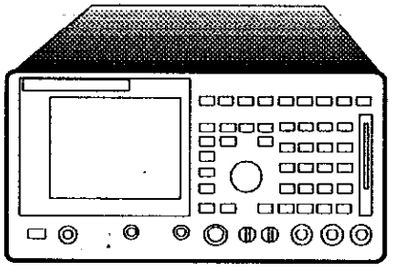
30 SPW PMEL
VAFB CA 93437

Hewlett Packard
8920, 8921

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

8920A OPT001-102



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

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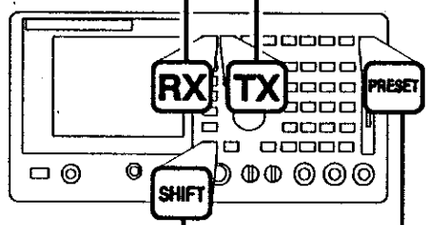
The Instrument -At A Glance

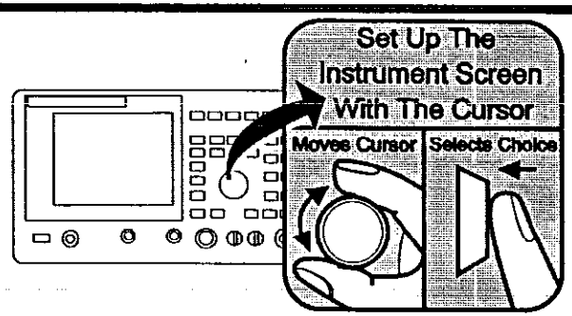
Use this key to perform a receiver test or to generate a modulated RF signal.

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



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

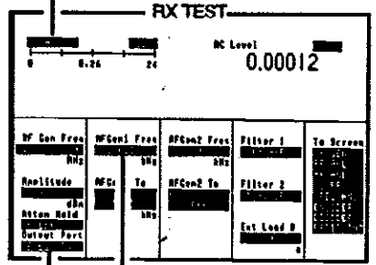
Use this key to reset all instrument settings.



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.

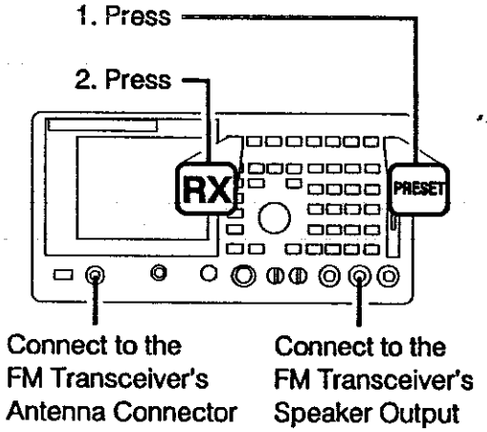
Underlined:

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

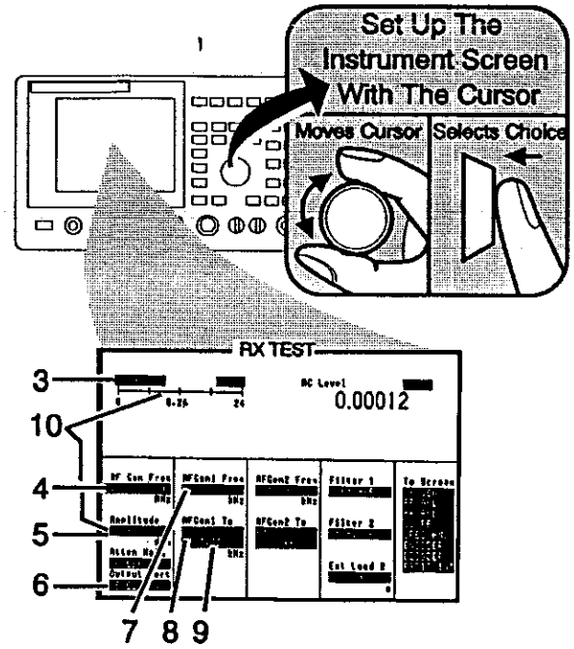
Table Of Contents

An Example Of How To Make An FM Radio SINAD Check

Front Panel Set Up



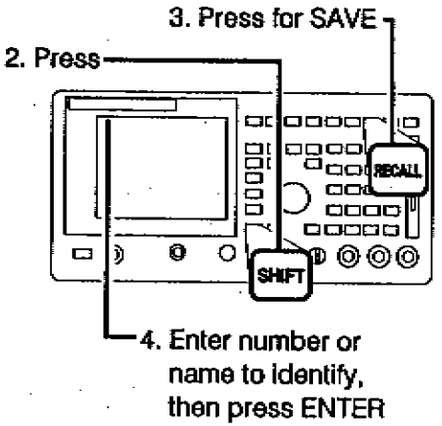
Screen Set Up



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

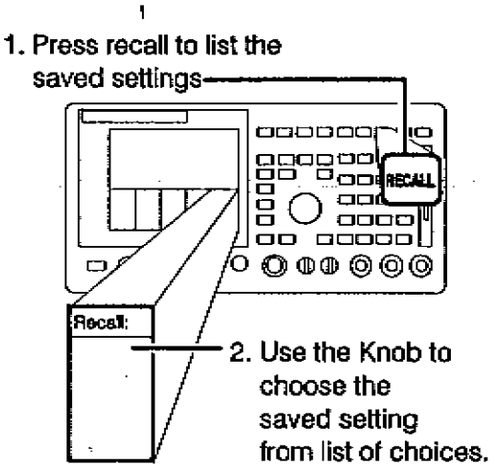
1. Set up the instrument as desired.



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.

