HEWLETT
PACKARD

The HP 8920/21
Test Set
User's Quick Reference
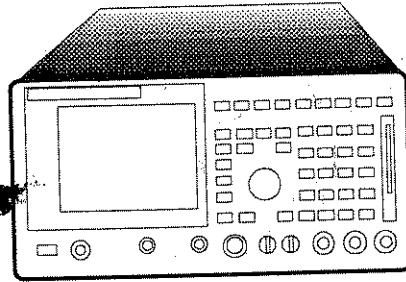
The HP 8920/21
Test Set
User's Quick Reference

Use this key to perform a receiver test or to generate a modulated RF signal.

Use this key to perform a transmitter test or to monitor and measure an RF signal.

RX TX PRESET SHIFT
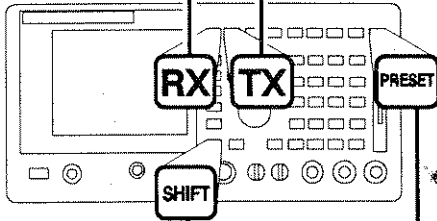
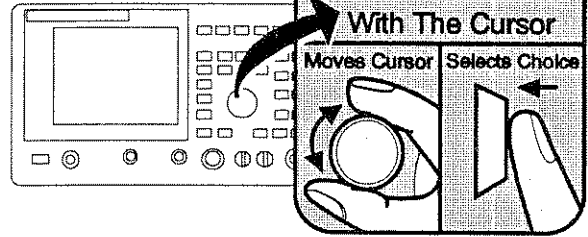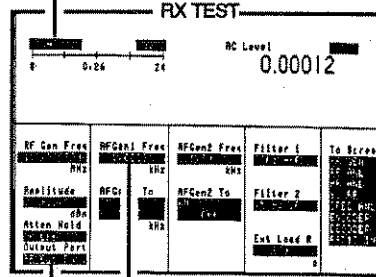Use this key to activate the blue labeled functions. Press and release, then press the key below the blue label.

Use this key to reset all instrument settings.

Set Up The Instrument Screen With The Cursor

| Moves Cursor | Selects Choice |

Some Of The Choices Made On The Screen

One-of-many:

Pushing the knob will display a list of choices in the lower-right corner of the screen. Turning the knob moves the cursor through the list. Pushing the knob again selects the choice adjacent to the cursor.

RX TEST

AC Level
0.00012

RF Gen Freq	RFGen1 Freq	RFGen2 Freq	Filter 1	To Screen
kHz	kHz	kHz		
Amplitude	RFG:	To	RFGen2 To	Filter 2
dBm				
Atten Hold		kHz		
Output Port				Ext Load R

Numeric Entry:

Pushing the knob will highlight the data. The highlighted data can be changed by turning the knob. Pushing the knob again enters the data.

Underlined:

Pushing the knob will move the underline below a choice. The underlined choice is active.

Table Of Contents

An Example Of How To
Make An FM Radio SINAD Check

Front Panel Set Up

1. Press ──────────

2. Press ──────

Connect to the
FM Transceiver's
Antenna Connector

Connect to the
FM Transceiver's
Speaker Output

Screen Set Up

Set Up The Instrument Screen With The Cursor

Moves Cursor | Selects Choice
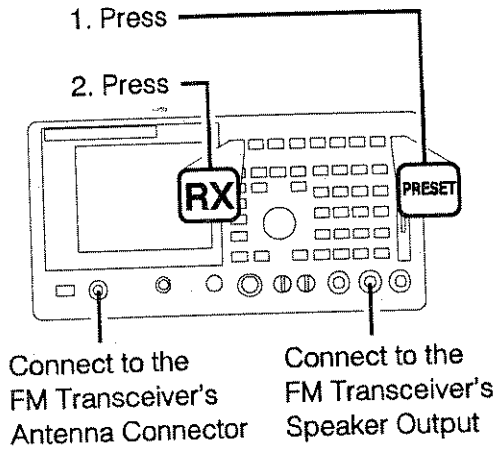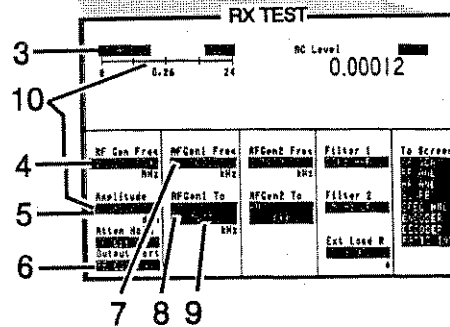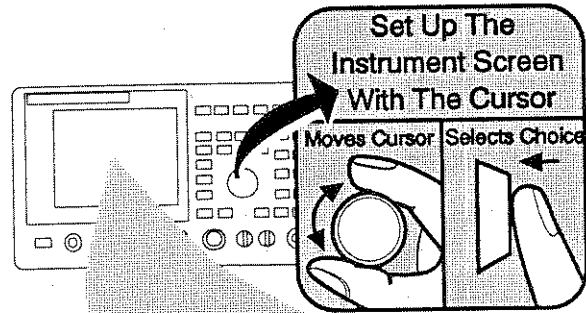
3. Verify that SINAD is displayed.

