:TRIGger[:SEQuence]:EXTernal1:DELay?	574
:TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation OFF ON 0 1	574
:TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation?	574
:TRIGger[:SEQuence]:EXTernal1:DELay:STATe OFF ON 0 1	574
:TRIGger[:SEQuence]:EXTernal1:DELay:STATe?	574
:TRIGger[:SEQuence]:EXTernal1:LEVel <level>	572
:TRIGger[:SEQuence]:EXTernal1:LEVel?	572
:TRIGger[:SEQuence]:EXTernal1:SLOPe POSitive NEGative	573
:TRIGger[:SEQuence]:EXTernal1:SLOPe?	573
:TRIGger[:SEQuence]:EXTernal2:DELay <time>	577
:TRIGger[:SEQuence]:EXTernal2:DELay?	577
:TRIGger[:SEQuence]:EXTernal2:DELay:COMPensation OFF ON 0 1	577
:TRIGger[:SEQuence]:EXTernal2:DELay:COMPensation?	577
:TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF ON 0 1	577
:TRIGger[:SEQuence]:EXTernal2:DELay:STATe?	577
:TRIGger[:SEQuence]:EXTernal2:LEVel	576
:TRIGger[:SEQuence]:EXTernal2:LEVel?	576
:TRIGger[:SEQuence]:EXTernal2:SLOPe POSitive NEGative	576
:TRIGger[:SEQuence]:EXTernal2:SLOPe?	576
:TRIGger[:SEQuence]:FRAMe:ADJust <time>	586
:TRIGger[:SEQuence]:FRAMe:DELay <time>	590
:TRIGger[:SEQuence]:FRAMe:DELay?	590
:TRIGger[:SEQuence]:FRAMe:DELay:STATe OFF ON 0 1	590



:TRIGger[:SEquence]:FRAMe:DELay:STATe?	590
:TRIGger[:SEquence]:FRAMe:OFFSet <time>	585
:TRIGger[:SEquence]:FRAMe:OFFSet?	585
:TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet	587
:TRIGger[:SEquence]:FRAMe:PERiod <time>	584
:TRIGger[:SEquence]:FRAMe:PERiod?	584
:TRIGger[:SEquence]:FRAMe:SYNC EXTernal1 EXTernal2 RFBurst OFF.	588
:TRIGger[:SEquence]:FRAMe:SYNC?	588
:TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff <time>	591
:TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff?	591
:TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe OFF ON 0 1.	591
:TRIGger[:SEquence]:FRAMe:SYNC:HOLDoff:STATe?	591
:TRIGger[:SEquence]:HOLDoff <time>	608
:TRIGger[:SEquence]:HOLDoff?	608
:TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1.	608
:TRIGger[:SEquence]:HOLDoff:STATe?	608
:TRIGger[:SEquence]:HOLDoff:TYPE NORMAl ABOVe BELow	609
:TRIGger[:SEquence]:HOLDoff:TYPE?	609
:TRIGger[:SEquence]:IDEMod:DELay <time>	594
:TRIGger[:SEquence]:IDEMod:DELay?	594
:TRIGger[:SEquence]:IDEMod:DELay:STATe OFF ON 0 1	594
:TRIGger[:SEquence]:IDEMod:DELay:STATe?	594
:TRIGger[:SEquence]:IDEMod:LEVel <voltage>	593
:TRIGger[:SEquence]:IDEMod:LEVel?	593
:TRIGger[:SEquence]:IDEMod:SLOPe POSitive   NEGative	594
:TRIGger[:SEquence]:IDEMod:SLOPe?	594
:TRIGger[:SEquence]:IINPut:DELay <time>.	597
:TRIGger[:SEquence]:IINPut:DELay?	597
:TRIGger[:SEquence]:IINPut:DELay:STATe OFF ON 0 1.	597
:TRIGger[:SEquence]:IINPut:DELay:STATe?	597
:TRIGger[:SEquence]:IINPut:LEVel <voltage>	596
:TRIGger[:SEquence]:IINPut:LEVel?.	596
:TRIGger[:SEquence]:IINPut:SLOPe POSitive   NEGative.	596
:TRIGger[:SEquence]:IINPut:SLOPe?	596

:TRIGger[:SEQuence]:IQMag:DELAy <time> . . . . .	592
:TRIGger[:SEQuence]:IQMag:DELAy? . . . . .	592
:TRIGger[:SEQuence]:IQMag:DELAy:STATe OFF ON 0 1 . . . . .	592
:TRIGger[:SEQuence]:IQMag:DELAy:STATe? . . . . .	592
:TRIGger[:SEQuence]:IQMag:LEVel <ampl >. . . . .	592
:TRIGger[:SEQuence]:IQMag:LEVel? . . . . .	592
:TRIGger[:SEQuence]:IQMag:SLOPe POSitive   NEGative . . . . .	592
:TRIGger[:SEQuence]:IQMag:SLOPe? . . . . .	592
:TRIGger[:SEQuence]:LINE:DELAy <time> . . . . .	571
:TRIGger[:SEQuence]:LINE:DELAy? . . . . .	571
:TRIGger[:SEQuence]:LINE:DELAy:STATe OFF ON 0 1 . . . . .	571
:TRIGger[:SEQuence]:LINE:DELAy:STATe? . . . . .	571
:TRIGger[:SEQuence]:LINE:SLOPe POSitive NEGative . . . . .	571
:TRIGger[:SEQuence]:LINE:SLOPe? . . . . .	571
:TRIGger[:SEQuence]:OFFSet <time> . . . . .	570
:TRIGger[:SEQuence]:OFFSet? . . . . .	570
:TRIGger[:SEQuence]:OFFSet:STATe OFF ON 0 1 . . . . .	570
:TRIGger[:SEQuence]:OFFSet:STATe? . . . . .	570
:TRIGger[:SEQuence]:QDEMod:DELAy <time> . . . . .	595
:TRIGger[:SEQuence]:QDEMod:DELAy? . . . . .	595
:TRIGger[:SEQuence]:QDEMod:DELAy:STATe OFF ON 0 1 . . . . .	595
:TRIGger[:SEQuence]:QDEMod:DELAy:STATe? . . . . .	595
:TRIGger[:SEQuence]:QDEMod:LEVel <voltage> . . . . .	595
:TRIGger[:SEQuence]:QDEMod:LEVel? . . . . .	595
:TRIGger[:SEQuence]:QDEMod:SLOPe POSitive   NEGative . . . . .	595
:TRIGger[:SEQuence]:QDEMod:SLOPe? . . . . .	595
:TRIGger[:SEQuence]:QINPut:DELAy <time>. . . . .	598
:TRIGger[:SEQuence]:QINPut:DELAy? . . . . .	598
:TRIGger[:SEQuence]:QINPut:DELAy:STATe OFF ON 0 1 . . . . .	598
:TRIGger[:SEQuence]:QINPut:DELAy:STATe? . . . . .	598
:TRIGger[:SEQuence]:QINPut:LEVel <voltage> . . . . .	597
:TRIGger[:SEQuence]:QINPut:LEVel? . . . . .	597
:TRIGger[:SEQuence]:QINPut:SLOPe POSitive   NEGative . . . . .	598
:TRIGger[:SEQuence]:QINPut:SLOPe? . . . . .	598

:TRIGger[:SEQuence]:RFBurst:DELAy <time> . . . . .	582
:TRIGger[:SEQuence]:RFBurst:DELAy? . . . . .	582
:TRIGger[:SEQuence]:RFBurst:DELAy:COMPensation OFF ON 0 1 . . . . .	582
:TRIGger[:SEQuence]:RFBurst:DELAy:COMPensation? . . . . .	582
:TRIGger[:SEQuence]:RFBurst:DELAy:STATe OFF ON 0 1 . . . . .	582
:TRIGger[:SEQuence]:RFBurst:DELAy:STATe? . . . . .	582
:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl> . . . . .	579
:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute? . . . . .	579
:TRIGger[:SEQuence]:RFBurst:LEVel:RELative <rel_ampl> . . . . .	580
:TRIGger[:SEQuence]:RFBurst:LEVel:RELative? . . . . .	580
:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE ABSolute RELative . . . . .	579
:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE? . . . . .	579
:TRIGger[:SEQuence]:RFBurst:SLOPe POSitive NEGative . . . . .	581
:TRIGger[:SEQuence]:RFBurst:SLOPe? . . . . .	581
:TRIGger[:SEQuence]:SLOPe POSitive NEGative . . . . .	568
:TRIGger[:SEQuence]:SLOPe? . . . . .	568
:TRIGger[:SEQuence]:TV:FMODE ENTire ODD EVEN . . . . .	603
:TRIGger[:SEQuence]:TV:FMODE? . . . . .	603
:TRIGger[:SEQuence]:TV:LINE <integer> . . . . .	602
:TRIGger[:SEQuence]:TV:LINE? . . . . .	602
:TRIGger[:SEQuence]:TV:STANdard MNTSc JNTSc NTSC443 MPAL BPAL NPAL CPAL PAL60 LSEC . . . . .	605
:TRIGger[:SEQuence]:TV:STANdard? . . . . .	605
:TRIGger[:SEQuence]:VIDeo:DELAy <time> . . . . .	568
:TRIGger[:SEQuence]:VIDeo:DELAy? . . . . .	568
:TRIGger[:SEQuence]:VIDeo:DELAy:STATe OFF ON 0 1 . . . . .	568
:TRIGger[:SEQuence]:VIDeo:DELAy:STATe? . . . . .	568
:TRIGger[:SEQuence]:VIDeo:LEVel <ampl> . . . . .	567
:TRIGger[:SEQuence]:VIDeo:LEVel? . . . . .	567
:TRIGger[:SEQuence]:VIDeo:SLOPe POSitive NEGative . . . . .	568
:TRIGger[:SEQuence]:VIDeo:SLOPe? . . . . .	568
*TST? . . . . .	110
*WAI . . . . .	111



---

# 1 Using Help

The online Help system is "context-sensitive", which means that the information displayed when you invoke the Help system depends on the selected instrument Mode, Measurement and key.

---

**NOTE** The instructions for using help are applicable to the instrument front-panel as well as a virtual front panel.

---

**TIP** To view help for any front-panel key or menu key, press that key while this Help Window is open.

To scroll any page vertically, press the **Down Arrow** or **Up Arrow** front-panel keys. To locate these keys, see [“Front Panel Keys used by the Help System” on page 41](#).

---

**NOTE** **E6607C:** When using the E6607C there is no instrument front-panel. Therefore, the PC mouse and monitor are required for instrument control through a virtual front panel (VFP). For ease in using the VFP, the PC keyboard is recommended.

---

## Structure of Help

See [“How Help is Organized” on page 38](#).

## Navigating Help

- If the instrument has an attached mouse, see [“Navigating Help with a Mouse” on page 45](#).
- If the instrument does not have an attached mouse, see [“Navigating Help Without a Mouse” on page 46](#).  
For specific details of how to navigate to topics, see [“Finding a Topic” on page 50](#).
- You can also copy the Help files to a separate computer and view them there. For details, see [“Viewing Help Files on a separate Computer” on page 53](#).

## Locating Other Documentation

See [“Other Help Resources” on page 55](#).

Key Path	Front-panel key
----------	-----------------

## How Help is Organized

This topic includes:

- “Help Contents Listing” on page 38
- “Key Descriptions for Each Measurement” on page 39
- “Key Information for Softkeys” on page 39
- “Common Measurement Functions” on page 40

### Help Contents Listing

The listing under the Contents tab in the Help Window includes a topic for each Front-panel key and each softkey, for each available measurement.

The Contents listing is split into several major sections, as shown below for the HTML Help version of the document. The structure of the PDF version is similar.



Help information is split between these sections as follows:

#### 1. Using Help

This section.

#### 2. Additional Documentation

Describes available documents for the test set, with links to allow you to download or open the files.

#### 3. About the Analyzer

Provides general information about the instrument.

#### 4. About this Mode or Measurement Application

Provides an overview of the currently-selected Measurement Application

#### 5. Programming the Test Set

Provides an overview of available programming information. Includes a list of all SCPI commands for the currently-selected Measurement Application.

## 6. System Functions

This section contains information for the following front-panel keys, which are listed in alphabetical order: **File, Preset, Print, Quick Save, Recall, Save, System, User Preset**.

The functions of these keys do not vary between measurements: they operate the same way, irrespective of which instrument measurement you have selected.

The sections for **Recall** and **Save** contain only cross-references to the respective sections in “[Common Measurement Functions](#)” on page 40, and are included here for convenience.

## 7. Measurement Functions

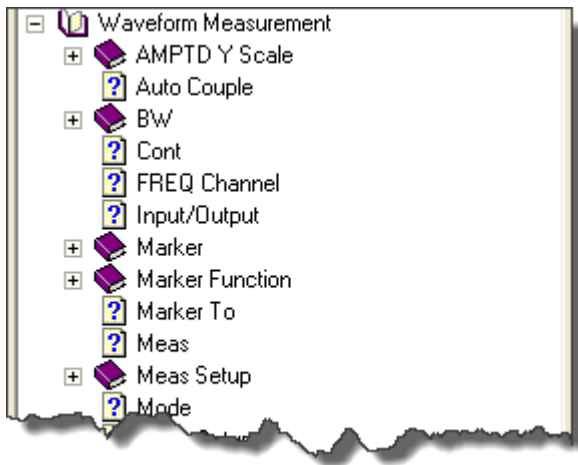
See “[Key Descriptions for Each Measurement](#)” on page 39 below.

## 8. Common Measurement Functions

See “[Common Measurement Functions](#)” on page 40 below.

### Key Descriptions for Each Measurement

The Contents section for each Measurement is sub-divided into topics for each front-panel key, in alphabetical order, as shown below.



When you expand any front-panel key section, you will see a listing of softkeys in the menu for that front-panel key (if there is a menu), plus any SCPI Remote Commands associated with the functionality, as described in “[Key Information for Softkeys](#)” on page 39 below.

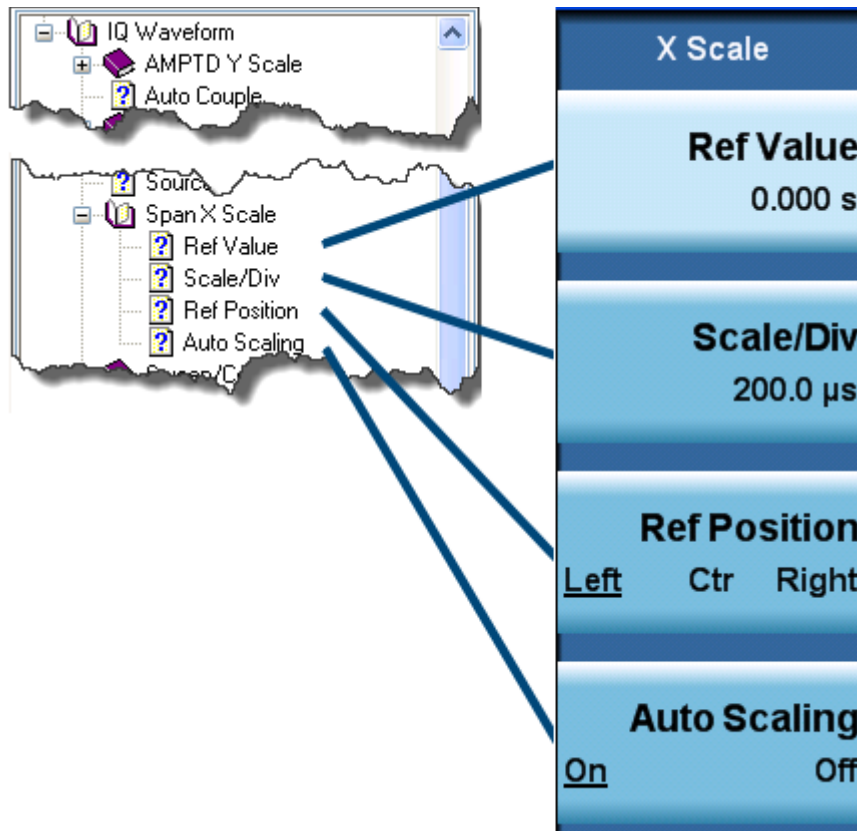
If you don’t see a topic for a front-panel key in the Measurement-specific section, then it is located in the System Functions section.

### Key Information for Softkeys

Information for each softkey that appears when you press a front-panel key (or a softkey with a submenu) is listed under the entry for each key.

The example below shows the submenu under the **SPAN X Scale** Front-panel key in the "Waveform"

Measurement, alongside the actual softkeys for that menu.



In these subsections, all softkeys are listed in the order they appear in their menu (that is, **not** in alphabetical order).

### Common Measurement Functions

This section groups together function and key information that is shared between measurements. However, there is a listing for every front-panel key and subkey in the [Key Descriptions for Each Measurement](#), so you will generally not need to refer to this section.

The key subsections are listed alphabetically.

---

**NOTE** The presence of a key or command description in this section indicates that it is available in more than one measurement. Its presence does **not** indicate that the functionality is necessarily available in all measurements.

---



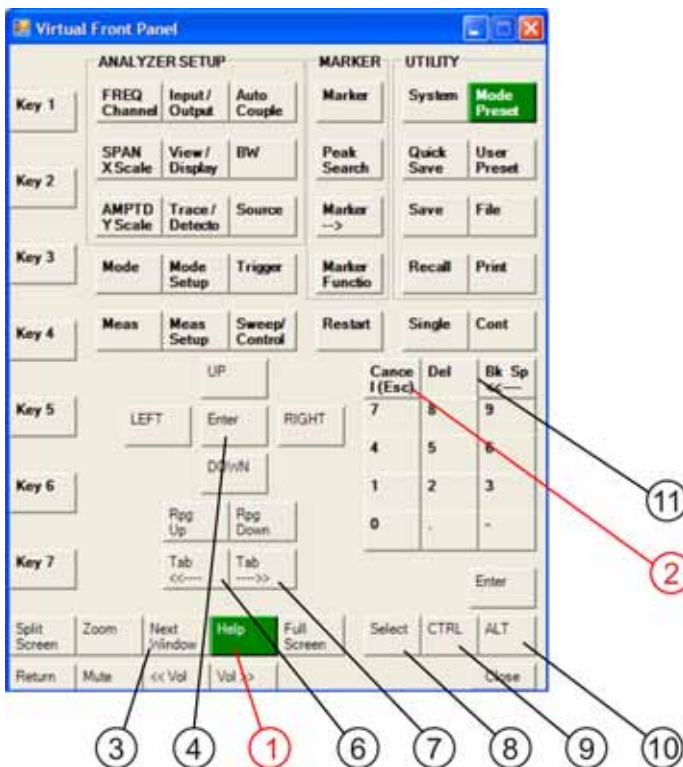
## Front Panel Keys used by the Help System

The interactive Help system uses the front-panel keys shown below.

### E6607A/B



### E6607C



## Using Help

### Front Panel Keys used by the Help System

Item		Description
#	Name	
1	Help Key	Opens Help (displaying the topic for the last key pressed).
2	Cancel (Esc) Key	Exits Help.
3	Next Window Key	Changes the current window pane selection.
4	Arrow / Enter Keys	A central <b>Enter</b> key, surrounded by four directional arrow keys. Navigates within the Help system.
5	Knob	For future use.
6	Backward Tab Key	Moves between controls in the Help display.
7	Forward Tab Key	Moves between controls in the Help display.
8	Select / Space Key	Navigates within the Help system, in conjunction with other keys.
9	Ctrl Key	Navigates within the Help system, in conjunction with other keys. See <a href="#">“Navigating the Help Files” on page 43</a> .
10	Alt Key	Navigates within the Help system, in conjunction with other keys. See <a href="#">“Navigating the Help Files” on page 43</a> .
11	Bk Sp (Backspace) Key	Acts as a "Back" key when navigating the pages of the Help system.

---

## Navigating the Help Files

This topic includes:

- “Help Window Components” on page 43
- “Basic Help Window Operations” on page 44
- “Navigating Help with a Mouse” on page 45

### Help Window Components

The Help Window appears on top of, and to the left of, the measurement display. When Help is open, the instrument’s display appears as below.



#### 1. Application Title Bar

The instrument retains its current Mode and Measurement when Help is open, as shown in the Title Bar.

#### 2. Help Button Bar

These buttons provide shortcuts to frequently-used help functions, including printing.

#### 3. Help Navigation Pane Tabs

Click one of these tabs to display either the Table of Contents, Index, Search, or Favorites controls.

#### 4. Help Navigation Pane

#### 5. Help Topic Pane

#### 6. Previous Page and Next Page Buttons

Use these buttons to move to the previous or next page in the Help file.

#### 7. Application Softkey Menu

You can still see and use the current softkey menu when Help is open.

When Help is open, pressing a softkey displays Help for that softkey, but does **not** execute the softkey’s function.

## Basic Help Window Operations

This topic includes:

- “Opening Help” on page 44
- “Getting Help for a Specific Key” on page 44
- “Closing Help” on page 44
- “Viewing Help on Using Help” on page 44

For more Help window operations, see “Navigating Help Without a Mouse” on page 46.

To locate the keys mentioned in this section, see “Front Panel Keys used by the Help System” on page 41.

### Opening Help

To access the Help system, press the green **Help** key below the front panel display while an Agilent application is running.



Note that the softkey menu remains visible when Help is open.

### Getting Help for a Specific Key

- If Help **is** already open, press the desired key. The relevant Help topic appears.  
The function normally invoked by the key is **not** executed when the key is pressed with Help open.  
If you want to execute the key’s function, first close Help by pressing the **Cancel (Esc)** key (as described in “Closing Help” on page 44), then press the key, before opening Help again (if required).
- If Help is **not** already open, press the desired key (which executes the key’s function), then press the **Help** key to display the relevant Help page. Help is available for all softkeys, and for all the front-panel keys listed under the "System Functions" and "Measurement" sections.

For details of how to navigate within the panes of the Help window, see “Navigating the Help Files” on page 43.

### Closing Help

To close Help, and return to the measurement application, press the **Cancel (Esc)** key (depicted below).



### Viewing Help on Using Help

With the Help window open, press the green **Help** key a second time.

The "Using Help" page appears.

To exit Help on Using Help, press the **Bk Sp** key, or see “[Topic Pane Operations](#)” on page 48 for equivalent methods.



## Navigating Help with a Mouse

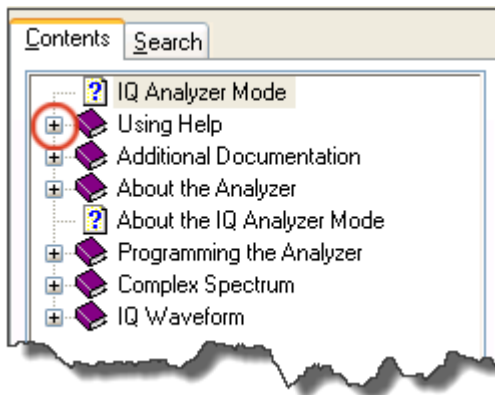
When Help is open, you can point-and-click to navigate, as you would when using Help for any Microsoft Windows computer application.

If you also have a keyboard attached to the instrument, you can use the Help system’s full-text search feature to locate help for any topic, by typing in a key name, a topic name, or any other desired text. See “[Searching for a Help Topic](#)” on page 46.

## Selecting a Topic from the Contents Listing

To select and display a topic, do the following:

- If necessary, press the green **Help** key on the Front Panel, as described in “[Opening Help](#)” on page 44, to open Help.
- Choose the desired topic from the list under the Contents Tab of the Navigation Pane, then click on the topic title to display the first page of the topic.
- To expand the tree and display a listing of subtopics (if any), click on the + icon to the left of the topic’s book icon, as shown below.

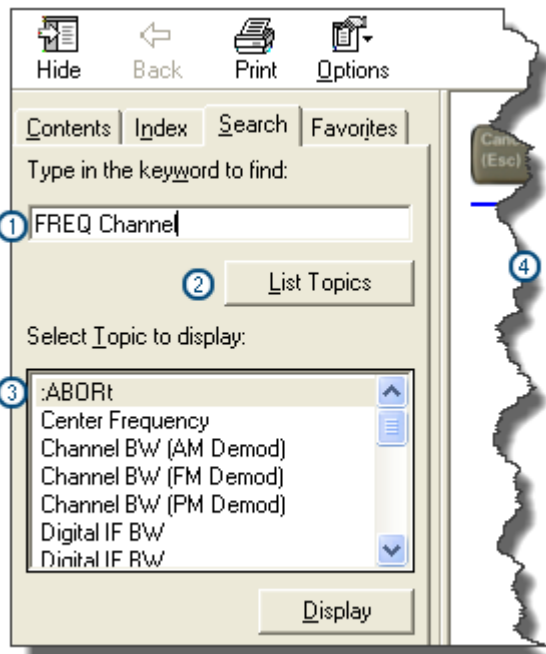


- To move to the next or previous page within a topic, click the **Next Page** or **Previous Page** keys (at the top right of the **Topic** Pane), as shown below.



## Searching for a Help Topic

Select the "Search" tab of the Help Navigation Pane, then use the following procedure:



1. Type the desired topic text into the Search edit box. Note that the text search is **not** case-sensitive.
2. Click on the **List Topics** button.
3. **Either:**
  - Double-click on the desired topic in the list,
  - Or:**
    - Click on the desired topic to select it, then click the **Display** button beneath the list.
4. The topic is displayed in the Topic Pane.

## Navigating Help Without a Mouse

Most features of the Help system can be accessed and navigated without attaching a mouse or keyboard to the instrument.

There are a few exceptions, as noted in [“Functions that cannot be used without a Mouse and Keyboard” on page 50.](#)

This topic includes:

- [“Next Window Key” on page 47](#)
- [“Contents Tab \(Navigation Pane\) Operations” on page 47](#)
- [“Topic Pane Operations” on page 48](#)
- [“Selecting a Hyperlink” on page 49](#)

- [“Finding a Topic” on page 50](#)

To locate all the keys mentioned in this section, see [“Front Panel Keys used by the Help System” on page 41](#).

### Next Window Key

- To toggle the focus between the Navigation Pane and the Topic Pane, press the **Next Window** key.

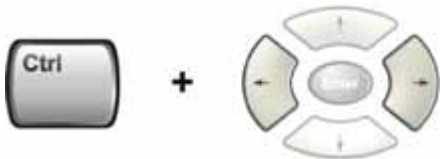


### Contents Tab (Navigation Pane) Operations

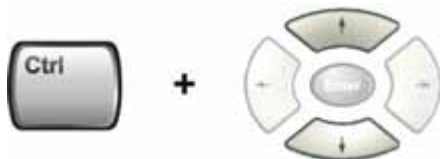
- To switch the active tab, hold down the **Ctrl** key, then press either the **Forward Tab** or **Backward Tab** key.



- To scroll **horizontally**, hold down the **Ctrl** key, then press either the **Left Arrow** or **Right Arrow** keys.



- To scroll **vertically**, hold down the **Ctrl** key, then press either the **Up Arrow** or **Down Arrow** keys.



- To scroll up or down the list of topics, press the **Up Arrow** or **Down Arrow** keys.



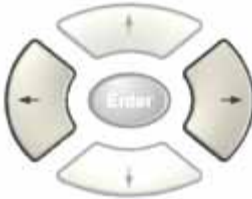
## Using Help

### Navigating the Help Files

- To display a selected topic in the Topic Pane, select it in the Contents listing, then press the **Enter** key.



- To expand or collapse a selected topic, press the **Right Arrow** or **Left Arrow** key.

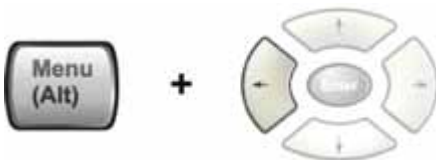


### Topic Pane Operations

- To scroll up or down within a topic, press either the **Up Arrow** key or **Down Arrow** key.



- To go **back**  
(that is, to display the previously-viewed topic), **either**:  
Hold down the **Alt** key, then press the **Left Arrow** key.



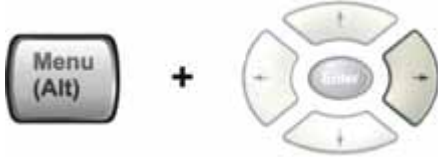
Or:

Press the **Bk Sp** key.





- To go **forward**, hold down the **Alt** key, then press the **Right Arrow** key.



(The "Forward" operation has no effect unless there have been previous "Back" operations.)

- To go to the next or previous page, use the **Forward Tab** or **Backward Tab** keys



to select the **Next Page** or **Previous Page** key



then press **Enter**.



- To print the currently displayed, topic, press the Front-panel **Print** key



## Selecting a Hyperlink

To select and follow a hyperlink on a Help page:.

1. Ensure that the focus is in the **Topic Pane**.

(If necessary, toggle the focus between the Navigation Pane and the Topic Pane by pressing the [Next Window Key](#).)

2. Move from link to link in the Topic Pane by pressing the **Forward Tab** and **Backward Tab** keys.



Links become highlighted upon selection.

## Using Help

### Navigating the Help Files

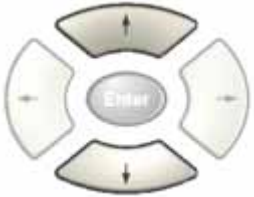
3. When you have selected the desired link, activate it by pressing the **Enter** key.



### Finding a Topic

To display a different Help topic by selecting it from the Contents tab of the Navigation Pane:

1. Ensure that the focus is in the Contents tab of the Navigation Pane.  
(If necessary, toggle the focus between the Navigation Pane and the Topic Pane, by pressing the [Next Window Key](#). Then press **Ctrl + Forward Tab** or **Backward Tab** to select the Contents tab.)
2. Move up or down the Contents list, by pressing the **Up Arrow** or **Down Arrow** keys.



Topics become highlighted upon selection.

3. Display the selected topic, by pressing the **Enter** key.



### Functions that cannot be used without a Mouse and Keyboard

The following parts of the HTML Help System **cannot** easily be used without attaching a mouse and keyboard to the instrument.

- The buttons in the Help Button Bar, consisting of: **Hide**, **Back**, **Print** and **Options**.
- The functionality of the Search Tab of the Navigation Pane.
- The functionality of the Favorites Tab of the Navigation Pane.

---

## Definition of Terms

Many special terms are used throughout this documentation. The table below provides brief definitions of commonly-used terms. Please refer to the "Getting Started Guide" for detailed explanations.

<b>Term</b>	<b>Meaning</b>
Default Unit	The default measurement unit of the setting.
Default Terminator	Indicates the units that will be attached to the numeric value that you have entered. This default will be used from the front panel, when you terminate your entry by pressing the <b>Enter</b> key, rather than selecting a units key. This default will be used remotely when you send the command without specifying any units after your value(s).
Dependencies/ Couplings	Some commands may be unavailable when other parameters are set in certain ways. If applicable, any such limitations are described here.
Example	Provides command examples using the indicated remote command syntax.
Factory Preset	Describes the function settings after a <b>Factory Preset</b> .
Key Path	The sequence of Front-panel keys that accesses the function or setting.
Knob Increment/Decrement	The numeric value of the minimum increment or decrement that is applied when turning the thumb wheel knob.
Max	The Maximum numerical value that the setting can take.
Min	The Minimum numerical value that the setting can take.
Meas Global	The functionality described is the same in all measurements.
Meas Local	The functionality described is only true for the measurement selected.
Mode Global	The functionality described is the same for all modes.
Preset	In some cases, a Preset operation changes the status of a parameter. If the operation of the key specified is modified by a Preset operation, the effect is described here.
Range	Describes the range of the smallest to largest values to which the function can be set. If you try to set a value below the minimum value, the instrument defaults to the minimum value. If you try to set a value above the maximum value, the instrument defaults to the maximum value.
Remote Command	Shows the syntax requirements for each SCPI command.
Remote Command Notes	Additional notes regarding Remote Commands.
Resolution	Specifies the smallest change that can be made to the numeric value of a parameter.
SCPI Status Bits/ OPC Dependencies	Pressing certain keys may affect one or more status bits. If applicable, details are given here.

<b>Term</b>	<b>Meaning</b>
State Saved	Indicates what happens to a particular function when the instrument state is saved (either to an external memory device or the internal D: drive). It also indicates whether the current settings of the function are maintained if the instrument is powered on or preset using <b>Power On Last State</b> or <b>User Preset</b> .

## Viewing Help Files on a separate Computer

You may want to view the help pages **without** having them appear on top of the instrument's screen.

Two separate Help files are available for each instrument Mode (or Measurement Application). The two files contain all the same help pages in different formats:

1. HTML Help (CHM) format.

These files are installed on the instrument's hard disk. To copy these files to another computer, see [“Copying the HTML Help \(CHM\) Files” on page 54](#) below.

2. Adobe Acrobat (PDF) format.

These files are called "Users & Programmers References". They are included on the Documentation CD supplied with the instrument, or may be downloaded from the Agilent web site.

For details of how to navigate PDF files, see [“Navigating Acrobat \(PDF\) Files” on page 55](#).

You can copy any of the CHM or PDF files to another computer, then open and view the help pages in the file on that computer.

Your choice of which file to copy and view may depend on what you want to do with the file (for example, whether you want to print it and read the paper copy, or view it on the computer).

The table below compares the relative advantages of the two formats:

Format Type	<b>HTML Help</b> Format ( <b>CHM</b> Files)	<b>Acrobat</b> Format ( <b>PDF</b> Files)
File Extension	CHM	PDF
Software Required to view file	Microsoft Windows operating system only, with Microsoft Internet Explorer installed.	Free Adobe Reader software can be downloaded for many operating systems, including: Microsoft Windows, Macintosh, Linux, Solaris.
Full Text Search?	Yes	Yes
Printable?	Yes, but with limited control.	Yes. Full print control. See <a href="#">“Printing Acrobat Files” on page 56</a> .
Printable Table of Contents?	No	Yes
Navigable without a Mouse and Keyboard?	Yes, but with some loss of functionality.	No
Has Page Numbers?	No	Yes
Context-Sensitive Display?	Yes, when viewed using the X-Series Analyzer application window.	No
Indexed?	Yes	No
Active Hyperlinks?	Yes	Yes

### Copying the HTML Help (CHM) Files

You can find the HTML Help (.chm) files:

- **Either**, on the documentation CD that came with the instrument,
- **Or**, in a special directory on the instrument's hard disk. The directory path is:

C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help

---

**NOTE**                      You can open and view the HTML Help files only on a computer that has Microsoft Windows and Microsoft Internet Explorer installed.

---

---

## Other Help Resources

- All available documentation is present either on the test set hard disk, either as HTML Help or Acrobat PDF files, or may be downloaded from the Agilent web site.
- Many of the supporting documents use the Adobe Acrobat (PDF) file format. You can view PDF files using the pre-installed Adobe Reader software.

The Adobe Reader user interface differs from the Windows Help interface. For full details, see [“Navigating Acrobat \(PDF\) Files” on page 55](#) and [“Printing Acrobat Files” on page 56](#).

### Navigating Acrobat (PDF) Files

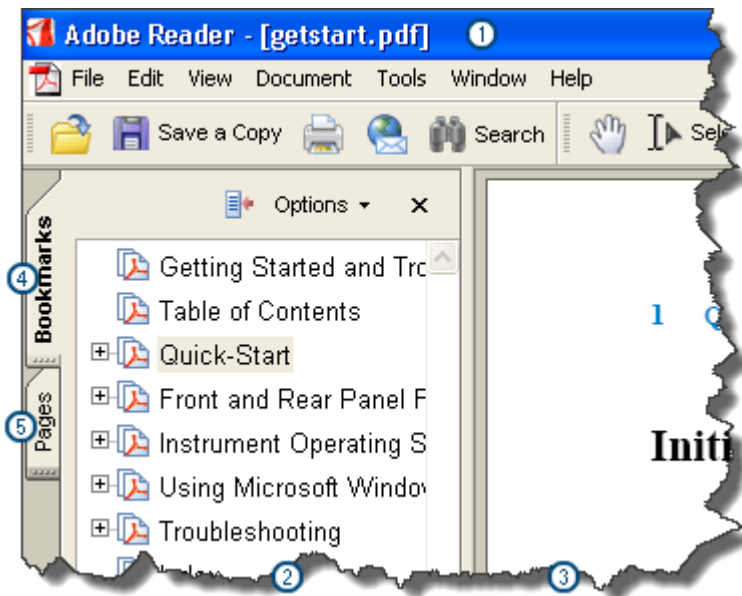
---

**IMPORTANT** To navigate PDF files effectively, you must attach a mouse and keyboard to the instrument. If it is not possible to attach a mouse and keyboard to the instrument, you should transfer the PDF file to a separate computer, then open it on that computer.

---

### Acrobat Reader Window

When a PDF file is open and being viewed, the instrument’s display shows the Adobe Acrobat Reader Window, which has the following features.



1. Adobe Acrobat Reader Window title bar
2. Navigation Pane
3. Document Pane
4. Navigation Pane: Bookmarks tab

5. Navigation Pane: Pages tab

The Navigation Pane also has tabs labeled Attachments and Comments, but, typically, PDF files for Agilent X-Series Analyzers contain useful content only under the Bookmarks and Pages Tabs.

Unlike the HTML Help Window, the Acrobat Reader Window is **not** embedded in the instrument's Application window, but can be resized, moved and closed independently of the Application window.


## Printing Acrobat Files

---

<b>NOTE</b>	The driver for the appropriate printer must be installed on the instrument's hard disk before any file can be printed. For driver installation instructions, see the printer manufacturer's documentation.
-------------	--

---

To print all or part of an open Acrobat file from the instrument, do the following.

1. **Either,**
  - a. click on the Print icon in the Acrobat Reader toolbar,  
The image shows a standard printer icon, which is a small graphic of a printer with a sheet of paper coming out of the tray. It is rendered in a light blue and grey color scheme with a slight drop shadow.
  - b. **or,** select File > Print from the menu.
2. The Acrobat Reader Print dialog opens.
3. Choose the desired options within the Print dialog, then click OK to print (or click Cancel to cancel printing).

---

<b>NOTE</b>	Clicking the Properties button within the Print dialog opens a window containing controls that are specific to the printer model installed. Check the printer manufacturer's documentation for details of these capabilities.
-------------	---

---



---

## 2

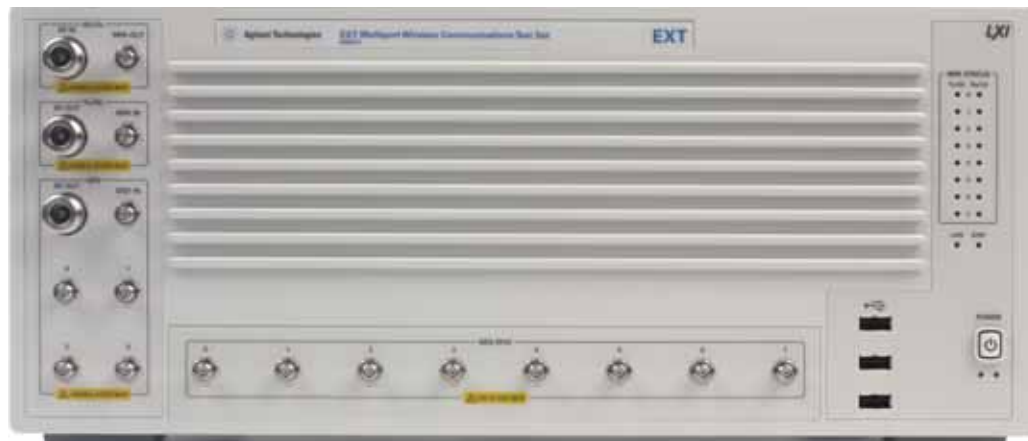
# About the Test Set

The EXT Wireless Communication Test Set is a one-box tester, combining a vector signal analyzer with a vector signal source in a single instrument. The analyzer and source are each provided with a dedicated list sequencer, for rapid execution of a series of stimulus or measurement steps. The test set is optimized for production testing (including calibration and verification) of wireless mobile devices.

### E6607A/B



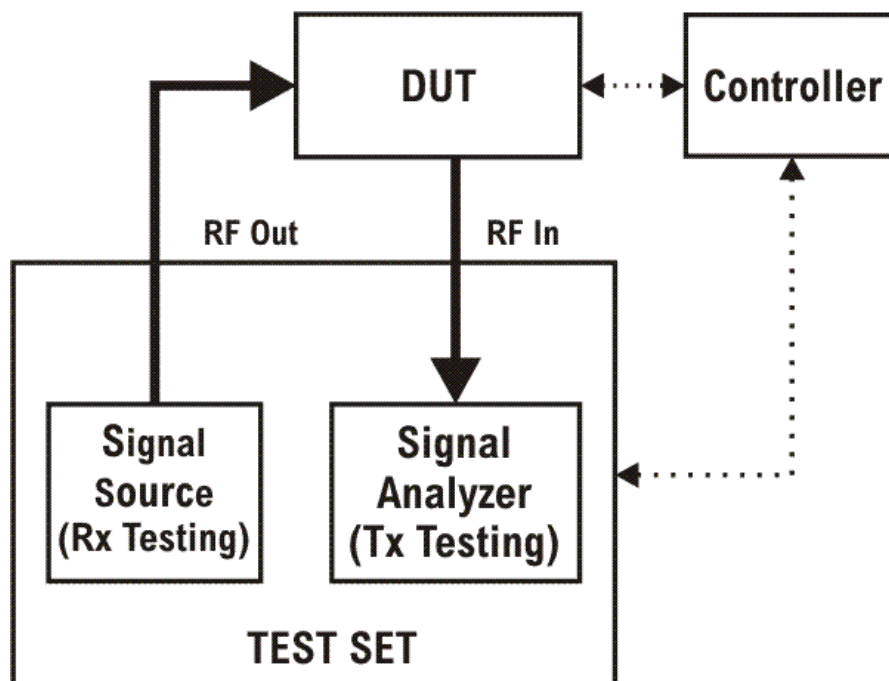
### E6607C



## How the Test Set Is Used

The E6607A/B/C Wireless Communication Test Set is typically used in a production test environment where mobile devices are being calibrated and verified in a “non-signalling” mode (that is, in a mode of operation which does not involve call processing, and which relies instead on test functions which are built into the device under test).

The test controller communicates with both the DUT and the test set to coordinate Rx and Tx test operations and to collect test results. However, both the DUT and the test set perform their own independent operations during the process (for example, internal test routines run by the DUT, and sequences run by the test set).



### Receiver Testing

The source within the test set can supply test signals to the DUT for the purpose of receiver testing. Typically the source plays a waveform which has been downloaded to the test set (for example, a .wfm file generated using Agilent Signal Studio or some other application). In receiver testing, the test set is providing the necessary stimulus for measurements which are performed by the DUT itself, using its built-in self-test capabilities. The test results (bit error rate, for example) come back to the controller from the DUT rather than from the test set.

### Transmitter Testing

The signal analyzer within the test set receives and measures signals from the DUT for the purpose of transmitter testing. Because the DUT is not being operated in a call-processing mode, the measurements

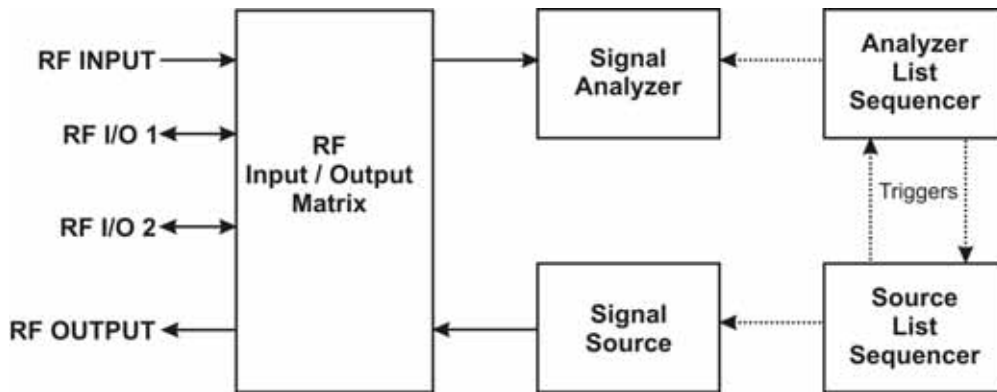
made by the analyzer pertain to signal quality (power, modulation accuracy, and so on) rather than to the data content of the transmitted signal. In transmitter testing, the measurement results come back to the controller from the test set rather than the DUT.

### Hardware Elements of the Test Set

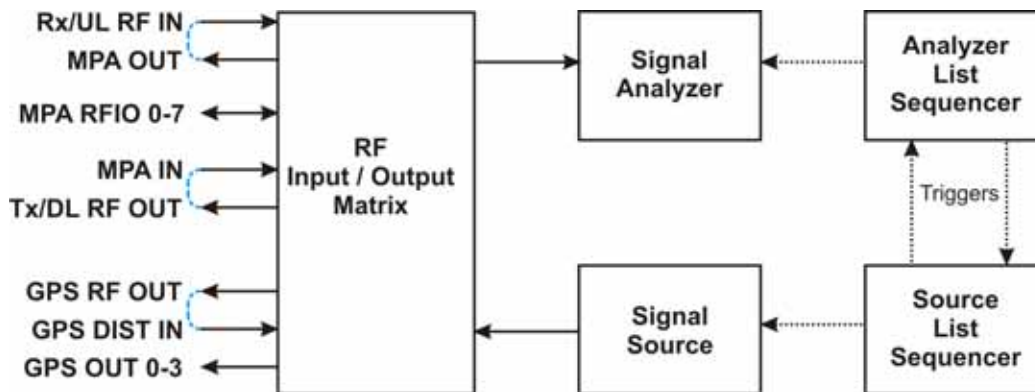
The test set includes a source and analyzer, which operate independently. You can control either of them directly (using front panel keys, the virtual front panel, or remote commands) or indirectly (by running a sequence, in which case the source and analyzer are operated by their list sequencers).

The source list sequencer and analyzer list sequencer function independently; however, you can coordinate their actions by setting them up to exchange trigger signals.

#### E6607A/B

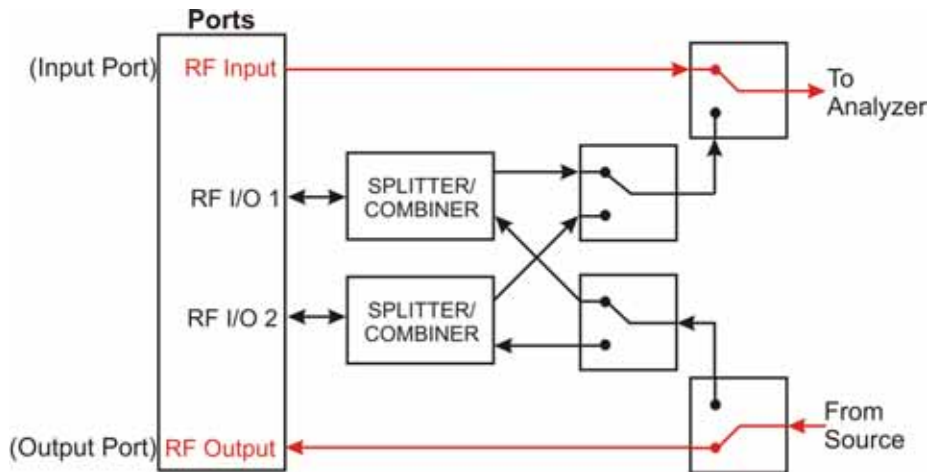


#### E6607C



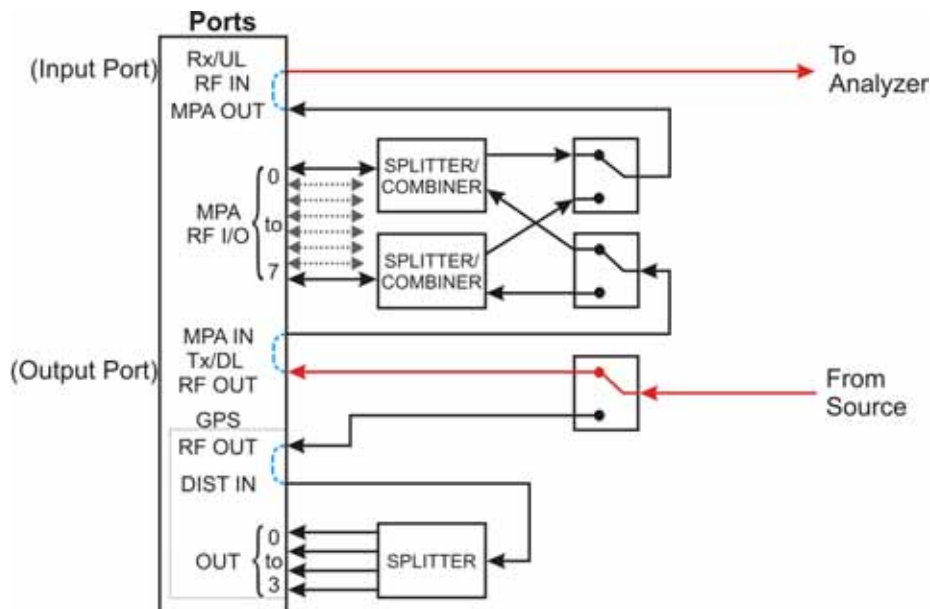
### E6607A/B

The source and analyzer communicate with the device under test through an RF input/output matrix with four ports. Two of the ports have a fixed direction: an RF Output port which can be connected only to the source, and an RF Input port which can be connected only to the analyzer.



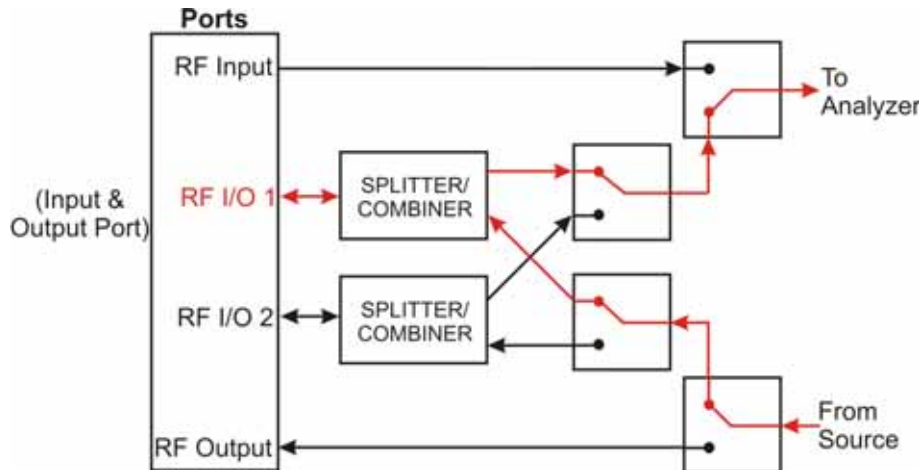
### E6607C

The source and analyzer communicate with the device under test through an RF input/output matrix with multiple ports. Two of the ports have a fixed direction: an Tx/DL RF Out port which can be connected only to the source, and an Rx/UL RF In port which can be connected only to the analyzer.



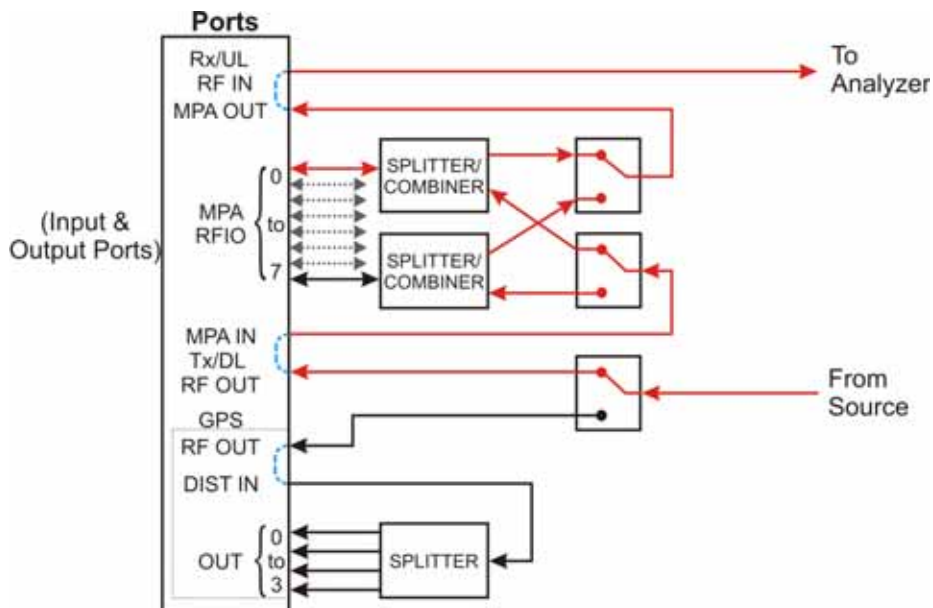
### E6607A/B

The remaining two ports (the RF I/O ports) have bi-directional capability; they can be connected (through a splitter/combiner) to the source, to the analyzer, or to both at once. For example, in testing a mobile phone, both the source and the analyzer might be set up to interface with the device through the RF I/O 1 port, employing different frequencies for the transmit and receive signals.



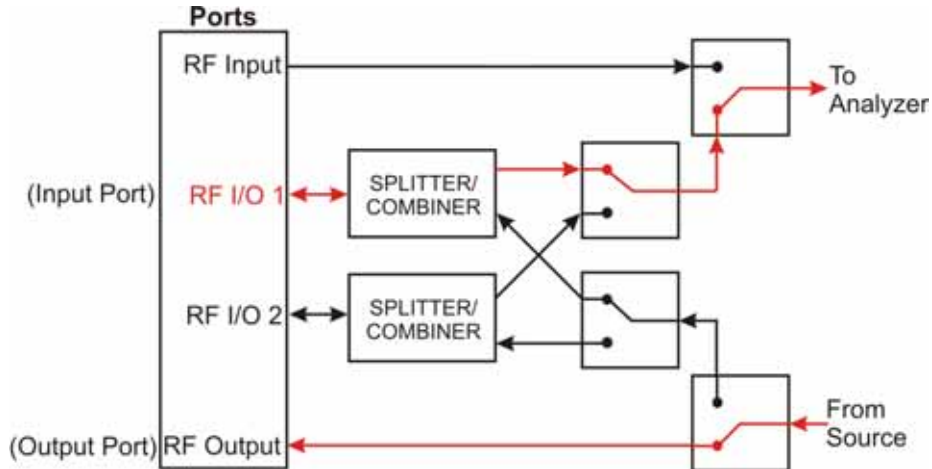
### E6607C

The eight MPA RFIO ports have bi-directional capability; they can be connected (through internal splitter/combiners) to the source, to the analyzer, or to both at once. For example, in testing a mobile phone, both the source and the analyzer might be set up to interface with the device through the MPA RFIO 0 port, employing different frequencies for the transmit and receive signals.



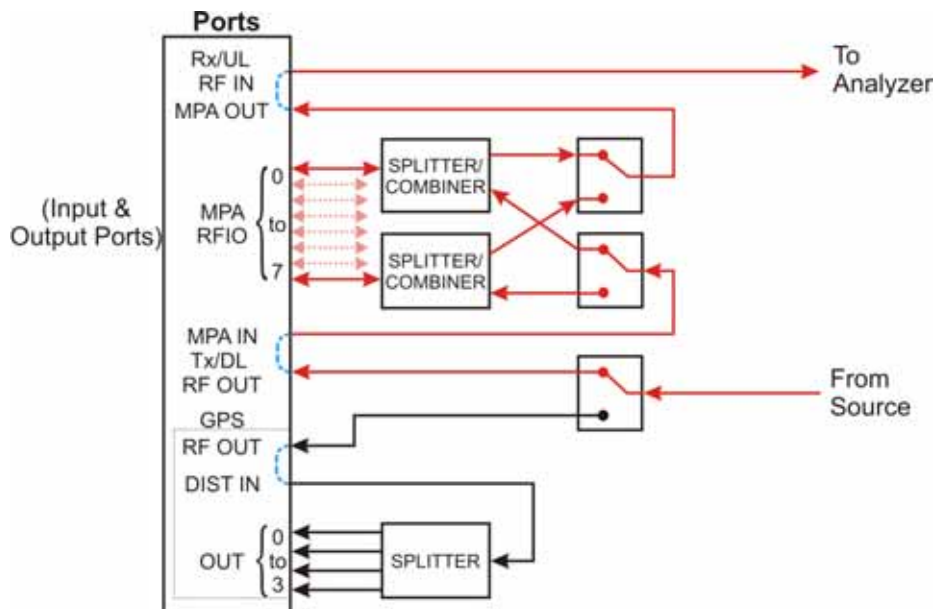
**E6607A/B**

The RF I/O ports can also be used in a single direction, as in the case illustrated below, where RF I/O 1 serves as the input port, and RF Output serves as the output port.



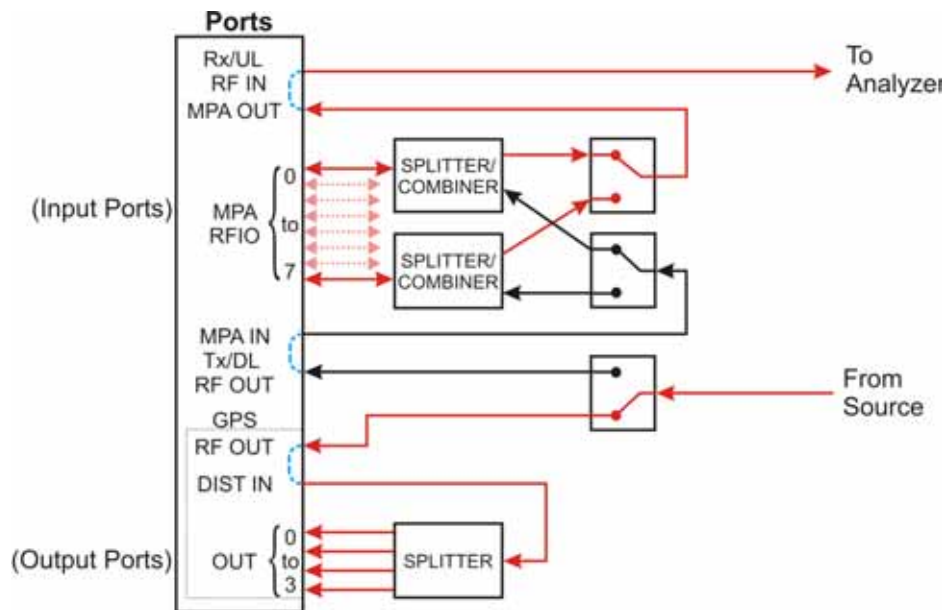
**E6607C**

The MPA RFIO ports can also be used in a single direction, as in the case illustrated below. In this case, the MPA RFIO 0-7 ports are paired and each pair is connected to a single DUT. In each pair, one serves as the input port and the other serves as the output port. This provides for a total of 4 DUTs connected to a single test set at the same time.



### E6607C

When making GPS tests, the GPS OUT ports are fixed direction and are connected only to the source, as in the case illustrated below. In this case, four of the MPA RFIO 0-7 ports are paired with the four GPS OUT ports and each pair is connected to a single DUT. In each pair, the MPA RFIO port serves as the input port and the GPS OUT port serves as the output port. This provides for a total of 4 DUTs connected to a single test set at the same time.



### E6607A/B

For any sequence that the test set runs, a single port must be designated the input port, and a single port must be designated the output port. These port assignments cannot be changed during a sequence. The rules for port assignments are:

- Only one port at a time can be the input port, and it must be one of the following: RF Input, RF I/O 1, or RF I/O 2.
- Only one port at a time can be the output port, and it must be one of the following: RF Output, RF I/O 1, or RF I/O 2.
- RF I/O 1 can serve as both the input port and the output port simultaneously, but in that case it must be the only port in use.
- RF I/O 2 can serve as both the input port and the output port simultaneously, but in that case it must be the only port in use.

Although the two RF I/O ports cannot both be used bi-directionally at the same time, having two bi-directional ports offers practical advantages in reducing the impact of fixturing delays. For example, you can set up two sequences which are exactly alike, except that one of them designates RF I/O 1 as the input and output port, while the other sequence uses RF I/O 2 in the same way. During testing, the two sequences are run alternatively; a DUT is tested on one port while the next DUT is being fixtured on the other port.

## E6607C

For any sequence that the test set runs using the MPA RFIO or GPS OUT ports, a single MPA RFIO port must be designated the input port. For the output signal to the DUT, any of the MPA RFIO ports can be designated as output ports. Up to eight of the MPA RFIO ports can provide an output signal at one time. (However, if the MPA RFIO ports are used in input/output pairs, this will limit the number of available output ports to four.) These port assignments cannot be changed during a sequence. The rules for port assignments are:

- Only one port at a time can be the input port, and it must be one of the following: Rx/UL RF IN or any one of MPA RFIO 0-7.
- MPA RFIO 0-7 serve as both input ports or output ports when the MPA RF OUT is connected to the MPA IN.
- GPS 0-3 serve as output ports simultaneously when the GPS OUT is connected to the Dist .

## Software Elements of the Test Set

The test set firmware, which runs within the Windows XP Pro operating system, controls the source and analyzer, and provides access to a variety of licensed measurement applications which are available to be installed on the test set.

The basic test set includes licenses for two applications: the IQ Analyzer Mode (U9060A) and the Sequence Analyzer Mode (U9065A). Several other applications are available for installation. Many of the measurements which are included in these applications can be run from within the Sequence Analyzer mode, and not just in the native mode of the measurement. The table below shows all the available applications, and the measurements they include. Measurements which can be run from within the Sequence Analyzer mode are marked “available to sequencer” in the table.

**Table 2-1 Applications and Measurements in the Test Set**

Application	Measurement
IQ Analyzer Mode (U9060A)	<ul style="list-style-type: none"> <li>• IQ Waveform</li> <li>• Complex Spectrum</li> </ul>
Analog Demodulation Mode (U9063A)	<ul style="list-style-type: none"> <li>• Amplitude Modulation</li> <li>• Frequency Modulation</li> <li>• Phase Modulation</li> </ul>
Sequence Analyzer Mode (U9065A)	<ul style="list-style-type: none"> <li>• Basic measurements: Power, Phase &amp; Frequency, Discrete PAVT, IQ Data</li> <li>• List Sequencer</li> <li>• All application-specific measurements listed below that are marked “available to sequencer”.</li> </ul>



**Table 2-1 Applications and Measurements in the Test Set**

Application	Measurement
GSM/EDGE Mode (U9071A)	<ul style="list-style-type: none"> <li>• Transmit Power, also known as Burst Power</li> <li>• Power Vs. Time, GSM &amp; Edge versions (available to sequencer)</li> <li>• GMSK Phase &amp; Frequency (available to sequencer)</li> <li>• Output RF Spectrum, GMSK &amp; EDGE versions (available to sequencer)</li> <li>• EDGE Error Vector Magnitude (available to sequencer)</li> </ul>
cdma2000 Mode (U9072A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Code Domain</li> <li>• ACP (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• Modulation Accuracy (available to sequencer)</li> <li>• QPSK Error Vector Magnitude (available to sequencer)</li> </ul>
W-CDMA/HSPA Mode (U9073A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Adjacent Channel Power (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• Code Domain (available to sequencer)</li> <li>• Modulation Accuracy (available to sequencer)</li> <li>• QPSK Error Vector Magnitude (available to sequencer)</li> <li>• Power Control (available to sequencer)</li> </ul>
“WiMAX” Mode (802.16 OFDMA, U9075A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Adjacent Channel Power</li> <li>• Spectrum Emission Mask</li> <li>• Modulation Analysis</li> </ul>
1xEVDO Mode (U9076A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Reverse-Link Code Domain</li> <li>• Adjacent Channel Power (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• Reverse-Link Modulation Accuracy (available to sequencer)</li> </ul>

**Table 2-1 Applications and Measurements in the Test Set**

Application	Measurement
TD-SCDMA with HSPA/8PSK (U9079A)	<ul style="list-style-type: none"> <li>• Burst Power (Transmit Power)</li> <li>• Power vs Time</li> <li>• ACP (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• Code Domain Power (available to sequencer)</li> <li>• Conformance Error Vector Magnitude (available to sequencer)</li> </ul>
LTE Mode (U9080A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Modulation Analysis (available to sequencer)</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• ACP (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Conformance Error Vector Magnitude (available to sequencer)</li> </ul>
Bluetooth (U9081A)	<ul style="list-style-type: none"> <li>• ACP</li> <li>• LE In-band Emissions</li> <li>• EDR In-band Spurious Emissions</li> <li>• Occupied Bandwidth</li> <li>• Transmit Analysis</li> </ul>
LTE TDD Mode (U9082A)	<ul style="list-style-type: none"> <li>• Channel Power</li> <li>• Occupied Bandwidth (available to sequencer)</li> <li>• ACP (available to sequencer)</li> <li>• Spectrum Emission Mask (available to sequencer)</li> <li>• Transmit On/Off Power (available to sequencer)</li> <li>• LTE Modulation Analysis (available to sequencer)</li> <li>• Conformance Error Vector Magnitude (available to sequencer)</li> </ul>

---

**NOTE** Some measurements which are not marked “available to sequencer” can be replaced by a basic measurement function which is available in the Sequence Analyzer mode. For example, it is possible to use the basic Power measurement in Sequence Analyzer mode as a substitute for a Channel Power measurement from one of the other modes. Some measurements are not currently supported by the analyzer list sequencer, and therefore can be run only in the native mode of the measurement.

---

## Methods of Operating the Source

Regardless of which measurement mode is currently selected, the source can be operated using front panel keys, the virtual front panel, or remote commands, or by initiating the source list sequencer (which executes a predefined series of signal-generation steps).

The RF output of the source can be modulated by its internal arbitrary waveform generator, which runs waveform segment files that have been downloaded to the test set and loaded into ARB memory. (If a source sequence refers to a number of different waveform segments, all of these segments need to be loaded into ARB memory before the sequence can execute.)

In addition to playing back waveform segments in ARB memory, the source provides basic modulation functions (AM, FM, and PM).

## Waveform Segment Files

A waveform segment can be defined in a set of binary files (an I/Q data file with its supporting header and marker files) or in a .wfm file (a combined file format which is produced by Agilent Signal Studio). Playback of .wfm segments requires installation of a Signal Studio license on the test set.

Where the segment is represented by separate binary files, the files need to be placed in the same directory, and need to follow a naming convention which enables the test set to recognize them: if the I/Q data file is called "testWaveform.bin", then the header file needs to be called "testWaveform\_hdr.bin" and the marker file needs to be called "testWaveform\_mkr.bin". The I/Q data file is the one that is loaded to ARB memory and is referenced by name in source sequences.

## Methods of Operating the Analyzer

When a measurement mode other than Sequence Analyzer mode is selected, the analyzer can be operated using front panel keys, the virtual front panel, or remote commands. When the analyzer is used in this way, measurements are made in their native measurement mode (for example, GSM measurements in GSM/EDGE mode).

In Sequence Analyzer mode, initiating the analyzer list sequencer causes it to execute a predefined series of acquisitions and measurements. As described in [“Software Elements of the Test Set” on page 64](#) Sequence Analyzer mode incorporates many measurements from other modes; that is, measurements such as EDGE EVM in GSM/EDGE mode can also be included in a sequence, so that the measurements are made when the analyzer list sequencer is initiated. The Sequence Analyzer mode also includes four basic measurements (power, frequency, phase, and I/Q data).

## Creating Sequences

A sequence is a set of parameters which defines a series of signals to be generated, or acquisitions to be analyzed, or both. The parameters can be saved to a text file and later recalled. Initiating the sequencers causes the source and/or analyzer to execute all steps defined in the sequence. (A series of SCPI commands can also be used for the same purpose.)

Although it is possible to create and save a simple sequence using front panel keys, the complexity of the format makes it preferable to use a spreadsheet template or other tool to create a sequence (which is saved to a text file).

The easiest method is to use Agilent Sequence Studio, a PC application designed specifically to generate

sequences for the EXT Wireless Communication Test Set. Sequence Studio is able to load waveform traces directly from the test set, so that the analysis intervals in the sequence can be aligned with the waveform, using an interactive graph display; this method of creating sequences is much more efficient than typing in numerical values.

## Executing Sequences

Sequences are executed by initiating the source list sequencer, the analyzer list sequencer, or both.

The source list sequencer can be initiated (in any measurement mode) by using the **[Source], List Sequencer, Initiate Sequence** key, or by sending the `:SOURCE:LIST:TRIG` command.

The analyzer list sequencer can be initiated (in the Sequence Analyzer mode) by using the **[Restart]** key, or by sending the `:INIT` command.

When both list sequencers are used together, initiation of the sequencers must be carefully coordinated. It is not possible for both sequencers to be initiated absolutely simultaneously. When both are used, the source list sequencer should always be initiated first. There are two ways to coordinate the sequencers so that they are initiated in the proper order:

- Enable **Meas Setup, Include Source in Sequence**. When this selection is made, both of the list sequencers are initiated automatically, in the correct order, when you use a command or key to initiate the analyzer sequence (in this case, the source sequence cannot be initiated independently of the analyzer sequence).
- If “Include Source in Sequence” is disabled, then the source and analyzer must be initiated independently, and the source must be initiated first.

In addition to the initiating the sequencers, it is also necessary to trigger them. Output and input triggering for the two sequencers (as defined in the sequences they are executing) must be set up to coordinate the timing of their operations. Typically, the analyzer list sequencer generates a trigger input to the source list sequencer, so that the source begins generating a signal once the analyzer is ready to receive and analyze it.

---

## Installing Application Software

When you want to install a measurement application after your initial hardware purchase, you only need to license it. All of the available applications are loaded in your test set at the time of purchase.

When you purchase an application, you receive an entitlement certificate that is used to obtain a license key for that particular measurement application. Enter the license key that you obtain into the EXT test set to activate the new measurement application.

For the latest information on Agilent X-series measurement applications and upgrade kits, visit the following internet URL: <http://www.agilent.com/find/ext>

### Viewing a license key

Measurement personalities purchased with your test set have been installed and activated at the factory before shipment. The test set requires a unique **License Key** for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, test set model number and serial number. It enables you to install, or reactivate that particular application.

Press **System, Show, System** to display which measurement applications are currently licensed in your test set.

Go to the following location to view the license keys for the installed measurement applications:

C:\Programing Files\Agilent\Licensing

---

**NOTE** You may want to keep a copy of your license key in a secure location. You can print out a copy of the display showing the license numbers to do this. If you should lose your license key, call your nearest Agilent Technologies service or sales office for assistance.

---

### Obtaining and installing a license key

If you purchase an additional application that requires installation, you will receive an “Entitlement Certificate” which may be redeemed for a license key for one test set. Follow the instructions that accompany the certificate to obtain your license key.

Installing a license key for the selected application can be done using a USB memory device. To do this, you put the license file on the USB memory device at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the license management application in the test set. It is found through the test set front panel keys at **System, Licensing...**, or internally at C:\Programming Files\Agilent\Licensing.

---

**NOTE** You can also use these procedures to reinstall a license key that has been accidentally deleted, or lost due to a memory failure.

---

## Missing and old Measurement application software

All the software applications were loaded at the time of original test set manufacture. It is a good idea to regularly update your software with the latest available version. This assures that you get any improvements and expanded functionality that is available.

Because the software was loaded at the initial purchase, there may be additional measurement applications that are now available. If the application you are interested in licensing is not available, you will need to do a software update. (Press **System, Show, System.**)

Check the Agilent internet website for the latest software versions available for downloading:

[http://www.agilent.com/find/ext\\_software](http://www.agilent.com/find/ext_software)

You must load the updated software package into the test set from a USB drive, or directly from the internet. An automatic loading program is included with the files.

---

## X-Series options and accessories

“EXT Test Set Options” on page 71

“EXT X-series accessories” on page 71

“Advanced Measurement Application Software” on page 71

### EXT Test Set Options

Product	Description
<EXT model number>	Wireless communications test set
<EXT model number>-503	Frequency range from 10 MHz to 3.6 GHz
<EXT model number>-504	Frequency range from 10 MHz to 3.8 GHz
<EXT model number>-UK6	Commercial Calibration Certificate with Test Data

### EXT X-series accessories

Product	Description
<EXT model number>-EFM	USB storage device 4 GB blank
<EXT model number>-KYB	Keyboard, USB interface
<EXT model number>-HTC	Hard transit case
<EXT model number>-ICP	Rackmount kit with handles
<EXT model number>-1CN	Front handle kit
<EXT model number>-1CM	Rackmount kit
<EXT model number>-1CR	Rack slide kit

### Advanced Measurement Application Software

For a current list of application software, go to the following URLs.

<http://www.agilent.com/find/ext>

Select the **Options** tab on the top of the webpage.

## Front-Panel Features (E6607A/B)



Item		Description
#	Name	
1	Menu Keys	Key labels appear to the left of the menu keys to identify the current function of each key. The displayed functions are dependent on the currently selected Mode and Measurement, and are directly related to the most recent key press.
2	Measurement Keys	These keys select the Mode, and the Measurement within the mode. They also control the initiation and rate of recurrence of measurements.
3	Setup Keys	These keys set the parameters used for setting up the test set in the current Mode.
4	Marker Keys	Markers are often available for a measurement, to measure a very specific point/segment of data within the range of the current measurement data.
5	Utility Keys	These keys control system-wide functionality such as <ul style="list-style-type: none"> <li>• test set configuration information and I/O setup,</li> <li>• printer setup and printing,</li> <li>• file management, save and recall,</li> <li>• test set presets.</li> </ul>
6	Probe Power	Supplies power for external high frequency probes and accessories.
7	Headphones Output	Headphones can be used to hear any available audio output.
8	Back Space Key	Press this key to delete the previous character when entering alphanumeric information. It also works as the Back key in Help and Explorer windows.
9	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, DVD drive or hard drive.



Item		Description
#	Name	
10	Delete Key	Press this key to delete files, or to perform other deletion tasks.
11	Local/Cancel/(Esc) Key	<p>If you are in remote operation the Local key</p> <ul style="list-style-type: none"> <li>returns test set control from remote back to local (the front panel).</li> <li>turns the display on (if it was turned off for remote operation).</li> <li>can be used to clear errors. (Press the key once to return to local control, and a second time to clear error message line.)</li> </ul> <p>If you have not already pressed the units or Enter key, Cancel exits the currently selected function without changing its value.</p> <p>Esc works the same as it does on a pc keyboard. It</p> <ul style="list-style-type: none"> <li>exits Windows dialogs</li> <li>clears errors</li> <li>aborts printing</li> <li>cancels operations.</li> </ul> <p>This key also exits the help system if it has been accessed.</p>
12	Numeric Keypad	Enters a specific numeric value for the current function. Entries appear on the upper left of the display, in the measurement information area.
13	Enter and Arrow Keys	<p>The Enter key terminates data entry when either no unit of measure is needed, or you want to use the default unit.</p> <p>The arrow keys</p> <ul style="list-style-type: none"> <li>Increment and decrement the value of the current measurement selection.</li> <li>Navigate help topics.</li> <li>Navigate, or make selections, within Windows dialogs.</li> <li>Navigate within forms used for setting up measurements.</li> <li>Navigate within tables.</li> </ul> <p><b>NOTE</b> The arrow keys cannot be used to move a mouse pointer around on the display.</p>
14	Menu/ (Alt) Key	Alt works the same as a pc keyboard. Use it to change control focus in Windows pull-down menus.
15	Ctrl Key	Ctrl works the same as a pc keyboard. Use it to navigate in Windows applications, or to select multiple items in lists.
16	Select / Space Key	Select is also the Space key and it has typical pc functionality. For example, in Windows dialogs, it selects files, checks and unchecks check boxes, and picks radio button choices. It opens a highlighted Help topic.
17	Tab Keys	Use these keys to move between fields in Windows dialogs.
18	Knob	Increments and decrements the value of the current active function.
19	Return Key	Exits the current menu and returns to the previous menu. Has typical pc functionality.
20	Full Screen Key	Pressing this key turns off the softkeys to maximize the graticule display area.

About the Test Set  
**Front-Panel Features (E6607A/B)**

Item		Description
#	Name	
21	Help Key	Initiates a context-sensitive help display for the current Mode. Once Help is accessed, pressing a front panel key brings up the help topic for that key function. Use the Local/Cancel/(Esc) key to exit help.
22	Speaker Control Keys	Enables you to increase or decrease the speaker volume, or mute it.
23	Window Control Keys	These keys select between single or multiple window displays. They zoom the current window to fill the data display, or change the currently selected window. They can be used to switch between the Help window navigation pane and the topic pane.
24	Power Standby/ On	Turns the test set on. A green light indicates power on. A yellow light indicates standby mode.  <div style="border: 1px solid black; padding: 2px; display: inline-block; margin: 5px 0;">NOTE</div> The front-panel switch is a standby switch, <b>not</b> a LINE switch (disconnecting device). The test set continues to draw power even when the line switch is in standby.  The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.
25	RF I/O 1 Connector	RF Input/Output port #1 (communicates with both the source and the analyzer).
26	RF I/O 2 Connector	RF Input/Output port #2 (communicates with both the source and the analyzer).
27	RF Output	The test set's RF output port (communicates only with the source).
28	RF Input	The test set's RF input port (communicates only with the analyzer).

### Overview of key types

The keys labeled **FREQ Channel**, **System**, and **Marker Functions** are all examples of front-panel keys.



Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

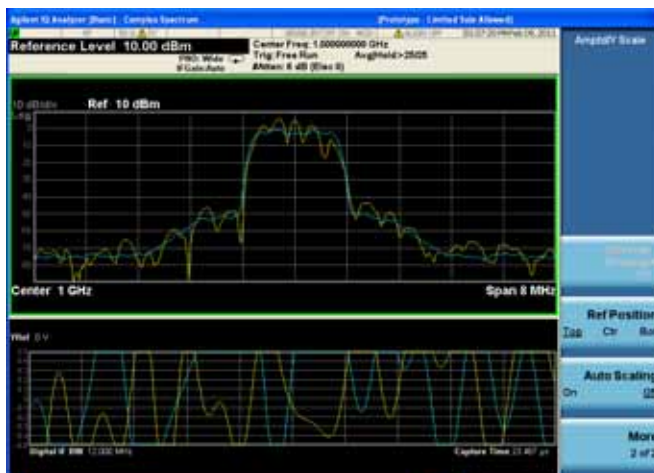
Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (**Mode**) and measurement (**Meas**).

If the numeric value of a menu key function can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press **AMPTD Y Scale**. This calls up the menu of related amplitude functions. The function labeled **Ref Level** (the default selected key in the Amplitude menu) is highlighted. **Ref Level** also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its

value can now be changed using any of the data entry controls.



Some menu keys have multiple choices on their label, such as **On/Off** or **Top/Ctr/Bot** (as shown below). The different choices are selected by pressing the key multiple times. For example, the Auto/Man type of key. To select the function, press the menu key and notice that Auto is underlined and the key becomes highlighted. To change the function to manual, press the key again so that Man is underlined. If there are more than two settings on the key, keep pressing it until the desired selection is underlined.



When a menu first appears, one key label is highlighted to show which key is the default selection. If you

## About the Test Set Front-Panel Features (E6607A/B)

press **Marker Function**, the **Marker Function Off** key is the menu default key, and is highlighted.



Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side or by a yellow border around the group of keys. When you press a key within the yellow region, such as **Marker Noise**, the highlight moves to that key to show it has been selected. The keys that are linked are related functions, and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar or border could include keys on the second page of keys.



In some key menus, a key label is highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the **Select Marker** key (in the **Marker** menu), it brings up its own menu of keys. The **Marker 1** key is highlighted. When you press the **marker 2** key, the highlight moves to that key and

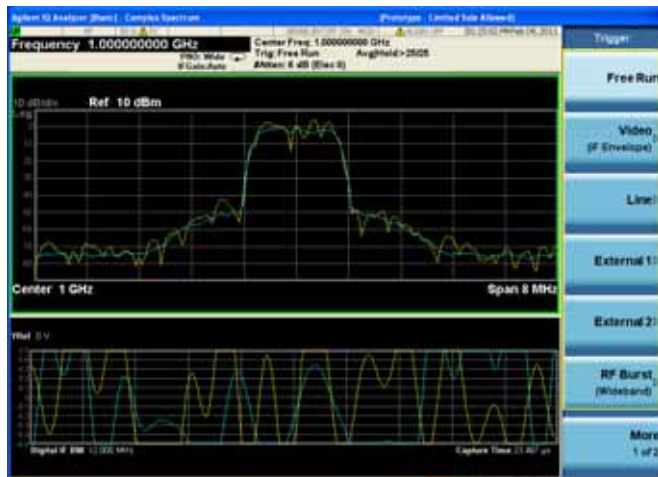
the screen returns to the **Marker** menu.



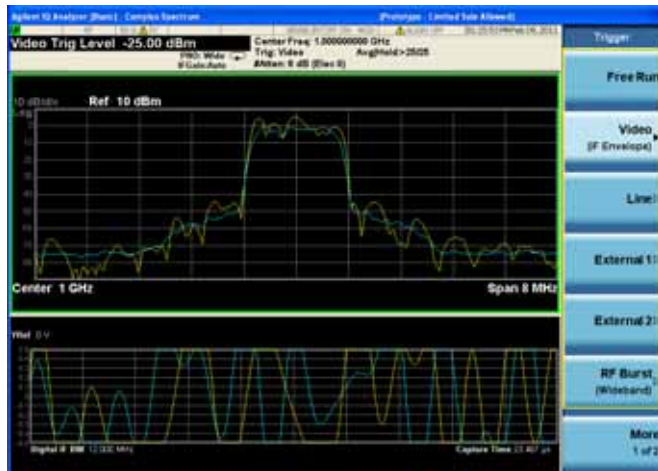
If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again brings up an additional menu of

# About the Test Set Front-Panel Features (E6607A/B)

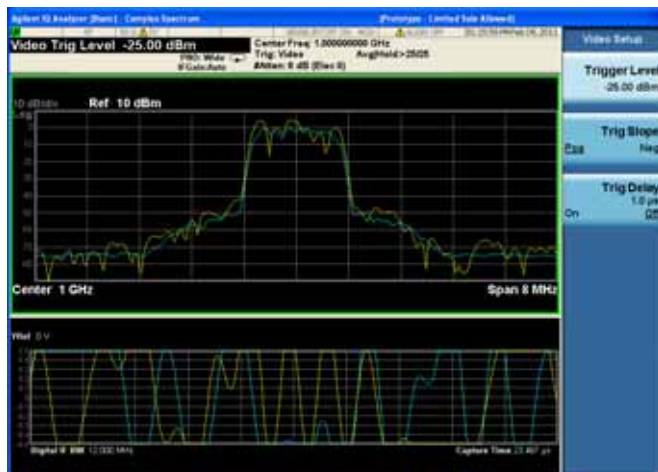
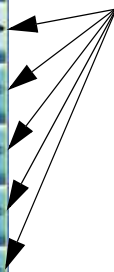
settings.



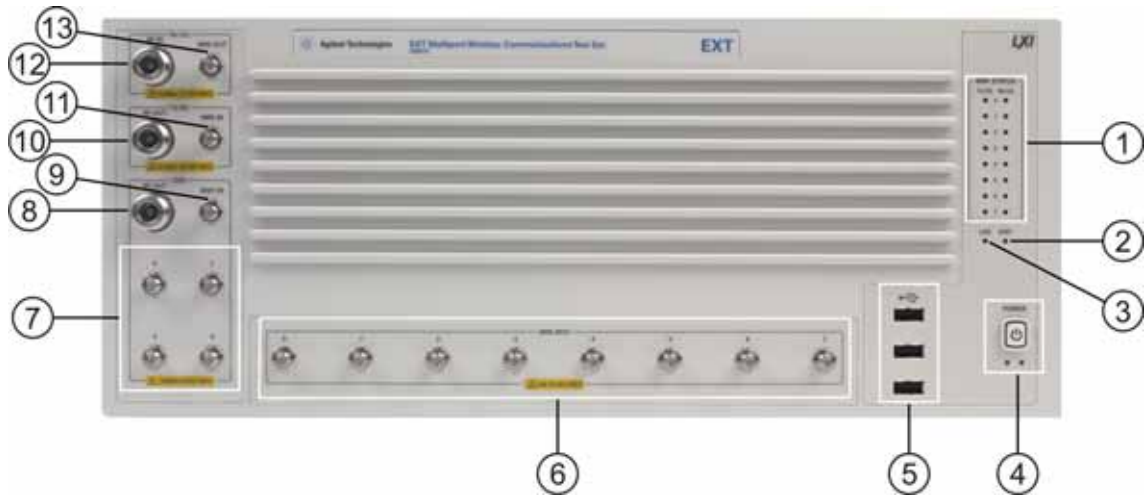
Open  
Arrow Tip



Solid  
Arrow Tip



## Front-Panel Features (E6607C)



Item		Description
#	Name	
1	MPA Status	<p>MPA Status Indicator LEDs light indicating the status of the instrument:</p> <ul style="list-style-type: none"> <li>Tx/DL 0 - 7 (these light to indicate that the related RFIO ports are being used to transmit RF outputs to the connected DUTs).</li> <li>Rx/UL 0 - 7 (these light to indicate that the related RFIO ports are being used to receive RF inputs from the connected DUTs).</li> </ul> <p><b>NOTE</b> There are no indicators for the GPS ports, because the ports cannot be switched on or off. Whatever RF input is provided to the GPS DIST IN port is always split and delivered to the GPS 0 - 3 ports.</p>
2	Stat	SCPI Status Indicator LED lights to indicate that the instrument is ready to receive a remote SCPI command.
3	LAN	LAN Status Indicator LED lights to indicate that the instrument has made an active LAN connection.
4	Power	<p>Power Standby/On switch and indicator LEDs. A green light indicates power on. A yellow light indicates standby mode.</p> <p><b>NOTE</b> The front-panel switch is a standby switch, <b>not</b> a LINE switch (disconnecting device). The test set continues to draw power even when the line switch is in standby.</p> <p>The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.</p>
5	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, DVD drive or hard drive.