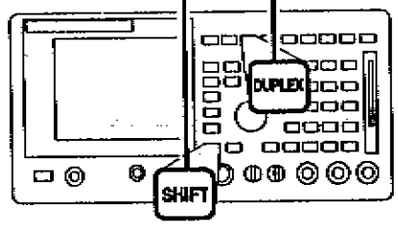
To Recall Instrument Settings



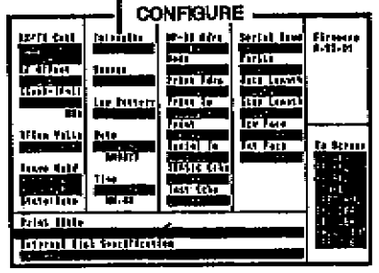
To Adjust The Screen Brightness

1. Press

2. Press for CONFIG

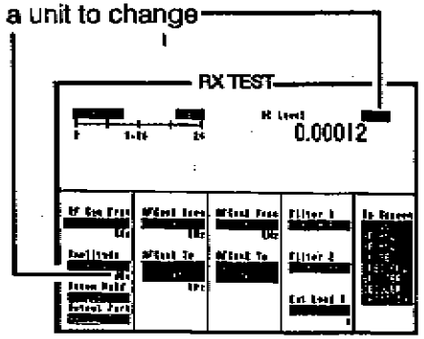


3. Vary the screen intensity with the knob

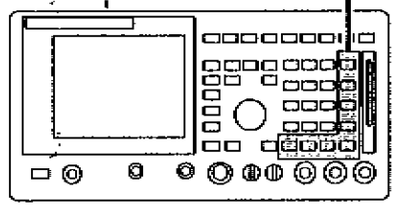


To Change The Unit Of Measure

1. Position the cursor at a unit to change

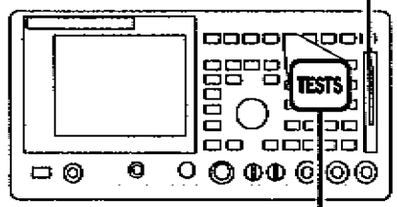


2. Press desired unit



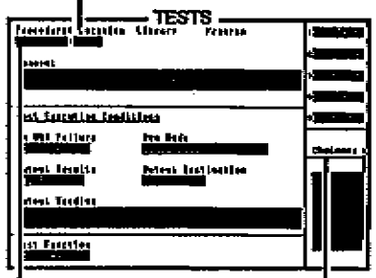
To Run A Memory Card Program

1. Insert a memory card



2. Press

3. List the choices



4. Choose Card

5. List the choices

6. Choose a program

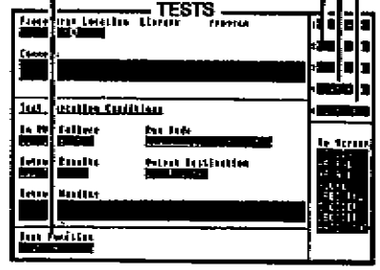
7. Test Configuration

Edit the test specifications

Edit the test frequencies

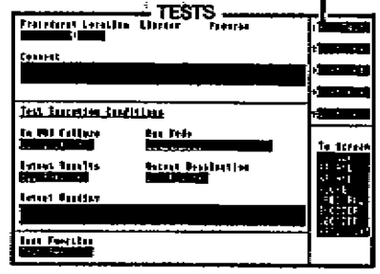
Edit the test sequence

Edit the test configuration and/ or Edit the test parameters

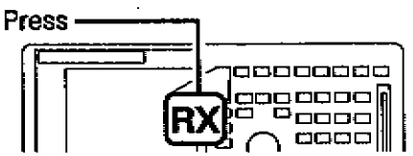


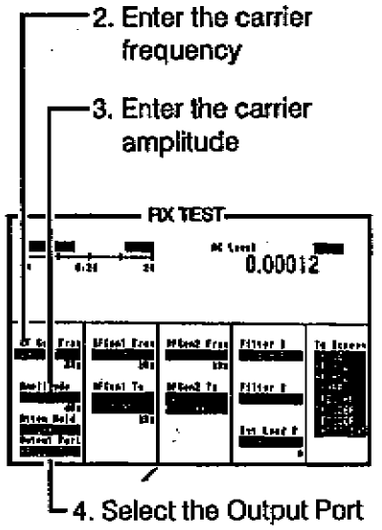
NOTE: Press the TESTS key to exit an editing screen.

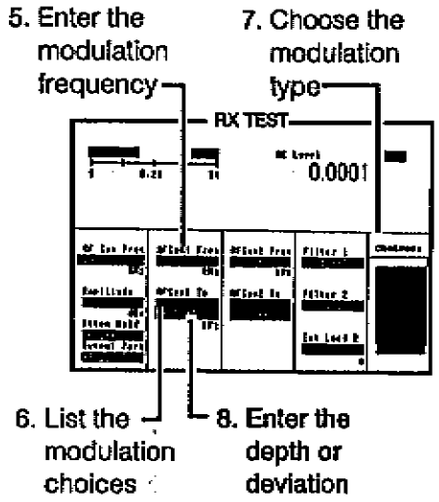
8. Run the program



To Set Up Single-Tone Modulation

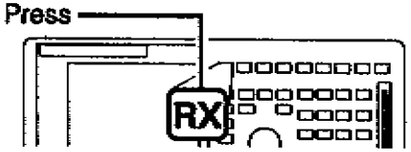






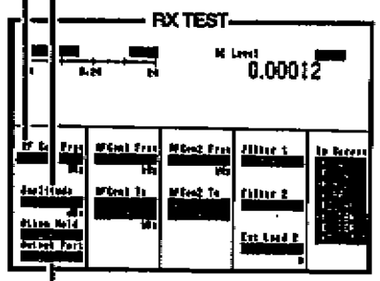
To Set Up Single-Tone Modulation With Signaling

1. Press



2. Enter the carrier frequency

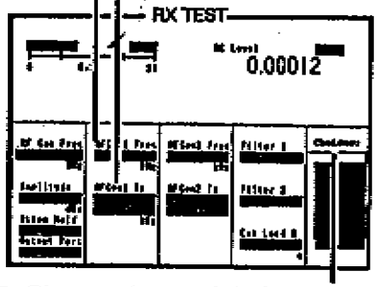
3. Enter the carrier amplitude



4. Select the Output Port

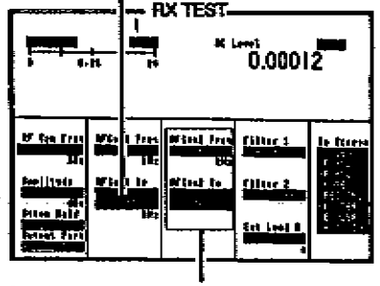
5. Enter the modulation frequency

6. List the modulation choices



7. Choose the modulation type

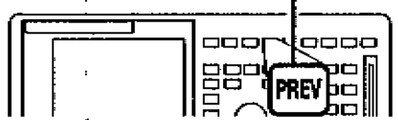
8. Enter the depth or deviation



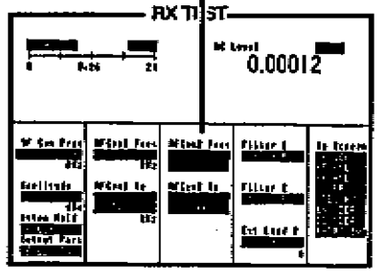
9. Refer to page 38 to set up the signaling then return to step 10

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

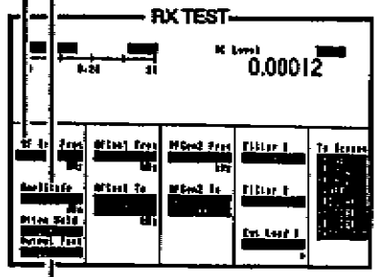


To Set Up Two-Tone Modulation

1. Press

2. Enter the carrier frequency

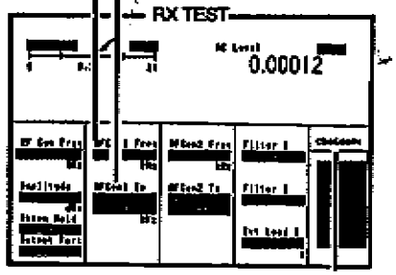
3. Enter the carrier amplitude



4. Select the Output Port

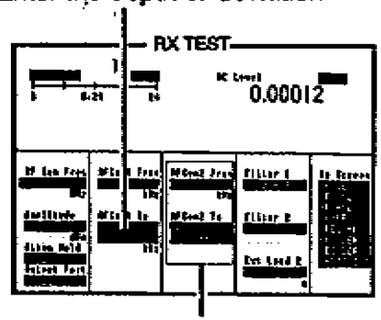
5. Enter the modulation frequency

6. List the modulation choices



7. Choose the modulation type

8. Enter the depth or deviation

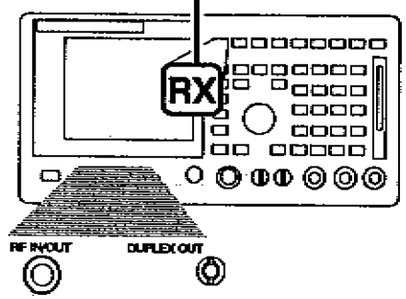


9. Repeat steps 2 thru 5 for AFGen 2

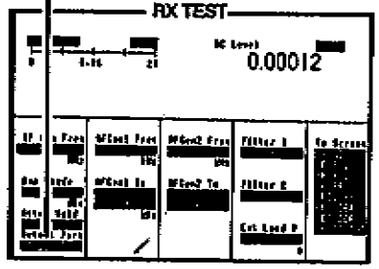
NOTE: The modulation type must be the same in AFGen 1 and AFGen 2.