4. Enter the RF frequency.

5. Enter the RF amplitude.

6. Verify that RF Out is underlined.

7. Verify that the modulation frequency displayed is 1 kHz.

8. Verify that the modulation type displayed is FM.

9. Enter the deviation.

10. Adjust the RF amplitude for a SINAD reading of 12 dB.

To Save Instrument Settings

1. Set up the instrument as desired.

3. Press for SAVE

2. Press

4. Enter number or
   name to identify,
   then press ENTER
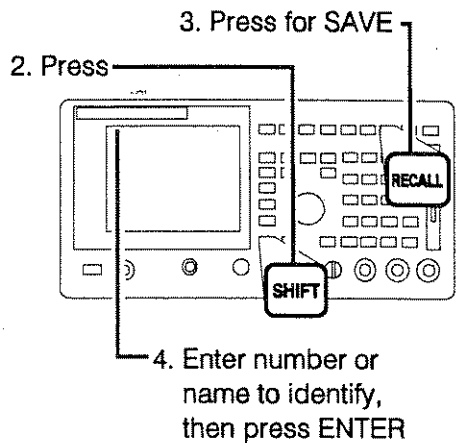
NOTE: The number of changes made
to the screen determines
memory consumption.

If memory capacity is exceeded,
you will get an error message.
Refer to the User's Guide and
Reference manual.

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To Recall Instrument Settings

1. Press recall to list the
   saved settings

Recall:

2. Use the Knob to
   choose the
   saved setting
   from list of choices.

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1. Press ——

2. Press for CONFIG
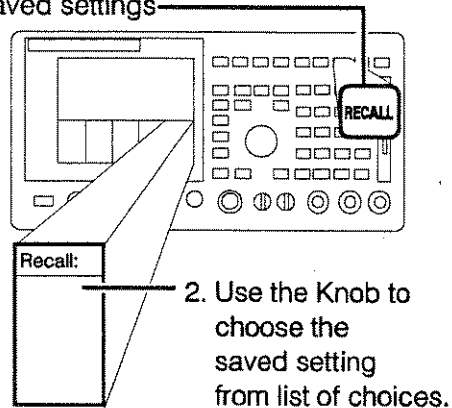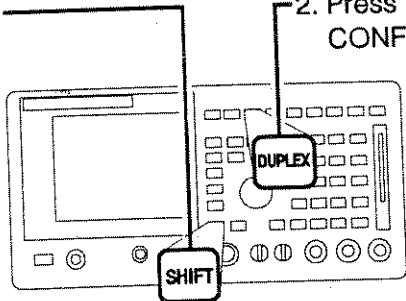
3. Vary the screen intensity with the knob
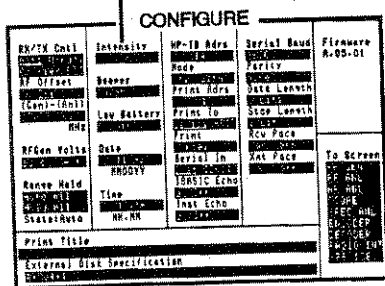
1. Position the cursor at a unit to change ——
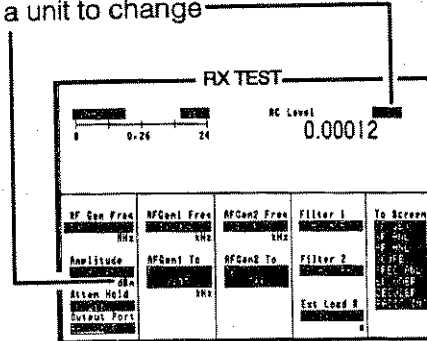
2. Press desired unit ——
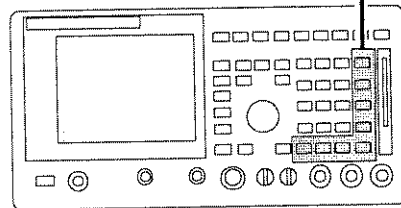
1. Insert a memory card
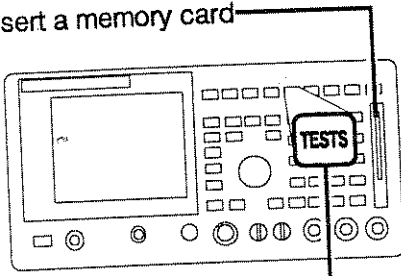
2. Press

3. List the choices
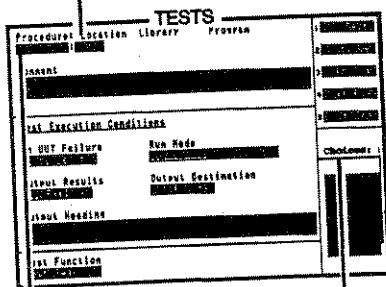
— TESTS —

4. Choose Card

5. List the choices

6. Choose a program

7. Test Configuration

Edit the test specifications

Edit the test frequencies

Edit the test sequence

Edit the test configuration and/ or Edit the test parameters
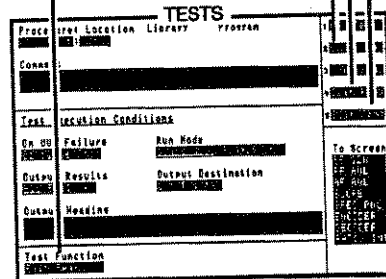
— TESTS —

NOTE: Press the TESTS key to exit an editing screen.