About the Test Set  
**Front-Panel Features (E6607C)**

Item		Description
#	Name	
6	MPA RFIO, Ports 0 - 7	RF input and output connections to the DUTs (SMA connectors). The maximum safe input level at any of these ports is 2 W (+33 dBm), $\pm 15$ Vdc.
7	GPS, Ports 0 - 3	RF input and output connections to the DUTs (SMA connectors). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), 0 Vdc. Because GPS Ports 0 - 3 are the outputs of a four-way splitter, the maximum output power levels from these ports are lower than for RFIO Ports 0 - 7; see the E6607C data sheet for specifics.
8	RF OUT	GPS RF output port (communicates only with the source). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), 0 Vdc.
9	DIST IN	GPS RF distribution input port (SMA connector). This port is connected to the four-way splitter that provides the signal to the 4 GPS output Ports 0 - 3. The maximum safe input level at any of these ports is 0.25 W (+24 dBm), 0 Vdc.
10	RF OUT	Tx/DL RF output port (communicates only with the source). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), $\pm 15$ Vdc.
11	MPA IN	Tx/DL MPA RF input port (SMA connector). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), $\pm 15$ Vdc.
12	RF IN	Rx/UL RF input port (communicates only with the analyzer). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), $\pm 15$ Vdc.
13	MPA OUT	Rx/UL RF MPA output port (SMA connector). The maximum safe input level at any of these ports is 0.25 W (+24 dBm), $\pm 15$ Vdc.



## Overview of key types

The keys labeled **FREQ Channel**, **System**, and **Marker Function** are all examples of front-panel keys.



Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (**Mode**) and measurement (**Meas**).

If the numeric value of a menu key function can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press **AMPTD Y Scale**. This calls up the menu of related amplitude functions. The function labeled **Ref Level** (the default selected key in the Amplitude menu) is highlighted. **Ref Level** also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its value can now be changed using any of the data entry controls.

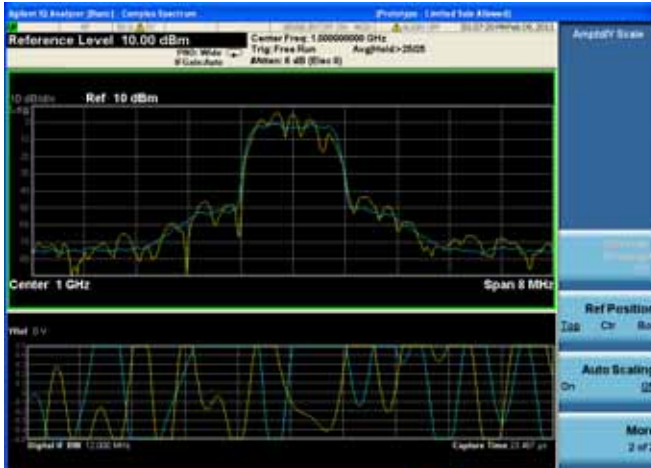


Some menu keys have multiple choices on their label, such as **On/Off** or **Top/Ctr/Bot** (as shown below). The different choices are selected by pressing the key multiple times. For example, the Auto/Man type of key. To select the function, press the menu key and notice that Auto is underlined and the key becomes highlighted. To change the function to manual, press the key again so that Man is underlined. If there are

## About the Test Set

### Overview of key types

more than two settings on the key, keep pressing it until the desired selection is underlined.



When a menu first appears, one key label is highlighted to show which key is the default selection. If you press **Marker Function**, the **Marker Function Off** key is the menu default key, and is highlighted.



Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side or by a yellow border around the group of keys. When you press a key within the yellow region, such as **Marker Noise**, the highlight moves to that key to show it has been selected. The keys that are linked are related functions, and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar or border could include keys on the

second page of keys.



In some key menus, a key label is highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the **Select Marker** key (in the **Marker** menu), it brings up its own menu of keys. The **Marker 1** key is highlighted. When you press the **marker 2** key, the highlight moves to that key and the screen returns to the **Marker** menu.

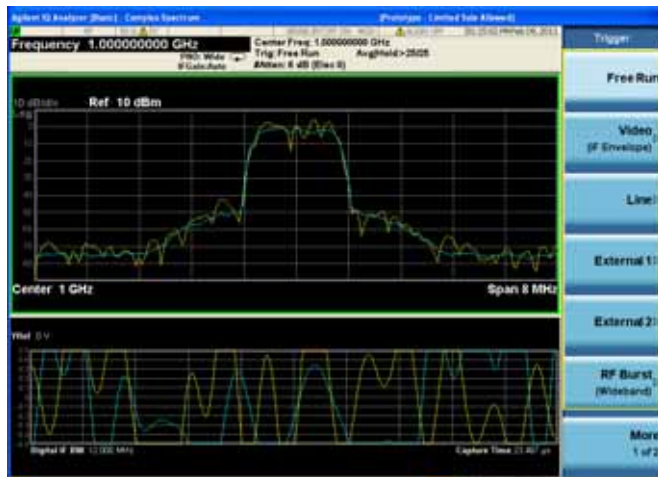


If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again brings up an additional menu of

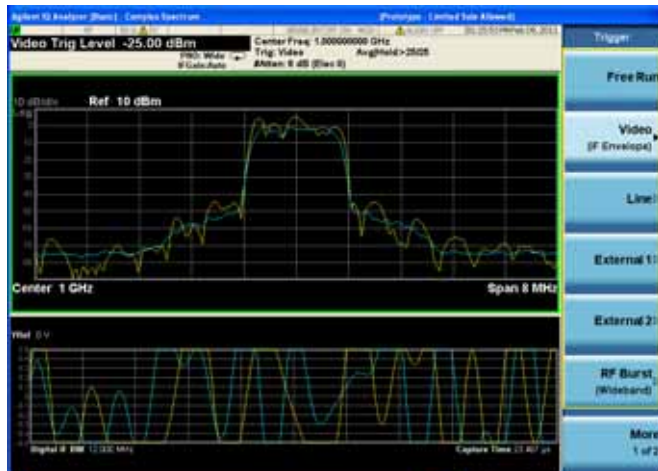
# About the Test Set

## Overview of key types

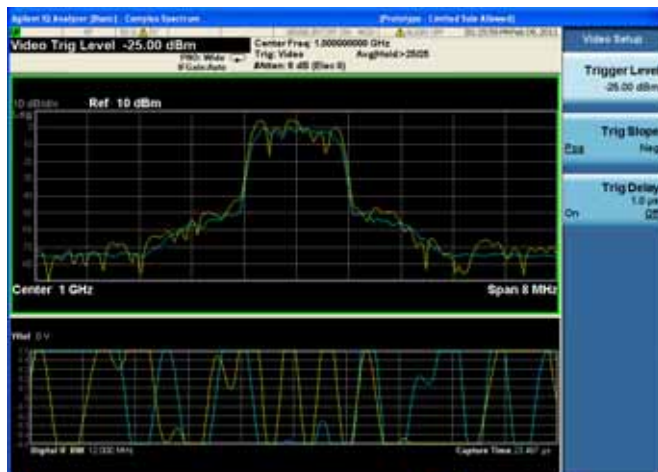
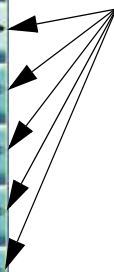
settings.



Open Arrow Tip

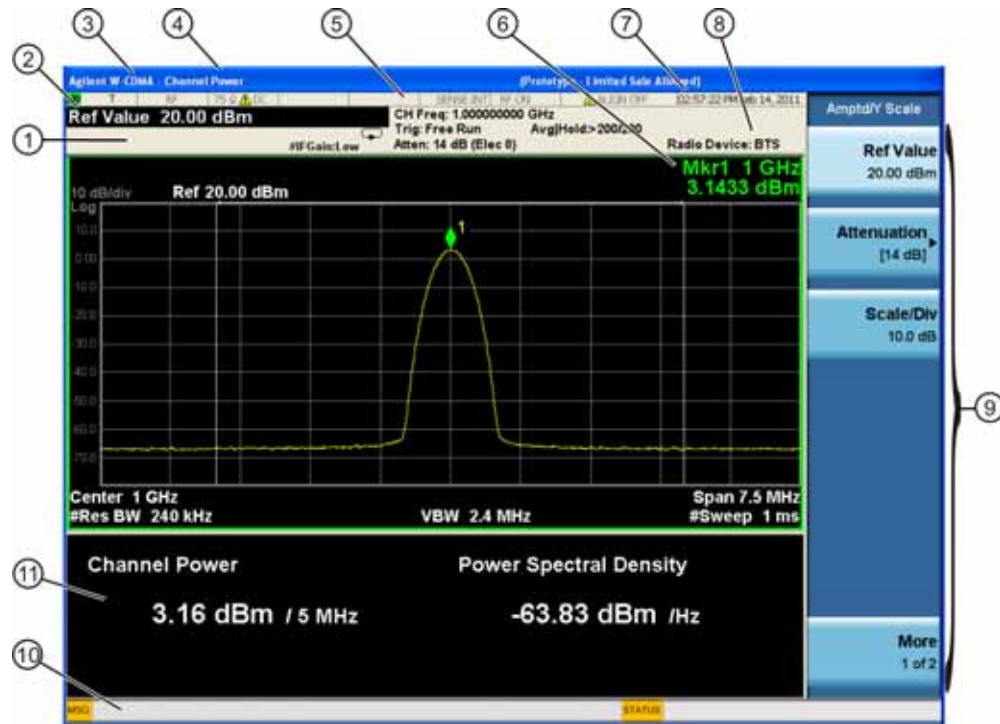




Solid Arrow Tip



## Display Annotations

This section describes the display annotation as it is on the Sequence Analyzer measurement application display. Other measurement application modes have some annotation differences.



Item	Description	Function Keys
1	<p>Measurement bar - Shows general measurement settings and information.</p> <p>  Indicates single/continuous measurement.</p> <p>Some measurements include limits that the data is tested against. A Pass/Fail indication may be shown in the lower left of the measurement bar.</p>	All the keys in the test set Setup part of the front panel.
2	Active Function (measurement bar) - when the current active function has a settable numeric value, it is shown here.	Currently selected front panel key.
3	Banner - shows the name of the selected application that is currently running.	<b>Mode</b>

About the Test Set  
**Display Annotations**

Item	Description	Function Keys
4	Measurement title - shows title information for the current measurement, or a title that you created for the measurement.	<b>Meas</b> <b>View/Display, Display, Title</b>
5	Settings panel - displays system information that is not specific to any one application. <ul style="list-style-type: none"> <li>• Input/Output status - RLTS indicate Remote, Listen, Talk, SRQ</li> <li>• Input impedance and coupling</li> <li>• Selection of external frequency reference</li> <li>• Setting of automatic internal alignment routine</li> </ul>	<b>Local and System, I/O Config</b> <b>Input/Output, Amplitude, System</b> and others
6	Active marker frequency, amplitude or function value	<b>Marker</b>
7	Settings panel - time and date display.	<b>System, Control Panel</b>
8	Trace and detector information	<b>Trace/Detector,</b> <b>Clear Write (W) Trace Average (A) Max</b> <b>Hold (M) Min Hold (m)</b> <b>Trace/Detector,</b> <b>More,</b> <b>Detector,</b> <b>Average (A) Normal (N) Peak (P)</b> <b>Sample (S) Negative Peak (p)</b>
9	Key labels that change based on the most recent key press.	Softkeys
10	Displays information, warning and error messages. Message area - single events, Status area - conditions	
11	Measurement settings for the data currently being displayed in the graticule area. In the example above: center frequency, resolution bandwidth, video bandwidth, frequency span, sweep time and number of sweep points.	Keys in the test set Setup part of the front panel.

## Test Set Display Indicators

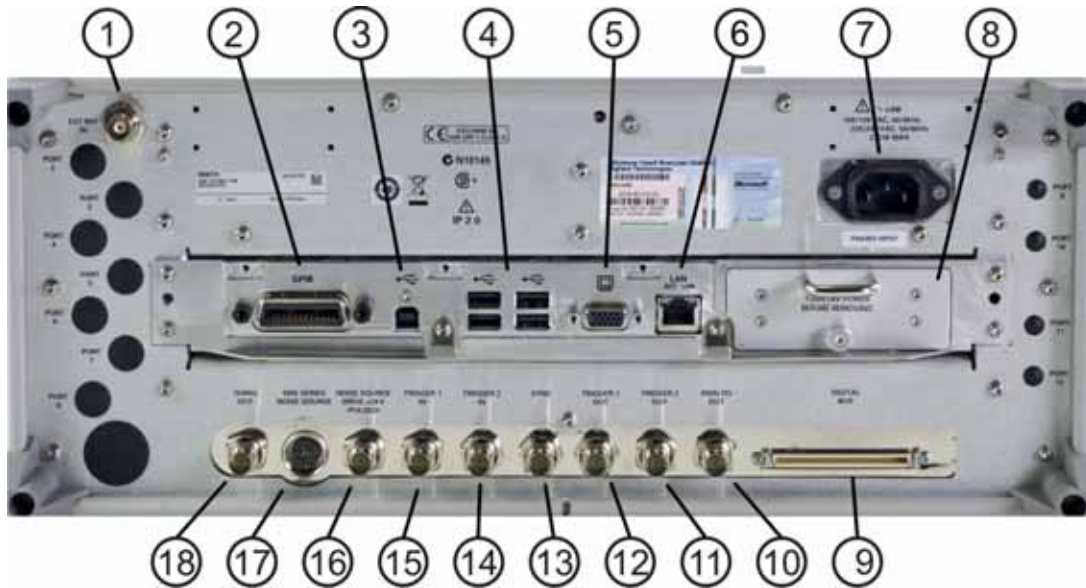
The display of the EXT Test Set includes, in the measurement bar, a field (highlighted in red below) which indicates the state of the internal source. When using the E6607A/B with the Multiport Adapter or when using the E6607C, this display is modified to indicate which output ports of the Multiport Adapter (if any) are supplying RF output power.



The table below illustrates the content of this field under different circumstances.

Multiport Adapter Usage	In Sequence Analyzer Mode	Not in Sequence Analyzer Mode, RF On	Not in Sequence Analyzer Mode, RF Off
Any or all of the 8 “RFIO” ports are in use.	SEQ MPA	RF ON MPA	RF OFF MPA
The 4 “GPS” ports are in use.	SEQ MPA-G	RF ON MPA-G	RF OFF MPA-G
Multiport Adapter is not in use.	SEQ	RF ON	RF OFF

## Rear-Panel Features



Item		Description
#	Name	
1	EXT REF IN	Input for an external frequency reference signal: 1 to 50 MHz
2	GPIB	A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote test set operation.
3	USB Connector	USB 2.0 port, Type B. USB TMC (test and measurement class) connects to an external pc controller to control the test set and for data transfers over a 480 Mbps link.
4	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, printer, DVD drive, or hard drive.
5	MONITOR	Allows connection of an external VGA monitor.
6	LAN	A TCP/IP Interface that is used for remote test set operation.
7	Line power input	The AC power connection. See the product specifications for more details.
8	Removable Hard Drive	Standard on E6607A.
9	DIGITAL BUS	Reserved for future use.
10	ANALOG OUT	Reserved for future use.
11	TRIGGER 2 OUT	A trigger output used to synchronize other test equipment with the test set. Configurable from the Input/Output keys.

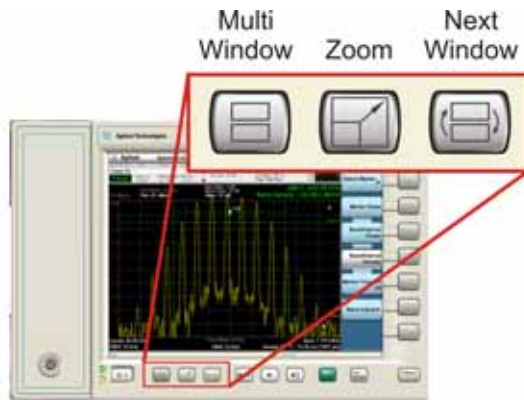


Item		Description
#	Name	
12	TRIGGER 1 OUT	A trigger output used to synchronize other test equipment with the test set. Configurable from the Input/Output keys.
13	SYNC	Reserved for future use.
14	TRIGGER 2 IN	Allows external triggering of measurements.
15	TRIGGER 1 IN	Allows external triggering of measurements.
16	NOISE SOURCE DRIVE +28 V (PULSED)	Not functional in the EXT Test Set.
17	SNS SERIES NOISE SOURCE	Not functional in the EXT Test Set.
18	10 MHz OUT	An output of the test set internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the test set.

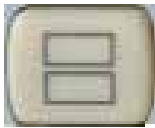
---

## Window Control Keys

The instrument provides three front-panel keys for controlling windows. They are Multi Window, Zoom, and Next Window. These are all “immediate action” keys.



### Multi-Window



The **Multi Window** front-panel key will toggle you back and forth between the Normal View and the last Multi Window View (Zone Span, Trace Zoom or Spectrogram) that you were in, when using the Swept SA measurement of the Spectrum Analyzer Mode. It remembers which View you were in through a Preset. This “previous view” is set to Zone Span on a Restore Mode Defaults.

Key Path:	<b>Front-panel key</b>
Initial S/W Revision:	Prior to A.02.00

### Zoom

Zoom is a toggle function. Pressing this key once increases the size of the selected window; pressing the key again returns the window to the original size.

When Zoom is on for a window, that window will get the entire primary display area. The zoomed window, since it is the selected window, is outlined in green.

Zoom is local to each Measurement. Each Measurement remembers its Zoom state. The Zoom state of each Measurement is part of the Mode’s state.

---

**NOTE** Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

---

Remote Command:	:DISPlay:WINDow:FORMat:ZOOM
Remote Command:	:DISPlay:WINDow:FORMat:TILE
Example:	:DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed
Preset:	TILE
Initial S/W Revision:	Prior to A.02.00

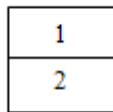
## Next Window

Selects the next window of the current view. When the Next Window key is pressed, the next window in the order of precedence becomes selected. If the selected window was zoomed, the next window will also be zoomed.

The window numbers are as follows. Note that these numbers also determine the order of precedence (that is, Next Window goes from 1 to 2, then 2 to 3, etc.):



**Four window display**



**Two window display**

Remote Command:	:DISPlay:WINDow[:SElect] <number> :DISPlay:WINDow[:SElect] ?
Example:	:DISP:WIND 1
Preset:	1
Min:	1
Max:	If <number> is greater than the number of windows, limit to <number of windows>
Initial S/W Revision:	Prior to A.02.00

One and only one window is always selected. The selected window has the focus; this means that all window-specific key presses apply only to that window. You can tell which window is selected by the thick green border around it. If a window is not selected, its boundary is gray.

If a window in a multi-window display is zoomed it is still outlined in green. If there is only one window, the green outline is not used. This allows the user to distinguish between a zoomed window and a display with only one window.

The selected window is local to each Measurement. Each Measurement remembers which window is selected. The selected window for each Measurement is remembered in Mode state.

---

**NOTE**                      When this key is pressed in Help Mode, it toggles focus between the table of contents window and the topic pane window.

---

---

## Mouse and Keyboard Control

If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

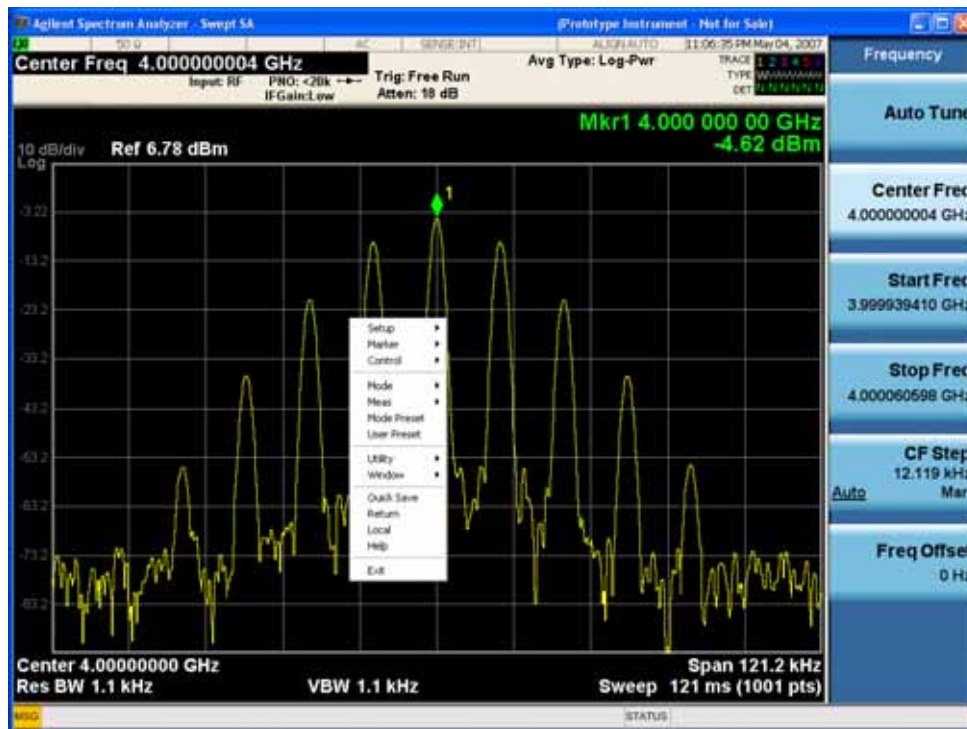
---

**NOTE**                    **E6607C:** When using the E6607C there is no instrument front-panel. Therefore, the PC mouse and monitor are required for instrument control through a virtual front panel (VFP). For ease in using the VFP, the PC keyboard is recommended.

---

### Right-Click

If you plug in a mouse and right-click on the analyzer screen, a menu will appear as below:



Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



## Virtual Front Panel

If you have a PC mouse, monitor, and keyboard plugged in (or through a Remote Desktop), you can navigate the front panel using the virtual front panel (VFP) shown below. Access the VFP as follows:

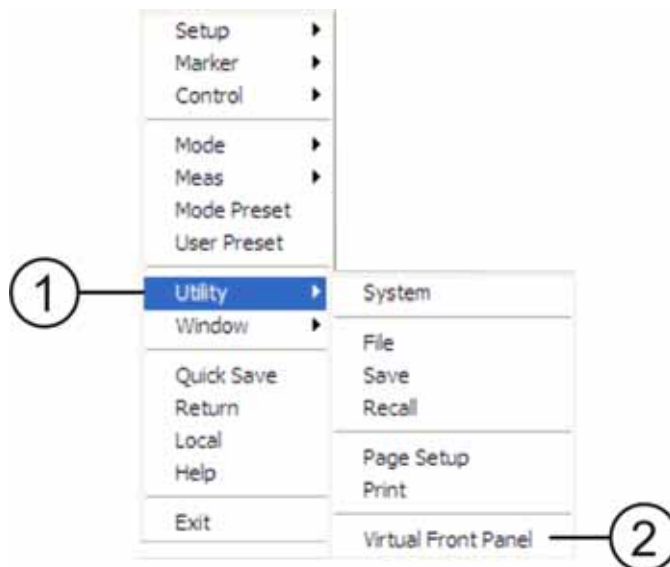
1. Right-click the mouse as described in [“Right-Click” on page 93](#).
2. Left-click Utility (1) in the menu, as shown below.
3. Left-click Virtual Front Panel (2) in the menu, as shown below.

---

**NOTE** The PC mouse and monitor are required when using the E6607C. For ease in using the VFP, the PC keyboard is recommended.

---

:



When the VFP opens, the keys behave just as the front-panel and menu keys described in [“Front-Panel Features \(E6607A/B\)” on page 72](#) and [“Overview of key types” on page 81](#). On the VFP the keys labeled "Key 1" through "Key 7" function as the menu keys. Using the mouse to click on a combination of the VFP keys and the menu keys on the display screen, you can operate the instrument just as you would using the front-panel of the E6607A/B.

About the Test Set  
**Mouse and Keyboard Control**



## PC Keyboard

If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

Front-panel key	Key code
Frequency	CTRL+SHIFT+F
Span	CTRL+SHIFT+S
Amplitude	CTRL+SHIFT+A
Input/Output	CTRL+SHIFT+O
View/Display	CTRL+SHIFT+V
Trace/Detector	CTRL+ALT+T
Auto Couple	CTRL+SHIFT+C
Bandwidth	CTRL+ALT+B
Source	CTRL+ALT-U



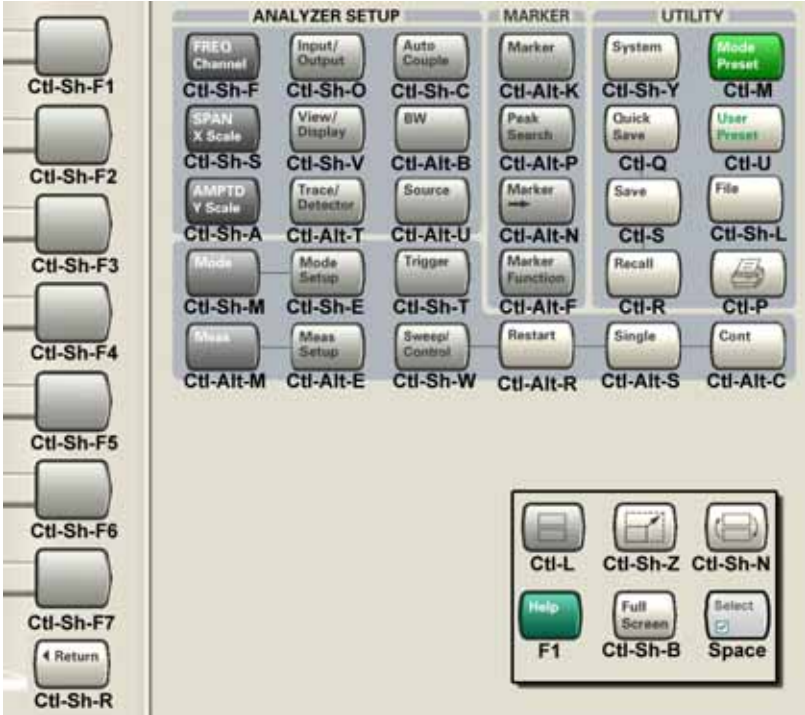
<b>Front-panel key</b>	<b>Key code</b>
Marker	CTRL+ALT+K
Peak Search	CTRL+ALT+P
Marker To	CTRL+ALT+N
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
Quick Save	CTRL+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+SHIFT+L
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+SHIFT+E
Meas Setup	CTRL+ALT+E
Trigger	CTRL+SHIFT+T
Sweep/Control	CTRL+SHIFT+W
Restart	CTRL+ALT+R
Single	CTRL+ALT+S
Cont	CTRL+ALT+C
Zoom	CTRL+SHIFT+Z
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L
Full Screen	CTRL+SHIFT+B
Return	CTRL+SHIFT+R
Mute	Mute
Inc Audio	Volume Up
Dec Audio	Volume Down
Help	F1

About the Test Set  
**Mouse and Keyboard Control**

<b>Front-panel key</b>	<b>Key code</b>
Control	CTRL
Alt	ALT
Enter	Return
Cancel	Esc
Del	Delete
Backspace	Backspace
Select	Space
Up Arrow	Up
Down Arrow	Down
Left Arrow	Left
Right Arrow	Right
Menu key 1	CTRL+SHIFT+F1
Menu key 2	CTRL+SHIFT+F2
Menu key 3	CTRL+SHIFT+F3
Menu key 4	CTRL+SHIFT+F4
Menu key 5	CTRL+SHIFT+F5
Menu key 6	CTRL+SHIFT+F6
Menu key 7	CTRL+SHIFT+F7
Backspace	BACKSPACE
Enter	ENTER
Tab	Tab
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

Front-panel key	Key code
0	0

This is a pictorial view of the table:



## **Instrument Security & Memory Volatility**

If you are using the test set in a secure environment, you may need details of how to clear or sanitize its memory, in compliance with published security standards of the United States Department of Defense, or other similar authorities.

For the X Series test sets, this information is contained in the document "Security Features and Volatility". This document is **not** included in the test set's on-disk library, but it may be downloaded from Agilent's web site.

To obtain a copy of the document, click on or browse to the following URL:

<http://www.agilent.com/find/security>

To locate and download the document, select a Model Number, for example "E6607A", then click "Submit". Then, follow the on-screen instructions to download the file.

The analog demodulation measurements provide the capability of demodulating Amplitude, Frequency, or Phase modulated signals (AM, FM, PM). These measurements provide functionality that can be generally categorized as follows:

- Demodulating a modulated carrier and playing the modulating signal over a speaker (sometimes referred to as tune and listen)
- Displaying demodulated signals in both time and frequency domain
- Displaying modulation metrics

Each measurement has four basic windows in which to display demodulated data. The primary view displays all four of these windows. In all views, the display is split into signal display windows and a numeric results (metrics) window. The metrics window displays carrier and modulation metrics.



This chapter provides introductory information about the programming documentation included with your test set.

---

## What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system and is included on the Documentation CD shipped with the instrument. It can also be found in the instrument at: C:\ProgramsFiles\Agilent\SignalAnalysis\Infrastructure\Help\otherdocs, or online at: [http://www.agilent.com/find/mxa\\_manuals](http://www.agilent.com/find/mxa_manuals).

The following resources are available to help you create programs for automating your X-Series measurements:

Resource	Description
<b>X-Series Programmer's Guide</b>	<p>Provides general SCPI programming information on the following topics:</p> <ul style="list-style-type: none"> <li>• Programming the X-Series Applications</li> <li>• Programming fundamentals</li> <li>• Programming examples</li> </ul> <p>Note that SCPI command descriptions for measurement applications are NOT in this book, but are in the User's and Programmer's Reference.</p>
<b>User's and Programmer's Reference manuals</b>	<p>Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that:</p> <ul style="list-style-type: none"> <li>• Each measurement application has its own User's and Programmer's Reference.</li> <li>• The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual).</li> </ul>
<b>Embedded Help in your instrument</b>	<p>Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application.</p> <p>Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.</p>
<b>X-Series Getting Started Guide</b>	<p>Provides valuable sections related to programming including:</p> <ul style="list-style-type: none"> <li>• Licensing New Measurement Application Software - After Initial Purchase</li> <li>• Configuring instrument LAN Hostname, IP Address, and Gateway Address</li> <li>• Using the Windows XP Remote Desktop to connect to the instrument remotely</li> <li>• Using the Embedded Web Server Telnet connection to communicate SCPI</li> </ul> <p>This printed document is shipped with the instrument.</p>
<b>Agilent Application Notes</b>	Printable PDF versions of pertinent application notes.
<b>Agilent VISA User's Guide</b>	Describes the Agilent Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.



## IEEE Common GPIB Commands

Numeric values for bit patterns can be entered using decimal or hexi-decimal representations. (that is,. 0 to 32767 is equivalent to #H0 to #H7FFF).

### Calibration Query

\*CAL? Performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment fails. The equivalent SCPI command is CALibrate[:ALL]?

See “Alignments” on page 170 for details of \*CAL?.

### Clear Status

Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.

Key Path:	<b>No equivalent key. Related key System, Show Errors, Clear Error Queue</b>
Remote Command:	*CLS
Example:	*CLS Clears the error queue and the Status Byte Register.
Notes:	For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem.
Status Bits/OPC dependencies:	Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also.
Backwards Compatibility Notes:	In general the status bits used in the X-Series status system will be backwards compatible with ESA and PSA. However, note that all conditions will generate events that go into the event log, and some will also generate status bits.
Initial S/W Revision:	Prior to A.02.00

### Standard Event Status Enable

Selects the desired bits from the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, status execution error, command error, and power on. The selected bits are OR'd to become a summary bit (bit 5) in the byte register which can be queried.

The query returns the state of the standard event status enable register.

Key Path:	<b>No equivalent key. Related key System, Show Errors, Clear Error Queue</b>
-----------	--

Remote Command:	*ESE <integer> *ESE?
Example:	*ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled.
Notes:	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset:	255
State Saved:	Not saved in state.
Min:	0
Max:	255
Status Bits/OPC dependencies:	Event Enable Register of the Standard Event Status Register.
Initial S/W Revision:	Prior to A.02.00

### Standard Event Status Register Query

Queries and clears the standard event status event register. (This is a destructive read.) The value returned is a hexadecimal number that reflects the current state (0/1) of all the bits in the register.

Remote Command:	*ESR?
Example:	*ESR? Returns a 1 if there is either a query or command error, otherwise it returns a zero.
Notes:	For related commands, see the STATus subsystem commands.
Preset:	0
Min:	0
Max:	255
Status Bits/OPC dependencies:	Standard Event Status Register (bits 0 – 7).
Initial S/W Revision:	Prior to A.02.00

### Identification Query

Returns a string of instrument identification information. The string will contain the model number, serial number, and firmware revision.

The response is organized into four fields separated by commas. The field definitions are as follows:

Manufacturer

Model

Serial number

Firmware version

Key Path:	<b>No equivalent key. See related key System, Show System.</b>
Remote Command:	*IDN?
Example:	*IDN? Returns instrument identification information, such as: Agilent Technologies,N9020A,US01020004,A.01.02
Initial S/W Revision:	Prior to A.02.00

### Instrument Model Number

ID? - Returns a string of the instrument identification. The string will contain the model number.

When in Remote Language compatibility mode the query will return the model number of the emulated instrument, when in any other mode the returned model number will be that of the actual hardware.

### Operation Complete

The \*OPC command sets bit 0 in the standard event status register (SER) to “1” when pending operations have finished, that is when all overlapped commands are complete. It does not hold off subsequent operations. You can determine when the overlapped commands have completed either by polling the OPC bit in SER, or by setting up the status system such that a service request (SRQ) is asserted when the OPC bit is set.

The \*OPC? query returns a “1” after all the current overlapped commands are complete. So it holds off subsequent commands until the "1" is returned, then the program continues. This query can be used to synchronize events of other instruments on the external bus.

Remote Command:	*OPC *OPC?
Example:	INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete.
Status Bits/OPC dependencies:	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. *OPC is an overlapped command, but *OPC? is sequential.

Backwards Compatibility Notes:	<p>The ESA/PSA/VSA products do not meet all the requirements for the *OPC command specified by IEEE 488.2. This is corrected for X-Series. This will sometimes cause behavior that is not backward compatible, but it will work as customers expect.</p> <p>Commands such as, *OPC/*OPC?/*WAI/*RST used to be global. They considered front panel operation in conjunction with the GPIB functionality. Now they are evaluated on a per channel basis. That is, the various rear panel remote ports and the front panel i/o are all considered separately. Only the functionality initiated on the port where the *OPC was sent, is considered for its operation.</p> <p>*OPC used to hold off until the operation bits were cleared. Now it holds off until all overlapping commands are completed. Also, earlier instruments did not wait for completion of all processes, only the ones identified here (in the STATus:OPERation register):</p> <p>Calibrating: monitored by PSA, ESA, VSA (E4406A)</p> <p>Sweeping: monitored by PSA, ESA, VSA (E4406A)</p> <p>Waiting for Trigger: monitored by PSA, ESA, VSA (E4406A)</p> <p>Measuring: monitored by PSA and ESA (but not in all Modes).</p> <p>Paused: monitored by VSA (E4406A).</p> <p>Printing: monitored by VSA (E4406A).</p> <p>Mass memory busy: monitored by VSA (E4406A).</p>
Initial S/W Revision:	Prior to A.02.00

### Query Instrument Options

Returns a string of all the installed instrument options. It is a comma separated list with quotes, such as: "503,P03,PFR".

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous SA products and software. So, the actual implementation will use arbitrary ascii. But quotes will be sent as the first and last ascii characters that are sent with the comma-separated option list.

Remote Command:	*OPT?
Initial S/W Revision:	Prior to A.02.00

### Recall Instrument State

This command recalls the instrument state from the specified instrument memory register.

If the state being loaded has a newer firmware revision than the revision of the instrument, no state is recalled and an error is reported

If the state being loaded has an equal firmware revision than the revision of the instrument, the state will be loaded.

If the state being loaded has an older firmware revision than the revision of the instrument, the instrument will only load the parts of the state that apply to the older revision.

Remote Command:	*RCL <register #>
Example:	*RCL 7 Recalls the instrument state that is currently stored in register 7.
Notes:	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.
Min:	0
Max:	127
Status Bits/OPC dependencies:	The command is sequential.
Initial S/W Revision:	Prior to A.02.00

### Save Instrument State

This command saves the current instrument state and mode to the specified instrument memory register.

Remote Command:	*SAV <register #>
Example:	*SAV 9 Saves the instrument state in register 9.
Notes:	Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers.
Min:	0
Max:	127
Status Bits/OPC dependencies:	The command is sequential.
Initial S/W Revision:	Prior to A.02.00

### Service Request Enable

This command enables the desired bits of the service request enable register.

The query returns the value of the register, indicating which bits are currently enabled.

Remote Command:	*SRE <integer> *SRE?
Example:	*SRE 22 Enables bits 1, 2, and 4 in the service request enable register.
Notes:	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset:	0
Min:	0
Max:	255

Status Bits/OPC dependencies:	Service Request Enable Register (all bits, 0 – 7).
Initial S/W Revision:	Prior to A.02.00

### Status Byte Query

Returns the value of the status byte register without erasing its contents.

Remote Command:	*STB?
Example:	*STB? Returns a decimal value for the bits in the status byte register. For example, if a 16 is returned, it indicates that bit 5 is set and one of the conditions monitored in the standard event status register is set.
Notes:	See related command *CLS.
Status Bits/OPC dependencies:	Status Byte Register (all bits, 0 – 7).
Initial S/W Revision:	Prior to A.02.00

### Trigger

This command triggers the instrument. Use the :TRIGger[:SEQuence]:SOURce command to select the trigger source.

Key Path:	<b>No equivalent key. See related keys Single and Restart.</b>
Remote Command:	*TRG
Example:	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Notes:	See related command :INITiate:IMMediate.
Initial S/W Revision:	Prior to A.02.00

### Self Test Query

This query performs the internal self-test routines and returns a number indicating the success of the testing. A zero is returned if the test is successful, 1 if it fails.

Remote Command:	*TST?
Example:	*TST? Runs the self-test routines and returns 0=passed, 1=some part failed.
Initial S/W Revision:	Prior to A.02.00

### Wait-to-Continue

This command causes the instrument to wait until all overlapped commands are completed before

executing any additional commands. There is no query form for the command.

Remote Command:	*WAI
Example:	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
Status Bits/OPC dependencies:	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from.
Initial S/W Revision:	Prior to A.02.00







## File

Opens a menu that enables you to access various standard and custom Windows functions. Press any other front-panel key to exit

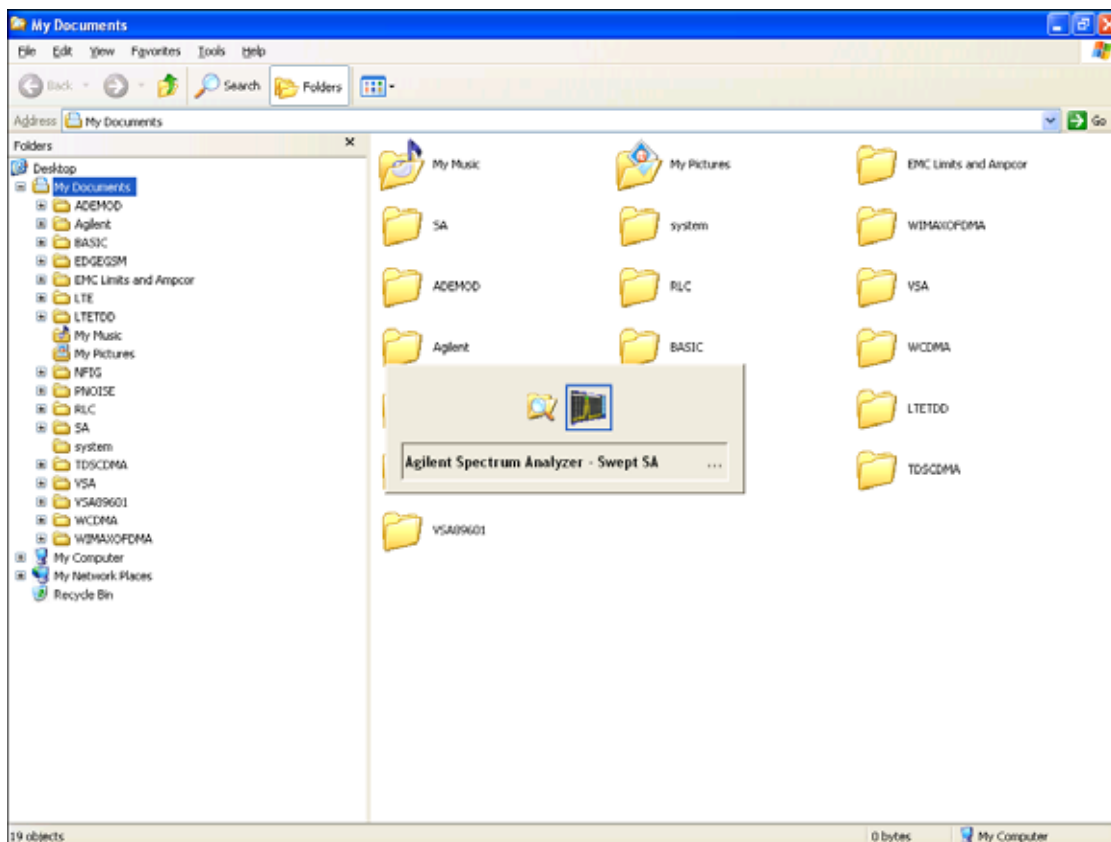
Key Path:	<b>Front-panel key</b>
Initial S/W Revision:	Prior to A.02.00

## File Explorer

Opens the standard Windows File Explorer. The File Explorer opens in the My Documents directory for the current user.

The File Explorer is a separate Windows application, so to return to the analyzer once you are in the File Explorer, you may either:

Exit the File Explorer by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer

logo is showing in the window in the center of the screen, as shown above, then release the Alt key.

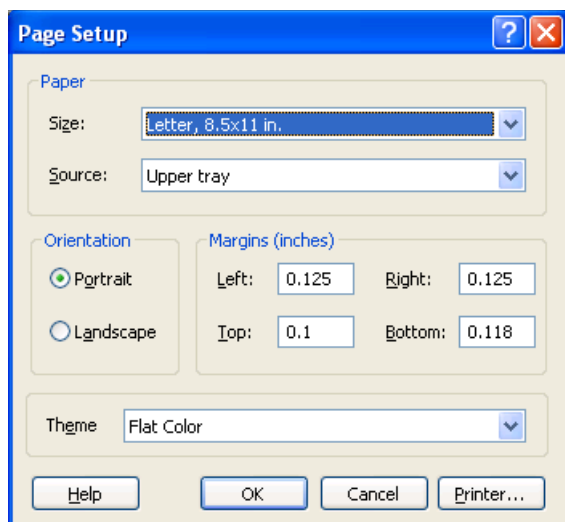
Key Path:	File
Initial S/W Revision:	Prior to A.02.00

## Page Setup

The Page Setup key brings up a Windows Page Setup dialog that allows you to control aspects of the pages sent to the printer when the PRINT hardkey is pressed.

Key Path:	File
Initial S/W Revision:	Prior to A.02.00

Paper size, the printer paper source, the page orientation and the margins are all settable. Just like any standard Windows dialog, you may navigate the dialog using the front-panel keys, or a mouse. There are no SCPI commands for controlling these parameters.



Also contained in this dialog is a drop-down control that lets you select the Theme to use when printing. For more on Themes, see information under View/Display, Display, System Display Settings, Theme. The Theme control has a corresponding SCPI command.

Parameter Name:	Print Themes
Parameter Type:	Enum
Mode:	All
Remote Command:	:SYSTem:PRINT:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :SYSTem:PRINT:THEMe?
Example:	:SYST:PRIN:THEM FCOL

Setup:	:SYSTem:DEFault MISC
Preset:	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

## Print

The Print key opens a Print dialog for configured printing ( for example, to the printer of your choice). Refer to your Microsoft Windows Operating System manual for more information.

## Maximize/Restore Down

These keys allow the Instrument Application to be maximized and then restored to its prior state. Only one of the two keys is visible at a time. When not already maximized the Maximize Application key is visible, and when maximized, the Restore Down Application key is visible and replaces the Maximize Application key.

### Maximize

This key allows you to Maximize the Instrument Application, which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

Key Path:	<b>File</b>
Mode:	<b>All</b>
Notes:	No equivalent remote command for this key.
State Saved:	No
Initial S/W Revision:	A.05.01


### Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

Key Path:	<b>File</b>
Mode:	<b>All</b>
Notes:	No equivalent remote command for this key.
State Saved:	No
Initial S/W Revision:	A.05.01

## Minimize

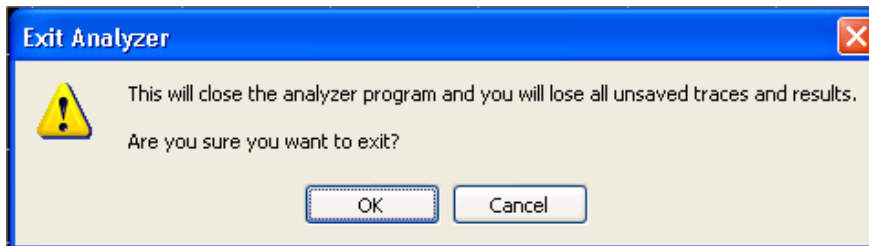
The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see

the Windows Desktop. You can use Alt-Tab (press and hold the Alt  key and press and release the Tab key) to restore the analyzer display.

Key Path:	<b>File</b>
Mode:	<b>All</b>
Notes:	No equivalent remote command for this key.
State Saved:	No
Initial S/W Revision:	A.05.01

## Exit

This key, when pressed, will exit the Instrument Application. A dialog box is used to confirm that you intended to exit the application:



Key Path:	<b>File</b>
Mode:	All
Notes:	The Instrument Application will close. No further SCPI commands can be sent. Use with caution!
Initial S/W Revision:	Prior to A.02.00

---

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

Aborts the currently running measurement.

Brings up the default menu for the mode, with no active function.

Sets measurement Global settings to their preset values for the active mode only.

Activates the default measurement.

Brings up the default menu for the mode.

Clears the input and output buffers.

Sets Status Byte to 0.

Mode Preset does not:

Cause a mode switch

Affect mode persistent settings

Affect system settings

See [“How-To Preset” on page 119](#) for more information.

Key Path:	<b>Front-panel key</b>
Remote Command:	:SYSTem:PRESet
Example:	:SYST:PRES
Notes:	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings:	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.

Backwards Compatibility Notes:	<p>In the X-Series, the legacy “Factory Preset” has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way in to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA.</p> <p>There is also no “Preset Type” as there is on the PSA. There is a green Mode Preset front-panel key that does a <b>Mode Preset</b> and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues.</p> <p>The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using User Preset.</p>
Initial S/W Revision:	Prior to A.02.00

### How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu

System Functions  
Mode Preset

Type Of Preset	SCPI Command	Front Panel Access
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu
Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

### Restore Mode Defaults

Resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by the Restore System Defaults function. This function does reset mode data; as well as settings.

Key Path:	<b>Mode Setup</b>
Remote Command:	:INSTrument:DEFault
Example:	:INST:DEF
Notes:	Clears all pending OPC bits. The Status Byte is set to 0. A message comes up saying: "If you are sure, press key again".
Couplings:	A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision:	Prior to A.02.00



## Meas Preset

Resets the measurement local variables for the currently active measurement to their factory default values. The measurement settings that get reset are the same ones that are reset during a Mode Preset. This function keeps the instrument in the current measurement and the current mode and does not affect the settings for other measurements, but does abort the currently running measurement.

Key Path:	<b>Meas Setup</b>
Remote Command:	:CONFigure:<Measurement>
Example:	:CONF:ACP immediately does a Meas Preset to the ACP measurement.
Notes:	Clears the Measuring bit  :CONF:<Measurement> resets the specified measurement settings to default in ESA, VSA and PSA; in GPSA it allows the addition of the NDEFault node to the command to prevent a measurement preset from occurring after a measurement switch.  :MEASure:<Measurement> also restores the default values of the selected measurement, but it also initiates the specified measurement.
Initial S/W Revision:	Prior to A.02.00

## Preset Type (Remote Command Only)

As stated in the Backward Compatibility section, to be compatible with ESA/PSA the PRESet:TYPE command will be implemented as a no-op.

Mode:	All
Remote Command:	:SYSTem:PRESet:TYPE FACTory  MODE  USER :SYSTem:PRESet:TYPE?
Example:	:SYST:PRESet:TYPE FACT
Notes:	This command is supported for backward compatibility only. It is a no-op which does not change the behavior of any preset operation.
Preset:	This is unaffected by Preset but is set to Mode on a “Restore System Defaults->All”
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

## \*RST (Remote Command Only)

\*RST is equivalent to :SYST:PRESet::INIT:CONT OFF, which is a Mode Preset in the Single measurement state. This remote command is preferred over Mode Preset remote command - :SYST:PRESet, as optimal remote programming occurs with the instrument in the single measurement

System Functions  
Mode Preset

state.

Remote Command:	*RST
Example:	*RST
Notes:	Sequential Clears all pending OPC bits and the Status Byte is set to 0.
Couplings:	A *RST will cause the currently running measurement to be aborted and cause the default measurement to be active. *RST gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes:	In legacy analyzers *RST did not set the analyzer to Single, but in the X-Series it does, for compliance with the IEEE 488.2 specification.  In the X-Series, *RST does not do a *CLS (clear the status bits and the error queue). In legacy analyzers, *RST used to do the equivalent of SYSTem:PRESet, *CLS and INITiate:CONTinuous OFF. But to be 488.2 compliant, *RST in the X-Series does not do a *CLS.
Initial S/W Revision:	Prior to A.02.00

---

## Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPY command is equivalent to pressing the PRINT key. The HCOpy:ABORt command can be used to abort a print which is already in progress. Sending HCOpy:ABORt will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORt command.

Key Path:	<b>Front-panel key</b>
Remote Command:	:HCOPY[:IMMediate]
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>SCPI command only</b>
Remote Command:	:HCOpy:ABORt
Initial S/W Revision:	Prior to A.02.00

---

## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

Register saves are not remembered as Saves for the purpose of the Quick Save function

If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does,

and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

---

**NOTE** Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

---

---

**NOTE** If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

---

Key Path:	<b>Front-panel key</b>
Notes:	No remote command for this key specifically.
Initial S/W Revision:	Prior to A.02.00

## Recall

The **Recall** menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an **Import (Data)** option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path:	<b>Front-panel key</b>
Notes:	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes:	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes:	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn’t support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can’t be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision:	Prior to A.02.00

## State

The **Recall State** menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. **Recall State** will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 128](#).

Key Path:	Recall
Mode:	All
Remote Command:	:MMEMory:LOAD:STATe <filename>
Example:	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
Example:	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.

System Functions  
**Recall**

Notes:	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <p>If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</p> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>Makes the saved measurement for the mode the active measurement.</li> <li>Clears the input and output buffers.</li> <li>Status Byte is set to 0.</li> <li>Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
Backwards Compatibility SCPI:	<p>:MMEMory:LOAD:STATe 1,&lt;filename&gt;</p> <p>For backwards compatibility, the above syntax is supported. The "1" is simply ignored.</p>
Initial S/W Revision:	Prior to A.02.00

**More Information**

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.



The following table describes the Trace Save and Recall possibilities:

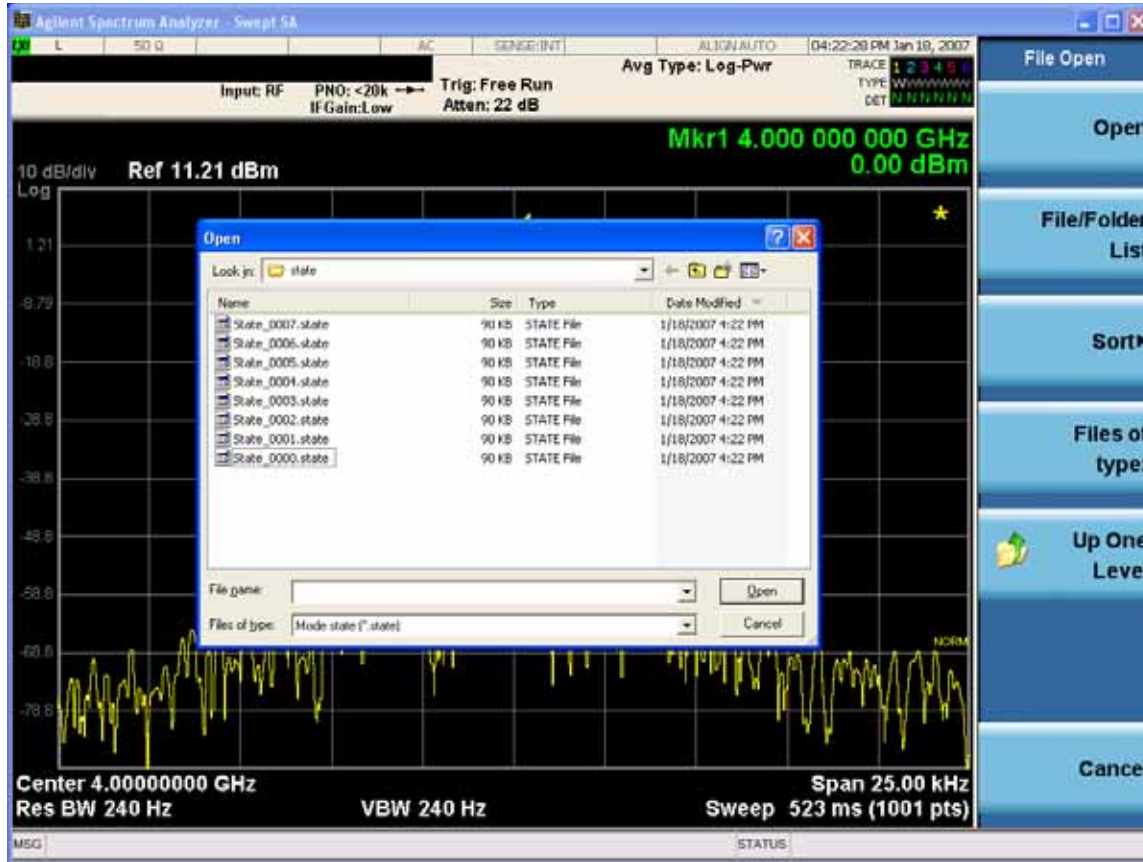
<p>You want to recall state and one trace's data, leaving other traces unaffected.</p>	<p>Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.</p>	<p>On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.</p>
<p>You want to recall all traces</p>	<p>Save Trace+State from ALL traces.</p>	<p>On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)</p>
<p>You want all traces to load exactly as they were when saved.</p>	<p>Save State</p>	<p>On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.</p>

**From File...**

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

## System Functions

### Recall



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

#### Look In

The **Look In** field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

#### Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can

be selected at a time and the sorting happens immediately. The sorting types are **By Date**, **By Name**, **By extension**, and **By Size**.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, "Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path:	<b>Recall, State</b>
Notes:	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision:	Prior to A.02.00

#### **Edit Register Names**

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the **Save, State** function.

Key Path:	<b>Recall, State</b>
Mode:	All
Dependencies:	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision:	A.11.00

#### **Register 1 thru Register 16**

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key under **Save, State** to enter custom names for each register.

## System Functions

### Recall

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path:	<b>Recall, State</b>
Example:	*RCL 1
Range:	1–16 from front panel, 1–128 from SCPI
Readback:	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the <b>Save, State, Edit Register Names</b> key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	Prior to A.11.00

### Trace (+State)

The Recall Trace (+State) menu lets you choose a register or file from which to recall the Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode’s state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled. Recall Trace (+State) will also cause a mode switch if the state being recalled is not for the current active mode.

After the recall completes, the message "File <filename> recalled" or “Recalled Trace Register <register number>” is displayed.

For rapid recalls, the Trace (+State) menu lists 5 registers to choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files including .trace files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path:	<b>Recall</b>
Mode:	SA
Remote Command:	:MMEMory:LOAD:TRACe TRACE1   TRACE2   TRACE3   TRACE4   TRACE5   TRACE6 , <filename>  :MMEMory:LOAD:TRACe:REGister TRACE1   TRACE2   TRACE3   TRACE4   TRACE5   TRACE6 , <integer>
Example:	MMEM:LOAD:TRAC TRACE2,"MyTraceFile.trace"  This loads the trace file data (on the default file directory path) into the specified trace; if it is a "single trace" save file, that trace is loaded to trace 2, and is set to be not updating.  :MMEM:LOAD:TRAC:REG TRACE1,2  restores the trace data in register 2 to Trace 1
Notes:	<p>When you perform the recall, the recalling Trace function must first verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, and loading the state from the saved state file to as close as possible to the context in which the save occurred. You can open .trace files from any mode that supports them, so recalling a Trace file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file and the saved measurement of the mode becomes the newly active measurement, and the data relevant to the measurement (if there is any) is recalled.</p> <p>Once the state is loaded, the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating (so as not to erase the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data (to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved.</p> <p>After the Recall the analyzer exits the Recall menu and returns to the previous menu.</p> <p>Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1   TRACE2   TRACE3 , &lt;filename&gt;</p>
Initial S/W Revision:	Prior to A.02.00

### Register 1 thru Register 5

Selecting any one of these register keys causes the Traces and State from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified.

## System Functions

### Recall

Trace registers are shared by all modes, so recalling from any one of the 5 registers may cause a mode switch to the mode that was active when the save to the Register occurred.

Key Path:	<b>Recall, Trace</b>
Range:	1–5
Readback:	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision:	Prior to A.02.00

### To Trace

These menu selections let you choose the Trace where the recalled saved trace will go. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Detector, Export Data, Import Data, or Save Trace menus, except if you have chosen All, then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "**To Trace**" is ignored and the traces each go back to the trace from which they were saved.

Once selected, the key returns back to the Recall Trace menu and the selected Trace number is annotated on the key. Now you have selected exactly where the trace needs to be recalled. To trigger a recall of the selected Trace, you must select the **Open** key in the Recall Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other traces.

Key Path:	<b>Save, Data, Trace</b>
Mode:	SA
Initial S/W Revision:	Prior to A.02.00

### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "**File Open.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See "[From File...](#)" on page 129 under Save, State for a full description of this dialog and menu.

Key Path:	<b>Recall, Trace</b>
Mode:	SA
Notes:	Brings up Open dialog for recalling a Trace Save Type
Initial S/W Revision:	Prior to A.02.00

### Sequences

This menu and all of its submenus are only available in the EXT (E6607A).

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path:	<b>Recall, Sequences</b>
Mode:	All
Remote Command:	:MMEMory:LOAD:SEQuences:  SLIS  ALIS  SAALIS   "MySequence.txt"
Example:	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes:	Available file types are: CSV (Comma delimited) (*.csv) Text (Tab delimited) (*.txt)
Initial S/W Revision:	A.05.00

### Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path:	<b>Recall, Sequences</b>
Example:	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies:	Only available in XOBT
Initial S/W Revision:	A.05.00

### Analyzer Sequence

Only Available in: Sequence Analyzer Mode

The list of parameters, that configure steps, that makes up a sequence for the Analyzer.

The Analyzer sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range for measuring the performance of a transmitters output

Key Path:	<b>Recall, Sequences</b>
Example:	:MMEM:LOAD:SEQ:ALIS "MySequence.txt"
Dependencies:	Only available in XOBT, Sequence Analyzer mode
Initial S/W Revision:	A.05.00

### Source and Analyzer Sequence

Only Available in: Sequence Analyzer Mode

The list of parameters, that configure steps, that makes up sequences for the Analyzer and the Source.

The Source and Analyzer sequence is completely configurable and can have internal triggers between the source and the analyzer to orchestrate a sequence to completely test an external transmitter and receiver's performance.

Key Path:	<b>Recall, Sequences</b>
Example:	:MMEM:LOAD:SEQ:SAAL "MySequence.txt"
Dependencies:	Only available in XOBT, Sequence Analyzer mode
Initial S/W Revision:	A.05.00

### Open...

Pressing **File Open** brings up the File Open standard Windows dialog and the File Open key menu.

When the user navigates to this selection, they have already determined they are recalling a specific Data Type and now they want to specify which file to open.

When you first enter this dialog, the path is in the Look In: field in this File Open dialog depends on which import data type you navigated here from.

The only files that are visible are those specific to the file type being recalled.

Key Path:	<b>Recall, Sequence</b>
Notes:	The key location is mode-dependent and will vary.
Notes:	Brings up Open dialog for recalling a <sequence> Save Type
Initial S/W Revision:	A.05.00

### Data (Import)

Importing a data file loads data that was previously saved from the current measurement or from other measurements and/or modes that produce compatible data files. The Import Menu only contains Data Types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by the user prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall



occurs as soon as the Open button is pressed.

Key Path:	<b>Recall</b>
Mode:	All
Notes:	The menu is built from whatever data types are available for the mode. Some keys will be missing completely, so the key locations in the sub-menu will vary.  No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:LOAD commands.
Dependencies:	If a file type is not used by a certain measurement, it is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset:	Is not affected by Preset or shutdown, but is reset during Restore Mode Defaults
Readback:	The data type that is currently selected
Initial S/W Revision:	Prior to A.02.00

### Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See “[From File...](#)” on page 129 in **Recall, State**, for a full description of this dialog and menu.

Key Path:	<b>Recall, Data</b>
Notes:	The key location is mode-dependent and will vary.  Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision:	Prior to A.02.00

## Save

The **Save** menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an **Export (Data)** option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path:	<b>Front-panel key</b>
Mode:	All
Notes:	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision:	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the **Input/Output** system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent **System** settings (for example, GPIB address) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<mode name>\state

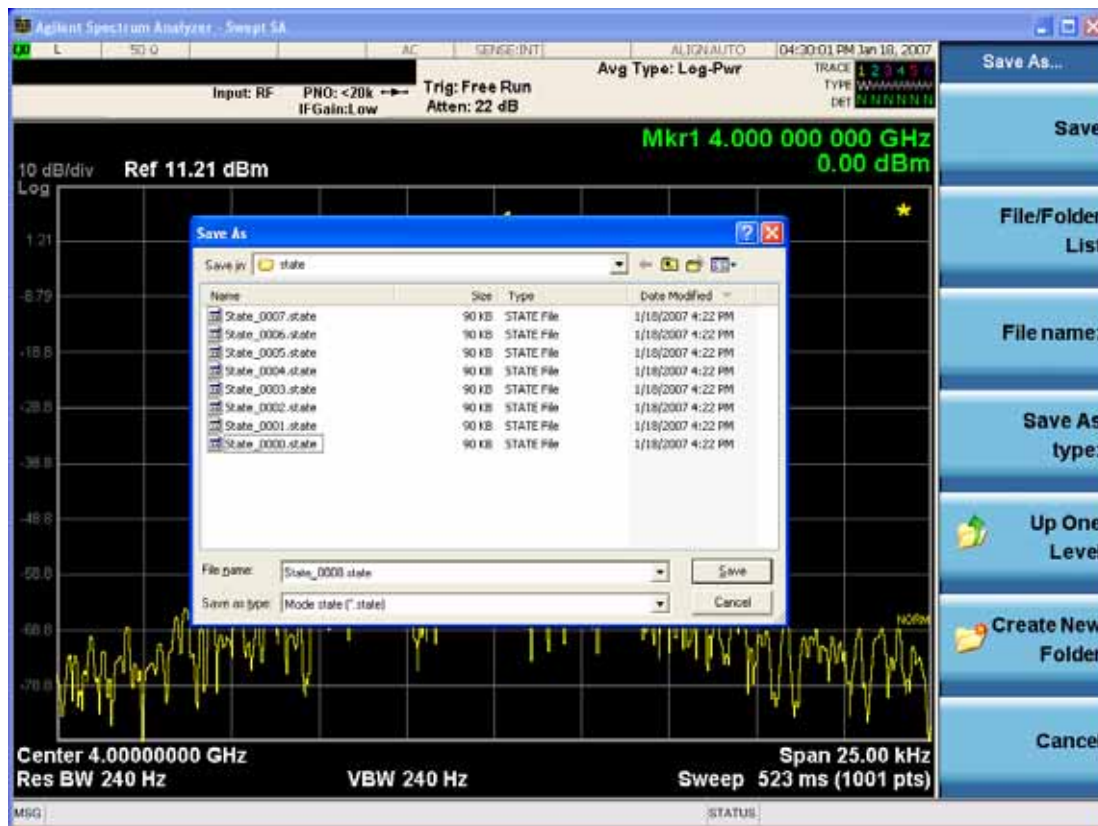
where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path:	<b>Save</b>
Mode:	All
Remote Command:	:MMEMory:STORe:STATe <filename>
Example:	MMEM:STOR:STATe "MyStateFile.state"  This stores the current instrument state data in the file MyStateFile.state in the default directory.

Notes:	<p>Both single and double quotes are supported for any filename parameter over remote.</p> <p>After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.</p> <p>After saving to a register, you remain in the <b>Save State</b> menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.</p>
Backwards Compatibility SCPI:	<p>:MMEMory:STORe:STATe 1,&lt;filename&gt;</p> <p>For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.</p>
Initial S/W Revision:	Prior to A.02.00

**To File . . .**

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.



The

Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

**Save**

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting **OK**, or you can Cancel the request. If you select

## System Functions

### Save

OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using **Restore Mode Defaults**.

#### File Name

The **File Name** field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the [“Quick Save” on page 124](#) documentation for more on the automatic file naming algorithm.

When you press the **File Name** key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the **Done** softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, "Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the **Cancel** selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path:	<b>Save, State</b>
Mode:	All
Notes:	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision:	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the **Edit Register Names** key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See [“More Information” on page 141](#)

Key Path:	<b>Save, State</b>
Mode:	All
Remote Command:	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
Example:	:MMEM:REG:STAT:LAB 1,"my label"
Notes:	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number"  "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters"  "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies:	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset:	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision:	A.11.00

### More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the **Edit Register Names** key to enter custom names for each register.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path:	<b>Save, State</b>
Mode:	All
Example:	*SAV 1
Range:	1–16 from front panel, 1–128 from SCPI
Readback:	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the <b>Edit Register Names</b> key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.11.00

### Trace (+State)

The **Save Trace (+State)** menu lets you choose a register or file specifying where to save the

Trace+State state file.

A saved state contains all of the settings and data required to return the analyzer as closely as possible to the exact setup it had when the save occurred. This includes the Input/Output settings, even though they are outside of the Mode's state, because they are needed to restore the complete setup. A Trace+State file also includes trace data from one trace or all traces, which will load in View mode when the Trace+State file is recalled.

After the save completes, the message "File <filename> saved" or "Trace Register <register number> saved" is displayed.

For rapid saves, the Trace (+State) menu lists 5 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files including .trace files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

This key is grayed out for measurements that do not support trace saves. It is blanked for modes that do not support trace saves. Saving **Trace** is identical to saving State except a .trace extension is used on the file instead of .state, and internal flags are set in the file indicating which trace was saved. You may select to save one trace or ALL traces.

Key Path:	<b>Save</b>
Mode:	SA
Remote Command:	:MMEMory:STORe:TRACe TRACE1   TRACE2   TRACE3   TRACE4   TRACE5   TRACE6   ALL, <filename> >  :MMEMory:STORe:TRACe:REGister TRACE1   TRACE2   TRACE3   TRACE4   TRACE5   TRACE6   ALL, <integer>
Example:	:MMEM:STOR:TRAC TRACE1, "myState.trace" saves the file myState.trace on the default path and flags it as a "single trace" file with Trace 1 as the single trace (even though all of the traces are in fact stored).  :MMEM:STOR:TRAC ALL, "myState.trace" saves the file myState.trace on the default path and flags it as an "all traces" file  :MMEM:STOR:TRAC:REG TRACE1,2 stores trace 1 data in trace register 2

Notes:	<p>This command actually performs a save state, which in the Swept SA measurement includes the trace data. However it flags it (in the file) as a “save trace” file of the specified trace (or all traces).</p> <p>Some modes and measurements do not have available all 6 traces. The Phase Noise mode command, for example, is: <code>MMEMory:STORE:TRACe TRACE1 TRACE2 TRACE3 ALL,&lt;filename&gt;</code></p> <p>The range for the register parameter is 1–5</p> <p>When you initiate a save, if the file already exists, a dialog will appear that allows you to replace the existing file by selecting <b>OK</b> or you can Cancel the request. If you select OK, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.</p> <p>Both single and double quotes are supported for any filename parameter over remote.</p> <p>After saving to a register, that register’s menu key is updated with the date and time of the save.</p> <p>After saving to a register, you remain in the <b>Save Trace</b> menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.</p>
Initial S/W Revision:	Prior to A.02.00

### Register 1 thru Register 5

Selecting any one of these register menu keys causes the Trace(s) specified under From Trace, along with the state of the currently active mode, to be saved to the specified Trace Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified.

Key Path:	<b>Save, Trace</b>
Mode:	SA
Range:	1–5
Readback:	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Initial S/W Revision:	Prior to A.02.00

### From Trace

Accesses a menu that enables you to select the trace to be saved. Once a trace is selected, the key returns to the Save Trace menu and the selected trace number is annotated on the key. The default is the currently selected trace, selected in this menu or in the Trace/Det, Export Data, Import Data or Recall Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace. To save the Trace you must select the **Save As** key in the Save Trace menu.

When you select a trace, it makes that trace the current trace, so it displays on top of all of the other



traces.

Key Path:	<b>Save, Trace + State</b>
Mode:	SA
Initial S/W Revision:	Prior to A.02.00

### To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See “To File . . .” on page 139 in **Save, State** for a full description of this dialog and menu.

Key Path:	<b>Save, Trace (+State)</b>
Mode:	SA
Notes:	Brings up Save As dialog for saving a Trace+State Save Type
Initial S/W Revision:	Prior to A.02.00

## Sequences

This menu and all of its submenus are only available in the EXT (E6607A).

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path:	<b>Save, Sequences</b>
Mode:	All
Remote Command:	:MMEM:STOR:SEquences:  SLISt  ALISt  SAALISt  SSTep "MySequence.txt"
Example:	:MMEM:STOR:SEQ:SLISt "MySequence.txt"
Notes:	Available file types are: CSV (Comma delimited) (*.csv) Text (Tab delimited) (*.txt)
Initial S/W Revision:	A.05.00

### Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the

instruments frequency range.

Key Path:	<b>Save, Sequences</b>
Example:	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies:	Only available in XOBT
Initial S/W Revision:	A.05.00

### Analyzer Sequence

Only Available in: Sequence Analyzer Mode

The list of parameters, that configure steps, that makes up a sequence for the Analyzer.

The Analyzer sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range for measuring the performance of a transmitters output

Key Path:	<b>Save, Sequences</b>
Example:	:MMEM:STOR:SEQ:ALIS "MySequence.txt"
Dependencies:	Only available in XOBT, Sequence Analyzer mode
Initial S/W Revision:	A.05.00

### Source and Analyzer Sequence

Available in: Sequence Analyzer Mode

The list of parameters, that configure steps, that makes up a sequence for the Analyzer and the Source.

The Source and Analyzer sequence is completely configurable and can have internal triggers between the source and the analyzer to orchestrate a sequence to completely test an external transmitter and receiver's performance.

Key Path:	<b>Save, Sequences</b>
Example:	:MMEM:STOR:SEQ:SAAL "MySequence.txt"
Dependencies:	Only available in XOBT, Sequence Analyzer mode
Initial S/W Revision:	A.05.00

### Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path:	<b>Save, Sequences</b>
Mode:	All
Notes:	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision:	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path:	<b>Save</b>
Mode:	All
Notes:	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary.  No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies:	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset:	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback:	The data type that is currently selected
Initial S/W Revision:	Prior to A.02.00

## Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See “[To File . . .](#)” on page 139 in **Save, State** for a full description of this dialog and menu.

The default path for saving files is:

## System Functions

### Save

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

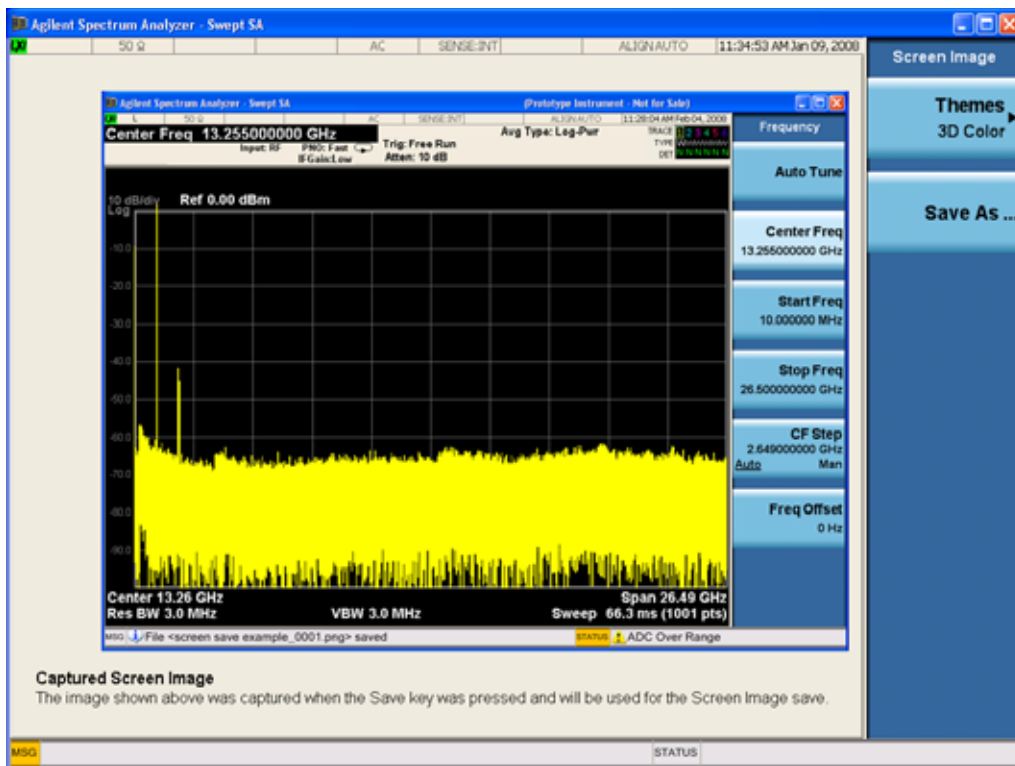
Key Path:	<b>Save, Data</b>
Mode:	All
Notes:	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision:	Prior to A.02.00

### Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

---

**NOTE** For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

---

Key Path:	<b>Save</b>
Mode:	All
Remote Command:	:MMEMory:STORe:SCReem <filename>
Example:	:MMEM:STOR:SCR "myScreen.png"  This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision:	Prior to A.02.00

**Themes**

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path:	<b>Save, Screen Image</b>
Remote Command:	:MMEMory:STORe:SCReen:THEMe TDCOLOR   TDMonochrome   FCOLOR   FMONochrome :MMEMory:STORe:SCReen:THEMe?
Example:	:MMEM:STOR:SCR:THEM TDM
Preset:	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback:	3D Color   3D Mono   Flat Color   Flat Mono
Backwards Compatibility Notes:	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if the user selected Reverse Bitmap AND a black&white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision:	Prior to A.02.00

**3D Color**

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path:	<b>Save, Screen Image, Themes</b>
Example:	MMEM:STOR:SCR:THEM TDC
Readback:	3D Color
Initial S/W Revision:	Prior to A.02.00

**3D Monochrome**

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path:	<b>Save, Screen Image, Themes</b>
Example:	MMEM:STOR:SCR:THEM TDM
Readback:	3D Mono
Initial S/W Revision:	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path:	<b>Save, Screen Image, Themes</b>
Example:	MMEM:STOR:SCR:THEM FCOL
Readback:	Flat Color
Initial S/W Revision:	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path:	<b>Save, Screen Image, Themes</b>
Example:	MMEM:STOR:SCR:THEM FMON
Readback:	Flat Mono
Initial S/W Revision:	Prior to A.02.00

### Save As...

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The **Tab** and **Arrow** keys can also be used for dialog navigation.

See “[To File . . .](#)” on page 139 in **Save, State** for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path:	<b>Save, Screen Image</b>
Notes:	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Catalog (Remote Command Only)

Remote Command:	:MMEMory:CATalog? [<directory_name>]
Notes:	<p>The string must be a valid logical path.</p> <p>Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format:</p> <p>&lt;numeric_value&gt;,&lt;numeric_value&gt;,{&lt;file_entry&gt;}</p> <p>It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The &lt;file_entry&gt; is a string. Each &lt;file_entry&gt; indicates the name, type, and size of one file in the directory list:</p> <p>&lt;file_name&gt;,&lt;file_type&gt;,&lt;file_size&gt;</p> <p>As the windows file system has an extension that indicates file type, &lt;file_type&gt; is always empty. &lt;file_size&gt; provides the size of the file in bytes. For directories, &lt;file_entry&gt; is surrounded by square brackets and both &lt;file_type&gt; and &lt;file_size&gt; are empty</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Change Directory (Remote Command Only)

Remote Command:	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes:	<p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The &lt;directory_name&gt; parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Copy (Remote Command Only)

Remote Command:	:MMEMory:COPY <string>,<string>[,<string>,<string>]
-----------------	---



Notes:	<p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>
--------	--

### Mass Storage Delete (Remote Command Only)

Remote Command:	:MMEMory:DELeTe <file_name>[, <directory_name>]
Notes:	<p>The string must be a valid logical path.</p> <p>Removes a file from the specified directory. The &lt;file_name&gt; parameter specifies the file name to be removed. This command will generate an "access denied" error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Remote Command:	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes:	<p>The string must be a valid logical path.</p> <p>The command form is MMEMory:DATA &lt;file_name&gt;,&lt;data&gt;. It loads &lt;data&gt; into the file &lt;file_name&gt;. &lt;data&gt; is in 488.2 block format. &lt;file_name&gt; is string data.</p> <p>The query form is MMEMory:DATA? &lt;file_name&gt; with the response being the associated &lt;data&gt; in block format.</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Make Directory (Remote Command Only)

Remote Command:	:MMEMOry:MDIRectory <directory_name>
Notes:	<p>The string must be a valid logical path.</p> <p>Creates a new directory. The &lt;directory_name&gt; parameter specifies the name to be created.</p> <p>This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Move (Remote Command Only)

Remote Command:	:MMEMOry:MOVE <string>, <string> [, <string>, <string>]
Notes:	<p>The string must be a valid logical path.</p> <p>Moves an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an “access denied” error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>
Initial S/W Revision:	Prior to A.02.00

### Mass Storage Remove Directory (Remote Command Only)

Remote Command:	:MEMMOry:RDIRectory <directory_name>
Notes:	<p>The string must be a valid logical path.</p> <p>Removes a directory. The &lt;directory_name&gt; parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an “access denied” error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p>
Initial S/W Revision:	Prior to A.02.00

## System

Opens a menu of keys that access various configuration menus and dialogs.

Key Path:	<b>Front-panel key</b>
Notes:	No remote command for this key specifically.
Initial S/W Revision:	Prior to A.02.00

## Show

Accesses a menu of choices that enable you to select the information window you want to view.

Key Path:	<b>System</b>
Mode:	All
Remote Command:	:SYSTem:SHOW OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPPLication :SYSTem:SHOW?
Example:	:SYST:SHOW SYST
Notes:	This command displays (or exits) the various System information screens.
Preset:	OFF
State Saved:	No
Range:	OFF ERRor SYSTem HARDware LXI HWSTatistics ALIGNment SOFTware CAPPLication
Initial S/W Revision:	Prior to A.02.00

## Errors

There are two modes for the Errors selection, History and Status.

The list of errors displayed in the Errors screen does not automatically refresh. You must press the Refresh key or leave the screen and return to it to refresh it.

History brings up a screen displaying the event log in chronological order, with the newest event at the top. The history queue can hold up to 100 messages (if a message has a repeat count greater than 1 it only counts once against this number of 100). Note that this count bears no relation to the size of the SCPI queue. If the queue extends onto a second page, a scroll bar appears to allow scrolling with a mouse. Time is displayed to the second.

Status brings up a screen summarizing the status conditions currently in effect. Note that the time is displayed to the second.

The fields on the Errors display are:

**System Functions**  
**System**

Type (unlabeled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) - This field shows the number of consecutive instances of the event, uninterrupted by other events. If an event occurs 5 times with no other intervening event, the value of repeat will be 5.

If the value of Repeat is 1 the field does not display. If the value of Repeat is >1, the time and date shown are those of the most recent occurrence. If the value of repeat reaches 999,999 it stops there.

Time - Shows the most recent time (including the date) at which the event occurred.

Key Path:	<b>System, Show</b>
Mode:	All
Remote Command:	:SYSTem:ERRor [:NEXT] ?
Example:	:SYST:ERR?
Notes:	The return string has the format: “<Error Number>,<Error>” Where <Error Number> and <Error> are those shown on the Show Errors screen
Backwards Compatibility Notes:	In some legacy analyzers, the Repeat field shows the number of times the message has repeated since the last time the error queue was cleared. In the X-Series, the Repeat field shows the number of times the error has repeated since the last intervening error. So the count may very well be different than in the past even for identical signal conditions  Unlike previous analyzers, in the X-Series all errors are reported through the Message or Status lines and are logged to the event queue. They never appear as text in the graticule area (as they sometimes do in previous analyzers) and they are never displayed in the settings panel at the top of the screen (as they sometimes do, by changing color, in previous analyzers).  As a consequence of the above, the user can only see one status condition (the most recently generated) without looking at the queue. In the past, at least in the Spectrum Analyzer, multiple status conditions might display on the right side of the graticule.  In general, there is no backwards compatibility specified or guaranteed between the error numbers in the X-Series and those of earlier products. Error, event, and status processing code in customers’ software will probably need to be rewritten to work with X-Series.  In the legacy analyzers, some conditions report as errors and others simply turn on status bits. Conditions that report as errors often report over and over as long as the condition exists. In the X-series, all conditions report as start and stop events. Consequently, software that repeatedly queries for a condition error until it stops reporting will have to be rewritten for the X-series.
Initial S/W Revision:	Prior to A.02.00

### Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

If on the last page of the log, the Next Page key is grayed-out

If on the first page of the log, the Previous Page key is grayed-out.

If there is only one page, both keys are grayed out.

Key Path:	<b>System, Show, Errors</b>
Initial S/W Revision:	Prior to A.02.00

### Previous Page

See [“Next Page” on page 157.](#)

Key Path:	<b>System, Show, Errors</b>
Initial S/W Revision:	Prior to A.02.00

### History

The History and Status keys select the Errors view. The Status key has a second line which shows a number in [square brackets]. This is the number of currently open status items.

Key Path:	<b>System, Show, Errors</b>
Initial S/W Revision:	Prior to A.02.00

### Status

See [“History” on page 157.](#)

### Verbose SCPI On/Off

When you turn Verbose SCPI on, additional information is returned when you send the :SYSTem:ERRor? query. The additional information consists of the characters that stimulated the error. This can aid you in debugging your test programs by indicating where in the parsing of a SCPI command the instrument encountered an invalid command or query.

Specifically, with Verbose SCPI on, the SYSTem:ERRor? query is expanded to show the SCPI data received, with the indicator <Err> at the point in the stream that the error occurred.

Verbose SCPI has no effect on the Show Errors screen or front panel Message Line; it only changes the response to the :SYST:ERR? query.

See the example below, where the invalid command “SENS:BOGUS” is sent:

Normal response to :SYST:ERR (using the Telnet window):

```
SCPI> SENS:BOGUS
SCPI> SYST:ERR?
```

System Functions  
System

-113,"Undefined header"

Now after turning on Verbose SCPI:

SCPI> SYST:BOGUS

SCPI> SYST:ERR?

-113,"Undefined header;SYST:BOGUS<Err>"

Key Path:	<b>System, Show, Errors</b>
Mode:	All
Remote Command:	:SYSTem:ERRor:VERBoSe OFF ON 0 1 :SYSTem:ERRor:VERBoSe?
Example:	:SYST:ERR:VERB ON
Preset:	This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc"
State Saved:	No
Range:	On   Off
Initial S/W Revision:	Prior to A.02.00

**Input Overload Enable (Remote Command Only)**

Input Overload errors are reported using the Input Overload status bit (bit 12 in the Measurement Integrity status register). Input Overloads (for example, ADC Overload errors) can come and go with great frequency, generating many error events (for example, for signals just on the verge of overload), and so are not put into the SCPI error queue by default. Normally the status bit is the only way for detecting these errors remotely.

It is possible to enable Input Overload reporting to the SCPI queue, by issuing the :SYSTem:ERRor:OVERload ON command. To return to the default state, issue the :SYSTem:ERRor:OVERload OFF command. In either case, Input Overloads always set the status bit.

---

**NOTE** For versions of firmware before A.10.01, the Input Overload was only a Warning and so was never available in the SCPI queue, although it did set the status bit. For A.10.01 and later, the Input Overload is an error and can be enabled to the SCPI queue using this command.

---

Key Path:	<b>SCPI only</b>
Remote Command:	:SYSTem:ERRor:OVERload[:STATe] 0 1 OFF ON
Example:	:SYST:ERR:OVER 1 Enable overload errors
Preset:	Set to OFF by Restore Misc Defaults (no Overload errors go to SCPI)
State Saved:	Saved in instrument state.

Initial S/W Revision:	A.10.01
-----------------------	---------

### Refresh

When pressed, refreshes the Show Errors display.

Key Path:	<b>System, Show, Errors</b>
Initial S/W Revision:	Prior to A.02.00

### Clear Error Queue

This clears all errors in all error queues.

Note the following:

Clear Error Queue does not affect the current status conditions.

Mode Preset does not clear the error queue.

Restore System Defaults will clear all error queues.

\*CLS only clears the queue if it is sent remotely and \*RST does not affect any error queue.

Switching modes does not affect any error queues.

Key Path:	<b>System, Show, Errors</b>
Initial S/W Revision:	Prior to A.02.00

### System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

<Product Name> <Product Description>	
Product Number: N9020A	
Serial Number: US46220924	
Firmware Revision: A.01.01	
Computer Name: <hostname>	
Host ID: N9020A,US44220924	
N9020A-503	Frequency Range to 3.6 GHz
N9020A-PFR	Precison Frequency Reference
N9020A-P03	Preamp 3.6 GHz
N9060A-2FP	Spectrum Analysis Measurement Suite 1.0.0.0
N9073A-1FP	WCDMA 1.0.0.0
N9073A-2FP	WCDMA with HSDPA 1.0.0.0

## System Functions

### System

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Key Path:	<b>System, Show</b>
Mode:	All
Example:	SYST:SHOW SYST
Backwards Compatibility Notes:	The hardware statistics that are displayed in the PSA Show System screen have been moved to a dedicated Show Hardware Statistics screen in the Service Menu.
Initial S/W Revision:	Prior to A.02.00

#### **Show System contents (Remote Command Only)**

A remote command is available to obtain the contents of the Show System screen (the entire contents, not just the currently displayed page).

Remote Command:	:SYSTem:CONFIgure [:SYSTem] ?
Example:	:SYST:CONF?
Notes:	The output is an IEEE Block format of the Show System contents. Each line is separated with a new-line character.
Initial S/W Revision:	Prior to A.02.00

#### **Computer System description (Remote Command Only)**

A remote command is available to obtain the Computer System description. The Computer System is the operating system and patch level as reported by operating system.