To Choose An RF Output Port

1. Press

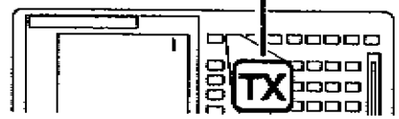


2. Underline RF Out or Dupl



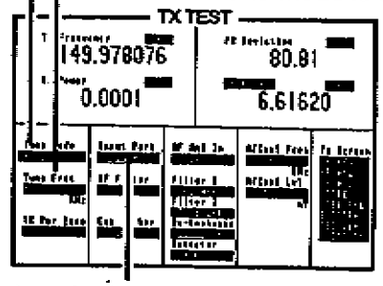
To Measure Modulation

1. Press



2. Select the Tune Mode

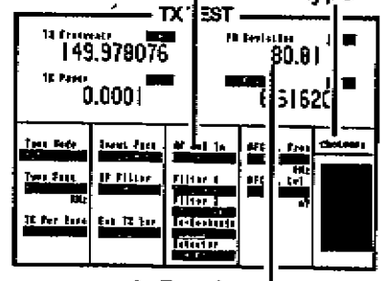
2a. Enter the Tune Freq if Manual Tune Mode is used



3. Select the Input Port

4. List the demodulation choices

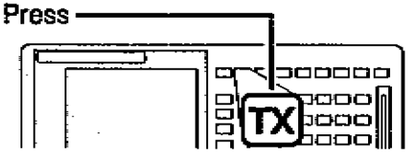
5. Choose the demodulation type



6. Read

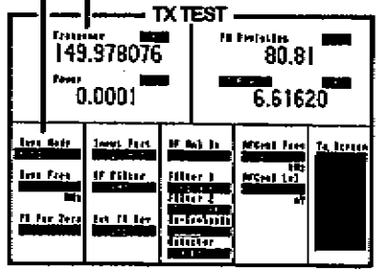
To Measure RF Frequency

1. Press



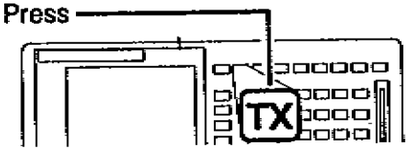
2. Underline Auto

3. Read



To Measure RF Frequency Error

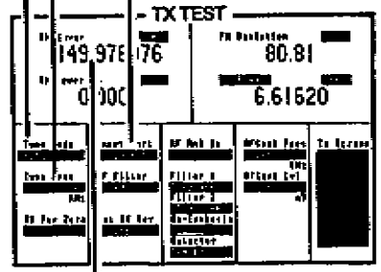
1. Press



2. Underline Manual

3. Enter the Tune Freq

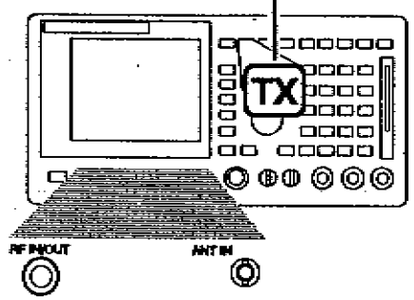
4. Select the Input Port



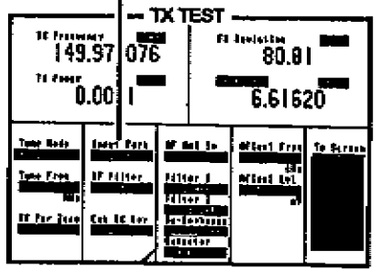
5. Read

To Choose An RF Input Port

1. Press

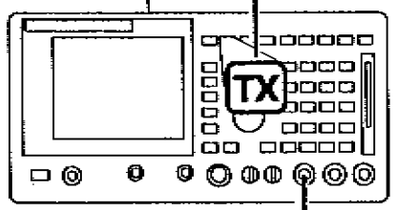


2. Underline RF In or Ant



To Output An AF Sine Wave

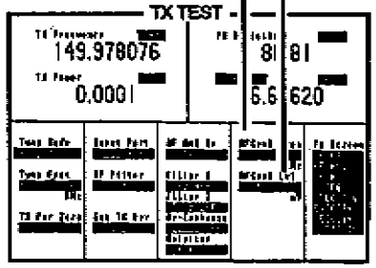
1. Press



2. Connect to AUDIO OUT

3. Enter the audio level

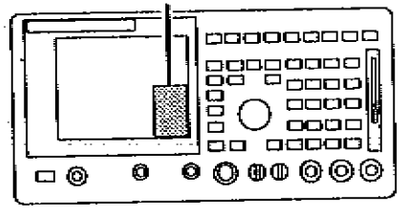
4. Enter the audio frequency



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

*Option 004 required in HP 8920

1. Choose ENCODER from the To Screen



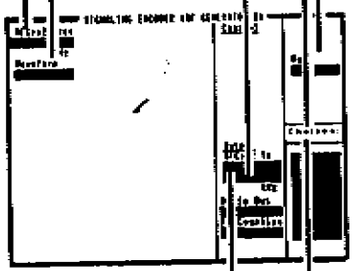
2. Set the Mode to Func Gen

3. Enter the frequency

4. List the choices

5. Choose the waveform

8. Enter the level

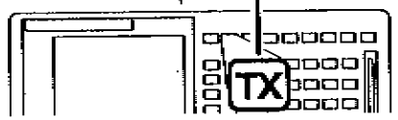


6. List the choices

7. Choose Audio Out

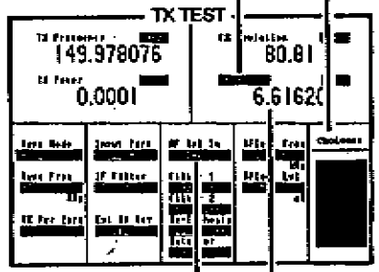
To Measure Audio Distortion

1. Press



2. List the choices

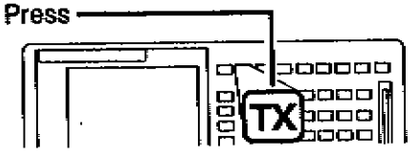
3. Choose Distn

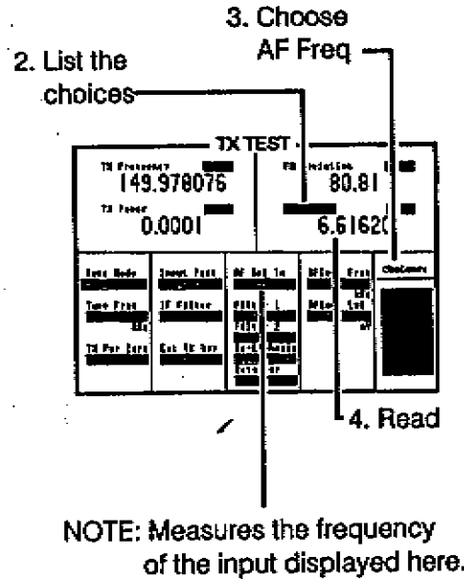


4. Read

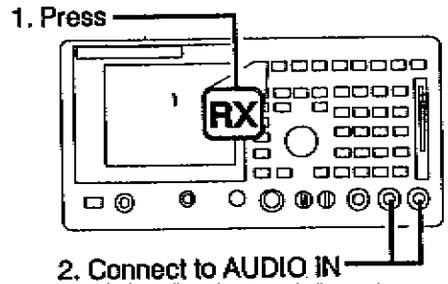
NOTE: Measures the distortion on a 1 kHz tone using the input displayed here.

