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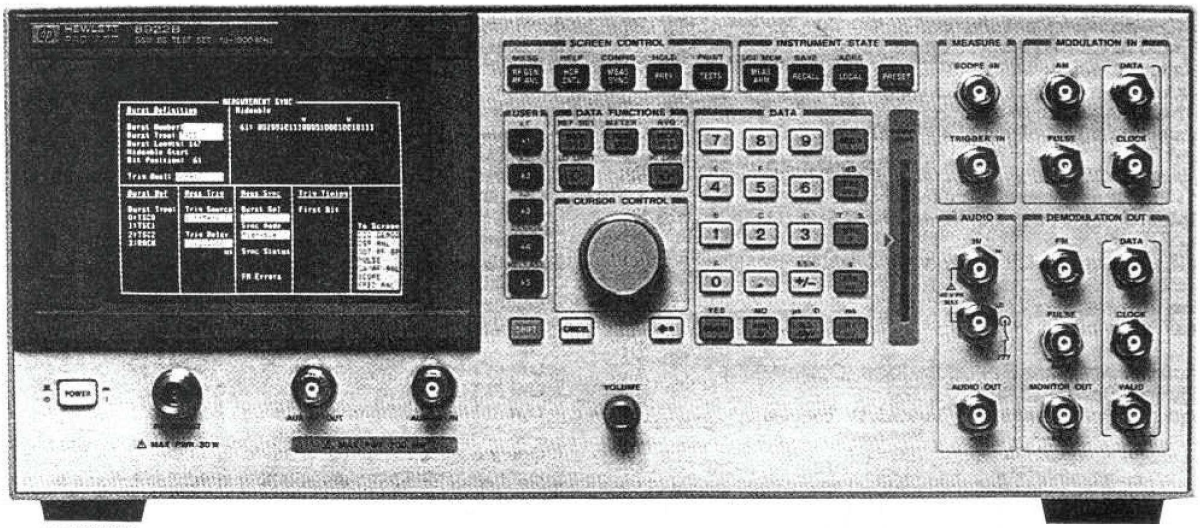
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RF COMMUNICATIONS TEST EQUIPMENT

GSM Test Sets

HP 8922A, 8922B, 8922G, 83212A

- Complete, one-box GSM mobile-station tester
- Designed to minimize production costs
- Full-featured "tool kit" of instruments
- GSM base-station tester
- Fast, one-key GSM measurements
- Built-in I-BASIC controller



HP 8922B

HP 8922A/B/G GSM Test Sets

The HP 8922A, 8922B, and 8922G are integrated test solutions for the production of GSM radios. These test sets are based on a common, expandable platform. Hewlett-Packard is working on new test sets based on this platform to meet your expanding digital radio measurement needs. The HP 8922A is a toolbox with the necessary hardware to test the RF characteristics of GSM radios. For base-station testing, the HP 8922B builds on this platform by adding a large memory and reference section to provide baseband data patterns for bit-error-rate (BER) testing. The HP 8922G is a stand-alone GSM mobile station tester. It adds bit-error-rate testing and signaling capability to the performance of the HP 8922A to fully test GSM mobile radios without additional equipment.

Minimize Production Testing Costs

Fast, accurate testing is crucial to producing competitive GSM radios. Because testing is a critical success item, the cost associated with testing a high-quality radio is a substantial component of the final production cost. The HP 8922 is carefully tuned to provide optimal measurement speed without sacrificing performance. Key measurements, such as phase and frequency error, utilize dedicated digital signal-processing hardware for high throughput. To facilitate measurements, the coherent data demodulation mode recovers and outputs the transmitted data from a timeslot every frame (1 timeslot/frame). In addition, the HP 8922G adds bit-error-rate capability. All measurements in the HP 8922 have been crafted in a similar manner to address the speed requirements of the GSM radio production market.

GSM Radio Test Solutions

The HP 8922A contains a complete set of instrumentation for testing the RF sections of GSM radios. In addition to the frequency-agile 0.3 GMSK RF generator, the RF analyzer has an agile local oscillator, coherent data demodulator, pulse demodulator, FM demodulator, global method analyzer for phase and frequency error, synthesized spectrum analyzer, and pulsed power meter. The HP 8922B adds a large programmable RAM and phase-lock-loop timing generator for generating long GSM data patterns. The HP 8922G adds a bit-error-rate tester (BERT) for performing GSM receiver measurements, channel CODEC for speech encoding and decoding, and call control protocol to set up a phone call and maintain the link while performing measurements. Echo mode is facilitated by the voice CODEC for functional testing of a mobile, and the electrical man-machine interface (EMMI) is implemented for controlling the mobile and supporting the digital audio interface (DAI)

Complete Tool Set

Besides this complement of GSM-specific instruments, the HP 8922 contains general-purpose tools useful for module test, troubleshooting, and debugging activities. These tools include a digital oscilloscope, a CW RF frequency counter, a CW RF power meter, an ac voltmeter, a dc voltmeter, a 1 kHz distortion/SINAD meter, an audio frequency counter, and a synthesized audio source. The combination of these capabilities makes the HP 8922 an extraordinarily powerful tool for the manufacture and installation of GSM radio equipment.