Remote Command:	:SYSTem:CSYSTem?
Example:	:SYST:CSYS?
Notes:	The return value is the Computer System name and service pack level.
Initial S/W Revision:	Prior to A.12.00

## **Hardware**

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:



Hardware Information							
MXA Signal Analyzer							
Product Number: N9020A							
Serial Number: US46220107							
Firmware Revision: A.01.14							
Assembly Name	Part #	Serial #	Mat Rev	Rev	OF Rev	Hw Id	Misc
Analog IF	E441060104	78060200131	003	0	C	15	
YIG Tuned Filter	50877305	11061500550	005	0	A	11	
Digital IF	E441060105	78060100559	003	0	F	14	
Front End Controller	E441060101	78060100147	004	2	A	8	
Low Band Switch	E441060170	78060800346	005	1	A	10	
LO Synthesizer	E441060102	78060100226	003	3	G	2	
Reference	E441060108	78060300420	004	1	C	16	
Front End	E441060154	13062800820	010	2	B	9	

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page is information is presently displayed.

Key Path:	<b>System, Show</b>
Mode:	All
Example:	SYST:SHOW HARD
Initial S/W Revision:	Prior to A.02.00

### LXI

This key shows you the product number, serial number, firmware revision, computer name, IP address, Host ID, LXI Class, LXI Version, MAC Address, and the Auto-MDIX Capability.

Key Path:	<b>System, Show</b>
Initial S/W Revision:	Prior to A.02.00

### Power On

Enables you to select how the instrument should power on. The options are: Mode and Input/Output

## System Functions

### System

Defaults, User Preset and Last State.

Key Path:	<b>System</b>
Mode:	All
Remote Command:	:SYSTem: PON: TYPE MODE   USER   LAST :SYSTem: PON: TYPE?
Example:	:SYST: PON: TYPE MODE
Preset:	This is unaffected by a Preset but is set to Mode on a “Restore System Defaults->All”
State Saved:	No
Backwards Compatibility SCPI:	:SYSTem: PON: TYPE PRESet the “PRESet” parameter is supported for backward compatibility only and behaves the same as MODE.
Backwards Compatibility Notes:	The <b>Preset Type</b> key in legacy analyzers has been removed, and the <b>Power On</b> toggle key has been replaced by this 1-of-N key in the <b>System</b> menu.
Initial S/W Revision:	Prior to A.02.00

### Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it performs a Restore Mode Defaults to all modes in the instrument and also performs a Restore Input/Output Defaults.

Persistent parameters (such as Amplitude Correction tables or Limit tables) are not affected at power on, even though they are normally cleared by Restore Input/Output Defaults and/or Restore Mode Defaults.

Key Path:	<b>System, Power On</b>
Mode:	All
Example:	SYST: PON: TYPE MODE
Readback Text:	Defaults
Initial S/W Revision:	Prior to A.02.00

### User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

---

**NOTE** An instrument could never power up for the first time in User Preset.

---

Key Path:	<b>System, Power On</b>
-----------	-------------------------

Mode:	All
Example:	SYST:PON:TYPE USER
Readback Text:	User Preset
Backwards Compatibility Notes:	Power On User Preset will cause the instrument to power up in the power-on mode, not the last mode the instrument was in prior to shut down. Also, Power On User Preset will User Preset all modes. This does not exactly match legacy behavior.
Initial S/W Revision:	Prior to A.02.00

### Last State

Sets **Power On** to **Last**. When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power **Standby** key or by using the remote command SYSTem:PDOWn. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

---

#### NOTE

An instrument can never power up for the first time in Last.

If line power to the analyzer is interrupted, for example by pulling the line cord plug or by switching off power to a test rack, Power On Last State may not work properly. For proper operation, Power On Last State depends on you shutting down the instrument using the Standby key or the SYSTem:PDOWn SCPI command. This will ensure the last state of each mode is saved and can be recalled during a power up.

---

Key Path:	<b>System, Power On</b>
Mode:	All
Example:	SYST:PON:TYPE LAST
Notes:	Power on Last State only works if you have done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command.
Readback Text:	Last State
Backwards Compatibility Notes:	It is no longer possible to power-up the analyzer in the last mode the analyzer was running with that mode in the preset state. (ESA/PSA SYST:PRESET:TYPE MODE with SYST:PON:PRESET) You can power-on the analyzer in the last mode the instrument was running in its last state (SYST:PON:TYPE LAST), or you can specify the mode to power-up in its preset state (SYST:PON:MODE <mode>).

System Functions  
System

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

### Power On Application

Accesses a menu that lists the available Modes and lets you select which Mode is to be the power-on application.

This application is used for Power On Type “Mode and Input/Output Defaults” and Restore System Defaults All.

Key Path:	<b>System, Power On</b>
Mode:	All
Remote Command:	:SYSTem:PON:MODE SA BASIC ADEMOD NFIGURE PNOISE CDMA2K TDSCDMA VSA VSA89 601 WCDMA WIMAXOFDMA :SYSTem:PON:MODE?
Example:	SYST:PON:MODE SA
Notes:	The list of possible modes (and remote parameters) to choose from is dependent on which modes are installed in the instrument.
Preset:	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to SA.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

### Configure Applications

The Configure Applications utility can be used to:

select applications for preload

determine how many applications can fit in memory at one time

specify the order of the Modes in the Mode menu.

This utility consists of a window with instructions, a set of “Select Application” checkboxes, a “fuel bar” style memory gauge, and keys that help you set up your configuration.

For more information, see the following topics:

[“Preloading Applications” on page 165](#)

[“Access to Configure Applications utility” on page 165](#)

[“Virtual memory usage” on page 165](#)

Key Path:	<b>System, Power On</b>
Example:	:SYST:SHOW CAPP Displays the Config Applications screen
Initial S/W Revision:	A.02.00

## Preloading Applications

During runtime, if a Mode that is not preloaded is selected using the Mode menu or sending SCPI commands, there will be a pause while the Application is loaded. During this pause a message that says “Loading application, please wait ...” is displayed. Once loaded, the application stays loaded, so the next time you select it during a session, there is no delay.

Preloading enables you to “preload” at startup, to eliminate the runtime delay. Preloading an application will cause it to be loaded into the analyzer’s memory when the analyzer program starts up. If you do this, the delay will increase the time it takes to start up the analyzer program, but this may be preferable to having to wait the first time you select an application. Note that, once an application is loaded into memory, it cannot be unloaded without exiting and restarting the analyzer program.

Note that there are more applications available for the X-Series than can fit into Windows Virtual Memory. By allowing you to choose which licensed applications to load at startup, the Configure Applications utility allows you to make optimal use of your memory.

## Access to Configure Applications utility

A version of the utility runs the first time you power up the analyzer after purchasing it from Agilent. The utility automatically configures preloads so that as many licensed applications as possible are preloaded while keeping the total estimated virtual memory usage below the limit. This auto-configuration only takes place at the very first run, and after analyzer software upgrades.

You may, at any time, manually call up the Configure Applications utility by pressing System, Power On, Configure Applications, to find a configuration that works best for you, and then restart the analyzer program.

The utility may also be called if, during operation of the analyzer, you attempt to load more applications than can fit in memory at once.

## Virtual memory usage

There are more applications available for the X-Series than can fit into memory at any one time, so the Configure Applications utility includes a memory tracker that serves two purposes:

It will not let you preload more applications than will fit into memory at once.

You can determine how many of your favorite applications can reside in memory at one time.

The utility provides a graphical representation of the amount of memory (note that the memory in question here is Virtual memory and is a limitation imposed by the operating system, not by the amount of physical memory you have in your analyzer). You select applications to preload by checking the boxes on the left. Checked applications preload at startup. The colored fuel bar indicates the total memory required when all the checked applications are loaded (either preloaded or selected during runtime).

Here is what the fuel bar colors mean:

**RED:** the applications you have selected cannot all fit into the analyzer’s memory. You must deselect applications until the fuel bar turns yellow.

**YELLOW:** the applications you have selected can all fit into the analyzer’s memory, but there is less than 10% of the memory left, probably not enough to load any other applications, either via preload or by selecting a Mode while the analyzer is running..

## System Functions

### System

**GREEN:** The indicator is green when <90% of the memory limit is consumed. This means the applications you have selected can all fit into the analyzer's memory with room to spare. You will likely be able to load one or more other applications without running out of memory.

#### Select All

Marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00

#### Deselect All

Clears the marks from all applications in the selection list, except the Power On application. The Power On application cannot be eliminated from the pre-load list.

Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00

#### Move Up

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00

#### Move Down

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application down in the list, thus moving the selected application later in the Mode Menu.

Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00

#### Select/Deselect

Toggles the currently highlighted application in the list.

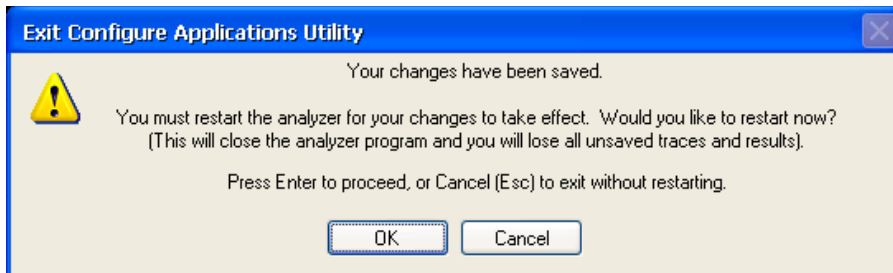
Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00

#### Save Changes and Exit

Applies the configuration of the applications list. The marked applications will be pre-loaded in memory the next time the instrument application is started, and the order of the applications in the list will be the

order of the applications in the Mode Menu.

After saving your changes, the analyzer asks you if you would like it to restart so that your changes can take effect (see dialog box, below). If you choose not to restart, the changes will not take affect until the next time you shut down and restart the analyzer.



Key Path:	<b>System, Power On, Configure Applications</b>
Remote Command:	:SYSTem:PUP:PROcess
Example:	:SYST:PUP:PROC This is the SCPI command for restarting the analyzer. You must Wait after this command for the instrument application to restart
Notes:	The softkey will be grayed-out when the virtual memory of the selected applications exceeds 100% of the limit.
Notes:	You cannot use *WAI or *OPC? to synchronize operation after a restart. This command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded.
Initial S/W Revision:	A.02.00
Modified at S/W Revision:	A.04.00

### Exit Without Saving

Pressing this key will exit the Configure Applications utility without saving your changes.

Key Path:	<b>System, Power On, Configure Applications</b>
Initial S/W Revision:	A.02.00
Modified at S/W Revision:	A.04.00

### Configure Applications - Instrument boot-up

At start-up of the analyzer program a dialog box similar to the one under the **System, Power On, Configure Applications** key will be displayed allowing you to choose which licensed applications are to be loaded. This dialog will only be displayed if the memory required to pre-load all of the licensed applications exceeds the Virtual Memory available.

### Configure Applications - Windows desktop

The Configure Applications Utility may be run from the Windows Desktop. The utility is launched by



double-clicking the icon on the desktop, which brings-up a dialog box similar to the one under the **System, Power On, Configure Applications** key, allowing you to choose which licensed applications are to be loaded when the analyzer program starts up. This dialog box has mouse buttons on it that do the job the softkeys normally do in the **System, Power On, Configure Applications** menu.

### Configure Applications - Remote Commands

The following topics provide details on using remote commands to configure the list of applications you want to load into the instrument memory or query the Virtual Memory utilization for your applications.

[“Configuration list \(Remote Command Only\)” on page 168](#)

[“Configuration Memory Available \(Remote Command Only\)” on page 169](#)

[“Configuration Memory Total \(Remote Command Only\)” on page 169](#)

[“Configuration Memory Used \(Remote Command Only\)” on page 169](#)

[“Configuration Application Memory \(Remote Command Only\)” on page 169](#)

### Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

Remote Command:	:SYSTem:PON:APPLication:LLISt <string of INSTRument:SELEct names>  :SYSTem:PON:APPLication:LLISt?
Example:	:SYST:PON:APPL:LLIS "SA,BASIC,WCDMA"
Notes:	<string of INSTRument:SELEct names> are from the enums of the :INSTRument:SELEct command.  The order of the <INSTRument:SELEct names> is the order that the applications are loaded into memory, and the order that they appear in the Mode Menu.  Error message –225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. When this occurs, the existing applications load list is unchanged.
Preset:	Not affected by Preset
State Saved:	Not saved in instrument state
Initial S/W Revision:	A.02.00



### Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

Remote Command:	:SYSTem:PON:APPLication:VMEMory[:AVAIlable]?
Example:	:SYST:PON:APPL:VMEM?
Preset:	Not affected by Preset
Initial S/W Revision:	A.02.00

### Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

Remote Command:	:SYSTem:PON:APPLication:VMEMory:TOTal?
Example:	:SYST:PON:APPL:VMEM:TOT?
Preset:	Not affected by Preset
Initial S/W Revision:	A.02.00

### Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

Remote Command:	:SYSTem:PON:APPLication:VMEMory:USED?
Example:	:SYST:PON:APPL:VMEM:USED?
Preset:	Not affected by Preset
Initial S/W Revision:	A.02.00

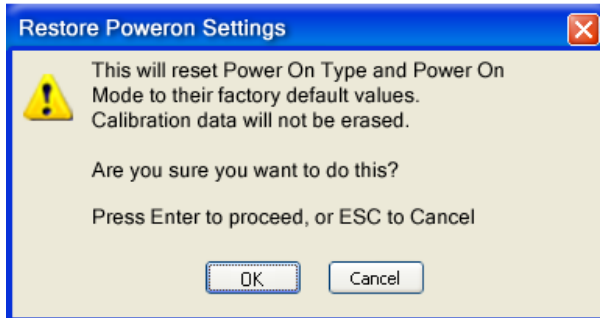
### Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

Remote Command:	:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SELEct name>
Example:	:SYST:PON:APPL:VMEM:USED:NAME? CDMA2K
Notes:	<INSTrument:SELEct name> is from the enums of the :INSTrument:SELEct command Value returned will be 0 (zero) if the name provided is invalid.
Preset:	Not affected by Preset
Initial S/W Revision:	Prior to A.02.00

### Restore Power On Defaults

This selection causes the Power On Type and Power On Application settings to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On key, under the Restore System Defaults menu, causes the same action.



If you press any key other than OK or Enter, it is construed as a Cancel, because the only path that will actually cause the reset to be executed is through OK or Enter.

Key Path:	<b>System, Power On</b>
Example:	.:SYST:DEF PON
Initial S/W Revision:	Prior to A.02.00

### Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specifications to be impacted.



Key Path:	<b>System</b>
Initial S/W Revision:	Prior to A.02.00

### Auto Align

Configures the method for which the automatic background alignment is run.

Automatic background alignments are run periodically between measurement acquisitions. The instrument's software determines when alignments are to be performed to maintain warranted operation. The recommended setting for Auto Align is Normal.

An Auto Align execution cannot be aborted with the Cancel (ESC) key. To interrupt an Auto Align

execution, select **Auto Align Off**.

Key Path:	<b>System, Alignments</b>
Mode:	All
Remote Command:	:CALibration:AUTO ON PARTial OFF :CALibration:AUTO?
Example:	:CAL:AUTO ON
Notes:	While Auto Align is executing, bit 0 of Status Operation register is set.
Couplings:	Auto Align is set to Off if Restore Align Data is invoked.
Preset:	This is unaffected by Preset but is set to ON upon a “Restore System Defaults->Align”.
State Saved:	No
Status Bits/OPC dependencies:	When Auto Align is executing, bit 0 in the Status Operational register is set.
Backwards Compatibility SCPI:	:CALibration:AUTO ALERT Parameter ALERT is for backward compatibility only and is mapped to PARTial
Backwards Compatibility Notes:	ESA SCPI for Auto Align is :CALibration:AUTO <Boolean>. The command for X-Series is an enumeration. Thus the parameters of “0” and “1” are not possible in X-Series.  Similarly, the ESA SCPI for :CALibration:AUTO? returned the Boolean value 1 or 0, in X-Series it is an Enumeration (string). Thus, queries by customer applications into numeric variables will result in an error  In PSA Auto Align OFF was not completely off, it is equivalent to PARTial in X-Series. In X-Series, OFF will be fully OFF. This means users of PSA SCPI who choose OFF may see degraded performance and should migrate their software to use PARTial.
Initial S/W Revision:	Prior to A.02.00

### Normal

Auto Align, Normal turns on the automatic alignment of all measurement systems. The Auto Align, Normal selection maintains the instrument in warranted operation across varying temperature and over time.

If the condition “Align Now, All required” is set, transition to Auto Align, Normal will perform the required alignments and clear the “Align Now, All required” condition and then continue with further alignments as required to maintain the instrument adequately aligned for warranted operation.

When **Auto Align, Normal** is selected the Auto Align Off time is set to zero.

When **Auto Align, Normal** is selected the Settings Panel indicates ALIGN AUTO.

Key Path:	<b>System, Alignments, Auto Align</b>
-----------	---------------------------------------

Mode:	All
Example:	:CAL:AUTO ON
Notes:	<p>Alignment processing as a result of the transition to Normal will be executed sequentially. Thus, *OPC? or *WAI following CAL:AUTO ON will return when the alignment processing is complete.</p> <p>The presence of an external signal may interfere with the RF portion of the alignment. If so, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is reported, and bit 11 is set in the Status Questionable Calibration register. After the interfering signal is removed, subsequent alignment of the RF will clear the condition, and clear bit 11 in the Status Questionable Calibration register.</p>
Readback Text:	Normal
Status Bits/OPC dependencies:	<p>An interfering user signal may prevent automatic alignment of the RF subsystem. If this occurs, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is reported, the Status Questionable Calibration bit 11 is set, and the alignment proceeds. When a subsequent alignment of the RF subsystem succeeds, either by the next cycle of automatic alignment or from an Align Now, RF, the Error Condition and Status Questionable Calibration bit 11 are cleared.</p>
Initial S/W Revision:	Prior to A.02.00

### Partial

Auto Align, Partial disables the full automatic alignment and the maintenance of warranted operation for the benefit of improved measurement throughput. Accuracy is retained for the Resolution Bandwidth filters and the IF Passband which is critical to FFT accuracy, demodulation, and many measurement applications. With Auto Align set to Partial, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The Auto Align, Alert mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the Align All, Now operation. Another is to return the Auto Align selection to Normal.

Auto Align, Partial is recommended for measurements where the throughput is so important that a few percent of improvement is more valued than an increase in the accuracy errors of a few tenths of a decibel. One good application of Auto Align, Partial would be an automated environment where the alignments can be called during overhead time when the device-under-test is exchanged.

When **Auto Align, Partial** is selected the elapsed time counter begins for Auto Align Off time.

When **Auto Align, Partial** is selected the Settings Panel indicates ALIGN PARTIAL with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument

Key Path:	<b>System, Alignments, Auto Align</b>
Mode:	All
Example:	:CAL:AUTO PART
Notes:	Auto Align Partial begins the elapsed time counter for Auto Align Off time.

Readback Text:	Partial
Initial S/W Revision:	Prior to A.02.00

## Off

Auto Align, Off disables automatic alignment and the maintenance of warranted operation, for the benefit of maximum measurement throughput. With Auto Align set to Off, you are now responsible for maintaining warranted operation by updating the alignments when they expire. The Auto Align, Alert mechanism will notify you when alignments have expired. One solution to expired alignments is to perform the Align All, Now operation. Another is to return the Auto Align selection to Normal.

The Auto Align, Off setting is rarely the best choice, because Partial gives almost the same improvement in throughput while maintaining the warranted performance for a much longer time. The choice is intended for unusual circumstances such as the measurement of radar pulses where you might like the revisit time to be as consistent as possible.

When **Auto Align, Off** is selected the Auto Align Off time is initialized and the elapsed time counter begins.

When **Auto Align, Off** is selected the Settings Panel indicates ALIGN OFF with a warning icon. The warning icon is to inform the operator that they are responsible for maintaining the warranted operation of the instrument:

Key Path:	<b>System, Alignments, Auto Align</b>
Mode:	All
Example:	:CAL:AUTO OFF
Notes:	Auto Align Off begins the elapsed time counter for Auto Align Off time.
Couplings:	Auto Align is set to Off if Restore Align Data is invoked.
Readback Text:	Off
Initial S/W Revision:	Prior to A.02.00

## All but RF

Auto Align, All but RF, configures automatic alignment to include or exclude the RF subsystem. (Eliminating the automatic alignment of the RF subsystem prevents the input impedance from changing. The normal input impedance of 50 ohms can change to an open circuit when alignments are being used. Some devices under test do not behave acceptably under such circumstances, for example by showing instability.) When Auto Align, All but RF ON is selected, the operator is responsible for performing an Align Now, RF when RF-related alignments expire. The Auto Align, Alert mechanism will notify the operator to perform an Align Now, All when the combination of time and temperature variation is exceeded.

When Auto Align, All but RF ON is selected the Settings Panel indicates ALIGN AUTO/NO RF with a warning icon (warning icon is intended to inform the operator they are responsible for the maintaining the RF alignment of the instrument):

Key Path:	<b>System, Alignments, Auto Align</b>
-----------	---------------------------------------

## System Functions

### System

Mode:	All
Remote Command:	:CALibration:AUTO:MODE ALL NRF :CALibration:AUTO:MODE?
Example:	:CAL:AUTO:MODE NRF
Preset:	This is unaffected by Preset but is set to ALL on a “Restore System Defaults->Align”.
State Saved:	No
Readback Text:	RF or NRF
Initial S/W Revision:	Prior to A.02.00

### Alert

The instrument will signal an Alert when conditions exist such that you will need to perform a full alignment (for example, Align Now, All). The Alert can be configured in one of four settings; Time & Temperature, 24 hours, 7 days, or None. A confirmation is required when a selection other than Time & Temperature is chosen. This prevents accidental deactivation of alerts.

With Auto Align set to Normal, the configuration of Alert is not relevant because the instrument’s software maintains the instrument in warranted operation.

Key Path:	<b>System, Alignments, Auto Align</b>
Mode:	All
Remote Command:	:CALibration:AUTO:ALERT TTEMPerature DAY WEEK NONE :CALibration:AUTO:ALERT?
Example:	:CAL:AUTO:ALERT TTEM
Notes:	The alert that alignment is needed is the setting of bit 14 in the Status Questionable Calibration register.
Preset:	This is unaffected by Preset but is set to TTEMPerature on a “Restore System Defaults->Align”.
State Saved:	No
Status Bits/OPC dependencies:	The alert is the Error Condition message “Align Now, All required” and bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### Time & Temperature

With Auto Align Alert set to Time & Temperature the instrument will signal an alert when alignments expire due to the combination of the passage of time and changes in temperature. The alert is the Error Condition message “Align Now, All required”. If this choice for Alert is selected, the absence of an alert means that the analyzer alignment is sufficiently up-to-date to maintain warranted accuracy.

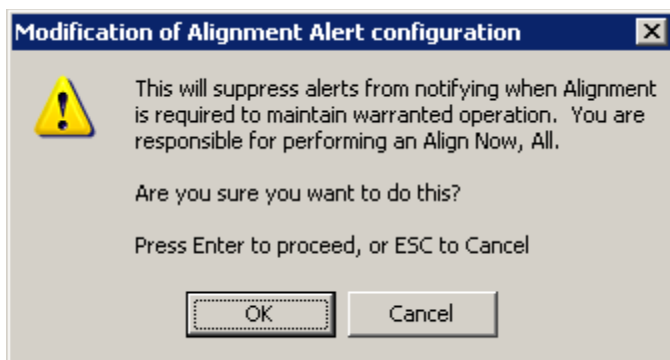
Key Path:	<b>System, Alignments, Auto Align, Alert</b>
-----------	--

Mode:	All
Example:	:CAL:AUTO:ALER TTEM
Readback Text:	Time & Temp
Status Bits/OPC dependencies:	Bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### 24 hours

With Auto Align Alert set to 24 Hours the instrument will signal an alert after a time span of 24 hours since the last successful full alignment (for example, Align Now, All or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a daily basis at a small risk of accuracy errors in excess of the warranted specifications. The alert is the Error Condition message “Align Now, All required”.

For front-panel operation , confirmation is required to transition into this setting of Alert. The confirmation dialog is:



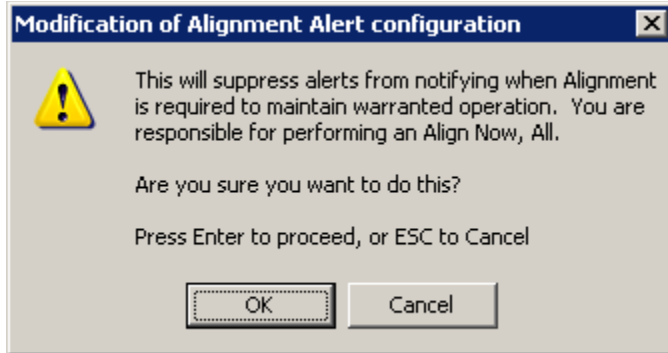
No confirmation is required when Alert is configured through a remote command.

Key Path:	<b>System, Alignments, Auto Align, Alert</b>
Mode:	All
Example:	:CAL:AUTO:ALER DAY
Readback Text:	24 hours
Status Bits/OPC dependencies:	Bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### 7 days

With Auto Align Alert is set to 7 days the instrument will signal an alert after a time span of 168 hours since the last successful full alignment (for example, Align Now, All or completion of a full Auto Align). You may choose this selection in an environment where the temperature is stable on a weekly basis, at a modest risk of accuracy degradations in excess of warranted performance. The alert is the Error Condition message “Align Now, All required”.

For front panel operation, confirmation is required for the customer to transition into this setting of Alert. The confirmation dialog is:



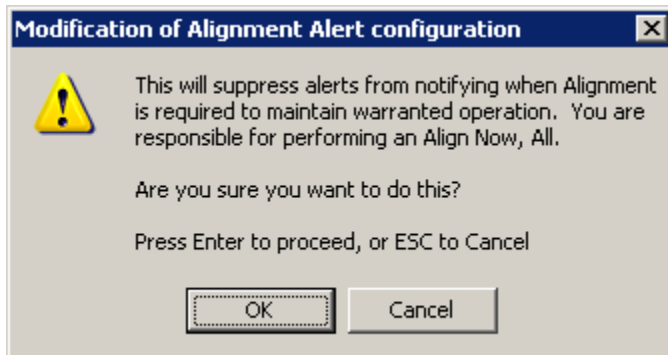
No confirmation is required when Alert is configured through a remote command.

Key Path:	<b>System, Alignments, Auto Align, Alert</b>
Mode:	All
Example:	:CAL:AUTO:ALER WEEK
Readback Text:	7 days
Status Bits/OPC dependencies:	Bit 14 is set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### None

With Auto Align Alert set to None the instrument will not signal an alert. This is provided for rare occasions where you are making a long measurement which cannot tolerate Auto Align interruptions, and must have the ability to capture a screen image at the end of the measurement without an alert posted to the display. Agilent does not recommend using this selection in any other circumstances, because of the risk of accuracy performance drifting well beyond expected levels without the operator being informed.

For front panel operation, confirmation is required to transition into this setting of Alert. The confirmation dialog is:



No confirmation is required when Alert is configured through a remote command.

Key Path:	<b>System, Alignments, Auto Align, Alert</b>
-----------	--



Mode:	All
Example:	:CAL:AUTO:ALER NONE
Initial S/W Revision:	Prior to A.02.00

### Execute Expired Alignments (Remote Command Only)

Alignments can be expired in the situation where Auto Align is in the state of Partial or Off. This feature runs the alignments that have expired. This is different than performing an Align All, Now operation. Align All, Now performs an alignment of all subsystems regardless of whether they are needed or not, with Execute Expired Alignments, only the individual subsystems that have become due are aligned.

Mode:	All
Remote Command:	:CALibration:EXPIred?
Example:	:CAL:EXP?
Notes:	:CALibration:EXPIred? returns 0 if successful :CALibration:EXPIred? returns 1 if failed
Initial S/W Revision:	Prior to A.02.00

### Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Key Path:	<b>System, Alignments</b>
Initial S/W Revision:	Prior to A.02.00

### All

Immediately executes an alignment of all subsystems. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is generated. In addition the Error Condition message “Align Now, RF required” is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or \*CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of **Align Now, All** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

## System Functions

### System

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

In models with the RF Preselector, such as the N9038A, the Align Now All alignment will immediately execute an alignment of all subsystems in the Spectrum Analyzer and partial subsystems of the RF Preselector. The additional alignments are the System Gain, Mechanical attenuator and Electronic attenuator alignments on the RF Preselector path. The purpose of these alignments is to improve the RF Preselector path amplitude variation compared to the bypass path.

Key Path:	<b>System, Alignments, Align Now</b>
Mode:	All
Remote Command:	:CALibration[:ALL] :CALibration[:ALL]?
Example:	:CAL
Notes:	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL?  While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.  Successful completion will clear bit 14 in the Status Questionable Calibration register.  An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required.  An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.

Couplings:	<p>Initializes the time for the Last Align Now, All Time.</p> <p>Records the temperature for the Last Align Now, All Temperature.</p> <p>If Align RF component succeeded, initializes the time for the Last Align Now, RF Time.</p> <p>If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.</p>
Status Bits/OPC dependencies:	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

Mode:	All
Remote Command:	*CAL?
Example:	*CAL?
Notes:	<p>*CAL? returns 0 if successful</p> <p>*CAL? returns 1 if failed</p> <p>:CALibration[:ALL]? is the same as *CAL?</p> <p>See additional remarks described with :CALibration[:ALL]?</p> <p>Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings</p>
Initial S/W Revision:	Prior to A.02.00

### All but RF

Immediately executes an alignment of all subsystems except the RF subsystem. The instrument will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of **All** if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

The query form of the remote commands (:CALibration:NRF?) will invoke the alignment and return a success or failure value.

Successful completion of Align Now, All but RF will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition message “Align Now, RF required” is generated and bit 12 in the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

Align Now, All but RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be used for an individual subsystem, but not a full new set of data for all subsystems.

## System Functions

### System

In models with the RF Preselector, such as the N9038A, the “All but RF” alignment will execute an alignment of all subsystems except the RF subsystem of the Spectrum Analyzer, as well as the system gain of the RF Preselector.

Key Path:	<b>System, Alignments, Align Now</b>
Mode:	All
Remote Command:	:CALibration:NRF :CALibration:NRF?
Example:	:CAL:NRF
Notes:	:CALibration:NRF? returns 0 if successful :CALibration:NRF? returns 1 if failed  While Align Now, All but RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.  Successful completion will clear bit 14 in the Status Questionable Calibration register and set bit 12 if invoked with “Align Now, All required”.
Couplings:	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature.
Status Bits/OPC dependencies:	Bits 12 or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### RF

Immediately executes an alignment of the RF subsystem. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and generate the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

Successful completion of Align Now, RF will begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition message “Align

Now, RF required” is generated, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

In models with the RF Preselector, such as the N9038A, the RF alignment will execute an alignment of the RF subsystem of the Spectrum Analyzer, as well as the RF subsystem on RF Preselector path.

Key Path:	<b>System, Alignments, Align Now</b>
Mode:	All
Remote Command:	:CALibration:RF :CALibration:RF?
Example:	:CAL:RF
Notes:	:CALibration:RF? returns 0 if successful :CALibration:RF? returns 1 if failed (including interfering user signal) While Align Now, RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register. A failure encountered during alignment will generate the Error Condition message “Align RF failed” and set bit 3 in the Status Questionable Calibration register. An interfering user signal will result in bits 11 and 12 to be set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings:	Initializes the time for the Last Align Now, RF Time. Records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies:	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision:	Prior to A.02.00

### External Mixer

Immediately executes an alignment of the External Mixer that is plugged into the USB port. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the Restart key). As this alignment calibrates the LO power to the mixer, this is considered an LO alignment; and failure is classified as an LO alignment failure.

The query form of the remote commands (:CALibration:EMIXer?) will invoke the alignment of the

System Functions  
System

External Mixer and return a success or failure value.

Key Path:	<b>System, Alignments, Align Now</b>
Mode:	All
Remote Command:	:CALibration:EMIXer :CALibration:EMIXer?
Example:	:CAL:EMIX
Notes:	:CAL:EMIX? returns 0 if successful :CAL:EMIX? returns 1 if failed  While Align Now, Ext Mix is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.  A failure encountered during alignment will generate the Error Condition message “Align LO failed” and set bit 5 in the Status Questionable Calibration register. Successful completion will clear the “Align LO failed” message and bit 5 in the Status Questionable Calibration register.
Dependencies:	This key does not appear unless option EXM is present and is grayed-out unless a USB mixer is plugged in to the USB.
Status Bits/OPC dependencies:	Bit3 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision:	A.08.00

**Source**

This menu is only available in the EXT (E6607A).

Accesses source alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Immediately executes an IQ alignment of the complete source. The instrument stops any sequence of the source, performs the alignment, then restarts the sequence from the beginning.

There is no alert available for the source alignment. The operators have the responsibility to check temperature shift since last Align Now, Source to determine if the source alignment need to be executed.

Key Path:	<b>System, Alignments, Align Now</b>
Mode:	All
Remote Command:	:CALibration:INTernal:SOURce[:ALL] :CALibration:INTernal:SOURce[:ALL]?
Example:	:CAL:INT:SOUR

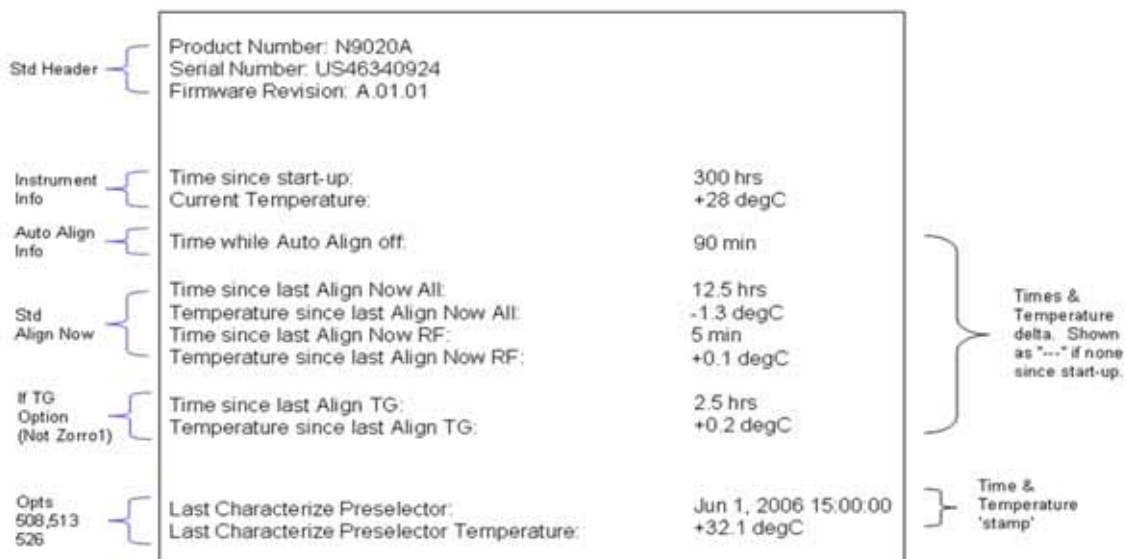
Notes:	Only available in: XOBT :CAL:SOUR? Initiates an Alignment and returns 0 if successful :CAL:SOUR? Initiates an Alignment and returns 1 if failed
Couplings:	Initializes the time for the Last Align Source Now, All Time. Records the temperature for the Last Align Source Now, All Temperature.
Status Bits/OPC dependencies:	Bits TODO may be set in the Status Questionable Calibration register
Initial S/W Revision:	A.05.00

### Show Alignment Statistics

Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands that access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

Key Path:	<b>System, Alignments</b>
Mode:	All

System Functions  
System

Notes:	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:SYSTem:PON:TIME?
Example:	:SYST:PON:TIME?
Notes:	Value is the time since the most recent start-up in seconds.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:CURRent?
Example:	:CAL:TEMP:CURR?
Notes:	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:LALL?
Example:	:CAL:TIME:LALL?
Notes:	Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:LALL?
Example:	:CAL:TEMP:LALL?



Notes:	Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF was executed.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:LRF?
Example:	:CAL:TIME:LRF?
Notes:	Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:LRF?
Example:	:CAL:TEMP:LRF?
Notes:	Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:SOURce:LALL?
Example:	:CAL:TIME:SOUR:LALL?
Notes:	Value is the date and time of the last successful Align Now, Source was performed on the instrument.
State Saved:	No
Initial S/W Revision:	A.05.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:SOURce: LALL?

System Functions  
System

Example:	:CAL:TEMP:SOUR:LALL?
Notes:	Value is in degrees Centigrade at which the last successful Align Now, Source was performed on the instrument.
State Saved:	No
Initial S/W Revision:	A.05.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:LPreselector?
Example:	:CAL:TIME:LPR?
Notes:	Value is the date and time the last successful Characterize Preselector was executed. The date is separated from the time by a space character. Returns "" if no Characterize Preselector has ever been performed on the instrument.
Dependencies:	In models that do not include preselectors, this command is not enabled and any attempt to set or query will yield an error.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:LPreselector?
Example:	:CAL:TEMP:LPR?
Notes:	Value is in degrees Centigrade at which the last successful Characterize Preselector was executed.
Dependencies:	In models that do not include preselectors, this command is not enabled and any attempt to set or query will yield an error.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:AUTO:TIME:OFF?
Example:	:CAL:AUTO:TIME:OFF?
Notes:	Value is the elapsed time, in seconds, since Auto Align has been set to Off or Off with Alert. The value is 0 if Auto Align is ALL or NORF.
State Saved:	No

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:RFPSelector:LCONducted?
Example:	:CAL:TIME:RFPS:LCON?
Notes:	Values are the date and time the last successful Align Now, 20 Hz – 30 MHz was executed. The date is separated from the time by a semi-colon character.
State Saved:	No

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:RFPSelector:LCONducted?
Example:	:CAL:TEMP:RFPS:LCON?
Notes:	Value is in degrees Centigrade at which the last successful Align Now, 20 Hz – 30 MHz was executed.
State Saved:	No

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TIME:RFPSelector:LRADiated?
Example:	:CAL:TIME:RFPS:LRAD?
Notes:	Value is the date and time the last successful Align Now, 30 MHz – 3.6 GHz was executed. The date is separated from the time by a semi-colon character.
State Saved:	No

Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
Mode:	All
Remote Command:	:CALibration:TEMPerature:RFPSelector:LRADiated?
Example:	:CAL:TEMP:RFPS:LRAD?
Notes:	Value is in degrees Centigrade at which the last successful Align Now, 30 MHz – 3.6 GHz was executed.
State Saved:	No

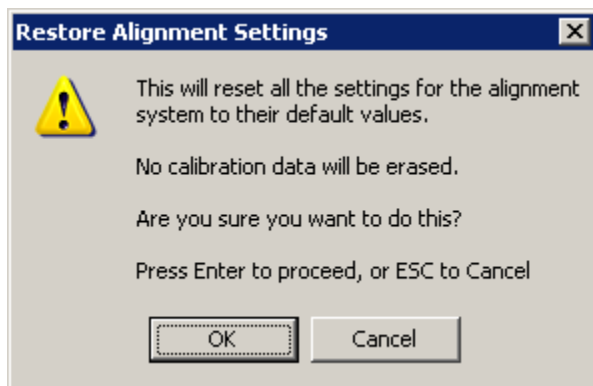
Key Path:	<b>Visual annotation in the Show Alignment Statistics screen</b>
-----------	--

Mode:	All
Remote Command:	:CALibration:RFPSelector:SCHeduler:TIME:NEXT? This query returns data using the following format “YYYY/MM/DD; HH:MM:SS”
Example:	:CAL:RFPS:SCH:TIME:NEXT?
Notes:	The next run time will be updated based on the start date/time and recurrence set by the users.  “date” is representation of the date the task will run in the form of “YYYY/MM/DD” where:  YYYY is the four digit representation of year. (for example, 2009) MM is the two digit representation of month. (for example, 01 to 12) DD is the two digit representation of the day. (for example, 01 to 28, 29, 30 or 31 depending on the month and year)  “time” is a representation of the time of day the task will run in the form of “HH:MM:SS” where:  HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS is the two digit representation of seconds  For model N9038A only.
State Saved:	No

### Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off
Auto Align Alert	Time & Temperature

Key Path:	<b>System, Alignments</b>
Mode:	All
Example:	:SYST:DEF ALIG
Notes:	Alignment processing that results as the transition to Auto Alignment Normal will be executed sequentially; thus *OPC? or *WAI will wait until the alignment processing is complete.
Initial S/W Revision:	Prior to A.02.00

### Backup or Restore Align Data...

Opens the utility for backing-up or restoring the alignment data.

Alignment data for the instrument resides on the hard drive in a database. Agilent uses high quality hard drives; however it is highly recommended the alignment data be backed-up to storage outside of the instrument. Additionally, for customers who use multiple CPU Assemblies or multiple disk drives, the alignment that pertains to the instrument must be transferred to the resident hard drive after a CPU or hard drive is replaced. This utility facilitates backing-up and restoring the alignment data.

---

**NOTE** This utility allows the operator to navigate to any location of the Windows file system. It is intended that the operator use a USB memory device or Mapped Network Drive to back up the alignment data to storage outside of the instrument.

---

Key Path:	<b>System, Alignments</b>
Initial S/W Revision:	A.02.00

Key Path:	<b>System, Alignments</b>
Mode:	All
Remote Command:	:CALibration:DATA:Default

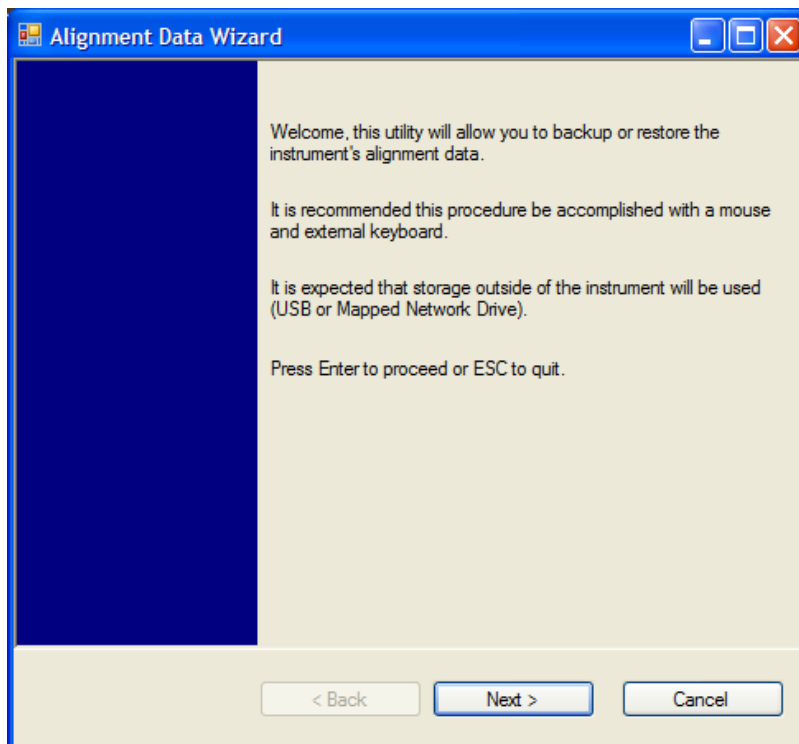
System Functions  
System

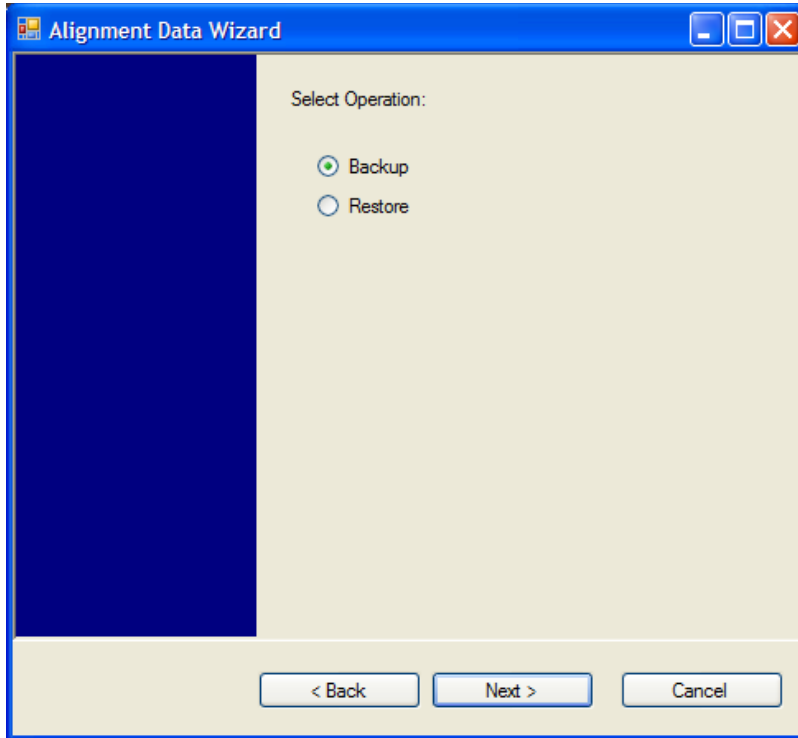
Example:	:CAL:DATA:DEF
Couplings:	Sets Auto Align to Off. Sets bit 14 in the Status Questionable Calibration register. The Error Condition message “Align Now, All required” is generated.
Initial S/W Revision:	Prior to A.02.00

### Alignment Data Wizard

The Backup or Restore Alignment Data wizard guides you through the operation of backing-up or restoring the alignment data.

The following dialogue boxes operates without a mouse or external keyboard when you use the default file names.

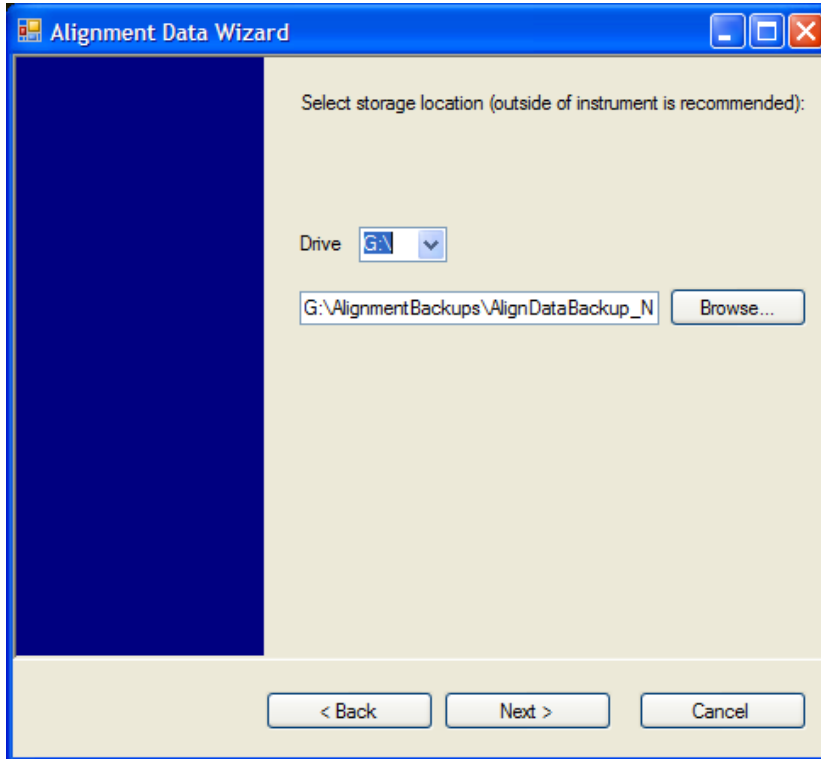




The backup screen indicates the approximate amount of space required to contain the backup file.

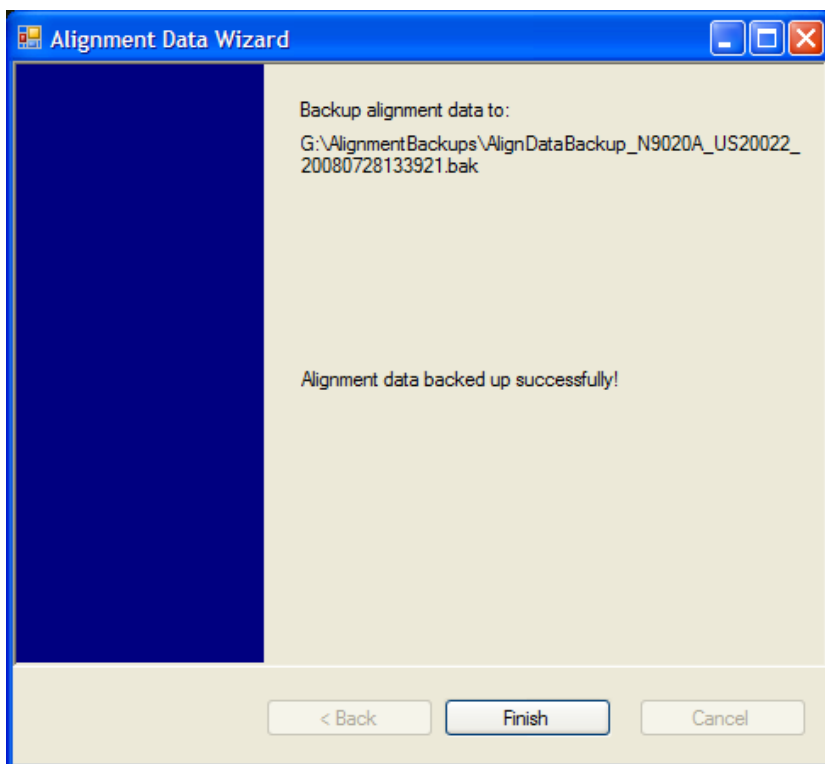
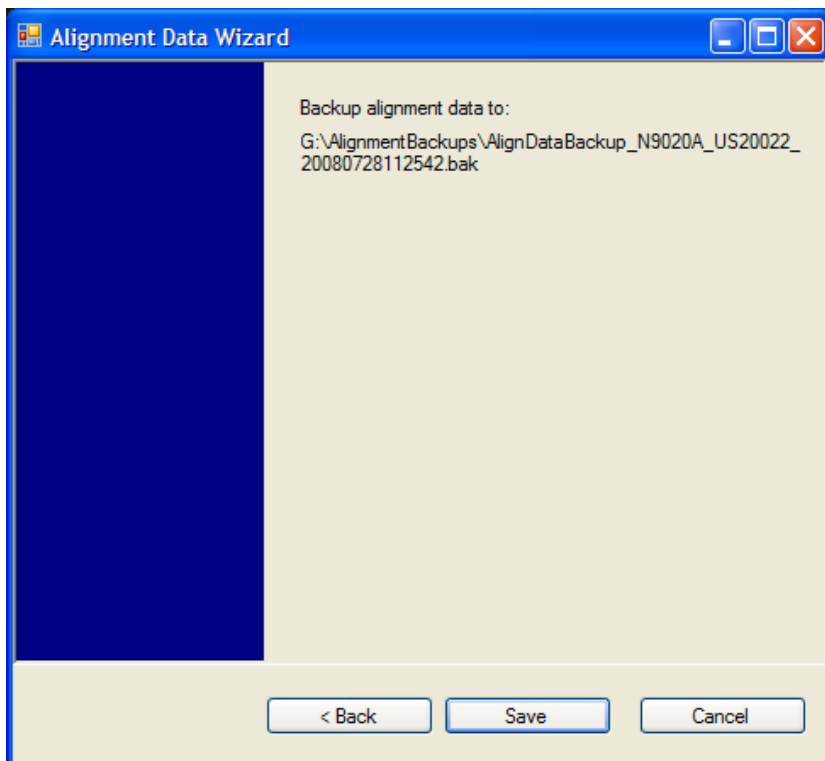
The default file name will be AlignDataBackup\_<model number>\_<serial number>\_<date in YYYYMMDDHHMMSS>.bak.

For the N9030A the default backup location will be the internal F: drive which is a solid-state memory device located internally on the instrument.



Changing the drive letter will also modify the path displayed in the box below. When this step is first loaded, the drive drop-down menu is populated with connected drives, which provide the user with write access. If there are many unreachable network drives connected to the instrument, this step can take a few seconds. If a USB drive is present, it will be selected by default. The path defaults to the AlignmentBackups folder, and a filename is automatically created in the form of AlignDataBackup\_<model>\_<serial number>\_<date><time>. When the "Next >" button is pressed, you will be prompted to create a new folder if the chosen path does not yet exist.





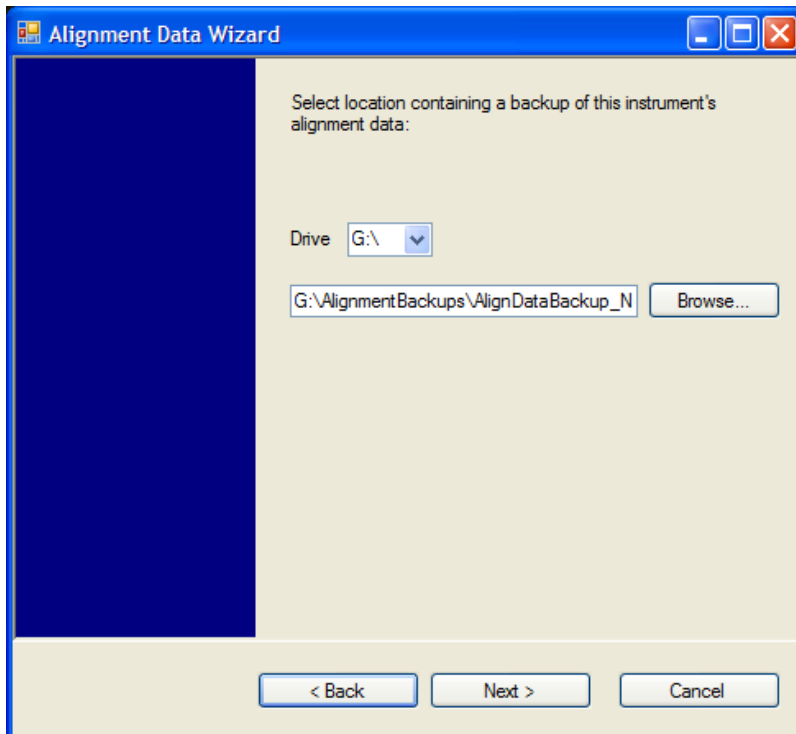
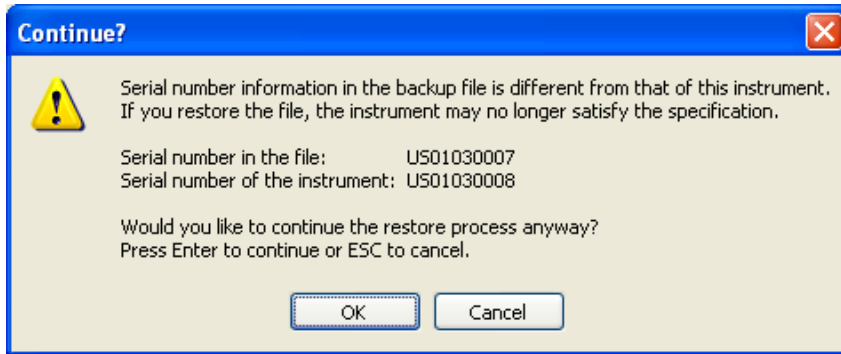
The restore operation checks the validity of the restore file using the database's built-in file validation. If the restore file is corrupt, the existing alignment data will remain in use.

If the serial number information in the backup file being restored is different from that of the instrument,

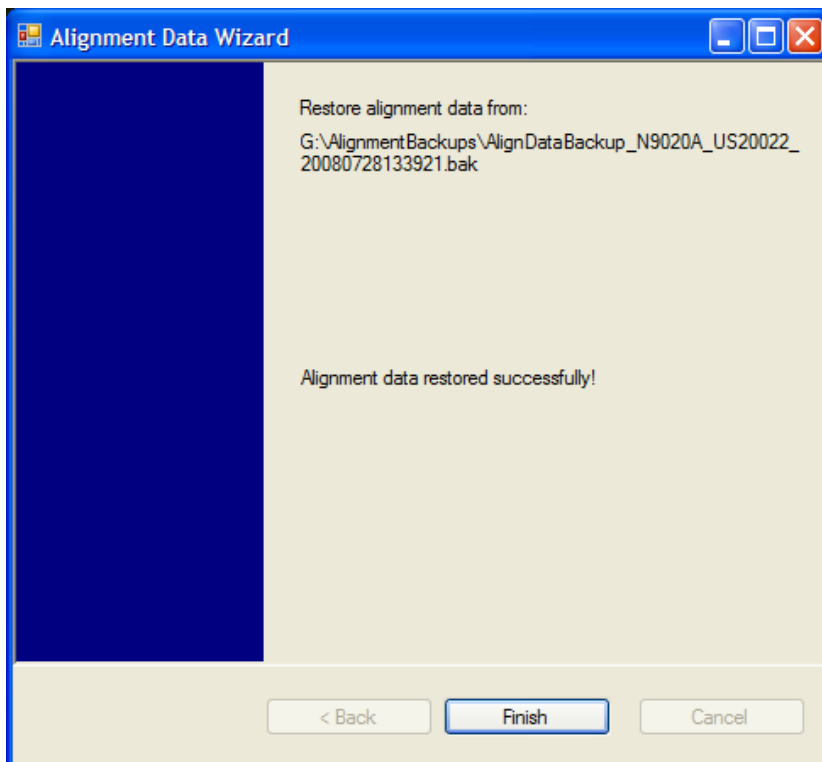
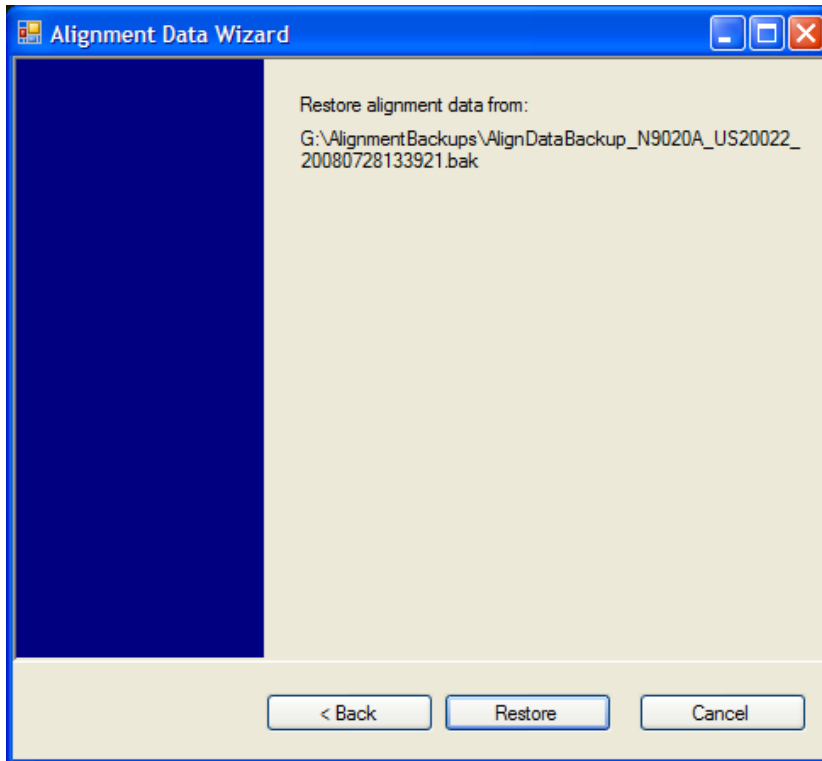
## System Functions

### System

the following message appears (the serial number shown are examples):



Changing the drive letter also modifies the path displayed in the box below. When this step is first loaded, the drive drop-down menu is populated with connected drives, which provide you with read access. The path defaults to the AlignBackups folder. The most recent \*.bak file in the folder will also be selected by default.



**Perform Backup (Remote Command Only)**

Invokes an alignment data backup operation to the provided Folder.

---

**NOTE** It is recommended that the Folder provided is outside of the instrument (USB or Mapped Network Drive).

---

Remote Command:	:CALibration:DATA:BACKup <filename>
Example:	:CAL:DATA:BACK "F:\AlignDataBackup_N9020A_US00000001_2008140100.bak"
Initial S/W Revision:	A.02.00

### Perform Restore (Remote Command Only)

Invokes an alignment data restore operation from the provided filename.

Remote Command:	:CALibration:DATA:RESTore <filename>
Example:	:CAL:DATA:REST "F:\ AlignDataBackup_N9020A_US00000001_2008140100.bak "
Initial S/W Revision:	A.02.00

### Advanced

Accesses alignment processes that are immediate action operations that perform operations that run until complete. Advanced alignments are performed on an irregular basis, or require additional operator interaction

Key Path:	<b>System, Alignments</b>
Initial S/W Revision:	Prior to A.02.00

### Characterize Preselector

The Preselector tuning curve drifts over temperature and time. Recognize that the Amplitude, Presel Center function adjusts the preselector for accurate amplitude measurements at an individual frequency. Characterize Preselector improves the amplitude accuracy by ensuring the Preselector is approximately centered at all frequencies without the use of the Amplitude, Presel Center function. Characterize Preselector can be useful in situations where absolute amplitude accuracy is not of utmost importance, and the throughput savings or convenience of not performing a Presel Center is desired. Presel Center is required prior to any measurement for best (and warranted) amplitude accuracy.

Agilent recommends that the Characterize Preselector operation be performed yearly as part of any calibration, but performing this operation every three months can be worthwhile.

Characterize Preselector immediately executes a characterization of the Preselector, which is a YIG-tuned filter (YTF). The instrument stops any measurement currently underway, performs the characterization, then restarts the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:YTF?) will invoke the alignment of the YTF subsystem and return a success or failure value.

A failure encountered during alignment will generate the Error Condition message “Characterize Preselector failure” and set bit 3 in the STATUS:QUESTIONable:CALibration:EXTended:FAILure status register. Successful completion of Characterize Preselector will clear this Condition. It will also begin the elapsed time counter for Last Characterize Preselector Time, and capture the Last Characterize Preselector Temperature.

The last Characterize Preselector Time and Temperature survives across the power cycle as this operation is performed infrequently.

---

**NOTE** The Characterize Preselector function can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORT SCPI command. None of the new characterization data is then used. However, since the old characterization data is purged at the beginning of the characterization, you now have an uncharacterized preselector. You should re-execute this function and allow it to finish before making any further preselected measurements.

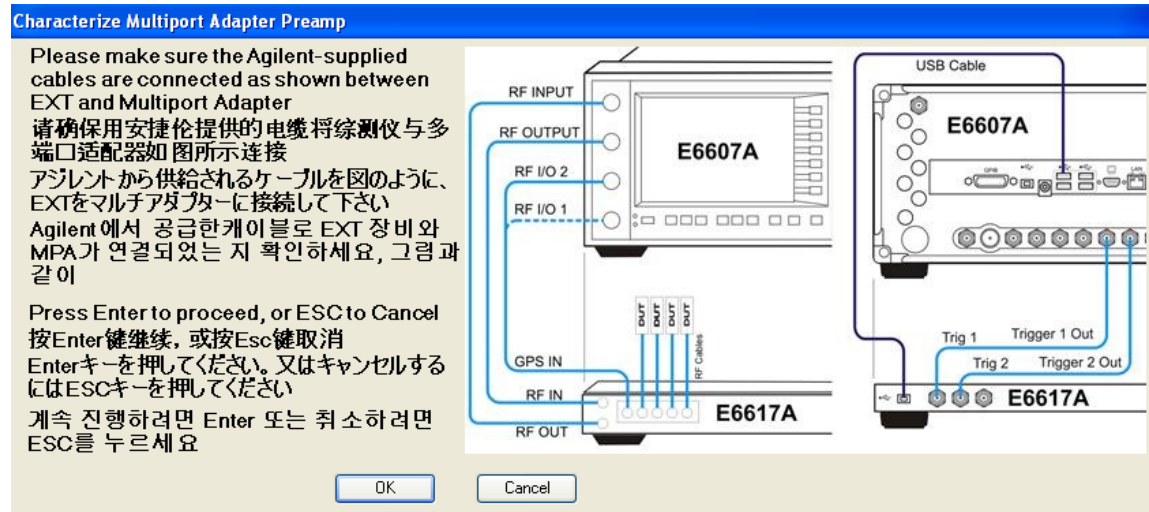
---

Key Path:	<b>System, Alignments, Advanced</b>
Mode:	All
Remote Command:	:CALibration:YTF :CALibration:YTF?
Example:	:CAL:YTF
Notes:	:CALibration:YTF? returns 0 if successful :CALibration:YTF? returns 1 if failed (including interfering user signal) While Advanced, Characterize Preselector is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORT command. Successful completion will clear bit 9 in the Status Questionable Calibration register. A failure encountered during alignment will generate the Error Condition message “Characterize Preselector failed” and set bit 9 in the Status Questionable Calibration register. For Options that support frequencies > 3.6 GHz only.
Dependencies:	This key does not appear in models that do not contain preselectors. In these models the SCPI command is accepted without error but no action is taken.
Couplings:	Initializes the time for the Last Characterize Preselector Time. Records the temperature for the Last Characterize Preselector Temperature.

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

### Characterize Multiport Adapter Preamp

A Multiport Adatper Preamp Characterization should be made when MPA and EXT are first paired, a message window is popped up as below to inform the user to take this action:



Correspondingly, bit 8 of the STATUS:QUESTIONable:CALibration:EXTended:NEEDED register (error 80) will be set for the “MPA Align required” message. Successful completion of Characterize Multiport Adapter Preamp will clear this Condition.

Users are expected to execute a characterization of the Preamp of Multiport Adapter when it is plugged into the USB port for the first time. The instrument stops any measurement currently underway, performs the characterization, then restarts the measurement from the beginning (similar to pressing the **Restart** key).

The query form of the remote command :CALibration:MPADapter:GAIN? will invoke the characterization of the Preamp of Multiport Adapter and return a success or failure value.

A failure encountered during characterization will generate the Error Condition message “MPA Align failed” and set bit 8 (error 83) in the STATUS:QUESTIONable:CALibration:EXTended:FAILure status register. Successful completion of Characterize Multiport Adapter Preamp will clear this Condition.

NOTE:

---

**NOTE** **Characterize Multiport Adapter Preamp** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command.

---

Key Path:	<b>System, Alignments, Advanced</b>
Mode:	All

Remote Command:	:CALibration:MPADapter:GAIN :CALibration:MPADapter:GAIN?
Example:	:CAL:MPAD:GAIN
Notes:	:CALibration:MPADapter:GAIN? returns 0 if successful :CALibration:MPADapter:GAIN? returns 1 if failed  While System, Alignments, Advanced, Characterize Multiport Adapter Preamp is performing the characterization, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential, it must be completed before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.  Successful completion will clear bit 8 in the Status Questionable Calibration Extended Failure register.  A failure encountered during alignment will generate the Error Condition message “MPAdapter Preamp Charact Failure” and set bit 8 in the Status Questionable Calibration Extended Failure register.
Dependencies:	This key does not appear unless a multiport adapter is plugged in to the USB.  Grayout error: -221.1400; Multiport Adapter Not Available
Status Bits/OPC dependencies:	Bit8 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision:	A.10.00

### Timebase DAC

Allows control of the internal 10 MHz reference oscillator timebase. This may be used to adjust for minor frequency alignment between the signal and the internal frequency reference. This adjustment has no effect if the instrument is operating with an External Frequency Reference.

If the value of the Timebase DAC changes (by switching to Calibrated from User with User set to a different value, or in User with a new value entered) an alignment may be necessary. The alignment system will take appropriate action; which will either invoke an alignment or cause an Alert.

Key Path:	<b>System, Alignments</b>
Mode:	All
Remote Command:	:CALibration:FREQuency:REFeRence:MODE CALibrated USER :CALibration:FREQuency:REFeRence:MODE?
Example:	:CAL:FREQ:REF:MODE CAL

System Functions  
System

Notes:	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.  If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Preset:	This is unaffected by Preset but is set to CALibrated on a "Restore System Defaults->Align".
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

**Calibrated**

Sets the Timebase DAC to the value established during factory or field calibration. The value displayed on the menu key is the calibrated value.

Key Path:	<b>System, Alignments, Timebase DAC</b>
Mode:	All
Example:	:CAL:FREQ:REF:MODE CAL
Readback Text:	[xxx] < where xxx is the calibrated value
Initial S/W Revision:	Prior to A.02.00

**User**

Allows setting the Timebase DAC to a value other than the value established during the factory or field calibration. The value displayed on the menu key is the calibrated value.

Key Path:	<b>System, Alignments, Timebase DAC</b>
Mode:	All
Example:	:CAL:FREQ:REF:MODE USER
Readback Text:	xxx < where xxx is the Timebase DAC setting
Initial S/W Revision:	Prior to A.02.00

Key Path:	<b>System, Alignments, Timebase DAC</b>
Mode:	All
Remote Command:	:CALibration:FREQuency:REFerence:FINE <integer> :CALibration:FREQuency:REFerence:FINE?
Example:	:CAL:FREQ:REF:FINE 8191
Notes:	If the value of the timebase is changed the alignment system automatically performs an alignment or alerts that an alignment is due.
Couplings:	Setting :CAL:FREQ:REF:FINE sets :CAL:FREQ:REF:MODE USER



Preset:	This is unaffected by Preset but is set to the factory setting on a “Restore System Defaults->Align”.
State Saved:	No
Min:	0
Max:	16383
Backwards Compatibility SCPI:	:CALibration:FREQuency:REFErence:COARse ESA hardware contained two DAC controls for the Timebase. In X-Series the command :CALibration:FREQuency:REFErence:FINE is the method for adjusting the timebase. The :COARse command is provided as an alias to :FINE.
Initial S/W Revision:	Prior to A.02.00

Remote Command:	:CALibration:FREQuency:REFErence:COARse <integer> :CALibration:FREQuency:REFErence:COARse?
Example:	:CAL:FREQ:REF:COAR 8191
Notes:	This is an alias for CAL:FREQ:REF:FINE any change to COARse is reflected in FINE and vice-versa. See CAL:FREQ:REF:FINE for description of functionality.
Couplings:	Setting :CAL:FREQ:REF:COAR sets :CAL:FREQ:REF:MODE USER
Initial S/W Revision:	Prior to A.02.00

### RF Preselector

This menu and all of its submenus are only available in models with the RF Preselector, such as the N9038A.

See [“Align Now, 20 Hz to 30 MHz” on page 201](#)

See [“Align Now, 30 MHz to 3.6 GHz” on page 203](#)

See [“Align Now, 20 Hz to 3.6 GHz” on page 204](#)

See [“Alert” on page 206](#)

Key Path:	<b>System, Alignments</b>
Initial S/W Revision:	Prior to A.08..00

### Align Now, 20 Hz to 30 MHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPreselector:CONDUCTed?) will invoke the alignment of the RF Preselector on Conducted Band and return a success or failure value. Successful

System Functions  
System

completion will clear the “Align 20 Hz to 30 MHz required” Error Condition, and clear the bit 1 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Conducted Time, and the temperature is captured for the Last Align Now, Conducted Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 20 Hz to 30 MHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 20 Hz to 30 MHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 20 Hz to 30 MHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path:	<b>System, Alignments, RF Preselector, Align Now</b>
Mode:	All
Remote Command:	:CALibration:RFPreselector:CONDUCTed :CALibration:RFPreselector:CONDUCTed?
Example:	:CAL:RFPS:COND
Notes:	:CALibration:RFPreselector:CONDUCTed? Return 0 if successful :CALibration:RFPreselector:CONDUCTed? Return 1 if failed  When Align 20 Hz to 30 MHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 1 in the Status Questionable Calibration Extended Needed register and bit 0 in Status Questionable Calibration Extended Failure register.  A failure encountered during alignment will set the Error Condition “20 Hz to 30 MHz Alignment Failure” and set both bit 1 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register.  For model N9038A only.
Dependencies:	This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.
Couplings:	Initializes the time for the Last Align Conducted Now, Conducted Time. Records the temperature for the Last Align Conducted Now, Conducted Temperature.

Status Bits/OPC Dependencies:	<p>Bit 8 or 9 may be set in the Status Questionable Calibration register.</p> <p>Bit 1 may be set in the Status Questionable Calibration Extended Needed register.</p> <p>Bit 0 may be set in the Status Questionable Calibration Extended Failure register.</p>
Initial S/W Revision:	A.08.00

### Align Now, 30 MHz to 3.6 GHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPSelector:RADiated?) will invoke the alignment of the RF Preselector on Radiated Band and return a success or failure value. Successful completion will clear the “Align 30 MHz to 3.6 GHz required” Error Condition, and clear the bit 2 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Radiated Time, and the temperature is captured for the Last Align Now, Radiated Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 30 MHz to 3.6 GHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 30 MHz to 3.6 GHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 30 MHz to 3.6 GHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path:	<b>System, Alignments, RF Preselector, Align Now</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:RADiated :CALibration:RFPSelector:RADiated?
Example:	:CAL:RFPS:RAD

Notes:	<p>:CALibration:RFPSelector:RADiated? Return 0 if successful</p> <p>:CALibration:RFPSelector:RADiated? Return 1 if failed</p> <p>When Align 30 MHz to 3.6 GHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.</p> <p>This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 2 in the Status Questionable Calibration Extended Needed register and bit 1 in Status Questionable Calibration Extended Failure register.</p> <p>A failure encountered during alignment will set the Error Condition “30 MHz to 3.6 GHz Alignment Failure” and set both bit 2 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register.</p> <p>For model N9038A only.</p>
Dependencies:	<p>This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.</p>
Couplings:	<p>Initializes the time for the Last Align Radiated Now, Radiated Time.</p> <p>Records the temperature for the Last Align Radiated Now, Radiated Temperature.</p>
Status Bits/OPC Dependencies:	<p>Bit 8 or 9 may be set in the Status Questionable Calibration register.</p> <p>Bit 2 may be set in the Status Questionable Calibration Extended Needed register.</p> <p>Bit 1 may be set in the Status Questionable Calibration Extended Failure register.</p>
Initial S/W Revision:	<p>A.08.00</p>

### Align Now, 20 Hz to 3.6 GHz

Immediately executes an alignment of the receiver subsystem. The receiver will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key).

The query form of the remote commands (:CALibration:RFPSelector:FULL?) will invoke the alignment of the RF Preselector on both Conducted and Radiated Band and return a success or failure value. Successful completion will clear the “Align 20 Hz to 3.6 GHz required” Error Condition, and clear the bit 1 and bit 2 in the Status Questionable Calibration Extended Needed register. The elapsed time counter will begin for Last Align Now, Conducted Time and Last Align Now Radiated Time and the temperature is captured for Last Align Now, Conducted Temperature and Last Align Now, Radiated Temperature. The alignment can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align 20 Hz to 3.6 GHz required” is set because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

The “Align 20 Hz to 3.6 GHz required” Error Condition will appear when this alignment has expired. User is now responsible to perform the Align Now, 20 Hz to 3.6 GHz in order to keep the receiver in warranted operation. This alignment can only be performed by user as it is not part of the Auto Align process.

Key Path:	<b>System, Alignments, RF Preselector, Align Now</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:FULL :CALibration:RFPSelector:FULL?
Example:	:CAL:RFPS:FULL
Notes:	:CALibration:RFPSelector:FULL? Return 0 if successful :CALibration:RFPSelector:FULL? Return 1 if failed  When Align 20 Hz to 3.6 GHz is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.  This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORT command. Successful completion will clear bit 1, bit 2 in the Status Questionable Calibration Extended Needed register and bit 0, bit 1 in Status Questionable Calibration Extended Failure register.  A failure encountered during alignment will set the Error Condition “20 Hz to 3.6 GHz Alignment Failure” and set bit 1, bit 2 in the Status Questionable Calibration Extended Needed register and bit 9 in Status Questionable Calibration register.  For model N9038A only.
Dependencies:	This key does not appear in other than N9038A models, setting or querying the SCPI will generate an error.
Couplings:	Initializes the time for the Last Align Conducted Now, Conducted Time. Initializes the time for the Last Align Radiated Now, Radiated Time. Records the temperature for the Last Align Conducted Now, Conducted Temperature. Records the temperature for the Last Align Radiated Now, Radiated Temperature.
Status Bits/OPC Dependencies:	Bit 8 or 9 may be set in the Status Questionable Calibration register. Bit 1 and 2 may be set in the Status Questionable Calibration Extended Needed register. Bit 0 and 1 may be set in the Status Questionable Calibration Extended Failure register.
Initial S/W Revision:	A.08.00

### Alert

Setting Alert to ON/OFF will enable/disable the display of RF Preselector alignment required message on the status line. The instrument will power up with Alert On mode.

Key Path:	<b>System, Alignments, RF Preselector</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:ALERT ON OFF 0 1 :CALibration:RFPSelector:ALERT?
Example:	:CAL:RFPS:ALER OFF
Notes:	For model N9038A only. Error Condition will be generated when the alert is On and any of the RF Preselector alignments has expired.
Preset:	This is unaffected by Preset, but is set to ON on a “Restore System Defaults->Align”.
State Saved:	No
Initial S/W Revision:	A.08.00

### Schedule Setup

Enables you to schedule a task to run automatically at the background based on the recurrence and time set in the scheduler. Make sure that the Instrument’s local time is accurate as the Scheduler relies on this information to execute the task.

Key Path:	<b>System, Alignments, RF Preselector</b>
Initial S/W Revision:	A.08.00

### Task

There are 3 task that can be selected for the scheduler to run.

Task 1 is the 20 Hz to 30 MHz alignment

Task 2 is the 30 MHz to 3.6 GHz alignment

Task 3 is the 20 Hz to 3.6 GHz alignment.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:SCHeduler:TASK T1 T2 T3 :CALibration:RFPSelector:SCHeduler:TASK?
Example:	:CAL:RFPS:SCH:TASK T1

Notes:	Changing the task will not reset the Scheduler time and the alignment is based on the current scheduled configuration to occur.  For model N9038A only.
Preset:	This is unaffected by Preset but is set to T3 on a “Restore System Defaults->Align”.
State Saved:	No
Range:	Task 1   Task 2   Task 3
Initial S/W Revision:	A.08.00

### Date/Time

Enables you to configure the scheduler to run a task starting from this date and time. The date and time rely on the instrument’s local time to execute a scheduled task. The date is based on the format “YYYY/MM/DD” and the time is based on a 24 hour clock.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:SCHeuler:TIME:START "date", "time"  :CALibration:RFPSelector:SCHeuler:TIME:START?  This query returns data using the following format "YYYY/MM/DD; HH:MM:SS"
Example:	:CAL:RFPS:SCH:TIME:STAR "2009/8/20","12:00:00"
Notes:	“date” is representation of the date the task will run in the form of “YYYY/MM/DD” where:  YYYY is the four digit representation of year. (for example, 2009) MM is the two digit representation of month. (for example, 01 to 12) DD is the two digit representation of the day. (for example, 01 to 28, 29, 30 or 31 depending on the month and year)  “time” is a representation of the time of day the task will run in the form of “HH:MM:SS” where:  HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS is the two digit representation of seconds  For model N9038A only.
Preset:	This is unaffected by Preset but is set to Current date and 00:00:00 on a “Restore System Defaults->Align”.
State Saved:	No
Initial S/W Revision:	A.08.00

## System Functions

### System

#### Date

Enables you to configure the date of the scheduled task. The SCPI command to configure the date and time parameters of the scheduler is the same; however, they each have their own front-panel control.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup, Date/Time</b>
Notes:	See “Date/Time ” on page 207. For model N9038A only.
Preset:	This is unaffected by Preset but is set to Current date and 00:00:00 on a “Restore System Defaults->Align”.
State Saved:	No
Initial S/W Revision:	A.08.00

#### Time

Enables you to configure the time of the scheduled task. The SCPI command to configure the date and time parameters of the scheduler is the same; however, they each have their own front panel-control.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup, Date/Time</b>
Notes:	See “Date/Time ” on page 207 . For model N9038A only.
Preset:	This is unaffected by Preset but is set to Current date and 00:00:00 on a “Restore System Defaults->Align”.
State Saved:	No
Initial S/W Revision:	A.08.00

#### Recurrence

Enables you to configure the scheduler to run the task recurrently on a scheduled date and time. You can schedule it to run daily, weekly or alternate weeks.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup</b>
Mode:	All
Remote Command:	:CALibration:RFPreselector:SCHeduler:REcurrence DAY WEEK OFF :CALibration:RFPreselector:SCHeduler:REcurrence?
Example:	:CAL:RFPS:SCH:REC DAY
Notes:	For model N9038A only.
Preset:	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Align”.
State Saved:	No



Range:	DAY WEEK  OFF
Initial S/W Revision:	A.08.00

### Every N Weeks

Enables you to configure the scheduler to run the task on a day in every number of week's duration.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup, Recurrence</b>
Initial S/W Revision:	A.08.00

### N of Weeks

Enables you to set the number of weeks that the scheduler will wait to trigger a task.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup, Recurrence, Every N Weeks</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:SCHeduler:REcurrence:WEEK <integer> :CALibration:RFPSelector:SCHeduler:REcurrence:WEEK?
Example:	:CAL:RFPS:SCH:REC:WEEK 2
Notes:	New scheduled date to run the alignment task will get updated when this parameter is changed. For model N9038A only.
Preset:	This is unaffected by Preset but is set to 1 on a "Restore System Defaults->Align".
State Saved:	No
Range:	1-52
Initial S/W Revision:	A.08.00

### Day

Enables you to set the Day of the Week the scheduler will run a scheduled task.

Key Path:	<b>System, Alignments, RF Preselector, Schedule Setup, Recurrence, Every N Weeks</b>
Mode:	All
Remote Command:	:CALibration:RFPSelector:SCHeduler:REcurrence:DAY SUN   MON   TUE   WED   THU   FRI   SAT :CALibration:RFPSelector:SCHeduler:REcurrence:DAY?
Example:	:CAL:RFPS:SCH:REC:DAY SUN
Notes:	For model N9038A only.

System Functions  
System

Preset:	This is unaffected by Preset but is set to SUN on a “Restore System Defaults->Align”.
State Saved:	No
Range:	Sunday Monday Tuesday Wednesday Thursday Friday Saturday
Initial S/W Revision:	A.08.00

**Scheduler**

Setting the Scheduler to ON will trigger the execution of the scheduled task based on the recurrence and time set in the scheduler since the last successful of the specific alignment. A warning condition of “RF Preselector alignment scheduler is ON” will be appeared when the scheduler is set to ON. OFF will turn off the Scheduler from running any scheduled task.

Key Path:	<b>System, Alignments, RF Preselector</b>
Mode:	All
Remote Command:	:CALibration:RFPreselector:Scheduler:STATE ON OFF 0 1 :CALibration:RFPreselector:Scheduler:STATE?
Example:	:CAL:RFPS:SCH:STAT OFF
Notes:	For model N9038A only.
Preset:	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Align”.
State Saved:	No
Initial S/W Revision:	A.08.00

**I/O Config**

Activates a menu for identifying and changing the I/O configuration for remote control.

Key Path:	<b>System</b>
Initial S/W Revision:	Prior to A.02.00

**GPIB**

Activates a menu for configuring the GPIB I/O port.

Key Path:	<b>System, I/O Config</b>
Initial S/W Revision:	A.02.00

### GPIB Address

Select the GPIB remote address.

Key Path:	<b>System, I/O Config, GPIB</b>
Mode:	All
Remote Command:	:SYSTem:COMMunicate:GPIB [1] [:SELF] :ADDRESS <integer> :SYSTem:COMMunicate:GPIB [1] [:SELF] :ADDRESS?
Example:	:SYST:COMM:GPIB:ADDR 17
Notes:	Changing the Address on the GPIB port requires all further communication to use the new address.
Preset:	This is unaffected by Preset but is set to 18 on a “Restore System Defaults->Misc”
State Saved:	No
Range:	0 to 30
Initial S/W Revision:	Prior to A.02.00

### GPIB Controller

Sets the GPIB port into controller or device mode. In the normal state, GPIB controller is disabled, which allows the analyzer to be controlled by a remote computer. When GPIB Controller is enabled, the instrument can run software applications that use the instrument's computer as a GPIB controller; controlling devices connected to the instrument's GPIB port.

---

**NOTE** When GPIB Controller is enabled, the analyzer application itself cannot be controlled over GPIB. In this case it can easily be controlled via LAN or USB. The GPIB port cannot be a controller and device at the same time. Only one controller can be active on the GPIB bus at any given time. If the analyzer is the controller, an external PC cannot be a controller.

---

To control the instrument from the software that is performing GPIB controller operation, you can use an internal TCP/IP connection to the analyzer application. Use the address TCPIP0:localhost:inst0:INSTR to send SCPI commands to the analyzer application.

Key Path:	<b>System, I/O Config, GPIB</b>
Mode:	All
Scope:	Mode Global
Remote Command:	:SYSTem:COMMunicate:GPIB [1] [:SELF] :CONTroller [:ENABle] ON   OFF   0   1 :SYSTem:COMMunicate:GPIB [1] [:SELF] :CONTroller [:ENABle] ?
Example:	:SYST:COMM:GPIB:CONT ON Will set GPIB port to Controller

System Functions  
System

Notes:	When the instrument becomes the Controller bit 0 in the Standard Event Status Register is set (and when the instrument relinquishes Controller capability bit 0 is cleared in the Standard Event Status Register).
Preset:	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Misc”
State Saved:	No
Range:	Disabled Enabled
Initial S/W Revision:	A.02.00

**Disabled**

Disables the GPIB Controller capability, this is the default (or normal) setting.

Key Path:	<b>System, I/O Config, GPIB, GPIB Controller</b>
Example:	:SYST:COMM:GPIB:CONT OFF Will set GPIB port to Device
Initial S/W Revision:	A.02.00

**Enabled**

Enables the GPIB Controller capability.

Key Path:	<b>System, I/O Config, GPIB, GPIB Controller</b>
Example:	:SYST:COMM:GPIB:CONT ON Will set GPIB port to Controller
Initial S/W Revision:	A.02.00

**SCPI LAN**

Activates a menu for identifying and changing the SCPI over a LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

Key Path:	<b>System, I/O Config</b>
Initial S/W Revision:	Prior to A.02.00

**SCPI Telnet**

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over LAN through telnet.