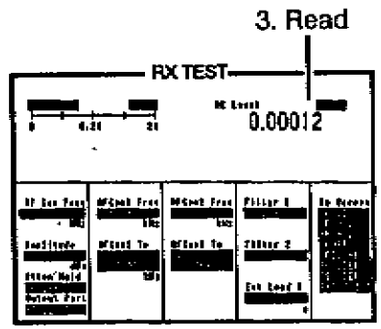
To Measure Audio Frequency





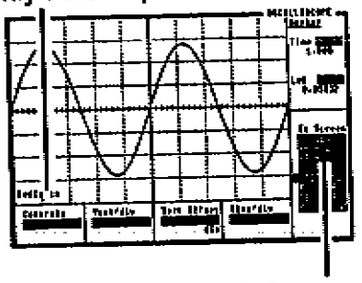
To Measure Audio Voltage





To Change The Scope Input

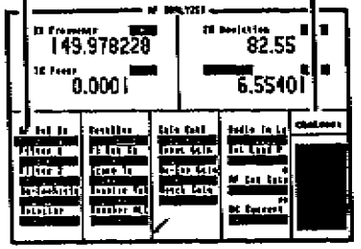
1. Verify which input is selected



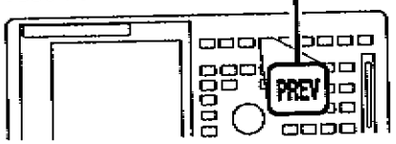
2. Select AF Anl from To Screen:

3. List the choices

4. Choose the input

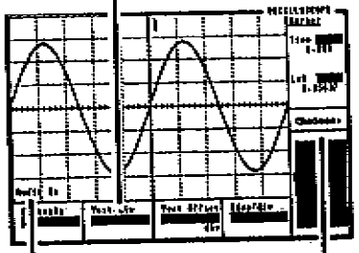


5. Press PREV to return to the scope



To Change The Scope Vertical Units Per Division

1. List the choices



2. Choose a vertical units per division

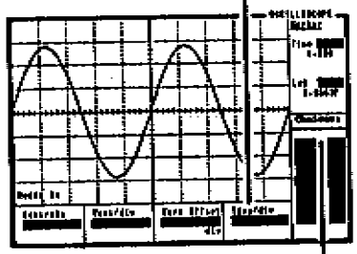
Scope Input Determines Unit of Measure

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

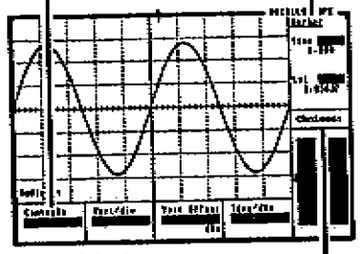
1. List the choices



2. Choose a time

To Use The Scope Marker

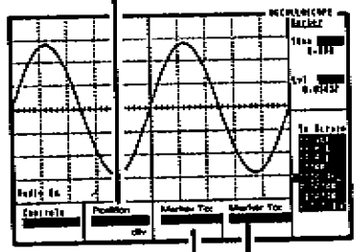
1. List the choices
4. Read the marker position



2. Choose Marker

3. Marker position

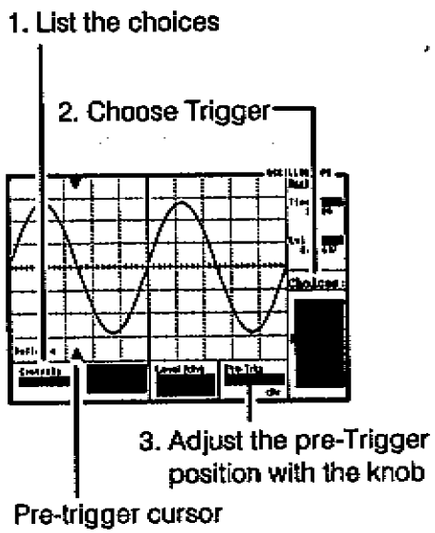
Manually position the marker with the knob



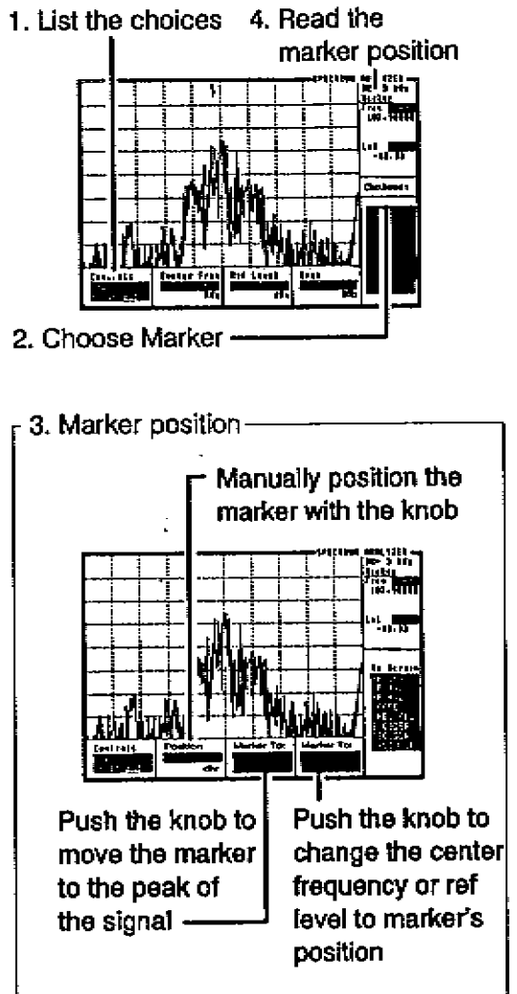
Push the knob to move the marker to the peak of the signal

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

To Display A Scope Waveform Before The Trigger Point

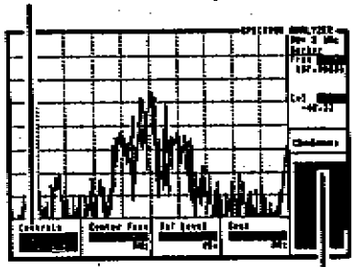


To Use The Spectrum Analyzer Marker



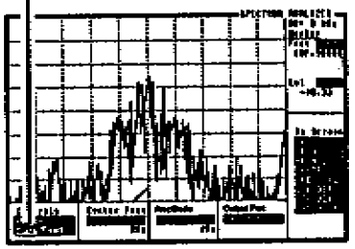
To Set Up The Spectrum Analyzer Tracking Generator

