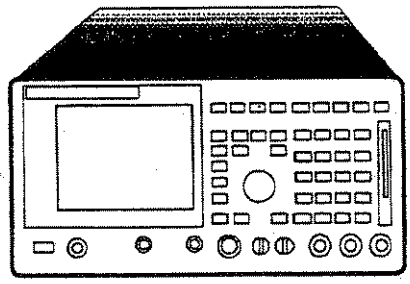
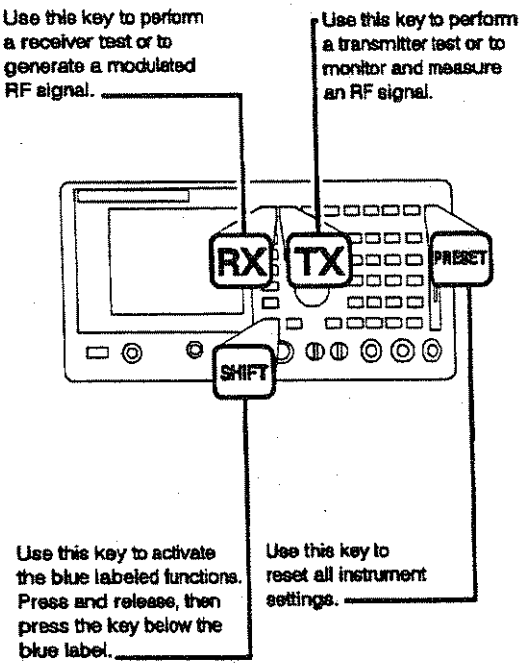
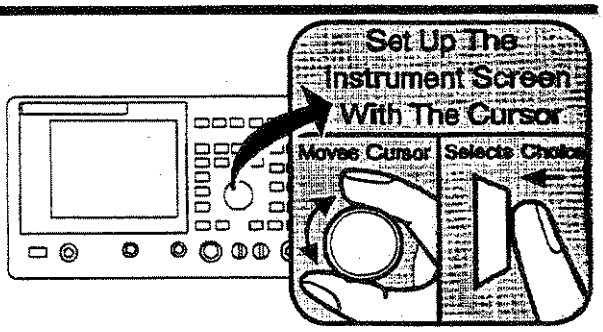
The HP 8920A RF Communications Test Set



Hewlett-Packard Company
Learning Products Department
TAF C34
Spokane, WA 99220 U.S.A.

The HP 8920A-At A Glance

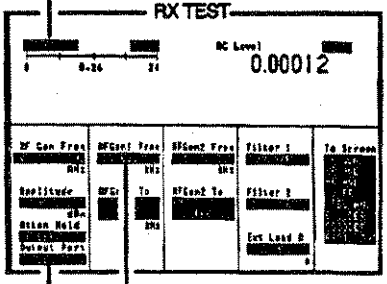




Some Of The Choices Made On The Screen

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.



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.

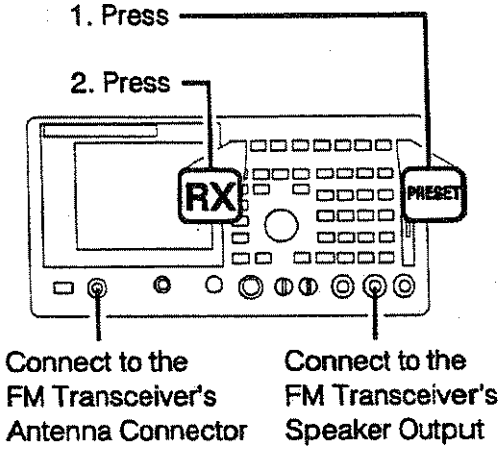
Underlined:

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

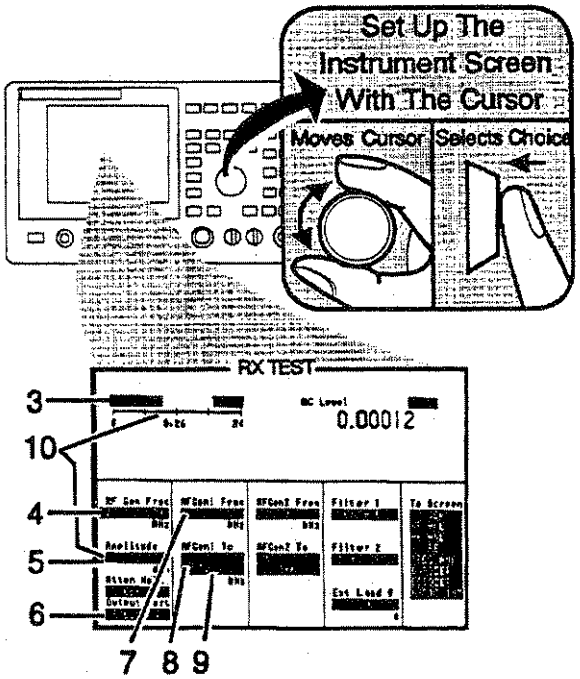
Table Of Contents

An Example Of How To Make An FM Radio SINAD Check

Front Panel Set Up



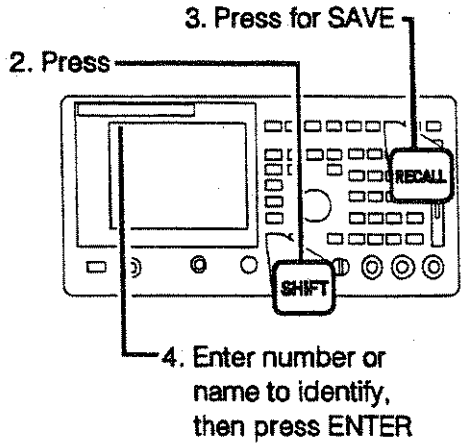
Screen Set Up



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.