8. Run the program

— TESTS —
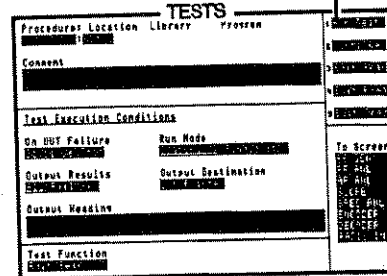
To Set Up
Single-Tone Modulation

1. Press
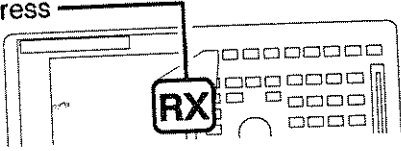
2. Enter the carrier frequency

3. Enter the carrier amplitude

RX TEST

AC Level
0.00012
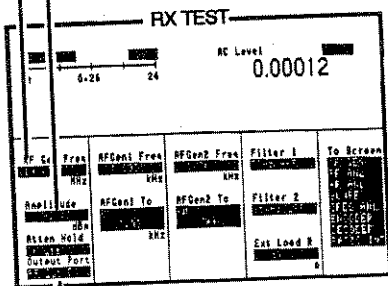
4. Select the Output Port

5. Enter the modulation frequency

7. Choose the modulation type

RX TEST

AC Level
0.0001
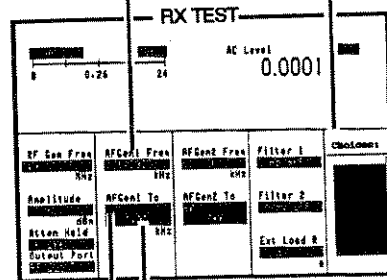
6. List the modulation choices

8. Enter the depth or deviation

1. Press

2. Enter the carrier frequency

3. Enter the carrier amplitude
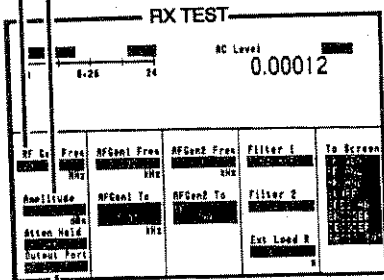
4. Select the Output Port

5. Enter the modulation frequency

6. List the modulation choices
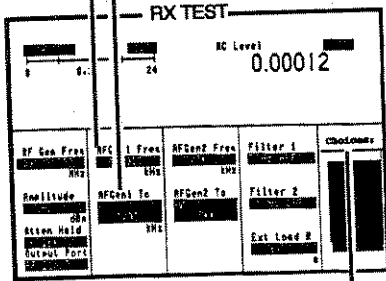
7. Choose the modulation type

8. Enter the depth or deviation
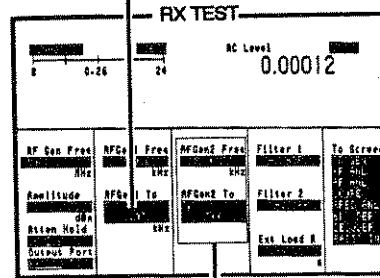
9. Refer to page 38 to set up the signaling then return to step 10

NOTE: The modulation type must be the same in AFGen 1 and AFGen 2.

10. Press to return to the RX Test screen
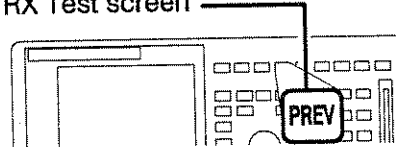
11. Turn signaling on/off
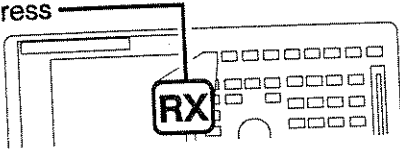
16

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1. Press

2. Enter the carrier frequency

3. Enter the carrier amplitude

4. Select the Output Port

5. Enter the modulation frequency

6. List the modulation choices

7. Choose the modulation type

8. Enter the depth or deviation

9. Repeat steps 2 thru 5 for AFGen 2

NOTE: The modulation type must be the same in AFGen 1 and AFGen 2.

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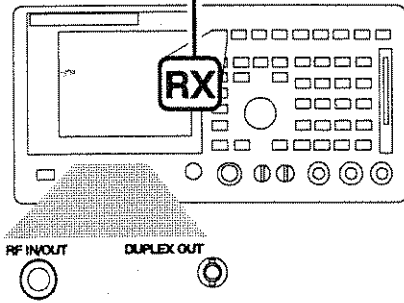
1. Press

2. Underline RF Out or Dupl

RX TEST

AC Level
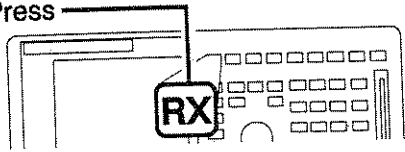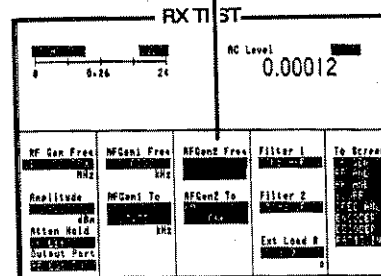0.00012

RF I Freq	AFGen1 Freq	AFGen2 Freq	Filter 1	To Screen
	kHz	kHz		
Amplitude	AFGen1 To	AFGen2 To	Filter 2	
	kHz			
Attr Hold				
Output Port			Ext Load R	
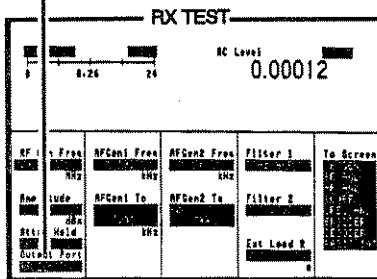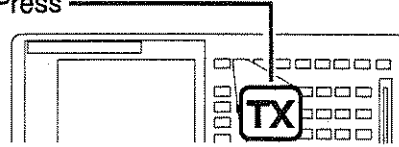
1. Press