Key Path:	<b>System, I/O Config, SCPI LAN</b>
Mode:	All

Remote Command:	:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?
Example:	:SYST:COMM:LAN:SCPI:TELN:ENAB OFF
Preset:	This is unaffected by Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved:	No
Range:	On   Off
Initial S/W Revision:	Prior to A.02.00

### SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

Key Path:	<b>System, I/O Config, SCPI LAN</b>
Mode:	All
Remote Command:	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
Example:	:SYST:COMM:LAN:SCPI:SOCK:ENAB OFF
Preset:	This is unaffected by a Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved:	No
Range:	On   Off
Initial S/W Revision:	Prior to A.02.00

### SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

Parameter	Description	Setting
Maximum Connections	The maximum number of connections that can be accessed simultaneously	5
Instrument Name	The name (same as the remote SICL address) of your analyzer	inst0
Instrument Logical Unit	The unique integer assigned to your analyzer when using SICL LAN	8
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7

System Functions  
System

Parameter	Description	Setting
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address)	18

Key Path:	<b>System, I/O Config, SCPI LAN</b>
Mode:	All
Remote Command:	:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?
Example:	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset:	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved:	No
Range:	On   Off
Initial S/W Revision:	Prior to A.02.00

### HiSLIP Server

Turns the HiSLIP server capability On or Off, enabling you to limit SCPI access over LAN through the HiSLIP server.

HiSLIP stands for High Speed LAN Instrument Protocol and is part of the IVI–6.1 specification.

Here is an example of a VISA connection string used to connect to the HiSLIP Server on an X-Series Spectrum Analyzer:

TCPIP0::a-n9030a-93016::hislip0::INSTR

In the example above, hislip0 is the HiSLIP device name that VISA users must include in their HiSLIP VISA Address strings. Your HiSLIP device name may be different depending on your VISA settings.

Key Path:	<b>System, I/O Config, SCPI LAN</b>
Mode:	All
Remote Command:	:SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle?
Example:	:SYST:COMM:LAN:SCPI:HISL:ENAB OFF
Preset:	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved:	No

Range:	On   Off
Initial S/W Revision:	A.11.00

### SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. The user must use this command to obtain the port number of the control socket. To force a device clear on this socket, open the port and send the string "DCL" to the instrument.

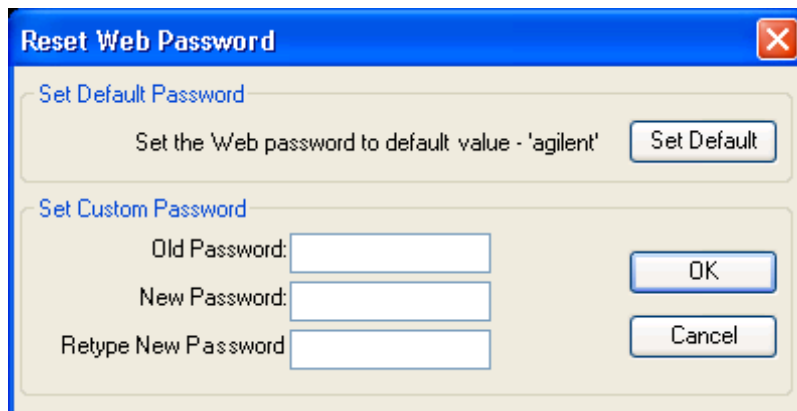
If this SCPI command is sent to a non SCPI Socket interface, then 0 is returned.

Mode:	All
Remote Command:	:SYSTem:COMMunicate:LAN:SCPI:SOCKET:CONTRol?
Example:	:SYST:COMM:LAN:SCPI:SOCK:CONT?
Preset:	This is unaffected by Preset or "Restore System Defaults->Misc".
State Saved:	No
Range:	0 to 65534
Initial S/W Revision:	Prior to A.02.00

### Reset Web Password

The embedded web server contains certain capability which are password protected; modifying the LAN configuration of the instrument, and access to web pages that can change the settings of the instrument. The default password from the factory is 'agilent' (without the quotes). The control provided here is the means to set the web password as the user desires, or to reset the password to the factory default.

Selecting Reset web password brings up a control for resetting the password as the user desires, or to the factory default. A keyboard is required to change the password from the factory default of 'agilent' or to set a new password that contains alphabetic characters. The control is:



If this control is entered without an external keyboard or mouse connected, you can cancel the control by

## System Functions

### System

pressing the Cancel (ESC) front-panel key.

Key Path:	<b>System, I/O Config</b>
Mode:	All
Initial S/W Revision:	Prior to A.02.00

### LXI

Opens a menu that allows you to access the various LXI configuration properties.

Key Path:	<b>System, I/O Config</b>
Initial S/W Revision:	Prior to A.02.00

### LAN Reset

Resets the LAN connection.

Key Path:	<b>System, I/O Config, LXI</b>
Initial S/W Revision:	Prior to A.02.00

### System IDN Response

This key allows you to specify a response to the \*IDN? query, or to return the analyzer to the Factory response if you have changed it.

To choose the factory-set response, press the **Factory** key.

To specify your own response, press the **User** key, and enter your desired response.

Key Path:	<b>System, I/O Config</b>
Mode:	All
Remote Command:	:SYSTem:IDN <string> :SYSTem:IDN?
Notes:	This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode..  It survives shutdown and restart of the software and therefore survives a power cycle  Null string as parameter restores the Factory setting
Preset:	This is unaffected by Preset but is set to the original factory setting on a "Restore System Defaults->Misc"
State Saved:	No
Initial S/W Revision:	A.06.00



## Factory

This key selects the factory setting, for example:

“Agilent Technologies,N9020A,MY00012345,A.05.01”

where the fields are manufacturer, model number, serial number, firmware revision.

Key Path:	<b>System, I/O Config, IDN Response</b>
Example:	:SYST:IDN "" null string, restores the factory setting
Initial S/W Revision:	A.06.0

## User

This key allows you to specify your own response to the \*IDN? query. You may enter your desired response with the Alpha Editor or a plugin PC keyboard.

When you press this key, the active function becomes the current User string with the cursor at the end. This makes it easy to edit the existing string.

If you enter a null string (for example, by clearing the User String while editing and then pressing **Done**) the analyzer automatically reverts to the Factory setting.

Key Path:	<b>System, I/O Config, IDN Response</b>
Example:	:SYST:IDN “XYZ Corp,Model 12,012345,A.01.01” user specified response
Initial S/W Revision:	A.06.00

## Query USB Connection (Remote Command Only)

Enables you to determine the speed of the USB connection.

Mode:	All
Remote Command:	:SYSTem:COMMunicate:USB:CONNectioN?
Example:	:SYST:COMM:USB:CONN?
Notes:	<p>NONE – Indicates no USB connection has been made.</p> <p>LSPeed – Indicates a USB low speed connection (1.5 Mbps).</p> <p>This is reserved for future use, the T+M488 protocol is not supported on low speed connections.</p> <p>HSPeed – Indicates that a USB high speed connection (480 Mbps) has been negotiated.</p> <p>FSPeed – Indicates that a USB full speed connection (12 Mbps) has been negotiated.</p>
State Saved:	No
Range:	NONE LSPeed HSPeed FSPeed

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

### USB Connection Status (Remote Command Only)

Enables you to determine the current status of the USB connection.

Mode:	All
Remote Command:	:SYSTem:COMMunicate:USB:STATus?
Example:	:SYST:COMM:USB:STAT?
Notes:	<p>SUSPended – Indicates that the USB bus is currently in its suspended state. The bus is in the suspended state when:</p> <ul style="list-style-type: none"> <li>The bus is not connected to any controller</li> <li>The controller is currently powered off</li> <li>The controller has explicitly placed the USB device into the suspended state.</li> </ul> <p>When in the suspended state, no USB activity, including start of frame packets are received.</p> <p>ACTive – Indicates that the USB device is in the active state. When the device is in the active state, it is receiving periodic start of frames but it isn't necessarily receiving or transmitting data.</p>
State Saved:	No
Range:	SUSPended ACTive
Initial S/W Revision:	Prior to A.02.00

### USB Packet Count (Remote Command Only)

Enables you to determine the number of packets received and transmitted on the USB bus.

Mode:	All
Remote Command:	:SYSTem:COMMunicate:USB:PACKets?
Example:	:SYST:COMM:USB:PACK?
Notes:	<p>Two integers are returned. The first is the number of packets received since application invocation, the second is the number of packets transmitted since application invocation. If no packets have been received or transmitted the response is 0,0.</p> <p>The packet count is initialized to 0,0 when the instrument application is started.</p>
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

## Restore Defaults

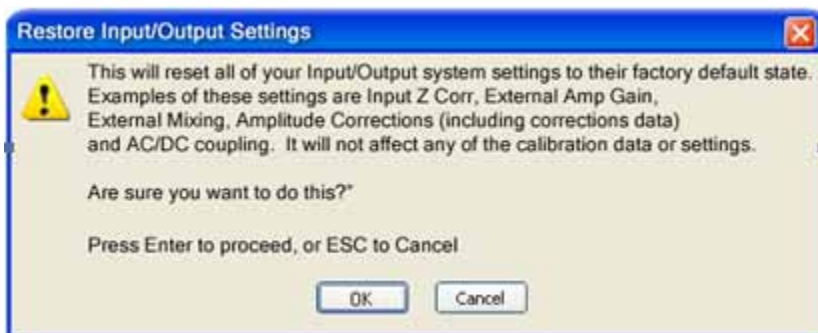
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values.

Key Path:	<b>System</b>
Mode:	All
Remote Command:	:SYSTem:DEFault [ALL]   ALIGn   INPut   MISC   MODes   PON
Example:	SYST:DEF
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

## Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. .

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:

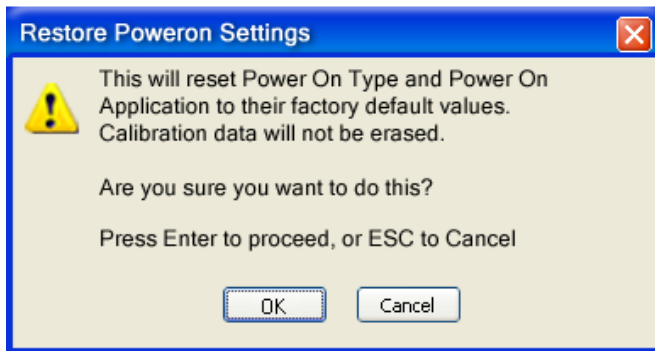


Key Path:	<b>System, Restore System Defaults</b>
Example:	:SYST:DEF INP
Initial S/W Revision:	Prior to A.02.00

## Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



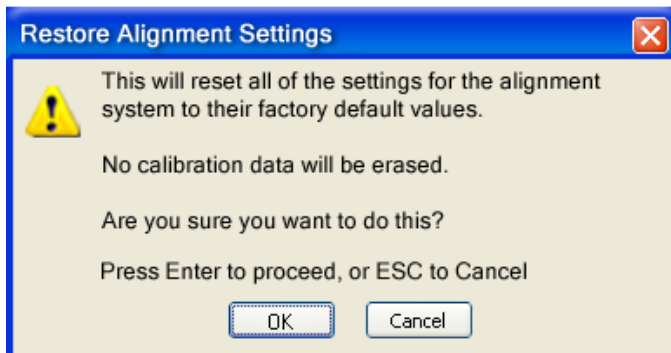
Key Path:	<b>System, Restore System Defaults</b>
Example:	:SYST:DEF PON
Initial S/W Revision:	Prior to A.02.00

### Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

Confirmation is required to restore the factory default values. The confirmation dialog is:



Key Path:	<b>System, Restore System Defaults</b>
Example:	:SYST:DEF ALIG
Initial S/W Revision:	Prior to A.02.00

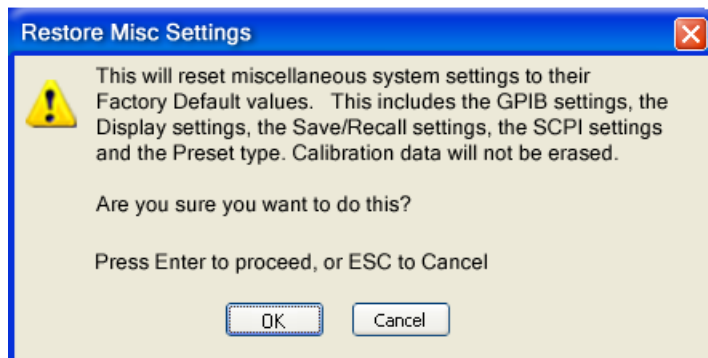
### Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode

switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

Miscellaneous Setting	Default Value
Verbose SCPI	Off
GPIB Address	18
Auto File Name Number	000
Save Type	State
State Save To	Register 1
Screen Save To	SCREEN000.png
DISP:ENABle	ON
Full Screen	Off
SCPI Telnet	ON
SCPI Socket	ON
SICL Server	ON
Display Intensity	100
Display Backlight	ON
Display Theme	TDColor
System Annotation	ON
The SYST:PRES:TYPE	MODE

Confirmation is required to restore the factory default values. The confirmation dialog is:

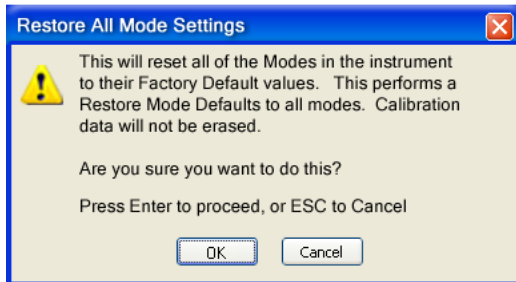


Key Path:	<b>System, Restore System Defaults</b>
Example:	:SYST:DEF MISC
Initial S/W Revision:	Prior to A.02.00

### Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

Confirmation is required to restore the factory default values. The confirmation dialog is:

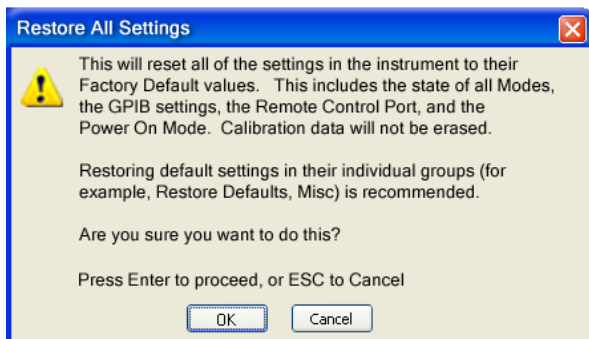


Key Path:	<b>System, Restore System Defaults</b>
Example:	:SYST:DEF MOD
Couplings:	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode.. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision:	Prior to A.02.00

### All

This performs a comprehensive reset of ALL analyzer settings to their factory default values. It resets all of the system setting groups, causes a Restore Mode Defaults for all modes in the instrument, and switches back to the power-on mode. It does not affect the User Preset file or any user saved files.

Confirmation is required to restore the factory default values. The confirmation dialog is:



Key Path:	<b>System, Restore System Defaults</b>
-----------	--

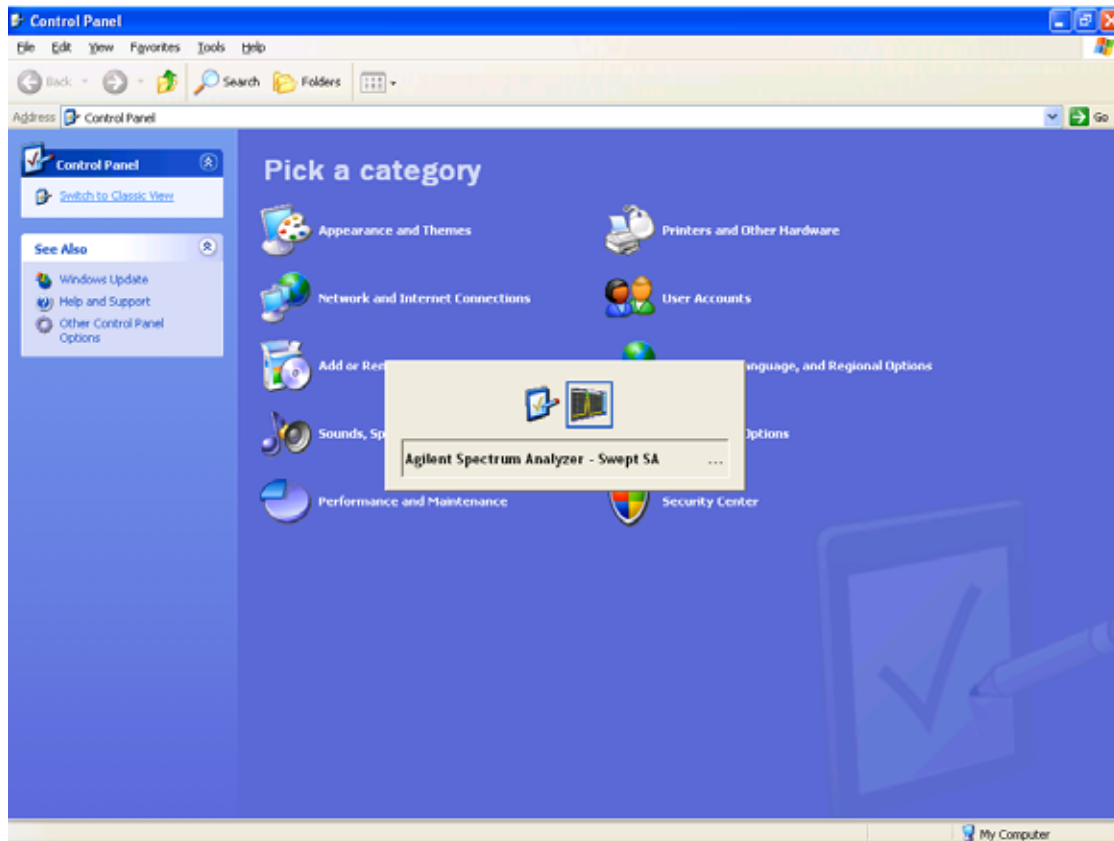
Example:	:SYST:DEF ALL
Couplings:	An All will cause the currently running measurement to be aborted and get all modes to a consistent state, so it is unnecessary to couple any settings.
Initial S/W Revision:	Prior to A.02.00


### Control Panel...

Opens the Windows Control Panel. The Control Panel is used to configure certain elements of Windows that are not configured through the hardkey/softkey System menus.

The Control Panel is a separate Windows application, so to return to the analyzer once you are in the Control Panel, you may either:

Exit the Control Panel by clicking on the red X in the upper right hand corner, with a mouse



Or use Alt-Tab: press and hold the Alt  key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

Key Path:	<b>System</b>
Notes:	No remote command for this key.
Initial S/W Revision:	Prior to A.02.00

## Licensing...

Opens the license explorer.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

Key Path:	<b>System</b>
Notes:	No equivalent remote command for this key.
Backwards Compatibility Notes:	In ESA the SCPI command for displaying the Show Licenses screen is: :SYSTem:CONFIgure:LKEY:STATe OFF ON 0 1 :SYSTem:CONFIgure:LKEY:STATe?  There are no equivalent SCPI commands in the X-Series for displaying the License Explorer.
Initial S/W Revision:	Prior to A.02.00

Remote Command:	:SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">
Example:	SYST:LKEY "N9073A-1FP","027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
Notes:	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature.  The <"LicenseInfo"> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports reverse compatibility.
Initial S/W Revision:	Prior to A.02.00

Remote Command:	:SYSTem:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo">
Example:	SYST:LKEY:DEL "N9073A-1FP","027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
Notes:	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed.  The <"LicenseInfo"> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports reverse compatibility.
Initial S/W Revision:	Prior to A.02.00



Remote Command:	:SYSTem:LKEY:LIST?
Notes:	<p>Return Value:</p> <p>An &lt;arbitrary block data&gt; of all the installed instrument licenses.</p> <p>The format of each license is as follows.</p> <p>&lt;Feature&gt;,&lt;Version&gt;,&lt;Signature&gt;,&lt;Expiration Date&gt;,&lt;Serial Number for Transport&gt;</p> <p>Return Value Example:</p> <p>#3136</p> <p>N9073A-1FP,1.000,B043920A51CA</p> <p>N9060A-2FP,1.000,4D1D1164BE64</p> <p>N9020A-508,1.000,389BC042F920</p> <p>N9073A-1F1,1.000,5D71E9BA814C,13-aug-2005</p> <p>&lt;arbitrary block data&gt; is:</p> <p>#NMMM&lt;data&gt;</p> <p>Where:</p> <p>N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2.</p> <p>MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55.</p> <p>&lt;data&gt; ASCII contents of the data</p>
Initial S/W Revision:	Prior to A.02.00

Remote Command:	:SYSTem:LKEY? <"OptionInfo" >
Example:	SYST:LKEY? "N9073A-1FP"
Notes:	<p>The &lt;"OptionInfo"&gt; contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one.</p> <p>Return Value:</p> <p>&lt;"LicenseInfo"&gt; if the license is valid, null otherwise.</p> <p>&lt;"LicenseInfo"&gt; contains the signature, the expiration date, and serial number if transportable.</p> <p>Return Value Example:</p> <p>"B043920A51CA"</p>
Initial S/W Revision:	Prior to A.02.00

Remote Command:	:SYSTem:HID?
Notes:	Return value is the host ID as a string

## System Functions

### System

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

### Security

Accesses capabilities for operating the instrument in a security controlled environment.

Key Path:	<b>System</b>
Initial S/W Revision:	A.04.00

### USB

#### Read-Write

Selection for allowing full read-write access to the USB ports.

Key Path:	<b>System, Security, USB</b>
Example:	:SYST:SEC:USB:WPR OFF      Will set USB ports to Read-Write
Initial S/W Revision:	A.04.00

#### Read only

Selection for disabling write access to the USB ports.

Key Path:	<b>System, Security, USB</b>
Example:	:SYST:SEC:USB:WPR ON      Will set USB ports to Read only
Initial S/W Revision:	A.04.00

### Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

Key Path:	<b>System</b>
Initial S/W Revision:	Prior to A.02.00

#### Show Hardware Statistics

Provides a display of various hardware statistics. The statistics include the following:

Mechanical relay cycles

High and Low temperature extremes

Elapsed time that the instrument has been powered-on (odometer)

The display should appear listing the statistics, product number, serial number, and firmware revision.

Hardware Statistical Information	
Agilent MXA Signal Analyzer	
Product Number: N9020A	
Serial Number: US00061145	
Instrument S/W Revision: A.12.00	
Revision Date: 7/11/2012 12:11:10 PM	
Component Name	Value
MechAtten #1 Count Total	457304
Calibrator Switch Cycles	105953
AC/DC Switch Cycles	114240
2 dB #1 Mechanical Atten Cycles	112655
2 dB #2 Mechanical Atten Cycles	124456
MechAtten #2 Count Total	472265
6 dB Mechanical Atten Cycles	115302
10 dB Mechanical Atten Cycles	93602
20 dB Mechanical Atten Cycles	144781
30 dB Mechanical Atten Cycles	118580
Low Noise Path Switch	45668
Preselector Bypass Cycles	31133
High temperature operating extreme	45.75
Low temperature operating extreme	-23.9375
Elapsed Time (On-Time)(hours)	134164

In some CXA models this field is called "Fixed Atten"

Some CXA models omit these fields

Only shown if LNP installed

Only shown if MPB installed

The CXA models in which the AC/DC Switch field is called Fixed Atten and which omit the mech atten fields are the N9000A–503/507 models.

The data will be updated only when the Show Hardware Statistics menu key is pressed, it will not be updated while the screen is displayed.

The tabular data should be directly printable.

Key Path:	<b>System, Diagnostics</b>
Mode:	All
Notes:	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision:	Prior to A.02.00

### SCPI for Show Hardware Statistics ( Remote Commands Only)

Each of the hardware statistic items can be queried via SCPI.

[“Query the Mechanical Relay Cycle Count” on page 228](#)

[“Query the Operating Temperature Extremes” on page 228](#)

[“Query the Elapsed Time since 1st power on” on page 229](#)

### Query the Mechanical Relay Cycle Count

Return the count of mechanical relay cycles. For N9038A model, there are additional 2 Mechanical Relays which are <N9038A Input2>, <N9038A Bypass>.

Remote Command:	:SYSTem:MRELay:COUNT?
Example:	:SYST:MREL:COUN?
Notes:	<p>Query Only</p> <p>The return value is a comma separated list of the individual counts for each mechanical relay.</p> <p>The position of the relays in the list is:  “&lt;Cal Signal&gt;,&lt;AC/DC&gt;,&lt;2dB #1 Atten&gt;,&lt;2dB #2 Atten&gt;,&lt;6dB Atten&gt;,&lt;10dB Atten&gt;,&lt;20dB Atten&gt;,&lt;30dB Atten&gt;,&lt;Fixed Atten&gt;,&lt;Low Noise Path Switch&gt;,&lt;Presel Bypass&gt;,&lt;N9038A Input2&gt;, &lt;N9038A Bypass&gt;”</p> <p>Items in the list not pertaining to your particular hardware configuration will return as -999 for those items.</p>
Dependencies:	This SCPI command is NOT supported by the E6607C model.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.08.00

### Query the Operating Temperature Extremes

Returns the low operating temperature extreme value. The value survives a power-cycle and is the temperature extreme encountered since the value was reset by the factory or service center.

Mode:	All
Remote Command:	:SYSTem:TEMPerature:LEXTreme?
Example:	:SYST:TEMP:LEXT?
Notes:	Value is in degrees Celsius at which the lowest operating temperature has been recorded since 1st power-up.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

Mode:	All
Remote Command:	:SYSTem:TEMPerature:HEXTreme?
Example:	:SYST:TEMP:HEXT?
Notes:	Value is in degrees Celsius at which the highest operating temperature has been recorded since 1st power-up.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

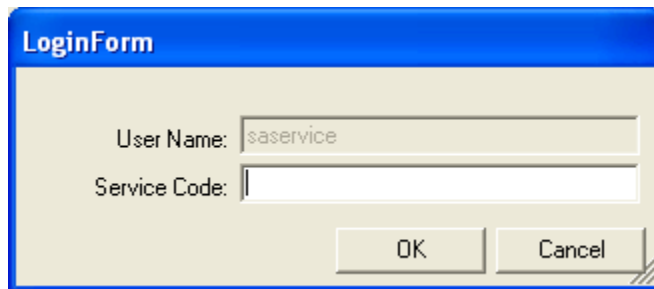
### Query the Elapsed Time since 1st power on

Returns the elapsed on-time in minutes since 1<sup>st</sup> power-on.

Remote Command:	:SYSTem: PON: ETIMe?
Example:	:SYST:PON:ETIM?
Notes:	Query Only
Initial S/W Revision:	Prior to A.02.00

### Advanced

Accesses advanced diagnostic capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “saservice”. The first access to the Advanced Diagnostic Menu after invoking the instrument application will require an authentication, which is to enter the Service Code. Subsequent accesses to the Advanced Diagnostic Menu are unimpeded. The Authentication dialog looks like:



“OK” is the default key thus the Enter key is used to complete the entry. If invalid Service Code is entered authentication is not granted and you are provided the following dialog:



Key Path:	<b>System, Diagnostics</b>
Notes:	Password is required to access this menu.
Initial S/W Revision:	Prior to A.02.00

### Self test

This key gives you access to diagnostic capabilities for self tests of the instrument.

Key Path:	<b>System, Diagnostics</b>
Initial S/W Revision:	Prior to A.10.00

### All Self Test

This key invokes all the self tests defined in the Diagnostics Self Test section.

Key Path:	<b>System, Diagnostics, Self Test</b>
Remote Command:	:SYSTem:TEST:WCTS:[ALL]
Example:	SYST:TEST:WCTS:[ALL]
Initial S/W Revision:	A.12.50

### Source Self Test

This key invokes the internal source self test. When operation is complete, the generated test summary file is: E:\Agilent\Instrument\CRFSSelfTestLog.txt. This test summary file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\ CRFSSelfTestLog.txt”

If the self test passes, an advisory message “Source self-test completed successfully” is generated.

Key Path:	<b>System, Diagnostics, Self Test</b>
Remote Command:	:SYSTem:TEST:WCTS:SOURce
Example:	SYST:TEST:WCTS:SOURce
Notes:	Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\CRFSSelfTestLog.txt"  Alias of source self test (:SOURce:SELF:TEST[:ALL])
Initial S/W Revision:	A.10.00

### RFIO Self Test

This key invokes the RFIO ports self test for embedded MPA, which just are available on E6607C. When operation is completed, the generated test summary information is appended to log file E:\Agilent\Instrument\RFIOTestLog.txt. This test summary file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\RFIOTestLog.txt”

If the self test passes, an advisory message “RFIO self-test completed successfully” is generated.

Key Path:	<b>System, Diagnostics, Self Test</b>
Remote Command:	:SYSTem:TEST:WCTS:MPADapter
Example:	SYST:TEST:WCTS:MPAD

Notes:	Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\RFIOTestLog.txt"
Initial S/W Revision:	A.12.50

---

**NOTE** This function is NOT available on EXT E6607A and E6607B models.

---

### FEC Self Test

This key invokes the EXT E6607C froned end control self test. When operation is complete, the generated test summary information is appended to log file E:\Agilent\Instrument\FECTestLog.txt. This test summary file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\FECTestLog.txt”

If the self test passes, an advisory message “FEC self-test completed successfully” is generated.

Key Path:	<b>System, Diagnostics, Self Test</b>
Remote Command:	:SYSTem:TEST:WCTS:FEC
Example:	SYST:TEST:WCTS:FEC
Notes:	Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\FECTestLog.txt"
Initial S/W Revision:	A.12.50

---

**NOTE** This function is NOT available on EXT E6607A and E6607B models.

---

### Show Result

This key gives you access to show results of the following self tests:

[“Source Self Test Results” on page 231](#)

E6607C embedded MPA self-test results - [“RFIO Self Test REsults” on page 233](#)

E6607C FEC self-test results - [“FEC Self Test REsults” on page 234](#)

Key Path:	<b>System, Diagnostics, Self Test</b>
Initial S/W Revision:	A.12.50

### Source Self Test Results

Provides a display of last source test results, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each

**System Functions**  
**System**

source test item, the tabular data should be directly printable.

Key Path:	<b>System, Diagnostics, Self Test, Show Results</b>
Remote Command:	:SYSTem:TEST:WCTS:SHOW:RESult SOURce
Example:	SYST:TEST:WCTS:SHOW:RES SOUR
Initial S/W Revision:	A.12.50

The example of source self test result display is as follows:

Source Self Test Results					
Produce Number: E6607B					
Serial Number: MY51380425					
Instrument S/W: 11/15/2012 2:51:19 PM					
FpgaVersionTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	Analog_FPGA	16.000	>= 16.000	Pass
11/23/2012	16:13:56	Digital_FPGA	50.000	>= 46.000	Pass
11/23/2012	16:13:56	CRFS_FPGA	38.000	>= 38.000	Pass
ModulatorTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:57	LOLevel_vs_DET_LO	-1.108	-2.200 - 2.200	Pass
11/23/2012	16:13:57	LOLevel_vs_LEVEL_DET	1.010	-1.100 - 1.100	Pass
11/23/2012	16:13:57	LOLevel_vs_LEVEL_REF	1.995	0.500 - 2.500	Pass
11/23/2012	16:13:57	QUAD_vs_DET_LO	-0.879	-1.100 - 1.100	Pass
11/23/2012	16:13:57	QUAD_vs_LEVEL_DET	0.000	-1.100 - 1.100	Pass
11/23/2012	16:13:57	QUAD_vs_LEVEL_REF	0.000	-0.300 - 0.300	Pass
11/23/2012	16:13:57	QUAD_vs_QUAD_LOOP	0.885	0.350 - 1.100	Pass
IQModulatorTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:57	VBLO_DAC	0.154	0.000 - 0.500	Pass
11/23/2012	16:13:57	AMP_BIAS1	145.154	132.000 - 185.000	Pass
11/23/2012	16:13:57	AMP_BIAS2	145.740	132.000 - 185.000	Pass
11/23/2012	16:13:57	OFFSET_QN	0.119	0.100 - 0.125	Pass
11/23/2012	16:13:57	OFFSET_QP	0.121	0.100 - 0.125	Pass



**Show Source Self Test Results contents (Remote Command Only)**

A remote command is available to obtain the contents of the Show Souce Self Test Results screen (the entire contents, not just the currently displayed page).

Remote Command:	:SYSTem:TEST:WCTS:SOURce:RESult?
Example:	SYST:TEST:WCTS:SOUR:RES?
Notes:	The output is an IEEE Block format of the Show Source Self Test Results contents. Each line is separated with a new-line character.
Initial S/W Revision:	A.12.50

**RFIO Self Test REsults**

Provides a display of last RFIO test results for embedded MPA of E6607C, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each RFIO test item, the tabular data should be directly printable.

Key Path:	<b>System, Diagnostics, Self Test, Show Results</b>
Remote Command:	:SYSTem:TEST:WCTS:SHOW:RESult MPADapter
Example:	SYST:TEST:WCTS:SHOW:RES MPAD
Initial S/W Revision:	A.12.50

---

**NOTE** This function is NOT available on EXT E6607A and E6607B models.

---

The example of RFIO self test result display is as following:

RFIO Self Test Results					
Produce Number: E6607C					
Serial Number: MY51380437					
Instrument S/W: 11/16/2012 2:51:19 PM					
CarrierClockTest	16:13:56				
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:57	Dig FPGA 100 MHz	1.000	1.000 - 1.000	Pass
11/23/2012	16:13:57	Feldspar CCLK	1.000	1.000 - 1.000	Pass
11/23/2012	16:13:57	Feldspar LVDS	1.000	1.000 - 1.000	Pass
11/23/2012	16:13:57	Dig FPGA LVDS	1.000	1.000 - 1.000	Pass
11/23/2012	16:13:57	Dig FPGA 200 MHz	1.000	1.000 - 1.000	Pass
DetectorTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result

**System Functions**  
**System**

11/23/2012	16:13:57	ABUS_DET_SYNTH	29.879	14.400 - 100.000	Pass
11/23/2012	16:13:57	ABUS_DET_LO	18.136	9.000 - 100.000	Pass
11/23/2012	16:13:57	ABUS_DET_MOD	13.556	6.600 - 100.000	Pass
11/23/2012	16:13:57	ABUS_DET_MOD_FLT	18.000	7.800 - 100.000	Pass
FilterBankTest1					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:57	Bank1_LPF_550MHz	30.357	>= 10.000	Pass
11/23/2012	16:13:57	Bank1_LPF_750MHz	29.358	>= 10.000	Pass
11/23/2012	16:13:57	Bank1_LPF_1020MHz	27.036	>= 10.000	Pass
11/23/2012	16:13:57	Bank1_LPF_1600MHz	27.594	>= 10.000	Pass
11/23/2012	16:13:57	Bank1_LPF_2400MHz	21.490	>= 10.000	Pass
11/23/2012	16:13:57	Bank1_LPF_3000MHz	18.476	>= 10.000	Pass
11/23/2012	16:13:57	OFFSET_QP	0.121	0.100 - 0.125	Pass

**Show RFIO Self Test Results contents (Remote Command Only)**

A remote command is available to obtain the contents of the Show RFIO Self Test Results screen (the entire contents, not just the currently displayed page).

Remote Command:	:SYSTem:TEST:WCTS:MPADapter:RESult?
Example:	SYST:TEST:WCTS:MPAD:RES?
Notes:	The output is an IEEE Block format of the Show RFIO Self Test Results contents. Each line is separated with a new-line character.
Initial S/W Revision:	A.12.50

**FEC Self Test Results**

Provides a display of last FEC test results, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each FEC test item, the tabular data should be directly printable.

Key Path:	<b>System, Diagnostics, Self Test, Show Results</b>
Remote Command:	:SYSTem:TEST:WCTS:SHOW:RESult FEC
Example:	SYST:TEST:WCTS:SHOW:RES FEC
Initial S/W Revision:	A.12.50

This function is NOT available on EXT E6607A and E6607B models.

The example of FEC self test result display is as follows:

FEC Self Test Results					
Produce Number: E6607C					
Serial Number: MY51380437					
Instrument S/W: 11/16/2012 2:51:19 PM					
FpgaVersionTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	Analog_FPGA	16.000	>= 16.000	Pass
11/23/2012	16:13:56	Digital_FPGA	50.000	>= 46.000	Pass
11/23/2012	16:13:56	CRFS_FPGA	38.000	>= 38.000	Pass
PowerSupplyTest					
Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	ABUS_+32CHK	31.904	30.900 - 32.900	Pass
11/23/2012	16:13:56	ABUS_+12CHK	12.296	10.800 - 13.200	Pass
11/23/2012	16:13:56	+10VA	9.935	9.600 - 10.200	Pass
11/23/2012	16:13:56	+5VA	4.995	4.900 - 5.100	Pass
11/23/2012	16:13:56	+3.3VA	3.299	3.200 - 3.400	Pass
11/23/2012	16:13:56	-3.3VA	-3.311	-3.400 - -3.200	Pass
11/23/2012	16:13:56	ACOM	0.00	-0.200 - 0.200	Pass
11/23/2012	16:13:56	-5VA	-5.036	-5.100 - -4.900	Pass
11/23/2012	16:13:56	-6.1VA	-5.880	-6.200 - -5.700	Pass
11/23/2012	16:13:56	-10VA	-10.116	-10.200 - -9.800	Pass
11/23/2012	16:13:56	ABUS_-2.5V_REF	-2.508	-2.520 - -2.470	Pass
11/23/2012	16:13:56	ABUS_+2.5V_REF	2.508	2.480 - 2.520	Pass
11/23/2012	16:13:56	ABUS_-10VPALC	-10.047	-10.200 - -9.800	Pass
11/23/2012	16:13:57	ABUS_DET_MOD_FLT	18.000	7.800 - 100.000	Pass

**Show FEC Self Test Results contents (Remote Command Only)**

A remote command is available to obtain the contents of the Show FEC Self Test Results screen (the entire contents, not just the currently displayed page).

Remote Command:	:SYSTem:TEST:WCTS:FEC:RESUlt?
-----------------	-------------------------------

Example:	SYST:TEST:WCTS:FEC:RES?
Notes:	The output is an IEEE Block format of the Show FEC Self Test Results contents. Each line is separated with a new-line character.
Initial S/W Revision:	A.12.50

### Multiport Adapter Cables Test

This key gives you access to diagnostic capabilities for the RF and trigger cable connections between EXT and Multiport Adapter with this instrument, which include:

EXT RF Input <-> Multiport Adapter RF OUT

EXT RF Output <-> Multiport Adapter RF IN

EXT RF IO2 <-> Multiport Adapter GPS IN

EXT Trigger 1<-> Multiport Adapter Trigger 1

EXT Trigger 2 <-> Multiport Adapter Trigger 2

Key Path:	<b>System, Diagnostics</b>
Remote Command:	:CALibration:MPADapter:CABLes:TEST
Example:	:CAL:MPAD:CABL:TEST
Notes:	If the Multiport Adapter cables are not connected correctly. It will report the proper error, for example: “-330, Self-test failed, MPA’S RF IN or RF OUT not properly connected”.
Dependencies:	This key does not appear unless a multiport adapter is plugged in to the USB. Grayout error: -221.1400; Multiport Adapter Not Available
Initial S/W Revision:	A.10.0

### Quick Test ...

This key gives you access to launch a Windows program for conducting a confidence check of the Agilent EXT Wireless Communications Test Set and the E6617A Multiport Adapter connected to EXT. The operator must exit Quick Test to return to the instrument application.

Key Path:	<b>System, Diagnostics</b>
Notes:	Operator is responsible for exiting the Quick Test and returning focus to the Instrument Application.  The softkey in the menu is only displayed when the instrument is an EXT and the EXTQuickTest.exe file is present in the C:\Program Files\Agilent\EXTQuickTest folder.
Initial S/W Revision:	A.09.49

	Agilent Converged	PSA
--	-------------------	-----

IP Address	SYSTem:COMMunicate:LAN:ADDRess <string> SYSTem:COMMunicate:LAN:ADDRess?	:SYSTem:COMMunicate:LAN[:SELF]:IP <string> :SYSTem:COMMunicate:LAN[:SELF]:IP?
Gateway	SYSTem:COMMunicate:LAN:DGATeway <string> SYSTem:COMMunicate:LAN:DGATeway?	:SYSTem:COMMunicate:LAN[:SELF]:GATEway <string> :SYSTem:COMMunicate:LAN[:SELF]:GATEway?
Subnet Mask	SYSTem:COMMunicate:LAN:SMASK <string> SYSTem:COMMunicate:LAN:SMASK?	:SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask <string> :SYSTem:COMMunicate:LAN[:SELF]:SUBNetmask?

## Service

Accesses capabilities performed in the factory or under instructions from repair procedures. This menu key is only visible when the logged-in user is “advanceduser” or “saservice”. The first access to the Service Menu after invoking the instrument application will require an authentication Service Code.

Key Path:	<b>System</b>
Initial S/W Revision:	Prior to A.02.00

## Internet Explorer...

This key launches Microsoft Internet Explorer. A mouse and external keyboard are highly desired for using Internet Explorer. When Internet Explorer is running, close Internet Explorer to return focus to the Instrument Application (or use Alt-Tab).

Key Path:	<b>System</b>
Mode:	<b>All</b>
Notes:	No equivalent remote command for this key.
Initial S/W Revision:	A.05.01

## System Remote Commands (Remote Commands Only)

The commands in this section have no front-panel key equivalent.

[“System Powerdown \(Remote Command Only\)” on page 238](#)

[“List installed Options \(Remote Command Only\)” on page 238](#)

[“Lock the Front-panel keys \(Remote Command Only\)” on page 238](#)

[“List SCPI Commands \(Remote Command Only\)” on page 239](#)

[“SCPI Version Query \(Remote Command Only\)” on page 239](#)

[“Date \(Remote Command Only\)” on page 239](#)

“Time (Remote Command Only)” on page 240

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

### System Powerdown (Remote Command Only)

Remote Command:	:SYSTem:PDOWn [NORMal   FORCe]
Notes:	Shuts down the instrument in the normal way (NORMal) or forced way (FORCe). In case there is another application with modified data pending for saving, the application prompts the user. The system waits until the user responds in the normal mode. It will go off after 20 seconds of wait in the force mode and all data will be lost.

### List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer). .

Mode:	All
Remote Command:	:SYSTem:OPTions?
Example:	:SYST:OPT?
Notes:	The return string is a comma separated list of the installed options. For example: “503,P03,PFR” :SYSTem:OPTions? and *OPT? are the same.
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

### Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a “K” for ‘Klock’ (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel ‘Local’ key (Cancel/Esc) has no effect if Klock is ON.

Mode:	All
Remote Command:	:SYSTem:KLOCK OFF ON 0 1 :SYSTem:KLOCK?
Example:	:SYST:KLOC ON

Notes:	Keyboard lock remains in effect until turned-off or the instrument is power-cycled
Preset:	Initialized to OFF at startup, unaffected by Preset
State Saved:	No
Initial S/W Revision:	Prior to A.02.00

### List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

Remote Command:	:SYSTem:HELP:HEADers?
Example:	:SYST:HELP:HEAD?
Notes:	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)
Initial S/W Revision:	Prior to A.02.00

### SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

Remote Command:	:SYSTem:VERSion?
Example:	:SYST:VERS?
Initial S/W Revision:	Prior to A.02.00

### Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

Mode:	All
Remote Command:	:SYSTem:DATE "<year>, <month>, <day>" :SYSTem:DATE?
Example:	:SYST:DATE "2006,05,26"

System Functions  
System

Notes:	<p>&lt;year&gt; is the four digit representation of year. (for example, 2006)</p> <p>&lt;month&gt; is the two digit representation of year. (for example. 01 to 12)</p> <p>&lt;day&gt; is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31) depending on the month and year</p> <p>Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.</p>
Initial S/W Revision:	Prior to A.02.00

**Time (Remote Command Only)**

Sets or queries the time in the instrument.

Mode:	All
Remote Command:	<p>:SYSTem:TIME "&lt;hour&gt;, &lt;minute&gt;, &lt;second&gt;"</p> <p>:SYSTem:TIME?</p>
Example:	:SYST:TIME "13,05,26"
Notes:	<p>&lt;hour&gt; is the two digit representation of the hour in 24 hour format</p> <p>&lt;minute&gt; is the two digit representation of minute</p> <p>&lt;second&gt; is the two digit representation of second</p> <p>Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.</p>
Initial S/W Revision:	Prior to A.02.00



## User Preset

Accesses a menu that gives you the following three choices:

**User Preset** – recalls a state previously saved using the Save User Preset function.

**User Preset All Modes** – presets all of the modes in the analyzer

**Save User Preset** – saves the current state for the current mode

Key Path:	Front-panel key
Backwards Compatibility Notes:	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision:	Prior to A.02.00

### User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, `SYST:PRES:USER:SAV`. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

Aborts the currently running measurement.

Sets the mode State to the values defined by Save User Preset.

Makes the saved measurement for the currently running mode the active measurement.

System Functions  
**User Preset**

Brings up the saved menu for the power-on mode.

Clears the input and output buffers.

Sets the Status Byte to 0.

Key Path:	<b>User Preset</b>
Remote Command:	:SYSTem:PRESet:USER
Example:	:SYST:PRES:USER:SAVE :SYST:PRES:USER
Notes:	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state.  Clears all pending OPC bits. The Status Byte is set to 0.  Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings:	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision:	Prior to A.02.00

**User Preset All Modes**

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

---

**NOTE**                      When the instrument is secured, all of the user preset files are converted back to their default user preset files.

---

The User Preset function does the following:

Aborts the currently running measurement.

Switches the Mode to the power-on mode.

Restores the User Preset files for each mode.

Makes the saved measurement for the power-on mode the active measurement.

Brings up the saved menu for the power-on mode.

Clears the input and output buffers.

Sets the Status Byte to 0.

Key Path:	<b>User Preset</b>
-----------	--------------------

Remote Command:	:SYSTem:PRESet:USER:ALL
Example:	:SYST:PRES:USER:SAVE :SYST:PRES:USER:ALL
Notes:	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings:	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision:	Prior to A.02.00

### Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path:	<b>User Preset</b>
Remote Command:	:SYSTem:PRESet:USER:SAVE
Example:	:SYST:PRES:USER:SAVE
Notes:	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision:	Prior to A.02.00



For the AM Demod measurement, the test set will return the metrics results, such as AM depth, modulation rate, SINAD, total harmonic distortion and carrier power. The test set can display trace data of the RF spectrum, the AF spectrum, or the demod waveform.

If Demod Min trace, Demod Max trace or Demod Average trace is queried using a Meas, Read or Fetch command when the Average/Hold feature is turned off, the resulting data will be default values.

This topic contains the following sections:

[“Measurement Commands for AM Demod” on page 245](#)

[“Remote Command Results for AM Demod” on page 245](#)

### Measurement Commands for AM Demod

Parameter Name	AM Meas/Read/Fetch Query Results
SCPI Command	:MEASure READ FETCh:AM[1] 0 2 3 4 5 6?
SCPI Example	MEAS:AM? FETCH:AM0? READ:AM5?
Setup	[COMPARE OFF]
Post Setup	[COMPARE ON]

### Remote Command Results for AM Demod

Command	n	Return Value
:INITiate:AM	n/a	n/a
:CONFigure?	n/a	name of current measurement: “AM”
:CONFigure:AM	n/a	n/a (selects AM measurement in Meas Preset state)
:CONFigure:AM:NDEFault	n/a	n/a (selects AM measurement without affecting settings)
:FETCh:AM[n] ? :MEASure:AM[n] ? :READ:AM[n] ?	0	This query returns the RF Spectrum trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view.

Command	n	Return Value
	not specified or n=1	<p>Returns the following comma-separated results. All modulation depth numbers are in units of percent.</p> <ol style="list-style-type: none"> <li>1. The RF Spectrum window's center frequency</li> <li>2. Carrier Power</li> <li>3. 0</li> <li>4. Modulation Rate</li> <li>5. SINAD value</li> <li>6. Distortion/Total Vrms (% - not ratio - or dB)</li> <li>7. Total Harmonic Distortion (% - not ratio - or dB)</li> <li>8. Modulation Depth (Peak+)</li> <li>9. Modulation Depth (Peak-)</li> <li>10. Modulation Depth (Pk-Pk)/2</li> <li>11. Modulation Depth (RMS)</li> <li>12. Modulation Depth (Peak+) Max Hold</li> <li>13. Modulation Depth (Peak-) Max Hold</li> <li>14. Modulation Depth (Pk-Pk)/2 Max Hold</li> <li>15. Modulation Depth (RMS) Max Hold</li> </ol>
	2	<p>This query returns the Demod Min Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all values are 10,000.</p>
	3	<p>This query returns the Demod Max Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all y-values are -100.</p>
	4	<p>This query returns the Demod Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p>
	5	<p>This query returns the Demod Average Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all y-values are -100.</p>
	6	<p>This query returns the AF Spectrum Trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view</p>

<b>Command</b>	<b>n</b>	<b>Return Value</b>
	7	Returns the following comma-separated results: Mod Depth (RMS) Mod Depth (RMS) Ratio Ratio Reference

<b>Key Path:</b>	<b>Meas</b>
Initial S/W Revision:	Prior to A.02.00





For the FM Demod measurement, the test set will display the metrics results, such as FM deviation, modulation rate, carrier frequency error, SINAD, total harmonic distortion and carrier power. The test set can also display trace data of the RF spectrum, the AF spectrum, or the demod waveform.

---

**NOTE** For Analog FM demod to work correctly, phase change from sample-to-sample cannot exceed 90 degrees.

---

If Demod Min trace, Demod Max trace or Demod Average trace is queried using a Meas, Read or Fetch command when Average/Hold feature is turned off, the resulting data will be default values.

If any of the metrics are off, a SCPI query will return not a number and show “---” in the metrics window. The metrics that can be turned off are: Modulation Rate, SINAD, Distortion, THD and all but one of the Deviations.

This topic contains the following sections:

[“Measurement Commands for FM Demod ” on page 249](#)

[“Remote Command Results for FM Demod” on page 249](#)

## Measurement Commands for FM Demod

Parameter Name	FM Meas/Read/Fetch Query Results
SCPI Command	:MEASure READ FETCh:FM[1] 0 2 3 4 5?
SCPI Example	MEAS:FM? FETCH:FM0? READ:FM5?
Setup	[COMPARE OFF]
Post Setup	[COMPARE ON]

## Remote Command Results for FM Demod

Command	n	Return Value
:INITiate:FM	n/a	n/a
:CONFigure?	n/a	name of current measurement: “FM”
:CONFigure:FM	n/a	n/a (selects FM measurement in Meas Preset state)
:CONFigure:FM:NDEfault	n/a	n/a (selects FM measurement without affecting settings)
:FETCh:FM[n] ? :MEASure:FM[n] ? :READ:FM[n] ?	0	This query returns the RF Spectrum trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view

Command	n	Return Value
	not specified or n=1	Returns the following comma-separated results: <ol style="list-style-type: none"> <li>1. The RF Spectrum window's center frequency</li> <li>2. Carrier Power</li> <li>3. Carrier Frequency Error</li> <li>4. Modulation Rate</li> <li>5. SINAD value</li> <li>6. Distortion/Total Vrms (% - not ratio - or dB)</li> <li>7. Total Harmonic Distortion(% - not ratio - or dB)</li> <li>8. Deviation (Peak+)</li> <li>9. Deviation (Peak-)</li> <li>10. Deviation (Pk-Pk)/2</li> <li>11. Deviation (RMS)</li> <li>12. Deviation (Peak+) Max Hold</li> <li>13. Deviation (Peak-) Max Hold</li> <li>14. Deviation (Pk-Pk)/2 Max Hold</li> <li>15. Deviation (RMS) Max Hold</li> </ol>
	2	This query returns the Demod Min Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view If Aver/Hold is off, all y-values are 1 GHz.
	3	This query returns the Demod Max Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view If Aver/Hold is off, all y-values are -1 GHz.
	4	This query returns the Demod Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view
	5	This query returns the Demod Average Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view If Aver/Hold is off, all y-values are -1 GHz.
	6	This query returns the AF Spectrum Trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view

<b>Command</b>	<b>n</b>	<b>Return Value</b>
	7	Returns the following comma-separated results: <ol style="list-style-type: none"><li>1. Deviation (RMS)</li><li>2. Deviation (RMS) Ratio</li><li>3. Ratio Reference</li></ol>

Key Path:	<b>Meas</b>
Initial S/W Revision:	Prior to A.02.00



For the PM Demod measurement, the test set will display the metrics results, such as deviation, modulation rate, carrier frequency error, SINAD, total harmonic distortion and carrier power. The test set can also display trace data of the RF spectrum, the AF spectrum, or the demod waveform.

If Demod Min trace, Demod Max trace or Demod Average trace is queried using a Meas, Read or Fetch command when the Average/Hold feature is turned off, the resulting data will be default values.

If any of the metrics are off, a SCPI query will return not a number and show “---” in the metrics window. The metrics that can be turned off are: Modulation Rate, SINAD, Distortion, THD and all but one of the Deviations.

This topic contains the following sections:

[“Measurement Commands for PM Demod” on page 253](#)

[“Remote Command Results for PM Demod” on page 253](#)

### Measurement Commands for PM Demod

Parameter Name	PM Meas/Read/Fetch Query Results
SCPI Command	:MEASure READ FETCh:PM[1] 0 2 3 4 5?
SCPI Example	MEAS:PM? FETCH:PM0? READ:PM5?
Setup	[COMPARE OFF]
Post Setup	[COMPARE ON]

### Remote Command Results for PM Demod

Command	n	Return Value
:INITiate:PM	n/a	n/a
:CONFigure?	n/a	name of current measurement: “PM”
:CONFigure:PM	n/a	n/a (selects PM measurement in Meas Preset state)
:CONFigure:PM:NDEFault	n/a	n/a (selects PM measurement without affecting settings)
:FETCh:PM[n] ? :MEASure:PM[n] ? :READ:PM[n] ?	0	This query returns the RF Spectrum trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view

Command	n	Return Value
	not specified or n=1	<p>Returns the following comma-separated results:</p> <ol style="list-style-type: none"> <li>1. The RF Spectrum window's center frequency</li> <li>2. Carrier Power</li> <li>3. Carrier Frequency Error</li> <li>4. Modulation Rate</li> <li>5. SINAD value</li> <li>6. Distortion/Total Vrms (% - not ratio - or dB)</li> <li>7. Total Harmonic Distortion(% - not ratio - or dB)</li> <li>8. Deviation (Peak+)</li> <li>9. Deviation (Peak-)</li> <li>10. Deviation (Pk-Pk)/2</li> <li>11. Deviation (RMS)</li> <li>12. Deviation (Peak+) Max Hold</li> <li>13. Deviation (Peak-) Max Hold</li> <li>14. Deviation (Pk-Pk)/2 Max Hold</li> <li>15. Deviation (RMS) Max Hold</li> </ol>
	2	<p>This query returns the Demod Min Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all y-values are 10 k.</p>
	3	<p>This query returns the Demod Max Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all y-values are -10 k.</p>
	4	<p>This query returns the Demod Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p>
	5	<p>This query returns the Demod Average Trace data as a list of x,y pairs. The x-axis values are in units of seconds. The y-value units depend on the current view</p> <p>If Aver/Hold is off, all y-values are -10 k.</p>
	6	<p>This query returns the AF Spectrum Trace data as a list of x,y pairs. The x-axis values are in units of Hz. The y-value units depend on the current view</p>

<b>Command</b>	<b>n</b>	<b>Return Value</b>
	7	Returns the following comma-separated results: <ol style="list-style-type: none"><li>1. Deviation (RMS)</li><li>2. Deviation (RMS) Ratio</li><li>3. Ratio Reference</li></ol>

Key Path:	<b>Meas</b>
Initial S/W Revision:	Prior to A.02.00





In all views, the display is split into signal display windows and a numeric results (metrics) window. The metrics window displays carrier and modulation metrics and is similar to the numeric windows common in the SA communications measurements such as Channel Power and Occupied Bandwidth. The metrics associated with the 3 Demod measurements and their metrics including units are shown below.

For the Modulation Depth/FM Deviation/M Deviation metrics, two columns are displayed.

Column 1: Averaging off - shows the metrics in real time, that is, the value from the last measurement.

Averaging on - shows the average value of the metric since the last restart. This uses the arithmetic average:

$$\text{New avg} = ((K-1) \text{ Old avg} + \text{New data})/K$$
 where K is the average counter

Column 2: Only displayed if Aver/Hold Num is on - shows the maximum value that the non-averaged metric has taken on since the last time the measurement was restarted, known as the “Max Hold” value (note: for the Peak(-) metric, Max Hold reads the negative of the absolute value of the maximum value. For example, if the absolute value of Peak- got up to 80 kHz, the Max Hold column would read -80 kHz)

Metric	Units		
	AM	FM	M
Carrier Power - the average power detected at the carrier frequency, averaged over integer periods of the modulation frequency	(dBm)	(dBm)	(dBm)
Carrier Frequency Error - represents the difference between the instrument's tuned center frequency and the detected carrier's frequency. This does not apply to AM signals.	N/A	(Hz)	(Hz)
Modulation Rate - represents the frequency of the detected modulation. This is also sometimes known as Modulation Frequency.	(Hz)	(Hz)	(Hz)
SINAD - represents the ratio of total received power (the received signal-plus-noise-plus-distortion power) to the received noise-plus-distortion power. It is always expressed in decibel units. The rejection of the carrier from the noise-plus-distortion power measurement is usually not much more than 50 dB, thus limiting the maximum SINAD.	(dB)	(dB)	(dB)

Metric	Units		
	AM	FM	M
Distortion/Total Vrms - represents the ratio of unwanted received rms voltage (noise combined with distortion) to the total received rms voltage, expressed in % or dB on the display and over SCPI. Therefore, this metric is the negative of SINAD when expressed in decibels. When expressed in %, the SCPI value is a true percentage, thus 100 times as large as the ratio – for example, 99% would return as 99, not as 0.99.	(dB or %)	(dB or %)	(dB or %)
THD - represents the ratio of the root mean square voltage of the harmonics referenced to the fundamental voltage, expressed in % or dB on the display and over SCPI. Note the difference with respect to Distortion. The denominator of the ratio is different and the items in the numerator do not include the noise between harmonics, just the harmonics themselves. When expressed in %, the SCPI value is a true percentage, thus 100 times as large as the ratio – for example, 99% would return as 99, not as 0.99.	(dB or %)	(dB or %)	(dB or %)
AM Mod Depth Peak (+) - the maximum AM modulation depth in units of % during the acquisition period.  When averaging is on, column 1 includes averaging of peaks through the acquisition period – this significantly improves the SNR when measuring cyclic signals. If averaging is off, column 1 shows simply the highest peak. Column 2 always shows the maximum of the highest peak.  Note that in amplitude modulation, the modulation depth (also known as % modulation or modulation index) is the amount of voltage deviation the modulated signal has relative to its original un-modulated level. Modulation depth of 100% means the peak voltage doubles, which in turn implies the peak power quadruples.	(%)	N/A	N/A
AM Mod Depth Peak (-) – represents the minimum value of AM modulation depth in units of % during the acquisition period. Not the absolute value, but the negative value.	(%)	N/A	N/A
AM Mod Depth (Pk – Pk)/2 – half the difference between the AM modulation depth Peak+ and Peak-.	(%)	N/A	N/A
AM Mod Depth RMS - represents the Root Mean Square AM modulation depth in units of % during the acquisition period.	(%)	N/A	N/A

Metric	Units		
	AM	FM	M
<p>Deviation Peak (+) - represents the maximum frequency (FM) or phase (PM) deviation during the acquisition period.</p> <p>When averaging is on, column 1 includes averaging of peaks through the acquisition period – this significantly improves the SNR when measuring cyclic signals. If averaging is off, column 1 shows simply the highest peak. Column 2 always shows the maximum of the highest peak.</p>	N/A	(Hz)	(rad)
Deviation Peak (-) - the minimum frequency (FM) or phase (PM) deviation during the acquisition period.	N/A	(Hz)	(rad)
Deviation (Pk-Pk)/2 - half the difference between the modulation depth Peak+ and Peak-.	N/A	(Hz)	(rad)
Deviation RMS - the Root Mean Square frequency (FM) or phase (PM) deviation during the acquisition period.	N/A	(Hz)	(rad)
RMS Ratio - the ratio between the displayed value of RMS modulation and the Ratio Reference (see below). Only appears when <b>RMS Ratio</b> is selected under <b>View/Display, Metrics Settings</b> .	(dB)	(dB)	(dB)
Ratio Ref - the reference value being used for the Ratio display. The reference is set whenever the ratio metric is selected (see <b>View/Display, Metrics Settings, RMS Ratio</b> ). Only appears when <b>RMS Ratio</b> is selected (see above)	(%)	(Hz)	(rad)



The key and command descriptions in this section describe functions of the Analog Demod Mode. In some instances, such as the Save front-panel key and the Display softkey, a more general description is documented. To access information on a specific key, press that key and then press the green Help key. This activates the applications context sensitive Help system, which displays the desired topic.



## AMPTD Y Scale

Accesses a menu that enables you to set the reference level, attenuation, scale per division, reference position, and internal pre-amplifier parameters for your measurement.

Key Path:	<b>Front-panel key</b>
Initial S/W Revision:	Prior to A.02.00

### Ref Value

The reference value specifies the amplitude of a signal displayed on the reference graticule line. The reference line is at the top, center, or bottom of the graticule, depending on the value of the Ref Position function.

Changing the reference value does not restart a measurement, but changes all displayed traces and markers to the new value. If a change to the reference value changes an auto-coupled attenuation value, the measurement restarts.

The Ref Value key applies only to the window with the focus. If the focus is on the Metrics window, the Ref Value key is unavailable.

Key Path:	<b>AMPTD Y Scale</b>
<b>Remote Command:</b>	:DISPlay:AM FM PM:WINDow [1]   2   3 :TRACe:Y[:SCALe] :RLEVel <real>  :DISPlay:AM FM PM:WINDow [1]   2   3 :TRACe:Y[:SCALe] :RLEVel?
Example:	DISP:AM:WIND:TRAC:Y:RLEV 20 dBm Sets the reference value in window 1 to 20 dBm.
Remote Command Notes:	Regardless of the View, the windows are numbered as follows:  1. RF Spectrum 2. Demod Waveform 3. AF Spectrum 4. Metrics
Couplings:	The value is constrained within the MAX and MIN values, but is otherwise generally not adjusted.

## AMPTD Y Scale

Preset:	RF Spectrum      0 dBm Demod Waveform    AM: 0% FM: 0 Hz PM: 0 rad  AF Spectrum        AM: 100% FM: 100 kHz PM: 6.28 rad
State Saved:	Saved in instrument state
Min:	<b>AM:</b> RF Spectrum        -170 dBm – Ext Gain Demod Waveform    -100% AF Spectrum        1 m% <b>FM:</b> RF Spectrum        -170 dBm – Ext Gain Demod Waveform    -10 GHz AF Spectrum        1 Hz <b>PM:</b> RF Spectrum        -170 dBm – Ext Gain Demod Waveform    -10 krad AF Spectrum        100 urad
Max:	<b>AM:</b> RF Spectrum        24 dBm Demod Waveform    100% AF Spectrum        10 k% <b>FM:</b> RF Spectrum        24 dBm Demod Waveform    10 GHz AF Spectrum        1 GHz <b>PM:</b> RF Spectrum        24 dBm Demod Waveform    10 krad AF Spectrum        10 krad
Default Unit:	depends on the current view
Initial S/W Revision:	Prior to A.02.00



## Attenuation

This single control replaces the Attenuation menu that is used in other applications. For a single attenuator configuration in the Analog Demod mode, control of the two stages of the single attenuator is integrated into this single control. In the dual attenuator configuration, the electronic attenuator is not used.

Key Path:	<b>AMPTD Y Scale</b>
<b>Remote Command:</b>	[ :SENSe ] :POWer [ :RF ] :ATTenuation <rel_ampl> [ :SENSe ] :POWer [ :RF ] :ATTenuation?
Example:	POW:ATT 20
Preset:	6 dB
State Saved:	Saved in instrument state
Min:	0 dB  The attenuation set by this key cannot be decreased below 6 dB with the knob or step keys. To get to a value below 6 dB it has to be directly entered from the keypad or via SCPI. This protects you from adjusting the attenuation to a dangerously small value which can put the instrument at risk of damage to input circuitry. However, if this attenuation IS below 6 dB it can be increased with the knob and step keys, but not decreased.
Max:	70 dB
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.03.00

## Scale / Div

Sets the units per vertical graticule division on the display.

The Scale/Div key applies only to the window with the focus. If the focus is on the Metrics window, the Scale/Div key is unavailable.

Key Path:	<b>AMPTD Y Scale</b>
<b>Remote Command:</b>	:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:PDIVision <real> :DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:PDIVision?
Example:	DISP:AM:WIND:TRAC:Y:PDIV 5 DB

## AMPTD Y Scale

Remote Command Notes:	Regardless of the View, the windows are numbered as follows: <ol style="list-style-type: none"><li>1. RF Spectrum</li><li>2. Demod Waveform</li><li>3. AF Spectrum</li><li>4. Metrics</li></ol>
Preset:	<b>AM:</b> RF Spectrum 10 dB Demod Waveform 20% AF Spectrum 10 dB <b>FM:</b> RF Spectrum 10 dB Demod Waveform 15 kHz AF Spectrum 10 dB <b>PM:</b> RF Spectrum 10 dB Demod Waveform 1 rad AF Spectrum 10 dB
State Saved:	Saved in State
Min:	<b>AM:</b> RF Spectrum 0.1 dB Demod Waveform 1% AF Spectrum 0.1 dB <b>FM:</b> RF Spectrum 0.1 dB Demod Waveform 1 Hz AF Spectrum 0.1 dB <b>PM:</b> RF Spectrum 0.1 dB Demod Waveform 10 mrad AF Spectrum 0.1 dB

Max:	<p>AM:</p> <p>RF Spectrum 20 dB</p> <p>Demod Waveform 1 kHz</p> <p>AF Spectrum 20 dB</p> <p>FM:</p> <p>RF Spectrum 20 dB</p> <p>Demod Waveform 1 GHz</p> <p>AF Spectrum 20 dB</p> <p>PM:</p> <p>RF Spectrum 20 dB</p> <p>Demod Waveform 1 krad</p> <p>AF Spectrum 20 dB</p>
Initial S/W Revision:	Prior to A.02.00

## Ref Position

Positions the reference value at the top, center, or bottom of the Y Scale display. Changing the reference position does not change the reference value.

The Ref Position key applies only to the window with the focus. If the focus is on the Metrics window, the Ref Position key is unavailable.

Key Path:	<b>AMPTD Y Scale</b>
Remote Command:	<pre>:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOSiti on TOP CENTer BOTTom</pre> <pre>:DISPlay:AM FM PM:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOSiti on?</pre>
Example:	DISP:AM:WIND:TRAC:Y:RPOS BOTT
Remote Command Notes:	<p>Regardless of the View, the windows are numbered as follows:</p> <ol style="list-style-type: none"> <li>1. RF Spectrum</li> <li>2. Demod Waveform</li> <li>3. AF Spectrum</li> <li>4. Metrics</li> </ol>
Preset:	<p>RF Spectrum window: Top</p> <p>Demod Waveform window: Center</p> <p>AF Spectrum window: Top</p>
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

## AMPTD Y Scale

### Internal Preamp

Accesses a menu of keys that control the internal preamps. Turning on the preamp gives a better noise figure, but a poorer TOI to noise floor dynamic range. You can optimize this setting for your particular measurement.

The instrument takes the preamp gain into account as it sweeps. If you sweep outside of the range of the preamp the instrument will also account for that. The displayed result will always reflect the correct gain.

Key Path	<b>AMPTD Y Scale</b>
Scope	Meas Global
<b>Remote Command</b>	[ :SENSE] :POWER[:RF] :GAIN[:STATe] OFF ON 0 1 [ :SENSE] :POWER[:RF] :GAIN[:STATe] ?
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown.  The preamp is not available when the electronic/soft attenuator is enabled.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

Key Path	<b>AMPTD Y Scale, Internal Preamp</b>
Scope	Meas Global
<b>Remote Command</b>	[ :SENSE] :POWER[:RF] :GAIN:BAND LOW FULL [ :SENSE] :POWER[:RF] :GAIN:BAND?
Dependencies	Preamp is not available on all hardware platforms. If the preamp is not present or is unlicensed, the key is not shown.  If a POW:GAIN:BAND FULL command is sent when a low band preamp is available, the preamp band parameter is to LOW instead of FULL, and an "Option not installed" message is generated.
Preset	LOW
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

### Off

Turns the internal preamp off

Key Path	<b>AMPTD Y Scale, Internal Preamp</b>
Example	:POW:GAIN OFF
Readback	Off

Initial S/W Revision	Prior to A.02.00
----------------------	------------------

**Low Band**

Sets the internal preamp to use only the low band.

The frequency range of the installed (optional) low-band preamp is displayed in square brackets on the **Low Band** key label.

Key Path	AMPTD Y Scale, Internal Preamp
Example	:POW:GAIN ON :POW:GAIN:BAND LOW
Readback	Low Band
Initial S/W Revision	Prior to A.02.00

## AMPTD Y Scale

---

## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement which have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

For Analog Demod, these parameters are:

- RF Res BW
- AF Res BW
- CF Step

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Auto Couple



## BW

Opens a menu of keys that enable you to control the bandwidth functions of the application.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### RF Res BW

Activates the RF Res BW function, which enables you to manually set the resolution bandwidth used in the RF Spectrum window.

Normally, the RF Res BW (Auto) key selects automatic coupling of the resolution bandwidth. To decouple the resolution bandwidth, press the RF Res BW key until Man is underlined, or enter a different value for the resolution bandwidth.

When the resolution bandwidth is manually selected, it may be returned to the coupled state by pressing the RF Res BW key until **Auto** is underlined. This may also be done by pressing the Auto Couple key or by performing a **preset**.

Only the Gaussian filter type is used.

Key Path	<b>BW</b>
<b>Remote Command</b>	<pre>[ :SENSE] :AM   FM   PM :BANDwidth[:RESolution] &lt;freq&gt; [ :SENSE] :AM   FM   PM :BANDwidth[:RESolution] ? [ :SENSE] :AM   FM   PM :BANDwidth[:RESolution] :AUTO OFF   ON   0   1 [ :SENSE] :AM   FM   PM :BANDwidth[:RESolution] :AUTO?</pre>
Example	<pre>AM:BAND 1 kHz AM:BAND? AM:BAND:AUTO ON AM:BAND:AUTO?</pre>
Notes	Only certain discrete resolution bandwidths are available. For numeric entries, all RBW Types choose the nearest (arithmetically, on a linear scale, rounding up) available RBW to the value entered.
Couplings	AM/FM/PM: In Auto, the 3 dB RBW of the desired filter is the closest possible choice to that given by Span divided by 106 (the Span: 3 dB RBW parameter), except that the range for auto-coupling is restricted to not exceed 3 MHz.
Preset	AM/FM/PM: Preset is Auto, which results in a 680 Hz value since the preset span is 75 kHz and the Span/RBW ratio is 106.
State Saved	Saved in Instrument state

## BW

Min	1 Hz
Max	8 MHz
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00

### Channel BW

The Channel BW variable is used to determine the bandwidth used for the demodulation. The flat top filter type must be used for demodulation.

This parameter also controls the RBW hardware setting for the demodulation fed to the speaker.

Key Path	BW
<b>Remote Command</b>	[ :SENSE ] :AM   FM   PM :BANDwidth :CHANnel <freq> [ :SENSE ] :AM   FM   PM :BANDwidth :CHANnel ?
Example	AM:BAND:CHAN 200 kHz
Preset	= AM/FM/PM = 25 kHz
State Saved	Saved in instrument state
Min	390 Hz
Max	8 MHz
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00

### AF Res BW

In the AF Spectrum window, the AF Res BW key is used to set the Resolution bandwidth of the FFT of the demodulated waveform.

The data acquisition uses the Channel BW value for hardware control during data acquisition, just as it does in the Demod Waveform window.

AF Res BW (Auto) selects automatic coupling of the AF Res BW to the AF Span (defined as AF Stop Freq – AF Start Freq) using the same factor of 106 used by the RF Res BW. To decouple the resolution bandwidth, press the AF Res BW key until **Man** is underlined, or enter a different value for the AF resolution bandwidth.

When the AF resolution bandwidth is manually selected, it may be returned to the coupled state by pressing the **AF Res BW** key until **Auto** is underlined. This may also be done by pressing Auto Couple or by performing a **Preset**.

Only the Gaussian filter type is used.

Key Path	BW
----------	----

<b>Remote Command</b>	<pre>[ :SENSe] :AM FM PM:AFSPepectrum:BA NDwidth &lt;freq&gt; [ :SENSe] :AM FM PM:AFSPepectrum:BA NDwidth? [ :SENSe] :AM FM PM:AFSPepectrum:BA NDwidth:AUTO OFF ON 0 1 [ :SENSe] :AM FM PM:AFSPepectrum:BA NDwidth:AUTO?</pre>
Example	<pre>AM:AFSP:BA ND 1 kHz AM:AFSP:BA ND?</pre>
Notes	Only certain discrete resolution bandwidths are available. For numeric entries, all RBW Types choose the nearest (arithmetically, on a linear scale, rounding up) available RBW to the value entered.
Notes	For numeric entries, all RBW Types choose the nearest (arithmetically, on a linear scale, rounding up) available RBW to the value entered.
Remote Command Notes	The setting and querying of values depends on the current bandwidth type.
Couplings	In Auto, the 3 dB RBW of the desired filter is the closest possible choice to that given by Span divided by 106 (the Span: 3 dB RBW parameter), except that the range for auto-coupling is restricted to not exceed 3 MHz.
Preset	Preset is Auto, which results in a 180 Hz value since the preset span is 20 kHz and the Span/RBW ratio is 106
State Saved	Saved in Instrument State
Min	1 Hz
Max	8 MHz
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00



## Cont (Continuous Measurement/Sweep)

Sets the test set for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing **Cont** does a Resume.

Key Path:	<b>Front-panel key</b>
<b>Remote Command:</b>	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example:	:INIT:CONT 0 puts the test set in Single measurement operation. :INIT:CONT 1 puts the test set in Continuous measurement operation
Preset:	ON  (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved:	Saved in instrument state
Backwards Compatibility Notes:	For Spectrum Analysis mode in ESA and PSA, there is no <b>Cont</b> hardkey, instead there is a <b>Sweep Single/Cont</b> key. In these analyzers, switching the <b>Sweep Single/Cont</b> key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart <b>Max Hold</b> and <b>Min Hold</b> .  The X-Series has <b>Single</b> and <b>Cont</b> hardkeys in place of the <b>Sweep Single Cont</b> softkey. In the X-Series, if in single measurement, the <b>Cont</b> hardkey (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision:	Prior to A.02.00

With **Avg/Hold Num** (in the **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the test set continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg/Hold Num** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the test set is in Single measurement, pressing the **Cont** key does not change k and does not cause the sweep to be reset; the only action is to put the test set into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the test set in Single Sweep but will have no effect on the current sequence until k = N, at which point the current sequence will stop and the instrument will go to the idle state.

**Cont (Continuous Measurement/Sweep)**

## FREQ Channel

Accesses a menu of keys that enable you to control the Frequency parameters of the instrument.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### Center Frequency

Sets the frequency that corresponds to the horizontal center of the RF Spectrum window. While adjusting the Center Frequency the Span is held constant, this means that both the start frequency and the stop frequency will change.

The Center Frequency is retained as you go from measurement to measurement.

Key Path	<b>FREQ Channel</b>
<b>Remote Command</b>	[ :SENSe] :FREQuency:CENTer <freq> [ :SENSe] :FREQuency:CENTer?
Example	FREQ:CENT 50MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100MHz sets the center frequency step size to 100 MHz FREQ:CENT?
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, In addition, the Center Frequency can be limited if the Span is so large that Start or Stop hit their limit.
Couplings	When operating in “swept span”, any value of the Center Frequency or Span that is within the frequency range of the test set is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the test set frequency range
Preset	1.000 GHz
State Saved	Saved in instrument state
Min	Depends on instrument minimum frequency and 10 Hz minimum span. If the knob or step keys are being used, depends on the value of the other three interdependent parameters.
Max	Depends on instrument maximum frequency and 10 Hz minimum span If the knob or step keys are being used, depends on the value of the other three interdependent parameters.
Default Unit	Hz
Status Bits/OPC dependencies	non-overlapped

## FREQ Channel

Initial S/W Revision	Prior to A.02.00
----------------------	------------------

### CF Step

Changes the step size for the center frequency function. Once a step size has been selected and the center frequency function is active, the step keys (and the UP|DOWN parameters for Center Frequency from remote commands) change center frequency by the step-size value. The step size function is useful for finding harmonics and sidebands beyond the current frequency span of the test set.

Key Path	FREQ Channel
<b>Remote Command</b>	[ :SENSe ] :FREQuency:CENTer:STEP [ :INCRement ] <freq> [ :SENSe ] :FREQuency:CENTer:STEP [ :INCRement ] ? [ :SENSe ] :FREQuency:CENTer:STEP:AUTO OFF   ON   0   1 [ :SENSe ] :FREQuency:CENTer:STEP:AUTO?
Example	FREQ:CENT:STEP:AUTO ON FREQ:CENT:STEP 500MHz FREQ:CENT UP increases the current center frequency value by 500 MHz FREQ:CENT:STEP? FREQ:CENT:STEP:AUTO?
Remote Command Notes	Preset and Max values are depending on Hardware Options (503, 504)
Dependencies	Span, RBW, Center frequency
Couplings	When auto-coupled in a non-zero span, the center frequency step size is set to 10% of the span. When auto-coupled in zero span, the center frequency step size is set to the equivalent -3 dB RBW value.
Preset	Auto
State Saved	Saved in State
Min	- (the maximum frequency of the instrument). For example, 27 GHz max freq instrument has a CF step range of +/- 27 GHz.
Max	The maximum frequency of the instrument. For example, 27 GHz max freq instrument has a CF step range of +/- 27 GHz.
Default Unit	Hz
Status Bits/OPC dependencies	non-overlapped
Initial S/W Revision	Prior to A.02.00

### AF Start Freq

Sets the frequency at the left side of the graticule in the AF Spectrum window. While adjusting the AF start frequency the AF stop frequency is held constant.



The AF Start Frequency is retained as you go from measurement to measurement.

Key Path	FREQ Channel
<b>Remote Command</b>	[ :SENSE] :AM FM PM:AFSPectrum:FREQuency:STARt <freq> [ :SENSe] :AM FM PM:AFSPectrum:FREQuency:STARt?
Example	AM:AFSP:FREQ:STAR 0 Hz
Dependencies	You cannot set the Start frequency > the Stop frequency. You cannot set the Start frequency = Stop frequency. You cannot set the Start Frequency to a value that would create a span of less than 10 Hz. If you try to do any of these, Stop Frequency will change to maintain a minimum value of 10 Hz for the difference between Start and Stop.
Preset	0 Hz
State Saved	Saved in instrument state
Min	0 Hz
Max	99.999990 MHz
Default Unit	Hz
Status Bits/OPC dependencies	non-overlapped
Initial S/W Revision	Prior to A.02.00

### AF Stop Freq

Sets the frequency at the right side of the graticule in the AF Spectrum window. While adjusting the AF Stop Frequency the AF Start Frequency is held constant.

Key Path	FREQ Channel
<b>Remote Command</b>	[ :SENSE] :AM FM PM:AFSPectrum:FREQuency:STOP <freq> [ :SENSe] :AM FM PM:AFSPectrum:FREQuency:STOP?
Example	AM:AFSP:FREQ:STOP 20 kHz
Dependencies	You cannot set the Stop frequency < the Start frequency. You cannot set the Start frequency = Stop frequency. You cannot set the Stop Frequency to a value that would create a span of less than 10 Hz. If you try to do any of these, the Start Frequency will change to maintain a minimum value of 10 Hz for the difference between Start and Stop.
Preset	20 kHz
State Saved	Saved in instrument state
Min	10 Hz
Max	100 MHz
Default Unit	Hz

## FREQ Channel

Status Bits/OPC dependencies	non-overlapped
Initial S/W Revision	Prior to A.02.00

---

## Input/Output

The Input/Output features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Input/Output key accesses the softkeys that control the Input/Output parameters of the instrument. In general, these are functions associated with external connections to the test set, either to the inputs or the outputs. Since these connections tend to be fairly stable within a given setup, in general, the input/output settings do not change when you Preset the test set.

Other functions related to the input/output connections, but which tend to change on a measurement by measurement basis, can be found under the **Trigger** and **AMPTD Y Scale** keys. In addition, some of the digital I/O bus configurations can be found under the **System** key.

---

**NOTE** The functions in the Input/Output menu are "global" (common) to all Modes (applications). But individual Input/Output functions only appear in a Mode if they apply to that Mode. Functions that apply to a Mode but not to all measurements in the Mode may be grayed-out in some measurements.

---

[“Input/Output variables - Preset behavior” on page 285](#)

The Input Port selection is the first menu under the **Input/Output** key:

Key Path:	<b>Front-panel key</b>
<b>Remote Command:</b>	[ :SENSe] :FEED RF   AIQ   EMIXer [ :SENSe] :FEED?
Example:	:FEED RF :FEED?
Couplings:	The [:SENSe]:FEED RF command turns the calibrator OFF
Preset:	This setting is unaffected by a Preset or power cycle. It survives a Mode Preset and mode changes.  It is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state

## Input/Output

<p>Backwards Compatibility SCPI:</p>	<p><code>[:SENSe]:FEED AREFERENCE</code></p> <p>In the PSA the calibrator was one of the inputs and selected using the AREF parameter to the same :FEED command that switched the inputs. In the X-Series it is controlled in a separate menu and overrides the input selection. For code compatibility the <code>[:SENSe]:FEED AREFERENCE</code> command is provided, and is aliased to <code>[SENSe]:FEED:AREF REF50</code>, which causes the input to be switched to the 50 MHz calibrator. The <code>[:SENSe]:FEED RF</code> command switches the input back to the RF port and turns the calibrator OFF, thus providing full compatibility with the PSA calibrator function.</p> <p>Note that after sending this, the query <code>[:SENSe]:FEED?</code> will NOT return "AREF" but instead the currently selected input.</p>
<p>Backwards Compatibility SCPI:</p>	<p><code>[:SENSe]:FEED IQ IONLy QONLy</code></p> <p><code>[:SENSe]:FEED?</code></p> <p>The parameters <code>IQ IONLy QONLy</code> are supported for backwards compatibility with the E44406A.</p> <p><code>[:SENSe]:FEED IQ</code> aliases to <code>[:SENSe]:FEED:IQ:TYPE IQ</code></p> <p><code>[:SENSe]:FEED IONLy</code> aliases to <code>[:SENSe]:FEED:IQ:TYPE IONLy</code></p> <p><code>[:SENSe]:FEED QONLy</code> aliases to <code>[:SENSe]:FEED:IQ:TYPE QONLy</code></p> <p>The query <code>[:SENSe]:FEED?</code> will always returns AIQ whatever the type of legacy parameters <code>IQ IONLy QONLy</code> has been used.</p>
<p>Backwards Compatibility Notes:</p>	<p>Most of the settings in the X-Series Input/Output system, including External Gain, Amplitude Corrections settings and data, etc., are shared by all modes and are not changed by a mode switch. Furthermore, most variables in the Input/Output system key are not affected by Mode Preset. Both of these behaviors represent a departure from legacy behavior.</p> <p>In the X-Series. Input/Output settings are reset by using the "Restore Input/Output Defaults" function. They can also be reset to their default values through the System-&gt;Restore System Defaults-&gt; In/Out Config key or through the System -&gt;Restore System Defaults -&gt; All key (and corresponding SCPI).</p> <p>While this matches most use cases better, it does create some code compatibility issues. For example, Amplitude Corrections are no longer turned off by a Mode Preset, but instead by using the "Restore Input/Output Defaults" key/SCPI.</p> <p>Although Input/Output settings are not part of each Mode's State, they are saved in the Save State files, so that all of the instrument settings can be recalled with Recall State, as in legacy instruments.</p>
<p>Initial S/W Revision:</p>	<p>Prior to A.02.00</p>
<p><b>Remote Command:</b></p>	<p><code>:INPut :MIXer EXTernal   INTernal</code></p> <p><code>:INPut :MIXer?</code></p>

Example:	INP:MIX INT INP:MIX?
Notes:	<ol style="list-style-type: none"> <li>1. In legacy analyzers you choose between the Internal mixer or an External Mixer. In the X-Series, the External Mixer is one of the choices for the Input and hence is selected using the FEED command (:SENSe:FEED EXTMixer).</li> </ol> <p>For compatibility, the INPut:MIXer EXTernal INTernal legacy command is mapped as follows:</p> <ol style="list-style-type: none"> <li>1. When INPut:MIXer EXTernal is received, SENSe:FEED EMIXer is executed.</li> <li>2. When INPut:MIXer INTernal is received, SENSe:FEED RF is executed.</li> <li>3. When INPut:MIXer? is received, the response will be INT if any input other than the external mixer is selected and EXT if the external mixer is selected</li> </ol>
Preset:	INT
Backwards Compatibility Notes:	<ol style="list-style-type: none"> <li>1. PSA supports the following SCPI Command : :INPut:MIXer:TYPE PRESelected UNPReselect :INPut:MIXer:TYPE? PXA does not support the :INPut:MIXer:TYPE command.</li> </ol>
Initial S/W Revision:	A.08.01

### Input/Output variables - Preset behavior

Virtually all the input/output settings are NOT a part of mode preset. They can be set to their default value by one of the three ways - by using the Restore Input/Output Defaults key on the first page of the input/output menu, by using the System->Restore System Defaults->Input/Output Settings or by using the System -> Restore System Defaults->All. Also, they survive a Preset and a Power cycle.

A very few of the Input/Output settings do respond to a Mode Preset; for example, if the Calibrator is on it turns off on a Preset, and if DC coupling is in effect it switches to AC on a Preset. These exceptions are made in the interest of reliability and usability, which overrides the need for absolute consistency. Exceptions are noted in the SCPI table for the excepted functions.

### RF Input

Selects the front-panel RF input port to be the test set signal input. If RF is already selected, pressing this key accesses the RF input setup functions.