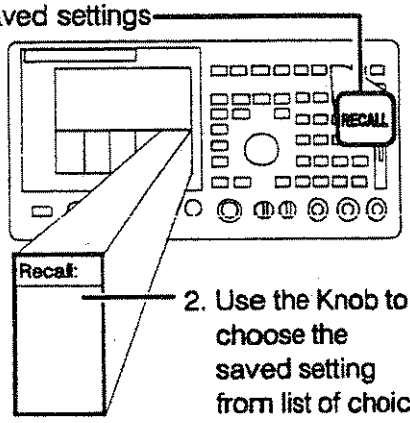


NOTE: The number of changes made to the screen determines memory consumption.

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

To Recall Instrument Settings

1. Press recall to list the saved settings

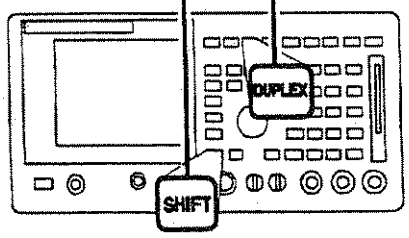


2. Use the Knob to choose the saved setting from list of choices.

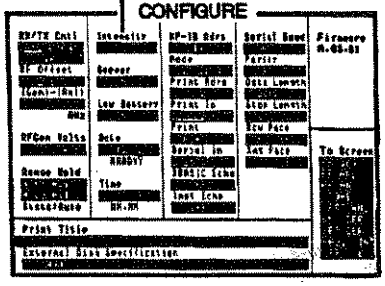
To Adjust The Screen Brightness

1. Press

2. Press for CONFIG

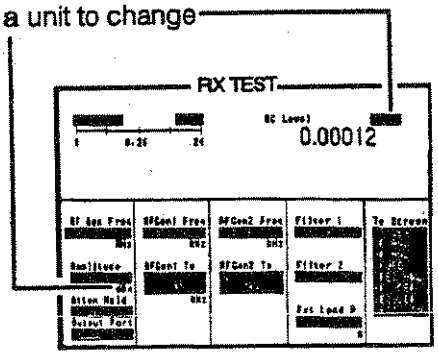


3. Vary the screen intensity with the knob

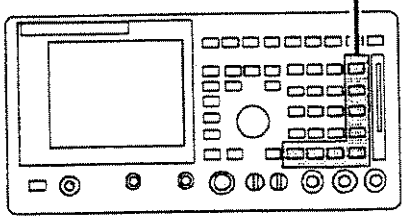


To Change The Unit Of Measure

1. Position the cursor at a unit to change

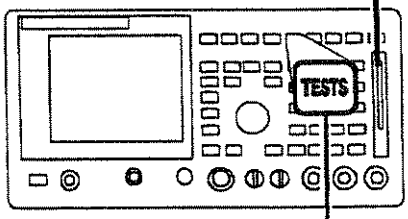


2. Press desired unit



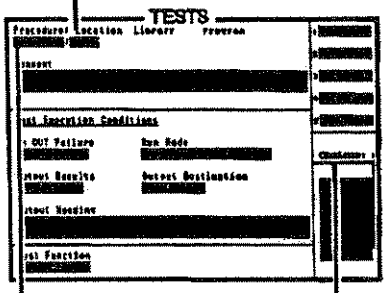
To Run A Memory Card Program

1. Insert a memory card



2. Press

3. List the choices



4. Choose Card

5. List the choices

6. Choose a program

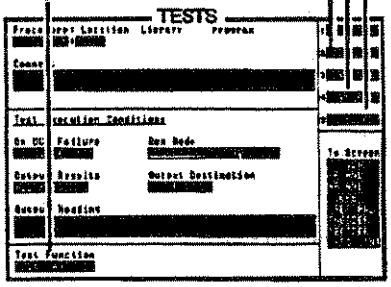
7. Test Configuration

Edit the test specifications

Edit the test frequencies

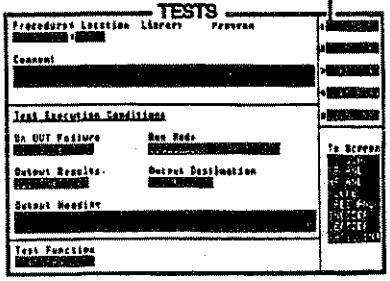
Edit the test sequence

Edit the test configuration and/
or Edit the test parameters

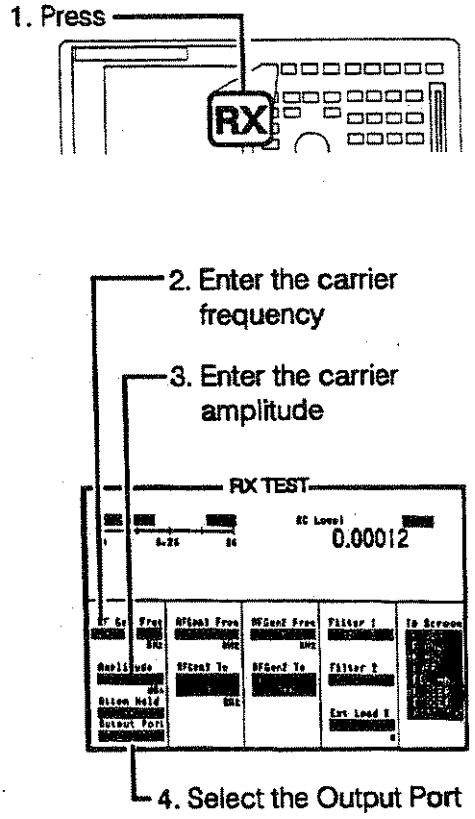


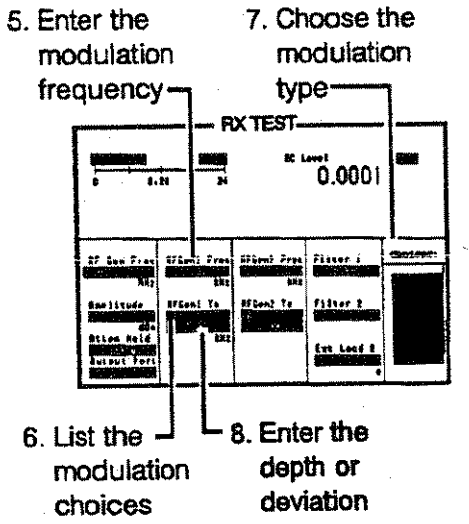
NOTE: Press the TESTS key
to exit an editing screen.