2. Select the Tune Mode

2a. Enter the Tune Freq if Manual Tune Mode is used

TX TEST

Frequency	FM Deviation
149.978076	80.81
Power	
0.0001	6.61620

Tune Mode	Input Port	RF Aml In	AFGen1 Freq	To Screen
Tune Freq	IF Filter	Filter 1	AFGen1 Lvl	
kHz		Filter 2	mV	
TX Pwr Zero	Ext key	De-Emphasis		
		Detector		
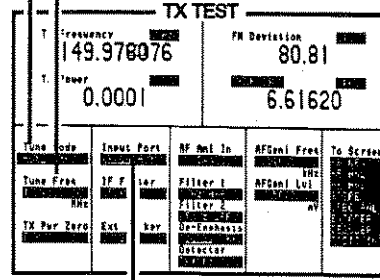
3. Select the Input Port

4. List the demodulation choices

5. Choose the demodulation type

TX TEST

TX Frequency	FM Deviation
149.978076	80.81
TX Power	
0.0001	6.61620

Tune Mode	Input Port	RF Aml In	AFG	Freq	Choloops
Tune Freq	IF Filter	Filter 1	AFG	Lvl	
kHz		Filter 2		mV	
TX Pwr Zero	Ext TX key	De-Emphasis			
		Detector			
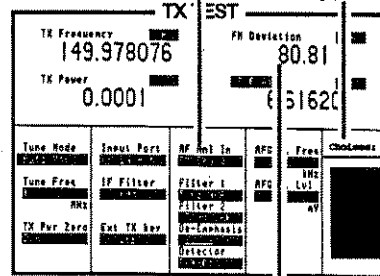
6. Read

To Measure RF Frequency

1. Press
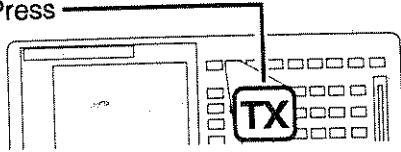
2. Underline Auto

3. Read

```
┌────────── TX TEST ──────────┐
│ Frequency  ███      FM Deviation ███ │
│ 149.978076            80.81   │
│ Power      ███                │
│ 0.0001            6.61620     │
```

Tune Mode	Input Port	AF Aml In	AFGeni Freq	To Screen
			kHz	
Tune Freq	IF Filter	Filter 1	AFGeni Lvl	
MHz		Filter 2	mV	
TX Pwr Zero	Ext TX key	De-Emphasis		
		Detector		

To Measure RF Frequency Error

1. Press
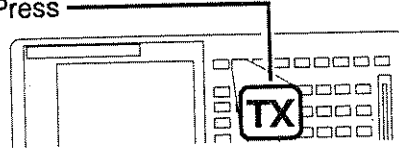
2. Underline Manual

3. Enter the Tune Freq

4. Select the Input Port

```
┌────────── TX TEST ──────────┐
│ TX Error   ███      FM Deviation ███ │
│ 149.978 76            80.81   │
│ Tx Power   ███                │
│ 0.000            6.61620      │
```

Tune Mode	Input Ports	AF Aml In	AFGeni Freq	To Screen
			kHz	
Tune Freq	F Filter	Filter 1	AFGeni Lvl	
MHz		Filter 2	mV	
TX Pwr Zero	Ext TX key	De-Emphasis		
		Detector		

5. Read

1. Press

RF IN/OUT   ANT IN

2. Underline RF In or Ant

1. Press

2. Connect to AUDIO OUT

3. Enter the audio level

4. Enter the audio frequency

To Output A Sine, Square, Triangle, Or Sawtooth Waveform*

1. Choose ENCODER from the To Screen
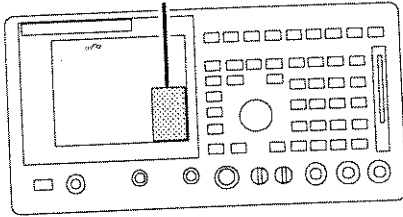
2. Set the Mode to Func Gen
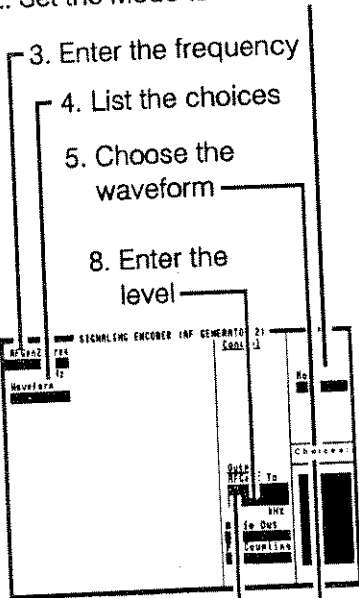
3. Enter the frequency

4. List the choices

5. Choose the waveform

8. Enter the level

6. List the choices

7. Choose Audio Out

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To Measure Audio Distortion

1. Press

3. Choose Distn

2. List the choices

```
┌──────── TX TEST ────────┐
  TX Frequency        FM Deviation
   149.978076           80.81
  TX Power
   0.0001              6.6162(
```
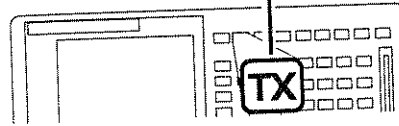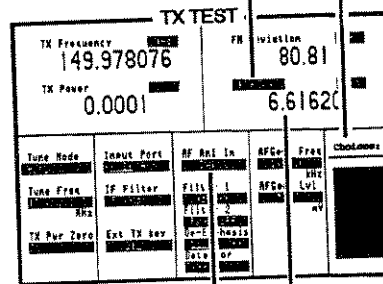
4. Read

NOTE: Measures the distortion on a 1 kHz tone using the input displayed here.