Key Path:	<b>Input/Output</b>
Example:	[:SENSe]:FEED RF

## Input/Output

Readback:	The RF input port, RF coupling, and current input impedance settings appear on this key as: "XX, YY, ZZ" where XX is RF, RF2, RFIO1, RFIO2, depending on what input is selected (only appears on test sets with multiple RF inputs) YY is AC or DC ZZ is 50 or 75
Initial S/W Revision:	Prior to A.02.00

### Input Z Correction

Sets the input impedance for unit conversions. This affects the results when the y-axis unit is voltage or current units (dBmV, dBμV, dBμA, V, A), but not when it is power units (dBm, W). The impedance you select is for computational purposes only, since the actual impedance is set by internal hardware to 50 ohms. Setting the computational input impedance to 75 ohms is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an test set with a 50 ohm input impedance.

There are a variety ways to make 50 to 75 ohm transitions, such as impedance transformers or minimum loss pads. The choice of the solution that is best for your measurement situation requires balancing the amount of loss that you can tolerate with the amount of measurement frequency range that you need. If you are using one of these pads/adaptors with the **Input Z Corr** function, you might also want to use the **Ext Gain** key. This function is used to set a correction value to compensate for the gain (loss) through your pad. This correction factor is applied to the displayed measurement values.

Key Path:	<b>Input/Output, RF Input</b>
Remote Command:	[ :SENSe ] :CORRection:IMPedance [ :INPut ] [ :MAGNitude ] 50   75 [ :SENSe ] :CORRection:IMPedance [ :INPut ] [ :MAGNitude ] ?
Example:	CORR:IMP 75 sets the input impedance correction to 75 ohms. CORR:IMP?
Couplings:	When the main RF Input is selected, the Input Z Correction will automatically change to 50 ohms. You may then change it to whatever is desired.
Preset:	This is unaffected by a Preset but is set to 50 ohms on a "Restore Input/Output Defaults" or "Restore System Defaults->All" Some instruments/options may have 75 ohms available.
State Saved:	Saved in instrument state
Readback:	50 Ω or 75 Ω Current setting reads back to the RF key.
Initial S/W Revision:	Prior to A.02.00

**RF Input Port**

Specifies the RF input port used. The RF Input Port key only appears on units with multiple inputs, and lets you switch between the two inputs.

Switching from the RF input port to one of the RFIO ports, on units which have them, changes the receiver performance of the instrument.

Key Path:	<b>Input/Output, RF Input</b>
Remote Command:	[ :SENSe ] :FEED:RF:PORT [ :INPut ] RFIN   RFIN2   RFIO1   RFIO2 [ :SENSe ] :FEED:RF:PORT [ :INPut ] ?
Example:	:FEED:RF:PORT RFIN
Dependencies:	This key only appears in models that support multiple inputs. If the SCPI command is sent with unsupported parameters in any other model, an error is generated, -221.1900, "Settings conflict;option not installed"  When any input is selected in a measurement that does not support it, the "No result; Meas invalid with this input" error condition occurs, and the measurement returns invalid data when queried.
Preset:	This is unaffected by Mode Preset but is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved:	Saved in State
Readback:	The current RF Input Port selected is read back to this key
Backwards Compatibility SCPI:	INPut<1 2>:TYPE INPUT1   INPUT2 INPut<1 2>:TYPE?  included for R&S ESU compatibility. In the MXE, the INPUT1 parameter is aliased to RFIN and the INPUT2 parameter is aliased to RFIN2
Initial S/W Revision:	A.05.01

**RF Input**

Specifies using the main RF port for the current measurement

Key Path:	<b>Input/Output, RF Input, RF Input Port</b>
Example:	:FEED:RF:PORT RFIN
ReadBack:	RF Input
Initial S/W Revision:	A.05.01

**RFIO1**

Specifies using the RFIO 1 port, if supported, for the current measurement

Key Path:	<b>Input/Output, RF Input, RF Input Port</b>
-----------	--

## Input/Output

Example:	:FEED:RF:PORT RFIO1
Dependencies:	Only available in EXT. If Multiport Adapter is ON, Select RF Input to RFIO1, an error message is generated: “-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON”.
ReadBack:	RFIO 1
Initial S/W Revision:	A.05.01

### RFIO2

Specifies using the RFIO 2 port, if supported, for the current measurement

Key Path:	<b>Input/Output, RF Input, RF Input Port</b>
Example:	:FEED:RF:PORT RFIO2
Dependencies:	Only available in EXT. If Multiport Adapter is ON, Select RF Input to RFIO1, an error message is generated: “-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON”.
ReadBack:	RFIO 2
Initial S/W Revision:	A.05.01

### RF Calibrator

Lets you choose a calibrator signal to look at or turns the calibrator "off".

Key Path:	<b>Input/Output</b>
<b>Remote Command:</b>	[ :SENSe ] :FEED:AREFERENCE REF50   REF4800   OFF [ :SENSe ] :FEED:AREFERENCE?
Example:	FEED:AREF REF50 selects the 50 MHz amplitude reference as the signal input. FEED:AREF REF4800 selects the 4.8 GHz amplitude reference as the signal input FEED:AREF OFF turns the calibrator "off" (switches back to the selected input – RF or I/Q)
Dependencies:	Selecting an input (RF or I/Q) turns the Calibrator OFF. This is true whether the input is selected by the keys or with the [:SENSe]:FEED command. The 4.8 GHz internal reference is only available in some models and frequency range options. If the 4.8 GHz reference is not present, the <b>4.8 GHz</b> softkey will be blanked, and if the REF4800 parameter is sent, the test set will generate an error.



Couplings:	When one of the calibrator signals is selected, the test set routes that signal (an internal amplitude reference) to the test set, and changes the main input selection to RF so the calibrator signal can be seen. When you turn the calibrator off it does not switch back to the previously selected input.
Preset:	OFF
State Saved:	Saved in instrument state
Readback:	Off, 50 MHz, 4.8 GHz
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	:CALibration:SOURce:STATe OFF ON 0 1 :CALibration:SOURce:STATe?
Notes:	For ESA backwards compatibility.  In the ESA the calibrator was a separate output which you connected to the input and switched on with this command.  In the X-Series, the ON parameter is aliased to the [SENSe]:FEED:AREF REF50 command and the OFF parameter is aliased to [SENSe]:FEED:AREF OFF.  When CALibration:SOURce:STATe? is received, 1 will be returned if any of the references is selected and 0 if the Calibrator is "Off"
Preset:	OFF
Initial S/W Revision:	Prior to A.02.00

### 50 MHz

Selects the 50 MHz internal reference as the input signal.

Key Path:	<b>Input/Output, RF Calibrator</b>
Example:	:FEED:AREF REF50
Readback:	50 MHz
Initial S/W Revision:	Prior to A.02.00

### Off

Switches the input back to the selected input (RF or I/Q)

Key Path:	<b>Input/Output, RF Calibrator</b>
Example:	:FEED:AREF OFF
Readback:	Off
Initial S/W Revision:	Prior to A.02.00

### External Gain

Compensates for gain or loss in the measurement system outside the test set. The External Gain is subtracted from the amplitude readout (or the loss is added to the amplitude readout). So, the displayed signal level represents the signal level at the output of the device-under-test, which can be the input of an external device that provides gain or loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, etc., are all affected by External Gain. Changing the External Gain, even on a trace which is not updating, will immediately change all of the above, without new data needing to be taken.

---

**NOTE** Changing the External Gain causes the test set to immediately stop the current sweep and prepare to begin a new sweep. The data will not change until the trace data updates because the offset is applied to the data as it is taken. If a trace is exported with a nonzero External Gain, the exported data will contain the trace data with the offset applied.

---

Key Path:	<b>Input/Output</b>
Couplings:	The Ext Preamp, MS, and BS keys may be grayed out depending on which measurement is currently selected. If any of the grayed out keys are pressed, or the equivalent SCPI command is sent, an advisory message is generated.
Readback:	1-of-N selection   [variable]
Initial S/W Revision:	Prior to A.02.00

### Ext Preamp

This function is similar to the reference level offset function. Both affect the displayed signal level. Ref Lvl Offset is a mathematical offset only, no test set configuration is affected. Ext Preamp gain is used when determining the auto-coupled value of the Attenuator. The External Gain value and the Maximum Mixer Level settings are both part of the automatic setting equation for the RF attenuation setting. (10 dB of Attenuation is added for every 10 dB of External Gain.)

Note that the Ref Lvl Offset and Maximum Mixer Level are described in the Amplitude section. They are reset by the instrument Preset. The External Preamp Gain is reset by the "Restore Input/Output Defaults" or "Restore System Defaults->All functions. . The External Gain is subtracted from the amplitude readout so that the displayed signal level represents the signal level at the output of the device-under-test, which is the input of the external device that is providing gain or loss.

Key Path:	<b>Input/Output, External Gain</b>
<b>Remote Command:</b>	[ :SENSE ] :CORRection:SA [ :RF ] :GAIN <rel_ampl> [ :SENSE ] :CORRection:SA [ :RF ] :GAIN?

Example:	CORR:SA:GAIN 10 sets the Ext Gain value to 10 dB CORR:SA:GAIN -10 sets the Ext Gain value to -10 dB (that is, an attenuation of 10 dB)
Notes:	Does not auto return.
Dependencies:	The reference level limits are determined in part by the External Gain/Atten, Max Mixer Level, and RF Atten.  This key is grayed out in Modes that do not support External Gain
Preset:	This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state
Min:	-120 dB
Max:	120 dB
Readback:	Preamp Gain, <Ext Gain value> dB
Backwards Compatibility SCPI:	[:SENSe]:CORRection:OFFSet[:MAGNitude]  The legacy "Ext Preamp Gain" key is now called "Ext Gain" and the sub-menu has choices of Ext Preamp   MS   BTS for backwards compatibility.
Initial S/W Revision:	Prior to A.02.00

**MS**

Sets an external gain/attenuation value for MS (Mobile Station) tests.

Key Path:	<b>Input/Output, External Gain</b>
<b>Remote Command:</b>	[:SENSe]:CORRection:MS[:RF]:GAIN <rel_amp1> [:SENSe]:CORRection:MS[:RF]:GAIN?
Example:	CORR:MS:GAIN 10 sets the Ext Gain value to 10 dB CORR:MS:GAIN -10 sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.)
Notes:	Does not auto return.
Dependencies:	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten  This key is grayed out in modes that do not support MS.
Preset:	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state.

## Input/Output

Min:	-100 dB
Max:	100 dB
Readback:	MS, <Ext Gain value> dB
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	<code>[ :SENSE ] :CORRection:MS [ :RF ] :LOSS &lt;rel_ampl&gt;</code> <code>[ :SENSE ] :CORRection:MS [ :RF ] :LOSS?</code>
Example:	<code>CORR:MS:LOSS 10</code> sets the Ext Gain value to -10 dB, and subsequently querying <code>:LOSS</code> will give 10 dB <code>CORR:MS:LOSS -10</code> sets the Ext Gain value to 10 dB, and subsequently querying <code>:LOSS</code> will give -10 dB
Notes:	A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime <code>:LOSS</code> is set it sets <code>:GAIN</code> to the negative value of the parameter sent. Anytime <code>:LOSS</code> is queried it gives the negative of <code>:GAIN</code>
Preset:	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min:	100 dB
Max:	-100 dB
Initial S/W Revision:	Prior to A.02.00

## BTS

Sets an external attenuation value for BTS (Base Transceiver Station) tests.

Key Path:	<b>Input/Output, External Gain</b>
<b>Remote Command:</b>	<code>[ :SENSE ] :CORRection:BTS [ :RF ] :GAIN &lt;rel_ampl&gt;</code> <code>[ :SENSE ] :CORRection:BTS [ :RF ] :GAIN?</code>
Example:	<code>CORR:BTS:GAIN 10</code> sets the Ext Gain value to 10 dB <code>CORR:BTS:GAIN -10</code> sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.)
Notes:	Does not auto return.
Dependencies:	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support BTS.

Preset:	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state.
Min:	-100 dB
Max:	100 dB
Readback:	BTS, <Ext Gain value> dB
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	[ :SENSE ] :CORRection:BTS [ :RF ] :LOSS <rel_ampl> [ :SENSE ] :CORRection:BTS [ :RF ] :LOSS?
Example:	CORR:BTS:LOSS 10 sets the Ext Gain value to -10 dB, and subsequently querying :LOSS will give 10 dB CORR:BTS:LOSS -10 sets the Ext Gain value to 10 dB, and subsequently querying :LOSS will give -10 dB
Notes:	A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime :LOSS is set it sets :GAIN to the negative value of the parameter sent. Anytime :LOSS is queried it gives the negative of :GAIN
Preset:	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min:	100 dB
Max:	-100 dB
Initial S/W Revision:	Prior to A.02.00

## Restore Input/Output Defaults

This selection causes the group of settings and data associated with the **Input/Output** key to be a reset to their default values. In addition, when a Source is installed, licensed and selected, Restore Input/Output defaults will initiate a Source Preset.

This level of Restore System Defaults does not affect any other system settings or mode settings and does not cause a mode switch. All the features described in this section are reset using this key, including Input Corrections and Data (described in the Corrections section).

Key Path:	<b>Input/Output</b>
Example:	:SYST:DEF INP presets all the Input/Output variables to their factory default values.

## Input/Output

Notes:	Refer to the Utility Functions for information about Restore System Defaults and the complete description of the :SYSTem:DEFault INPut: command.
Initial S/W Revision:	Prior to A.02.00

### Data Source

Gives you the choice of either using a hardware input signal as the input or raw data stored in a data storage buffer from an earlier acquisition. You can also share raw data across certain measurements that support this feature. The measurements must be capable of storing raw data. There are three choices under this menu. You can select "Inputs" which is the same as selecting one of the inputs from the input port, for example RF, AREF, I/Q, or IFALign. Selecting "Capture Buffer" allows you to use data that has been stored earlier in the same measurement or from a previous measurement using the "Current Meas -> Capture Buffer" feature. Selecting "Recorded Data" allows you to playback long data capture records stored in the record buffer.

Key Path:	<b>Input/Output</b>
<b>Remote Command:</b>	[ :SENSe] :FEED:DATA INPut   STORed [ :SENSe] :FEED:DATA?
Example:	FEED:DATA STOR FEED:DATA?
Notes:	INPutS = Inputs STORed = Capture Buffer
Dependencies:	Not all inputs are available in all modes. Unavailable keys are grayed out.
Preset:	This is unaffected by Preset but is set to INPut on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state
Readback:	Variable
Backwards Compatibility SCPI:	[ :SENSe]:FEED:SOURce INPut STORed [ :SENSe]:FEED:SOURce?
Initial S/W Revision:	Prior to A.02.00

### Inputs

Sets the measurement to use the input selections (RF, AREF, I/Q)

Key Path:	<b>Input/Output, Data Source</b>
Example:	FEED:DATA INP causes the measurement to look at the input selection
Notes:	Does not auto return.

Readback:	Inputs
Initial S/W Revision:	Prior to A.02.00

### Capture Buffer

Some WCDMA and demod measurements support this feature. This allows sharing of the raw data across certain measurements. If you want to make another measurement on the same signal, you would store that raw data using the "Current Meas -> Capture Buffer" key. Then the data is available for the next measurement to use. You must have raw data stored in the instrument memory before the Capture Buffer choice is available for use.

Key Path:	<b>Input/Output, Data Source</b>
Example:	FEED:DATA STOR causes stored measurement data to be used with a different measurement that supports this.
Notes:	Does not auto return. This key is grayed out when you switch to a measurement that does not support this feature.
Dependencies:	If you switch to a measurement that does not support this feature, then the instrument switches to use "Inputs" and grays out this key. If the grayed out key is pressed, it generates a message.
Readback:	Stored Data
Initial S/W Revision:	Prior to A.02.00

### Current Meas -> Capture Buffer

Pressing this key stores the raw data of one measurement in the internal memory of the instrument where it can then be used by a different measurement by pressing "Stored Data". When raw data is stored, then the data source selection switch automatically changes to "Stored Data". Stored raw data cannot be directly accessed by a user. There is no save/recall function to save the raw data in an external media. However if you want to get the stored raw data, you must first perform a measurement using the stored raw data. Now you can access the used raw data, which is the same as stored raw data, using the FETCh or READ commands.

Key Path:	<b>Input/Output, Data Source</b>
<b>Remote Command:</b>	[ :SENSe] :FEED:DATA:STORe
Example:	FEED:DATA:STOR stores recorded data
Notes:	This is command only, there is no query
Backwards Compatibility SCPI:	[:SENSe]:FEED:SOURce:STORe
Initial S/W Revision:	Prior to A.02.00

### Corrections

This key accesses the Amplitude Corrections menu.

## Input/Output

Amplitude Corrections arrays can be entered, sent over SCPI, or loaded from a file. They allow you to correct the response of the test set for various use cases. The X-series supports four separate Corrections arrays, each of which can contain up to 2000 points. They can be turned on and off individually and any or all can be on at the same time.

Trace data is in absolute units and corrections data is in relative units, but we want to be able to display trace data at the same time as corrections data. Therefore we establish a reference line to be used while building or editing a Corrections table. The reference line is halfway up the display and represents 0 dB of correction. It is labeled "0 dB CORREC". It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it.

In zero span, where the frequency is always the center frequency of the test set, we apply the (interpolated) correction for the center frequency to all points in the trace. In the event where there are two correction amplitudes at the center frequency, we apply the first one in the table.

Note that the corrections are applied as the data is taken; therefore, a trace in **View** (Update Off) will not be affected by changes made to the corrections table after the trace is put in **View**.

Instruments that have multiple Input/Output RF ports can have different corrections applied to the different ports. There are 4 sets of corrections that can be applied to the RF ports; ports cannot share the same set of corrections but a single port can have multiple corrections applied to it. The correction data is applied to incoming signals as well as transmitted signals and is in the form of a list of spot frequencies and amplitude correction levels.

Key Path:	<b>Input/Output, Corrections</b>
Mode:	SEQAN, TDSCDMA
Dependencies:	<p>This key will only appear if you have the proper option installed in your instrument.</p> <p>Amplitude correction may not be available in all modes; if a mode does not support amplitude correction, the Corrections key should be blanked while in that mode. If an application supports corrections but the current measurement does not, then the key should be grayed out in that measurement.</p> <p>This menu selection does not have any effect when <b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Multiport Adapter</b> is set to the <b>On</b> state and <b>Input/Output, RF Output &amp; Test Set Config, RF Output</b> is <b>RF Output</b>.</p>
Preset:	Corrections arrays are reset (deleted) by Restore Input/Output Defaults. They survive shutdown and restarting of the test set application, which means they will survive a power cycle.
Initial S/W Revision:	A.02.00

### Correction On/Off

Turning the Selected Correction on allows the values in it to be applied to the data. This also automatically turns on "Apply Corrections" (sets it to ON), otherwise the correction would not take effect.



A new sweep is initiated if an amplitude correction is switched on or off. Note that changing, sending or loading corrections data does NOT directly initiate a sweep, however in general these operations will turn corrections on, which DOES initiate a sweep.

Key Path:	<b>Input/Output, Corrections</b>
<b>Remote Command:</b>	[ :SENSe] :CORRection:CSET [1]   2   3   4   5   6 [ :STATe] ON   OFF   1   0  [ :SENSe] :CORRection:CSET [1]   2   3   4   5   6 [ :STATe] ?
Example:	SENS:CORR:CSET1 ON
Dependencies:	Turning this on automatically turns on "Apply Corrections"  Only the first correction array (Correction 1) supports antenna units. When this array is turned on, and it contains an Antenna Unit other than "None", the Y Axis Unit of the test set is forced to that Antenna Unit. All other Y Axis Unit choices are grayed out.  Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include .ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.  This command will generate an "Option not available" error unless you have the proper option installed in your instrument.
Preset:	Not affected by a Preset. Set to OFF by <b>Restore Input/Output Defaults</b>
State Saved:	Saved in instrument state.
Backwards Compatibility Notes:	Unlike legacy analyzers, Preset does not turn Corrections off (Restore Input/Output Defaults does).
Initial S/W Revision:	A.02.00

### Properties

Accesses a menu that lets you set the properties of the selected correction.

Key Path:	<b>Input/Output, Corrections</b>
Initial S/W Revision:	A.02.00

### Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

Key Path:	<b>Input/Output, Corrections, Properties</b>
Notes:	The selected correction is remembered even when not in the correction menu.
Preset:	Set to Correction 1 by Restore Input/Output Defaults.

## Input/Output

Readback:	Correction 1 Correction 2 Correction 3 Correction 4 Correction 5 Correction 6
Initial S/W Revision:	A.02.00

### Frequency Interpolation

This setting controls how the correction values per-bucket are calculated. We interpolate between frequencies in either the logarithmic or linear scale.

This setting is handled and stored individually per correction set.

See “[Interpolation](#)” on page 298

Key Path:	<b>Input/Output, Corrections, Properties</b>
Remote Command:	<code>[[:SENSE]:CORREction:CSET[1] 2 3 4 5 6:X:SPACing LINear LOGarithmic [:SENSe]:CORREction:CSET[1] 2 3 4 5 6:X:SPACing?</code>
Example:	<code>CORR:CSET:X:SPAC LIN</code>
Preset:	Unaffected by a Preset. Set to Linear by Restore Input/Output Defaults.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.02.00

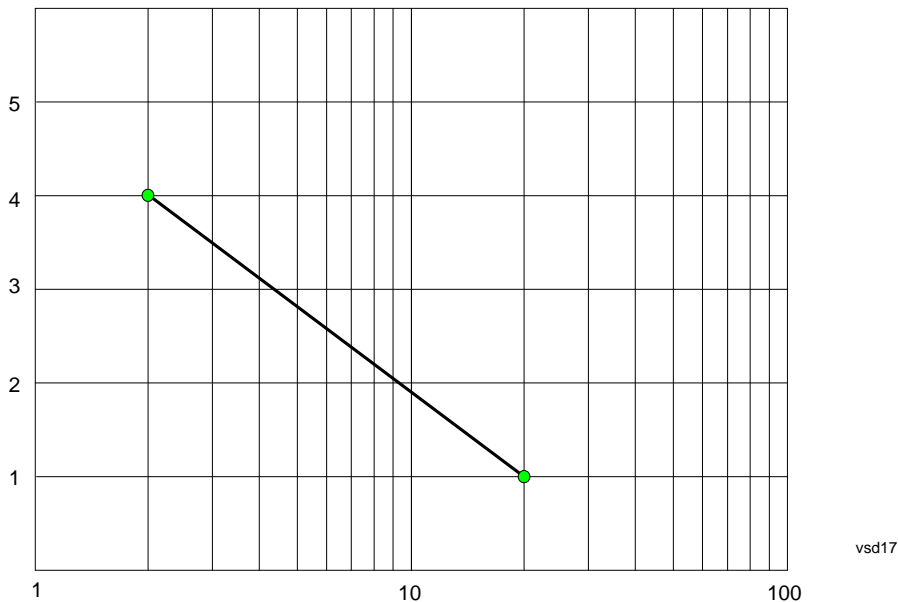
### Interpolation

For each bucket processed by the application, all of the correction factors at the frequency of interest (center frequency of each bucket) are summed and added to the amplitude. All trace operations and post processing treat this post-summation value as the true signal to use.

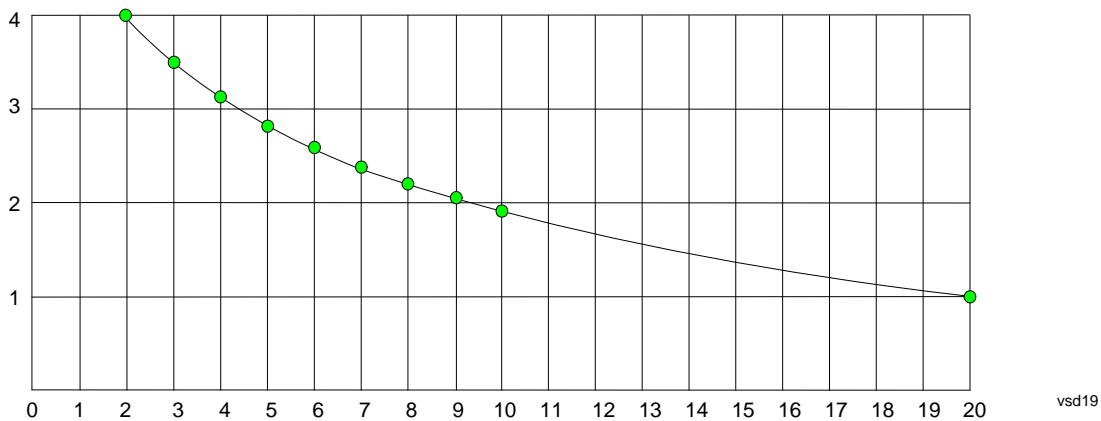
To effect this correction, the goal, for any particular start and stop frequency, is to build a correction trace, whose number of points matches the current Sweep Points setting of the instrument, which will be used to apply corrections on a bucket by bucket basis to the data traces.

For amplitudes that lie between two user specified frequency points, we interpolate to determine the amplitude value. You may select either linear or logarithmic interpolation between the frequencies.

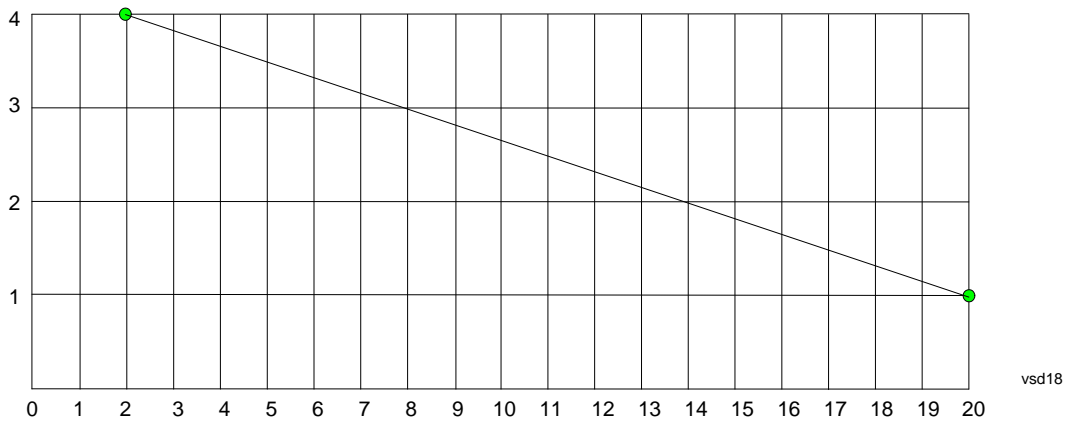
If we interpolate on a log scale, we assume that the line between the two points is a straight line on the log scale. For example, let’s say the two points are (2,4) and (20,1). A straight line between them on a log scale looks like:



On a linear scale (like that of the test set), this translates to:



If we interpolate on a linear scale, we assume that the two points are connected by a straight line on the linear scale, as below:



## Input/Output

The correction to be used for each bucket is taken from the interpolated correction curve at the center of the bucket.

### Description

Sets an ASCII description field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path:	<b>Input/Output, Corrections, Properties</b>
Remote Command:	[ :SENSe ] :CORRection:CSET [1]   2   3   4   5   6 :DESCRiption "text" [ :SENSe ] :CORRection:CSET [1]   2   3   4   5   6 :DESCRiption?
Example:	:CORR:CSET1:DESC "11941A Antenna correction"
Notes:	45 chars max; may not fit on display if max chars used
Preset:	Unaffected by a Preset. Set to empty by Restore Input/Output Defaults
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.02.00

### Comment

Sets an ASCII comment field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path:	<b>Input/Output, Corrections, Properties</b>
Remote Command:	[ :SENSe ] :CORRection:CSET [1]   2   3   4   5   6 :COMMent "text" [ :SENSe ] :CORRection:CSET [1]   2   3   4   5   6 :COMMent?
Example:	:CORR:CSET1:COMM "this is a comment"
Notes:	60 chars max; may not fit on display if max chars used
Preset:	Unaffected by Preset. Set to empty by <b>Restore Input/Output Defaults</b>
State Saved:	Saved in instrument state
Initial S/W Revision:	A.02.00

### RF Port

This menu and all of its submenus are only available in the EXT.

Maps one of the sets of corrections to one of the IO ports.

Key Path:	<b>Input/Output, Corrections, Properties</b>
Mode:	SEQAN

<b>Remote Command:</b>	[ :SENSE ] :CORRection:CSET [1]   2   3   4   5   6 :RF:PORT RFIN   RFIO1   RFIO2   RFOut  [ :SENSE ] :CORRection:CSET [1]   2   3   4   5   6 :RF:PORT?
Example:	:CORR:CSET:RF:PORT RFIN
Remote Command Notes:	
Dependencies:	Only available in EXT
Couplings:	
Preset:	Unaffected by Preset. Set to RF by Restore Input/Output Defaults
State Saved:	Saved in State
Initial S/W Revision:	A.05.01

**RF Input**

The port that the current corrections will be applied to.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT RFIN
Dependencies:	Only available in EXT
ReadBack:	RF IN
Initial S/W Revision:	A.05.01

**RFOut**

The port that the current corrections will be applied to.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT RFO
Dependencies:	Only available in EXT
ReadBack:	RFOut
Initial S/W Revision:	A.05.01

**RFIO1**

The port that the current corrections will be applied to. Pressing this key again allows the user access to the menu for specifying which internal device the corrections for RFIO 1 will be applied to.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSE ] :CORRection:CSET [1]   2   3   4   5   6 :RF:PORT:RFIO1 SOURce   ANALyzer   BOTH  [ :SENSE ] :CORRection:CSET [1]   2   3   4   5   6 :RF:PORT:RFIO1?

## Input/Output

Example:	:CORR:CSET:RF:PORT:RFIO1 BOTH
Preset:	Both
State Saved:	Saved in State

### Correct Source

Sets the corrections for the RFIO1 port to be applied to the source.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO1 SOUR
Readback:	"Correct Source"

### Correct Analyzer

Sets the corrections for the RFIO1 port to be applied to the test set.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO1 ANAL
Readback:	"Correct Analyzer"

### Correct Source and Analyzer

Sets the corrections for the RFIO1 port to be applied to both the source and the test set.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO1 BOTH
Readback:	"Correct Source and Analyzer"

## RFIO2

The port that the current corrections will be applied to. Pressing this key again allows the user access to the menu for specifying which internal device the corrections for RFIO 2 will be applied to.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSe ] :CORRection:CSET [ 1 ]   2   3   4   5   6 :RF:PORT:RFIO2 SOURce   ANALyzer   BOTH [ :SENSe ] :CORRection:CSET [ 1 ]   2   3   4   5   6 :RF:PORT:RFIO2?
Example:	:CORR:CSET:RF:PORT:RFIO2 BOTH
Preset:	Both
State Saved:	Saved in State

**Correct Source**

Sets the corrections for the RFIO2 port to be applied to the source.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO2 SOUR
Readback:	"Correct Source"

**Correct Analyzer**

Sets the corrections for the RFIO2 port to be applied to the test set.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO2 ANAL
Readback:	"Correct Analyzer"

**Correct Source and Analyzer**

Sets the corrections for the RFIO2 port to be applied to both the source and the test set.

Key Path:	<b>Input/Output, Corrections, Properties, RF Port</b>
Example:	:CORR:CSET:RF:PORT:RFIO2 BOTH
Readback:	"Correct Source and Analyzer"

**Edit**

Invokes the integrated editing facility for this correction set.

When entering the menu, the editor window turns on, the selected correction is turned **On**, **Apply Corrections** is set to **On**, the amplitude scale is set to **Log**, and the Amplitude Correction (“Ampcor”) trace is displayed. The actual, interpolated correction trace is shown in green for the selected correction. Note that since the actual interpolated correction is shown, the correction trace may have some curvature to it. This trace represents only the correction currently being edited, rather than the total, accumulated amplitude correction for all amplitude corrections which are currently on, although the total, accumulated correction for all corrections which are turned on is still applied to the data traces.

Because corrections data is always in dB, but the Y-axis of the test set is in absolute units, it is necessary to establish a reference line for display of the Corrections data. The reference line is halfway up the display and represents 0 dB of correction. It is labeled “0 dB CORREC”. It is drawn in blue.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to correct it before displaying it. By definition all points are connected. If a gap is desired for corrections data, enter 0 dB.

Note that a well-designed Corrections array should start at 0 dB and end at 0 dB. This is because whatever the high end point is will be extended to the top frequency of the instrument, and whatever the

## Input/Output

low end point is will be extended down to 0 Hz. So for a Corrections array to have no effect outside its range, you should start and end the array at 0 dB.

---

**NOTE** The table editor will only operate properly if the test set is sweeping, because its updates are tied to the sweep system. Thus, you should not try to use the editor in single sweep, and it will be sluggish during compute-intensive operations like narrow-span FFT sweeps.

---

When exiting the edit menu (by using the **Return** key or by pressing an instrument front-panel key), the editor window turns off and the Ampcor trace is no longer displayed; however, **Apply Corrections** remains **On**, any correction that was on while in the editor remains on, and the amplitude scale returns to its previous setting.

Corrections arrays are not affected by a Preset, because they are in the Input/Output system. They also survive shutdown and restarting of the test set application, which means they will survive a power cycle.

Key Path:	<b>Input/Output, Corrections</b>
Initial S/W Revision:	A.02.00

### Navigate

Lets you move through the table to edit the desired point.

Key Path:	<b>Input/Output, Corrections, Edit</b>
Notes:	There is no value readback on the key
Min:	1
Max:	2000
Initial S/W Revision:	A.02.00

### Frequency

Lets you edit the frequency of the current row.

Key Path:	<b>Input/Output, Corrections, Edit</b>
Notes:	There is no value readback on the key.
Min:	0
Max:	1 THz
Initial S/W Revision:	A.02.00

### Amplitude

Lets you edit the Amplitude of the current row.

Key Path:	<b>Input/Output, Corrections, Edit</b>
-----------	--



Notes:	There is no value readback on the key.
Min:	-1000 dB
Max:	1000 dB
Initial S/W Revision:	A.02.00

### Insert Point Below

Inserts a point below the current point. The new point is a copy of the current point and becomes the current point. The new point is not yet entered into the underlying table, and the data in the row is displayed in light gray.

Key Path:	<b>Input/Output, Corrections, Edit</b>
Initial S/W Revision:	A.02.00

### Delete Point

Deletes the currently-selected point, whether or not that point is being edited, and selects the Navigate functionality. The point following the currently-selected point (or the point preceding if there is none) will be selected.

Key Path:	<b>Input/Output, Corrections, Edit</b>
Initial S/W Revision:	A.02.00

### Delete Correction

Deletes the correction values for this set. When this key is pressed a prompt is placed on the screen that says "Please press Enter or OK key to delete correction. Press ESC or Cancel to close this dialog." The deletion is only performed if you press OK or Enter.

Key Path:	<b>Input/Output, Corrections</b>
<b>Remote Command:</b>	[ :SENSE ] :CORRection:CSET [1]   2   3   4   5   6 :DELete
Example:	CORR:CSET:DEL CORR:CSET1:DEL CORR:CSET4:DEL
Notes:	Pressing this key when no corrections are present is accepted without error.
Initial S/W Revision:	A.02.00

### Apply Corrections

Applies amplitude corrections which are marked as ON to the measured data. If this is set to OFF, then no amplitude correction sets will be used, regardless of their individual on/off settings. If set to ON, the

## Input/Output

corrections that are marked as ON (see “Correction On/Off” on page 296) are used.

Key Path:	<b>Input/Output, Corrections</b>
<b>Remote Command:</b>	[ :SENSe ] :CORRection:CSET:ALL [ :STATe ] ON   OFF   1   0 [ :SENSe ] :CORRection:CSET:ALL [ :STATe ] ?
Example:	SENS:CORR:CSET:ALL OFF  This command makes sure that no amplitude corrections are applied, regardless of their individual on/off settings.
Preset:	Not affected by Preset. Set to OFF by Restore Input/Output Defaults
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.02.00

### Delete All Corrections

Erases all correction values for all 4 Amplitude Correction sets.

When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete all corrections. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter.

Key Path:	<b>Input/Output, Corrections</b>
<b>Remote Command:</b>	[ :SENSe ] :CORRection:CSET:ALL:DELeTe
Example:	CORR:CSET:ALL:DEL
Initial S/W Revision:	A.02.00

### Remote Correction Data Set Commands

#### Set (Replace) Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas.

The values sent in the command will totally replace all existing correction points in the specified set.

An Ampcor array can contain 2000 points maximum.

<b>Remote Command:</b>	[ :SENSe ] :CORRection:CSET [ 1 ]   2   3   4   5   6 :DATA <freq> , <ampl> , . . . [ :SENSe ] :CORRection:CSET [ 1 ]   2   3   4   5   6 :DATA?
Example:	CORR:CSET1:DATA 10000000,-1.0,20000000,1.0  This defines two correction points at (10 MHz, -1.0 dB) and (20 MHz, 1.0 dB) for correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives a shutdown or restart of test set application (including a power cycle).

State Saved:	Saved in instrument state.
Min:	Freq: 0 Hz Amptd: -1000 dBm
Max:	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision:	A.02.00

### Merge Correction Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas. The difference between this command and Set Data is that this merges new correction points into an existing set.

Any new point with the same frequency as an existing correction point will replace the existing point's amplitude with that of the new point.

An Ampcor array can contain 2000 total points, maximum.

<b>Remote Command:</b>	<code>[ :SENSE ] :CORRection:CSET [ 1   2   3   4   5   6 :DATA:MERGe &lt;freq&gt;, &lt;ampl&gt;, ...</code>
Example:	<code>CORR:CSET1:DATA:MERGE 15000000,-5.0,25000000,5.0</code> This adds two correction points at (15 MHz, -5.0 dB) and (25 MHz, 5.0 dB) to whatever values already exist in correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives shutdown/restart of test set application (including power cycle)
Min:	Freq: 0 Hz Amptd: -1000 dBm
Max:	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision:	A.02.00

### Freq Ref In

Specifies the frequency reference as being the internal reference, external reference or sensing the presence of an external reference.

When the frequency reference is set to internal, the internal 10 MHz reference is used even if an external reference is connected.

When the frequency reference is set to external, the instrument will use the external reference. However, if there is no external signal present, or it is not within the proper amplitude range, a condition error message is generated. When the external signal becomes valid, the error is cleared.

If Sense is selected, the instrument checks whether a signal is present at the external reference connector and will automatically switch to the external reference when a signal is detected. When no signal is

## Input/Output

present, it automatically switches to the internal reference. No message is generated as the reference switches between external and internal. The monitoring of the external reference occurs approximately on 1 millisecond intervals, and never occurs in the middle of a measurement acquisition, only at the end of the measurement (end of the request).

If for any reason the instrument's frequency reference is not able to obtain lock, Status bit 2 in the Questionable Frequency register will be true and a condition error message is generated. When lock is regained, Status bit 2 in the Questionable Frequency register will be cleared and the condition error will be cleared.

If an external frequency reference is being used, you must enter the frequency of the external reference if it is not exactly 10 MHz. The External Ref Freq key is provided for this purpose.

Key Path:	<b>Input/Output</b>
<b>Remote Command:</b>	[ :SENSe ] :ROSCillator :SOURce :TYPE INTernal   EXTernal   SENSe  [ :SENSe ] :ROSCillator :SOURce :TYPE?
Preset:	This is unaffected by a Preset but is set to SENSe on a "Restore Input/Output Defaults" or "Restore System Defaults->All".
State Saved:	Saved in instrument state.
Status Bits/OPC dependencies:	STATus:QUEStionable:FREQUency bit 2 set if unlocked.
Backwards Compatibility Notes:	1. Freq Ref In was not saved in state in the legacy instruments. It is a part of state in the X-Series.
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	[ :SENSe ] :ROSCillator :SOURce ?
Notes:	The query [SENSe]:ROSCillator:SOURce? returns the current switch setting. This means:  <ol style="list-style-type: none"> <li>1. If it was set to SENSe but there is no external reference so the instrument is actually using the internal reference, then this query returns INTernal and not SENSe.</li> <li>2. If it was set to SENSe and there is an external reference present, the query returns EXTernal and not SENSe.</li> <li>3. If it was set to EXTernal, then the query returns "EXTernal"</li> <li>4. If it was set to INTernal, then the query returns "INTernal"</li> </ol>
Preset:	SENSe

Backwards Compatibility Notes:	The query [:SENSe]:ROSCillator:SOURce? was a query-only command in ESA which always returned whichever reference the instrument was using. The instrument automatically switched to the ext ref if it was present.  In PSA (which had no sensing) the command [:SENSe]:ROSCillator:SOURce set the reference (INT or EXT), so again its query returned the actual routing.  Thus the query form of this command is 100% backwards compatible with both instruments.
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	[:SENSe]:ROSCillator:SOURce INTernal EXTernal
Notes:	For PSA compatibility the command form is provided and is directly mapped to [:SENSe]:ROSCillator:SOURce:TYPE
Initial S/W Revision:	Prior to A.02.00

### Sense

The external reference is used if a valid signal is sensed at the Ext Ref input. Otherwise the internal reference is used.

Key Path:	<b>Input/Output, Freq Ref In</b>
Example:	:ROSC:SOUR:TYPE SENS
Readback:	Sense
Initial S/W Revision:	Prior to A.02.00

### Internal

The internal reference is used.

Key Path:	<b>Input/Output, Freq Ref In</b>
Example:	:ROSC:SOUR:TYPE INT
Readback:	Internal
Initial S/W Revision:	Prior to A.02.00

### External

The external reference is used.

Key Path:	<b>Input/Output, Freq Ref In</b>
Example:	:ROSC:SOUR:TYPE EXT
Readback:	External
Initial S/W Revision:	Prior to A.02.00

## Input/Output

### Ext Ref Freq

This key tells the test set the frequency of the external reference. When the external reference is in use (either because the reference has been switched to External or because the Reference has been switched to Sense and there is a valid external reference present) this information is used by the test set to determine the internal settings needed to lock to that particular external reference signal.

For the instrument to stay locked, the value entered must be within 5 ppm of the actual external reference frequency. So it is important to get it close, or you risk an unlock condition.

Note that this value only affects the instrument's ability to lock. It does not affect any calculations or measurement results. See "Freq Offset" in the Frequency section for information on how to offset frequency values.

Key Path:	<b>Input/Output, Freq Ref In</b>
Remote Command:	<code>[ :SENSe ] :ROSCillator :EXTernal :FREQUENCY &lt;freq&gt;</code> <code>[ :SENSe ] :ROSCillator :EXTernal :FREQUENCY?</code>
Example:	ROSC:EXT:FREQ 20 MHz sets the external reference frequency to 20 MHz, but does not select the external reference. ROSC:SOUR:TYPE EXT selects the external reference.
Notes:	Still available with Internal selected, to allow setup for when External is in use.
Preset:	This is unaffected by a Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min:	CXA: 10 MHz EXA: 10 MHz or 13 MHz, depending on whether N9010A-R13 is licensed MXA: 1 MHz PXA: 1 MHz 1 MHz
Max:	CXA: 10 MHz EXA: 10 MHz MXA: 50 MHz PXA: 50 MHz 50 MHz
Default Unit:	Hz
Initial S/W Revision:	Prior to A.02.00

### RF Output & Test Set Config

This menu and all of its submenus are only available in the EXT (E6607A/B/C).

Access the menu to select the front-panel RF output port to be the test set signal output. If RF is

already selected, pressing this key accesses the RF output setup functions.

### EXT (E6607A/B)

The RF Output & Test Set Config key allows you to set the RF Output Port and multiport adapter unit which is connected to the EXT by USB for download of calibration data and additional control.

### EXT (E6607C)

The RF Output & Test Set Config key allows you to set the RF Output Port and MPA settings.

Key Path:	<b>Input/Output</b>
Dependencies:	Only available in EXT
Preset:	All settings under this key are returned to their default state when <b>Restore Input/Output Defaults</b> is pressed.
State Saved:	Saved in State
Initial S/W Revision:	A.10.00

### RF Output

Specifies the RF Output Port used.

Switching from the RF Output port to one of the RFIO ports changes the transmitter performance of the instrument.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config</b>
<b>Remote Command:</b>	[ :SENSE] :FEED:RF:PORT:OUTPut RFOut   RFIO1   RFIO2 [ :SENSE] :FEED:RF:PORT:OUTPut?
Example:	:FEED:RF:PORT:OUTP RFIO1
Dependencies:	Only available in EXT
Preset:	This is unaffected by Mode Preset but is set to RFOut on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved:	Saved in State
Readback Text:	The current RF Output Port selected is read back to this key
Initial S/W Revision:	A.05.01

### RF Out

The RF port that will be used for the current output

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, RF Output</b>
Example:	:FEED:RF:PORT:OUTP RFO
Dependencies:	Only available in EXT

## Input/Output

ReadBack:	RF Output
Initial S/W Revision:	A.05.01

### RFIO1

The RF port that will be used for the current output

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, RF Output</b>
Example:	:FEED:RF:PORT:OUTP RFIO1
Dependencies:	Only available in EXT.
ReadBack:	RFIO1
Initial S/W Revision:	A.05.01

### RFIO2

The RF port that will be used for the current output

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, RF Output</b>
Example:	:FEED:RF:PORT:OUTP RFIO2
Dependencies:	Only available in EXT.
ReadBack:	RFIO2
Initial S/W Revision:	A.05.01

### Multiport Adapter

The Multiport Adapter key allows you to set the multiport adapter unit which is connected to the EXT by USB for download of calibration data and additional control.

Multiport Adapter is only available in the EXT (E6607A/B/C), and is blanked for other models.

#### EXT (E6607A/B)

The Multiport Adapter key will not be displayed if the multiport adapter unit is not connected to the EXT by USB.

#### EXT (E6607C)

The MPA is integrated into the instrument; therefore, the Multiport Adapter key is always displayed.

See [“More Information” on page 313](#)

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config</b>
-----------	--

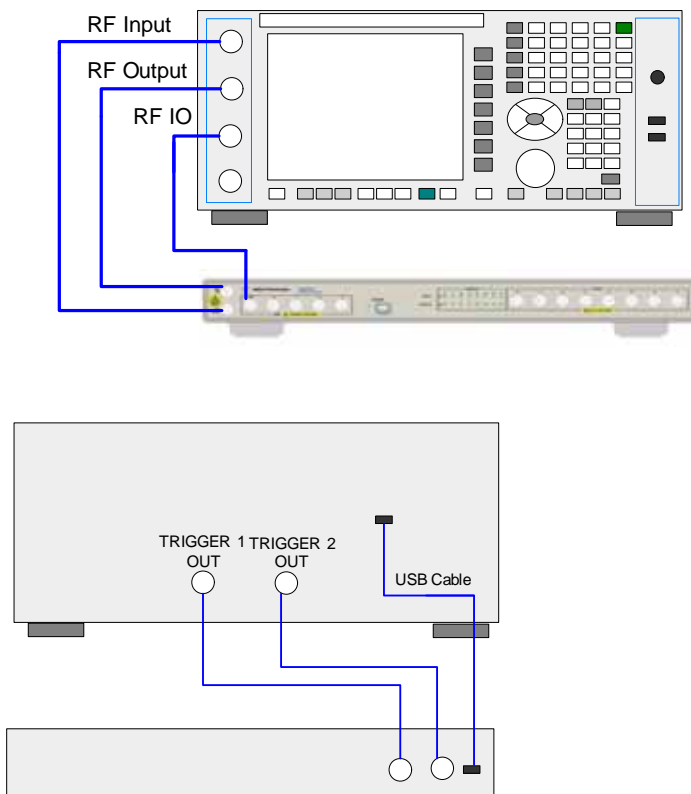


Dependencies:	Multiport adapter is only available for EXT (E6607A/B) model, and is blanked for other models.  Multiport adapter unit is connected to EXT by USB for download of calibration data and additional control.
Preset:	All settings under this key are returned to their default state when <b>Restore Input/Output Defaults</b> is pressed.
State Saved:	All settings under this key, are remembered when you unplugged the multiport adapter unit USB connection, so that when multiport adapter unit USB is connected again, all the multiport adapter functions will retain their previous settings, with the exception of <b>Multiport Adapter</b> which is set to OFF.
Initial S/W Revision:	A.10.00

More Information

Multiport adapter in the EXT (E6607A/B) supports the Agilent E6617A, which provides a USB connection for download of calibration data and additional control.

The connection diagram for Agilent E6617A switch unit is:



**Multiport Adapter On/Off**

Turning the Multiport Adapter On means that the multiport adapter unit is connected and it will be used for the measurements or source.

Turning the Multiport Adapter Off means that the multiport adapter unit will not be used for the analyzer

## Input/Output

or source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter [ :STATe ] ON   OFF   1   0 [ :SENSe ] :MPADapter [ :STATe ] ?
Example:	:MPAD ON
Dependencies:	Only when the multiport adapter unit is connected to the EXT by USB, it is appeared. Otherwise, it will not be displayed and set to OFF.  If the current RF Input port is not RF Input, turn Multiport Adapter to On , an error message is generated: “-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON”.
Preset:	This is unaffected by Mode Preset but is set to OFF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
Initial S/W Revision:	A.10.00

## Input Port

Specifies the multiport adapter unit input port used.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:PORT:INPut OFF   RFIO0   RFIO1   RFIO2   RFIO3   RFIO4   RFIO5   RFIO6   RFIO7 [ :SENSe ] :MPADapter:PORT:INPut ?
Example:	:MPAD:PORT:INP RFIO1
Dependencies:	This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter is set to the On state.
Preset:	This is unaffected by Mode Preset but is set to RFIO0 on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved:	Saved in State
Readback Text:	The current Multiport Adapter Input Port selected is read back to this key
Backwards Compatibility SCPI Notes:	The commands above are included for ESU compatibility
Initial S/W Revision:	A.10.00

## OFF

Specifies using the multiport adapter input port OFF.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[ :SENSe ] :MPADapter:PORT:INPut OFF

ReadBack:	OFF
Initial S/W Revision:	A.10.00

**RFIO0**

Specifies using the multiport adapter input port RFIO 0.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[ :SENSe] :MPADapter:PORT:INPut RFIO0
ReadBack:	RFIO 0
Initial S/W Revision:	A.10.00

**RFIO1**

Specifies using the multiport adapter input port RFIO 1.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[ :SENSe]:MPADapter:PORT:INPut RFIO1
ReadBack:	RFIO 1
Initial S/W Revision:	A.10.00

**RFIO2**

Specifies using the multiport adapter Input port RFIO 2.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[ :SENSe]:MPADapter:PORT:INPut RFIO2
ReadBack:	RFIO 2
Initial S/W Revision:	A.10.00

**RFIO3**

Specifies using the multiport adapter input port RFIO 3.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[ :SENSe]:MPADapter:PORT:INPut RFIO3
ReadBack:	RFIO 3
Initial S/W Revision:	A.10.00

## Input/Output

### RFIO4

Specifies using the multiport adapter input port RFIO 4.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port</b>
Example:	[:SENSe]:MPADapter:PORT:INPut RFIO4
ReadBack:	RFIO 4
Initial S/W Revision:	A.10.00

### RFIO5

Specifies using the multiport adapter input port RFIO 5.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port, Page 2</b>
Example:	[:SENSe]:MPADapter:PORT:INPut RFIO5
ReadBack:	RFIO 5
Initial S/W Revision:	A.10.00

### RFIO6

Specifies using the multiport adapter input port RFIO 6.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port, Page 2</b>
Example:	[:SENSe]:MPADapter:PORT:INPut RFIO6
ReadBack:	RFIO 6
Initial S/W Revision:	A.10.00

### RFIO7

Specifies using the multiport adapter input port RFIO 7.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Input Port, Page 2</b>
Example:	[:SENSe]:MPADapter:PORT:INPut RFIO7
ReadBack:	RFIO 7
Initial S/W Revision:	A.10.00

## Output Port

Specifies the multiport adapter unit output ports used. The Output Port key lets you set eight outputs

ON/OFF. See the table below for bitmapping.

Multiport Adapter Output Port	Bit
RFIO0	0
RFIO1	1
RFIO2	2
RFIO3	3
RFIO4	4
RFIO5	5
RFIO6	6
RFIO7	7

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter</b>
<b>Remote Command:</b>	[ :SENSE] :MPADapter:PORT:OUTPut:BITMap <integer> [ :SENSE] :MPADapter:PORT:OUTPut:BITMap?
Example:	:MPAD:PORT:OUTPut:BITMap 1
Notes:	Each bit is associated with a multiport adapter output port; as shown in the bitmap table above. The value of a bit is '0' if the corresponding multiport adapter output port is not selected, and '1' if it is. (For example, to select multiport adapter RFIO7 output port , set Bit 7 to '1'.)  The field requires a decimal entry. For example, if multiport adapter selects the RFIO 7 output port and RFIO 0 output port, the Bit Mask for this combination is 10000001, and the value of this parameter is the decimal number '129'.
Dependencies:	This menu selection does not have any effect unless Input/Output, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state and Input/Output, RF Output & Test Set Config, RF Output is RF Output port.  When Input/Output, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state and Input/Output, RF Output & Test Set Config, RF Output is set to RFIO1 or RFIO2 port, the Multiport Adapter GPS Output Port will be used.
Preset:	This is unaffected by Mode Preset but is set to "1" on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved:	Saved in State
Backwards Compatibility SCPI Notes:	The commands above are included for ESU compatibility
Initial S/W Revision:	A.10.00

## Input/Output

### RFIO0

Turn on or off the multiport adapter RFIO0 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to ON pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

### RFIO1

Turn on or off the multiport adapter RFIO1 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

### RFIO2

Turn on or off the multiport adapter RFIO2 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

### RFIO3

Turn on or off the multiport adapter RFIO3 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

**RFIO4**

Turn on or off the multiport adapter RFIO4 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

**RFIO5**

Turn on or off the multiport adapter RFIO5 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

**RFIO6**

Turn on or off the multiport adapter RFIO6 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port, Page 2</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

**RFIO7**

Turn on or off the multiport adapter RFIO7 output port.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Output Port, Page 2</b>
Preset:	Not affected by a Preset. Set to OFF by pressing System > Restore Defaults > Input/Output Settings or System > Restore Defaults > All.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

**Preamp On/Off**

Turn on or off the preamplifier of the multiport adapter input path. It will provide one fix gain for the

## Input/Output

multiport adapter input path.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter</b>
Remote Command:	[ :SENSe ] :MPADapter:GAIN [ :STATe ] ON   OFF   1   0 [ :SENSe ] :MPADapter:GAIN [ :STATe ] ?
Example:	:MPAD:GAIN ON
Dependencies:	This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state.
Preset:	This is unaffected by Mode Preset but is set to OFF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.0

## Amplitude Corrections

### Corrections

Multiport Adapter Amplitude Corrections arrays can be entered by the user, sent over SCPI, or loaded from a file. The Multiport Adapter correction supports 16 separate Corrections arrays, each of which can contain up to 2000 points. They can be turned on and off individually and any or all can be on at the same time. Multiport Adapter has multiple Input/Output RF ports can have different corrections applied to the different ports. The correction data is applied to incoming signals as well as transmitted signals and is in the form of a list of spot frequencies and amplitude correction levels.

See section [“Amplitude Corrections” on page 320](#) for more information on Corrections.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter</b>
Mode:	Sequence Analyzer, I/Q Analyzer
Dependencies:	This key will only appear if you have the proper option installed in your instrument.  Multiport Adapter Amplitude correction may not be available in all modes; if a mode does not support amplitude correction, the Correction On/Off and Apply Corrections On/Off keys should be grayed and un-accessible.  This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state.
Preset:	Multiport Adapter Corrections arrays are reset (deleted) by Restore Input/Output Defaults. They survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.
Initial S/W Revision:	A.10.00



### Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport adapter, Corrections</b>
Mode:	Sequence Analyzer, I/Q Analyzer
Notes:	The selected correction is remembered even when not in the correction menu
Dependencies:	This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state.
Preset:	Set to Correction 1 by Restore Input/Output Defaults
Readback:	Correction 1 Correction 2 Correction 3 Correction 4 Correction 5 Correction 6 Correction 7  Correction 9 Correction 9 Correction 10 Correction 11 Correction 12
Initial S/W Revision:	A.10.00

### Correction On/Off

Turning the Selected Correction on allows the values in it to be applied to the data. This also automatically turns on "Apply Corrections" (sets it to ON), otherwise the correction would not take effect.

A new sweep is initiated if an amplitude correction is switched on or off. Note that changing, sending or loading corrections data does NOT directly initiate a sweep, however in general these operations will turn corrections on, which DOES initiate a sweep.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
<b>Remote Command:</b>	[ :SENSe] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 [ :STaTe] ON   OFF   1   0 [ :SENSe] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 [ :STaTe] ?
Example:	SENS:MPAD:CORR:CSET ON

## Input/Output

Dependencies:	<p>This menu selection does not have any effect unless Input/Output, More, RF Output &amp; Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state. This menu selection is hidden if the currently active measurement or mode does not support amplitude correction.</p> <p>Turning this on automatically turns on "Apply Corrections"</p> <p>Only the first correction array (Correction 1) supports antenna units. When this array is turned on, and it contains an Antenna Unit other than "None", the Y Axis Unit of the analyzer is forced to that Antenna Unit. All other Y Axis Unit choices are grayed out.</p> <p>Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.</p> <p>This command will generate an "Option not available" error unless you have the proper option installed in your instrument.</p>
Preset:	Not affected by a Preset. Set to OFF by <b>Restore Input/Output Defaults</b>
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.00

### Properties

Accesses a menu that lets you set the properties of the selected correction.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
Dependencies:	<p>This menu selection does not have any effect unless Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state. This menu selection is hidden if the currently active measurement or mode does not support amplitude correction.</p>
Initial S/W Revision:	A.10.00

### Select Correction

Specifies the selected correction. The term "selected correction" is used throughout this document to specify which correction will be affected by the functions.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
Notes:	The selected correction is remembered even when not in the correction menu
Dependencies:	This menu selection does not have any effect unless Input/Output, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state
Preset:	Set to Correction 1 by Restore Input/Output Defaults.

Readback:	Correction 1 Correction 2 Correction 3 Correction 4 Correction 5 Correction 6 Correction 7  Correction 9 Correction 9 Correction 10 Correction 11 Correction 12 Correction 13 Correction 14 Correction 15 Correction 16
Initial S/W Revision:	A.10.00

### Antenna Unit

For devices (like antennae) which make measurements of field strength or flux density, the correction array should contain within its values the appropriate conversion factors such that, when the data on the analyzer is presented in dB $\mu$ V, the display is calibrated in the appropriate units. The "Antenna Unit" used for the conversion is contained within the corrections array database. It may be specified by the user or loaded in from an external file or SCPI.

When an array with an Antenna Unit other than "None" is turned on, the Y Axis Unit of the analyzer is forced to that unit. When this array is turned on, and it contains an Antenna Unit other than "None", the Y Axis Unit of the analyzer is forced to that Antenna Unit., and all other Y Axis Unit choices are grayed out.

Antenna Unit does not appear in all Modes that support Corrections. Only the modes listed in the Mode row of the table below support Antenna Units.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
Mode:	SA
Remote Command:	[ :SENSE] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :ANTenna [ :UNIT] GAUSS   PTES1a   UVM   UAM   NOConversion  [ :SENSE] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :ANTenna [ :UNIT] ?
Example:	:MPAD:CORR:CSET:ANT GAUS
Dependencies:	Only the first correction array (Correction 1) supports antenna units.  Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated. Forceful message -250.3004
Preset:	Unaffected by Preset. Set to NOC by Restore Input/Output Defaults
State Saved:	Saved in State
Initial S/W Revision:	A.10.00

### dB $\mu$ V/m

Sets the antenna unit to dB $\mu$ V/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dB $\mu$ V/m and all other Y Axis Unit selections will be grayed out.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, Antenna Unit</b>
-----------	--

## Input/Output

Example:	:MPAD:CORR:CSET2:ANT UVM
Readback:	"dB $\mu$ V/m"
Initial S/W Revision:	A.10.00

### dB $\mu$ A/m

Sets the antenna unit to dB $\mu$ A/m. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dB $\mu$ A/m and all other Y Axis Unit selections will be grayed out.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, Antenna Unit</b>
Example:	:MPAD:CORR:CSET2:ANT UVA
Readback:	" dB $\mu$ A/m"
Initial S/W Revision:	A.10.00

### dBpT

Sets the antenna unit to dBpT. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBpT and all other Y Axis Unit selections will be grayed out.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, Antenna Unit</b>
Example:	:MPAD:CORR:CSET3:ANT PTES
Readback:	"dBpT"
Initial S/W Revision:	A.10.00

### dBG

Sets the antenna unit to dBG. If this correction is turned on, and Apply Corrections is on, the Y Axis Unit will then be forced to dBG and all other Y Axis Unit selections will be grayed out.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, Antenna Unit</b>
Example:	:MPAD:CORR:CSET:ANT GAUS
Readback:	" dBG"
Initial S/W Revision:	A.10.00

### None

Selects no antenna unit for this Correction set. Thus no Y Axis unit will be forced.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, Antenna Unit</b>
Example:	:MPAD:CORR:CSET4:ANT NOC

Readback:	"None"
Initial S/W Revision:	A.10.00

### Frequency Interpolation

This setting controls how the correction values per-bucket are calculated. We interpolate between frequencies in either the logarithmic or linear scale.

This setting is handled and stored individually per correction set.

See [“Interpolation” on page 325](#)

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
Remote Command:	[ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :X:SPACing LINear   LOGarithmic [ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :X:SPACing?
Example:	:MPAD:CORR:CSET:X:SPAC LIN
Dependencies:	This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state.
Preset:	Unaffected by a Preset. Set to Linear by Restore Input/Output Defaults.
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.00

### Interpolation

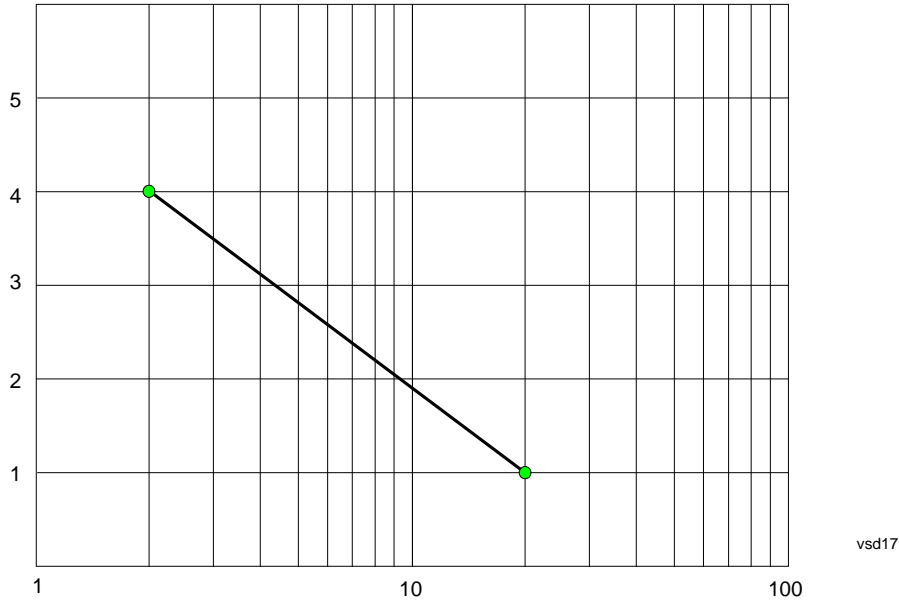
For each bucket processed by the application, all of the correction factors at the frequency of interest (center frequency of each bucket) are summed and added to the amplitude. All trace operations and post processing treat this post-summation value as the true signal to use.

To effect this correction, the goal, for any particular start and stop frequency, is to build a correction trace, whose number of points matches the current Sweep Points setting of the instrument, which will be used to apply corrections on a bucket by bucket basis to the data traces.

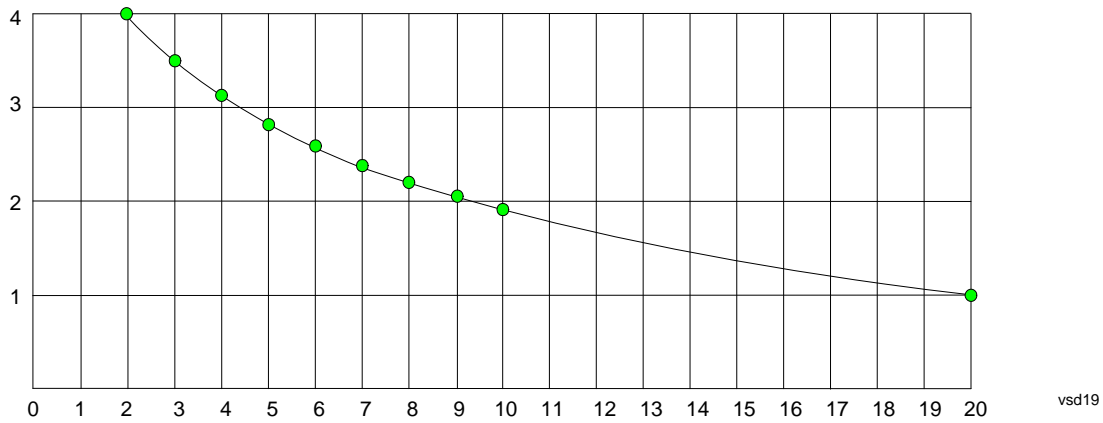
For amplitudes that lie between two user specified frequency points, we interpolate to determine the amplitude value. You may select either linear or logarithmic interpolation between the frequencies.

If we interpolate on a log scale, we assume that the line between the two points is a straight line on the log scale. For example, let's say the two points are (2,4) and (20,1). A straight line between them on a log scale looks like:

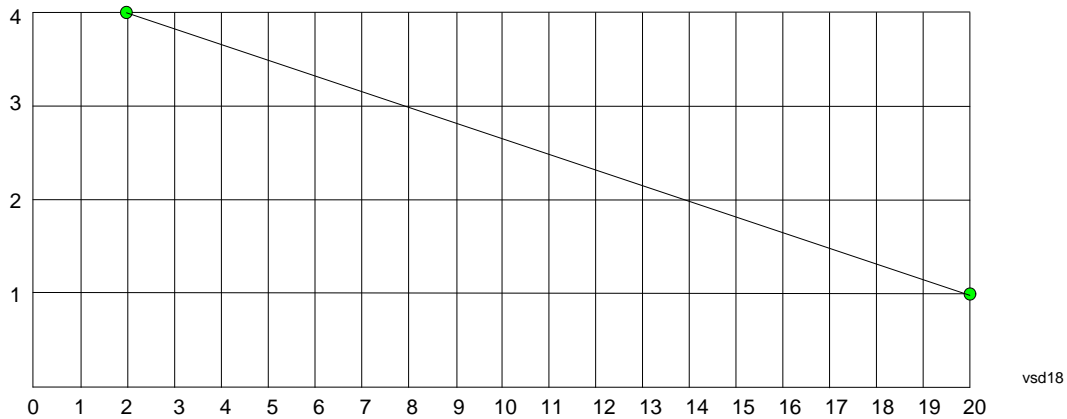
## Input/Output



On a linear scale (like that of the spectrum analyzer), this translates to:



On the other hand, if we interpolate on a linear scale, we assume that the two points are connected by a straight line on the linear scale, as below:



The correction to be used for each bucket is taken from the interpolated correction curve at the center of the bucket.

### Description

Sets an ASCII description field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16:DESCRiption "text" [ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16:DESCRiption?
Example:	:MPAD:CORR:CSET:DESC "11941A Antenna correction"
Notes:	45 chars max; may not fit on display if max chars used
Dependencies:	This menu selection does not have any effect unless Input/Output, More, RF Output & Test Set Config, Multiport Adapter, Multiport Adapter is set to the On state.
Preset:	Unaffected by a Preset. Set to empty by <b>Restore Input/Output Defaults</b>
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.00

### Comment

Sets an ASCII comment field which will be stored in an exported file. Can be displayed in the active function area by selecting as the active function, if desired to be in a screen dump.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16:COMMeNt "text" [ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16:COMMeNt?
Example:	:MPAD:CORR:CSET:COMM "this is a comment"
Notes:	45 chars max; may not fit on display if max chars used
Preset:	Unaffected by Preset. Set to empty by <b>Restore Input/Output Defaults</b>
State Saved:	Saved in instrument state
Initial S/W Revision:	A.10.00

## Input/Output

### RF Port

Maps one of the sets of corrections to one of the IO ports.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties</b>
Mode:	SEQAN
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT RFIO   RFIO1   RFIO2   RFIO3   RFIO4   RFIO5   RFIO6   RFIO7  [ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT?
Example:	:MPAD:CORR:CSET:RF:PORT RFIO0
Notes:	
Dependencies:	Only available in EXT
Couplings:	
Preset:	Unaffected by Preset. Set to RF by Restore Input/Output Defaults
State Saved:	Saved in State
Backwards Compatibility SCPI:	
Initial S/W Revision:	A.10.00

### RFIO0

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 0 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO0 SOURce   ANALyzer   BOTH  [ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO0?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO0 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0



**Correct Source**

Sets the corrections for the multiport adapter RFIO 0 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 0</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO0 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

**Correct Analyzer**

Sets the corrections for the multiport adapter RFIO 0 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 0</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO0 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

**Correct Source and Analyzer**

Sets the corrections for the multiport adapter RFIO 0 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 0</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO0 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

**RFIO1**

The port to which the current corrections will be applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 1 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSE ] :MPADapter: CORRection: CSET [ 1 ]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 : RF : PORT : RFIO1 SOURce   ANALyzer   BOTH [ :SENSE ] :MPADapter: CORRection: CSET [ 1 ]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 : RF : PORT : RFIO1?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO1 BOTH

## Input/Output

Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

### Correct Source

Sets the corrections for the multiport adapter RFIO 1 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 1</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO1 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

### Correct Analyzer

Sets the corrections for the multiport adapter RFIO 1 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 1</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO1 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 1 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 1</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO1 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

### RFIO2

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 2 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port</b>
-----------	---

<b>Remote Command:</b>	[ :SENSE] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO2 SOURce   ANALyzer   BOTH  [ :SENSe] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO2?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO2 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

**Correct Source**

Sets the corrections for the multiport adapter RFIO 2 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 2</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO2 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

**Correct Analyzer**

Sets the corrections for the multiport adapter RFIO 2 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 2</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO2 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

**Correct Source and Analyzer**

Sets the corrections for the multiport adapter RFIO 2 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 2</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO2 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

## Input/Output

### RFIO3

The port to which the current corrections will be applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 3 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port</b>
Remote Command:	[ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO3 SOURce   ANALyzer   BOTH [ :SENSe ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO3?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO3 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

### Correct Source

Sets the corrections for the multiport adapter RFIO 3 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 3</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO3 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

### Correct Analyzer

Sets the corrections for the multiport adapter RFIO 3 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 3</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO3 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 3 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 3</b>
-----------	---

Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO3 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

**RFIO4**

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multipoint adapter RF path the corrections for multipoint adapter RFIO 4 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multipoint Adapter, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSE ] :MPADapter:CORREction:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO4 SOURce   ANALyzer   BOTH [ :SENSE ] :MPADapter:CORREction:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO4?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO4 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

**Correct Source**

Sets the corrections for the multipoint adapter RFIO 4 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multipoint Adapter, Corrections, Properties, RF Port, RFIO 4</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO4 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

**Correct Analyzer**

Sets the corrections for the multipoint adapter RFIO 4 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multipoint Adapter, Corrections, Properties, RF Port, RFIO 4</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO4 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

## Input/Output

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 4 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 4</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO4 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

### RFIO5

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 5 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [ 1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO5 SOURce   ANALyzer   BOTH [ :SENSe ] :MPADapter:CORRection:CSET [ 1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO5?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO5 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

### Correct Source

Sets the corrections for the multiport adapter RFIO 5 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 5</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO5 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

### Correct Analyzer

Sets the corrections for the multiport adapter RFIO 5 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 5</b>
-----------	---

Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO5 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 5 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 5</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO5 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

### RFIO6

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 6 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, Page 2</b>
<b>Remote Command:</b>	[ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO6 SOURce   ANALyzer   BOTH  [ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO6?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO6 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

### Correct Source

Sets the corrections for the multiport adapter RFIO 6 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 6</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO6 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

## Input/Output

### Correct Analyzer

Sets the corrections for the multiport adapter RFIO 6 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 6</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO6 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 6 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 6</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO6 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

### RFIO7

The port to which the current corrections are applied. Pressing this key again allows the user access to the menu for specifying to which internal device and multiport adapter RF path the corrections for multiport adapter RFIO 7 are applied.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, Page 2</b>
<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET[1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO7 SOURce   ANALyzer   BOTH [ :SENSe ] :MPADapter:CORRection:CSET[1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :RF:PORT:RFIO7?
Example:	:MPAD:CORR:CSET:RF:PORT:RFIO7 BOTH
Preset:	Both
State Saved:	Saved in State
Initial S/W Revision:	A.10.0

### Correct Source

Sets the corrections for the multiport adapter RFIO 7 port to be applied to the source.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 7</b>
-----------	---



Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO7 SOUR
Readback:	"Correct Source"
Initial S/W Revision:	A.10.0

### Correct Analyzer

Sets the corrections for the multiport adapter RFIO 7 port to be applied to the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 7</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO7 ANAL
Readback:	"Correct Analyzer"
Initial S/W Revision:	A.10.0

### Correct Source and Analyzer

Sets the corrections for the multiport adapter RFIO 7 port to be applied to both the source and the analyzer.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Properties, RF Port, RFIO 7</b>
Example:	:MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:RF:PORT:RFIO7 BOTH
Readback:	"Correct Source and Analyzer"
Initial S/W Revision:	A.10.0

### Table Editor

#### Edit

Invokes the integrated editing facility for this correction set. See description in section [“Table Editor” on page 337](#).

When entering the menu, the editor window turns on, the selected correction is turned **On**, **Apply Corrections** is set to **On**, the amplitude scale is set to **Log**, and the Amplitude Correction (“Ampcor”) trace is displayed. The actual, interpolated correction trace is shown in green for the selected correction. Note that since the actual interpolated correction is shown, the correction trace may have some curvature to it. This trace represents only the correction currently being edited, rather than the total, accumulated amplitude correction for all amplitude corrections which are currently on, although the total, accumulated correction for all corrections which are turned on is still applied to the data traces.

Because corrections data is always in dB, but the Y-axis of the analyzer is in absolute units, it is necessary to establish a reference line for display of the Corrections data. The reference line is halfway up the display and represents 0 dB of correction. It is labeled “0 dB CORREC”. It is drawn in blue. (0,0,255) and is three pixels high. The green correction trace is drawn after all other traces and this reference blue line, so it sits “on top” of them.

Corrections data is always in dB. Whatever dB value appears in the correction table represents the correction to be applied to that trace at that frequency. So if a table entry shows 30 dB that means we ADD 30 dB to each trace to

## Input/Output

correct it before displaying it. By definition all points are connected. If a gap is desired for corrections data, enter 0 dB.

Note that a well-designed Corrections array should start at 0 dB and end at 0 dB. This is because whatever the high end point is will be extended to the top frequency of the instrument, and whatever the low end point is will be extended down to 0 Hz. So for a Corrections array to have no effect outside its range, you should start and end the array at 0 dB.

---

**NOTE** The table editor will only operate properly if the analyzer is sweeping, because its updates are tied to the sweep system. Thus, you should not try to use the editor in single sweep, and it will be sluggish during compute-intensive operations like narrow-span FFT sweeps.

---

When exiting the edit menu (by using the **Return** key or by pressing an instrument front-panel key), the editor window turns off and the Ampcor trace is no longer displayed; however, **Apply Corrections** remains **On**, any correction that was on while in the editor remains on, and the amplitude scale returns to its previous setting.

Corrections arrays are not affected by a Preset, because they are in the Input/Output system. They also survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.

When editing a correction, the editor remembers which correction and which element in the correction array you were editing, and returns you to that correction and that element when you return to the editor after leaving it.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
Initial S/W Revision:	A.10.00

### Navigate

Lets you move through the table to edit the desired point.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Notes:	There is no value readback on the key
Min:	1
Max:	2000
Initial S/W Revision:	A.10.00

### Frequency

Lets you edit the frequency of the current row.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Notes:	There is no value readback on the key.
Min:	0
Max:	1 THz

Initial S/W Revision:	A.10.00
-----------------------	---------

**Amplitude**

Lets you edit the Amplitude of the current row.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Notes:	There is no value readback on the key.
Min:	-1000 dB
Max:	1000 dB
Initial S/W Revision:	A.10.00

**Insert Point Below**

Inserts a point below the current point. The new point is a copy of the current point and becomes the current point. The new point is not yet entered into the underlying table, and the data in the row is displayed in light gray.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Initial S/W Revision:	A.10.00

**Delete Point**

Deletes the currently-selected point, whether or not that point is being edited, and selects the Navigate functionality. The point following the currently-selected point (or the point preceding if there is none) will be selected.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Initial S/W Revision:	A.10.00

**Scale X Axis**

Matches the X Axis to the selected Correction, as well as possible. Sets the Start and Stop Frequency to contain the minimum and maximum Frequency of the selected Correction. The range between Start Frequency and Stop Frequency is 12.5% above the range between the minimum and maximum Frequency, so that span exceeds this range by one graticule division on either side. If in zero-span, or there is no data in the Ampcor table, or the frequency range represented by the table is zero, no action is taken. Standard clipping rules apply if the value in the table is outside the allowable range for the X axis.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections, Edit</b>
Dependencies:	If either the first or last point in the array is outside the frequency range of the current input, an error message is generated:  “-221. Settings conflict; Start or Stop Freq out of range for current input settings”

## Input/Output

Initial S/W Revision:	A.10.00
-----------------------	---------

### Delete Correction

Deletes the correction values for this set. When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete correction. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
Remote Command:	[ :SENSe ] :MPADapter:CORRection:CSET [1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :DELete
Example:	MPAD:CORR:CSET:DEL MPAD:CORR:CSET1:DEL MPAD:CORR:CSET4:DEL
Notes:	Pressing this key when no corrections are present is accepted without error.
Initial S/W Revision:	A.10.00

### Correction On/Off

#### Apply Corrections

Applies amplitude corrections which are marked as ON to the measured data. If this is set to OFF, then no amplitude correction sets will be used, regardless of their individual on/off settings. If set to ON, the corrections that are marked as ON (see “[Correction On/Off](#)” on page 321) are used.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
Remote Command:	[ :SENSe ] :MPADapter:CORRection:CSET:ALL [ :STATe ] ON   OFF   1   0  [ :SENSe ] :MPADapter:CORRection:CSET:ALL [ :STATe ] ?
Example:	SENS:MPAD:CORR:CSET:ALL OFF  This command makes sure that no amplitude corrections are applied, regardless of their individual on/off settings.
Preset:	Not affected by Preset. Set to OFF by Restore Input/Output Defaults
State Saved:	Saved in instrument state.
Initial S/W Revision:	A.10.00

#### Delete All Corrections

Erases all correction values for all 16 Amplitude Correction sets.

When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete all

corrections. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter.

Key Path:	<b>Input/Output, RF Output &amp; Test Set Config, Multiport Adapter, Corrections</b>
<b>Remote Command:</b>	[ :SENSE ] :MPADapter:CORRection:CSET:ALL:DELeTe
Example:	MPAD:CORR:CSET:ALL:DEL
Initial S/W Revision:	A.10.00

### Set (Replace) Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas.

The values sent in the command will totally replace all existing correction points in the specified set.

An Ampcor array can contain 2000 points maximum.

<b>Remote Command:</b>	[ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :DATA <freq>, <ampl>, . . . [ :SENSE ] :MPADapter:CORRection:CSET [1]   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :DATA?
Example:	MPAD:CORR:CSET[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA 10000000,-1.0,20000000,1.0  This defines two correction points at (10 MHz, -1.0 dB) and (20 MHz, 1.0 dB) for correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives a shutdown or restart of analyzer application (including a power cycle).
State Saved:	Saved in instrument state.
Min:	Freq: 0 Hz Amptd: -1000 dBm
Max:	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision:	A.10.00

### Merge Correction Data (Remote Command Only)

The command takes an ASCII series of alternating frequency and amplitude points, each value separated by commas. The difference between this command and Set Data is that this merges new correction points into an existing set.

Any new point with the same frequency as an existing correction point will replace the existing point's amplitude with that of the new point.

## Input/Output

An Ampcor array can contain 2000 total points, maximum.

<b>Remote Command:</b>	[ :SENSe ] :MPADapter:CORRection:CSET [1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16 :DATA:MERGe <freq>, <ampl>, ...
Example:	MPAD:CORR:CSET[1]2 3 4 5 6 7 8 9 10 11 12 13 14 15 16:DATA:MERGE 15000000,-5.0,25000000,5.0  This adds two correction points at (15 MHz, -5.0 dB) and (25 MHz, 5.0 dB) to whatever values already exist in correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives shutdown/restart of analyzer application (including power cycle)
Min:	Freq: 0 Hz Amptd: -1000 dBm
Max:	Freq: 1 THz Amptd: +1000 dBm
Initial S/W Revision:	A.10.00

## Output Config

Accesses keys that configure various output settings, like the frequency reference output, trigger output and analog output.

<b>Key Path:</b>	<b>Input/Output</b>
Backwards Compatibility Notes:	1. In ESA there was not a user interface to enable the Video Output (Analog Output), Trigger Output, or Gate Output. In the X-Series each of these physical connectors requires configuration, thus the user interface has been added for X-Series, along with the potential for an output you think is always on to be switched off.
Initial S/W Revision:	Prior to A.02.00

## Trig Out (1 and 2)

Select the type of output signal that will be output from the rear panel Trig 1 Out or Trig 2 Out connectors.

<b>Key Path:</b>	<b>Input/Output, Output Config</b>
<b>Remote Command:</b>	:TRIGger   TRIGger1   TRIGger2 [ :SEquence ] :OUTPut HSWP   MEASuring   MAIN   GATE   GTRigger   OEVEN   SPOint   SSweep   SETtled   S1Marker   S2Marker   S3Marker   S4Marker   OFF  :TRIGger   TRIGger1   TRIGger2 [ :SEquence ] :OUTPut?
Example:	TRIG:OUTP HSWP  TRIG2:OUTP GATE

Dependencies:	The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger 2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF.
Dependencies:	SSWeep SSETtled S1Marker S2Marker S3Marker S4Marker are only available for the source in the EXT.
Preset:	Trigger 1: Sweeping (HSWP) Trigger 2: Gate  This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

**Off**

Selects no signal to be output to the Trig 1 Out or Trig 2 Out connector.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP OFF
Readback:	Off
Initial S/W Revision:	Prior to A.02.00

**Polarity**

Sets the output to the Trig 1 Out or Trig 2 Out connector to trigger on either the positive or negative polarity.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
<b>Remote Command:</b>	:TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut:POLarity POSitive NEGative  :TRIGger TRIGger1 TRIGger2[:SEQuence]:OUTPut:POLarity?
Example:	TRIG1:OUTP:POL POS
Preset:	This is unaffected by a Preset but is set to POSitive on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

## Input/Output

### Sweeping (HSWP)

Selects the Sweeping Trigger signal to be output to the Trig 1 Out or Trig 2 Out connector when a measurement is made. This signal has historically been known as "HSWP" (High = Sweeping), and is 5 V TTL level with 50 ohm output impedance."

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP HSWP
Readback:	Sweeping
Initial S/W Revision:	Prior to A.02.00

### Measuring

Selects the Measuring trigger signal to be output to the Trig 1 Out or Trig 2 Out connector. This signal is true while the Measuring status bit is true.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP MEAS
Readback:	Measuring
Initial S/W Revision:	Prior to A.02.00

### Main Trigger

Selects the current instrument trigger signal to be output to the Trig 1 Out or Trig 2 Out connector.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP MAIN
Readback:	Main Trigger
Initial S/W Revision:	Prior to A.02.00

### Gate Trigger

Selects the gate trigger signal to be output to the Trig 1 Out or Trig 2 Out connector. This is the source of the gate timing, not the actual gate signal.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP GTR
Readback:	Gate Trigger
Initial S/W Revision:	Prior to A.02.00

### Gate

Selects the gate signal to be output to the Trig 1 Out or Trig 2 Out connector. The gate signal has been delayed and its length determined by delay and length settings. When the polarity is positive, a high on



the Trig 1 Out or Trig 2 Out represents the time the gate is configured to pass the signal.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP GATE
Readback:	Gate
Initial S/W Revision:	Prior to A.02.00

### Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 Out or Trig 2 Out connector when performing swept spectrum analysis. When the polarity is positive, this output goes high during the time the test set is sweeping past the first point (Point 0) and every other following trace point. The opposite is true if the polarity is negative.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP OEV
Readback:	Odd/Even
Initial S/W Revision:	Prior to A.02.00

### Source Point Trigger

Selects the gate signal to be output to the Trig 1 Out or Trig 2 Out connector for use as the Point Trigger when operating an external source in Tracking mode. When Ext Trigger 1 is selected as the Point Trigger under Source, the Source Point Trigger under Trig1 Out automatically gets selected. Similarly, when Ext Trigger 2 is selected as the Point Trigger under Source, the Source Point Trigger key under Trig2 Out automatically gets selected

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	TRIG1:OUTP SPO
Readback:	Source Point
Initial S/W Revision:	Prior to A.02.00

### Source Marker 1

This key is only available in the EXT.

Trigger output at marker 1 in current playing Waveform file.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	:TRIG1:OUTP S1M
ReadBack:	Marker 1
Initial S/W Revision:	A.05.01

## Input/Output

### Source Marker 2

This key is only available in the EXT.

Trigger output at marker 2 in current playing Waveform file.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	:TRIG1:OUTP S2M
ReadBack:	Marker 2
Initial S/W Revision:	A.05.01

### Source Marker 3

This key is only available in the EXT.

Trigger output at marker 3 in current playing Waveform file.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	:TRIG1:OUTP S3M
ReadBack:	Marker 3
Initial S/W Revision:	A.05.01

### Source Marker 4

This key is only available in the EXT.

Trigger output at marker 4 in current playing Waveform file.

Key Path:	<b>Input/Output, Output Config, Trig 1/2 Output</b>
Example:	:TRIG1:OUTP S4M
ReadBack:	Marker 4
Initial S/W Revision:	A.05.01

### Analog Out

This menu lets you control which signal is fed to the “Analog Out” connector on the test set rear panel.