8. Run the program



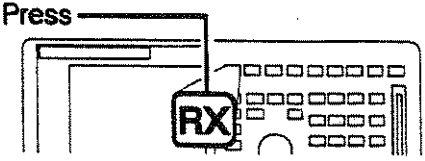
To Set Up Single-Tone Modulation




5. Enter the modulation frequency
7. Choose the modulation type
RX TEST
0.0001
6. List the modulation choices
8. Enter the depth or deviation

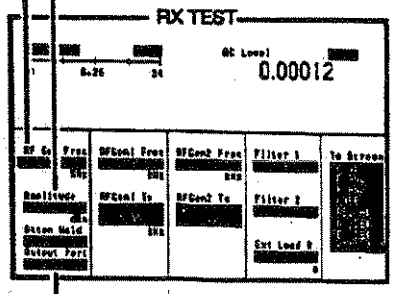
To Set Up Single-Tone Modulation With Signaling

1. Press



2. Enter the carrier frequency

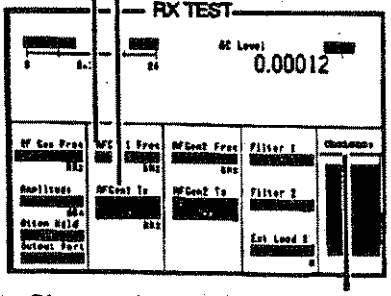
3. Enter the carrier amplitude



4. Select the Output Port

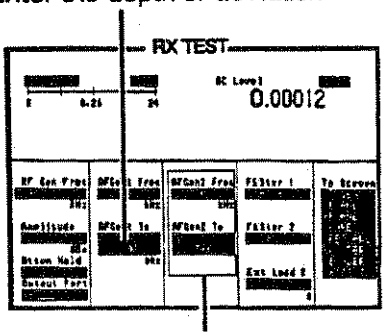
5. Enter the modulation frequency

6. List the modulation choices



7. Choose the modulation type

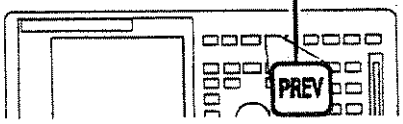
8. Enter the depth or deviation



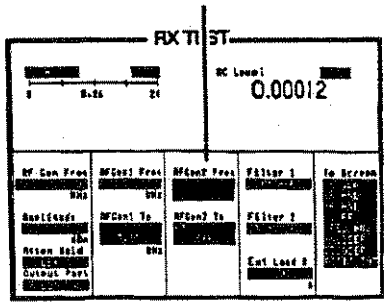
9. Refer to page 38 to set up the signaling then return to step 10

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

10. Press to return to the RX Test screen

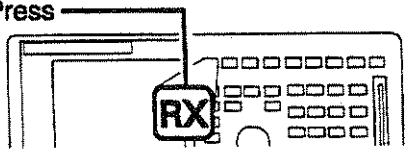


11. Turn signaling on/off



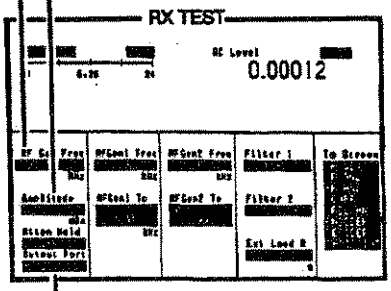
To Set Up Two-Tone Modulation

1. Press



2. Enter the carrier frequency

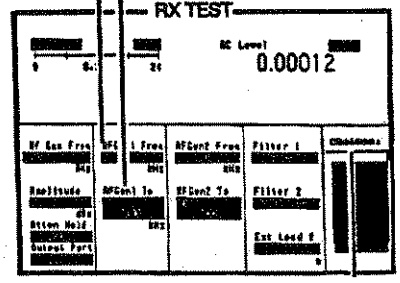
3. Enter the carrier amplitude



4. Select the Output Port

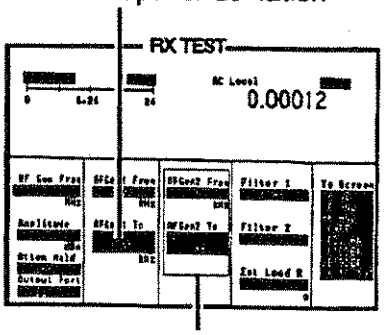
5. Enter the modulation frequency

6. List the modulation choices



7. Choose the modulation type

8. Enter the depth or deviation

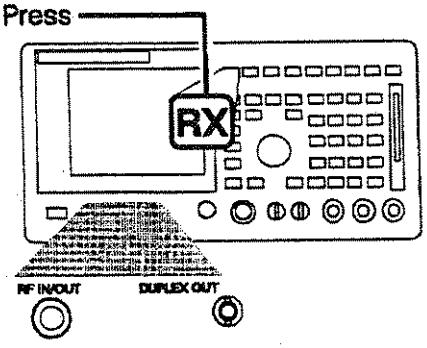


9. Repeat steps 2 thru 5 for AFGen 2

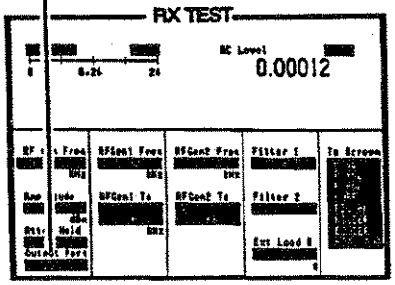
NOTE: The modulation type must be the same in AFGen 1 and AFGen 2.