1. List the choices

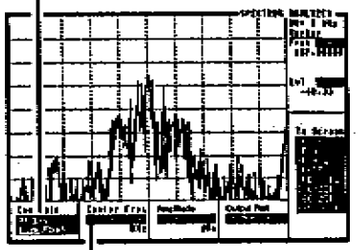


2. Choose RF Gen

3. Underline Track



4. Adjust the offset frequency using the Knob

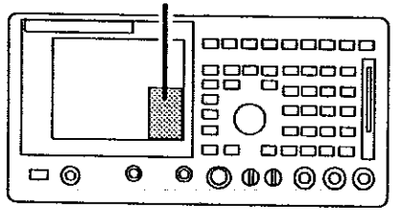


5. Enter the amplitude

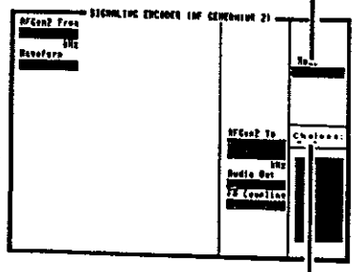
To Output Tone Sequential Signaling*

*Option 004 Required in HP 8920

1. Choose ENCODER from the To Screen

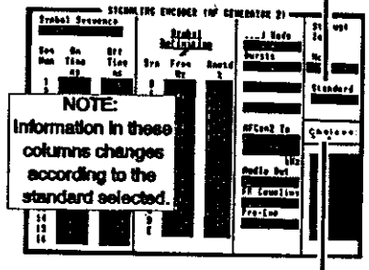


2. List the signaling mode choices



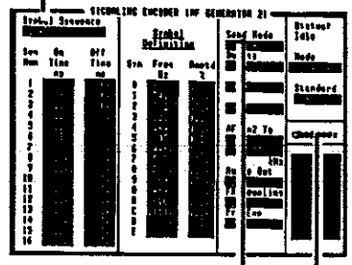
3. Choose Tone Seq

4. List the standard choices



5. Choose a standard

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

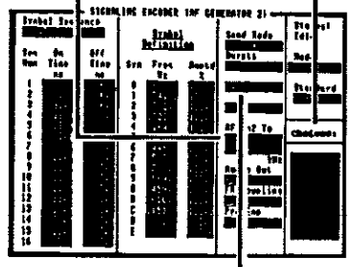


7. List the Send Mode choices

8. Choose the mode

9. List the output choices

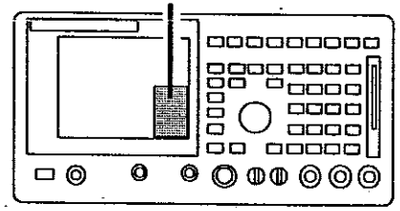
10. Choose the output



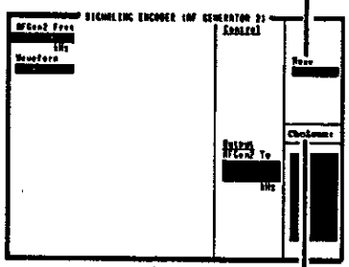
11. Select Send

To Output A DTMF Sequence

1. Choose ENCODER from the To Screen

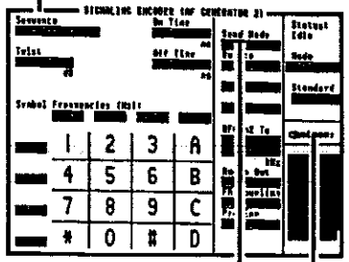


2. List the signaling mode choices



3. Choose DTMF

4. Enter the sequence

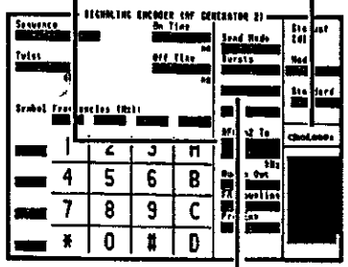


5. List the Send Mode choices

6. Choose the mode

7. List the output choices

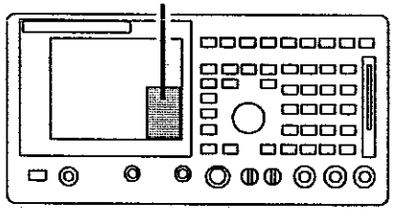
8. Choose the output



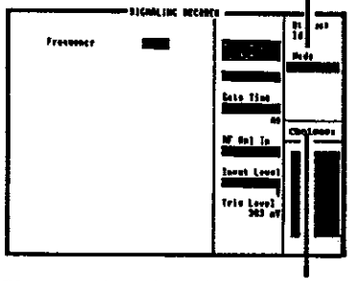
9. Select Send

To Decode A Signaling Sequence

1. Choose DECODER from the To Screen

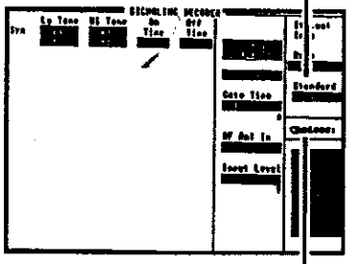


2. List the signaling mode choices



3. Choose the signaling mode

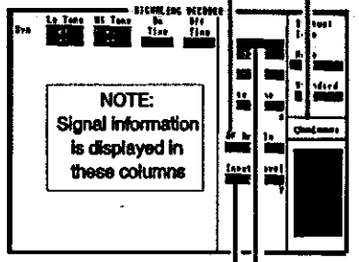
4. List the standard choices



5. Choose a standard

6. List the choices of inputs

7. Choose the input



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.

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 fldat 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.

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.

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.

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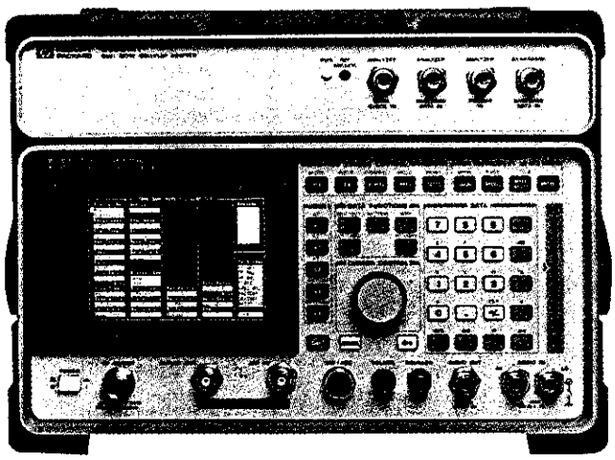
Index



HP 8921D

8921A/D Cell Site Test Sets

ıe HP 8921A cell site test set and HP 8921D dual-mode cell site ystem are highly portable, integrated solutions for the installa- and maintenance of AMPS and TACS cell sites. The HP 8921A porates more than twenty powerful instruments into a compact, ound package. The HP 8921D consists of an HP 83201A dual- e cellular adapter and an HP 8921A for testing TDMA dual-mode stations. The integral IBASIC controller in the HP 8921A/D runs IP 11807B cell site test software to fully automate base station test adjustment procedures. Automation combined with accurate urements increase technician efficiency to speed installation maintenance procedures.

omated Base Station Maintenance

veloped from manufacturer's recommended maintenance pro- res, the HP 11807B cell site test software ensures complete test djustment of cell sites. Standardizing system maintenance with IP 8921A/D increases system integrity. The fast measurement d of the HP 8921A/D and HP 11807B software results in less ne time for each transceiver during maintenance work. Since all are uniformly tested using the same test procedures, problems letected earlier.

ewlett-Packard has automated testing solutions for the following ufacturers' equipment:

otorola HDII, HDII NAMPS, and LD series
standard, extended frequency, and compact RCU series
csson 882 and 882M analog, Microcell, TDMA
&T Autoplex Series II analog, LMT Microcell, TDMA
rthern Telecom DRU and P-Series

e of Setup

ith single keystroke setup and a push-to-select cursor knob, the 921A/D user interface is easy to learn and use. For complex base on maintenance, the HP 11807B cell site test software guides the through each step of the procedure. Graphical displays show ection diagrams and highlight key adjustment points when re- d. Technicians spend less time learning and more time testing the HP 8921A/D cell site test set.

tability

all size combined with a total weight of 35 pounds results in less nician fatigue when servicing remote cell sites. The HP 8921A/D nal controller reduces the equipment that must be transported e cell site by controlling the base station. For TDMA dual-mode station test, the HP 83201A dual-mode cellular adapter adds only ounds for a total weight of 45 pounds.

erage for Analog and Dual-Mode Cellular Systems

addition to testing current AMPS and TACS base stations, the 921A is ready to grow with your measurement needs for future lar systems. The HP 8921A supports Motorola NAMPS, Ericsson ocell, and AT&T LMT Microcell base stations. To test the new TIA sanctioned TDMA digital cellular format, order the 921D dual-mode cell site test system or simply add the *3201A Dual-Mode Cellular Adapter* to your HP 8921A. The 3201A is a compact addition that allows the HP 8921A to gener- nd measure dual-mode $\pi/4$-DQPSK signals. The HP 8921A/D is vestment that provides measurement value today and in the e.