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1. Press

3. Choose
AF Freq

2. List the
choices

TX TEST

TX Frequency		FM Deviation
149.978076		80.81
TX Power		
0.0001		6.6162C

Tune Mode	Input Port	AF Amp In	AFGen	Freq	ChoLeusr
Tune Freq	IF Filter	Filt 1	AFGen	Lvl	
		Filt 2			
TX Pwr Zero	Ext TX Key	De-Emphasis			
		Detector			
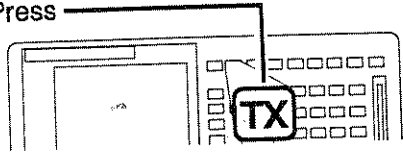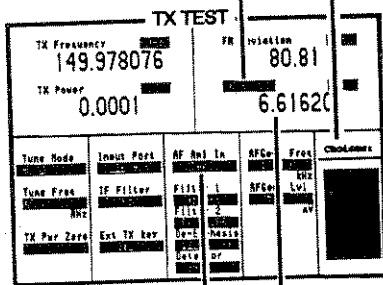
4. Read

NOTE: Measures the frequency
of the input displayed here.

1. Press

RX
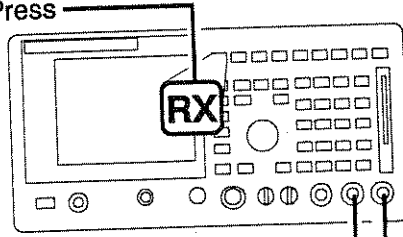
2. Connect to AUDIO IN

3. Read

RX TEST

		AC Level	
0	0.26	24	0.00012

RF Gen Freq	RFGen1 Freq	RFGen2 Freq	Filter 1	To Screen
	kHz		kHz	
Amplitude	RFGen1 To	RFGen2 To	Filter 2	
dBm		kHz		
Atten Hold				
Output Port			Ext Load R	
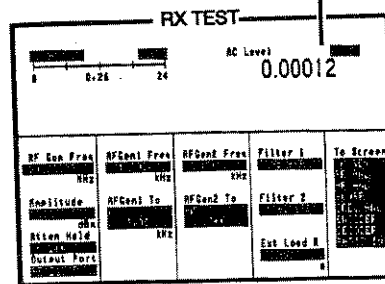
1. Verify which input is selected
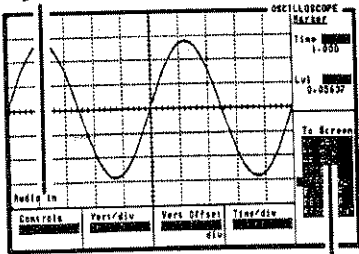
2. Select AF Anl from To Screen:
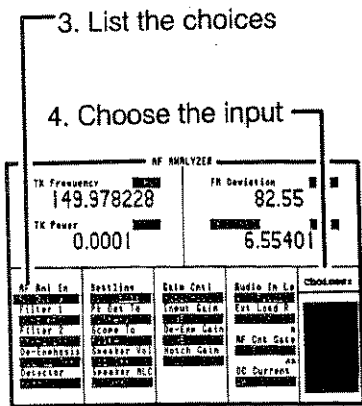
3. List the choices

4. Choose the input

5. Press PREV to return to the scope
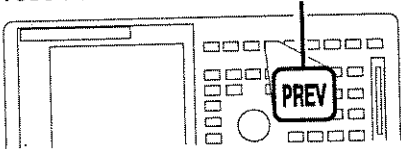
1. List the choices

2. Choose a vertical
   units per division

Scope Input Determines
Unit of Measure

Scope Input	Unit of Measure
Audio In	V
FM	kHz
AM	%
SSB	mV

NOTE: To change the scope
input see page 30.

To Change The Scope
Horizontal Units Per Division

1. List the choices
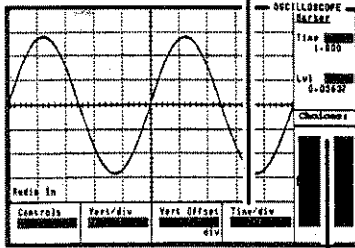
2. Choose a time

To Use The Scope Marker

1. List the choices   4. Read the
                          marker position
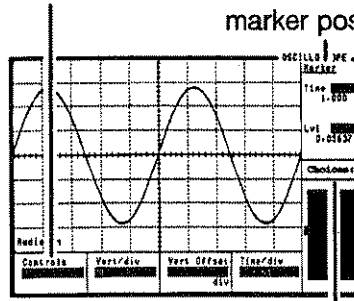
2. Choose Marker

3. Marker position

Manually position the
marker with the knob

Push the knob to move the marker to the peak of the signal	Push the knob to change the center frequency or ref level to marker's position