To Choose An RF Output Port

1. Press



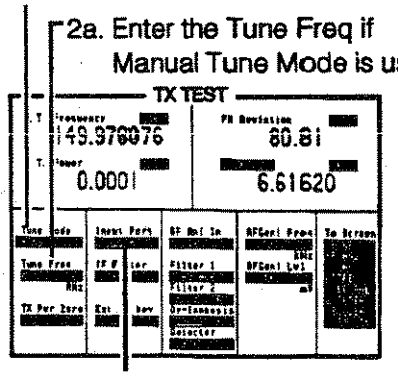
2. Underline RF Out or Dupl



To Measure Modulation

1. Press

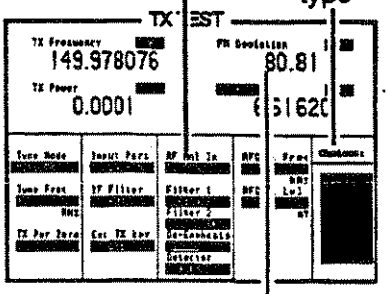
2. Select the Tune Mode



3. Select the Input Port

4. List the demodulation choices

5. Choose the demodulation type



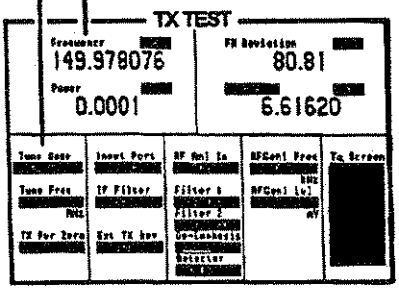
6. Read

To Measure RF Frequency

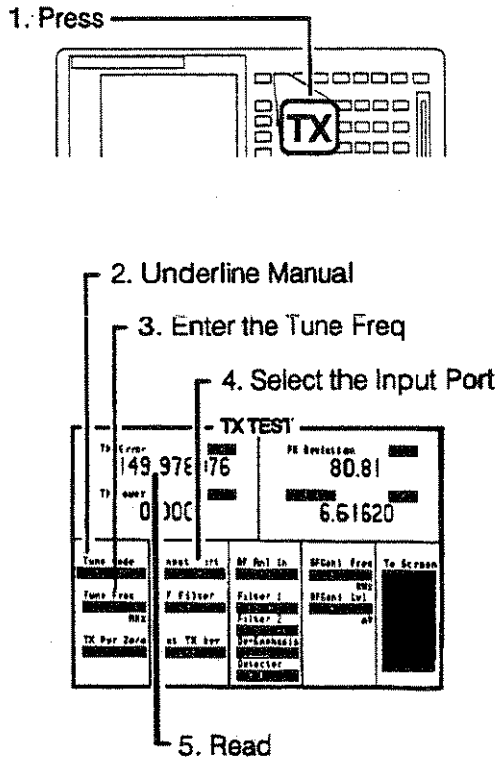
1. Press

2. Underline Auto

3. Read

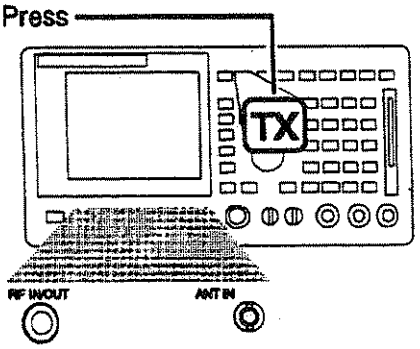


To Measure RF Frequency Error

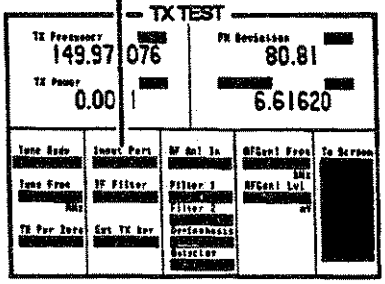


To Choose An RF Input Port

1. Press

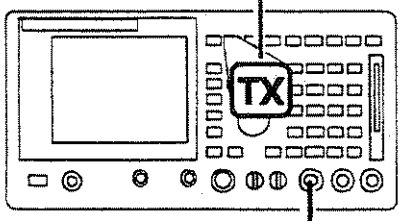


2. Underline RF In or Ant



To Output An AF Sine Wave

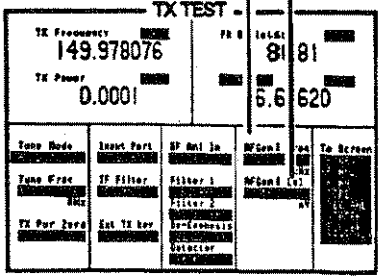
1. Press



2. Connect to AUDIO OUT

3. Enter the audio level

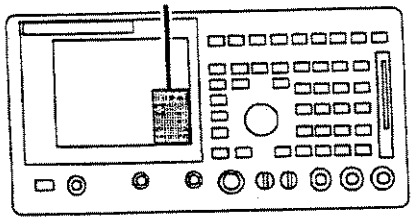
4. Enter the audio frequency



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

*Requires Option 004

1. Choose ENCODER from the To Screen



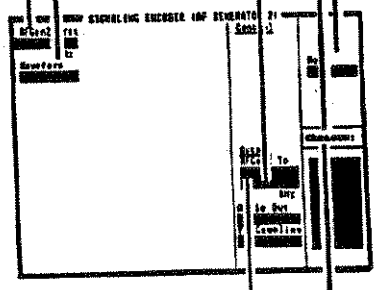
2. Set the Mode to Func Gen

3. Enter the frequency

4. List the choices

5. Choose the waveform

8. Enter the level



6. List the choices

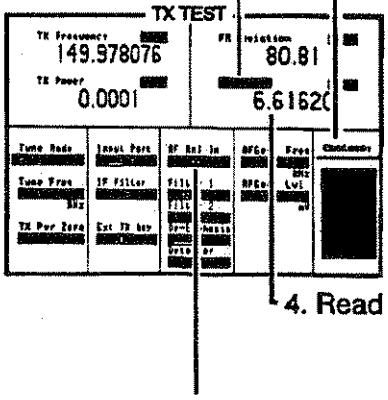
7. Choose Audio Out