Total HP Support for Your Cell Site Test Needs

The HP 8921A/D and HP 11807B are just the beginning of HP support for cell site testing. For ease of integration into your environment, HP has set up special connection and cabling kits for each supported manufacturers' base stations. These give you all the necessary connectors for quickly and easily controlling and testing your cell site.

In addition, HP offers a wide variety of options to support cell site testing and keep your solution up to date with the latest technology. The HP 11807B software option +36H Start-Up Assistance provides one day of on-site training for up to five people. Additional HP consulting/training is also available as needed. Option +SAJ Software Update Subscription keeps your software current by ensuring you get all software enhancements/updates sent to you automatically.

HP 8920A and HP 8921A Features Summary

	HP 8920A	HP 8921A
AM/FM Signal Generator	std	
AM/FM Modulation Analyzer	std	
Duplex Offset Generator	std	
RF Power Meter	std	
RF Frequency Counter/ Frequency Error Meter	std	
SSB Demodulator	std	
Audio Frequency Counter	std	
AF Power Meter	std	
AC/DC Voltmeter	std	
SINAD/SNR Distortion Meter	std	
Two Variable AF Generators	std	
Digital Oscilloscope	std	
Built-in IBASIC Controller	std	
Spectrum Analyzer with Tracking Generator and ACP	opt 102	std
Signaling Encoder/Decoder	opt	std
AM/FM/PM Radio Test Software	opt	N/A
Cellular Phone Test Software	opt	opt'
AMPS Cellular Base Station Software	N/A	opt
Clearchannel LTR and EDACS Trunked Radio Software	opt	N/A
High Stability Timebase	opt 001	std
DC Current Meter	opt	std
HP-IB/RS-232 Remote Interfaces	opt	std
Radio Interface Card	opt	opt
NADC TDMA Upgradability	opt	std

HP 8920D/HP 8921D TDMA Features Summary

- $\pi/4$ DQPSK signal generator
- $\pi/4$ DQPSK modulation analyzer
- Continuous/pulsed RF power meter
- Bit error-rate meter
- Baseband data-source

MOBILE/CELLULAR RADIO TEST SETS

RF Communications Test Set (cont'd)

HP 8920A, 8920D, 8921A, 8921D, 11807A/B

Specifications Summary

Signal Generator

RF Frequency
Range: 250 kHz to 1 GHz
Accuracy and stability: Same as reference oscillator ±0.015 Hz

Output
Range: −137 to −19 dBm into 50 Ω (RF in/out)
−127 to +7 dBm into 50 Ω (duplex out)
Level accuracy: ±1.8 dB (RF in/out)
±1.5 dB (duplex out)
Typically ±1.0 dB for all levels

Modulation
FM (ac/dc-coupled)
FM deviation: (Rates >25 Hz) 100 kHz; 0.25 to 250 MHz
50 kHz; 250 to 500 MHz
100 kHz; 500 to 1000 MHz
FM rate: dc to 75 kHz (3 dB BW)
FM accuracy: ≤10 kHz dev: ±7.5% of setting ±50 Hz
>10 kHz dev: ±7.5% of setting ±500 Hz

AM
AM depth: 0% to 90%
AM rate: 20 Hz to 25 kHz (3 dB BW)
AM accuracy: ≤10% AM: ±5% of setting ±1.0% AM
>10% AM: ±5% of setting ±1.5% AM

Audio Generator

Frequency Range: dc to 25 kHz
Output Level Range: 0.1 mV to 4 V rms
Output Impedance: <1 Ω

RF Analyzer

RF Frequency Measurement
Measurement range: 400 kHz to 1 GHz
Accuracy: ±1 Hz plus timebase accuracy

RF Power Measurement
Measurement range: 1 mW to 60 W continuous
100 W for 10 s/min
40 μW to 2.4 W continuous, 4 W for 10 s/min (Opt 007)
0.1 mW to 6 W continuous, 10 W for 10s/min (Opt 008)
Accuracy: ±10% of reading ±resolution (8920A/D)
±5% of reading ±resolution (8921A/D)

FM Measurement
Frequency range: 5 to 1000 MHz
Deviation: 20 Hz to 75 kHz
Sensitivity: 2 μV (typically <1 μV)
Accuracy: ±4% of reading plus residual FM and noise contribution
Residual FM and noise: <20 Hz (0.3 to 3 kHz rms)

AM Measurement
Frequency range: 10 to 1000 MHz
Depth: 0% to 95%
Accuracy: ±5% of reading ±1.5% AM

SSB Measurement
Frequency range: 400 kHz to 1 GHz
Bandwidth (3 dB): 20 Hz to 70 kHz

AF Analyzer

Frequency Measurement
Measurement range: 20 Hz to 400 kHz
Accuracy: ±0.02% plus resolution plus reference oscillator accuracy

AC/DC Voltage Measurement
AC range: 0 to 30 Vrms
AC accuracy: ±3% of reading ±150 μV rms
DC range: 100 mV to 42V
DC accuracy: ±1.0% of reading ±45 mV
Input impedance: Switchable between 600 Ω and 1 MΩ

SINAD/SNR Distortion Measurement
Fundamental frequency: 300 Hz to 10 kHz (with Opt 019) 1 kHz ±5 Hz
Distortion range: 0.1% to 100%
Accuracy: ±1 dB (0.5 to 100% distortion)
SINAD range: 0 to 60 dB
Accuracy: ±1 dB (0 to 46 dB SINAD)

Oscilloscope Specifications

Bandwidth: (3 dB): 2 Hz to 50 kHz
Scale/Division: 10 mV to 10 V
Time/Division: 10 μs to 100 ms

Spectrum Analyzer Specifications

Frequency Range: 400 kHz to 1 GHz
Frequency Span/Resolution Bandwidth (coupled):

Span	Bandwidth
≤50 kHz	300 Hz
≤300 kHz	1 kHz
≤5 MHz	3 kHz
≤50 MHz	30 kHz
>50 MHz	300 kHz

Plus full span capability
Display Range: 80 dB

Tracking Generator

Frequency Range: 400 kHz to 1 GHz
Frequency Offset: Frequency span endpoints ± frequency offset cannot be <400 kHz or >1 GHz
Output Level Range: Same as signal generator
Sweep Modes: Normal and inverted

Signaling Encode/Decode

CDCSS, DTMF, 1 TONE, 2 TONE, 5/6 TONE SEQUENTIAL (EIA, CCITT, CCIR, ZVEI, EEA, Euro, NATEL), RPC1 (Pocsag), GOLAY, AMPS, NAMPS, TACS, NTACS, NMT-450, NMT-900, LTR, EDACS, MPT1327

DC Current Meter

Measurement Range: 0 to 10 A (usable to 15 A)
Accuracy: The greater of: ±10% of reading or ±30 mA

Reference Oscillator Specifications

TCXO
Temperature: 1 ppm (0 to +55° C)
Aging: <2 ppm/year

OCXO
Temperature: 0.05 ppm (0 to +55° C)
Aging: <0.5 ppm/year (<1 ppm in 1st year)