To Display A Scope Waveform Before The Trigger Point

1. List the choices
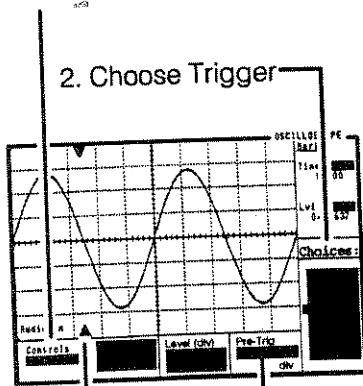
2. Choose Trigger

3. Adjust the pre-Trigger position with the knob

Pre-trigger cursor

To Use The Spectrum Analyzer Marker

1. List the choices   4. Read the marker position
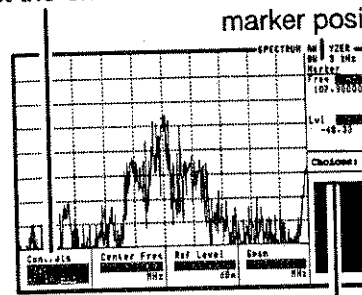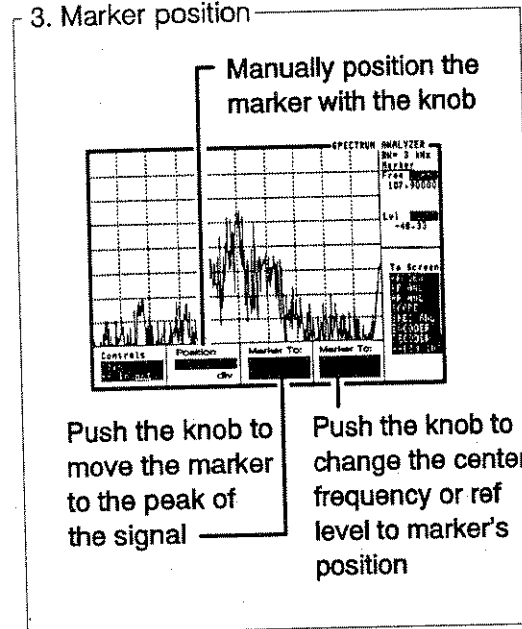
2. Choose Marker

3. Marker position

Manually position the marker with the knob

Push the knob to move the marker to the peak of the signal

Push the knob to change the center frequency or ref level to marker's position
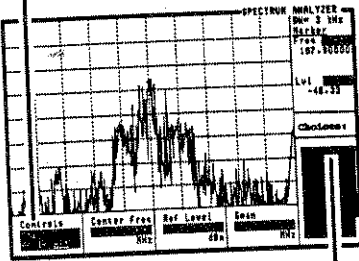
1. List the choices

2. Choose RF Gen

3. Underline Track
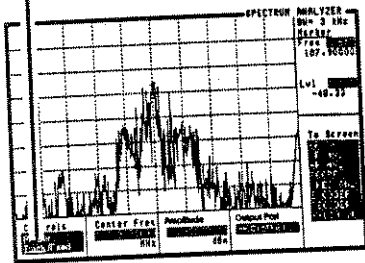
4. Adjust the offset frequency
   using the Knob
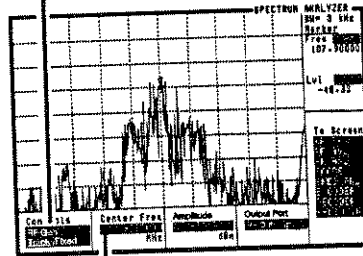
5. Enter the amplitude

To Output
Tone Sequential Signaling*

*Option 004 Required in HP 8920

1. Choose ENCODER from the To Screen
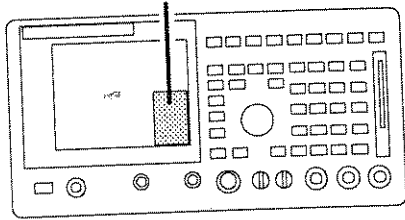
2. List the signaling mode choices
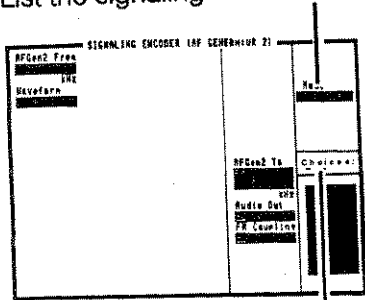
3. Choose Tone Seq

4. List the standard choices

NOTE:
Information in these
columns changes
according to the
standard selected.
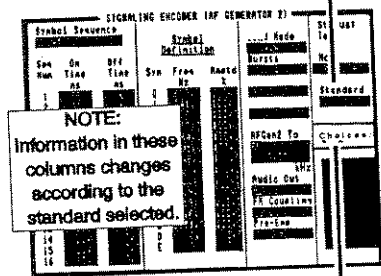
5. Choose a standard

6. Enter a tone sequence
using the symbols
0-9, A-E, and space

7. List the Send
Mode choices

8. Choose the mode

9. List the output choices

10. Choose the output

11. Select Send

1. Choose ENCODER from the To Screen

2. List the signaling mode choices

3. Choose DTMF

4. Enter the sequence
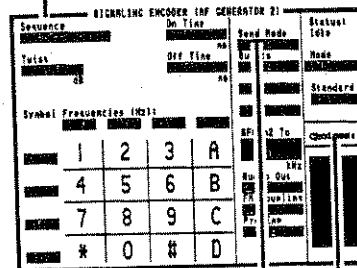
5. List the Send Mode choices

6. Choose the mode

7. List the output choices

8. Choose the output
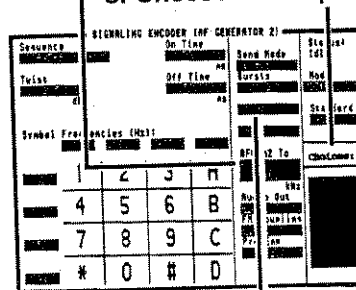
9. Select Send

1. Choose DECODER from the To Screen
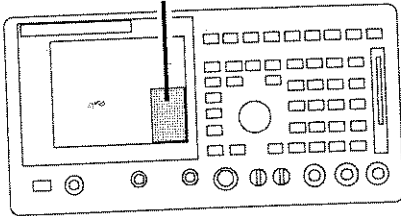
2. List the signaling mode choices
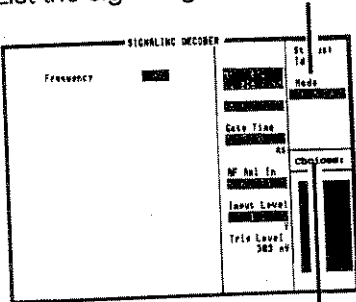
3. Choose the signaling mode