See [“More Information” on page 347](#)

Key Path:	<b>Input/Output, Output Config</b>
<b>Remote Command:</b>	:OUTPut:ANALog OFF SVIDeo LOGVideo LINVideo DAUDio :OUTPut:ANALog?
Example:	OUTP:ANAL SVIDeo ! causes the analog output type to be Screen Video
Preset:	OFF

Preset:	This is unaffected by Preset but is set to DAUDio on a "Restore Input/Output Defaults" or "Restore System Defaults->All
State Saved:	Saved in Input/Output State
Readback line:	1-of-N selection [variable]
Backwards Compatibility Notes:	<p>Prior to A.04.00, OFF was the default functionality except when in the Analog Demod application or with Tune and Listen, in which case it was DAUDio, and there was no selection menu. So for backwards compatibility with earlier X-Series firmware versions, Auto (:OUTP:ANAL:AUTO ON) will duplicate the prior behavior.</p> <p>The DNWB and SANalyzer parameters, which were legal in PSA but perform no function in the X-Series, are accepted without error.</p>
Initial S/W Revision:	A.04.00

### More Information

The table below gives the range for each output.

Analog Out	Nominal Range exc. (10% overrange)	Scale Factor	Notes
Off	0 V		
Screen Video	0 – 1 V open circuit	10%/division	8566 compatible
Log Video	0 – 1 V terminated	1/(192.66 dB/V)	dB referenced to mixer level, 1V out for –10 dBm at the mixer.
Linear Video	0 – 1 V terminated	100%/V	Linear referenced to Ref Level, 1 V out for RF envelope at the Ref Level.
Demod Audio	(varies with test set setting)		

### Auto

Selects the Auto state for the Analog Output menu. In this state, the Analog Output will automatically be set to the most sensible setting for the current mode or measurement.

If you make a selection manually from the Analog Out menu, this selection will remain in force until you change it (or re-select Auto), even if you go to a mode or measurement for which the selected output does not apply.

Key Path:	<b>Input/Output, Output Config, Analog Out</b>
Remote Command:	:OUTPut :ANALog:AUTO OFF ON 0 1 :OUTPut :ANALog:AUTO?
Example:	OUTP:ANAL:AUTO ON
Preset:	ON
State Saved:	Saved in Input/Output State

## Input/Output

Initial S/W Revision:	A.04.00
-----------------------	---------

### Off

Turns off the analog output.

Key Path:	<b>Input/Output, Output Config, Analog Out</b>
Example:	OUTP:ANAL OFF ! causes the analog output to be off
Readback Text:	Off
Initial S/W Revision:	A.04.00

### Log Video (RF Envelope, Ref=Mixer Level)

Selects the analog output to be the log of the video signal. In this mode, the pre-detector data is output to the Analog Out connector with a Log scaling. The output is referenced to the current level at the mixer, does not depend on display settings like Reference Level or dB per division, and it is not influenced by the selected detector or any digital flatness corrections or trace post-processing (like Trace Averaging), but does change with input attenuation.

The output is designed so that full scale (1 V) corresponds to  $-10$  dBm at the mixer. The full range (0–1 V) covers 192.66 dB ; thus, 0 V corresponds to  $-202.66$  dBm at the mixer.

Key Path:	<b>Input/Output, Output Config, Analog Out</b>
Example:	OUTP:ANAL LOGV
Dependencies:	<p>Because the Log Video output uses one of the two IF processing channels, only one detector is available while Screen Video is selected. All active traces will change to use the same detector as the selected trace when Log Video is activated.</p> <p>Log Video output is not available while any EMI Detector is selected (Quasi Peak, RMS Average or EMI Average), because these detectors use both IF processing channels. Consequently, if the user chooses an EMI Detector, there will be no Log Video output.</p> <p>The output holds at its last value during an alignment, during a marker count, and during retrace (after a sweep and before the next sweep starts).</p> <p>This function depends on optional capability. The key will be blanked and the command will generate an “Option not available” error unless you have Option YAV licensed in your instrument.</p>
Couplings:	Log Video output changes while in FFT Sweeps, so for measurements that use exclusively FFT Sweeps, or if the user manually chooses FFT Sweeps, the Log Video output will look different than it does in swept mode.
Readback Text:	Log Video
Initial S/W Revision:	A.04.00

**Linear Video (RF Envelope, Ref=Ref Level)**

Selects the analog output to be the envelope signal on a linear (voltage) scale. In this mode, the pre-detector data is output to the Analog Out connector with a Linear scaling. The output is based on the current Reference Level, and is not influenced by the selected detector or any digital flatness corrections or trace post-processing (like Trace Averaging).

The scaling is set so that 1 V output occurs with an instantaneous video level equal to the reference level, and 0 V occurs at the bottom of the graticule. This scaling gives you the ability to control the gain without having another setup control for the key. But it requires you to control the look of the display (the reference level) in order to control the analog output.

This mode is ideal for looking at Amplitude Modulated signals, as the linear envelope effectively demodulates the signal.

Key Path:	<b>Input/Output, Output Config, Analog Out</b>
Example:	OUTP:ANAL LINV
Dependencies:	<p>Because the Linear Video output uses one of the two IF processing channels, only one detector is available while Linear Video is selected. All active traces will change to use the same detector as the selected trace when Log Video is activated.</p> <p>Linear Video output is not available while any EMI Detector is selected (Quasi Peak, RMS Average or EMI Average), because these detectors use both IF processing channels. Consequently, if the user chooses an EMI Detector, there will be no Linear Video output.</p> <p>The output holds at its last value during an alignment and during a marker count and during retrace (after a sweep and before the next sweep starts).</p> <p>This function depends on optional capability; the key will be blanked and the command will generate an “Option not available” error unless you have Option YAV licensed in your instrument.</p>
Couplings:	Linear Video output changes while in FFT Sweeps, so for measurements that use exclusively FFT Sweeps, or if the user manually chooses FFT Sweeps, the Linear Video output will look different than it does in swept mode.
Readback Text:	Linear Video
Initial S/W Revision:	A.04.00

**Demod Audio**

Selects the analog output to be the demodulation of the video signal.

When Demod Audio is selected, the demodulated audio signal appears at this output whenever the Analog Demod application is demodulating a signal.

When Analog Out is in the Auto state, this output is auto-selected when in the Analog Demod mode.

If any other Analog Output is manually selected when in the Analog Demod mode, a condition warning

## Input/Output

message appears.

Key Path:	<b>Input/Output, Output Config, Analog Out</b>
Example:	OUTP:ANAL DAUD
Dependencies:	<p>This key only appears if the Analog Demod application (N9063A), the N6141A or W6141A application, or Option EMC is installed and licensed, otherwise the key will be blanked and the command will generate an “Option not available” error.</p> <p>The output holds at its last value during an alignment and during a marker count. It is not held between sweeps, in order for Tune and Listen to work properly.</p> <p>When Demod Audio is the selected Analog Output:</p> <ul style="list-style-type: none"><li>• all active traces are forced to use the same detector.</li><li>• CISPR detectors (QPD, EMI Avg, RMS Avg) are unavailable</li></ul>
Readback Text:	Demod Audio
Initial S/W Revision:	Prior to A.02.00 (this was the default functionality, and there was no selection)
Modified at S/W Revision:	A.04.00

## Digital Bus

This menu allows you to configure the LVDS connector located on the rear panel of the instrument. It is a unidirectional link of real time data at a 90 MSa/s rate. The ADC is sampling a 22.5 MHz IF.

The data that appears on this port is raw, uncorrected ADC samples, unless you have option RTL. With option RTL, you get fully corrected I/Q data.

This connector will only be active when the Narrowband IF Path is currently in use.

Key Path:	<b>Input/Output, Output Config, Digital Out</b>
Initial S/W Revision:	A.04.00

## Marker

Accesses the Marker menu. A marker can be placed on a trace to allow the value of the trace at the marker point to be determined precisely. The functions in this menu include a 1-of-N selection of the control mode Normal, Delta, Fixed, or Off for the selected marker.

If the selected marker is Off, pressing Marker sets it to the selected window. If the metrics window is selected, the marker will appear in the first visible window (RF Spectrum if Quad View is selected).

The units of Delta Marker are window dependent. In the Spectrum windows they are dB, in the Demod Waveform window they are the same as the Y-Axis Unit. In this window delta marker is a linear difference rather than a ratio. For example, in FM, in the Demod Waveform window, the units of delta marker are Hz.

### Control Mode

Key Path	Front-panel key
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE POSITION DELTA FIXed OFF :CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE?
Example	CALC:AM:MARK:MODE POS turns on marker 1 in Normal mode
Remote Command Notes	This command (not the query) causes the specified marker to become selected.
Preset	OFF (all markers)
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays a menu with 12 markers available for selection for the current measurement.

Key Path	Marker
Preset	Marker 1
State Saved	The number of the selected marker is saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Normal

Sets the control mode for the selected marker to Normal and turns on the active function for setting its value. If the selected marker was off, it is placed at the center of the screen on the trace specified by the marker's Trace attribute.

A Normal mode (POSITION type) marker can be moved to any point on the X Axis by specifying its X

## Marker

Axis value. Its absolute Y Axis value is then the value of the trace point at that X Axis value.

Key Path	Marker
Example	: CALC: MARK: MODE POS sets Marker 1 to Normal.
Remote Command Notes	See the description under the “ <a href="#">Marker</a> ” on page 351 key.
Couplings	The marker addressed by this command becomes the selected marker on the front panel.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X Axis value are saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Delta

Sets the control mode for the selected marker to Delta and turns on the active function for setting its delta value. If the selected marker is off, the marker is placed at the center of the screen on the trace specified by the marker’s Trace attribute.

In Delta mode the marker result shows the relative result between the selected (Delta) marker and its reference marker. A delta marker can be moved to any point on the X Axis by specifying its X Axis offset from a reference marker. Its absolute Y Axis value is then the value of the trace point at that X Axis value.

Key Path	Marker
Example	CALC:MARK:MODE DELT sets marker 1 to Delta.
Remote Command Notes	See the description under the “ <a href="#">Marker</a> ” on page 351 key.
Couplings	Coupled to fix absolute X when turned On.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) and X Axis value are saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Fixed

Sets the control mode for the selected marker to Fixed. A fixed marker is fixed in the sense that it stays where you place it. It can be directly moved in both X and Y. It can be moved with a Peak Search. It can also be indirectly moved by re-zeroing the delta if it is a relative marker. If it is moved, it again becomes fixed at the X Axis point it moved to and it has a Y-axis result that it took on when it moved there. If a Normal or Delta marker is changed to Fixed it becomes fixed at the X Axis point it was at, and with the Y-axis result it had when it was set to Fixed.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00



## Marker X

Sets and queries a marker's X value.

Key Path	Marker, Fixed
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : X <time>   <freq>  :CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : X?
Remote Command Notes	The query is returned in the fundamental units for the current marker X Axis scale. This command (not the query) causes the specified marker to become selected.
Preset	After a preset, all Markers are turned off, so a Marker X Axis Value query will return not a number (9.91 e37). When a Marker is on, the default value of the Marker X value is the center of the appropriate window.
Min	-9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

## Marker Y

Sets and queries a marker's Y axis value.

Key Path	Marker, Fixed
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : Y <real>  :CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : Y?
Remote Command Notes	The query is returned in the fundamental units for the current marker Y Axis scale. This command (not the query) causes the specified marker to become selected.
Preset	Defaults to the measurement result at the default X value, or not a number (9.91 e37) if off or if off screen is Fixed.
Min	-9.9E+37
Max	9.9E+37
Initial S/W Revision	Prior to A.02.00

## Marker

### Off

Turns off the selected marker. Turning the marker off does not affect which marker is selected.

Key Path	<b>Marker</b>
Example	: CALC: MARK: MODE OFF sets Marker 1 to Off.
Remote Command Notes	See the description under the “ <a href="#">Marker</a> ” on page 351 key.
State Saved	The marker control mode (Normal, Delta, Fixed, Off) is saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Properties

Accesses a menu used to assign properties to the selected marker.

Key Path	<b>Marker</b>
Initial S/W Revision	Prior to A.02.00

### Select Marker

Displays a menu with 12 markers available for selection for the current measurement.

Key Path	<b>Marker, Properties</b>
Notes	The selected marker is remembered even when not in the Marker menu and is used if a Search is initiated.
Preset	Marker 1
State Saved	The number of the selected marker is saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Relative To

Selects the reference marker for a marker in Delta mode.

If a delta marker has a reference marker in a different window, the delta marker’s mode changes to POS (for example, it becomes a normal marker).

Key Path	<b>Marker, Properties</b>
<b>Remote Command</b>	: CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : REFerence <int>  : CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : REFerence?
Example	CALC:AM:MARK1:REF 2 sets the marker 1 reference marker to 2 and turns marker 1 on as a delta marker.

Remote Command Notes	This command (not the query) causes the specified marker to become selected.
Preset	By default, marker X is relative to marker X + 1 except for marker 12, which is relative to marker 1.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

**AM/FM/PM Marker Trace**

Selects the trace on which to place the marker. A marker is associated with one and only one trace. This trace is used to determine the placement, result, and X Axis Scale of the marker. All markers have an associated trace, even **Fixed** markers. It is from that trace that they determine their attributes and behaviors, and it is to that trace that they go when they become Normal or Delta markers.

In the Analog Demod mode FM/AM/PM measurements, there are five named traces. The RF Spectrum trace is the trace in the RF Spectrum window, and the AF Spectrum trace is the trace in the AF Spectrum window. There are four traces in the Demod Waveform window: Demod, Demod Avg, Demod Max, and Demod Min.

When Auto Init is on, the marker’s trace attribute is re-determined automatically by the test set whenever the marker turns on (Normal, Delta, or Fixed) from an off state. The marker goes to the trace in the window that has the focus, or onto the RF spectrum window if the Metrics window has the focus. If in the Demod Waveform window, it goes to the Demod trace.

This command associates the marker with the specified trace. Setting the Marker Trace directly (whether the marker is on or off) will turn off Auto Init.

If the marker is not **off**, it moves the marker from the trace it was on to the new trace. If the new trace is in the same window, the marker goes to the same data point on the new trace. If the marker changes windows, it retains its relative horizontal positions in the new window. If it is a fixed marker, it will retain both relative horizontal and vertical position.

If the marker is **off** it stays off, but is now associated with the specified trace.

The query returns the name of the trace on which the marker is currently placed.

Key Path	Marker, Properties
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : TRACe RFSPectrum AFSPectrum DEMod DAverage DMaximum DMINimum :CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : TRACe?
Example	:CALC:AM:MARK1:TRAC DEM places marker 1 on the Demod trace

## Marker

Couplings	This is not affected by Auto Coupling. Sending the remote command causes the addressed marker to become selected. If ever a delta marker has a reference marker in a different window, the delta marker's mode changes to POS (for example, it becomes a normal marker). When Marker Trace Auto Init State is on, the marker trace will automatically be set whenever the marker is turned on.
Preset	RF Spectrum on a Preset or All Markers Off
State Saved	The Marker Trace for each marker is saved in instrument state.
Readback line	[Trace name, Auto Init] or [Trace Name, Manual]
Initial S/W Revision	Prior to A.02.00

### RF Spectrum

Selects the input RF signal in the RF Spectrum window as the trace on which you want to place your marker. This trace is used to determine the placement, result, and X Axis Scale of the marker.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC RFSP
Initial S/W Revision	Prior to A.02.00

### Demod

Selects the current demodulated signal in the Demod Waveform window, shown in yellow, as the trace on which you want to place your marker. This trace is used to determine the placement, result, and X Axis Scale of the marker.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC DEM
Initial S/W Revision	Prior to A.02.00

### Demod Average

Selects the averaged demodulation signal in the Demod Waveform window, shown in green, as the trace on which you want to place your marker. This trace is used to determine the placement, result, and X Axis Scale of the marker.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC DAV
Initial S/W Revision	Prior to A.02.00

### Demod Max

Selects the Demod Max trace in the Demod Waveform window, shown in cyan, as the trace on which you want to place your marker. This trace shows the maximum hold value for each data point since the last restart.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC DMAX
Initial S/W Revision	Prior to A.02.00

### Demod Min

Selects the Demod Min trace in the Demod Waveform window, shown in magenta, as the trace on which you want to place your marker. This trace shows the minimum hold value for each data point since the last restart.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC DMIN
Initial S/W Revision	Prior to A.02.00

### AF Spectrum

Selects the demodulated signal in the AF Spectrum window as the trace on which you want to place your marker.

Key Path	<b>Marker, Properties, Marker Trace</b>
Example	:CALC:AM:MARK1:TRAC AFSP
Initial S/W Revision	Prior to A.02.00

### Trace Auto Init

Selects whether the marker trace is automatically reset to the selected window when the marker is turned on or not.

Key Path	<b>Marker, Properties, Trace</b>
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : TRACe:AUTO OFF ON 0 1  :CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : TRACe:AUTO?
Example	:CALC:AM:MARK1:TRAC:AUTO 0 turns off auto-initialization of marker trace.
Preset	On
State Saved	Saved in instrument state.

## Marker

Readback line	Trace name
Initial S/W Revision	Prior to A.02.00

## Lines

When on, displays a vertical line of graticule height and a horizontal line of graticule width, intersecting at the indicator point of the marker (that is, the center of the X or the bottom tip of the diamond). The lines are blue in color.

If the marker is off screen, the lines should be extended from the marker so that they go through the screen area if possible. This is really useful for off screen Fixed markers as it lets you see their amplitude even though they are off the X Axis.

Key Path	Marker, Properties
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : LINes [:STATe] OFF ON 0 1  :CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : LINes [:STATe] ?
Example	CALC:AM:MARK2:LIN ON turns Lines on for marker 2.
Couplings	Sending the remote command causes the addressed marker to become selected.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer:AOFF
Example	CALC:AM:MARK:AOFF turns off all markers for the AM measurement
Couplings	Sets the selected marker to 1.
Initial S/W Revision	Prior to A.02.00

---

## Marker Function

There are no menus under this key in the Analog Demod mode.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Marker Function



---

## Marker To

Accesses a menu that contains only the marker center frequency key.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### Mkr->CF

Sets the center frequency of the RF Spectrum window to the frequency of the selected marker. The marker stays at this frequency, so it moves to the center of the display.

In delta marker mode, this function sets the center frequency to the x-axis value of the delta marker.

Key Path	<b>Marker -&gt;</b>
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12[:SET]:CENTer
Example	CALC:AM:MARK2:CENT sets the CF of the test set to the value of marker 2.
Remote Command Notes	Sending this command selects the sub-op coded marker. If the currently selected marker is not on when this key is pressed, it will be turned on at the center of the RF Spectrum trace as a normal type marker.
Dependencies	This function is unavailable (key is grayed out) unless the selected marker's trace is off, or on the RF Spectrum trace.
Couplings	All the usual couplings associated with setting Center Frequency apply (see <a href="#">"Center Frequency" on page 279</a> ).
Initial S/W Revision	Prior to A.02.00

Marker To

---

## Meas

Accesses a menu that contains three measurements: AM, FM, PM (Phase Modulation).

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

Meas

---

## Meas Setup

### Overview

This section describes the measurement setup features of the Analog Demod measurements.

### Set Parameters

The following parameters are set as indicated, are not settable by the user and therefore do not appear in any menus:

FFT IF Gain	Low (0 dB)
ADC Dither	On
Avg Mode	Exponential
Phase Noise Optimization	Auto

### Auto Rules for Phase Noise Optimization:

Use “Optimize for  $f < 20$  kHz” when the Channel BW  $< 120$  kHz, otherwise use “Optimize for  $f > 30$  kHz”.

[“Optimizing Measurement Speed” on page 365](#)

[“Channel Bandwidth” on page 365](#)

[“RF Spectrum Span ” on page 366](#)

[“RF Spectrum RBW / AF Spectrum RBW” on page 366](#)

[“AF Waveform Sweep Time” on page 366](#)

[“Filters and Annotation” on page 366](#)

### Optimizing Measurement Speed

The speed of the analog demodulation measurements is driven largely by how much data must be acquired to satisfy the selected configuration.

Each measurement cycle generates all of the metrics and traces from a single acquisition, so there are several different settings which can affect the overall speed. Note that even though you may not be viewing a particular result on the display, the result is available and its configuration and constraints are used to determine the acquisition settings.

### Channel Bandwidth

This setting determines the sampling rate used by the measurement, higher bandwidths will result in larger data sets being acquired and processed. This should be set to the lowest value possible which allows your signal to be fully captured.

## Meas Setup

### RF Spectrum Span

This setting is used in a similar way as the Channel Bandwidth in that it determines the sampling rate. As with channel bandwidth, it should be set as narrow as possible to capture the signal of interest.

### RF Spectrum RBW / AF Spectrum RBW

These settings dictate a minimum acquisition time for the measurement. The Auto setting is recommended for optimal performance while maintaining measurement integrity. Narrower resolution bandwidths (RBWs) require longer acquisitions to achieve the resolution improvements.

### AF Waveform Sweep Time

This setting sets another minimum acquisition time for the measurement. In many uses, the AF Spectrum RBW will dominate the determination of the data acquisition duration, but if the AF waveform view is not needed keeping its sweep time low will ensure that it does not negatively impact the throughput.

### Filters and Annotation

You may choose to filter by frequency – choosing an optional low-pass filter and an optional high-pass filter – or may filter using a standard published band-pass filter (CCITT). Turning on a band-pass filter will automatically turn off the high-pass and low-pass filters; similarly, the band-pass filter will automatically turn off if you request either a high-pass or a low-pass filter.

Accesses a menu of keys that enable you to control specific parameters for the current measurement.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### Average/Hold Num

When turned on, the RF Spectrum and AF spectrum traces are averaged, and the Demod window shows an Average trace, a Max Hold trace, and a Min Hold trace in addition to the current trace. All metrics are averaged, and the metrics show an “Average” column and a “Max Hold” column.

The average feature for the Analog Demod measurement differs from other measurements in that the average type is fixed depending on the window as shown in the following table:

Window	Average Type
RF Spectrum	Pwr Average
Demod Waveform	Arithmetic Average
AF Spectrum	Log Average

For more details, see [“Average/Hold On/Off Functionality” on page 367](#).

Key Path	<b>Meas Setup</b>
----------	-------------------

<b>Remote Command</b>	<pre>[ :SENSE] :AM FM PM:AVERAge:COUNT &lt;integer&gt; [ :SENSE] :AM FM PM:AVERAge:COUNT? [ :SENSE] :AM FM PM:AVERAge [:STATe] ON OFF 1 0 [ :SENSE] :AM FM PM:AVERAge [:STATe] ?</pre>
Example	AM:AVER:COUN 10
Preset	10 ON
State Saved	Saved in instrument state
Min	1
Max	9999
Initial S/W Revision	Prior to A.02.00

### Average/Hold On/Off Functionality

Average, Minhold, and Maxhold are coupled.

When Average/Hold is on:

- The RF Spectrum and AF Spectrum traces are averaged.
- The Demod Waveform window will display a current trace, an Average trace, a Max Hold trace, and a Min Hold trace.
- The Metrics window will display an “Average” column and a “Max Hold” column.
- Metrics will display to four significant digits.
- The Meas Bar will display the Average/Hold number (along with how many of those sweeps have been captured).
- Demod Min trace, Demod Max trace, and Demod Avg trace are maintained.
- The Max Hold column shows the maximum value the unaveraged metric has attained since the last Restart.

When Average/Max Hold is off:

- The RF Spectrum and AF Spectrum traces are not averaged.
- The Demod Waveform window will display only the demod trace.
- The Metrics window will display only a “Current” column.
- Metrics will display to two significant digits.
- The Meas Bar will not display the Average/Hold number.
- Max Hold metrics over SCPI will return SCPI not a number.
- Demod Min trace, Demod Max trace and Demod Avg trace will return default values in a Meas?, Read?, and Fetch? and when exported to a .csv file

## Meas Setup

- Max Hold column is blank.

### Modulation Rate Periodic Yes/No

The algorithms used by the instrument for demodulation have an improved speed/accuracy tradeoff when the modulation is both periodic (such as a sinusoidal test signal) and assumed to be periodic by the analysis system. Thus, "Yes" is best for periodic signals. When the modulation is aperiodic, such as voice or music or even multiple nonharmonically related tones, "No" gives better results.

Key Path	Meas Setup
Remote Command	[ :SENSE ] :AM   FM   PM :PERIodic [ :STATE ] ON   OFF   1   0 [ :SENSE ] :AM   FM   PM :PERIodic [ :STATE ] ?
Example	FM:PERI OFF
Preset	ON
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.12.00

### Filters

Pressing this key displays the Filters menu, allowing the user to control the post demodulation and de-emphasis filters.

If any filters are turned on and the filters cannot be applied, the error "161 Setting Modified; Filters not applied" will appear.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

### High Pass Filter (Post Demod)

This parameter allows you to adjust the post demodulation high pass filters. This filter allows you to remove unwanted low-frequency components from the modulated signal.

Key Path	Meas Setup
Remote Command	[ :SENSE ] :AM   FM   PM :HPFilter OFF   HPF20   HPF50   HPF300 [ :SENSE ] :AM   FM   PM :HPFilter?
Example	FM:HPF HPF20
Remote Command Notes	Off = No filtering HPF20 = Use 20 Hz high pass filter HPF50 = Use 50 Hz high pass filter HPF300 = Use 300 Hz high pass filter



Couplings:	AM/FM/PM: Turning on any high-pass filter will turn off bandpass filters. If a band-pass filter is turned off, the following advisory message is displayed: “Band-pass filter set to OFF”. If the band-pass filter was already off, no advisory message is displayed.
Preset:	Off (AM/FM), HPF20 (PM)
State Saved	Saved in instrument state
Readback line	1-of-N selection
Initial S/W Revision	Prior to A.02.00

### Off

This selection turns the post demodulation high pass filter off.

Key Path	<b>Meas Setup, HPF</b>
Example	AM:HPF OFF
Notes	Annotation line (DC Coupled) appears in the Meas Bar, except if in the AM measurement.
Readback	Off
Initial S/W Revision	Prior to A.02.00

### 20 Hz

Sets the post demodulation high pass filter to 20 Hz.

Key Path	<b>Meas Setup, HPF</b>
Example	AM:HPF HPF20
Readback	20 Hz
Initial S/W Revision	Prior to A.02.00

### 50 Hz

Sets the post demodulation high pass filter to 50 Hz.

Key Path	<b>Meas Setup, HPF</b>
Example	AM:HPF HPF50
Readback	50 Hz
Initial S/W Revision	Prior to A.02.00

## Meas Setup

### 300 Hz

Sets the post demodulation high pass filter to 300 Hz.

Key Path	<b>Meas Setup, HPF</b>
Example	AM:HPF HPF300
Readback	300 Hz
Initial S/W Revision	Prior to A.02.00

### Lowpass Filter (Post Demod)

This parameter allows you to adjust the post demodulation low pass filter. The filter is useful in removing unwanted high frequency components of the modulating signal.

Key Path	<b>Meas Setup</b>
<b>Remote Command</b>	[ :SENSe ] :AM   FM   PM :LPFilter OFF   LPF300   LPF3K   LPF15K   LPF30K   LPF80K   LPF300K  [ :SENSe ] :AM   FM   PM :LPFilter?
Example	FM:LPF LPF3K
Remote Command Notes	Off = No filtering LPF300 = Use 300 Hz low pass filter LPF3K = Use 3 kHz low pass filter LPF15K = Use 15 kHz low pass filter LPF30K = Use 30 kHz low pass filter LPF80K = Use 80 kHz low pass filter LPF300K = Use 300 kHz low pass filter
Dependencies	LPF key is unavailable (grayed out) when the CCITT filter is selected.
Couplings:	AM/FM/PM:  Turning on any low-pass filter will turn off band-pass filters.  If a band-pass filter is turned off, the following advisory message is displayed: "Band-pass filter set to OFF".  If the band-pass filter was already off, no advisory message is displayed.
Preset	Off
State Saved	Saved in instrument state
Readback line	1-of-N selection
Initial S/W Revision	Prior to A.02.00

**Off**

Turns the post demodulation low pass filter off.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

**300 Hz**

Sets the post demodulation low pass filter to 300 Hz.

Key Path	<b>Meas Setup, HPF/LPF</b>
Example	AM:HPBP LPF300
Readback	300 Hz
Initial S/W Revision	Prior to A.02.00

**3 kHz**

Selects the 3 kHz post demodulation low pass filter.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF LPF3K
Readback	3 kHz
Initial S/W Revision	Prior to A.02.00

**15 kHz**

Selects the 15 kHz post demodulation low pass filter.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF LPF15K
Readback	15 kHz
Initial S/W Revision	Prior to A.02.00

**30 kHz**

Selects the 30 kHz post demodulation low pass filter.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF LPF30K

## Meas Setup

Readback	30 kHz
Initial S/W Revision	Prior to A.02.00

### 80 kHz

Selects the 80 kHz post demodulation low pass filter.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF LPF80K
Readback	80 kHz
Initial S/W Revision	Prior to A.02.00

### 300 kHz

Selects the 300 kHz post demodulation low pass filter.

Key Path	<b>Meas Setup, Post Demod LPF</b>
Example	AM:LPF LPF300K
Readback	300 kHz
Initial S/W Revision	Prior to A.02.00

### Band Pass Filter (Post Demod)

This parameter enables you to choose the post demodulation band pass filters, allowing you to apply industry-defined filters.

Key Path	<b>Meas Setup</b>
<b>Remote Command</b>	<code>[ :SENSe ] :AM   FM   PM :BPFilter OFF   CCITT</code> <code>[ :SENSe ] :AM   FM   PM :BPFilter?</code>
Example	FM:BPFilter CCITT
Remote Command Notes	Off = No filtering CCITT = Use CCITT filter

Couplings:	<p>AM/FM/PM:</p> <p>Turning on any bandpass filter will turn off high-pass and low-pass filters.</p> <p>If a high-pass filter is turned off, the following advisory message is displayed: “High-pass filter set to OFF”.</p> <p>If a low-pass filter is turned off, the following advisory message is displayed: “Low-pass filter set to OFF”.</p> <p>If both are turned off, the following advisory message is displayed: “High-pass and Low-pass filters set to OFF”.</p> <p>If both high-pass and low-pass filters were already off, no advisory message is displayed.</p>
Preset	Off
State Saved	Saved in instrument state
Readback	1-of-N
Initial S/W Revision	Prior to A.02.00

**Off**

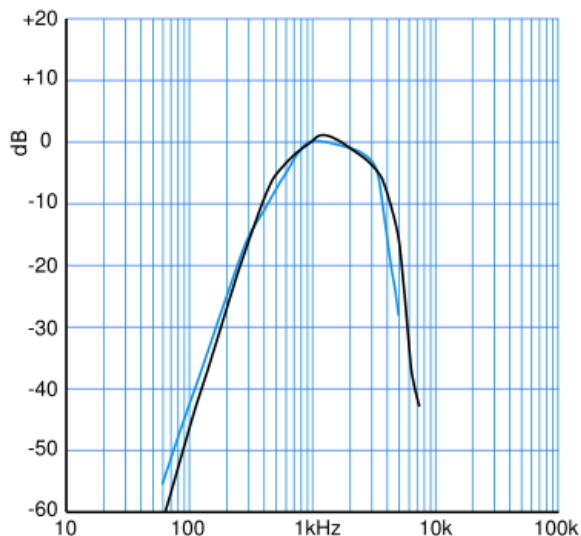
Turns the post demodulation band-pass filter off.

Key Path	<b>Meas Setup, BPF</b>
Example	AM:BPF OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

**CCITT**

Sets the post demodulation band-pass filter to CCITT.

## Meas Setup



Key Path	<b>Meas Setup, BPF</b>
Example	AM:BPF CCITT
Readback	CCITT
Initial S/W Revision	Prior to A.02.00

### De-emphasis (FM Demod measurement only)

Controls a single-pole filter, usually 6 dB/octave roll off, to counter intentional pre-emphasis in the transmitter. When the De-emphasis state is OFF the hardware digital filter is bypassed, otherwise the setting is applied

US75 is recommended for US commercial FM 75  $\mu$ s pre-emphasis.

The De-emphasis key only appears in the Meas Setup menu for the FM Demod measurement. It is unavailable for the AM and PM measurements.

Key Path:	<b>Meas Setup, Filters</b>
<b>Remote Command:</b>	[ :SENSe ] :FM:DEEMphasis OFF   US25   US50   US75   US750 [ :SENSe ] :FM:DEEMphasis?
Example:	FM:DEEM US75 FM:DEEM?
Dependencies:	Only available in FM measurement. Unavailable for AM and PM
Preset:	OFF
State Saved:	Saved in instrument state
Readback line:	1-of-N selection

Initial S/W Revision:	Prior to A.02.00
-----------------------	------------------

**Off**

Bypasses the De-emphasis filter.

Key Path:	<b>Meas Setup, Filters, De-emphasis</b>
Example:	FM:DEEM OFF
Readback:	Off
Initial S/W Revision:	Prior to A.02.00

**25  $\mu$ s**

Sets the De-emphasis time constant to 25  $\mu$ s.

Key Path:	<b>Meas Setup, Filters, De-emphasis</b>
Example:	FM:DEEM US25
Readback:	25 $\mu$ s
Initial S/W Revision:	Prior to A.02.00

**50  $\mu$ s**

Sets the De-emphasis time constant to 50  $\mu$ s.

Key Path:	<b>Meas Setup, Filters, De-emphasis</b>
Example:	FM:DEEM US50
Readback:	50 $\mu$ s
Initial S/W Revision:	Prior to A.02.00

**75  $\mu$ s**

Sets the De-emphasis time constant to 75  $\mu$ s.

Key Path:	<b>Meas Setup, Filters, De-emphasis</b>
Example:	FM:DEEM US75
Readback:	75 $\mu$ s
Initial S/W Revision:	Prior to A.02.00

**750  $\mu$ s**

Sets the De-emphasis time constant to 750  $\mu$ sec.

Key Path:	<b>Meas Setup, Filters, De-emphasis</b>
-----------	---

## Meas Setup

Example:	FM:DEEM US750
Readback:	750 $\mu$ s
Initial S/W Revision:	Prior to A.02.00

## Demod to Speaker

Controls whether a demodulated audio signal is connected to the speaker or not. This allows the demodulated audio to be turned off without completely disabling (muting) the instrument speaker. When the Analog Demod application is running, the demodulated signal can be heard from the speaker as long as the “Demod to Speaker” function is set to On.

This function is shared among all measurements in the mode, but not across other modes.

Key Path	Meas Setup
<b>Remote Command</b>	[ :SENSE] :SPEaker [ :STATE] ON OFF 1 0 [ :SENSE] :SPEaker [ :STATE] ?
Example	SPE OFF Disconnects demodulated audio from speaker circuit.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## Auto Scale

Automatically sets many measurement parameters by pressing one button, based upon the current signal under test. The feature requires that the center frequency be set to the signal of interest, and works best on stable periodic signals. The measurement is preset at the beginning of the Auto Scale operation, with the exception that the user’s Center Frequency is maintained.

The signal is analyzed using an Occupied Bandwidth measurement to automatically set the RF Spectrum Span and Channel Bandwidth to good values. Once this is done, the software examines the demodulated signal and appropriately sets the Sweep Time and Demod Waveform Scale/Div.

There are no configurable parameters for Auto Scale. The function is pre-configured to work with most real-world use cases.

Key Path:	Meas Setup
<b>Remote Command:</b>	[ :SENSE] :AUToscale
Example:	AUT
Initial S/W Revision:	Prior to A.02.00



## Meas Preset

Returns the variables in the current measurement to their preset values.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

## Meas Setup

---

## Mode

The Mode key allows you to select the available measurement applications or “Modes”. Modes are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each application software product is ordered separately by Model Number and must be licensed to be available. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

---

**NOTE** Key operation can be different between modes. The information displayed in Help is about the current mode.

To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

---

For more information on Modes, preloading Modes, and memory requirements for Modes, see [“More Information” on page 380](#)

Key Path:	<b>Front-panel key</b>
<b>Remote Command:</b>	:INSTrument [:SElect] SEQAN   BASIC   WCDMA   EDGEgSM   WIMAXOFDMA   ADEMOD   BT00th   TDSC DMA   CDMA2K   CDMA1XEV   LTE   LTETDD   :INSTrument [:SElect] ?
Example:	INST SEQAN
Notes:	The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application.  A list of the valid mode choices is returned with the INST:CAT? Query.
Preset:	Not affected by Preset.  In the EXT, the mode set by Restore System Defaults is the Sequence Analyzer mode.
State Saved:	Saved in instrument state
Backwards Compatibility SCPI:	:INSTrument[:SElect] GSM  provided for backwards compatibility. Mapped to EDGEgSM.
Backwards Compatibility SCPI:	:INSTrument[:SElect] SANalyzer  provided for ESU compatibility. When this command is received, the analyzer aliases it to the following:  INST:SEL SCPI LC  This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode.

## Mode

Backwards Compatibility SCPI:	:INSTrument[:SElect] RECEiver  provided for ESU compatibility. When this command is received, the analyzer aliases it to the following:  :INST:SEL EMI :CONF FSC  This results in the analyzer being placed in the EMI Receiver Mode, running the Frequency Scan measurement, in order to emulate the ESU Receiver Mode.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.10.01

Example:	INST 'SEQAN'?
Notes:	The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above.  The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
Backwards Compatibility SCPI:	:INSTrument[:SElect] 'GSM' 'BASIC'
Initial S/W Revision:	Prior to A.02.00

## More Information

It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (**System, Power On, Configure Applications**). It is also possible, using the same utility, to specify a subset of the available applications to load into memory at startup time, which can significantly decrease the startup time of the test set. During runtime, if an application that is not loaded into memory is selected (by either pressing that applications Mode key or sending that applications :INST:SEL command over SCPI), there will be a pause while the Application is loaded. During this pause a message box that says “Loading application, please wait...” is displayed.

Each application (Mode) that runs in the X-Series test set consumes virtual memory. The various applications consume varying amounts of virtual memory, and as more applications run, the memory consumption increases. Once an application is run, some of its memory remains allocated even when it is not running, and is not released until the test set program (xSA.exe) is shut down.

Agilent characterizes each Mode and assigns a memory usage quantity based on a conservative estimate. There is a limited amount of virtual memory available to applications (note that this is virtual memory and is independent of how much physical RAM is in the instrument). The instrument keeps track of how much memory is being used by all loaded applications – which includes those that preloaded at startup, and all of those that have been run since startup.

When you request a Mode that is not currently loaded, the instrument looks up the memory estimate for that Mode, and adds it to the residual total for all currently loaded Modes. If there is not enough virtual memory to load the Mode, a dialog box and menu will appear that gives you four options:

Close and restart the test set program without changing your configured preloads. This may free up enough memory to load the requested Mode, depending on your configured preloads

Clear out all preloads and close and restart the test set program with only the requested application preloaded, and with that application running. This choice is guaranteed to allow you to run the requested application; but you will lose your previously configured preloads. In addition, there may be little or no room for other applications, depending on the size of the requested application.

Bring up the Configure Applications utility in order to reconfigure the preloaded apps to make room for the applications you want to run (this will then require restarting the test set program with your new configuration). This is the recommended choice because it gives you full flexibility to select exactly what you want.

Exit the dialog box without doing anything, which means you will be unable to load the application you requested.

In each case except 4, this will cause the test set software to close, and you will lose all unsaved traces and results.

If you attempt to load a mode via SCPI that will exceed memory capacity, the Mode does not load and an error message is returned:

```
-225, "Out of memory; Insufficient resources to load Mode (mode name) "
```

where “mode name” is the SCPI parameter for the Mode in question, for example, BASIC for IQ Analyzer Mode.

### Application Mode Number Selection (Remote Command Only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table in the same order they appear in the Mode menu (if the order is not changed by the Configure Applications utility found in the **System, Power On** menu). See [“Detailed List of Modes” on page 386](#) for Mode details.

The Mode Number is the parameter for use with the :INSTRument:NSElect command. The Mode Parameter is the parameter for use with the :INSTRument[:SElect] command.

Mode	Mode Number	Mode Parameter
Sequence Analyzer	400	SEQAN
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSPA+	9	WCDMA
GSM/EDGE/EDGE Evo	13	EDGE GSM
802.16 OFDMA (WiMAX/WiBro)	75	WIMAX OFDMA
Analog Demod	234	ADEMOD
Bluetooth	228	BTtooth
TD-SCDMA with HSPA/8PSK	211	TDSCDMA
cdma2000	10	CDMA2K
1xEV-DO	15	CDMA1XEV

## Mode

Mode	Mode Number	Mode Parameter
LTE	102	LTE
LTE TDD	105	LTETDD

<b>Remote Command:</b>	:INSTRument:NSElect <integer> :INSTRument:NSElect?
Example:	:INST:NSEL 1
Notes:	The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
Preset:	Not affected by Preset. Set to default mode following Restore System Defaults.
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Application Mode Catalog Query (Remote Command Only)

Returns a string containing a comma separated list of names of all the installed and licensed measurement modes (applications). These names can only be used with the :INSTRument[:SElect] command.

<b>Remote Command:</b>	:INSTRument:CATalog?
Example:	:INST:CAT?
Notes:	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "BASIC,EDGE GSM,CDMA"
Backwards Compatibility Notes:	VSA (E4406A) :INSTRument:CATalog? returned a list of installed INSTRument:SELECT items as a comma separated list of string values: "BASIC","GSM","EDGE GSM","CDMA","NADC","PDC","WCDMA","CDMA2K","CDMA1XEV","IDEN","WIDEN","WLAN","SERVICE" X-Series uses the ESA/PSA compatible query of a string contain comma separated values: "BASIC,CDMA,CDMA2K,WCDMA,CDMA1XEV,EDGE GSM,GSM,TSCDMA,DMODULATION,WLAN"
Initial S/W Revision:	Prior to A.02.00

### Application Identification (Remote Commands Only)

Each entry in the Mode Menu will have a Model Number and associated information: Version, and Options.

This information is displayed in the Show System screen. The corresponding SCPI remote commands are defined here.

[“Current Application Model ” on page 383](#)

[“Current Application Revision” on page 383](#)

[“Current Application Options” on page 384](#)

### Current Application Model

Returns a string that is the Model Number of the currently selected application (mode).

<b>Remote Command:</b>	:SYSTem:APPLication[:CURRent] [:NAME] ?
Example:	:SYST:APPL?
Notes:	Query returns a quoted string that is the Model Number of the currently selected application (Mode). Example: "N9060A" String length is 6 characters.
Preset:	Not affected by Preset
State Saved:	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision:	Prior to A.02.00

### Current Application Revision

Returns a string that is the Revision of the currently selected application (mode).

<b>Remote Command:</b>	:SYSTem:APPLication[:CURRent] :REVision?
Example:	:SYST:APPL:REV?
Notes:	Query returns a quoted string that is the Revision of the currently selected application (Mode). Example: "1.0.0.0" String length is a maximum of 23 characters. (each numeral can be an integer + 3 decimal points)
Preset:	Not affected by a Preset
State Saved:	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision:	Prior to A.02.00

## Mode

### Current Application Options

Returns a string that is the Options list of the currently selected application (Mode).

<b>Remote Command:</b>	:SYSTem:APPLication[:CURRent]:OPTion?
Example:	:SYST:APPL:OPT?
Notes:	Query returns a quoted string that is the Option list of the currently selected application (Mode). The format is the name as the *OPT? or SYSTem:OPTion command: a comma separated list of option identifiers. Example:  "1FP,2FP"  String length is a maximum of 255 characters.
Preset:	Not affected by a Preset
State Saved:	Not saved in state per se, the value will be the selected application when a Save is invoked.
Initial S/W Revision:	Prior to A.02.00

### Application Identification Catalog (Remote Commands Only)

A catalog of the installed and licensed applications (Modes) can be queried for their identification.

[“Application Catalog Number of Entries” on page 384](#)

[“Application Catalog Revision” on page 385](#)

[“Application Catalog Options” on page 385](#)

### Application Catalog Number of Entries

Returns the number of installed and licensed applications (Modes).

<b>Remote Command:</b>	:SYSTem:APPLication:CATalog[:NAME]:COUNt?
Example:	:SYST:APPL:CAT:COUN?
Preset:	Not affected by Preset
State Saved:	Not saved in instrument state.
Initial S/W Revision:	Prior to A.02.00

### Application Catalog Model Numbers

Returns a list of Model Numbers for the installed and licensed applications (Modes).

<b>Remote Command:</b>	:SYSTem:APPLication:CATalog[:NAME]?
Example:	:SYST:APPL:CAT?



Notes:	Returned value is a quoted string of a comma separated list of Model Numbers. Example, if SAMS and Phase Noise are installed and licensed:  "N9060A,N9068A"  String length is COUNT * 7 – 1. (7 = Model Number length + 1 for comma. –1 = no comma for the 1st entry.)
Preset:	Not affected by a Preset
State Saved:	Not saved in instrument state.
Initial S/W Revision:	Prior to A.02.00

### Application Catalog Revision

Returns the Revision of the provided Model Number.

<b>Remote Command:</b>	:SYSTem:APPLication:CATalog:REVision? <model>
Example:	:SYST:APPL:CAT:REV? 'N9060A'
Notes:	Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed:  "1.0.0.0"
Preset:	Not affected by a Preset.
State Saved:	Not saved in instrument state.
Initial S/W Revision:	Prior to A.02.00

### Application Catalog Options

Returns a list of Options for the provided Model Number

<b>Remote Command:</b>	:SYSTem:APPLication:CATalog:OPTion? <model>
Example:	:SYST:APPL:CAT:OPT? 'N9060A'
Notes:	Returned value is a quoted string of a comma separated list of Options, in the same format as *OPT? or :SYSTem:OPTion?. If the provided Model Number is not installed and licensed a null-string ("") will be returned. Example, if SAMS is installed and licensed:  "2FP"  String length is a maximum of 255 characters.
Preset:	Not affected by a Preset
State Saved:	Not saved in instrument state.
Initial S/W Revision:	Prior to A.02.00

## Mode

### Detailed List of Modes

This section contains an alphabetical list of Modes available in the X-Series, along with a brief description of each Mode.

Note that with the exception of the 89601 VSA, only licensed applications appear in the Mode menu. The 89601 will always appear, because it's licensing is handled differently.

#### 1xEV-DO

Selects the 1xEV-DO mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL CDMA1XEV INST:NSEL 15
Initial S/W Revision:	Prior to A.02.00

#### 802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL WIMAXOFDMA INST:NSEL 75
Initial S/W Revision:	Prior to A.02.00

#### Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL ADEMODO INST:NSEL 234
Initial S/W Revision:	Prior to A.02.00

**Bluetooth**

Selects the Bluetooth mode for Bluetooth specific measurements. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL BT INST:NSEL 228
Initial S/W Revision:	A.06.01

**cdma2000**

Selects the cdma2000 mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL CDMA2K INST:NSEL 10
Initial S/W Revision:	Prior to A.02.00

**GSM/EDGE/EDGE Evo**

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL EDGE GSM INST:NSEL 13
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.02.00

**IQ Analyzer (Basic)**

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If

## Mode

it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL BASIC INST:NSEL 8
Initial S/W Revision:	Prior to A.02.00

## LTE

Selects the LTE mode for general purpose measurements of signals following the LTE FDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL LTE INST:NSEL 102
Initial S/W Revision:	Prior to A.02.00

## LTE TDD

Selects the LTE TDD mode for general purpose measurements of signals following the LTE TDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision:	A.03.00

## Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL SEQAN INST:NSEL 400

Initial S/W Revision:	A.05.01
-----------------------	---------

### TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL TDSCDMA INST:NSEL 211
Initial S/W Revision:	Prior to A.02.00

### W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path:	<b>Mode</b>
Example:	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision:	Prior to A.02.00

## Global Settings

Opens up a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the “Global Center Frequency” switch to on, it applies to all Modes that support Global Settings.

Key Path:	<b>Front Panel Key</b>
Initial S/W Revision:	Prior to A.02.00

### Global Center Freq

The software maintains a Mode Global value called “Global Center Freq”.

When the **Global Center Freq** key is switched to **On** in any mode, the current mode’s center frequency is copied into the Global Center Frequency, and from then on all modes which support global settings use the Global Center Frequency. So you can switch between any of these modes and the Center Freq will remain unchanged.

Adjusting the Center Freq of any mode which supports Global Settings, while **Global Center Freq** is

## Mode

**On**, will modify the Global Center Frequency.

When **Global Center Freq** is turned **Off**, the Center Freq of the current mode is unchanged, but now the Center Freq of each mode is once again independent.

When **Mode Preset** is pressed while **Global Center Freq** is **On**, the Global Center Freq is preset to the preset Center Freq of the current mode.

This function is reset to Off when the Restore Defaults key is pressed in the Global Settings menu, or when **System, Restore Defaults, All Modes** is pressed.

Key Path:	<b>Mode Setup, Global Settings</b>
Scope:	Mode Global
<b>Remote Command:</b>	:INSTRument:COUPle:FREQuency:CENTer ALL NONE :INSTRument:COUPle:FREQuency:CENTer?
Example:	INST:COUP:FREQ:CENT ALL INST:COUP:FREQ:CENT?
Preset:	Set to Off on Global Settings, Restore Defaults and System, Restore Defaults, All Modes
Range:	On Off
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	:GLOBal:FREQuency:CENTer[:STATE] 1 0 ON OFF :GLOBal:FREQuency:CENTer[:STATE]?
Preset:	Off
Initial S/W Revision:	Prior to A.02.00

## Restore Defaults

This key resets all of the functions in the Global Settings menu to Off. This also occurs when **System, Restore Defaults, All Modes** is pressed.

Key Path:	<b>Mode Setup, Global Settings</b>
<b>Remote Command:</b>	:INSTRument:COUPle:DEFault
Example:	INST:COUP:DEF
Backwards Compatibility SCPI:	:GLOBal:DEFault
Initial S/W Revision:	Prior to A.02.00

## Mode Setup

The Mode Setup menu contains setup functions that are global across the entire Mode. These functions are independent of which measurement is currently running - they are global to all measurements in the mode, or "Meas Global." The Mode Setup functions are not the only Meas Global functions in the analyzer; for example, the Trigger Setup functions are Meas Global, and there are even Mode Global functions (that is, the same for all Modes) in the Input/Output menu, but the fact that they are all Meas Global is a distinguishing characteristic of the Mode Setup functions.

The Mode Setup menu also contains the **Restore Mode Defaults** key. Most Meas Global functions are restored to their preset values by **Mode Preset**, however some variables are more persistent and are not preset until the **Restore Mode Defaults** key is pressed.

There are also a few Meas Global variables (for example, Global Center Frequency) that can be switched to be Mode Global, that is, the same for all modes. The keys under the Global Settings key control whether these variables are Mode Global or not.

In the Spectrum Analyzer mode, the Mode Setup functions include which radio standard and/or EMC standard is in use and how it is configured. A set of CISPR EMC presets is available as well.

The EMC keys require either the N6141A or W6141A application or Option EMC to be installed and licensed.

Key Path:	<b>Front-panel key</b>
Initial S/W Revision:	Prior to A.02.00

## Radio Standard

Allows you to specify the radio standard to be used. Spectrum Analyzer mode supports many radio standards. You can select the desired radio standard using the **Radio Std** key.

Key Path:	<b>Mode Setup</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSE] :RADio:STANdard [:SElect] NONE   JSTD   IS95a   IS97D   IS98D   GSM   W3GPP   CDMA2000MC1   C2000 1X   NADC   PDC   BLUEtooth   TETRa   WL802DOT11A   WL802DOT11B   WL8 02DOT11G   HIPERLAN2   DVBTLSN   DVBTGPN   DVBTIPN   FCC15   SDMBSE   UWBINDOOR [ :SENSE] :RADio:STANdard [:SElect] ?
Example:	RAD:STAN NONE RAD:STAN?
Couplings:	By changing the radio standard, the measurement parameters will be automatically set to an appropriate default value.
State Saved:	Saved in instrument state

## Mode Setup

Range:	None IS-95A J-STD-008 IS-97D/98D GSM/EDGE 3GPP W-CDMA cdma2000 1x NADC PDC Bluetooth TETRA W-LAN DVB-T FCC Part 15 Subpart F S-DMB System E UWB Indoor
Initial S/W Revision:	Prior to A.02.00

Note that not every measurement in the Spectrum Analyzer mode is available with every standard. The chart below describes which measurements are available with each radio standard.

	None	IS-95A	J-STD-008	IS-97D/98D	GSM/EDGE	3GPP W-CDMA	cdma2000 1x	NADC	PDC	Bluetooth	TETRA	FCC Part 15 Subpart F	W-LAN 802.11a	W-LAN 802.11b	W-LAN 802.11g	W-LAN HiperLAN/2	DVB-T L/SECAM/NICAM	DVB-T G/PAL/NICAM	DVB-T I/PAL/NICAM	S-DMB System E	UWB Indoor	
Swept SA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Channel Power	X	X	X	X		X	X	X	X		X						X	X	X	X		
Occupied BW	X	X	X	X		X	X	X	X												X	
ACP	X	X	X	X		X	X	X	X		X										X	
Power Stat CCDF	X	X	X	X	X	X	X	X	X	X							X	X	X			
Burst Power	X	X	X		X	X	X	X	X	X												
Spurious Emission	X											X										X
Spectrum Emission Mask	X					X							X	X	X	X						

The tables below give the setting used for each standard:

<b>None</b>	
IBW	2MHz
Span	3MHz
RBW	Auto rules
VBW	Auto rules
<b>IS-95A, J-STD-008, IS-97D/98D, cdma2000</b>	
IBW	1.23MHz
Span	1.845MHz
RBW	24kHz
VBW	Auto rules
<b>3GPP W-CDMA</b>	
IBW	5MHz



Span	7.5MHz
RBW	240kHz
VBW	Auto rules
RRC Filter	Off
RRC Filter Alpha	0.22
<b>NADC</b>	
IBW	32.8kHz
Span	49.2kHz
RBW	1.2kHz
VBW	Auto rules
<b>PDC</b>	
IBW	21kHz
Span	31.5kHz
RBW	6.2kHz
VBW	Auto rules
<b>TETRA</b>	
IBW	18kHz
Span	27kHz
RBW	1.2kHz
VBW	Auto rules
RRC Filter	On
RRC Filter Alpha	0.35
<b>DVB-T L/SECAM/NICAM, G/PAL/NICAM, I/PAL/NICAM</b>	
IBW	7.61MHz
Span	24MHz
RBW	3.9kHz
VBW	Auto rules
Sweep Points	8001

## Mode Setup

<b>S-DMB System E</b>	
IBW	25MHz
Span	37.5MHz
RBW	360kHz
VBW	Auto rules
RRC Filter	Off
RRC Filter Alpha	0.22

Some standards are used by only one or two measurements, and their settings are documented in those measurements. These are:

GSM/EDGE – used only in CCDF and Burst Power

Bluetooth - used only in CCDF and Burst Power

WLAN - used only in SEM

FCC Part15 - used only in Spurious Emissions

UWB Inband - used only in Spurious Emissions

### Device

Allows you to specify the device to be used. This key appears in the Setup menu of most of the Radio Stds. It is a global setting that affects the Device selection, between Mobile (MS) and Base Station (BTS) settings, for all relevant Power Suite measurements.

Key Path:	<b>Mode Setup, Radio Std</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSE ] :RADio:STANdard:DEVIce BTS MS [ :SENSE ] :RADio:STANdard:DEVIce?
Example:	RAD:STAN:DEV MS RAD:STAN:DEV?
Preset:	BTS
State Saved:	Saved in instrument state
Range:	BTS MS
Initial S/W Revision:	Prior to A.02.00

### IS-95A

Sets the specific parameters for the selected measurement appropriate for industry standard IS-95A. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#)

section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN IS95
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

### J-STD-008

Sets the specific parameters for the selected measurement appropriate for industry standard J-STD-008. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN JSTD
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

### IS-97D/98D

Sets the specific parameters for the selected measurement appropriate for industry standard IS-97D/98D. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN IS97D :RAD:STAN IS98D :RAD:STAN IS95C
Notes:	Regardless of whether IS97D, IS98D or IS95C is used to select this standard, the query always returns IS97D
Initial S/W Revision:	Prior to A.02.00

### Band Class

This function is only available when you have selected the standard: IS-97D/98D. It enables you to select the band class.

Key Path:	<b>Mode Setup, Radio Std, IS-97D/98D, IS-97D/98D</b>
-----------	--

## Mode Setup

Scope:	Meas Global
Remote Command:	[ :SENSe ] :RADio:STANdard:BAND:CLASs BC0   BC1 [ :SENSe ] :RADio:STANdard:BAND:CLASs?
Example:	RAD:STAN:BAND:CLAS BC0 RAD:STAN:BAND:CLAS?
Preset:	BC0
State Saved:	Saved in instrument state
Range:	0 (800 MHz Band) 1 (1900 MHz Band)
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

### GSM/EDGE

Sets the specific parameters for the selected measurement appropriate for industry standard GSM/EDGE. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN GSM
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

### 3GPP W-CDMA

Sets the specific parameters for the selected measurement appropriate for industry standard 3GPP W-CDMA. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN W3GPP
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

**Cdma2000 1x**

Sets the specific parameters for the selected measurement appropriate for industry standard cdma2000–1x. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN CDMA20001X :RAD:STAN CDMA2000MC1
Notes:	Regardless of whether CDMA20001X or CDMA2000MC1 is used to select this standard, the query always returns CDMA2001X
Initial S/W Revision:	Prior to A.02.00

**Device**

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

**NADC**

Sets the specific parameters for the selected measurement appropriate for industry standard NADC. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN NADC
Initial S/W Revision:	Prior to A.02.00

**Device**

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

**PDC**

Sets the specific parameters for the selected measurement appropriate for industry standard PDC. For the available measurements with this radio standard, see the chart in the [“Radio Standard” on page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN PDC
Initial S/W Revision:	Prior to A.02.00

**Device**

Operation of this key is identical for many locations in this measurement. For details about this key, see [“Device” on page 394](#).

## Mode Setup

### Bluetooth

Sets the specific parameters for the selected measurement appropriate for industry standard Bluetooth™. For the available measurements with this radio standard, see the chart in the “[Radio Standard](#)” on [page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN BLUE
Initial S/W Revision:	Prior to A.02.00

### Std Setup

Sets the packet type for the Bluetooth measurement

Key Path:	<b>Mode Setup, Radio Std, Bluetooth</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSE ] :RADio:STANdard:PACKet DH1   DH3   DH5 [ :SENSE ] :RADio:STANdard:PACKet?
Example:	RAD:STAN:PACK DH1 RAD:STAN:PACK?
Notes:	The packet length is DH1 -> 366 $\mu$ s DH3 -> 1622 $\mu$ s DH5 -> 2870 $\mu$ s
Preset:	DH1
State Saved:	Saved in instrument state
Range:	DH1 DH3 DH5
Initial S/W Revision:	Prior to A.02.00

### TETRA

Sets the specific parameters for the selected measurement appropriate for industry standard TETRA. For the available measurements with this radio standard, see the chart in the “[Radio Standard](#)” on [page 391](#) section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN TETR
Initial S/W Revision:	Prior to A.02.00

### Device

Operation of this key is identical for many locations in this measurement. For details about this key, see “[Device](#)” on [page 394](#).

**W-LAN**

Accesses the W-LAN radio standards key menu to enable you to select a W-LAN standard. Selecting a W-LAN standard modifies spectrum analyzer settings for the measurement activated under the Meas menu. For the available measurements with this radio standard, see the chart in the “Radio Standard” on page 391 section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN WL802DOT11A 802.11a :RAD:STAN WL802DOT11B 802.11b :RAD:STAN WL802DOT11G 802.11g :RAD:STAN HIPERLAN2 HiperLAN/2
Range:	802.11a 802.11b 802.11g HiperLAN/2
Initial S/W Revision:	Prior to A.02.00

**DVB-T**

Accesses the DVB-T key menu to enable you to select a DVB-T mask filtering standard. Selecting a DVB-T filtering standard modifies spectrum analyzer settings for the measurement activated under the Meas menu. For the available measurements with this radio standard, see the chart in the “Radio Standard” on page 391 section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN DVBTLSN L/SECAM/NICAM :RAD:STAN DVBTGPN G/PAL/NICAM :RAD:STAN DVBTIPN I/PAL/NICAM
Range:	L/SECAM/NICAM G/PAL/NICAM I/PAL/NICAM
Initial S/W Revision:	Prior to A.02.00

**FCC Part 15 Subpart F**

Sets the specific parameters for the selected measurement appropriate for unlicensed devices. For the available measurements with this radio standard, see the chart in the “Radio Standard” on page 391 section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN FCC15
Initial S/W Revision:	Prior to A.02.00

**S-DMB System E**

Sets the specific parameters for the selected measurement appropriate for industry standard System E. For the available measurements with this radio standard, see the chart in the “Radio Standard” on

## Mode Setup

page 391 section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN SDMBSE
Initial S/W Revision:	Prior to A.02.00

### UWB Indoor

Sets the specific parameters for the selected measurement appropriate for UWB Indoor standard. For the available measurements with this radio standard, see the chart in the “Radio Standard” on page 391 section.

Key Path:	<b>Mode Setup, Radio Std</b>
Example:	:RAD:STAN UWBINDOOR
Initial S/W Revision:	Prior to A.02.00

### Enable Non-Std Measurements

Allows you to specify whether all measurements and radio standards are enabled or not. In default, Enable All Measurements is set to No, so you can select only the valid combination of preset available standard and measurement. Any measurement or standard that make the combination that have no valid preset value are grayed out. When Enable Non-Std Measurements is set to Yes, all measurements and standard selections are enabled so that you can choose any.

If you select an unavailable measurement or unavailable radio standard using the Enable Non-Std Measurement key, the measurement results may not conform to the selected standard.

Key Path:	<b>Mode Setup</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSe ] :RADio:STANdard:EAMeas YES   NO [ :SENSe ] :RADio:STANdard:EAMeas?
Example:	RAD:STAN:EAM YES RAD:STAN:EAM?
Preset:	NO
State Saved:	Saved in instrument state
Range:	Yes No
Initial S/W Revision:	Prior to A.02.00

### EMC Standard

Only appears with the N6141A or W6141A application or Option EMC installed and licensed.



This menu allows you to select None (no EMI standard), CISPR (CISPR 16–1–1), and MIL (MIL–461A). Each standard has a unique way of determining the couplings between detectors and RBWs, as well as its own set of available RBW’s.

Note that Auto Couple will have no effect on the EMC Standard setting.

Key Path:	<b>Mode Setup</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSE ] :EMC:STANdard [ :SELEct ] NONE   CISPr   MIL [ :SENSe ] :EMC:STANdard [ :SELEct ] ?
Example:	:EMC:STAN CISP
Dependencies:	When the <b>EMC Standard</b> changes to <b>CISPR</b> or <b>MIL</b> , the <b>RBW Control</b> key is grayed out. The <b>Filter Type</b> is then always Gaussian; the <b>Filter BW</b> is chosen as appropriate for the filter and the standard.  When the EMC Standard changes to None, the Filter Type is set to Gaussian and the Filter BW is set to –3 dB.  Only appears with the N6141A or W6141A application or Option EMC installed and licensed. If not, the SCPI command generates a message.
Couplings:	The auto rules for detector select Peak for any trace in Auto when the EMI Standard is CISPR or MIL.  Choosing a CISPR detector or CISPR presets automatically picks the CISPR Standard, however switching from a CISPR detector has no impact on EMC Standard.
State Saved:	Saved in instrument state
Initial S/W Revision:	A.02.00

<b>Remote Command:</b>	[ :SENSE ] :BANDwidth   BWIDth : [ :RESolution ] :MODE EMI   SAN   OFF [ :SENSe ] :BANDwidth   BWIDth : [ :RESolution ] :MODE?
Notes:	This command is mapped to the EMC:STANdard command with the following mappings: EMI=>CISPr, SAN =>None, and if the legacy command comes in with the OFF parameter, it sets EMC Standard to None and Res BW to Manual . The query returns “OFF” if Res BW in Manual, otherwise “EMI” if EMC Standard is CISPR or MIL, and “SAN” if EMC Standard is None
Dependencies:	Only appears with the N6141A or W6141A applications or Option EMC installed and licensed. If not, the SCPI command generates a message.
Preset:	SAN
Initial S/W Revision:	A.02.00

## Mode Setup

### CISPR presets

Only appears with the N6141A or W6141A application or Option EMC installed and licensed.

This key lets you easily set up the analyzer for CISPR measurements.

This topic contains the following sections:

[“Band Setup” on page 402](#)

[“Sweep Points in Band E” on page 403](#)

[“Number of points in band E” on page 403](#)

Key Path:	<b>Mode Setup, CISPR Presets</b>
Remote Command:	[ :SENSE ] :FREQuency:CISPr: BAND A B C CD D E
Example:	FREQ:CISPR:BAND A activates the CISPR preset for Band A
Couplings:	Selecting a CISPR preset sets the EMI Standard to CISPR, performs an autocouple all, and sets the Y Axis Unit to dB $\mu$ V (unless dBuV is grayed out, in which case it will leave the Y Axis Unit unaffected).
Initial S/W Revision:	A.02.00

### Band Setup

The number of sweep points for each band is roughly calculated by the formula  $2 * (\text{Stop Frequency} - \text{Start Frequency}) / \text{RBW}$ , so that you get two points for every RBW width. This number is increased as necessary to make it an odd integer, so that you always end up with an odd number of sweep points. This is desirable so that you always have a sweep point at the Center Freq.

Band Setup	Band A	Band B	Band C	Band D	Band C&D	Band E
Start Frequency	9kHz	150kHz	30MHz	300MHz	30MHz	1GHz
Stop Frequency	150kHz	30MHz	300MHz	1GHz	1GHz	Max freq of analyzer or 18 GHz, whichever is lower
Sweep Point	1411	6635	4501	11667	16167	See below

The table above is based on the fact that the Res BW autocouples to the center frequency when in the

CISPR EMC standard as follows:

Center Frequency	RBW
<150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
>30 MHz to 1 GHz	120 kHz
>1 GHz	1 MHz

### Sweep Points in Band E

Note that the Res BW will be 1 MHz in band E. The number of sweep points for band E is dependent on the maximum frequency of the analyzer. The formula above gives the following values for Band E:

### Number of points in band E

Option	Max Analyzer Freq(nominal)	Width of Band E	Number of Points
503 (3.0 GHz models)	3.0 GHz	2.0 GHz	4001
503 (3.6 GHz models)	3.6 GHz	2.6 GHz	5201
507 (7 GHz models)	7.0 GHz	6.0 GHz	12001
507 (7.5 GHz models)	7.5 GHz	6.5 GHz	13001
508	8.4 GHz	7.4 GHz	14801
513	13.2 GHz	12.2 GHz	24401
526 (and above)	26.5 GHz	17 GHz	34001

### Noise Reduction

Noise Reduction accesses a menu for configuring the noise compensation of the instrument. This menu only appears in models that support Noise Reduction.

Key Path:	<b>Mode Setup</b>
Initial S/W Revision:	A.04.00

### Noise Floor Extension

Turns on the **Noise Floor Extension** function. When this function is On, the expected noise power of the analyzer (derived from a factory calibration) is subtracted from the trace data. This will usually reduce the apparent noise level by about 10 dB in low band, and 8 dB in high band (>~3.6 GHz).

## Mode Setup

**Noise Floor Extension** works with any RBW, VBW, detector, any setting of Average Type, any amount of trace averaging, and any signal type. It is ineffective when the trace is not smoothed (smoothing processes include narrow VBWs, trace averaging, and long sweep times with the detector set to Average or Peak). It works best with extreme amounts of smoothing, and with the average detector, with the Average Type set to Power.

---

**NOTE** Noise Floor Extensions has no effect unless the RF Input is selected, therefore it does nothing when External Mixing is selected.

---

In those cases where the cancellation is ineffective, it nonetheless has no undesirable side-effects. There is no significant speed impact to having **Noise Floor Extension** on.

The best accuracy is achieved when substantial smoothing occurs in each point before trace averaging. Thus, when using the average detector, results are better with long sweep times and fewer trace averages. When using the sample detector, the VBW filter should be set narrow with less trace averaging, instead of a wide VBW filter with more trace averaging.

See [“More Information” on page 404](#)

Key Path:	<b>Mode Setup, Noise Reduction</b>
Scope:	Meas Global
<b>Remote Command:</b>	[ :SENSe ] :CORRection:NOISe:FLOor ON OFF 1 0 [ :SENSe ] :CORRection:NOISe:FLOor?
Example:	CORR:NOIS:FLO ON
Dependencies:	In models that do not support Noise Floor Extension, the SCPI command will be accepted without error but will have no effect.
Preset:	Unaffected by Mode Preset. Turned off by Restore Mode Defaults.
State Saved:	No
Initial S/W Revision:	A.04.00

## More Information

The analyzer is characterized in the factory (or during a field calibration) with a model of the noise, referred to the input mixer, versus frequency in each band and path combination. Bands are 0 (low band) and 1 through 4 (high band) in a 26.5 GHz instrument, for example. Paths include normal paths, preamp paths, the electronic attenuator, etc.

In most band/path combinations, the noise can be well characterized based on just two parameters and the analyzer frequency response before compensation for frequency-dependent losses.

After the noise density at the input mixer is estimated, the effects of the input attenuator, RBW, detector, etc. are computed to get the estimated input-port-referred noise level.

In the simplest case, the measured power (signal plus analyzer noise) in each display point (bucket) is compensated by subtracting the estimated noise power, leaving just the signal power. This is the operation when the detector is Average and the Average Type is set to Power.

In other cases, operation is often not quite as good but still highly effective. With peak detection, the noise floor is estimated based on the RBW and the duration of the bucket using the same equations used in the noise marker function. The voltage of the noise is subtracted from the voltage of the observed signal-plus-noise measurement to compute the estimated signal voltage. The peak detector is one example of processing that varies with detector to give good estimates of the signal level without the analyzer noise.

For best operation, the average detector and the power scale are recommended, as already stated. Peak detection for pulsed-RF can still give excellent effectiveness. FFT analysis does not work well, and does not do NFE well, with pulsed-RF signals, so this combination is not recommended. Negative peak detection is not very useful, either. Sample detection works well, but is never better than the average detector because it doesn't smooth as well. The Normal detector is a combination of peak and negative peak behaviors, and works about as well as these.

For best operation, extreme smoothing is desirable, as already stated. Using narrow VBWs works well, but using very long bucket durations and the average detector works best. Reducing the number of trace points will make the buckets longer.

For best operation, the power scale (Average Type = Power) is optimum. When making CW measurements in the presence of noise without NFE, averaging on the decibel scale has the advantage of reducing the effect of noise. When using NFE, the NFE does an even better job than using the log scale ever could. Using NFE with the log scale is not synergistic, though; NFE with the power scale works a little better than NFE with log averaging type.

The results from NFE with internal preamp can often be lower than the theoretical noise in a signal source at room temperature, a noise density of  $-174$  dBm/Hz. This is expected and useful behavior, because NFE is designed to report the amount of input signal that is in excess of the thermal noise, not the amount that includes the thermal noise. This can be a useful behavior because thermal noise often interferes with what you want to measure, instead of being part of what you want to measure. Note that NFE is not adequately accurate to always be able to read below  $kTB$ .

## Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state.

See [“Global Settings” on page 389](#) for more information.

## Legacy Compatibility

Certain behaviors in the X-Series analyzers were changed from legacy analyzers, in order to give users access to new, more powerful functionality. Agilent recognizes that from time to time, it is necessary to EXACTLY match legacy behaviors. The Legacy Compatibility menu lets you modify certain X-Series behaviors to exactly match our legacy products.

Key Path:	<b>Mode Setup</b>
Initial S/W Revision:	A.11.00

## Average/Hold

In the X-Series analyzers, Max Hold and Min Hold traces were added to the trace types that were controlled by the Average Number (which became the Average/Hold Number). In other words, setting

## Mode Setup

an Average/Hold number of 100 and then performing a Max Hold in Single sweep takes 100 traces and then stops, and pressing Restart restarts the Max Hold Sequence. This allows the user to exactly control how the number of Max Hold traces taken; however many users need a way of stopping and then resuming a Max/Min Hold without clearing the accumulated result.

In the past you could stop and start Max Hold by going back and forth between Single and Continuous. Currently, neither the X-Series nor the legacy analyzers like ESA and PSA clear the Max or Min Hold when going from Cont to Single and vice versa; so you can go to Single to stop temporarily and then resume the Max or Min Hold by going back to Cont. However, in the X-Series, because Max and Min Hold obey the Average/Hold number, this is not an effective method for stopping a sweep, until you have reached the terminal count. Also, Restart is sometimes used as part of this method and in the X-Series, Restart clears the accumulated Max/Min Hold, whereas in the PSA (for example) it does not.

The Average/Hold switch in the Legacy Compatibility menu solves this problem. When this switch is in the “Legacy” position, the following is true for traces in Max Hold or Min Hold:

They pay no attention to the Average/Hold number; “Single” for Max Hold and Min Hold causes one sweep only, so going to Single stops after the current sweep, and going to Cont starts you going again without clearing the accumulated result

They don’t clear the Max or Min Hold on a Restart or Single or INIT:IMM (changing a measurement parameter like frequency or bandwidth etc would still restart the max/min hold).

Note that whenever any trace is in Average, the Single/Cont controls DO tie in to the Avg/Hold number and pressing Single WILL cause a set of sweeps (100 by default). This is also true in PSA.

Key Path:	<b>Mode Setup, Legacy Compatibility</b>
<b>Remote Command:</b>	:CONTRol:COMPAtible:TRACe ON OFF 1 0 :CONTRol:COMPAtible:TRACe?
Example:	CONT:COMP:TRAC ON ON means exhibit legacy average/hold behavior
Preset:	Unaffected by Mode Preset. Set to OFF by Restore Mode Defaults.
State Saved:	Saved in State
Initial S/W Revision:	A.11.00

## Peak Search

Displays the Peak Search menu and places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Key Path	Front-panel key
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : MAXimum
Example	CALC:AM:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

### Next Peak

Moves the selected marker to the peak that has the next highest amplitude less than the current marker value. If there is no valid peak lower than the current marker position, an error is generated and the marker is not moved.

If the selected marker was off, then it is turned on as a normal marker and a peak search is performed.

In Analog Demod, the Peak Threshold and Peak Excursion functions are both OFF. If there is no valid peak, an error is generated and the marker is not moved. If the selected marker was off, then it is turned on as a normal marker and a peak search is performed.

Key Path	Peak Search
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : MAXimum:NEXT
Example	CALC:AM:MARK2:MAX:NEXT selects marker 2 and moves it to the peak that is closest in amplitude to the current peak, but the next lower value.
Remote Command Notes	Sending this command selects the specified marker
State Saved	Not part of instrument saved state
Initial S/W Revision	Prior to A.02.00

### Pk-Pk Search

Finds and displays the amplitude and frequency (or time, if on a time domain trace) differences between the highest and lowest y-axis value. It places the selected marker on the minimum value on its selected trace and it places that marker's reference marker on the peak of its selected trace. This function turns on the reference marker and sets its mode to **Fixed** if it is not already on. (These markers may be on two different traces.)

When peak-to-peak search is successful, a message is displayed on the message line.

If the selected marker is off, a delta type marker is turned on and the peak-to-peak search is done. If the selected marker is on, but it is not a delta marker, then it is changed to delta, which turns on the reference

## Peak Search

marker if needed. It then performs the peak-to-peak function.

Key Path	Peak Search
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : PTPeak
Example	CALC:AM:MARK:PTP CALC:AM:MARK:Y? queries the delta amplitude value for marker 1.
Notes	Turns on the Marker $\Delta$ active function.
Remote Command Notes	Sending this command selects the specified marker.
Couplings	Selected marker becomes a delta marker if not already in delta mode.
State Saved	Not part of instrument saved state
Initial S/W Revision	Prior to A.02.00

## Min Search

Moves the selected marker to the minimum y-axis value on the current trace. If the selected marker is off, it is turned on before the minimum search is performed.

Key Path	Peak Search
<b>Remote Command</b>	:CALCulate:AM FM PM:MARKer [1]   2   3   4   5   6   7   8   9   10   11   12 : MINimum
Example	CALC:AM:MARK:MIN selects marker 1 and moves it to the minimum amplitude value.
Remote Command Notes	Sending this command selects the specified marker.
State Saved	Not part of instrument saved state
Initial S/W Revision	Prior to A.02.00



## Recall

Most of the functions under this key work the same way in many measurements, so they are documented in [“Recall” on page 126.](#)

The Amplitude Correction Import Data function under Recall is documented here.

### Amplitude Correction

This key selects the Amplitude Corrections as the data type to be imported. When pressed a second time, it brings up the Select Menu, which lets you select the Correction into which the data will be imported.

Amplitude Corrections are fully discussed in the documentation of the Input/Output key, under the Corrections softkey.

A set of preloaded Corrections files can be found in the directory

/My Documents/ EMC Limits and Ampcor.

Under this directory, the directory called Ampcor (Legacy Naming) contains a set of legacy corrections files, generally the same files that were supplied with older Agilent EMI analyzers, that use the legacy suffixes .ant, .oth, .usr, and .cbl, and the old 8-character file names. In the directory called Ampcor, the same files can be found, with the same suffixes, but with longer, more descriptive filenames.

When the Amplitude Correction is an Antenna correction and the Antenna Unit in the file is not **None**, the Y Axis Unit setting will change to match the Antenna Unit in the file.

Key Path:	<b>Recall</b>
Mode:	EDGE GSM
<b>Remote Command:</b>	:MMEMory:LOAD:CORRection 1 2 3 4 5 6, <filename>
Example:	:MMEM:LOAD:CORR 2 "myAmpcor.csv" recalls the Amplitude Correction data from the file myAmpcor.csv in the current directory to the 2nd Amplitude Correction table, and turns on Correction 2.  The default path is My Documents\amplitudeCorrections.

## Recall

Dependencies:	<p>Only the first correction array (Correction 1) supports antenna units. This means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include .ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.</p> <p>Corrections are not supported by all Measurements. If in a Mode in which some Measurements support it, this key will be grayed out in measurements that do not. The key will not show at all if no measurements in the Mode support it.</p> <p>Errors are reported if the file is empty or missing, or if the file type does not match, or if there is a mismatch between the file type and the destination data type. If any of these occur during manual operation, the test set returns to the Import Data menu and the File Open dialog goes away.</p> <p>This key does not appear unless you have the proper option installed in your instrument.</p> <p>This command will generate an “Option not available” error unless you have the proper option installed in your instrument.</p>
Couplings:	When a correction file is loaded from mass storage, it is automatically turned on ( <b>Correction ON</b> ) and <b>Apply Corrections</b> is set to On. This allows the user to see its effect, thus confirming the load.
Readback:	selected Correction
Backwards Compatibility SCPI:	<p>:MMEMory:LOAD:CORRection ANTenna CABLe OTHer USER, &lt;filename&gt;</p> <p>For backwards compatibility, ANTenna maps to 1, CABLe maps to 2, OTHer maps to 3 and USER maps to 4</p>
Initial S/W Revision:	A.02.00

### Amplitude Correction

These keys let you select which Correction to import the data into. Once selected, the key returns back to the Import Data menu and the selected Correction number is annotated on the key. The next step is to select the Open key in the Import Data menu.

Antenna corrections are a particular kind of Amplitude Corrections – they are distinguished in the corrections file by having the Antenna Unit set to a value other than None. Only Correction 1 supports Antenna Units.

Key Path:	<b>Recall, Data, Amplitude Correction</b>
Notes:	auto return
Dependencies:	Only Correction 1 may be used to load a Correction that contains an Antenna Unit other than None
Preset:	Not part of Preset, but is reset to Correction 1 by Restore Input/Output Defaults; survives shutdown.
State Saved:	The current Correction number is saved in instrument state

Initial S/W Revision:	A.02.00
-----------------------	---------

### Multiport Adapter Amplitude Correction

This key selects the Multiport Adapter Amplitude Corrections as the data type to be imported. When pressed a second time, it brings up the Select Menu, which lets you select the Correction into which the data will be imported.

Amplitude Corrections are fully discussed in the documentation of the Input/Output key, under the Corrections softkey.

A set of preloaded Corrections files can be found in the directory

/My Documents/ EMC Limits and Ampcor.

Under this directory, the directory called Ampcor (Legacy Naming) contains a set of legacy corrections files, generally the same files that were supplied with older Agilent EMI analyzers, that use the legacy suffixes .ant, .oth, .usr, and .cbl, and the old 8-character file names. In the directory called Ampcor, the same files can be found, with the same suffixes, but with longer, more descriptive filenames.

When the Amplitude Correction is an Antenna correction and the Antenna Unit in the file is not **None**, the Y Axis Unit setting will change to match the Antenna Unit in the file.

Key Path:	<b>Recall, Data, Amplitude Correction</b>
Mode:	SA EDGE GSM PN
<b>Remote Command:</b>	:MMEMory:LOAD:MPADapter:CORRection 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16, <filename>.
Example:	:MMEM:LOAD:MPAD:CORR 2 "myAmpcor.csv" recalls the Multiport Adapter Amplitude Correction data from the file myAmpcor.csv in the current directory to the 2nd Multiport Adapter Amplitude Correction table, and turns on MPA Correction 2.  The default path is My Documents\amplitudeCorrections.

## Recall

Dependencies:	<p>Only the first correction array (Correction 1) supports antenna units. This means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include .ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.</p> <p>Corrections are not supported by all Measurements. If in a Mode in which some Measurements support it, this key will be grayed out in measurements that do not. The key will not show at all if no measurements in the Mode support it.</p> <p>Errors are reported if the file is empty or missing, or if the file type does not match, or if there is a mismatch between the file type and the destination data type. If any of these occur during manual operation, the analyzer returns to the Import Data menu and the File Open dialog goes away.</p> <p>This key does not appear unless you have the proper option installed in your instrument.</p> <p>This command will generate an “Option not available” error unless you have the proper option installed in your instrument.</p> <p>If the file is empty, message –250.3005 is reported. If the file does not exist message –256 is reported. If there is a mismatch between the file and the destination data type, an message is reported. –250.3003. See error list in the X-series Messaging document for the exact error text.</p>
Couplings:	When a correction file is loaded from mass storage, it is automatically turned on ( <b>Correction ON</b> ) and <b>Apply Corrections</b> is set to On. This allows the user to see its effect, thus confirming the load.
Readback:	selected Correction
Backwards Compatibility SCPI:	<p>For backwards compatibility, the following parameters syntax is supported:</p> <pre>:MMEMory:LOAD:MPADapter:CORRection ANTenna CABLE OTHer USER, &lt;filename&gt;</pre> <p>ANTenna maps to 1, CABLE maps to 2, OTHer maps to 3 and USER maps to 4</p>
Initial S/W Revision:	A.10.00

### **Multiport Adapter Amplitude Correction 1,2,3,4,5,6,7,8,9,10,11,~,15,16**

These keys let you select which Correction to import the data into. Once selected, the key returns back to the Import Data menu and the selected Correction number is annotated on the key. The next step is to select the Open key in the Import Data menu.

Antenna corrections are a particular kind of Multiport Adapter Amplitude Corrections – they are distinguished in the corrections file by having the Antenna Unit set to a value other than None. Only Correction 1 supports Antenna Units.

Key Path:	<b>Recall, Data, Amplitude Correction, Multiport Adptr Correction</b>
Notes:	auto return

Dependencies:	Only Multiport Adapter Correction 1 may be used to load a Correction that contains an Antenna Unit other than None
Preset:	not part of Preset, but is reset to Correction 1 by Restore Input/Output Defaults; survives shutdown
State Saved:	The current Correction number is saved in instrument state
Initial S/W Revision:	A.10.00

## Recall

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

Key Path:	<b>Front-panel key</b>
<b>Remote Command:</b>	:INITiate[:IMMEDIATE] :INITiate:RESTART
Example:	:INIT:IMM :INIT:REST
Notes:	:INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function.
Couplings:	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies:	This is an Overlapped command. The STATUS:OPERATION register bits 0 through 8 are cleared. The STATUS:QUESTIONABLE register bit 9 (INTEGRITY sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes:	For Spectrum Analysis mode in ESA and PSA, the <b>Restart</b> hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in <b>Clear Write</b> , but did not restart <b>Max Hold</b> and <b>Min Hold</b> . In the X-Series, the <b>Restart</b> hardkey and the INITiate:RESTART command restart not only <b>Trace Average</b> , but <b>Max Hold</b> and <b>Min Hold</b> traces as well. For wireless comms modes in ESA and PSA, the <b>Restart</b> hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision:	Prior to A.02.00

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

## Restart

If the test set is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the test set stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the test set will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.



---

## Save

Accesses a menu that provides the save type options. The Analog Demod measurements will support the following:

Save and Recall of state only.

Save of measurement results

The Analog Demod measurements will NOT support save or recall of trace + state.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Export/Import Data

The Analog Demod Mode Export Data options include Traces and Measurement Results.

Key Path	Save, Data
Remote Command Notes	No SCPI command directly controls the Data Type that this key controls. The Data Type is included as part of the MMEM:STORe commands.
Preset	Trace; is not affected by a Preset, but is reset during Restore Mode Defaults and survives Power cycles.
State Saved	Saved in instrument state.
Readback line	1-of-N selection
Initial S/W Revision	Prior to A.02.00

## AM/FM/PM Trace

Selects Trace as the data type to be exported with this save request. This key brings up the Trace menu that enables you to select one of the following traces:

- RF Spectrum (RFSPectrum)
- Demod (DEMod)
- Demod Avg (DAVerage)
- Demod Max (DMAximum)
- Demod Min (DMINimum)
- AF Spectrum (AFSPectrum)

Once you select a trace, the menu returns back to the Data menu and the name of the selected trace is annotated on the Trace key. Now that you have selected exactly what needs to be saved, to trigger a save of the selected trace, you must select the **Save As** key in the Data menu.

If the Demod Min trace, Demod Max trace, or Demod Avg trace is exported when the Average/Hold

## Save

Num feature is turned off, the resulting data will be default values.

The trace data file is a .csv file containing the data for one trace, suitable for import into spreadsheet software. There is a header block, followed by metadata that includes the parameters necessary to recreate the measurement, followed by a DATA block that contains the x,y data for the specified trace. Each line in the metadata includes the parameter, followed by a comma, followed by the parameter value. The metadata includes the following information:

Parameter	
Measurement <sup>1</sup>	AM FM PM
Trace	AF Spectrum RF Spectrum Demod  Demod Ave Demod Min Demod Max
X Axis Unit	Hz S
Y Axis Unit	dBm % Hz Rad
Center Frequency <sup>1</sup>	[units of Hz]
Channel BW <sup>1</sup>	[units of Hz]
Average State <sup>1</sup>	Off On
Average Count	#
HPF/BPF <sup>1</sup>	Off HPF20 HPF50 HPF300 CCITT
LPF <sup>1</sup>	Off LPF300 LPF3K LPF15K LPF30K LPF80K LPF300K
Attenuation <sup>1</sup>	[units of dB]
RF Coupling <sup>1</sup>	AC DC
Ref Level	[units of Y Axis Unit]
RF Span <sup>1</sup>	[units of Hz]
RF Res Bandwidth <sup>1</sup>	[units of Hz]
Sweep Time <sup>1</sup>	[units of S]
AF Start Freq	[units of Hz]
AF Stop Freq <sup>1</sup>	[units of Hz]
AF Res Bandwidth <sup>1</sup>	[units of Hz]
Trigger Source <sup>1</sup>	Off Ext1 Ext2
Trigger Level <sup>1</sup>	[units of V]
Trigger Slope <sup>1</sup>	Positive Negative
Trigger Delay <sup>1</sup>	[units of S]

<b>Parameter</b>	
PreAmp State <sup>1</sup>	Off On
PreAmp Band <sup>1</sup>	Low High
Input Z Correction <sup>1</sup>	50 75
RF Calibrator	Off 50 MHz 4.8 GHz Comb
External Gain	[units of dB]

1. Changing this parameter requires a measurement restart.

Note that all metadata is stored for each trace. After the metadata, the keyword DATA occurs on its own line, followed by the data (one X, Y pair per line).