To Measure Audio Distortion

1. Press

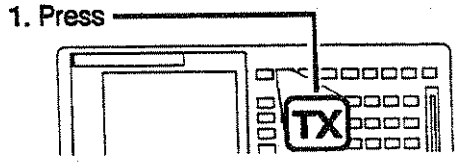
2. List the choices

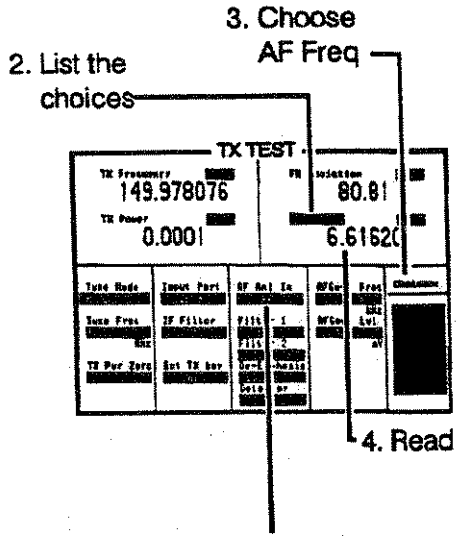
3. Choose Distn



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

To Measure Audio Frequency

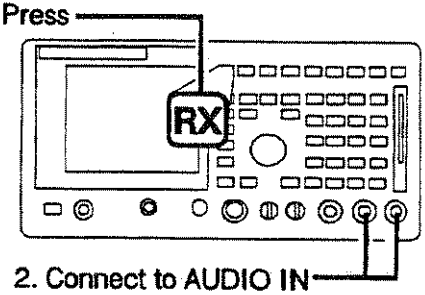




NOTE: Measures the frequency of the input displayed here.

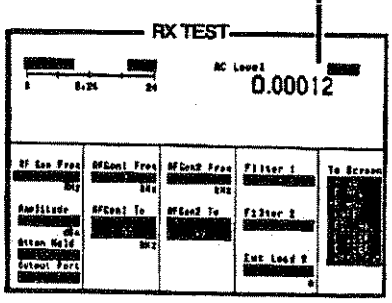
To Measure Audio Voltage

1. Press



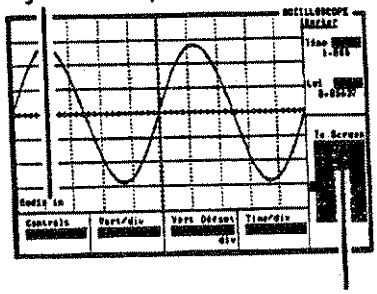
2. Connect to AUDIO IN

3. Read



To Change The Scope Input

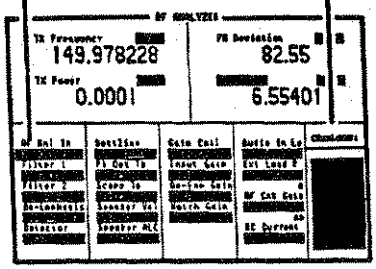
1. Verify which input is selected



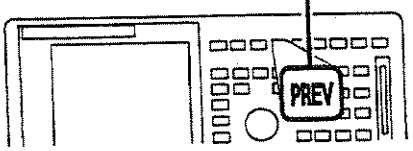
2. Select AF Anl from To Screen:

3. List the choices

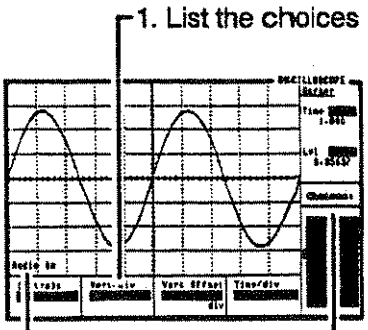
4. Choose the input



5. Press PREV to return to the scope



To Change The Scope Veritical Units Per Division

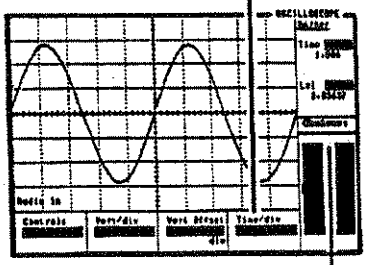


Scope Input	Unit of Measure
Audio In	V
FM	kHz
AM	%
SSB	mV

NOTE: To change the scope input see page 30.

To Change The Scope Horizontal Units Per Division

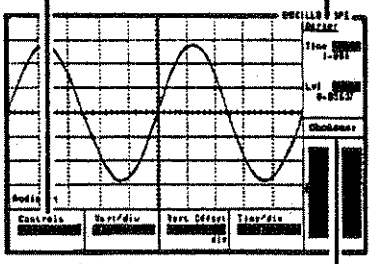
1. List the choices



2. Choose a time

To Use The Scope Marker

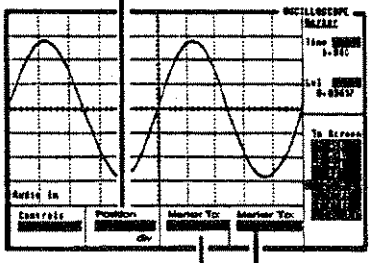
1. List the choices
4. Read the marker position