4. List the standard choices
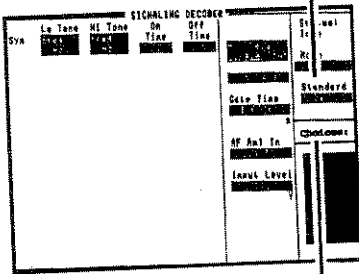
5. Choose a standard

6. List the choices of inputs

7. Choose the input

NOTE:
Signal information is displayed in these columns
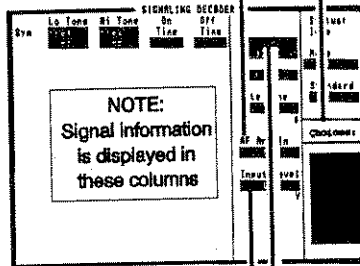
8. Enter the estimated level of the input signal (after de-emphasis if used)

9. Push knob to arm the decoder for a measurement

Instrument Terms And Abbreviations

Refer to the Instrument User's Guide
if more information is needed.

AF Anl- Audio Frequency Analyzer.

AF Anl In- Audio Frequency Analyzer
  Input.

AF Cnt Gate- Audio Frequency Counter
  Gate Time.

AF Gen1- Audio Frequency Generator 1.

AF Gen2- Audio Frequency Generator 2.
  Also used as the signaling
  Encoder.

Ant- Antenna.

ANT IN- Antenna Input. An alternate input connector for the RF Analyzer and Spectrum Analyzer for low level measurements. RF power CANNOT be measured from this connector.

ASSIGN. The key used to assign USER keys to instrument settings. To assign a USER key, position the cursor adjacent to the setting, press SHIFT, ASSIGN, and then one of the user keys k1-k5 or k1'-k3'.

Atten Hold - Attenuator Hold. A setting that prevents the RF Generator output attenuator from changing ranges, limiting the amplitude adjustment range.

AUDIO IN (HI). External input connector for audio measurements.

AUDIO IN (LO). External input connector for floating measurements. To ground or float the connector use the Audio In Lo field on the AF ANL screen.

AUDIO OUT. External output connector for AF Gen1 and/or AFGen2 (Encoder).

AVG- Average. The key used to do measurement averaging. When used it smooths out the measurement of rapidly fluctuating signals. To activate averaging, positon the cursor adjacent to the unit of measure of the measurement. Then press SHIFT, AVG, ENTER. To cancel averaging, press SHIFT, AVG,ON/OFF.

CONFIG- Configure. The key used to access the CONFIGURE screen to change the HP-IB address, define the printer type, setup serial communications, and several other instrument settings.

DC FM Zero. This function removes DC offset when using DC-coupled FM.

DECODER. Signaling decoder.

Dupl- Duplex.

DUPLEX. The key used to access the DUPLEX TEST screen for simultaneous transmitter/receiver testing.

DUPLEX OUT. An alternate output connector for the RF Generator and Spectrum Analyzer Tracking Generator.

ENCODER. Signaling encoder.

Ext Load R- External Load Resistance. This function is used to specify the impedance of the device connected to the AUDIO IN connector for calibrated audio power measurements.

Ext TX Key- External Transmitter Key. This function keys a transmitter through the MIC/ACC connector.

Filter 1. The AF Analyzer high-pass and optional filters.

Filter 2. The AF Analyzer low-pass and optional filters.

Gain Cntl- Gain Control. This function selects the automatic or manual AF Analyzer input, De-Emp, and Notch gains. Auto is normally used.

HI LIMIT/LO LIMIT. The keys used to set high and low measurement limits. To enter the limits, position the cursor adjacent to the unit-of-measure of the measurement, then press SHIFT, LO or HI LIMIT, a value, ENTER. To cancel limits, press SHIFT, LO or HI LIMIT, ON/OFF.

HOLD. The key used to freeze information displayed on the screen. Select HOLD again to release the display.

IF Filter- Intermediate Frequency Filter. A field that selects the RF Analyzer IF bandwidth.

Input Atten- Input Attenuator.

k1,k2,k3,k4,k5. Local USER keys are for accessing a user-assigned field on the currently displayed screen. Pressing a local user key moves the cursor adjacent to the key's assigned field.

k1',k2',k3'. Global USER keys are for accessing a user-assigned field on another screen. Pressing the global user key displays the assigned field at the top of the currently displayed screen.

MEAS RESET- Measurement Reset.

METER. The key used to display the analog meter. To set up the meter, position the cursor adjacent to the unit of measure of the measurement to display, then press SHIFT, METER.

MIC/ACC- Microphone/Accessory. A connector that is used to key a transmitter and/or modulate a carrier with a microphone.

Mic Pre-Emp (Auto)- Microphone Pre-Emphasis. This function automatically switches in and out the pre-emphasis network (750us).