Key Path:	<b>Save, Data</b>
Notes:	The first key press selects traces out of the 1-of-N file type options. The second key press brings up the Traces menu so you can select which trace you want to export.
Preset:	RF Spectrum; is not affected by a Preset, but is reset during Restore Mode Defaults and survives Power cycles.
State Saved:	Saved in instrument state.
Readback:	Selected Trace table
Readback line:	RF Spectrum, Demod, Demod Avg, Demod Max, Demod Min, AF Spectrum
Initial S/W Revision:	Prior to A.02.00

### Measurement Results

The file format of the .csv Measurement Results file is shown in the table below. If any metrics are off, or there is no valid value, they will appear as not a number (9.91 e37)

AM	FM and PM
Carrier Power	Carrier Power
Carrier Frequency Error (0)	Carrier Frequency Error
Modulation Rate	Modulation Rate
SINAD value	SINAD value
Distortion/Total Voltage (rms)	Distortion/Total Voltage (rms)
Total Harmonic Distortion	Total Harmonic Distortion
Mod Depth (Peak+)	Deviation (Peak+)
Mod Depth (Peak-)	Deviation (Peak-)

## Save

<b>AM</b>	<b>FM and PM</b>
Mod Depth (Pk-Pk)/2	Deviation (Pk-Pk)/2
Mod Depth (RMS)	Deviation (RMS)
Mod Depth (Peak+) Max Hold	Deviation (Peak+) Max Hold
Mod Depth (Peak-) Max Hold	Deviation (Peak-) Max Hold
Mod Depth (Pk-Pk)/2 Max Hold	Deviation (Pk-Pk)/2 Max Hold
Mod Depth (RMS) Max Hold	Deviation (RMS) Max Hold
RMS Ratio (only valid for Metrics Setting of RMS Ratio)	RMS Ratio (only valid for Metrics Setting of RMS Ratio)
Ratio Reference (only valid for Metrics Setting of RMS Ratio)	Ratio Reference (only valid for Metrics Setting of RMS Ratio)

Key Path:	<b>Save, Data</b>
Initial S/W Revision:	Prior to A.02.00

### Save As...

Accesses a menu that enables you to select the location where you can save the Data Type. This menu is a standard Windows dialog with Save As menu keys. The Save As dialog is loaded with the file information related to the Data Type. The filename is filled in using the auto file naming algorithm for the specific Data Type and is highlighted. The “auto file name” feature automatically generates a file name for use when saving a file.

When you navigate to this selection, you have already determined that you are saving Data and now you want to specify to which file to direct the save.

When you first enter this dialog, the path in the Save In: field in this Save As dialog depends on the export data type from which you navigated. The only files that are visible are the files with the corresponding data type suffix, and the Save As type lists the same suffix.

For Analog Demod Mode, the file suffix is .csv and the \*.csv files are the only visible files in the Save As dialog and .csv is the Save As Type.

The default path for saving files is:

My Documents\Analog Demod\data\traces

Key Path:	<b>Save, Data</b>
Initial S/W Revision:	Prior to A.02.00

### Save

When a Save of a specific Data File is requested, the data is saved to the specified or selected file. The save is performed immediately and does not wait until the measurement is complete.

If the file already exists, a dialog will appear that allows you to replace the existing file by selecting an

OK or you can cancel the request.

While the save is being performed, the floppy icon will show up in the settings bar near the Continuous/Single icon. After a register save completes, the corresponding register key annotation is updated with the date, time, and an advisory message that the file was saved appears in the message bar.

<b>Remote Command:</b>	AM/FM/PM: :MMEMory:STORe:TRACe:DATA RFSpectrum DEMod DAverage DMAximum DMINimum AFSpectrum, <filename>
Example:	:MMEM:STOR:TRAC:DATA RRSP, "myRFSpectrum.csv" exports the RF Spectrum trace to the file myRFSpectrum.csv in the default path.
Remote Command Notes:	If the save is initiated through SCPI, and the file already exists, the file will be overwritten.  Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	:MMEMory:STORe:RESults <filename>
Example:	:MMEM:STOR:RES "myResults.csv" saves the results from the current measurement to the file myResults.csv in the default path.
Remote Command Notes:	If the save is initiated through SCPI, and the file already exists, the file will be overwritten.  Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.

Save

## Single (Single Measurement/Sweep)

Sets the test set for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

Key Path:	<b>Front-panel key</b>
Example:	:INIT:CONT OFF
Notes:	See <b>Cont</b> key description.
Backwards Compatibility Notes:	<p>For Spectrum Analysis mode in ESA and PSA, the <b>Single</b> hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart <b>Max Hold</b> and <b>Min Hold</b>. In the X-Series, the <b>Single</b> hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including <b>Max Hold</b> and <b>Min Hold</b>.</p> <p>For Spectrum Analysis mode in ESA and PSA, the <b>Single</b> hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, <b>Restart</b> does this but <b>Single</b> only restarts the sweep or sweep sequence if you are in the idle state.</p>
Initial S/W Revision:	Prior to A.02.00

Single (Single Measurement/Sweep)



## Source (Internal)

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path:	Front-panel key
-----------	-----------------

## RF Output

This parameter sets the source RF power output state.

Key Path:	<b>Source</b>
<b>Remote Command:</b>	:OUTPut [:EXTErnal] [:STATe] ON OFF 1 0 :OUTPut [:EXTErnal] [:STATe] ?
Example:	OUTP OFF OUTP?
Notes:	<p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the <a href="#">“List Sequencer” on page 507</a>. If the <a href="#">“Sequencer” on page 507</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an “RF” annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the <a href="#">“Sequencer” on page 507</a> is set to ON, the “RF” annunciator will be replaced by “SEQ” in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path:	<b>Source</b>
-----------	---------------

## Source (Internal)

Notes:	The sub-menu under this button is for independent mode and has no effect on “List Sequencer” on page 507. If the “Sequencer” on page 507 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set “Sequencer” on page 507 to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision:	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the “RF Power Range ” on page 427 table below for the valid ranges.

Key Path:	<b>Source, Amplitude</b>
Remote Command:	:SOURce:POWer[:LEVel] [:IMMediate] [:AMPLitude] <ampl> :SOURce:POWer[:LEVel] [:IMMediate] [:AMPLitude] ?
Example:	SOUR:POW -100 dBm
Notes:	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the “Source Unleveled” indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the “Source Unleveled” indicator will appear on status panel. When the source output setting is restored to the normal range, the “Source Unleveled” is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step’s output power.</p> <p>{ A.12.50 } The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message. When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message. This is only warning message, and check is performed when RF is ON.</p>
Notes:	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.

Dependencies:	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset:	-100 dBm
Min:	The range of values depends on the current frequency and selected RF output port. Please refer to the “RF Power Range ” on page 427 table below for the valid ranges.
Max:	The range of values depends on the current frequency and selected RF output port. Please refer to the “RF Power Range ” on page 427 table below for the valid ranges.
Initial S/W Revision:	A.05.00

### RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-130 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-130 dBm	0 dBm

### Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

---

#### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

---

## Source (Internal)

Key Path:	<b>Source, Amplitude</b>
Dependencies:	This key is unavailable, and is grayed out when the “ <a href="#">List Sequencer</a> ” on <a href="#">page 507</a> is turned ON.
Initial S/W Revision:	A.05.00

### Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to “[Set Reference Power](#)” on [page 427](#)

Key Path:	<b>Source, Amplitude</b>
<b>Remote Command:</b>	:SOURce:POWer:REFerence <ampl> :SOURce:POWer:REFerence? :SOURce:POWer:REFerence:STATe OFF ON 0 1 :SOURce:POWer:REFerence:STATe?
Example:	SOUR:POW:REF 0.00 dBm SOUR:POW:REF:STATe ON
Dependencies:	This setting is unavailable and is grayed out when the “ <a href="#">List Sequencer</a> ” on <a href="#">page 507</a> is turned ON.
Couplings:	This value is coupled to the “ <a href="#">Set Reference Power</a> ” on <a href="#">page 427</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset:	0.00 dBm OFF
Min:	-125.00 dBm
Max:	10.00 dBm
Initial S/W Revision:	A.05.00

**Amptd Offset**

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path:	<b>Source, Amplitude</b>
<b>Remote Command:</b>	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_amp1> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example:	SOUR:POW:OFFS 0.00 dB
Dependencies:	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset:	0.00 dB
Min:	-200.00 dB
Max:	200.00 dB
Initial S/W Revision:	A.05.00

**ALC**

Allows you to enable or disable the automatic leveling control (ALC) circuit.

The purpose of the ALC circuit is to hold output power at a desired level by adjusting the source's power circuits to compensate for power drift. Power drift occurs over time and changes in temperature.

Turning the ALC off disables the ALC circuitry, enabling you to measure the output at a specific point in a test setup and adjust as required for the desired power level at that point. Turning the ALC off is useful when the modulation consists of very narrow pulses that are below the pulse width specification of the

## Source (Internal)

ALC, or when the modulation consists of slow amplitude variations that the automatic leveling would remove.

Key Path:	<b>Source, Amplitude</b>
<b>Remote Command:</b>	:SOURce:POWer:ALC[:STATe] ON OFF 1 0 :SOURce:POWer:ALC[:STATe] ?
Example:	SOUR:POW:ALC OFF SOUR:POW:ALC?
Preset:	On
Range:	On   Off
Initial S/W Revision:	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path:	<b>Source</b>
<b>Remote Command:</b>	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe] ?
Example:	:OUTP:MOD OFF
Notes:	This setting is for independent mode and has no effect on <a href="#">“List Sequencer” on page 507</a> . If the <a href="#">“Sequencer” on page 507</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the “MOD” annunciator is displayed in the system settings panel. When the Modulation is turned Off, the “MOD” annunciator is cleared. If the <a href="#">“Sequencer” on page 507</a> is set to ON, the “MOD” annunciator will be replaced by “SEQ” in the system settings panel indicating that the output is controlled by list sequencer.
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path:	<b>Source</b>
-----------	---------------

Notes:	The sub-menu under this button is for independent mode and has no effect on “List Sequencer” on page 507. If the “Sequencer” on page 507 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.
Initial S/W Revision:	A.05.00

## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path:	<b>Source, Frequency</b>
<b>Remote Command:</b>	:SOURce:FREQuency [:CW] <freq> :SOURce:FREQuency [:CW] ?
Example:	SOUR:FREQ 1.00 GHz
Notes:	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step’s output frequency.
Couplings:	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset:	1.00 GHz
Min:	10.00 MHz
Max:	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz
Initial S/W Revision:	A.05.00

## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: “GSM/EDGE Channel Number Ranges” on page 433, “W-CDMA Channel Number Ranges” on page 433, “CDMA 2000 / 1xEVDO Channel Number Ranges” on page 436, “LTE FDD Channel Number Ranges” on page 438, “LTE TDD Channel Number Ranges” on page 439, and “TDSCDMA Channel Number Ranges” on page 440.

Key Path:	<b>Source, Frequency</b>
-----------	--------------------------

## Source (Internal)

<b>Remote Command:</b>	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
Example:	SOUR:FREQ:CHAN:NUMB 1
Notes:	This key is grayed out when the <a href="#">“Radio Standard” on page 441</a> is set to NONE.
Dependencies:	This key is grayed out when the <a href="#">“Radio Standard” on page 441</a> is set to NONE.
Couplings:	The channel number is coupled to the frequency value when the <a href="#">“Radio Standard” on page 441</a> is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset:	1
Min:	Please refer to the tables below for the valid ranges.
Max:	Please refer to the tables below for the valid ranges.
Initial S/W Revision:	A.05.00



**GSM/EDGE Channel Number Ranges**

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$
	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
GSM 850	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

**W-CDMA Channel Number Ranges**

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$

Source (Internal)

Band	Link (Device)	Range	Frequency (MHz)
Band II	Downlink	$412 \leq n \leq 687$ $9662 \leq n \leq 9938$	$n+5 + 1850.1$ $n+5$
	Uplink	$12 \leq n \leq 287$ $350 \leq n \leq 425$	$n+5 + 1850.1$ $n+5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n+5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n+5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$ $1887 \leq n \leq 2087$	$n+5 + 1805$ $n+5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$ $1662 \leq n \leq 1862$	$n+5 + 1450$ $n+5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$ $4357 \leq n \leq 4458$	$n+5 + 670.1$ $n+5$
	Uplink	$782 \leq n \leq 862$ $4132 \leq n \leq 4233$	$n+5 + 670.1$ $n+5$
Band VI	Downlink	$1037 \leq n \leq 1062$ $4387 \leq n \leq 4413$	$n+5 + 670.1$ $n+5$
	Uplink	$812 \leq n \leq 837$ $4162 \leq n \leq 4188$	$n+5 + 670.1$ $n+5$
Band VII	Downlink	$2237 \leq n \leq 2563$ $2587 \leq n \leq 2912$	$n+5 + 2175$ $n+5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$ $2362 \leq n \leq 2687$	$n+5 + 2100$ $n+5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n+5 + 340$
	Uplink	$2712 \leq n \leq 2863$	$n+5 + 340$
Band IX	Downlink	$9237 \leq n \leq 9387$	$n+5$
	Uplink	$8762 \leq n \leq 8912$	$n+5$
Band X	Downlink	$3112 \leq n \leq 3388$ $3412 \leq n \leq 3687$	$n+5 + 1490$ $n+5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$ $3187 \leq n \leq 3462$	$n+5 + 1135$ $n+5 + 1075.1$

Band	Link (Device)	Range	Frequency (MHz)
Band XI	Downlink	$3712 \leq n \leq 3812$	$n+5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n+5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n+5 - 37$
		$3927 \leq n \leq 3992$	$n+5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n+5 - 22$
		$3702 \leq n \leq 3767$	$n+5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n+5 - 55$
		$4067 \leq n \leq 4092$	$n+5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n+5 + 21$
		$3702 \leq n \leq 3767$	$n+5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n+5 - 63$
		$4167 \leq n \leq 4192$	$n+5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n+5 + 12$
		$3942 \leq n \leq 3967$	$n+5 + 2.1$

## CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
US PCS	Downlink (BS, forward link)	$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 489.000$

Band	Link (Device)	Range	Frequency (MHz)
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$ $720 \leq N \leq 919$	$0.025 \times N + 806.000$ $0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$ $720 \leq N \leq 919$	$0.025 \times N + 851.000$ $0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
AWS	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
US 2.5 GHz	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
700 Public Safety	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
C2K Lower 700	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$

Source (Internal)

Band	Link (Device)	Range	Frequency (MHz)
400 Euro PAMR	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
		$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
		$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where  $F_{DL\_low}$  and  $N_{Offs-DL}$  are given in table 5.4.4–1 and  $N_{DL}$  is the downlink EARFCN.

$$F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs-DL})$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where  $F_{UL\_low}$  and  $N_{Offs-UL}$  are given in table 5.4.4–1 and  $N_{UL}$  is the uplink EARFCN.

$$F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs-UL})$$

Band	Downlink			Uplink		
	$F_{DL\_low}$ (MHz)	$N_{Offs-DL}$	Range of $N_{DL}$	$F_{UL\_low}$ (MHz)	$N_{Offs-UL}$	Range of $N_{UL}$
1	2110	0	0 – 599	1920	18000	18000 – 18599
2	1930	600	600 - 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749

7	2620	2750	2750 – 3449	2500	20750	20750 – 20449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 – 6449	832	24150	24150 – 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 – 24599
...						
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 – 8689	1850	26040	26040 – 26689
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where  $F_{DL\_low}$  and  $N_{Offs-DL}$  are given in table 5.4.4–1 and  $N_{DL}$  is the downlink EARFCN.

$$F_{DL} = F_{DL\_low} + 0.1(N_{DL} - N_{Offs-DL})$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where  $F_{UL\_low}$  and  $N_{Offs-UL}$  are given in table 5.4.4–1 and  $N_{UL}$  is the uplink EARFCN.

## Source (Internal)

$$F_{UL} = F_{UL\_low} + 0.1(N_{UL} - N_{Offs-UL})$$

Band	Downlink			Uplink		
	F <sub>DL_low</sub> (MHz)	N <sub>Offs-DL</sub>	Range of N <sub>DL</sub>	F <sub>UL_low</sub> (MHz)	N <sub>Offs-UL</sub>	Range of N <sub>UL</sub>
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

## TDSCDMA Channel Number Ranges

### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$



## UARFCN

## 1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio Frequency Channel Number 1.28 Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

### Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

Key Path:	<b>Source, Frequency</b>
Initial S/W Revision:	A.05.00

### Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path:	<b>Source, Frequency, Radio Setup</b>
-----------	---------------------------------------

## Source (Internal)

<b>Remote Command:</b>	: SOURce : FREQuency : CHANnels : BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND4   BANDB   BANDC   BANDD   BANDE   BANDF  : SOURce : FREQuency : CHANnels : BAND?
Example:	SOUR:FREQ:CHAN:BAND PGSM
Notes:	Set this setting to “NONE” will grey out “Channel” on page 431 Channel
Initial S/W Revision:	A.05.00

### None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### P-GSM

Selects P-GSM as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision:	A.05.00

### E-GSM

Selects E-GSM as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND EGSM

Initial S/W Revision:	A.05.00
-----------------------	---------

**R-GSM**

Selects R-GSM as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision:	A.05.00

**DCS 1800**

Selects DCS 1800 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision:	A.05.00

**PCS 1900**

Selects PCS 1900 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision:	A.05.00

**GSM 450**

Selects GSM 450 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision:	A.05.00

**GSM 480**

Selects GSM 480 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision:	A.05.00

## Source (Internal)

### GSM 850

Selects GSM 850 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision:	A.05.00

### GSM 700

Selects GSM 700 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision:	A.05.00

### T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE</b>
Example:	SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision:	A.05.00

### WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### Band I

Selects Band I as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision:	A.05.00

### Band II

Selects Band II as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDII

Initial S/W Revision:	A.05.00
-----------------------	---------

**Band III**

Selects Band III as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision:	A.05.00

**Band IV**

Selects Band IV as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision:	A.05.00

**Band V**

Selects Band V as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision:	A.05.00

**Band VI**

Selects Band VI as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision:	A.05.00

**Band VII**

Selects Band VII as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision:	A.05.00

## Source (Internal)

### Band VIII

Selects Band VIII as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision:	A.05.00

### Band IX

Selects Band IX as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision:	A.05.00

### Band X

Selects Band X as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision:	A.05.00

### Band XI

Selects Band XI as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision:	A.05.00

### Band XII

Selects Band XII as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision:	A.05.00

### Band XIII

Selects band XIII as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
-----------	--

Example:	SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision:	A.05.00

**Band XIV**

Selects Band XIV as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, WCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision:	A.05.00

**CDMA 2000 / 1xEVDO**

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

**US CELL**

Selects US Cell as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision:	A.05.00

**US PCS**

Selects US PCS as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision:	A.05.00

**Japan Cell**

Selects Japan Cell as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision:	A.05.00

## Source (Internal)

### Korean PCS

Selects Korean PCS as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision:	A.05.00

### NMT 450

Selects NMT 450 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision:	A.05.00

### IMT 2000

Selects IMT 2000 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision:	A.05.00

### Upper 700

Selects Upper 700 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision:	A.05.00

### Secondary 800

Selects Secondary 800 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision:	A.05.00

### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
-----------	---



Example:	SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision:	A.05.00

**800 PAMR**

Selects 800 PAMR as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision:	A.05.00

**2.5GHz IMT EXT**

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision:	A.05.00

**US PCS 1.9GHz**

Selects US PCS 1.9 GHz as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision:	A.05.00

**AWS**

Selects AWS as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision:	A.05.00

**US 2.5GHz**

Selects US 2.5 GHz as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision:	A.05.00

## Source (Internal)

### 700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision:	A.05.00

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Example:	SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision:	A.05.00

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.09.50

### BAND 1

Selects BAND 1 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision:	A.09.50

### BAND 2

Selects BAND 2 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision:	A.09.50

### BAND 3

Selects BAND 3 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND3

Initial S/W Revision:	A.09.50
-----------------------	---------

**BAND 4**

Selects BAND 4 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision:	A.09.50

**BAND 5**

Selects BAND 5 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision:	A.09.50

**BAND 6**

Selects BAND 6 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision:	A.09.50

**BAND 7**

Selects BAND 7 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision:	A.09.50

**BAND 8**

Selects BAND 8 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision:	A.09.50

## Source (Internal)

### BAND 9

Selects BAND 9 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision:	A.09.50

### BAND 10

Selects BAND 10 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision:	A.09.50

### BAND 11

Selects BAND 11 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision:	A.09.50

### BAND 12

Selects BAND 12 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision:	A.09.50

### BAND 13

Selects BAND 13 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision:	A.09.50

### BAND 14

Selects BAND 14 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
-----------	--

Example:	SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision:	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision:	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision:	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision:	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision:	A.09.50

**BAND 21**

Selects BAND 21 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision:	A.09.50

## Source (Internal)

### BAND 24

Selects BAND 24 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision:	A.09.50

### BAND 25

Selects BAND 25 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE</b>
Example:	SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision:	A.09.50

### LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.11.50

### BAND 33

Selects BAND 33 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision:	A.11.50

### BAND 34

Selects BAND 34 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision:	A.11.50

### BAND 35

Selects BAND 35 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND35

Initial S/W Revision:	A.11.50
-----------------------	---------

**BAND 36**

Selects BAND 36 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision:	A.11.50

**BAND 37**

Selects BAND 37 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision:	A.11.50

**BAND 38**

Selects BAND 38 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision:	A.11.50

**BAND 39**

Selects BAND 39 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision:	A.11.50

**BAND 40**

Selects BAND 40 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision:	A.11.50

## Source (Internal)

### BAND 41

Selects BAND 41 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision:	A.11.50

### BAND 42

Selects BAND 42 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision:	A.11.50

### BAND 43

Selects BAND 43 as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, LTE TDD</b>
Example:	SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision:	A.11.50

### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.11.50

### BAND A

Selects BAND A as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision:	A.11.50

### BAND B

Selects BAND B as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDB



Initial S/W Revision:	A.11.50
-----------------------	---------

**BAND C**

Selects BAND C as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision:	A.11.50

**BAND D**

Selects BAND D as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision:	A.11.50

**BAND E**

Selects BAND E as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision:	A.11.50

**BAND F**

Selects BAND F as the band for the current step.

Key Path:	<b>Source, Frequency, Radio Setup, Radio Standard, TDSCDMA</b>
Example:	SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision:	A.11.50

**Radio Band Link**

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path:	<b>Source, Frequency, Radio Setup</b>
-----------	---------------------------------------

## Source (Internal)

<b>Remote Command:</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
Example:	SOUR:RAD:BAND:LINK UP
Preset:	DOWN
Range:	DOWN   UP
Backwards Compatibility SCPI:	:SOURce:RADio:DEVice BTS MS :SOURce:RADio:DEVice?
Backwards Compatibility Notes:	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision:	A.05.00

### Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

---

**NOTE** If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.  
If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

---

Key Path:	<b>Source, Frequency</b>
<b>Remote Command:</b>	:SOURce:FREQuency:REference:SET
Example:	SOUR:FREQ:REF:SET

Dependencies:	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision:	A.05.00

### Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to [“Set Reference Frequency” on page 458](#)

Key Path:	<b>Source, Frequency</b>
<b>Remote Command:</b>	:SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe?
Example:	SOUR:FREQ:REF 0.00 Hz SOUR:FREQ:REF:STATe ON
Dependencies:	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings:	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset:	0.00 Hz OFF
Min:	0.00 Hz
Max:	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz
Initial S/W Revision:	A.05.00

## Source (Internal)

### Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path:	<b>Source, Frequency</b>
<b>Remote Command:</b>	:SOURce:FREQuency:OFFSet <freq> :SOURce:FREQuency:OFFSet?
Example:	SOUR:FREQ:OFFS 0 Hz
Dependencies:	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset:	0 Hz
Min:	-100.00 GHz
Max:	100.00 GHz
Initial S/W Revision:	A.05.00

### Modulation Setup

Allows access to the menus for setting up the available modulation types: “ARB” on page 461, “AM” on page 503, “FM” on page 504, and “PM” on page 505.

Key Path:	<b>Source</b>
-----------	---------------

Initial S/W Revision:	A.05.00
-----------------------	---------

**ARB**

Allows you access to the ARB sub-menus.

Key Path:	<b>Source, Modulation Setup</b>
Initial S/W Revision:	A.05.00

**ARB**

Allows you to toggle the state of the ARB function. When the ARB is On, a “MOD” annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path:	<b>Source, Modulation Setup, ARB</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe] ?
Example:	SOUR:RAD:ARB OFF SOUR:RAD:ARB?
Notes:	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies:	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting 7.1Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting 7.1Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.  The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. “-  When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

**Select Waveform**

Allows you to access to the waveform selection sub-menus.

## Source (Internal)

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Initial S/W Revision:	A.05.00

### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:WAVEform <string> :SOURce:RADio:ARB:WAVEform?
Example:	SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes:	<string> - specifies the name of the waveform segment or waveform sequence to be played by the ARB.  When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .  When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and none of the waveform segments is loaded.  If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.  If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.  If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.error is generated.  If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision:	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D:\nvarb.

Pressing this key changes the current view to the Waveform Management View.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform</b>
Initial S/W Revision:	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D:\NVARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [“Memory Subsystem \(Remote Command Only\)” on page 548](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:LOAD <string>
Example:	SOUR:RAD:ARB:LOAD “D:\NVARB\testwaveform.bin” or SOUR:RAD:ARB:LOAD “NVWFM:testwaveform.bin”

## Source (Internal)

Notes:	<p>&lt;string&gt; - specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed”. User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
Initial S/W Revision:	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk</b>
<b>Remote Command:</b>	:SOURCE:RADio:ARB:LOAD:ALL <string>
Example:	SOUR:RAD:ARB:LOAD:ALL “D:\nvarb”



Notes:	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision:	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk</b>
Notes:	No remote command, SCPI front panel only.
Initial S/W Revision:	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example:	SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" SOUR:RAD:ARB:DEF:DIR?
State Saved:	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision:	A.05.00

## Source (Internal)

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform</b>
Initial S/W Revision:	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:DELeTe <string>
Example:	SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes:	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision:	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path:	<b>Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:DELeTe:ALL
Example:	SOUR:RAD:ARB:DELeTe:ALL

Notes:	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in “List Sequencer” on page 507 and “Sequencer” on page 507 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision:	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

---

**NOTE** This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use “[Query ARB Memory Full File List \(Remote Command Only\)](#)” on page 467.

---

<b>Remote Command:</b>	:SOURce:RADio:ARB:CATalog?
Example:	SOUR:RAD:ARB:CATalog?
Notes:	<p>The return data is in the following format:</p> <p>&lt;integer&gt; - memory used</p> <p>&lt;integer&gt; - memory free</p> <p>&lt;string&gt; ... - comma separated list of waveform segments within ARB memory</p>
Initial S/W Revision:	A.05.00

### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

<b>Remote Command:</b>	:SOURce:RADio:ARB:FCATalog?
Example:	SOUR:RAD:ARB:FCATalog?

## Source (Internal)

Notes:	The return data is in the following format:  <integer> - memory used  <integer> - memory free  <integer> - file count in ARB memory  <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory  Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
Initial S/W Revision:	A.09.00

### ARB Setup

Allows access to the ARB setup sub-menus.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Initial S/W Revision:	A.05.00

### Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path:	<b>Source, Modulation Setup, ARB, ARB Setup</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example:	SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	125.00 MHz
Min:	1.00 kHz
Max:	125.00 MHz
Initial S/W Revision:	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path:	<b>Source, Modulation Setup, ARB, ARB Setup</b>
-----------	---

<b>Remote Command:</b>	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example:	SOUR:RAD:ARB:RSC 100.00
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	70.00 %
Min:	1.00 %
Max:	100.00 %
Initial S/W Revision:	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path:	<b>Source, Modulation Setup, ARB, ARB Setup</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example:	SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	0.00 Hz
Min:	-50.00 MHz
Max:	50.00 MHz
Initial S/W Revision:	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path:	<b>Source, Modulation Setup, ARB</b>
-----------	--------------------------------------

## Source (Internal)

<b>Remote Command:</b>	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGle   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
Example:	SOUR:RAD:ARB:TRIG:TYPE CONT SOUR:RAD:ARB:TRIG:TYPE?
Notes:	Gated trigger type will be implemented at a later release
Preset:	CONTInuous
Range:	Continuous   Single   Seg Adv   Gated
Initial S/W Revision:	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous [:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous [:TYPE] ?
Example:	SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset:	FREE
Range:	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision:	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Continuous</b>
Example:	SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision:	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Continuous</b>
-----------	--

Example:	SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision:	A.05.00

**Reset + Run**

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Continuous</b>
Example:	SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision:	A.05.00

**Single**

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMEDIATE :SOURce:RADio:ARB:RETRigger?
Example:	SOUR:RAD:ARB:RETR OFF
Notes:	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger  This is defined as an enumerated SCPI command, with ON/OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset:	ON
Range:	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision:	A.05.00

**No Retrigger**

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Single</b>
Example:	SOUR:RAD:ARB:RETR OFF
Initial S/W Revision:	A.05.00

## Source (Internal)

### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Single</b>
Example:	SOUR:RAD:ARB:RETR ON
Initial S/W Revision:	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Single</b>
Example:	SOUR:RAD:ARB:RETR IMM
Initial S/W Revision:	A.05.00

### Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance [:TYPE] SINGLE   CONTinuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance [:TYPE] ?
Example:	SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Preset:	CONTinuous
Range:	Single   Continuous
Initial S/W Revision:	A.05.00

### Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to



completion and the next segment is played once.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Segment Advance</b>
Example:	SOUR:RAD:ARB:TRIG:TYPE:SADV SING
Initial S/W Revision:	A.05.00

### Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Type, Segment Advance</b>
Example:	SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
Initial S/W Revision:	A.05.00

### Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path:	<b>Source, Modulation Setup, ARB</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce] ?
Example:	SOUR:RAD:ARB:TRIGger KEY
Dependencies:	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset:	EXTernal2
Range:	Trigger Key   Bus   External 2
Initial S/W Revision:	A.05.00

### Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Source</b>
Example:	SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision:	A.05.00

### Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB

## Source (Internal)

using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Source</b>
Example:	SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision:	A.05.00

## External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path:	<b>Source, Modulation Setup, ARB, Trigger Source</b>
Example:	SOUR:RAD:ARB:TRIGger EXT2
Initial S/W Revision:	A.05.00

## Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Notes:	No remote command, SCPI front panel only.
Initial S/W Revision:	A.05.00

## Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Notes:	No remote command, SCPI front panel only.
Initial S/W Revision:	A.05.00

## Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences</b>
Notes:	No remote command, SCPI front panel only.
Initial S/W Revision:	A.05.00

**Current Segment**

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path:	<b>Source, Modulation Setup , ARB, Waveform Sequences, Build New Sequence</b>
Notes:	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision:	A.05.00

**Insert New Waveform**

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence</b>
Notes:	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision:	A.05.00

**Insert Waveform**

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform</b>
Notes:	No remote command, SCPI front panel only. Waveform segment NAME string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision:	A.05.00

**Segments on Hard Disk**

This key functions the same as [“Segments on Hard Disk”](#) on page 462.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform</b>
Initial S/W Revision:	Prior to A.09.00

## Source (Internal)

### Load Segment To ARB Memory

This key functions the same as [“Load Segment To ARB Memory”](#) on page 463.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as [“Load All To ARB Memory”](#) on page 464.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Change Directory ...

This key functions the same as [“Change Directory...”](#) on page 465.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Default Directory ...

This key functions the same as [“Default Directory...”](#) on page 465

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Segments in ARB Memory

This key functions the same as [“Segments in ARB Memory”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform</b>
Initial S/W Revision:	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as [“Delete Segment From ARB Mem”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Delete All From ARB Memory**

This key functions the same as [“Delete All From ARB Memory”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Query ARB Memory File List (Remote Command Only)**

This command functions the same as [“Query ARB Memory File List \(Remote Command Only\)”](#) on page 467.

Initial S/W Revision:	Prior to A.09.00
-----------------------	------------------

**Edit Selected Waveform**

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Repetitions**

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform</b>
Notes:	No remote command, SCPI front panel only.
Preset:	1
Min:	1
Max:	65535
Initial S/W Revision:	A.05.00

**Marker 1**

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled

## Source (Internal)

Initial S/W Revision:	A.05.00
-----------------------	---------

### Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

### Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

### Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

**Delete Segment**

Allows you to delete the selected segment from the waveform sequence.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Save Sequence...**

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence</b>
Initial S/W Revision:	A.05.00

**Build New Sequence (Remote Command Only)**

This command is the SCPI equivalent of the waveform sequence creation features described in [“Build New Sequence” on page 474](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) “NVWFM” or use a real full path representation. See the example below. MSUS “NVWFM” is mapped to D:\NVARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

<b>Remote Command:</b>	<pre>:SOURce:RADio:ARB:SEQuence[:MWAVeform] &lt;filename&gt;, &lt;waveform1&gt;, &lt;reps&gt;, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M 1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, {&lt;waveform2&gt;, &lt;reps&gt;, NONE M1 M2 M3 M4 M1M2 M1M3 M1M4 M2M3 M2M4 M3M4 M1M2M3 M 1M2M4 M1M3M4 M2M3M4 M1M2M3M4 ALL, } ...</pre> <p>(For additional description of each item, see Notes below <a href="#">“For Setup SCPI” on page 481</a> “For Setup SCPI”.)</p> <pre>:SOURce:RADio:ARB:SEQuence[:MWAVeform]? &lt;filename&gt;</pre> <p>(For additional description of each item, see Notes <a href="#">“For Query SCPI” on page 482</a> below.)</p>
------------------------	---

## Source (Internal)

Example:	<p>For setup:</p> <p>SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm",10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3</p> <p>Or</p> <p>SOUR:RAD:ARB:SEQ "D:\NVARB\testSeq1.seq", " D:\NVARB\wfmSegment1.wfm",10, M2M3M4, " D:\NVARB\wfmSegment2.wfm", 20, M1M3</p> <p>For query, must specify which waveform sequence file to query.</p> <p>SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"</p> <p>Or</p> <p>SOUR:RAD:ARB:SEQ? "D:\NVARB\testSeq1.seq",</p>
----------	--



Notes:	<p><b>For Setup SCPI</b></p> <p>For the Setup SCPI command, the parameters are:</p> <p>&lt;filename&gt; - String Type</p> <p>This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.</p> <p>&lt;waveform1&gt; - String Type</p> <p>This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.</p> <p>The segment file must reside within ARB playback memory before it can be played by the ARB player.</p> <p>&lt;reps&gt; - Integer Type</p> <p>This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.</p> <p>&lt;marker&gt; - Enum Type</p> <p>NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.</p> <p>M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.</p> <p>ALL – This choice enables all four markers in the waveform segment or sequence.</p> <p>&lt;waveform2&gt; - String type.</p> <p>This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.</p> <p>The segment file must reside within ARB playback memory before it can be played by the ARB player.</p> <p>&lt;reps&gt; same as above, for the 2<sup>nd</sup> waveform segment.</p> <p>&lt;marker&gt; same as above, for the 2<sup>nd</sup> waveform segment.</p> <p>You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.</p> <p>Error Checks for Setup SCPI command:</p> <p>If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.</p>
--------	--

## Source (Internal)

Notes:	<p>Error Checks for Query SCPI command: (Continued)</p> <p>If the specified waveform sequence file name suffix is not “.seq”, error is generated.</p> <p>If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.</p> <p>If the first specified waveform file cannot be found, an error is generated.</p> <p>If you nest one waveform sequence file into another waveform sequence file, an error is generated.</p> <p>If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.</p> <p>If the specified marker type is unrecognized, an error is generated.</p> <p><b>For Query SCPI</b></p> <p>For the Query the parameters are:</p> <p>&lt;filename&gt; - String type.</p> <p>This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.</p> <p>The return value is a &lt;string&gt;, which includes each waveform segment file name, repetitions, and marker type. For example:</p> <p>SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,</p> <p>&lt;“wfmSegment1. wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”</p> <p>Error Checks for Query SCPI command:</p> <p>If you do not specify a filename, an error is generated.</p> <p>If the waveform sequence file name is empty, an error is generated.</p> <p>If the specified waveform sequence file cannot be found, an error is generated.</p>
Initial S/W Revision:	A.05.00

### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Current Segment**

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence</b>
Notes:	No remote command, front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision:	A.05.00

**Insert New Waveform**

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Insert Waveform**

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Segments on Hard Disk**

This key functions the same as section [“Segments on Hard Disk” on page 462](#).

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform</b>
Initial S/W Revision:	Prior to A.09.00

**Load Segment To ARB Memory**

This key functions the same as section [“Load Segment To ARB Memory” on page 463](#).

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments on Hard Disk</b>
Initial S/W Revision:	Prior to A.09.00

## Source (Internal)

### Load All To ARB Memory

This key functions the same as section [“Load All To ARB Memory”](#) on page 464.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments on Hard Disk</b>
Initial S/W Revision:	Prior to A.09.00

### Change Directory ...

This key functions the same as section [“Change Directory...”](#) on page 465

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments on Hard Disk</b>
Initial S/W Revision:	Prior to A.09.00

### Default Directory ...

This key functions the same as section [“Default Directory...”](#) on page 465

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments on Hard Disk</b>
Initial S/W Revision:	Prior to A.09.00

### Segments in ARB Memory

This key functions the same as section [“Segments in ARB Memory”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform</b>
Initial S/W Revision:	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as section [“Delete Segment From ARB Mem”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as section [“Delete All From ARB Memory”](#) on page 466.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Query ARB Memory File List (Remote Command Only)**

This key functions the same as section [Query “Query ARB Memory File List \(Remote Command Only\)” on page 467](#)

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Insert New Waveform, Segments in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Edit Selected Waveform**

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Repetitions**

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	1
Min:	1
Max:	TBD
Initial S/W Revision:	A.05.00

**Marker 1**

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

**Marker 2**

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can

## Source (Internal)

enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

### Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

### Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence but not for others.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence, Edit Selected Waveform</b>
Notes:	No remote command, front panel only.
Preset:	Enabled
Range:	Enabled Disabled
Initial S/W Revision:	A.05.00

### Delete Segment

Allows you to delete the current segment from the waveform sequence.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence</b>
Notes:	No remote command, front panel only.

Initial S/W Revision:	A.05.00
-----------------------	---------

**Save Sequence...**

Pressing this key displays the “Save As” dialog box. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog opens into is the default waveform directory.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences, Edit Selected Sequence</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Current Directory...**

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Sequences</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

**Waveform Utilities**

Allows you access to the waveform utilities sub-menus.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Initial S/W Revision:	A.05.00

**Multi-Pack Licenses**

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities</b>
Dependencies:	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision:	A.05.00

**Add Waveform**

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses</b>
Dependencies:	This key is only available if there is at least one slot available within at least one multi-pack license.

## Source (Internal)

Initial S/W Revision:	A.05.00
-----------------------	---------

### Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform</b>
Remote Command:	:SYSTem:LKEY:WAVEform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVEform:ADD <string>
Example:	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes:	The second SCPI :SYSTem:LIcense[:FPACK]:WAVEform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them.  Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack.  If you attempt to license a waveform that is already licensed using another slot an error is generated.
Dependencies:	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision:	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 462](#).

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform</b>
Initial S/W Revision:	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 463](#).

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00



**Load All To ARB Memory**

This key functions the same as [“Load All To ARB Memory”](#) on page 464.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

**Change Directory ...**

This key functions the same as [“Change Directory...”](#) on page 465.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

**Default Directory ...**

This key functions the same as [“Default Directory...”](#) on page 465

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

**Replace Waveform**

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses</b>
Dependencies:	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision:	A.05.00

**Replace Waveform**

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform</b>
<b>Remote Command:</b>	:SYSTem:LKEY:WAVEform:REPLace <int>, <string> or :SYSTem:LICense[:FPACK]:WAVEform:REPLace <int>, <string>
Example:	SYST:LKEY:WAV:REPL 1, “myotherwaveform.wfm” or :SYST:LIC:WAV:REPL 1, “myotherwaveform.wfm”

## Source (Internal)

Notes:	<p>The second SCPI :SYSTem:LiCense[:FPACK]:WAVEform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them.</p> <p>If you attempt to license a waveform that is already licensed using another slot an error is generated.</p> <p>Waveform slot number &lt;int&gt; is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot &lt;n&gt; is illegal, slot number must be positive"</p>
Initial S/W Revision:	A.05.00

### Segments on Hard Disk

This key functions the same as [“Segments on Hard Disk”](#) on page 462.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform</b>
Initial S/W Revision:	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as [“Load Segment To ARB Memory”](#) on page 463.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as [“Load All To ARB Memory”](#) on page 464.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Change Directory ...

This key functions the same as [“Change Directory...”](#) on page 465.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Default Directory ...

This key functions the same as [“Default Directory...”](#) on page 465

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive</b>
-----------	--

Initial S/W Revision:	Prior to A.09.00
-----------------------	------------------

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses</b>
<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
Example:	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
Notes:	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them.  Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot <n> is illegal, slot number must be positive"
Dependencies:	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision:	A.05.00

### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path:	<b>Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses</b>
<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example:	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes:	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them.  Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot <n> is illegal, slot number must be positive"

## Source (Internal)

Dependencies:	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision:	A.05.00

### Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:STATus? <int>
Example:	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
Notes:	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them.  Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot <n> is illegal, slot number must be positive"  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
Range:	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
Initial S/W Revision:	A.05.00

### Slots Free Query (Remote Command Only)

Returns the number of license slots free.

<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LIcense[:FPACK]:WAVeform:FREE?
Example:	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
Notes:	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision:	A.05.00

**Slot Used Query (Remote Command Only)**

Returns the number of license slots used.

<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LIcense[:FPACK]:WAVeform:USED?
Example:	:SYST:LKEY:WAV:USED? or :SYST:LIC:WAV:USED?
Notes:	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision:	A.05.00

**Slot Waveform Name Query (Remote Command Only)**

Returns the waveform name of the specified slot

<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>
Example:	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes:	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot <n> is illegal, slot number must be positive".  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision:	A.12.00

**Slot Waveform Unique ID Query (Remote Command Only)**

Returns the waveform unique ID of the specified slot.

<b>Remote Command:</b>	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int>
------------------------	---

## Source (Internal)

Example:	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes:	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. "-220 Parameter error; License slot <n> is illegal, slot number must be positive".  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  Only Signal Studio waveform has unique ID, which is a positive number. (User generated waveform has no unique ID). If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision:	A.12.00

### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

<b>Remote Command:</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
Example:	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm","GSM_MCS1.WFM","c2kWfm.wfm"
Initial S/W Revision:	A.11.00

### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

<b>Remote Command:</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
Example:	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136","3812603511","3710986266"
Notes:	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision:	A.11.00

### Marker Utilities

Allows access to the marker utilities sub-menus.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Initial S/W Revision:	A.05.00

**Marker Polarity**

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities</b>
Initial S/W Revision:	A.05.00

**Mkr 1 Polarity**

Allows you to set the polarity of marker 1.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example:	SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	Pos
Range:	Neg   Pos
Initial S/W Revision:	A.05.00

**Mkr 2 Polarity**

Allows you to set the polarity of marker 2.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example:	SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	Pos

## Source (Internal)

Range:	Neg   Pos
Initial S/W Revision:	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity</b>
Remote Command:	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example:	SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	Pos
Range:	Neg   Pos
Initial S/W Revision:	A.05.00

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity</b>
Remote Command:	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example:	SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset:	Pos
Range:	Neg   Pos
Initial S/W Revision:	A.05.00



### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities</b>
Initial S/W Revision:	A.05.00

### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
Example:	SOUR:RAD:ARB:MDES:PULS NONE
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range:	None   M1   M2   M3   M4
Initial S/W Revision:	A.05.00

### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank</b>
Example:	SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision:	A.05.00

## Source (Internal)

### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank</b>
Example:	SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision:	A.05.00

### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank</b>
Example:	SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision:	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank</b>
Example:	SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision:	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank</b>
Example:	SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision:	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing</b>
-----------	--

<b>Remote Command:</b>	:SOURCE:RADio:ARB:MDEStination:ALCHold NONE   M1   M2   M3   M4 :SOURCE:RADio:ARB:MDEStination:ALCHold?
Example:	SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies:	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range:	None   M1   M2   M3   M4
Initial S/W Revision:	A.05.00

**None**

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold</b>
Example:	SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision:	A.05.00

**Marker 1**

Sets marker 1 to be used for the ALC hold function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold</b>
Example:	SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision:	A.05.00

**Marker 2**

Sets marker 2 to be used for the ALC hold function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold</b>
Example:	SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision:	A.05.00

**Marker 3**

Sets marker 3 to be used for the ALC hold function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold</b>
-----------	--

## Source (Internal)

Example:	SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision:	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path:	<b>Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold</b>
Example:	SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision:	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path:	<b>Source, Modulation Setup, ARB</b>
Dependencies:	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision:	A.05.00

### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path:	<b>Source, Modulation Setup, ARB, Header Utilities</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:HEADer:CLEar
Example:	SOUR:RAD:ARB:HEAD:CLE
Notes:	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision:	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

Key Path:	<b>Source, Modulation Setup, ARB, Header Utilities</b>
<b>Remote Command:</b>	:SOURce:RADio:ARB:HEADer:SAVE
Example:	SOUR:RAD:ARB:HEAD:SAVE
Notes:	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision:	A.05.00

**Query Waveform Unique ID (Remote Command Only)**

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command.

<b>Remote Command:</b>	:MMEMory:HEADer:ID? "<file name>"
Example:	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D:\NVARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes:	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D:\NVARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision:	A.09.00

**Source (Internal)**

**Query Selected Waveform Header info (Remote Command Only)**

This query provides a listing of the current selected ARB header info. If no ARB selected, then empty string is returned..

<b>Remote Command:</b>	:SOURce:RADio:ARB:HEADer:INFormation?
Example:	SOUR:RAD:ARB:HEAD:INF?
Notes:	<p>Query only</p> <p>After each colon of field title string, related header info string will be appended.</p> <p>The field title string in "Range" part cannot change, for Sequence Studio needs to accurately match those string character to know which header info field it is.</p> <p>Below are related abbreviation description:</p> <p>"DESC" - Description</p> <p>"SR" - Sample Rate</p> <p>"RTS" - Run Time Scaling</p> <p>"RMS" - Root Mean Square</p> <p>"M1P" - Marker 1 Polarity</p> <p>"M2P" - Marker 2 Polarity</p> <p>"M3P" - Marker 3 Polarity</p> <p>"M4P" - Marker 4 Polarity</p> <p>"ALCHR" - ALC Hold Routing</p> <p>"RFBR" - RF Blank Routing</p> <p>"FOFF" - Frequency Offset</p> <p>"AWGNST" - AWGN State</p> <p>"AWGNCN" - AWGN C/N Ratio</p> <p>"AWGNCBW" - AWGN Carrier Bandwidth</p> <p>"AWGNNBW" - AWGN Noise Bandwidth</p> <p>"AWGNCRMS" - AWGN Carrier RMS</p> <p>"ORP" - DAC Over Range Protection</p> <p>"UID" - Unique ID</p> <p>"LICSTS" - License Status</p>
Range:	"DESC:", "SR:", "RTS:", "RMS:", "M1P:", "M2P:", "M3P:", "M4P:", "ALCHR:", "RFBR:", "FOFF:", "AWGNST:", "AWGNCN:", "AWGNCBW:", "AWGNNBW:", "AWGNCRMS:", "ORP:", "UID:", "LICSTS"
Initial S/W Revision:	A.12.00

**Bus Trigger Command (Remote Command Only)**

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command:</b>	:SOURce:RADio:ARB:TRIGger:INITiate
Example:	SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision:	A.05.00

**AM**

Allows access to the menu for configuring the Amplitude Modulation.

Key Path:	<b>Source, Modulation Setup</b>
Initial S/W Revision:	A.05.00

**AM**

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path:	<b>Source, Modulation Setup, AM</b>
<b>Remote Command:</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
Example:	SOUR:AM:STAT OFF
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

**AM Depth**

Allows you to set the amplitude modulation depth in percent.

Key Path:	<b>Source, Modulation Setup, AM</b>
<b>Remote Command:</b>	:SOURce:AM[:DEPTh] [:LiNear] :SOURce:AM[:DEPTh] [:LiNear] ?
Example:	SOUR:AM 0.1
Preset:	0.1 %
Min:	0.1 %
Max:	95.0 %
Initial S/W Revision:	A.05.00

## Source (Internal)

### AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path:	<b>Source, Modulation Setup, AM</b>
<b>Remote Command:</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
Example:	SOUR:AM:INT:FREQ 40.0 Hz
Preset:	400.0 Hz
Min:	10 Hz
Max:	40 kHz
Initial S/W Revision:	A.05.00

### FM

Allows access to the menu for configuring the frequency modulation.

Key Path:	<b>Source, Modulation Setup</b>
Initial S/W Revision:	A.05.00

### FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path:	<b>Source, Modulation Setup, FM</b>
<b>Remote Command:</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
Example:	SOUR:FM:STAT OFF
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

### FM Deviation

Allows you to set the frequency modulation deviation.

Key Path:	<b>Source, Modulation Setup, FM</b>
<b>Remote Command:</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?



Example:	SOUR:FM 1.00 kHz
Preset:	1.00 Hz
Min:	1.00 Hz
Max:	100.00 kHz
Initial S/W Revision:	A.05.00

**FM Rate**

Allows you to set the internal frequency modulation rate.

Key Path:	<b>Source, Modulation Setup, FM</b>
<b>Remote Command:</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
Example:	SOUR:FM:INT:FREQ 40.0 Hz
Preset:	400.0 Hz
Min:	10 Hz
Max:	40 kHz
Initial S/W Revision:	A.05.00

**PM**

Allows access to the menu for configuring the phase modulation.

Key Path:	<b>Source, Modulation Setup</b>
Initial S/W Revision:	A.05.00

**PM**

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path:	<b>Source, Modulation Setup, PM</b>
<b>Remote Command:</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
Example:	SOUR:PM:STAT OFF
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

## Source (Internal)

### PM Deviation

Allows you to set the phase modulation deviation.

Key Path:	<b>Source, Modulation Setup, PM</b>
<b>Remote Command:</b>	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
Example:	SOUR:PM 1.00 rad
Preset:	0.1 rad
Min:	0.1 rad
Max:	20.0 rad
Initial S/W Revision:	A.05.00

### PM Rate

Allows you to set the internal phase modulation rate.

Key Path:	<b>Source, Modulation Setup, PM</b>
<b>Remote Command:</b>	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example:	SOUR:PM:INT:FREQ 40.0 Hz
Preset:	400.0 Hz
Min:	10 Hz
Max:	40 kHz
Initial S/W Revision:	A.05.00

### Multiport Adapter Output Port Amplitude Correction Configuration Validation (Remote Command Only)

This command is used to validate MPA TX port amplitude correction for Source MXG Mode.

Key Path:	<b>Remote Command Only</b>
<b>Remote Command:</b>	:SOURce:RADio:MPADapter:CORRection:ERRor?
Example:	SOUR:RAD:MPAD:CORR:ERR?

Note	<p>Query Only SCPI</p> <p>Remote command only</p> <p>If detected invalid configuration, popup error message</p> <p>"-221 Settings conflict; MPA TX port&lt;n&gt; amplitude correction value &lt;n&gt;dB is out of range. The valid range is &lt;n&gt; ~ &lt;n&gt;dB"</p> <p>Or</p> <p>"-221 Settings conflict; MPA TX port&lt;n&gt; amplitude correction delta exceeds &lt;n&gt;dB between port&lt;n&gt; and port&lt;n&gt;"</p> <p>to report the first detected conflict.</p>
Range:	"No error"   Error info of the first found conflic
Initial S/W Revision:	A.12.00

## List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a tabular form. The details of the SCPI for configuring the list sequencer can be found in [“Step Configuration \(Remote Command Only\)” on page 536](#).

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path:	<b>Source</b>
Initial S/W Revision:	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path:	<b>Source, List Sequencer</b>
<b>Remote Command:</b>	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example:	SOUR:LIST OFF

## Source (Internal)

Notes:	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings:	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset:	Off
Range:	On   Off
Initial S/W Revision:	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path:	<b>Source, List Sequencer</b>
<b>Remote Command:</b>	:SOURCE:LIST:TRIGGER[:IMMEDIATE]
Example:	SOUR:LIST:TRIG
Notes:	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see <a href="#">“Query List Sequence Initiation Armed Status (Remote Command Only)”</a> on page 546 Query Source List Sequence Armed Status)
Dependencies:	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision:	A.05.00

## Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to “Bus”. Sending this command will trigger the step and continue the sequence.

<b>Remote Command:</b>	:SOURCE:LIST:TRIGGER:INITIATE[:IMMEDIATE]
Example:	SOUR:LIST:TRIG:INIT
Initial S/W Revision:	A.05.00

## List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path:	<b>Source, List Sequencer</b>
-----------	-------------------------------

## Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURCE:LIST:NUMBER:STEPS <integer> :SOURCE:LIST:NUMBER:STEPS?
Example:	SOUR:LIST:NUMB:STEP 1
Notes:	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values.  Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies:	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset:	1
Min:	1
Max:	1000
Initial S/W Revision:	A.05.00

## Current Step

Allows you to select the step number you wish to view or edit.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Notes:	No remote command, front panel only.
Preset:	1
Min:	1
Max:	Step Count
Initial S/W Revision:	A.05.00

## Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error -221, "Setting Conflict; Cannot

## Source (Internal)

insert more steps, maximum number of steps reached”

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Notes:	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision:	A.05.00

## Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Notes:	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision:	A.05.00

## Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Initial S/W Revision:	A.05.00

## Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:INPut:TRIGger IMMediate   INTernal   EXTernal2   KEY   BUS :SOURce:LIST:STEP [1]   2   3...1000:SETup:INPut:TRIGger?
Example:	SOUR:LIST:STEP2:SET:INP:TRIG BUS SOUR:LIST:STEP2:SET:INP:TRIG?
Notes:	SCPI is supported after A.09.40
Preset:	Free Run
Range:	Free Run   Internal   Manual (Trigger Key)   Bus   External 2
Initial S/W Revision:	A.05.00

**Free Run**

Sets the trigger input for the current step to Free Run.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Trigger</b>
Example:	SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

**Internal**

Sets the trigger input for the current step to Internal.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Trigger</b>
Example:	SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

**Manual (Trigger Key)**

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Trigger</b>
Example:	SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

**Bus**

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Trigger</b>
Example:	SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

## Source (Internal)

### External 2

Sets the trigger input for the current step to External 2.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Trigger</b>
Example:	SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

### Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	Switching within same frequency band: 300 $\mu$ s Switching across frequency bands: 1 ms The band ranges are: Frequency Band 1: -0.08 GHz to 0.6075 GHz Frequency Band 2: 0.5075 GHz to 2.1775 GHz Frequency Band 3: 2.0775 GHz to 3.6 GHz
Amplitude	500 $\mu$ s

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP [1]   2   3...1000:SETup:TRANSition:TIME?



Example:	SOUR:LIST:STEP2:SET:TRAN:TIME 1ms SOUR:LIST:STEP2:SET:TRAN:TIME?
Notes:	SCPI is supported after A.09.40
Preset:	1.0 ms
Min:	0.0 ms
Max:	4.0 ks
Initial S/W Revision:	A.05.00

### Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Notes:	No remote command, front panel only.
Initial S/W Revision:	A.05.00

### Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF :SOURce:LIST:STEP [1]   2   3...1000:SETup: RADio:BAND?
Example:	SOUR:LIST:STEP2:SET:RAD:BAND PGSM SOUR:LIST:STEP2:SET:RAD:BAND?
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

## Source (Internal)

### None

Selects no radio standard for use on the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Example:	SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

### GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### P-GSM

Selects P-GSM as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

### E-GSM

Selects E-GSM as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

### R-GSM

Selects R-GSM as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

### DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
-----------	--

Initial S/W Revision:	A.05.00
-----------------------	---------

**PCS 1900**

Selects PCS 1900 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

**GSM 450**

Selects GSM 450 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

**GSM 480**

Selects GSM 480 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

**GSM 850**

Selects GSM 850 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

**GSM 700**

Selects GSM 700 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE</b>
Initial S/W Revision:	A.05.00

## Source (Internal)

### WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### Band I

Selects Band I as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band II

Selects Band II as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band III

Selects Band III as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band IV

Selects Band IV as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band V

Selects Band V as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band VI**

Selects Band VI as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band VII**

Selects Band VII as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band VIII**

Selects Band VIII as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band IX**

Selects Band IX as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band X**

Selects Band X as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

**Band XI**

Selects Band XI as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

## Source (Internal)

### Band XII

Selects Band XII as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band XIII

Selects Band XIII as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### Band XIV

Selects Band XIV as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA</b>
Initial S/W Revision:	A.05.00

### CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.05.00

### US CELL

Selects US Cell as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### US PCS

Selects US PCS as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**Japan Cell**

Selects Japan Cell as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**Korean PCS**

Selects Korean PCS as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**NMT 450**

Selects NMT 450 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**IMT 2000**

Selects IMT 2000 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**Upper 700**

Selects Upper 700 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**Secondary 800**

Selects Secondary 800 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

## Source (Internal)

### 400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### 800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### AWS

Selects AWS as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00



**700 Public Safety**

Selects 700 Public Safety as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**C2K Lower 700**

Selects C2K Lower 700 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO</b>
Initial S/W Revision:	A.05.00

**LTE**

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.09.50

**BAND 1**

Selects BAND 1 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 2**

Selects BAND 2 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 3**

Selects BAND 3 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

## Source (Internal)

### BAND 4

Selects BAND 4 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 5

Selects BAND 5 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 6

Selects BAND 6 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 7

Selects BAND 7 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 8

Selects BAND 8 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 9

Selects BAND 9 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 10**

Selects BAND 10 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 11**

Selects BAND 11 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

## Source (Internal)

### BAND 18

Selects BAND 18 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 19

Selects BAND 19 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 20

Selects BAND 20 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 21

Selects BAND 21 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 24

Selects BAND 24 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

### BAND 25

Selects BAND 25 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE</b>
Initial S/W Revision:	A.09.50

**LTE TDD**

Pressing this key once selects LTE TDD as the radio standard and the current LTE TDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE TDD band

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

**BAND 36**

Selects BAND 36 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

**BAND 37**

Selects BAND 37 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

## Source (Internal)

### BAND 38

Selects BAND 38 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

### BAND 39

Selects BAND 39 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

### BAND 40

Selects BAND 40 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

### BAND 41

Selects BAND 41 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

### BAND 42

Selects BAND 42 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

### BAND 43

Selects BAND 43 as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD</b>
Initial S/W Revision:	A.11.50

**TDSCDMA**

Pressing this key once selects TDSCDMA as the radio standard and the current TDSCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different TDSCDMA band

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard</b>
Initial S/W Revision:	A.11.50

**BAND A**

Selects BAND A as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

**BAND B**

Selects BAND B as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

**BAND C**

Selects BAND C as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

**BAND D**

Selects BAND D as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

**BAND E**

Selects BAND E as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

## Source (Internal)

### BAND F

Selects BAND F as the band for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, TDSCDMA</b>
Initial S/W Revision:	A.11.50

### Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Radio Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
Example:	SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes:	SCPI is supported after A.09.40
Preset:	DOWN
Range:	DOWN   UP
Initial S/W Revision:	A.05.00

### Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency?
Example:	SOUR:LIST:STEP2:SET:CNFR 124 SOUR:LIST:STEP2:SET:CNFR?
Notes:	SCPI is supported after A.09.40.  This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number.



Couplings:	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset:	1
Min:	0 (Please refer to for valid ranges.)
Max:	10838 (Please refer to for valid ranges.)
Initial S/W Revision:	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRfrequency?
Example:	SOUR:LIST:STEP2:SET:CNFR 1GHz SOUR:LIST:STEP2:SET:CNFR?
Notes:	SCPI is supported after A.09.40.  This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings:	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset:	1.00 GHz
Min:	10.00 MHz
Max:	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz
Initial S/W Revision:	A.05.00

## Source (Internal)

### Power

Allows you to specify a power value for the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Remote Command:	:SOURce:LIST:STEP [1]   2   3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:AMPLitude?
Example:	SOUR:LIST:STEP2:SET:AMPL -50dBm SOUR:LIST:STEP2:SET:AMPL?
Notes:	SCPI is supported after A.09.40
Notes:	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the “Source Unleveled” indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.
Notes:	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies:	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset:	-100 dBm
Min:	The range of values depends on the current frequency and selected RF output port. Please refer to “RF Power” on page 426 and the table RF Power Range for the valid ranges.
Max:	The range of values depends on the current frequency and selected RF output port. Please refer to “RF Power” on page 426 and the table RF Power Range for the valid ranges.
Initial S/W Revision:	A.05.00

### Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Remote Command:	:SOURce:LIST:STEP [1]   2   3...1000:SETup:WAVEform <string> :SOURce:LIST:STEP [1]   2   3...1000:SETup:WAVEform?
Example:	SOUR:LIST:STEP2:SET:WAV “CW” SOUR:LIST:STEP2:SET:WAV?
Notes:	SCPI is supported after A.09.40

Remote Command Notes:	String type, takes “Off”   “CW”   “Cont”   “waveform name”
Preset:	CW
Range:	Waveform   Continue Previous   CW   Off
Initial S/W Revision:	A.05.00

**CW**

Sets the current step to output a CW tone.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform</b>
Example:	SOUR:LIST:STEP2:SET:WAV “CW”
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

**Selected Waveform**

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform</b>
Example:	SOUR:LIST:STEP2:SET:WAV “waveform name”
Notes:	SCPI is supported after A.09.40  If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision:	A.05.00

**Continue Previous**

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform</b>
Example:	SOUR:LIST:STEP2:SET:WAV “Cont”
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

**Off**

Disable RF output of the current step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform</b>
-----------	---

## Source (Internal)

Example:	SOUR:LIST:STEP2:SET:WAV "Off"
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk"](#) on page 462.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform</b>
Initial S/W Revision:	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory"](#) on page 463.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory"](#) on page 464.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..."](#) on page 465.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..."](#) on page 465

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive</b>
Initial S/W Revision:	Prior to A.09.00

**Segments in ARB Memory**

This key functions the same as [“Segments in ARB Memory” on page 466](#).

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Delete Segment From ARB Memory**

This key functions the same as [“Delete Segment From ARB Mem” on page 466](#).

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Delete All From ARB Memory**

This key functions the same as [“Delete All From ARB Memory” on page 466](#).

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory</b>
Initial S/W Revision:	Prior to A.09.00

**Step Duration**

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous :SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TYPE?
Example:	SOUR:LIST:STEP2:SET:DUR:TYPE TIME SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes:	SCPI is supported after A.09.40
Notes:	If “Step Duration” is set to “Time” or “Play Count” for the last step, the last step of ARB keeps playing as if set to “Continuous”, until the set “Time” has expired or until the “Play Count” setting is reached.
Range:	Time   Play Count   Continuous
Initial S/W Revision:	A.05.00

## Source (Internal)

### Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Duration</b>
Example:	SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

### Duration Time

Allows you to specify the length of time the current step will play.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Duration, Time</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOUNT?
Example:	SOUR:LIST:STEP2:SET:DUR:TCO 1s SOUR:LIST:STEP2:SET:DUR:TCO?
Notes:	SCPI is supported after A.09.40  This SCPI is reused by “Play Count” and “Duration Time” according to current Duration Type setting if “Play Count” or “Duration Time”.  If current “Duration Type” is “Continuous”, then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
Notes:	If “Duration Time” is set for the last step, the last step of ARB keeps playing as if set to “Continuous” after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
Preset:	1.00 ms
Min:	100 $\mu$ s
Max:	1800 s
Initial S/W Revision:	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is

selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Duration</b>
Example:	SOUR:LIST:STEP2:SET:DUR:TYPE COUN
Notes:	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
Initial S/W Revision:	A.05.00

### Play Count

Allows you to specify the number of times the current ARB waveform file will play during a step.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Duration, Time, Play Count</b>
<b>Remote Command:</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCoun <double>  :SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCoun?
Example:	SOUR:LIST:STEP2:SET:DUR:TCO 10 SOUR:LIST:STEP2:SET:DUR:TCO?
Notes:	SCPI is supported after A.09.40  This SCPI is reused by “Play Count” and “Duration Time” according to current Duration Type setting if “Play Count” or “Duration Time”.  If current “Duration Type” is “Continuous”, then popup error –221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
Notes:	If “Play Count” is set for the last step, the last step of ARB keeps playing as if set to “Continuous” after play count setting is reached.
Preset:	1
Min:	1
Max:	65536
Initial S/W Revision:	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup, Step Duration</b>
Example:	SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes:	SCPI is supported after A.09.40
Initial S/W Revision:	A.05.00

## Source (Internal)

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path:	<b>Source, List Sequencer, List Sequencer Setup</b>
Remote Command:	:SOURce:LIST:STEP [1]   2   3...1000:SETup:OUTPut:TRIGger ON OFF 1 0  :SOURce:LIST:STEP [1]   2   3...1000:SETup:OUTPut:TRIGger
Example:	SOUR:LIST:STEP2:SET:OUTP:TRIG ON  SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes:	SCPI is supported after A.09.40
Preset:	Off
Range:	On Off
Initial S/W Revision:	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

Remote Command:	:SOURce:LIST:STEP [1]   2   3   4..1000:SETup IMMediate INTernal KEY BUS EXTernal2, <time>, NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM4 80 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BAND VI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXII I BANDXIV USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SEC OND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLI C LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7  BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18  BAND19 BAND20 BAND21 BAND24 BAND25 BAND33 BAND34 BAND35  BAND36 BAND37 BAND38 BAND39 BAND40 BAND41 BAND42 BAND4 3 BANDA BANDB BANDC BANDD BANDE BANDE BANDE, DOWN UP, <freq>, <ampl>, <string>, TIME COUNT CONTInuous, <time>, ON OFF 1 0, [<int>],  :SOURce:LIST:STEP [1]   2   3   4..1000:SETup?
Example:	SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, “GSM_Test1.bin”, TIME, 10ms, OFF, 255



Notes:	<p>The parameters are: (There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)</p> <ol style="list-style-type: none"> <li>1. Step Trigger &lt;enum&gt; - specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">“Step Trigger” on page 510</a>.</li> <li>2. Transition Time &lt;time&gt; - specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">“Transition Time” on page 512</a>.</li> <li>3. Radio Band &lt;enum&gt; - specifies the radio band for the step. For details of the valid radio bands see <a href="#">“Radio Setup” on page 513</a>.</li> <li>4. Radio Band Link &lt;enum&gt; - specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">“Radio Band Link” on page 528</a>.</li> <li>5. Frequency/Channel Number &lt;freq&gt;/&lt;chan num&gt; - specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">“Channel” on page 528</a> and <a href="#">“Frequency” on page 529</a>.</li> <li>6. Power &lt;ampl&gt; - specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">“Power” on page 530</a>.</li> <li>7. Waveform &lt;string&gt; - specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <ul style="list-style-type: none"> <li>&lt;filename&gt; - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.</li> <li>CONT – continues playback of the ARB file from the previous step</li> <li>CW – outputs a CW tone</li> <li>OFF – disable RF output</li> </ul> </li> <li>8. Step Duration &lt;enum&gt; - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to “CW”, this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see <a href="#">“Step Duration” on page 533</a>.</li> <li>9. Time or Count &lt;time/int&gt; - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, <a href="#">“Time” on page 534</a> and <a href="#">“Play Count” on page 534</a>.</li> <li>10. Output Trigger &lt;Boolean&gt; - specifies the output trigger for the step. For details of the ranges for this setting see <a href="#">“Output Trigger” on page 536</a>.</li> </ol>
--------	--

## Source (Internal)

Dependencies:	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .  If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision:	A.05.00

### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?
Example:	SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 SOUR:LIST:SET:INP:TRIG?
Notes:	The command is to setup below parameter array of whole list sequence.  Step Trigger <enum> - specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">“Step Trigger” on page 510</a> .  If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes:	IMMediate INTErnal KEY BUS EXTernal2
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME?
Example:	SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms SOUR:LIST:SET:TRAN:TIME?

Notes:	The command is to setup below parameter array of whole list sequence. Transition Time <time> - specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">“Transition Time” on page 512</a> If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURCE:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ... :SOURCE:LIST:SETup:RADio:BAND?
Example:	SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM SOUR:LIST:SET:RAD:BAND?
Notes:	The command is to setup below parameter array of whole list sequence. Radio Band <enum> - specifies the radio band for the step. For details of the valid radio bands see <a href="#">“Radio Setup” on page 513</a> . If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.
Remote Command Notes:	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDIV BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV USCELL USPCS JAPAN KOREAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1 BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND19 BAND20 BAND21 BAND24 BAND25
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

### Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step

## Source (Internal)

is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURCE:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURCE:LIST:SETup:RADio:BAND:LINK?
Example:	SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP SOUR:LIST:SET:RAD:BAND:LINK?
Notes:	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> - specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">“Radio Band Link” on page 528</a> . If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Remote Command Notes:	DOWN UP
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

### Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURCE:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURCE:LIST:SETup:CNFRrequency?
Example:	SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 SOUR:LIST:SET:CNFR?

Notes:	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Frequency/Channel Number <b>&lt;freq&gt;/&lt;chan num&gt;</b> - specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">“Channel” on page 528</a> and <a href="#">“Frequency” on page 529</a></p> <p>This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number</p> <p>If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p>
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

#### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	<pre>:SOURCE:LIST:SETup:AMPLitude &lt;ampl&gt;, &lt;ampl&gt;, &lt;ampl&gt;, ... :SOURce:LIST:SETup:AMPLitude?</pre>
Example:	<pre>SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm SOUR:LIST:SET:AMPL?</pre>
Notes:	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Power <b>&lt;ampl&gt;</b> - specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">“Power” on page 530</a>.</p> <p>If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.</p>
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

#### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is

## Source (Internal)

setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURCE:LIST:SETup:WAVEform <string>, <string>, <string>, ... :SOURCE:LIST:SETup:WAVEform?
Example:	SOUR:LIST:SET:WAV "CW","Off","CONT" SOUR:LIST:SET:WAV?
Notes:	The command is to setup below parameter array of whole list sequence.  Waveform <string> - specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:  <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.  CONT – continues playback of the ARB file from the previous step CW – outputs a CW tone OFF – disable RF output  If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 509</a> .
Range:	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision:	A.09.40

### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURCE:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ... :SOURCE:LIST:SETup:DURation:TYPE?
Example:	SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT SOUR:LIST:SET:DUR:TYPE?

Notes:	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration &lt;enum&gt; - specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to “CW”, this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see <a href="#">“Step Duration” on page 533</a>.</p> <p>If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes:	TIME   COUNT   CONTInuous
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure “Duration Time” or “Play Count” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in [“Number of Steps” on page 509](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	<pre>:SOURCE:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURCE:LIST:SETup:TOCount?</pre>
Example:	<pre>SOUR:LIST:SET:TOC 1s,2s,3s SOUR:LIST:SET:TOC? SOUR:LIST:SET:TOC 5,6,7 SOUR:LIST:SET:TOC?</pre>
Notes:	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Time or Count &lt;time/int&gt; - specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, <a href="#">“Time” on page 534</a> and <a href="#">“Play Count” on page 534</a>.</p> <p>If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p> <p>If current <a href="#">“Step Duration” on page 533</a> is “Continuous”, then generate error –221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"</p>
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">“Number of Steps” on page 509</a> .
Initial S/W Revision:	A.09.40

## Source (Internal)

### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Output Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in “Number of Steps” on page 509 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command:</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
Example:	SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON SOUR:LIST:SET:OUTP:TRIG?
Notes:	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> - specifies the output trigger for the step. For details of the ranges for this setting see “Output Trigger” on page 536. If input parameter number exceeds the step number defined by Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Remote Command Notes:	ON OFF 1 0
Dependencies:	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see “Number of Steps” on page 509.
Initial S/W Revision:	A.09.40

### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI feature described in.

<b>Remote Command:</b>	:SOURce:LIST:SETup:CLEar
Example:	SOUR:LIST:SETup:CLE
Initial S/W Revision:	A.05.00

### Multiport Adapter Output Port Bitmap Mode

When this setting is set to LIST, it will allow you to select the multiport adapter output path of each step. When this setting is set to FIXEd, source list sequence multiport adapter output path on each step is controlled by global multiport adapter output port bitmap setting (same as source independent mode). Under this situation, source list sequence will ignore local multiport adapter output port bitmap setting defined in each step, they are still there and can be queried out, but take no effect.

Key Path:	<b>Source, List Sequencer</b>
<b>Remote Command:</b>	:SOURce:LIST:MPADapter:PORT:OUTPut:BITMap:MODE LIST   FIXEd :SOURce:LIST:MPADapter:PORT:OUTPut:BITMap:MODE?



Example:	SOUR:LIST:MPAD:PORT:OUTP:BITM:MODE LIST SOUR:LIST:MPAD:PORT:OUTP:BITM:MODE?
Preset:	FIXed
Range:	LIST   FIXed
State Saved:	Yes
Initial S/W Revision:	A.09.40

### **Multiport Adapter Output Port Amplitude Correction Configuration Validation for List Sequencer (Remote Command Only)**

This command is used to validate MPA TX port amplitude correction for Source List Sequencer.

Key Path:	<b>Source, List Sequencer</b>
<b>Remote Command:</b>	:SOURce:LIST:MPADapter:CORRection:ERRor?
Example:	SOUR:LIST:MPAD:CORR:ERR?
Notes:	Query Only SCPI Remote command only If detected invalid configuration, popup error message: "-221 Settings conflict; Source List Step<n> MPA TX port<n> amplitude correction value <n>dB is out of range. The valid range is <n> ~ <n>dB" Or "-221 Settings conflict; Source List Step<n> MPA TX port<n> amplitude correction delta exceeds <n>dB between port<n> and port<n>" to report the first detected conflict.
Range:	"No error"   Error info of the first found conflict
State Saved:	Yes
Initial S/W Revision:	A.12.00

### **Manual Trigger Now**

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a "Manual" step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path:	<b>Source, List Sequencer</b>
<b>Remote Command:</b>	No remote command, front panel only.
Initial S/W Revision:	A.05.00

## Source (Internal)

### Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command:</b>	:SOURce:LIST:INITiation:ARMed?
Example:	SOUR:LIST:INIT:ARMed?
Notes:	The return data is in the following format: Integer
Notes:	Query only SCPI. Returning “1” if list sequence has been initiated successfully, returning “0” if not. Once get “0”, you can use :SYST:ERR? to query what error happened.  Just like “*OPC?”, this command can be blocked until event/status “IsSourceSweeping” happens, and then returns. Doing so can help user’s script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI “:SOUR:LIST:TRIGger[:IMMediate]” (see <a href="#">“Initiate Sequence” on page 508</a> Initiate Sequence), the right usage of this command is to use it after “:SOUR:LIST:TRIG”. If not, this command will return “1” immediately.
Notes:	There is an alias SCPI “:SOURce:LIST:TRIGger:INITiation:ARMed?”.
Initial S/W Revision:	A.09.40

### Source Preset

Allows you to preset the source settings to their default values.

Key Path:	<b>Source</b>
<b>Remote Command:</b>	:SOURce:PRESet
Example:	SOUR:PRES

### Source Self Test

#### Internal Source

This key in the System, Diagnostics menu gives you access to diagnostic capabilities of Internal Source of the instrument.

Key Path:	<b>System, Diagnostics</b>
Initial S/W Revision:	Prior to A.09.20

#### Source Self Test

This key invokes internal source self test. When operation is complete, the generated test summary file is: E:\Agilent\Instrument\CRFSSelfTestLog.txt. This test summary file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified path and file name.

If self test fails, error message “–330, Self-test failed, see log file E:\Agilent\Instrument\CRFSSelfTestLog.txt” is generated. If self test passes, an advisory message “Source self-test completed successfully” is generated.

Key Path:	<b>System, Diagnostics, Internal Source, Self Test</b>
<b>Remote Command:</b>	:SOURce:SELF:TEST [:ALL]
Example:	SOUR:SELF:TEST
Notes:	MMEM:DATA? "E:\ Agilent\Instrument\CRFSSelfTestLog.txt"
Initial S/W Revision:	A.09.20

## Recall

Most of the functions under this key work the same way in many measurements, so they are documented in the System Functions section. For details about this key, see [“Recall” on page 126](#)

## Save

Most of the functions under this key work the same way in many measurements, so they are documented in the Utility Functions section. For details about this key, see [“Save” on page 138](#)

## Signal Studio Commands

### Overview

EXT supports connectivity with Signal Studio. To achieve this, the SCPI commands described in this chapter enable you to connect Signal Studio to the EXT test set and to download waveform into the hard disk. They are SCPI only, no menu

Initial S/W Revision:	A.05.00
-----------------------	---------

### Query License List (Remote Command Only)

This query provides a listing of the current licenses for external software installed for the test set internal source.

<b>Remote Command:</b>	:SYSTem:LIcense:EXTErnal:LIST?
Example:	SYST:LIC:EXT:LIST?
Notes:	Query only.
Initial S/W Revision:	A.05.00

### Query License List Detail (Remote Command Only)

This is an obsolete command for Signal Studio. However, it has not been removed from Signal Studio to prevent a Signal Studio connectivity time out. Using this command returns a null string and does not

## Source (Internal)

affect Signal Studio.

<b>Remote Command:</b>	:SYSTem:LIcense:LIST:DETail?
Example:	SYST:LIC:LIST:DET?
Notes:	Query only. Always returns a null string "".
Initial S/W Revision:	A.05.00

## Memory Subsystem (Remote Command Only)

To be compatible with other Signal Generator products, the EXT test set internal source provides a memory subsystem for Signal Studio to download waveform file into the instrument.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D:\NVARB.

In addition, you can load a waveform file from the hard disk to the ARB memory, using the [“Load Segment To ARB Memory” on page 463](#) remote command :SOURce:RADio:ARB:LOAD, which also supports using either “NVWFM” MSUS or specifying a full path.

<b>Remote Command:</b>	:MEMory[:SOURce]
Example:	MEM
Initial S/W Revision:	A.05.00

## :DATA (Remote Command Only)

This command loads data into the EXT test set hard disk using the <data> parameter and saves the data to a file designated by the <file\_name> variable. For downloads to non-volatile waveform memory, use the path “NVWFM:<file\_name>”.

<b>Remote Command:</b>	:MEMory[:SOURce]:DATA <file_name>, <data>
Example:	MEM:DATA “NVWFM:test.wfm”, #1212 or MEM:DATA “D:\NVARB\test.wfm”, #1212
Notes:	Data is in 488.2 block format. If a file already exists with same name, the file will be overwritten without warning.
Initial S/W Revision:	A.05.00

## :DATA:APPend (Remote Command Only)

This command appends data to an existing file stored in hard disk using the <data> parameter and saves

the data to a file designated by the <file\_name> variable. For downloads to non-volatile waveform memory, use the path “NVWFM:<file\_name>”.

<b>Remote Command:</b>	:MEMory[:SOURce]:DATA:APPend <file_name>, <data>
Example:	MEM:DATA:APP “NVWFM:test.wfm”, #14Y9oL or MEM:DATA:APP “D:\NVARB\test.wfm”, #14Y9oL
Notes:	Data is in 488.2 block format.  If no file exists with the name designated in the command, a file will be created the first time this command is used with that designated name.
Initial S/W Revision:	A.05.00

## Sequence Studio Commands

### Overview

EXT supports connectivity with Sequence Studio. The SCPI commands described in this chapter are used to support connectivity from Sequence Studio to the EXT test set. These are only intended for Sequence Studio, so provided as service commands, and SCPI only, no menu

Initial S/W Revision	A.12.00
----------------------	---------

### Query Supportable System Information Query SCPI List (Remote Command Only)

This query provides a listing of the current EXT supportable list of query SCPI which is used to query EXT HW/SW information. It returns string result and parsed by Sequence Studio.

Sequecne Studio needs to query some EXT system information like capability etc. when connecting. With more and more new SCPIs added in EXT FW, each time when Sequence Studio try to connect to an old version FW without those new SCPI commands, VISA timeout in Sequence Studio will occur and just make Sequence Studio looks dead. To avoid that, this SCPI is provided to give a list of current supportable information-query SCPI list.

<b>Remote Command</b>	:SERVice[:PRODUCTION]:SIQuery:SCPI:LIST?
Example	SERV:SIQ:SCPI:LIST?

**Source (Internal)**

Notes	<p>Query only</p> <p>The string in “Range” part cannot change, for Sequence Studio needs to accurately match those string character.</p> <p>If “SEQ Ver Info” string presents, then means “:SERVice[:PRODUCTION]:LSEQuencer:ANALyzer:FILE:VERSion?” and “:SERVice[:PRODUCTION]:LSEQuencer:SOURce:FILE:VERSion?” query SCPIs are supported in current version.</p> <p>If “ARB Header Info” string presents, that means <a href="#">“Query Selected Waveform Header info (Remote Command Only)” on page 502</a> query SCPI is supported in current version.</p>
Range	“HW Capability Info”, “SEQ Ver Info”, “ARB Header Info”
Initial S/W Revision	A.12.00

---

## SPAN X Scale

Activates and displays the Span function menu.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### Span

Adjusts the Span of the RF Spectrum window.

Key Path	<b>SPAN X Scale</b>
<b>Remote Command</b>	[ :SENSe] :AM   FM   PM :FREQuency :SPAN <freq> [ :SENSe] :AM   FM   PM :FREQuency :SPAN?
Example	AM:FREQ:SPAN 2.122kHz AM:FREQ:SPAN?
Notes	Adjusts the Span of the RF Spectrum window.
Preset:	= AM/FM/PM = 75 kHz
State Saved	Saved in instrument state
Min	10 Hz
Max	Max Span is the same as max information bandwidth. This is normally 10 MHz, or 25 MHz if the test set has the wide bandwidth option licensed
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00

## SPAN X Scale



## Sweep/Control

Activates a menu and selects **Sweep Time** as the active function. Sweep time is used by the Demod Waveform window, but this key is available in any view.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00

### Demod Wfm Sweep Time

Selects the display length for the Demod Waveform window. This is commonly set to two sample lengths.

Key Path	<b>Sweep/Control</b>
<b>Remote Command</b>	[ :SENSe] :AM FM PM:DWSweep:TIME <time> [ :SENSe] :AM FM PM:DWSweep:TIME?
Example	AM:DWS:TIME 50 ms AM:DWS:TIME?
Preset	2 ms
State Saved	Saved in Instrument State
Min	1 $\mu$ s
Max	2 s
Initial S/W Revision	Prior to A.02.00

### Demod Time

Selects the minimum length of data acquisition used in demodulation. Increasing the demodulation time will result in more accurate metrics; reducing the demodulation time will result in a faster measurement.

The measurement might require more data than specified by the demodulation time. If the resolution bandwidth is low in the spectrum windows, or the demod waveform sweep time is high, then the data required for the measurement might be higher than the demodulation time.

If measurement speed is critical, make sure to increase the resolution bandwidth and reduce the demodulation waveform sweep time.

The Auto rules for the demodulation time will give the nominal specification performance if the sweep time is set to display two cycles of data.

Key Path	<b>Sweep/Control</b>
----------	----------------------

## Sweep/Control

<b>Remote Command</b>	<pre>[ :SENSe] :AM   FM   PM :DEMod :TIME &lt;time&gt; [ :SENSe] :AM   FM   PM :DEMod :TIME? [ :SENSe] :AM   FM   PM :DEMod :TIME :AUTO OFF   ON   0   1 [ :SENSe] :AM   FM   PM :DEMod :TIME :AUTO?</pre>
Example	<pre>AM:DEM:TIME 50 ms AM:DEM:TIME?</pre>
Couplings	<p>When in Auto mode, the demodulation time depends on the demodulation waveform sweep time.</p> <p>Lower</p>
Preset:	<pre>= AM/FM/PM = 72 ms ON</pre>
State Saved	Saved in instrument state
Min	1 $\mu$ s
Max:	= AM/FM/PM =44 s
Initial S/W Revision:	Prior to A.02.00

---

## Trace/Detector

There are no menus under this key in the Analog Demod mode.

Key Path	<b>Front-panel key</b>
Initial S/W Revision	Prior to A.02.00



## Trigger

Accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, and so forth.