2. Choose Marker

3. Marker position

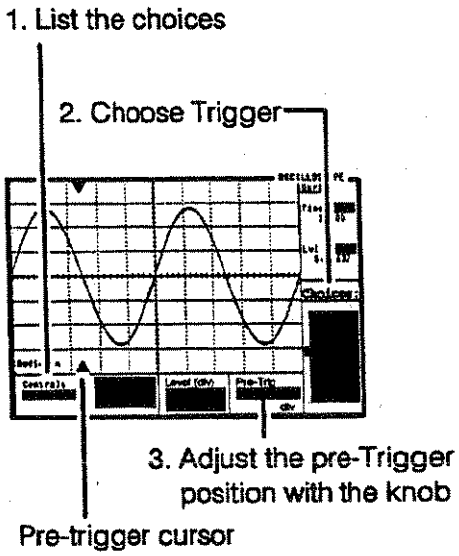
Manually position the marker with the knob



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

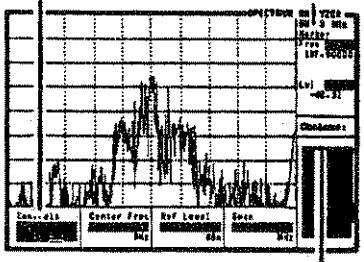
Push the knob to change the center frequency or ref level to marker's position

To Display A Scope Waveform Before The Trigger Point



To Use The Spectrum Analyzer Marker

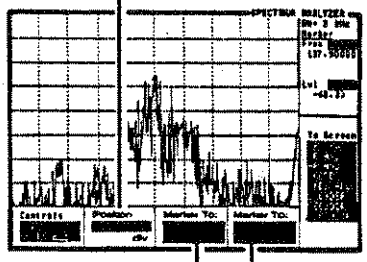
1. List the choices
4. Read the marker position



2. Choose Marker

3. Marker position

Manually position the marker with the knob

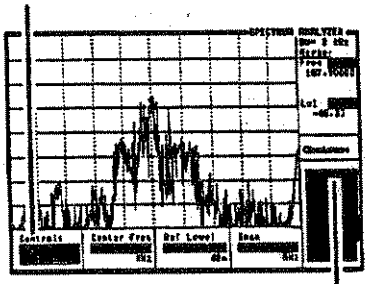


Push the knob to move the marker to the peak of the signal

Push the knob to change the center frequency or ref level to marker's position

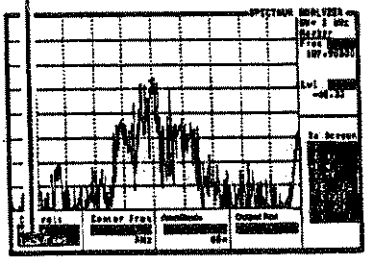
To Set Up The Spectrum Analyzer Tracking Generator