Mic Pre-Emp (Hold)- Microphone Pre-Emphasis. This function allows manual switching in and out of the pre-emphasis network when FM modulation is used.

Mod In To- Modulation In To. This function selects the RF Generator's modulation type when using the Modulation Input and MIC/ACC connectors for external modulation.

Normalize (A-B). A Spectrum Analyzer entry to display the difference between the current screen and a previously saved screen.

Normalize (A Only). A Spectrum Analyzer entry to select a normal display

Normalize (Save B). A Spectrum Analyzer entry to save the current display.

Pk Det To (De-Emp)- Peak Detector To (De-Emphasis). This function sets up the AF Analyzer to measure the peak voltage after the de-emphasis network.

Pk Det To (Filters)- Peak Detector To (Filters). This function sets up the AF Analyzer to measure the peak voltage after audio filters 1 and 2 and before the de-emphasis network.

PREV- Previous screen. The key used to toggle between the currently displayed screen and the previously accessed screen.

PRESET. The key used to reset the instrument's settings to the factory-defined default states.

PRINT. The key used to print the currently displayed screen if a printer is connected to the rear-panel's SERIAL PORT or the HP-IB connector. To set up the instrument for printing, press SHIFT, CONFIG to access the CONFIGURE screen. On the screen select the printer port in the Print To field. For HP-IB printers enter the printers address in the Print Adrs field. This is a graphic pixel dump that requires an HP graphic-compatable printer.

Range Hold. This function selects the automatic or manual control of all AF Analyzer and RF Analyzer gain, and tuning adjustments.

RECALL. The key used to recall previously saved settings.

REF SET- Reference Set. The key used enter a measurement reference level. To enter a reference level, position the cursor adjacent to the unit of measure of the measurement. Then press SHIFT, REF SET, enter the ref level*, and complete the entry by pressing ENTER. To cancel ref set, press SHIFT, REF SET, ON/OFF.

*The currently displayed measurement value is used as the reference if you do not enter a specific value.
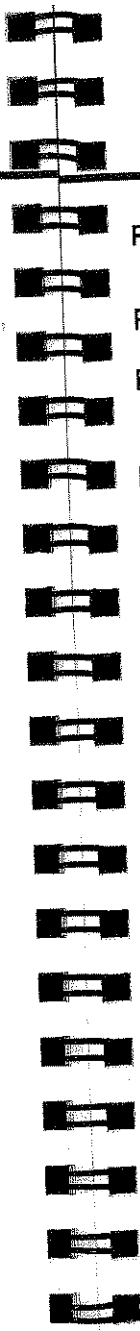
RELEASE. The key used to clear a user key's assignment.

RF Anl- Radio Frequency Analyzer.

RF Cnt Gate- Radio Frequency Counter Gate Time.

RF Gen- Radio Frequency Generator.

RF Offset (Gen-Anl)- Radio Frequency Offset (Generator-Analyzer). An entry that sets up the difference between the RF Generator and RF Analyzer frequencies. Automatically offsets the RF Analyzer tune frequency from the RF Generator frequency.

RX- Receiver Test. The key used to access the RX TEST screen for performing tests on a radio receiver.

RX/TX Cntl (Auto)- RX TEST/TX TEST screen Control (Auto). This function enables automatic switching between the RX TEST and TX TEST screens.

RX/TX Cntl (Carrier)- Receiver/Transmitter Control (Carrier). This function automatically switches RX TEST and TX TEST screens when a signal is detected at the RF IN/OUT or ANT IN connector and Auto is selected in the RX/TX Cntl field.

RX/TX Cntl (Manual)- RX TEST and TX TEST screen Control (Manual). This function disables automatic switching between the RX TEST and TX TEST screens.

RX/TX Cntl (ptt)- Receiver/Transmitter Control (push to talk).This function switches the instrument to the RX TEST screen when a microphone connected to the MIC/ACC connector is keyed, and Auto is selected in the RX/TX Cntl field.

SAVE. The key used to save settings displayed on the screen. The number of settings that can be saved depends on the number of entries made since the default settings.

SCOPE- Oscilloscope. This selection accesses the OSCILLOSCOPE screen.

Sensitivity. A field that sets up the RF Analyzer's input sensitivity at the ANT IN connector. Measurements may not be as accurate when using High sensitivity.

Settling (Fast). This function sets up the AF Analyzer for fast settling. Use for measurements above 200 Hz.

Settling (Slow). This function sets up the AF Analyzer for slow settling. Use for measurements below 200 Hz.

SPEC ANL- Spectrum Analyzer. This selection accesses the SPECTRUM ANALZER screen.

Squelch (Fixed). The instrument is set to the factory defined squelch level.

Squelch (Open). The instrument is set for no squelch.

Squelch (Pot). The instrument is set to manually adjust the squelch with the knob.

TESTS. The key used to access the
TESTS screen for running
IBASIC programs.

Tune Mode (Auto). This function sets
up the RF Analyzer to tune to the
input signal and displays the
signal's frequency.

Tune Mode (Manual). This function
sets up the RF Analyzer to tune
to the manually-entered frequency
and displays the difference be-
tween the input signal and the
manually entered frequency.

TX- Transmitter Test. The key used to ac-
cess the TX TEST screen for per-
forming tests on a radio trans-
mitter.

TX Pwr Meas- Transmitter Power Mea-
surement Zero. This function zeros
the RF power meter.

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Help Screens are
available for assistance

User's Guide

Instrument BASIC
Programming Guide

User's Quick Reference Manual:
- Brief instructions for radio test functions
- Terms and abbreviations

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