The TRIG:SOURCe command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the TRIGger:RF:SOURce and TRIGger:IQ:SOURce commands (later in this section). When in External Mixing, the analyzer uses the RF trigger source.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See [“Trigger Source Presets” on page 559](#)

See [“RF Trigger Source” on page 562](#)

See [“I/Q Trigger Source” on page 563](#)

See [“More Information” on page 564](#)

Key Path:	Front-panel key
<b>Remote Command:</b>	<pre>:TRIGger:&lt;measurement&gt;[:SEquence]:SOURce EXTErnal1 EXTErnal2 IMMediate LINE FRAMe RFBurst VIDeo  IF ALARm LAN IQMag IDEMod QDEMod IINPut QINPut AIQMag T V  :TRIGger:&lt;measurement&gt;[:SEquence]:SOURce?</pre> <p>where &lt;measurement&gt; is the measurement for which you wish to set the Source (blank for the Swept SA measurement)</p>
<b>Example:</b>	<pre>TRIG:ACP:SOUR EXT1</pre> <p>Selects the external 1 trigger input for the ACP measurement and the selected input</p> <pre>TRIG:SOUR VID</pre> <p>Selects video triggering for the Swept SA (SANalyzer) measurement in the Spectrum Analyzer mode. For SAN, do not use the &lt;measurement&gt; keyword. Only send this form in the Spectrum Analyzer mode or you will get an Undefined Header error</p>

## Trigger

Notes:	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. See the <a href="#">“RF Trigger Source” on page 562</a> and <a href="#">“I/Q Trigger Source” on page 563</a> commands for detailed information on which trigger sources are available for each input.</p> <p>Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems.</p> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges and presets can vary from mode to mode.</p>
Dependencies:	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message.
Preset:	See table below
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:SOURCe EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI:	[ :SENSe ] : <measurement > : TRIGger : SOURCe This backwards compatibility alias command is provided for ESA/PSA compatibility This backwards compatibility command does not apply to the Swept SA measurement, for that just use :TRIGger:SOURCe This backwards compatibility command does not apply to the monitor spectrum, log plot and spot frequency measurements
Backwards Compatibility SCPI:	[ :SENSe ] : <measurement > : TRIGger : SOURCe IF In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF parameter selects VIDEo triggering. Sending IF in the command causes VID to be returned to a query.
Backwards Compatibility SCPI:	[ :SENSe ] : ACPr : TRIGger : SOURCe This backwards Compatibility SCPI command is provided to support the same functionality as [ :SENSe ] : ACPr : TRIGger : SOURCe (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to the fact that the ACPr node conflicts with the ACPower node.
Initial S/W Revision:	Prior to A.02.00

Modified at S/W Revision:	A.03.00
---------------------------	---------

### Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

Meas	Mode	Preset for RF	Preset for IQ	Notes
Swept SA	SA	IMM	IQ not supported	
CHP	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
OBW	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T, MSR	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMEDIATE, VIDEO, LINE, FRAME or IF, the gate state is set to off.
CCDF	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	WIMAX OFDMA : RFBurst LTETDD: BTS: External 1 MS: Periodic Timer TD-SCDMA and 1xEV-DO: BTS: External 1 MS: RFBurst SA, WCDMA, C2K, LTE, CMMB, ISDB-T, DVB-T/H, DTMB, Digital Cable TV, MSR: IMMEDIATE	TD-SCDMA and 1xEV-DO: BTS: External 1 MS: IQMag LTETDD: BTS: External 1 MS: Periodic Timer Others: IMM	For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTERNAL1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out.

## Trigger

Meas	Mode	Preset for RF	Preset for IQ	Notes
ACP	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
Tx Power	SA, GSM, TD-SCDMA	SA, GSM: RFBurst TD-SCDMA: EXternal	IMM	TD-SCDMA doesn't support the Line and Periodic Timer parameters.  When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst
SPUR	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, LTE, LTETDD, MSR	IMM	IQ not supported	
SEM	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	1xEVDO(BTS): EXternal1  All others: IMMEDIATE	IQ not supported	
CDP	WCDMA	IMM	IMM	
RHO	WCDMA	IMM	IMM	
PCON	WCDMA	IMM	IMM	
QPSK	WCDMA, C2K, 1xEVDO	All except CDMA1xEVDO: IMMEDIATE CDMA1xEVDO: EXT1	IMM	



Meas	Mode	Preset for RF	Preset for IQ	Notes
MON	All except SA and BASIC	IMM	IQ not supported	
WAV		LTETDD: BTS: External 1 MS: Periodic Timer  GSM/EDGE: RFBurst  All others: IMMediate	LTETDD: BTS: External 1 MS: Periodic Timer  GSM/EDGE: IQMag  All others: IMMMediate	
PVT	WIMAXOFDMA	RFB	IMM	
EVM	WIMAXOFDMA , DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	All but CMMB: IMM  CMMB: Periodic Timer	All but CMMB: IMM  CMMB: External 1	LTE, LTETDD supports Free Run, Video and External 1 only.
SPEC	BASIC	IMM	IMM	
LOG Plot	PN	IMM	IQ not supported	
Spot Freq	PN	IMM	IQ not supported	
GMSK PVT	EDGE/GSM	RFB	IMM	
GMSK PFR	EDGE/GSM	RFB	IQMag	
GMSK ORFS	EDGE/GSM	RF Burst	IQ not supported	
EDGE PVT	EDGE/GSM	RFB	IMM	
EDGE EVM	EDGE/GSM	RFB	IQMag	
EDGE ORFS	EDGE/GSM	Periodic Timer	IQ not supported	
Combined WCDMA	WCDMA	IMM	IQ not supported	
Combined GSM	EDGE/GSM	RFB	IQ not supported	

## Trigger

Meas	Mode	Preset for RF	Preset for IQ	Notes
List Power Step	WCDMA, EDGE/GSM	IMM	IQ not supported	
Transmit On/Off Power	LTETDD	LTETDD: BTS: External 1 MS: Periodic Timer	LTETDD: BTS: External 1 MS: Periodic Timer	
Transmit Analysis	BLUETOOTH	RFB	IQ not supported	
Adjacent Channel Power	BLUETOOTH	IMM	IQ not supported	
LE In-band Emissions	BLUETOOTH	IMM	IQ not supported	
EDR In-band Spurious Emissions	BLUETOOTH	Periodic Timer	IQ not supported	
Conformance EVM	LTE, LTETDD, MSR	IMM	IMM	

### RF Trigger Source

The **RF Trigger Source** command selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

<b>Remote Command:</b>	:TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1 EXTernal2 IMMediate LINE FRAMe RFBurst VIDeo  IF ALARm LAN TV  :TRIGger:<measurement>[:SEQuence]:RF:SOURce?
Example:	TRIG:ACP:RF:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the RF input  TRIG:RF:SOUR VID Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.

Notes:	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the <b>RF Trigger Source</b>, the following trigger sources are available:</p> <ul style="list-style-type: none"> <li>— IMMEDIATE - free run triggering</li> <li>— VIDEO - triggers on the video signal level</li> <li>— LINE - triggers on the power line signal</li> <li>— EXTERNAL1 (or EXTERNAL) - triggers on an externally connected trigger source marked "Trigger 1 In" on the rear panel</li> <li>— EXTERNAL2 - triggers on an externally connected trigger source marked "Trigger 2 In" on the front panel. In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTERNAL2 parameter will generate a "Hardware missing; Not available for this model number" message</li> <li>— RFBURST - triggers on the bursted frame</li> <li>— FRAME - triggers on the periodic timer</li> <li>— IF (video) - same as video, for backwards compatibility only</li> </ul> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and presets can vary from mode to mode.</p>
Status Bits/OPC dependencies:	<p>The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.</p>
Initial S/W Revision:	Prior to A.02.00

## I/Q Trigger Source

This command selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

<b>Remote Command:</b>	<pre>:TRIGger:&lt;measurement&gt;[:SEQUENCE]:IQ:SOURce EXTERNAL1 EXTERNAL2 IMMEDIATE IQMag IDEMod QDEMod IINPu t QINPut AIQMag  :TRIGger:&lt;measurement&gt;[:SEQUENCE]:IQ:SOURce?</pre>
Example:	<pre>TRIG:WAVEform:SOUR IQM</pre> <p>Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input</p>

## Trigger

Notes:	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the <b>I/Q Trigger Source</b>, the following trigger sources are available:</p> <ul style="list-style-type: none"><li>— IMMEDIATE - free run triggering</li><li>— EXTERNAL1 (or EXTERNAL) - triggers on an externally connected trigger source on the rear panel</li><li>— EXTERNAL2 - triggers on an externally connected trigger source on the front panel</li><li>— IQMAG - triggers on the magnitude of the I/Q signal</li><li>— IDEMOD - triggers on the I/Q signal's demodulated I voltage</li><li>— QDEMOD - triggers on the I/Q signal's demodulated Q voltage</li><li>— IINPUT - triggers on the I channel's ADC voltage</li><li>— QINPUT - triggers on the Q channel's ADC voltage</li><li>— AIQMAG - triggers on the magnitude of the auxiliary receiver channel I/Q signal</li></ul> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and from mode to mode presets can vary</p>
Status Bits/OPC dependencies:	<p>The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.</p>
Initial S/W Revision:	Prior to A.02.00

### More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and -10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same

for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

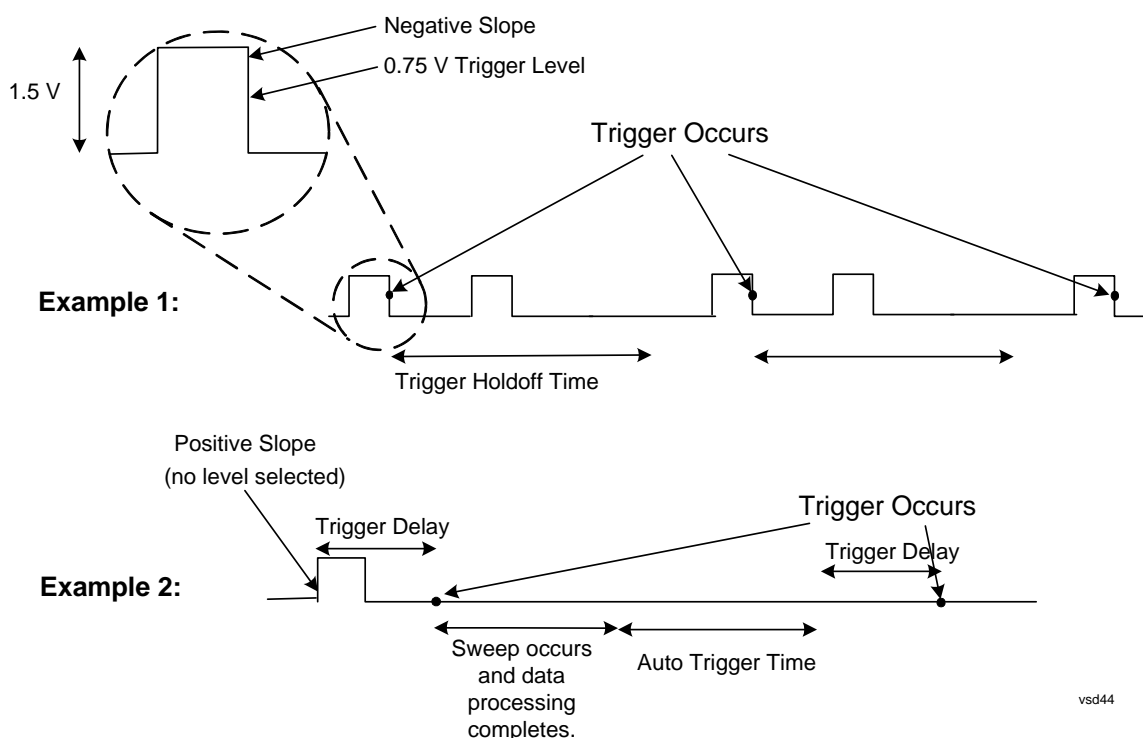
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



vsd44

## Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

Key Path:	Trigger
Example:	TRIG:SOUR IMM Swept SA measurement
	TRIG:<meas>:SOUR IMM Measurements other than Swept SA

## Trigger

State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00

## Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

---

**NOTE** When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

---

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA
Notes:	Log Plot and Spot Frequency measurements do not support Video Trigger
Dependencies:	Video trigger is allowed in average detector mode.
State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes:	1. In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed.
Initial S/W Revision:	Prior to A.02.00

## Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

Key Path:	<b>Trigger, Video</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:VIDeo:LEVel <ampl> :TRIGger[:SEQuence]:VIDeo:LEVel?
Example:	TRIG:VID:LEV -40 dBm
Notes:	<p>When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering.</p> <p>Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level.</p> <p>Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.</p>
Couplings:	This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu.
Preset:	Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was.
State Saved:	Saved in instrument state
Min:	-170 dBm
Max:	+30 dBm
Default Unit:	Depends on the current selected Y axis unit
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:IF:LEVel :TRIGger[:SEQuence]:IF:LEVel?
Backwards Compatibility Notes:	This alias is provided for backward compatibility with VSA/PSA comms apps.
Initial S/W Revision:	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a

## Trigger

falling edge.

Key Path:	<b>Trigger, Video</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEquence]:VIDeo:SLOPe?
Example:	TRIG:VID:SLOP NEG
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility SCPI:	:TRIGger[:SEquence]:IF:SLOPe NEGative POSitive :TRIGger[:SEquence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps
Backwards Compatibility Notes:	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	:TRIGger[:SEquence]:SLOPe POSitive NEGative :TRIGger[:SEquence]:SLOPe?
Example:	TRIG:SLOP NEG
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility Notes:	In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source.
Initial S/W Revision:	Prior to A.02.00

## Trig Delay

Controls a time delay during that the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in the time domain or FFT, but not in swept spans.

Key Path:	<b>Trigger, Video</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:VIDeo:DELAy <time> :TRIGger[:SEquence]:VIDeo:DELAy? :TRIGger[:SEquence]:VIDeo:DELAy:STATE OFF ON 0 1 :TRIGger[:SEquence]:VIDeo:DELAy:STATE?



Example:	TRIG:VID:DEL:STAT ON TRIG:VID:DEL 100 ms
Notes:	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset:	Off, 1 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	+500 ms
Default Unit:	s
Backwards Compatibility Notes:	! For backward compatibility with VSA/PSA comms apps :TRIGger[:SEQuence]:IF:DELay :TRIGger[:SEQuence]:DELay The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

<b>Remote Command:</b>	:TRIGger[:SEQuence]:DELay <time> :TRIGger[:SEQuence]:DELay? :TRIGger[:SEQuence]:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:DELay:STATe?
Example:	TRIG:DEL 1 ms
Preset:	1 us
State Saved:	Saved in instrument state
Backwards Compatibility Notes:	In ESA/PSA, the Trigger Delay was global to all triggers. In the X-Series, the delay can be set individually for each Trigger Source. For backward compatibility, the global DELay command updates all instances of trigger slope (VID, LINE, EXT1, EXT2) except TV and RFBurst. The query returns the trigger delay setting of the currently selected trigger source.
Initial S/W Revision:	Prior to A.02.00

## Trigger

<b>Remote Command:</b>	:TRIGger[:SEQuence]:OFFSet <time> :TRIGger[:SEQuence]:OFFSet? :TRIGger[:SEQuence]:OFFSet:STATe OFF ON 0 1 :TRIGger[:SEQuence]:OFFSet:STATe?
Example:	TRIG:OFFS ON TRIG:OFFS -100 ms
Notes:	These are ESA commands for trigger offset that allowed you to use a positive or negative delay when in zero span and in a Res BW >= 1 kHz. For ESA compatibility, X-series analyzers keep track of this offset and adds it to the Trigger Delay for VIDEo, LINE, EXTernal1 or EXTernal2 whenever the value is sent to the hardware, if in Zero Span and RBW >= 1 kHz.
Preset:	Off, 0 s
State Saved:	Saved in instrument state
Min:	-11 s
Max:	+11 s
Initial S/W Revision:	Prior to A.02.00

## Line

Pressing this key, when it is not selected, selects the line signal as the trigger. A new sweep/measurement will start synchronized with the next cycle of the line voltage. Pressing this key, when it is already selected, access the line trigger setup menu.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR LINE Swept SA measurement TRIG:<meas>:SOUR LINE Measurements other than Swept SA
Dependencies:	Line trigger is not available when operating from a "dc power source", for example, when the instrument is powered from batteries.
State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Line</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:LINE:SLOPe POSitive NEGative :TRIGger[:SEQuence]:LINE:SLOPe?
Example:	TRIG:LINE:SLOP NEG
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility Notes:	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

## Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path:	<b>Trigger, Line</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:LINE:DELay <time> :TRIGger[:SEQuence]:LINE:DELay? :TRIGger[:SEQuence]:LINE:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:LINE:DELay:STATe?
Example:	TRIG:LINE:DEL:STAT ON TRIG:LINE:DEL 100 ms
Notes:	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset:	Off, 1.000 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	500 ms
Default Unit:	S

## Trigger

Backwards Compatibility Notes:	The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.  The legacy :TRIGger[:SEQuence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers.
Initial S/W Revision:	Prior to A.02.00

### External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA
Dependencies:	Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1.
State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

Key Path:	<b>Trigger, External 1</b>
Remote Command:	:TRIGger[:SEQuence]:EXTernal1:LEVel <level> :TRIGger[:SEQuence]:EXTernal1:LEVel?
Example:	TRIG:EXT1:LEV 0.4 V
Couplings:	This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset:	1.2 V
State Saved:	Saved in instrument state

Min:	-5 V
Max:	5 V
Default Unit:	V
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:FRAMe:EXTernal1:LEVel
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, External 1</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEQuence]:EXTernal1:SLOPe?
Example:	TRIG:EXT1:SLOP NEG
Couplings:	This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe
Backwards Compatibility Notes:	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path:	<b>Trigger, External 1</b>
-----------	----------------------------

## Trigger

<b>Remote Command:</b>	:TRIGger[:SEquence]:EXTErnal1:DElAY <time> :TRIGger[:SEquence]:EXTErnal1:DElAY? :TRIGger[:SEquence]:EXTErnal1:DElAY:STATe OFF ON 0 1 :TRIGger[:SEquence]:EXTErnal1:DElAY:STATe?
Example:	TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms
Notes:	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset:	Off, 1.000 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	+500 ms
Default Unit:	s
Backwards Compatibility SCPI:	:TRIGger[:SEquence]:EXTErnal:DElAY For backward compatibility, the parameter EXTErnal is mapped to EXTErnal1
Backwards Compatibility Notes:	The legacy :TRIGger[:SEquence]:DElAY command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. The legacy :TRIGger[:SEquence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers.
Initial S/W Revision:	Prior to A.02.00

### Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

Key Path:	<b>Trigger, External 1</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:EXTErnal1:DElAY:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTErnal1:DElAY:COMPensation?
Example:	TRIG:EXT1:DEL:COMP ON

Dependencies:	No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP.
Preset:	OFF
State Saved:	Saved in instrument state
Initial S/W Revision:	A.11.00

## External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA
Dependencies:	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXternal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2.
State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.03.00

## Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

Key Path:	<b>Trigger, External 2</b>
-----------	----------------------------

## Trigger

<b>Remote Command:</b>	:TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel?
Example:	TRIG:EXT2:LEV 1.1 V
Couplings:	This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu.
Preset:	1.2 V
State Saved:	Saved in instrument state
Min:	-5 V
Max:	5 V
Default Unit:	V
Backwards Compatibility SCPI:	:TRIGger[:SEquence]:FRAME:EXTernal2:LEVel
Initial S/W Revision:	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

<b>Key Path:</b>	<b>Trigger, External 2</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe?
Example:	TRIG:EXT2:SLOP NEG
Couplings:	This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility SCPI:	:TRIGger[:SEquence]:FRAME:EXTernal2:SLOPe
Backwards Compatibility Notes:	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

## Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept



spans.

Key Path:	<b>Trigger, External 2</b>
Remote Command:	:TRIGger[:SEquence]:EXTernal2:DElay <time> :TRIGger[:SEquence]:EXTernal2:DElay? :TRIGger[:SEquence]:EXTernal2:DElay:STATe OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DElay:STATe?
Example:	TRIG:EXT2:DEL:STAT ON TRIG:EXT2:DEL 100 ms
Notes:	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset:	Off, 1.000 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	500 ms
Default Unit:	s
Backwards Compatibility Notes:	The legacy :TRIGger[:SEquence]:DElay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.  The legacy :TRIGger[:SEquence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers.
Initial S/W Revision:	Prior to A.02.00

### Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

Key Path:	<b>Trigger, External 2</b>
Remote Command:	:TRIGger[:SEquence]:EXTernal2:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DElay:COMPensation?
Example:	TRIG:EXT2:DEL:COMP ON

## Trigger

Dependencies:	No effect except in zero-span, but not locked out in nonzero spans.  Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: –221, “Settings conflict; Feature not supported for this measurement”  In analyzers shipping N9060A, this feature requires N9060A–7FP.
Preset:	OFF
State Saved:	Saved in instrument state
Initial S/W Revision:	A.11.00

## RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA
State Saved:	Saved in instrument state
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes:	The legacy command: :TRIGger[:SEQuence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series.
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.04.00

## Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

---

**NOTE** When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the

## RF path.

Key Path:	<b>Trigger, RF Burst</b>
Scope:	Meas Global
<b>Remote Command:</b>	:TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute?
Example:	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm
Notes:	<p>Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below.</p> <p>Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions.</p> <p>If mode is Bluetooth, the default value is -50 dBm.</p>
Couplings:	This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu
Preset:	-20 dBm
State Saved:	Saved in instrument state
Min:	-200 dBm
Max:	100 dBm
Default Unit:	depends on the current selected Y-Axis unit
Backwards Compatibility SCPI:	:TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.04.00

Key Path:	<b>Trigger, RF Burst</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE?

## Trigger

Example:	TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative.
Preset:	ABSolute
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.04.00

### Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:

$$\text{absolute RF Burst level} = \text{peak level of the previous acquisition} + \text{relative RF Burst level}$$

3. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

Key Path:	<b>Trigger, RF Burst</b>
Scope:	Meas Global
<b>Remote Command:</b>	:TRIGger[:SEQuence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEQuence]:RFBurst:LEVel:RELative?
Example:	TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB
Notes:	Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command, above.  The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEQuence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent.

Dependencies:	This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering.
Preset:	-6 dB GSM: -25 dB
State Saved:	Saved in instrument state
Min:	-45 dB
Max:	0 dB
Default Unit:	dB or dBc
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:RFBurst:LEVel  This legacy command is aliased to :TRIGger[:SEQuence]:RFBurst:LEVel:RELative because the PSA had ONLY relative burst triggering
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.04.00

### Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, RF Burst</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEQuence]:RFBurst:SLOPe?
Example:	TRIG:RFB:SLOP NEG
Couplings:	This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset:	POSitive
State Saved:	Saved in instrument state
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:FRAME:RFBurst:SLOPe
Backwards Compatibility Notes:	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept

## Trigger

spans.

Key Path:	<b>Trigger, RF Burst</b>
Remote Command:	:TRIGger[:SEquence]:RFBurst:DElay <time> :TRIGger[:SEquence]:RFBurst:DElay? :TRIGger[:SEquence]:RFBurst:DElay:STATe OFF ON 0 1 :TRIGger[:SEquence]:RFBurst:DElay:STATe?
Example:	TRIG:RFB:DEL:STAT ON TRIG:RFB:DEL 100 ms
Notes:	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset:	Off, 1.000 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	500 ms
Default Unit:	s
Backwards Compatibility Notes:	The legacy :TRIGger[:SEquence]:DElay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision:	Prior to A.02.00

### Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the **Zero Span Delay Comp On/Off** feature to enable or disable zero span delay compensation.

Key Path:	<b>Trigger, RF Burst</b>
Remote Command:	:TRIGger[:SEquence]:RFBurst:DElay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:RFBurst:DElay:COMPensation?
Example:	TRIG:RFB:DEL:COMP ON

Dependencies:	No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP.
Preset:	OFF
State Saved:	Saved in instrument state
Initial S/W Revision:	A.11.00

## Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA
State Saved:	Saved in instrument state
Readback:	[Sync: <value of Sync Source>], for example, [Sync: External 1]
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00

### Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF

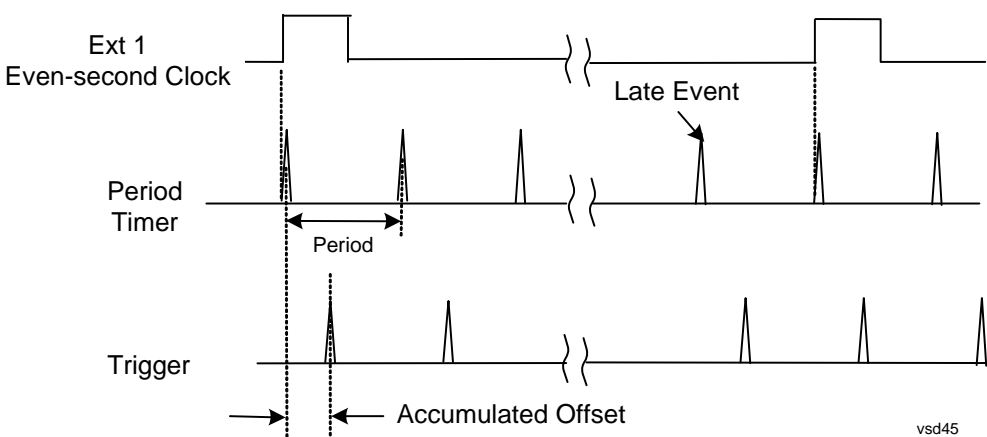
## Trigger

burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not mis-trigger. Mis-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



### Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

Key Path:	<b>Trigger, Periodic Timer</b>
Remote Command:	:TRIGger[:SEquence]:FRAME:PERiod <time> :TRIGger[:SEquence]:FRAME:PERiod?



Example:	TRIG:FRAM:PER 100 ms
Dependencies:	The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes.
Couplings:	The same period is used in the Gate Source selection of the period timer.
Preset:	20 ms GSM: 4.615383
State Saved:	Saved in instrument state
Min:	100.000 ns
Max:	559.0000 ms
Default Unit:	S
Initial S/W Revision:	Prior to A.02.00

### Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

Key Path:	<b>Trigger, Periodic Timer</b>
<b>Remote Command:</b>	:TRIGger [:SEquence]:FRAM:OFFSet <time> :TRIGger [:SEquence]:FRAM:OFFSet?
Example:	TRIG:FRAM:OFFS 1.2 ms

## Trigger

Notes:	<p>The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key).</p> <p>Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section <a href="#">“Trig Delay” on page 590</a>.</p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.</p>
Notes:	<p>When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value.</p> <p>The SCPI query simply returns the value currently showing on the key.</p>
Dependencies:	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings:	The same offset is used in the Gate Source selection of the period timer.
Preset:	0 s
State Saved:	Saved in instrument state
Min:	-10.000 s
Max:	10.000 s
Default Unit:	S
Initial S/W Revision:	Prior to A.02.00

### Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

<b>Remote Command:</b>	:TRIGger [:SEquence] :FRAMe:ADJust <time>
Example:	TRIG:FRAM:ADJ 1.2 ms
Notes:	<p>Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section <a href="#">“Trig Delay” on page 590</a></p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.</p>

Notes:	<p>The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value.</p> <p>When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command.</p> <p>This is a "command only" SCPI command, with no query.</p>
Dependencies:	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings:	The same offset is used in the Gate Source selection of the period timer.
Preset:	0 s
State Saved:	Saved in instrument state
Min:	-10.000 s
Max:	10.000 s
Default Unit:	S
Initial S/W Revision:	Prior to A.02.00

### Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

Key Path:	<b>Trigger, Periodic Timer</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet
Example:	TRIG:FRAM:OFFS:DISP:RES
Initial S/W Revision:	Prior to A.02.00

### Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

Key Path:	<b>Trigger, Periodic Timer</b>
-----------	--------------------------------

## Trigger

<b>Remote Command:</b>	:TRIGger [:SEQuence] :FRAMe:SYNC EXTernal1   EXTernal2   RFBurst   OFF  :TRIGger [:SEQuence] :FRAMe:SYNC?
Example:	TRIG:FRAM:SYNC EXT2
Dependencies:	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message.
Preset:	Off  GSM/EDGE: RFBurst
State Saved:	Saved in instrument state
Readback:	The current setting is read back to this key and it is also Readback to the previous <b>Periodic Timer</b> trigger key.
Backwards Compatibility SCPI:	:TRIGger[:SEQuence]:FRAMe:SYNC EXTernal  For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.03.00

### Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

Key Path:	<b>Trigger, Periodic Timer, Sync Source</b>
Example:	TRIG:FRAM:SYNC OFF
Readback:	Off
Initial S/W Revision:	Prior to A.02.00

### External 1

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic trigger synchronization. Pressing this key, when it is already selected, accesses the external 1 sync source setup menu.

Key Path:	<b>Trigger, Periodic Timer, Sync Source</b>
Example:	TRIG:FRAM:SYNC EXT
Couplings:	Same as External 1 trigger source.
Readback:	External 1
Initial S/W Revision:	Prior to A.02.00

**Trigger Level**

Sets the value where the signal at the external 1 trigger input will synchronize with the periodic timer trigger. This same level is used in the Ext1 trigger source in the Trigger menu. See section [“Trigger Level ” on page 572](#) for information on this key and the SCPI command.

**Trig Slope**

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the Ext1 trigger source in the Trigger menu. See section [“Trig Slope ” on page 573](#) for information on this key and the SCPI command

**External 2**

Pressing this key, when it is not selected, selects the external input port that you will use for the periodic frame trigger synchronization.

Pressing this key, when it is already selected, accesses the external 2 sync source setup menu.

Key Path:	<b>Trigger, Periodic Timer, Sync Source</b>
Example:	TRIG:FRAM:SYNC EXT2
Dependencies:	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXternal2 parameter will generate a “Hardware missing; Not available for this model number” message.
Couplings:	Same as External 2 trigger source.
Readback:	External 2
Initial S/W Revision:	Prior to A.02.00
Modified at S/W Revision:	A.03.00

**Trigger Level**

Sets the value where the signal at the external 2 trigger input will synchronize with the periodic timer trigger. This same level is used in the Ext2 trigger source in the Trigger menu. See section [“Trigger Level ” on page 575](#) for information on this key and the SCPI command.

**Trig Slope**

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the Ext2 trigger source in the Trigger menu. See section [“Trig Slope ” on page 576](#) for information on this key and the SCPI command

**RF Burst**

Pressing the key once selects the RF burst envelope signal to be used for the periodic timer trigger synchronization.

Press the key a second time to access the RF burst sync source setup menu.

Key Path:	<b>Trigger, Periodic Timer, Sync Source</b>
Example:	TRIG:FRAM:SYNC RFB

## Trigger

Couplings:	Same as RF Burst trigger source.
Readback:	RF Burst
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets the trigger level to be used for the RF Burst trigger. This same level is used in the RF Burst trigger source in the Trigger menu. See section [“Absolute Trigger Level” on page 578](#) for information on this key and the SCPI command.

### Trig Slope

Controls the RF Burst trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge. This same value is used in the RF Burst trigger source in the Trigger menu. See section [“Trigger Slope” on page 581](#) for information on this key and the SCPI command

### Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

Key Path:	<b>Trigger, Periodic Timer</b>
Remote Command:	:TRIGger [:SEquence] :FRAMe:DELay <time> :TRIGger [:SEquence] :FRAMe:DELay? :TRIGger [:SEquence] :FRAMe:DELay:STATe OFF ON 0 1 :TRIGger [:SEquence] :FRAMe:DELay:STATe?
Notes:	Note that delay is used when the sync source is not set to OFF. If the sync source is set to OFF, offset is used.
Preset:	Off, 1.000 us
State Saved:	Saved in instrument state
Min:	-150 ms
Max:	+500 ms
Default Unit:	s
Initial S/W Revision:	Prior to A.02.00

### Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

Key Path:	<b>Trigger, Periodic Timer</b>
-----------	--------------------------------

<b>Remote Command:</b>	:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff <time> :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff? :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe?
Preset:	On, 1.000 ms
State Saved:	Saved in instrument state
Min:	0 ms
Max:	+500 ms
Default Unit:	s
Initial S/W Revision:	Prior to A.02.00

## Baseband I/Q

Pressing this key when it is not selected selects Baseband I/Q as the trigger. Pressing the key when it is already selected accesses the Baseband I/Q trigger type selection menu. The key is annotated to display which of the Baseband I/Q trigger types is currently selected.

Key Path:	<b>Trigger</b>
State Saved:	Saved in instrument state
Readback:	The Baseband I/Q trigger source that becomes active when this key is selected is displayed. The possible values are "I/Q Mag", "I", "Q", "Input I", "Input Q", and "Aux I/Q Mag".
Initial S/W Revision:	Prior to A.02.00

## I/Q Mag

Pressing this key, when it is not selected, selects the I/Q magnitude signal as the trigger. The I/Q Magnitude trigger condition is met when the I/Q magnitude crosses the I/Q magnitude trigger level. The magnitude is measured at the output of the main I/Q digital receiver.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR IQM
Readback Text:	I/Q Mag
Initial S/W Revision:	Prior to A.02.00

## Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green

## Trigger

line will be displayed to indicate the trigger level.

Key Path:	<b>Trigger, Baseband I/Q, I/Q Mag</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IQMag:LEVel <ampl > :TRIGger[:SEquence]:IQMag:LEVel?
Example:	TRIG:IQM:LEV -30 dBm
Notes:	The I/Q reference impedance is used for converting between power and voltage.
Preset:	-25 dBm
State Saved:	Saved in instrument state
Range:	-200 dBm to 100 dBm
Readback Text:	<level> dBm
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, I/Q Mag</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IQMag:SLOPe POSitive   NEGative :TRIGger[:SEquence]:IQMag:SLOPe?
Example:	TRIG:IQM:SLOP POS
Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, I/Q Mag</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IQMag:DELAy <time> :TRIGger[:SEquence]:IQMag:DELAy? :TRIGger[:SEquence]:IQMag:DELAy:STATE OFF ON 0 1 :TRIGger[:SEquence]:IQMag:DELAy:STATE?



Example:	TRIG:IQM:DEL 10 ms TRIG:IQM:DEL:STAT ON
Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### I (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output I voltage as the trigger. The I (Demodulated) trigger condition is met when the I voltage crosses the I voltage trigger level.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR IDEM
Readback Text:	I
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets a level for the I (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Key Path:	<b>Trigger, Baseband I/Q, I (Demodulated)</b>
<b>Remote Command:</b>	:TRIGger [:SEquence] :IDEMod:LEVel <voltage> :TRIGger [:SEquence] :IDEMod:LEVel?
Example:	TRIG:IDEM:LEV 0.5 V
Preset:	0.25 V
State Saved:	Saved in instrument state
Range:	-1 to 1 V
Readback Text:	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, I (Demodulated)</b>
-----------	---

## Trigger

<b>Remote Command:</b>	:TRIGger[:SEQuence]:IDEMod:SLOPe POSitive   NEGative :TRIGger[:SEQuence]:IDEMod:SLOPe?
Example:	TRIG:IDEM:SLOP POS
Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, I (Demodulated)</b>
<b>Remote Command:</b>	:TRIGger[:SEQuence]:IDEMod:DELay <time> :TRIGger[:SEQuence]:IDEMod:DELay? :TRIGger[:SEQuence]:IDEMod:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:IDEMod:DELay:STATe?
Example:	TRIG:IDEM:DEL 10 ms TRIG:IDEM:DEL:STAT ON
Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### Q (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output Q voltage as the trigger. The Q (Demodulated) trigger condition is met when the Q voltage crosses the Q voltage trigger level.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR QDEM
Readback Text:	Q
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets a level for the Q (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a

green line will be displayed to indicate the trigger level.

Key Path:	<b>Trigger, Baseband I/Q, Q (Demodulated)</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QDEMod:LEVel <voltage> :TRIGger[:SEquence]:QDEMod:LEVel?
Example:	TRIG:QDEM:LEV 0.5 V
Preset:	0.25 V
State Saved:	Saved in instrument state
Range:	-1 to 1 V
Readback Text:	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, Q (Demodulated)</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QDEMod:SLOPe POSitive   NEGative :TRIGger[:SEquence]:QDEMod:SLOPe?
Example:	TRIG:QDEM:SLOP POS
Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, Q (Demodulated)</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QDEMod:DELay <time> :TRIGger[:SEquence]:QDEMod:DELay? :TRIGger[:SEquence]:QDEMod:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:QDEMod:DELay:STATe?
Example:	TRIG:QDEM:DEL 10 ms TRIG:QDEM:DEL:STAT ON

## Trigger

Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### Input I

Pressing this key, when it is not selected, selects the I channel's ADC voltage as the trigger. The Input I trigger condition is met when the voltage crosses the trigger level.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR IINP
Readback Text:	Input I
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets a level for the Input I trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path:	<b>Trigger, Baseband I/Q, Input I</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IINPut:LEVel <voltage> :TRIGger[:SEquence]:IINPut:LEVel?
Example:	TRIG:IINP:LEV 0.5 V
Preset:	0.25 V
State Saved:	Saved in instrument state
Range:	-1 to 1 V
Readback Text:	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, Input I</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IINPut:SLOPe POSitive   NEGative :TRIGger[:SEquence]:IINPut:SLOPe?
Example:	TRIG:IINP:SLOP POS

Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, Input I</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:IINPut:DELay <time> :TRIGger[:SEquence]:IINPut:DELay? :TRIGger[:SEquence]:IINPut:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:IINPut:DELay:STATe?
Example:	TRIG:IINP:DEL 10 ms TRIG:IINP:DEL:STAT ON
Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### Input Q

Pressing this key, when it is not selected, selects the Q channel's ADC voltage as the trigger. The Input Q trigger condition is met when the voltage crosses the trigger level.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR QINP
Readback Text:	Input Q
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets a level for the Input Q trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path:	<b>Trigger, Baseband I/Q, Input Q</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QINPut:LEVel <voltage> :TRIGger[:SEquence]:QINPut:LEVel?

## Trigger

Example:	TRIG:QINP:LEV 0.5 V
Preset:	0.25 V
State Saved:	Saved in instrument state
Range:	-1 to 1 V
Readback Text:	0.1 of displayed unit (V, mV, etc.)
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, Input Q</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QINPut:SLOPe POSitive   NEGative :TRIGger[:SEquence]:QINPut:SLOPe?
Example:	TRIG:QINP:SLOP POS
Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, Input Q</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:QINPut:DELay <time> :TRIGger[:SEquence]:QINPut:DELay? :TRIGger[:SEquence]:QINPut:DELay:STATe OFF ON 0 1 :TRIGger[:SEquence]:QINPut:DELay:STATe?
Example:	TRIG:QINP:DEL 10 ms TRIG:QINP:DEL:STAT ON
Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### Auxiliary Channel I/Q Mag

Pressing this key, when it is not selected, selects the Auxiliary Channel I/Q magnitude signal as the trigger. The Auxiliary Channel I/Q Magnitude trigger condition is met when the auxiliary receiver's I/Q magnitude output crosses the Auxiliary I/Q magnitude trigger level.

Key Path:	<b>Trigger, Baseband I/Q</b>
Example:	TRIG:<meas>:SOUR AIQM
Readback Text:	Aux I/Q Mag
Initial S/W Revision:	Prior to A.02.00

### Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Key Path:	<b>Trigger, Baseband I/Q, Aux Channel I/Q Mag</b>
<b>Remote Command:</b>	:TRIGger [:SEquence] :AIQMag:LEVEl <ampl > :TRIGger [:SEquence] :AIQMag:LEVEl?
Example:	TRIG:AIQM:LEV -30 dBm
Notes:	The I/Q reference impedance is used for converting between power and voltage.
Preset:	-25 dBm
State Saved:	Saved in instrument state
Range:	-200 dBm to 100 dBm
Readback Text:	<level> dBm
Initial S/W Revision:	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path:	<b>Trigger, Baseband I/Q, Aux Channel I/Q Mag</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:AIQMag:SLOPe POSitive   NEGative :TRIGger[:SEquence]:AIQMag:SLOPe?
Example:	TRIG:AIQM:SLOP POS
Preset:	POSitive
State Saved:	Saved in instrument state
Initial S/W Revision:	Prior to A.02.00

## Trigger

### Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Key Path:	<b>Trigger, Baseband I/Q, Aux Channel I/Q Mag</b>
Remote Command:	:TRIGger[:SEQuence]:AIQMag:DELAy <time> :TRIGger[:SEQuence]:AIQMag:DELAy? :TRIGger[:SEQuence]:AIQMag:DELAy:STATe OFF ON 0 1 :TRIGger[:SEQuence]:AIQMag:DELAy:STATe?
Example:	TRIG:AIQM:DEL 10 ms TRIG:AIQM:DEL:STAT ON
Preset:	1 us OFF
State Saved:	Saved in instrument state
Range:	-2.5 s to +10 s
Initial S/W Revision:	Prior to A.02.00

### Trigger Center Frequency

This key sets the center frequency to be used by the auxiliary receiver.

Key Path:	<b>Trigger, Baseband I/Q, Aux Channel I/Q Mag</b>
Remote Command:	:TRIGger[:SEQuence]:AIQMag:CENTer <freq> :TRIGger[:SEQuence]:AIQMag:CENTer?
Example:	:TRIG:AIQM:CENT 10 MHz
Notes:	Trigger CF + 1/2 Trigger BW < Max Trigger CF - 1/2 Trigger BW > Min
Preset:	0 Hz
State Saved:	Saved in instrument state
Range:	-40 MHz to 40 MHz
Initial S/W Revision:	Prior to A.02.00

### Trigger Bandwidth

This key sets the information bandwidth used by the auxiliary receiver for the Auxiliary Channel I/Q Magnitude trigger.

Key Path:	<b>Trigger, Baseband I/Q, Aux Channel I/Q Mag</b>
-----------	---



<b>Remote Command:</b>	:TRIGger[:SEquence]:AIQMag:BANDwidth <freq> :TRIGger[:SEquence]:AIQMag:BANDwidth?
Example:	:TRIG:AIQM:BAND 8 MHz
Notes:	The combined sample rate for the main and auxiliary receivers cannot exceed 100 MSa/sec. The bandwidth available to the Trigger BW is limited to what is available after the main receiver's bandwidth (Info BW, sometimes pre-FFT BW) is set. Because of this limitation, the Max is not always achievable.  The combination of Trigger Center Freq and Trigger BW is also limited: Trigger CF + 1/2 Trigger BW < Max Trigger CF – 1/2 Trigger BW > Min
Preset:	Bandwidth option dependent: No Opt: 10 MHz Opt B25: 25 MHz Opt S40: 40 MHz
State Saved:	Saved in instrument state
Range:	10 Hz to Maximum
Initial S/W Revision:	Prior to A.02.00

## TV

Pressing this key, when it is not selected, selects the TV input signal as the trigger. A new sweep/measurement will start synchronized with the next occurrence of the synchronizing pulse of the selected TV line number.

Pressing this key, when it is already selected, opens a menu of TV Trigger setup functions. The default active function in this menu is the TV line number on which you want to trigger.

The Frame and Field options enable you to determine how the fields of the TV picture signal will be affected by the trigger system. One complete TV image consists of one frame of 525 or 625 horizontal lines depending on the TV standard being used. Each frame is composed of two fields of interlacing lines, each consisting of 262 1/2 lines (or 312 1/2 lines). The fields are called Field One and Field Two. Field One is viewed as having 263 lines (or 313 lines) and Field Two is viewed as having 262 lines (or 312 lines).

For the 525 line NTSC video standard, we refer to TV lines as follows (these are the Field Modes):

Entire Frame, lines 1 to 525

Field One, lines 1 to 263

Field Two, lines 1 to 262 (note that this really refers to "actual" lines 264 to 525)

For the 625 line PAL and SECAM video standards, we refer to TV lines as follows:

Entire Frame, lines 1 to 625

Field One, lines 1 to 313

## Trigger

Field Two, lines 314 to 625

As the Field is changed, the appropriate value for Line is chosen to keep triggering on the same line as before, or if this is not possible, the corresponding line in the new Field. For example, suppose line 264 is selected while in the NTSC-M standard and the Entire Frame mode. This is the first line in Field Two. If Field Two is then selected, the Line number changes to Line 1, the same actual line in the TV signal. If Field One is then selected, the line number stays at 1, but now we are triggering in the first line in Field One. The only exception to this is if we are on the last line of Field One and change to Field Two. In this case, we go to the last line in Field Two.

Key Path:	<b>Trigger</b>
Example:	TRIG:SOUR TV Swept SA measurement TRIG:<meas>:SOUR TV Measurements other than Swept SA
Dependencies:	This key only appears in Modes which support TV Trigger, otherwise the key is blanked. If the SCPI command is sent while the key is blanked, an error is returned.
Readback:	This key displays the value read back from TV Line
Status Bits/OPC dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision:	Prior to A.02.00

### TV Line

Selects the TV line number to trigger on. Line number range is dependent on the settings of the **Standard** and **Field** menus within the TV trigger setup functions. When the line number is incremented beyond the upper limit, the value will change to the lower limit and continue incrementing from there. When the line number is decremented below the lower limit, the value will change to the upper limit and continue decrementing from there.

Key Path:	<b>Trigger, TV</b>
<b>Remote Command:</b>	:TRIGger[:SEquence]:TV:LINE <integer> :TRIGger[:SEquence]:TV:LINE?
Example:	TRIG:TV:LINE 20 TRIG:TV:LINE?
Notes:	The range of the TV line number is dependent on the settings of the Standard and Field menus within the TV trigger setup functions.
Preset:	17
State Saved:	Saved in instrument state

Min:	The minimum value is the minimum line, and rolls over to the maximum value. The minimum line number depends on which Field and standard are selected.
Max:	The maximum value is the maximum line, and rolls over to the minimum value. The maximum line number depends on which Field and standard are selected.
Initial S/W Revision:	Prior to A.02.00

### Field

Accesses the menu to select the field.

Key Path:	<b>Trigger, TV</b>
Remote Command:	:TRIGger [:SEquence] :TV:FMODE ENTire   ODD   EVEN :TRIGger [:SEquence] :TV:FMODE?
Example:	TRIG:TV:FMOD EVEN
Notes:	ODD is Field 1 EVEN is Field 2
Dependencies:	This command is available only when Option B7B (TV trigger) is installed.
Preset:	ENTire
Readback:	Displays the Readback value
Initial S/W Revision:	Prior to A.02.00

### Entire Frame

When you select Entire Frame it causes the selected line number to be viewed as an offset into the entire frame starting with line 1, the first line in Field One.

Key Path:	<b>Trigger, TV, Field</b>
Example:	TRIG:TV:FMOD ENT
Min:	1, for all formats.
Max:	525, for formats NTSC-M, NTSC-Japan, NTSC-4.43, PAL-M and PAL-60 625, for formats PAL-B, D, G, H, I, PAL-N, PAL-N Combin, and SECAM-L.
Readback:	Entire Frame
Initial S/W Revision:	Prior to A.02.00

### Field One

When you select Field One it causes the selected line number to be viewed as an offset into the first field starting

## Trigger

with Line 1, the first line in Field One.

Key Path:	<b>Trigger, TV, Field</b>
Example:	TRIG:TV:FMOD ODD
Min:	Field 1 (ODD) The minimum line is 1
Max:	Field 1 (ODD) Maximum line is 263 for formats NTSC-M, NTSC-Japan, NTSC-4.43, PAL-M and PAL-60 Maximum line is 313 for formats PAL-B, D, G, H, I, PAL-N, PAL-N Combin, and SECAM-L.
Readback:	Field 1
Initial S/W Revision:	Prior to A.02.00

## Field Two

When you select Field Two it causes the selected line number to be viewed as an offset into the second field. If Line 1 is selected, it is the 264th line of the frame (NTSC-M, NTSC-Japan, NTSC-4.43, PAL-M, PAL-60) or the 314th line of the frame (PAL-B,D,G,H,I, PAL-N, PAL-N-Combin, SECAM-L).

Key Path:	<b>Trigger, TV, Field</b>
Example:	TRIG:TV:FMOD EVEN
Min:	Field 2 (EVEN) The minimum line is 1
Max:	Field 2 (EVEN) The maximum line 262 for formats NTSC-M, NTSC-Japan, NTSC-4.43, PAL-M and PAL-60 The maximum line is 312 for formats PAL-B, D, G, H, I, PAL-N, PAL-N Combin, and SECAM-L
Readback:	Field 2
Initial S/W Revision:	Prior to A.02.00

## Standard

Accesses the Standard menu keys which select from the following TV standards: **NTSC-M, NTSC-Japan, NTSC-4.43, PAL-M, PAL-B,D,G,H,I, PAL-N, PAL-N-Combin, PAL-60, SECAM-L.**

As the TV standard is changed, the current line value is clipped as necessary to keep it valid for the chosen standard and field mode. For example, line 600 is selected in Entire Frame mode in PAL-N; if NTSC-M is selected, the line number is clipped to 525. Or, if line 313 is selected in Field 1 mode in PAL-N and NTSC-M is selected, the line number is clipped to 263. Changing back to the PAL-N

standard will leave the line number at 263.

Key Path:	<b>Trigger, TV</b>
Remote Command:	:TRIGger [:SEquence] :TV:STANdard MNTSc   JNTSc   NTSC443   MPAL   BPAL   NPAL   CPAL   PAL60   LSEC :TRIGger [:SEquence] :TV:STANdard?
Example:	TRIG:TV:STAN MPAL TRIG:TV:STAN?
Preset:	MNTS
State Saved:	Saved in instrument state
Readback:	Displays Readback value
Initial S/W Revision:	Prior to A.02.00

### NTSC-M

Sets the TV standard to **NTSC-M**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN MNTS
Readback:	NTSC-M
Initial S/W Revision:	Prior to A.02.00

### NTSC-Japan

Sets the TV standard to **NTSC-Japan**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN JNTS
Readback:	NTSC-Japan
Initial S/W Revision:	Prior to A.02.00

### NTSC-4.43

Sets the TV standard to **NTSC-4.43**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN NTSC443
Readback:	NTSC-Japan
Initial S/W Revision:	Prior to A.02.00

## Trigger

### **PAL-M**

Sets the TV standard to **PAL-M**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN MPAL
Readback:	PAL-M
Initial S/W Revision:	Prior to A.02.00

### **PAL-N**

Sets the TV standard to **PAL-N**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN NPAL
Readback:	PAL-N
Initial S/W Revision:	Prior to A.02.00

### **PAL-N-Combin**

Sets the TV standard to **PAL-N-Combin**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN CPAL
Readback:	PAL-N-C
Initial S/W Revision:	Prior to A.02.00

### **PAL-B,D,G,H,I**

Sets the TV standard to **PAL-B,D,G,H,I**

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN BPAL
Readback:	PAL-B
Initial S/W Revision:	Prior to A.02.00

### **PAL-60**

Sets the TV standard to **PAL-60**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN PAL60

Readback:	PAL-N
Initial S/W Revision:	Prior to A.02.00

### SECAM-L

Sets the TV standard to **SECAM-L**.

Key Path:	<b>Trigger, TV, Standard</b>
Example:	TRIG:TV:STAN LSEC
Readback:	SECAM-L
Initial S/W Revision:	Prior to A.02.00

### Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

Key Path:	<b>Trigger</b>
Readback line:	<p>Displays a summary of the Auto Trig and Holdoff settings, in square brackets</p> <p>First line: Auto Off or Auto On</p> <p>Second Line: "Hldf" followed by:</p> <ul style="list-style-type: none"> <li>• If Holdoff is Off, readback Off</li> <li>• If Holdoff On and Type = Normal, readback value</li> <li>• If Holdoff On and Type = Above, readback value followed by AL</li> <li>• If Holdoff On and Type = Below, readback value followed by BL</li> <li>• If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal</li> </ul>
Initial S/W Revision:	A.02.00

### Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

Key Path:	<b>Trigger, Auto/Holdoff</b>
<b>Remote Command:</b>	<pre>:TRIGger[:SEquence]:ATRigger &lt;time&gt; :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe?</pre>
Example:	<pre>TRIG:ATR:STAT ON TRIG:ATR 100 ms</pre>

## Trigger

Notes:	The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends.
Preset:	Off, 100 ms
State Saved:	Saved in instrument state
Min:	1 ms
Max:	100 s
Default Unit:	s
Initial S/W Revision:	Prior to A.02.00

### Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

Key Path:	<b>Trigger, Auto/Holdoff</b>
Remote Command:	:TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATe?
Example:	TRIG:HOLD:STAT ON TRIG:HOLD 100 ms
Dependencies:	Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated.
Preset:	Off, 100 ms
State Saved:	Saved in instrument state
Min:	0 s
Max:	0.5 s
Default Unit:	s
Initial S/W Revision:	Prior to A.02.00

### Holdoff Type

Lets you set the Trigger Holdoff Type.



---

**NOTE** Holdoff Type is not supported by all measurements. If the current measurement does not support it, this key will be blank and the Holdoff Type will be Normal. If the Holdoff Type SCPI is sent while in such a measurement, the SCPI will be accepted and the setting remembered, but it will have no effect until a measurement is in force that supports Holdoff Type.

---

Trigger Holdoff Type functionality:

- **NORMal**  
This is the “oscilloscope” type of trigger holdoff, and is the setting when the Holdoff Type key does not appear. In this type of holdoff, no new trigger will be accepted until the holdoff interval has expired after the previous trigger.
- **ABOVe**  
If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) and then remains above the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) after having been above the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.
- **BELOW**  
If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) after having been below the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) and then remains below the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

Key Path:	Trigger, Auto/Holdoff
<b>Remote Command:</b>	:TRIGger [:SEquence] :HOLDoff :TYPE NORMal   ABOVe   BELow :TRIGger [:SEquence] :HOLDoff :TYPE?
Example:	TRIG:HOLD:TYPE NORM
Preset:	All modes but GSM/EDGE: Normal GSM/EDGE: Below
State Saved:	Saved in instrument state
Initial S/W Revision:	A.02.00

Trigger

## View/Display AM/FM/PM

Each of the Analog Demod measurements (AM, FM, PM) have four views. The primary view is called “Quad View” and displays all four of the view windows with the focus in the RF Spectrum window. This is the view seen after a Mode Preset. There are also three other views that combine one of the graphics windows with the metrics windows. The views can be selected from the **View/Display** menu.

These views are designed such that you can identify analog modulated carriers, determine whether the carrier is a commercial or other broadcast station, and analyze the modulating signal.

Key Path	Front-panel key
<b>Remote Command</b>	:DISPlay:AM FM PM:VIEW[:SElect] QUAD RFSPectrum DEMod AFSPectrum :DISPlay:AM FM PM:VIEW[:SElect]?
Example	:DISP:FM:VIEW DEM selects Demod Waveform & Metrics View for FM Demod measurement
Preset	QUAD (Focus in RF Spectrum Window)
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## Display

The **Display** menu is common to most measurements, and is used for configuring items on the display. Some **Display** menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

Key Path	Display
Initial S/W Revision	Prior to A.02.00

## Annotation

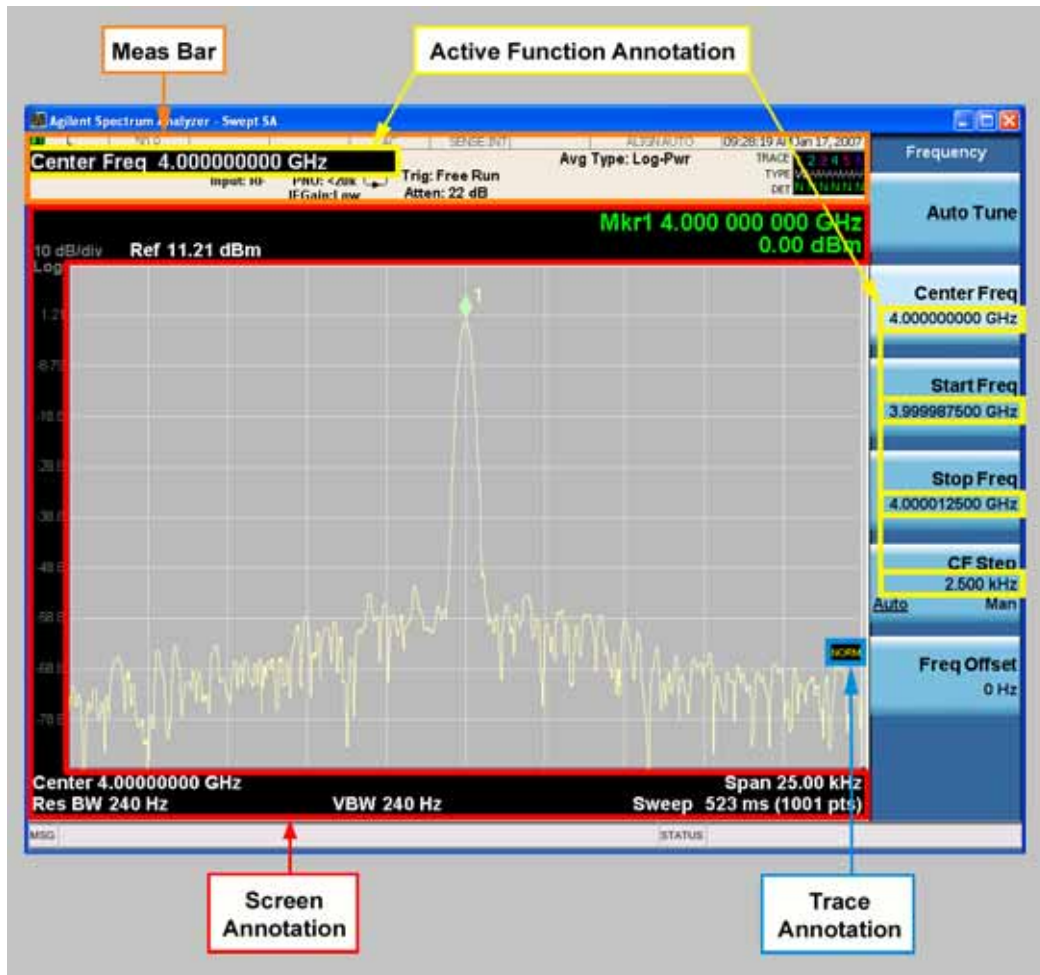
Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, et cetera). This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active

## View/Display AM/FM/PM

function values displayed on keys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	<b>View/Display, Display</b>
Initial S/W Revision	Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	<b>View/Display, Display, Annotation</b>
Remote Command	:DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when <b>System Display Settings, Annotation</b> is set to Off.

Preset	On This should remain Off through a Preset when <b>System Display Settings, Annotation</b> is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, et cetera) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

Key Path	<b>View/Display, Display, Annotation</b>
<b>Remote Command</b>	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe] ?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed out and forced to OFF when <b>System Display Settings, Annotation</b> is set to Off.
Preset	On This should remain Off through a Preset when <b>System Display Settings, Annotation</b> is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Trace

Turns on and off the labels on the traces, showing their detector (or their math mode) as described in the Trace/Detector section.

If trace math is being performed with a trace, then the trace math annotation will replace the detector annotation.

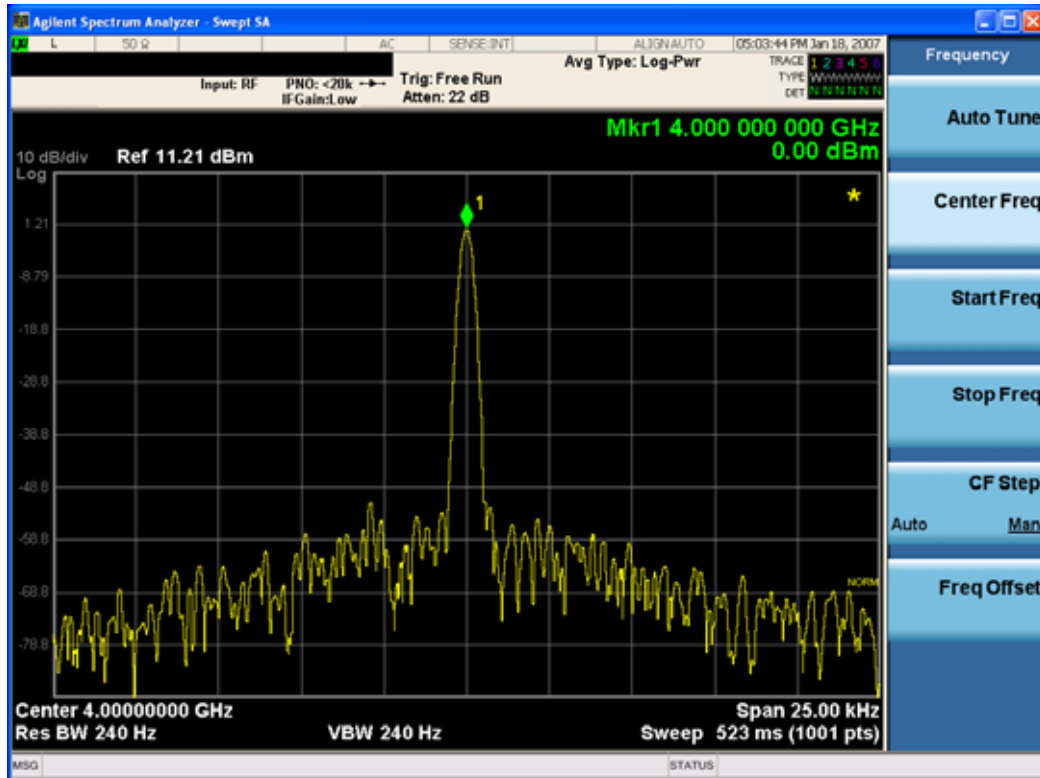
Key Path	<b>View/Display, Display, Annotation</b>
<b>Remote Command</b>	:DISPlay:ANNotation:TRACe[:STATe] ON OFF 1 0 :DISPlay:ANNotation:TRACe[:STATe] ?
Example	DISP:ANN:TRAC OFF
Preset	Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## View/Display AM/FM/PM

### Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the keys.

Note that all of the keys that have active functions have these numeric values blanked when this function is on. This is a security feature.



Key Path	<b>View/Display, Display, Annotation</b>
Remote Command	:DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when <b>System Display Settings, Annotation</b> is set to Off.
Preset	On  This should remain Off through a Preset when <b>System Display Settings, Annotation</b> is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Title**

Displays menu keys that enable you to change or clear a title on your display.

Key Path	<b>View/Display, Display</b>
Initial S/W Revision	Prior to A.02.00

**Change Title**

Writes a title into the "measurement name" field in the banner, for example, "List Sequencer".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title replaces the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title, Clear Title**.

---

**NOTE** Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name.

---

Key Path	<b>View/Display, Display, Title</b>
Mode	All
<b>Remote Command</b>	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ACP:ANN:TITL:DATA "This Is My Title" This sets the title to: This Is My Title
Notes	Pressing this key cancels any active function.  When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	<b>View/Display, Display, Title</b>
----------	-------------------------------------

## View/Display AM/FM/PM

Example	DISP:ANN:TITL:DATA "" clears any existing title characters.
Notes	Use the :DISPlay:ANNotation:TITLe:DATA <string> command with an empty string.
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

### Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	<b>View/Display, Display</b>
<b>Remote Command</b>	:DISPlay:WINDow [1] :TRACe:GRATicule:GRID [:STATe] OFF ON 0 1  :DISPlay:WINDow [1] :TRACe:GRATicule:GRID [:STATe] ?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

### Display Line

Activates an adjustable horizontal line that is used as a visual reference line. The line's vertical position corresponds to its amplitude value. The value of the display line (for example, "-20.3 dBm") appears above the line itself on the right side of the display in the appropriate font.

The display line can be adjusted using the step keys, knob, or numeric keypad. The unit of the Display Line is determined by the **Y axis unit** setting under **Amplitude**. If more than one window has a display line, the display line of the selected window is controlled.

If the display line is off the screen, it shows as a line at the top/bottom of the screen with an arrow pointing up or down. As with all such lines (Pk Thresh, Trigger Level, et cetera) it is drawn on top of all traces.

The display line is unaffected by Auto Couple.

Key Path	<b>View/Display, Display</b>
<b>Remote Command</b>	:DISPlay:WINDow [1] :TRACe:Y:DLINe <ampl> :DISPlay:WINDow [1] :TRACe:Y:DLINe? :DISPlay:WINDow [1] :TRACe:Y:DLINe:STATe OFF ON 0 1 :DISPlay:WINDow [1] :TRACe:Y:DLINe:STATe?



Example	DISP:WIND:TRAC:Y:DLIN:STAT ON DISP:WIND:TRAC:Y:DLIN:STAT -32 dBm
Preset	Set the Display Line to Off and -25 dBm on Preset. When the Display Line goes from Off to On, if it is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was.  The Display Line's value does not change when it is turned off.
State Saved	Saved in instrument state.
Min	$-\infty$ (minus infinity) in current units
Max	$+\infty$ (plus infinity) in current units
Default Unit	Depends on the current selected Y axis unit
Initial S/W Revision	Prior to A.02.00

### System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	<b>View/Display, Display</b>
Initial S/W Revision	Prior to A.02.00

### Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is **All Off**, it forces **Screen Annotation, Meas Bar, Trace, and Active Function Values** settings to be **OFF** for all measurements in all modes. This provides the security based "annotation off" function of previous test sets; hence it uses the legacy SCPI command.

When it is **All Off**, the **Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	<b>View/Display, Display, System Display Settings</b>
<b>Remote Command</b>	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]?
Example	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## View/Display AM/FM/PM

### Theme

This key allows you to change the Display theme. This is similar to the Themes selection under Page Setup and Save Screen Image. The four themes are detailed below.

Key Path	<b>View/Display, Display, System Display Settings</b>
Remote Command	:DISPlay:THEMe TDColor TDMonochrome FCOLor FMONochrome :DISPlay:THEMe?
Example	DISP:THEM TDM sets the display theme to 3D Monochrome.
Notes	TDColor – 3D is the standard color theme with filling and shading TDMonochrome – is similar to 3D color, but only black is used FCOLor – flat color is intended for inkjet printers to conserve ink. It uses a white background instead of black. FMONochrome – is like flat color, but only black is used
Preset	TDColor (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Backlight

Accesses the display backlight on/off keys. This setting may interact with settings under the Windows "Power" menu.

When the backlight is off, pressing ESC, TAB, SPACE, ENTER, UP, DOWN, LEFT, RIGHT, DEL, BKSP, CTRL, or ALT turns the backlight on without affecting the application. Pressing any other key will turn backlight on and could potentially perform the action as well.

Key Path	<b>View/Display, Display, System Display Settings</b>
Remote Command	:DISPlay:BACKlight ON OFF :DISPlay:BACKlight?
Preset	ON (Set by Restore Misc Defaults)
Initial S/W Revision	Prior to A.02.00

### On

Turns the display backlight on.

Key Path	<b>View/Display, Display, System Display Settings, Backlight</b>
Example	DISP:BACK ON
Readback	On
Initial S/W Revision	Prior to A.02.00

**Off**

Turns the display backlight off.

Key Path	<b>View/Display, Display, System Display Settings, Backlight</b>
Example	DISP:BACK OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

**Backlight Intensity**

An active function used to set the backlight intensity. It goes from 0 to 100 where 100 is full on and 0 is off. This value is independent of the values set under the Backlight on/off key.

Key Path	<b>View/Display, Display, System Display Settings</b>
<b>Remote Command</b>	:DISPlay:BACKlight:INTensity <integer> :DISPlay:BACKlight:INTensity?
Example	DISP:BACK:INT 50
Preset	100 (Set by Restore Misc Defaults)
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

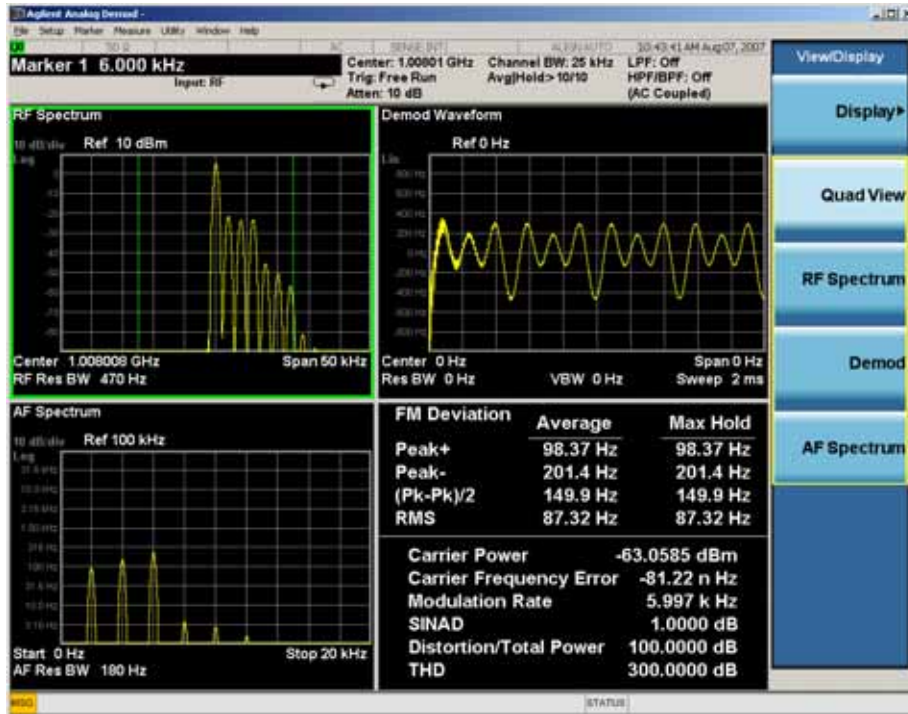
**Quad View**

The Quad View displays each of the four fundamental windows of the Analog Demod mode. The basic window format is essentially the same for the 3 measurements. The main difference is the demodulation technique performed in the hardware and the specific metrics and units of the displayed results.

In general, there is little window-context sensitivity in the Analog Demod mode, that is, most of the variables have been designed so that they are unique to their window. The three variables that are window dependent are, Ref Value, Scale/Div, and Ref Position. These variables change to reflect the settings of the current window (the current window is always outlined in green).

The Quad View is shown below. For more information on the views, see [“RF Spectrum Window” on page 620](#), [“Demod Waveform Window” on page 620](#), [“AF Spectrum Window” on page 621](#), or [“Metrics Window” on page 621](#).

## View/Display AM/FM/PM



### RF Spectrum Window

The **RF Spectrum** window shows a spectral display of the input RF signal with amplitude in the vertical Y axis and frequency in the horizontal X axis. The vertical axis is always scaled in dB, with units of dBm, with the Ref Value initially at the top of the vertical scale. The span is restricted to 8 MHz and zero span is not allowed.

The **RF Spectrum** window provides a convenient way to identify broadcast stations by placing the signal of interest at the center frequency using this window and listening to the instrument's speaker. Demodulation is always performed at the center frequency of the RF Spectrum window; this is regarded as the application's center frequency and is annotated in the Measurement Bar.

In the RF Spectrum window, two green vertical lines are shown centered around the center frequency, with spacing equal to the Channel BW. If the Channel BW is wider than the span, they are not seen.

The Center Frequency, Span, and RF Res BW are annotated at the bottom of the RF Spectrum Window. The Ref Value and Scale/Div are annotated above the graticule.

### Demod Waveform Window

In the **Demod Waveform** window, the demodulated signal is displayed in the time domain (zero span) with time on the horizontal X axis, and modulation depth (AM) or deviation (FM, PM) on the vertical Y axis.

In the **Demod Waveform** window the Y axis is linearly scaled in units of percent modulation for AM, frequency (Hz) for FM, or phase (radians) for PM. On a preset, the Ref Value is positioned in the center of the vertical scale.

Four traces are available in the Demod Waveform window. The Demod trace, in yellow, shows the current demodulation signal. The Demod Max trace, in cyan, shows the Max Hold value for each display

point since the last restart and the Demod Min trace, in magenta, shows the Min Hold value for each display point since the last restart. The Demod Average trace, in green, shows the averaged demodulation signal. If Averaging is turned off, only the Demod trace is displayed.

The Sweep Time is annotated at the bottom of the Demod Waveform Window. The Ref Value and Scale/Div are annotated above the graticule.

### AF Spectrum Window

In the **AF Spectrum** window, the demodulated signal is displayed in the frequency domain with frequency on the X axis and amplitude on the Y axis.

The vertical axis is always scaled in dB with the Ref Value initially at the top of the vertical scale. The Y-Axis Unit is % for AM, Hz for FM, and radians for PM.

In this view you can observe the spectral components of the modulating signal. The preset Start Frequency of this window is 0 Hz. The AF Start Freq and AF Stop Freq are annotated at the bottom of the AF Spectrum Window, as is the AF Res BW.

The Ref Value and Scale/Div are annotated above the graticule.

It is only possible to show a spectrum to a maximum frequency of Channel BW / 2. For trace display points beyond that frequency, the value 1.0E-50 is plotted and returned in queries.

### Metrics Window

The metrics window displays measurement results.

If averaging is turned on, the column marked “Current” is relabeled “Average” and the results in that column are averaged over successive measurements until the Average/Hold number is reached. Then, if not in Single measurement mode, the measurement continues, exponentially averaging in successive results. The Max Hold column shows the Maximum value the unaveraged metric has attained since the last Restart. The Max Hold column is removed when averaging is turned off.

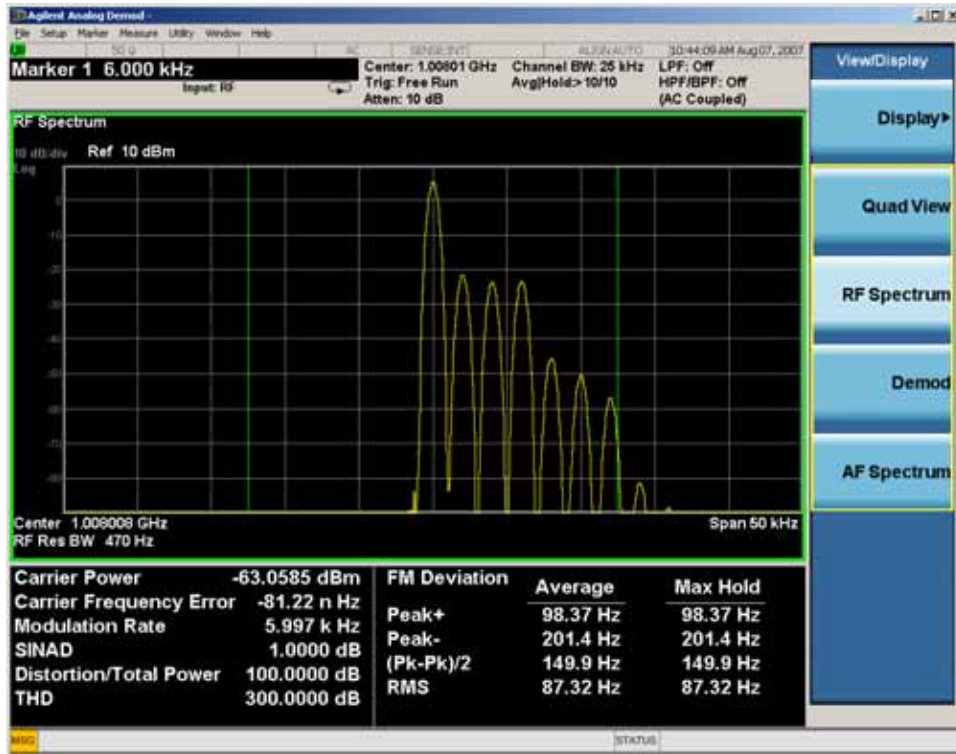
The window title is “FM Deviation” in FM, “AM Mod Depth” in AM, and “PM Radians” in PM.

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

### RF Spectrum & Metrics View

This view shows the RF Spectrum window and the Metrics window displayed in a split screen mode with the RF Spectrum window taking up approximately  $\frac{3}{4}$  of the display.

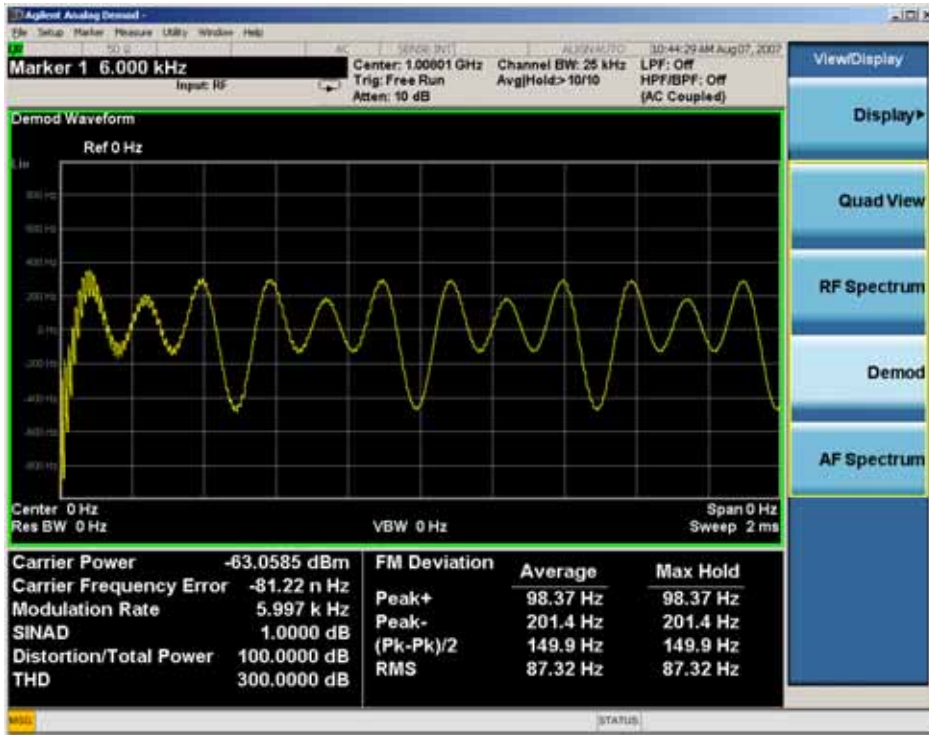
## View/Display AM/FM/PM



Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

## Demod Waveform & Metrics View

This view shows the Demod Waveform window and the Metrics windows displayed in a split screen mode with the Demod Waveform window taking up approximately  $\frac{3}{4}$  of the display.

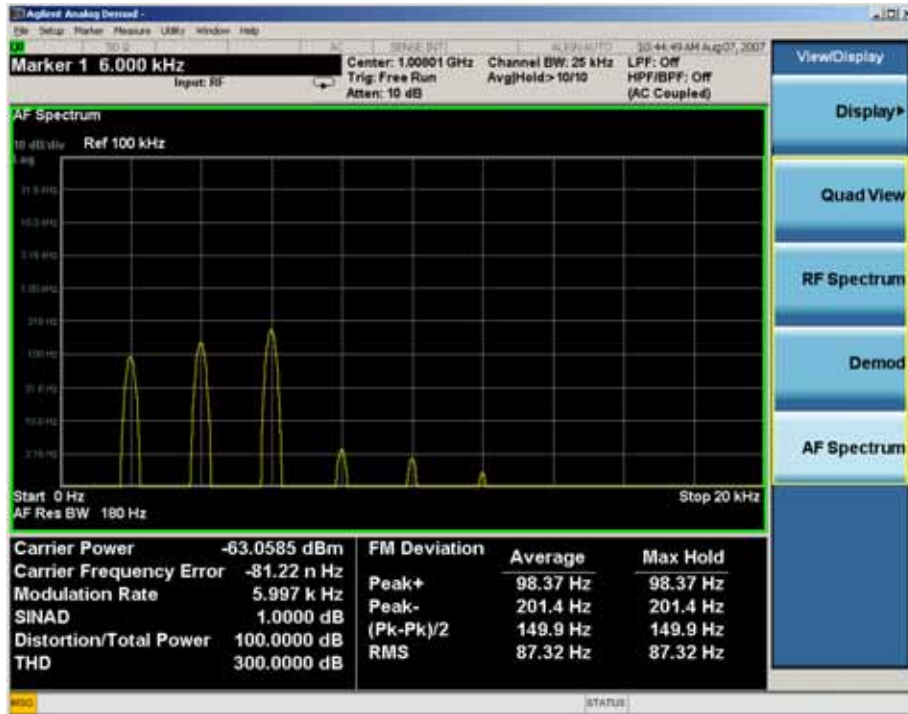


Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

### AF Spectrum & Metrics View

This view shows the AF Spectrum window and the Metrics windows displayed in a split screen mode with the AF Spectrum window taking up approximately  $\frac{3}{4}$  of the display.

## View/Display AM/FM/PM



Key Path	<b>View/Display</b>
Initial S/W Revision	Prior to A.02.00

## Distortion & THD Unit

Changes the units of distortion and THD in the Metrics screen between % and dB units.

Key Path	<b>View/Display</b>
<b>Remote Command</b>	:DISPlay:AM FM PM:VIEW:DISToRtion:UNIT DB PCT :DISPlay:AM FM PM:VIEW:DISToRtion:UNIT?
Example	DISP:AM:VIEW:DIS:T:UNIT PCT Sets AM distortion and THD display to percent.
Preset	PCT
State Saved	Saved in State
Initial S/W Revision	Prior to A.02.00

## Metrics Settings

Accesses a menu used to control which metrics will be provided. This includes a 1-of-N menu which allows you to control which modulation magnitude metrics are displayed, as well as On/Off controls for Modulation Rate and SINAD/Distortion/THD. If speed is an issue, select only the metric(s) that is (are) required. If modulation magnitude is set to Peak+ Only, Pk-Pk/2 Only, or RMS Only, the other



modulation magnitude metrics are loaded with not a number and show “---” in the metrics window.

Key Path	<b>View/Display, Metrics Settings</b>
<b>Remote Command</b>	:DISPlay:AM FM PM:VIEW:METRics:MMAGnitude ALL PPK PNPK RMS RMSRatio  :DISPlay:AM FM PM:VIEW:METRics:MMAGnitude?
Example	DISP:AM:VIEW:METR:MMAG PPK Sets AM modulation magnitude to peak +.  DISP:FM:VIEW:METR:MMAG RMSR Sets ratio reference and sets FM modulation magnitude to ratio display
Preset	ALL
State Saved	Saved in State
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.05.00

### Normal

Turns on all absolute modulation magnitude metrics. In the metrics window, Peak +, Peak -, Pk-Pk/2 and RMS results are provided.

Key Path	<b>View/Display, Metrics Settings, Mod Magnitude</b>
Example	:DISP:AM:VIEW:METR:MMAG ALL
Notes	This key was labeled “All” in earlier releases
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.05.00

### Peak+ Only

Turns on just the Peak+ metric in the portion of the metrics window that shows the modulation magnitude results.

Key Path	<b>View/Display, Metrics Settings, Mod Magnitude</b>
Example	:DISP:AM:VIEW:METR:MMAG PPK
Initial S/W Revision	Prior to A.02.00

### Pk-Pk/2 Only

Turns on just the Pk-Pk/2 metric in the portion of the metrics window that shows the modulation magnitude results..

Key Path	<b>View/Display, Metrics Settings, Mod Magnitude</b>
----------	--

## View/Display AM/FM/PM

Example	:DISP:AM:VIEW:METR:MMAG PNPK
Initial S/W Revision	Prior to A.02.00

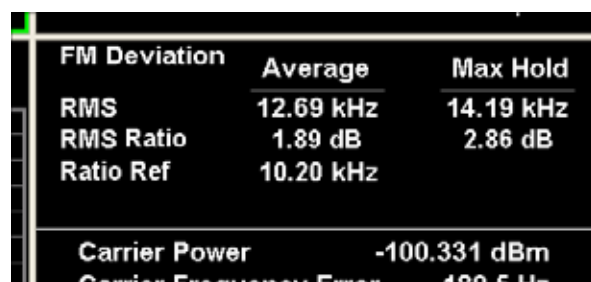
### RMS Only

Turns on just the RMS metric in the portion of the metrics window that shows the modulation magnitude results.

Key Path	<b>View/Display, Metrics Settings, Mod Magnitude</b>
Example	:DISP:AM:VIEW:METR:MMAG RMS
Initial S/W Revision	Prior to A.02.00

### RMS Ratio

Turns on the display of RMS Ratio. In this mode, the only magnitude metrics that are displayed are the RMS metrics, but besides the display of RMS, the ratio (in dB) of the RMS modulation to its reference is displayed, as well as the value of the reference, as shown in the display below:



FM Deviation	Average	Max Hold
RMS	12.69 kHz	14.19 kHz
RMS Ratio	1.89 dB	2.86 dB
Ratio Ref	10.20 kHz	
Carrier Power	-100.331 dBm	
Carrier Frequency Error	180.5 Hz	

Pressing the RMS Ratio key (or sending :DISP:AM:VIEW:METR:MMAG RMSR) establishes the reference. Pressing it again (or sending the SCPI command again) establishes a new reference. Whenever this happens, the current value of RMS modulation from the left hand column (Current or Average) is taken as the new reference.

If, when the ratio is to be established, there is not a valid value being displayed to use as a reference, an error is generated, the RMS Ratio and Ratio Ref values display --- and queries of either return not a number (9.91 e37).

To turn off the ratio display, select one of the other Mod magnitude views.

Note that each measurement (AM, FM and PM) has its own reference; and the reference is remembered when you leave the measurement and return.

The ratio references are saved in State, and when the recalled state of **Metrics Settings** is **RMS Ratio**, the saved reference for the current measurement should be recalled and used, rather than establishing a new one.

Key Path	<b>View/Display, Metrics Settings, Mod Magnitude</b>
Example	:DISP:AM:VIEW:METR:MMAG RMSR
Initial S/W Revision	A.05.00

## Modulation Rate

Toggles the Modulation Rate metric on and off. When turned on, the Modulation Rate metric is provided. When turned off, the Modulation Rate metric is set to not a number and shows “---” in the metric window.

Key Path	View/Display, Metrics Settings
<b>Remote Command</b>	:DISPlay:AM FM PM:VIEW:METRics:MRATe[:STATE] ON OFF 1 0 :DISPlay:AM FM PM:VIEW:METRics:MRATe[:STATE]?
Example	DISP:AM:VIEW:METR:MRAT OFF Sets AM modulation rate to off
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## SINAD, THD, Distortion

Toggles the distortion metrics (SINAD, Distortion, & THD) on and off. When turned on, the SINAD, Distortion, and THD metrics are provided. When turned off, the SINAD, Distortion, and THD metrics are set to not a number and show "---" in the metric window..

SINAD is the ratio of total received power (the received signal-plus-noise-plus-distortion power) to the received noise-plus-distortion power. It is always expressed in decibel units. The rejection of the carrier from the noise-plus-distortion power measurement is usually not much more than 50 dB, thus limiting the maximum SINAD.

THD is the ratio of the root mean square voltage of the harmonics referenced to the fundamental voltage, expressed in % or dB. Note the differences with respect to Distortion. The denominator of the ratio is different and the items in the numerator do not include the noise between harmonics, just the harmonics themselves.

Distortion/Total Voltage (rms) is the ratio of unwanted received power (noise plus distortion) to the total received power, expressed in % or dB. Therefore, this metric is the negative of SINAD when expressed in decibels.

Key Path	View/Display, Metrics Settings
<b>Remote Command</b>	:DISPlay:AM FM PM:VIEW:METRics:DISTortion[:STATE] ON OFF 1 0 :DISPlay:AM FM PM:VIEW:METRics:DISTortion?
Example	DISP:AM:VIEW:METRics:DIST OFF Sets AM SINAD, Distortion, THD Metrics to off
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

View/Display AM/FM/PM