Remote Programming

HP-IB: Hewlett-Packard's implementation of IEEE Standard 488.2
RS-232: Three-wire RJ-11 connector used for serial data in and out (2 ports available)
Baud Rates: 300, 1200, 2400, 4800, 9600, and 19200 selectable

General Specifications

Size: 330 mm W × 188 mm H × 456 mm D (8920A/8921A)
330 mm W × 260 mm H × 456 mm D (8920D/8921D)
330 mm W × 62 mm H × 456mm D (83203A)
Weight: 15.9 Kg (35 lbs) (8920A/8921A)
20.9 Kg (45 lbs) (8920D/8921D)
4.5 Kg (10 lbs) (83203A)
CRT Size: 7 × 10 cm
Operating temperature: 0° to + 55° C
AC: 100/120/220/240 V, 48 to 440 Hz, approx. 80 watts
DC: 11 to 28 V, approx 120 watts
Leakage: At signal generator output frequency and level <40 dBm typical leakage is <0.5 μV induced in a resonant dipole antenna 1 inch from any surface except the rear panel. Spurious leakage levels are typically <1 μV in a resonant dipole antenna. With the 83203A conducted and radiated interference meets CISPR11 and FTZ 1046.

HP 8920D/HP 8921D TDMA Specifications Summary

π/4 DQPSK Signal Generator

Output Level Range:
RF In/Out: −22 dBm to −127 dBm
Duplex: +4 to −127 dBm
Residual EVM: <3.0%
Residual Phase Error: <3.0%
Residual Magnitude Error: <2.5%
IQ Origin Offset: −30 dBc within ±15° C of last calibration
Frequency Error: ±4 Hz plus reference

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 691.

π/4 DQPSK Analyzer Specifications

Residual EVM: <1.4%
EVM Measurement Accuracy: 0.4% + 2% of reading
Residual Phase Error: <1.4°
Residual Magnitude Error: <1.3%
I/Q Origin Offset Accuracy: ±0.5 dB for values to −40 dBc
Frequency Error Accuracy: ±2 Hz plus reference

HP 83203A CDMA Cellular Adapter

CDMA Signal Generator

Frequency Range: 824 to 894 MHz, usable from 800 MHz to 900 MHz and from 100 MHz to 200 MHz with degraded performance
Output Level (RF In/Out): −137 dBm to −19 dBm. Up to +4 dBm available when using Duplex Out connector
Output Level Accuracy: ± 1.5 dB
Channel A Short Sequence Source Modulation: IS-95 CDMA forward or reverse link modes (QPSK or OQPSK formats)
Residual ρ: Better than 0.96, typically better than 0.98
Carrier Feedthrough: Typically better than −35 dBc
Adjacent Channel Noise: Typically < −50 dBc measured in a 30 kHz BW filter relative to the total carrier power at Fc ±880 kHz for output levels < −29 dBm at the RF In/Out connector or < −3 dBm when using the Duplex Qut connector

CDMA Analyzer

Input Frequency Range: 1 MHz to 1000 MHz
Input Level Range (RF In/Out): 0 dBm to +48 dBm
Modulation Measurement Type: IS-95 forward or reverse link formats (QPSK or OQPSK)
ρ Measurement Data Rate: 9600 bps
ρ Measurement Accuracy: ρ ± 0.003
Frequency Error Measurement Range: ± 1 kHz
Frequency Error Measurement Accuracy: ± 30 Hz using a measurement interval greater than or equal to 0.5 ms
Static Time Offset Accuracy: Typically < ± 250 ns
Relative Power Accuracy: Typically ±0.5 dB for signal levels > −30 dbFS

Ordering Information Summary

	Price
HP 8920A RF Communications Test Set	$14,100
Opt 001 High-Stability Timebase	$610
Opt 102 Spectrum Analyzer with Tracking Generator and ACP	$1,750
Opt 003 HP-IB/RS-232/dc Current Measurement	$610
Opt 004 Tone/Digital Signaling	$610
Opt 005 256 k RAM Memory	$510
Opt 007 Low Level RF Power Measurement	$0
Opt 008 Cellular Mobile RF Power Measuring Range	$255
Opt 010 400 Hz High-Pass Filter	$305
Opt 011 CCITT Weighting Filter	$305
Opt 012 4 kHz Bandpass Filter	$305
Opt 013 C-Message Weighting Filter	$305
Opt 014 6 kHz Bandpass Filter	$305
Opt 019 Variable Frequency Notch Filter	$500
Opt 020 Radio Interface Card	$2,040
Opt 050 Dual-Mode Rear Panel Connectors	$1,020
Opt W30 Three-Year Warranty	$335
HP 8920D Dual-Mode Cellular Mobile Test System	$28,350
Opt 102 Spectrum Analyzer with Tracking Generator and ACP	$1,750
Opt 008 Cellular Mobile RF Power Measuring Range	$255
Opt 010 400 Hz High Pass Filter	$305
Opt 011 CCITT Weighting Filter	$305
Opt 012 4 kHz Bandpass Filter	$305
Opt 014 6 kHz Bandpass Filter	$305
Opt 020 Radio Interface Card	$2,040
HP8920DT Digital RF Communication System capability is provided using the following primary instruments plus required options:	
HP 8920A RF Communication Test Set	$14,100
HP 83215A RF Interface	$24,050
HP 83201B TDMA Cellular Adapter	$21,400
HP 11807C Radio Test Software with Opt 021 or Opt 022	$1,530
Some of the following additional instruments may be necessary to perform some tests:	
HP 8595E Spectrum Analyzer	$20,400
HP 85720B PDC Measurement Personality	$3,060
HP 85726A PHS Measurement Personality	$2,500
HP 34401A Digital Multimeter	$995
HP 8657D pi/4 DQPSK Signal generator with PRBS Data Generator	$25,000
HP 8657J pi/4 DQPSK Signal Generator with PRBS Data Generator	$25,900
HP 8643A Synthesized Signal Generator	$16,050
HP 6642A or HP 6643A DC Power Supply	$2,345
HP 83219A Test Format Upgrade	$5,100
HP 11807A Radio Test Software	
Opt 001 North American FM Tests	$510
Opt 002 European PM Tests	$510
Opt 003 AM Tests	$510
Opt 004 AMPS/EAMPS/NAMPS Cellular Tests	$1,530
Opt 005 TACS/ETACS/NTACS Cellular Tests	$1,530
Opt 006 NMT Cellular Tests	$1,530
Opt 007 JTACS Cellular Tests	$1,530
Opt 008 AMP/NAMPS/TDMA Dual Mode Cellular Tests	$2,040
Opt 009 "Over-the-Air" TDMA Dual-Mode Cellular Phone Tests	$2,040
Opt 010 LTR[1] Trunked Radio Tests	$1,020
Opt 011 EDACS[2] Trunked Radio Tests	$1,020
Opt 012 MPT 1327 Trunked Radio Tests	$1,530
Opt 100 System Support Tests	$77
HP 8921A Cell Site Test Set	$19,400
Opt 011 CCITT Weighting Filter	$0
Opt 020 Radio Interface Card	$2,040
Opt 042 Ericsson PCM Reference	$610
Opt W30 Three-Year Warranty	$500
HP 8921D Dual-Mode Cell Site Test System	$30,600
Opt 011 CCITT Weighting Filter	$0
Opt 020 Radio Interface Card	$2,040
Opt 042 Ericsson PCM Refernce	$610
Opt W30 Three-Year Warranty	$510
HP 83201A Dual-Mode Cellular Adapter	$11,200
Opt W30 Three-Year Warranty	$275
HP 83203A CDMA Cellular Adapter	$15,300
Opt 001 Second CDMA Source	$5,100
Opt 1CM Rack Kit	$510
HP 11807B Cell Site Test Software	
Opt 040 Motorola Test Software	$2,550
Opt 041 GE Test Software	$2,550
Opt 042 Ericsson Test Software	$2,550
Opt 043 ATT Test Software	$2,550
Opt 044 Northern Telecom Test Software	$2,550
Opt 050 Motorola TACS/ETACS/UTACS Test Software	$2,550
Opt 052 Ericsson TACS/ETACS Test Software	$2,550

[1]LTR is a registered trademark of E.F. Johnson Company
[2]EDACS is a trademark of Ericsson GE Mobile Communications, Inc.