1. List the choices

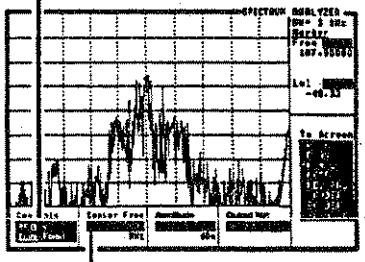


2. Choose RF Gen

3. Underline Track



4. Adjust the offset frequency using the Knob

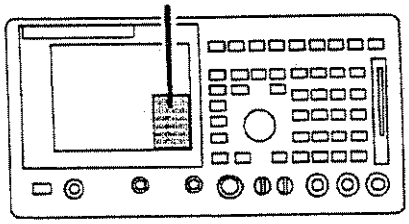


5. Enter the amplitude

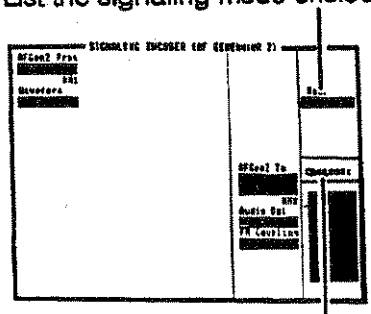
To Output
Tone Sequential Signaling*

*Requires Option 004

1. Choose ENCODER from the To Screen

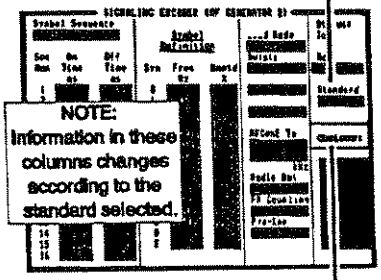


2. List the signaling mode choices



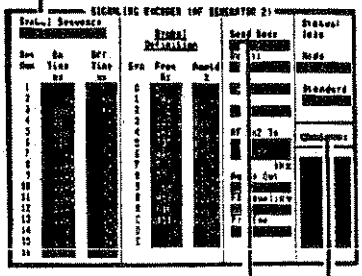
3. Choose Tone Seq

4. List the standard choices



5. Choose a standard

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

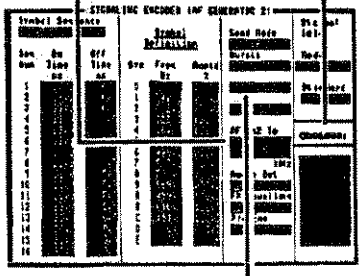


7. List the Send Mode choices

8. Choose the mode

9. List the output choices

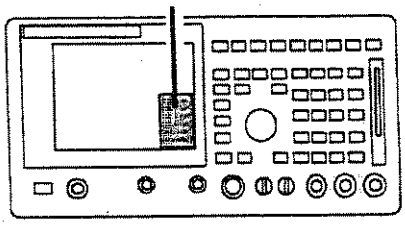
10. Choose the output



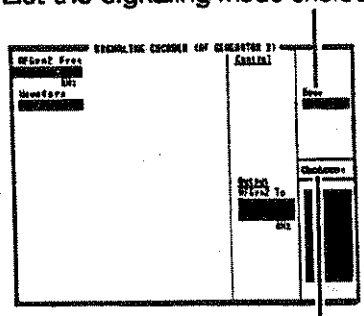
11. Select Send

To Output A DTMF Sequence

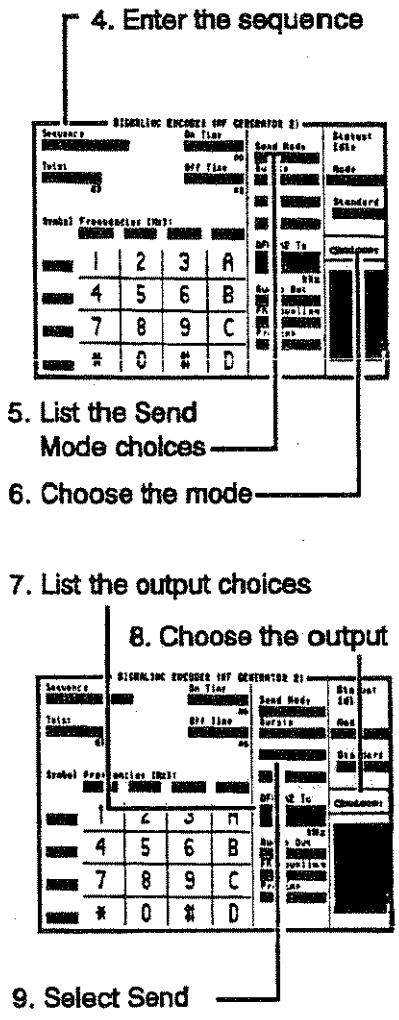
1. Choose ENCODER from the To Screen



2. List the signaling mode choices

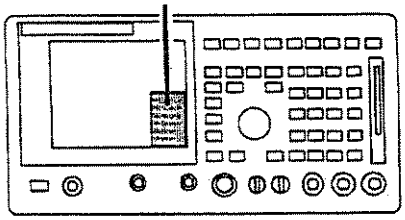


3. Choose DTMF

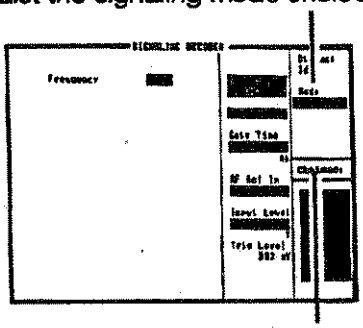

4. Enter the sequence
5. List the Send Mode choices
6. Choose the mode
7. List the output choices
8. Choose the output
9. Select Send

To Decode A Signaling Sequence

1. Choose DECODER from the To Screen

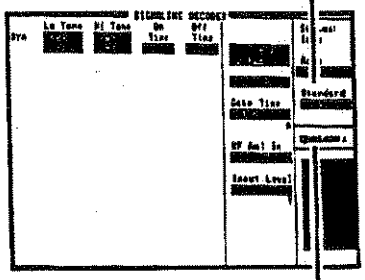


2. List the signaling mode choices

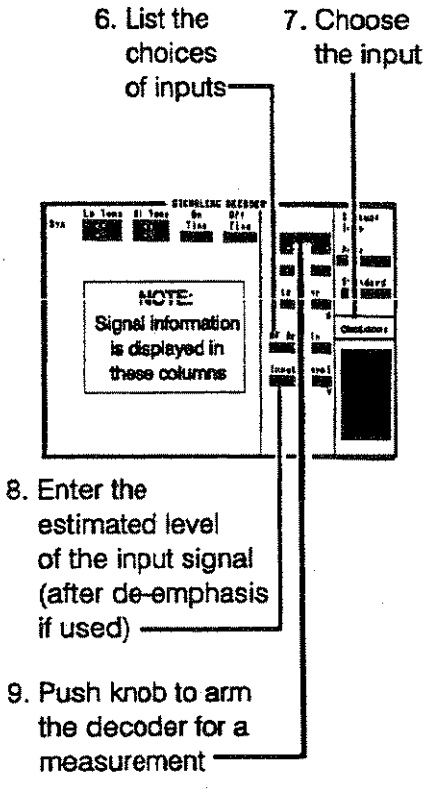


3. Choose the signaling mode

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 HP 8920 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.

Instrument Terms And Abbreviations

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.

Instrument Terms And Abbreviations

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.

Instrument Terms And Abbreviations

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 HP 8920A'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.

Instrument Terms And Abbreviations

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.

Instrument Terms And Abbreviations

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.

Instrument Terms And Abbreviations

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.

Instrument Terms And Abbreviations

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 between the input signal and the manually entered frequency.

TX- Transmitter Test. The key used to access the TX TEST screen for performing tests on a radio transmitter.