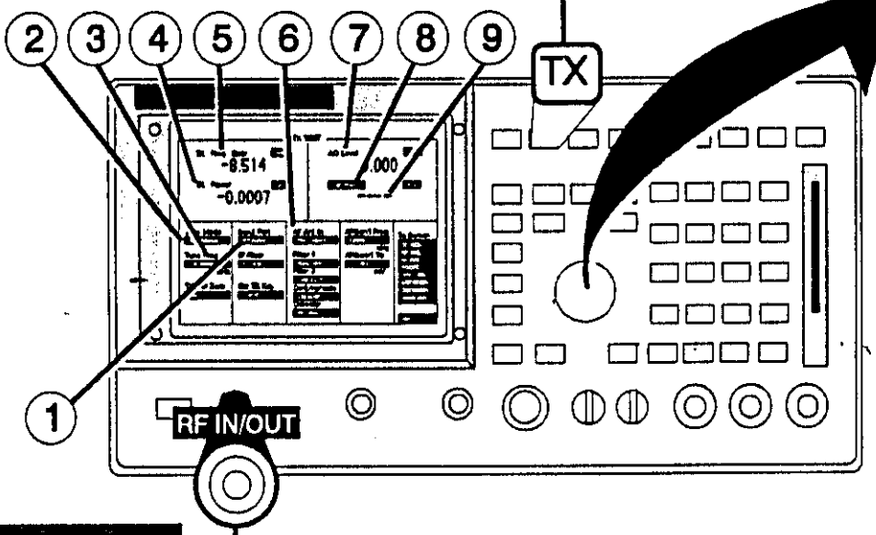
Key Literature

HP 8920A/D Technical Data Sheet, p/n 5091-7724.
Service Applications/Brochure, p/n 5952-2797.
Manufacturing Application/Brochure, p/n 5952-2796.
Cellular Applications/Brochure, p/n 5091-7627.
HP 11807A Technical Data Sheet, p/n 5091-7801.
HP 8921A/D Technical Data Sheet, p/n 5962-8091.
HP 8920DT Product Overview, p/n 5962-8548.
HP 83203A Product Overview, p/n 5963-1202.

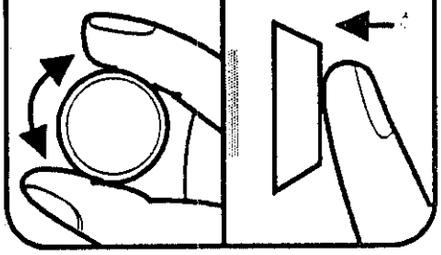
For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 591.

To Make Measurements with the HP 8920/21

1. PRESS



Set Up the Instrument Screen with the Cursor



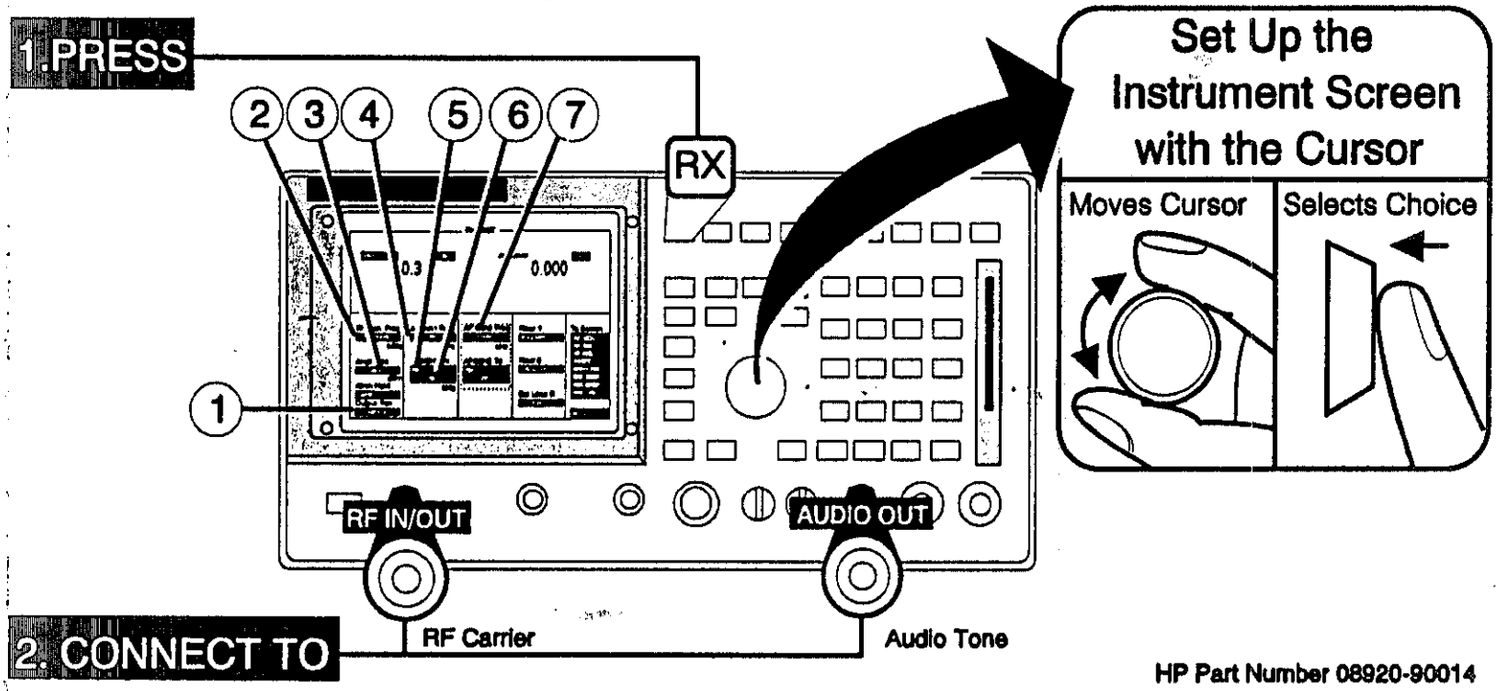
2. CONNECT TO

HP Part Number 08920-90014

3. SET UP THE SCREEN

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

To Output a Signal with the HP 8920/21



HP Part Number 08920-90014

3. SET UP THE SCREEN

To Output...	Make these Choices and Entries on the Screen with the Cursor...
A Modulated RF Carrier	underline [Output Port: RF Out/Dupl] (1), enter [RF Gen Freq: the freq] (2), enter [Amplitude: the ampl] (3), enter [AF Gen1 Freq: the mod freq] (4), choose [AF Gen1 To: the mod type] (5), enter [AF Gen1 To: the dev % kHz] (6), (7) For two tones repeat 4 5 6 in AF Gen2
An Audio Tone	enter [AF Gen1 Freq: the audio freq] (4), choose [AF Gen1 To: Audio Out] (5), enter [AF Gen1 To: the audio mV] (6), (7) For two tones repeat 4 5 6 in AF Gen2