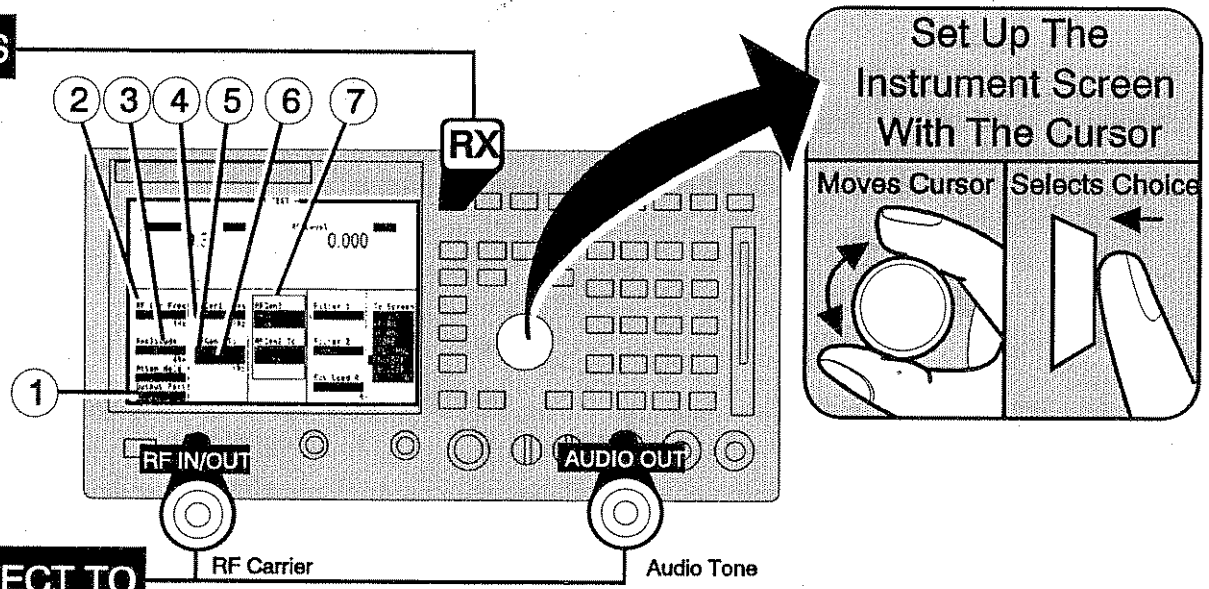
TX Pwr Meas- Transmitter Power Measurement Zero. This function zeros the RF power meter.

Index

Index

To Output A Signal With The HP 8920A

1.PRESS



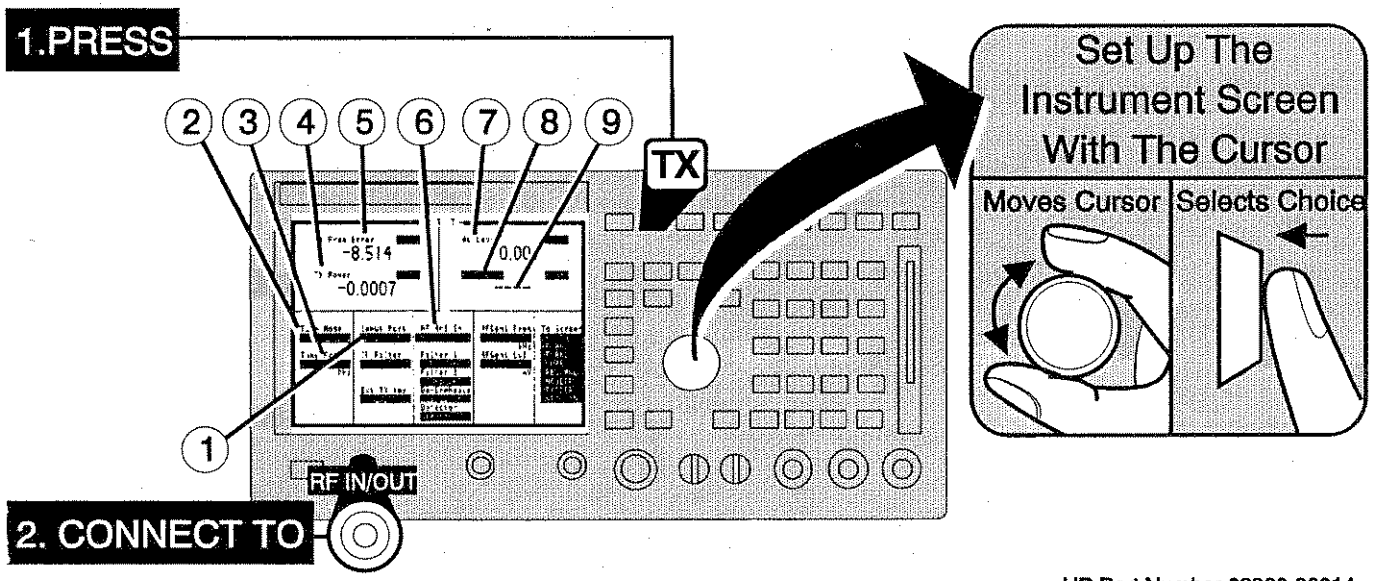
2. CONNECT TO

HP Part Number 08920-90014

3. SET UP THE SCREEN

To Output...	And Make These Choices And Entries On The Screen With The Cursor...
A Modulated RF Carrier	underline Output Port (1) RF Out/Duplex ,enter RF Gen Freq (2) the freq ,enter Amplitude (3) the ampl ,enter AF Gen1 Freq (4) the mod freq ,choose AF Gen1 To (5) the mod type ,enter AF Gen1 To (6) the dev % kHz (7) For two tones repeat (4) (5) (6) in AF Gen2
An Audio Tone	enter AF Gen1 Freq (4) the audio freq ,choose AF Gen1 To (5) Audio Out ,enter AF Gen1 To (6) the audio mV (7) For two tones repeat (4) (5) (6) in AF Gen2

To Make Measurements With The HP 8920A



HP Part Number 08920-90014

3. SET UP THE SCREEN

To Measure...	And Make These Choices And Entries On The Screen With The Cursor...	For The Measurement...
AM %	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq, choose AF Anl In (6) AM Demod	read AM Depth (7)
FM Deviation	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq, choose AF Anl In (6) FM Demod	read FM Deviation (7)
SSB Level	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq, choose AF Anl In (6) SSB Demod	read AC Level (7)
RF Frequency	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual	read TX Freq (5)
RF Frequency Error	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq	read TX Freq Error (5)
RF Power	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual	read TX Power (4)
Demodulated Audio Frequency	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq, choose a demod type AFAnl In (6) the demod, choose (8) AF Freq	read AF Freq (9)
Demodulated Audio Distortion (1kHz)	underline Input Port (1) RF In /Ant, underline Tune Mode (2) Auto/Manual, enter Tune Freq (3) the freq, choose a demod type AFAnl In (6) the demod, choose (8) Distn	read Distn (9)