NEW

HP 83212A GSM Mobile Station Test Software

The HP 83212A is an easy-to-use software solution for automatic testing of GSM mobile stations. Running on the HP 8922G's built-in I-BASIC controller, the HP 83212A offers a comprehensive set of tests ideal for manufacturing and servicing GSM mobile stations. Its flexibility and modularity allows you to select and change test sequences, test parameters, and pass/fail limits without programming expertise. All test results are displayed on the screen and can be documented with hard-copy printouts when an external printer is added. Three levels of MS testing are available with the HP 83212A: manual mobile station troubleshooting, quick functional checkout, and full parametric testing. Automating your measurements provides repeatable results while allowing the user to test more mobile stations in less time. This increase in throughput lowers your testing costs.

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HP 8922A/B/G Specifications

RF Generator
Frequency Range: 10 to 1000 MHz
Frequency Resolution: 1 Hz
Switching Speed: 577 μs
0.3 GMSK Modulation: External clock and data
Pulse Modulation: External
30 dB Pulse Modulation: External
Reverse Power: 30 W continuous, 100 W for 10 s/min (RF input)

RF Analyzer
Frequency Range: 10 to 1000 MHz
Frequency Resolution: 1 Hz (100 kHz in hop mode)
Switching Speed: 577 μs
Coherent Data Demodulation: 0.3 GMSK at 270.833 Kbits/s, 1 time-slot/frame
FM Analog Demodulation: 0.3 GMSK
Global Method: RMS and peak phase error, frequency error
Amplitude Envelope: Rise, fall, and burst flatness over useful bits
Peak Transmitter Power: −10 to +45 dBm
Output RF Spectrum Measurements: Due to modulation and switching transients
CW Frequency Counter: 10 to 1000 MHz

Spectrum Analyzer
Frequency Range: 10 to 1000 MHz
Frequency Accuracy and Stability: Same as timebase
Display Range: 80 dB
Other Features: External trigger, marker

Digital Oscilloscope
Frequency Range: 2 Hz to 50 kHz
Sweep Times: 10 μs to 100 ms in 1, 2, 5, 10 steps

Audio Analyzer
Frequency Range: 20 Hz to 400 kHz
ac Voltage Range: 0 to 30 V_{rms}
dc Voltage Range: 100 mV to 42 V
THD + Noise: 1 kHz ±5 Hz
SINAD: 1 kHz ±5 Hz

Audio Source
Frequency Range: dc to 25 kHz
Output Level Range: 0.1 mV_{rms} to 4 V_{rms}

Reference Oscillator
External Reference Input Frequency: 13, 10, 5, 2, or 1 MHz
External Reference Output: 10 and 13 MHz

Remote Programming
HP-IB: IEEE 488.2
RS-232: 300, 1200, 2400, 4800, 9600, and 19200 baud

Internal Programming
Programming Language: Hewlett-Packard Instrument BASIC
Program Storage: 32 Kbyte to 256 Kbyte external memory cards

General Specifications
Size: 177 mm H × 426 mm W × 574 mm D (7 in × 16.75 in × 23 in)
Weight: 32 kg (70 lb)
Operating Temperature: 0° to +55° C
Storage Temperature: −40° to +75° C
Power: 100, 120, 220, 240 Vac, 48 to 440 Hz, ±10% of line voltage

HP 8922B Additional Specifications

Data Buffer
Frame Control RAM: Memory for 102 unique GSM frames
Data RAM: 64 Kbyte FIFO for active timeslot (load via GPIO)
Hop RAM: 32 Kbytes for controlling HP 8922B frequency hopping

GSM Reference
External Reference Input Frequencies: 13, 10, 5, 2, 1 MHz, bit clock, or frame clock

HP 8922G Additional Specifications

Broadcast Channel Capability: BCCH + CCCH or BCCH + CCCH + SDCCH/4
Control Channels: BCCH + CCCH, BCCH + CCCH + SDCCH/4, SDCCH/8 (non-hopped), SACCH/FACCH
Traffic Channels: TCH/FS
Call Control Capabilities: BS originated call (FS), MS originated call (FS), MS camp on, BS call disconnect, MS call disconnect
Encryption (with Opt. 005): On, off, user-supplied key
Timing: Auto, manual, uplink-downlink offset measurement
Hopping: Cyclic only, 2 independent MA tables with offsets
Digital Audio Interface (DAI): Normal operation and test of acoustic devices and A/D & D/A
Electrical Man-Machine Interface: Control via HP-IB
Speech Encoding/Decoding: Full rate speech (FS)
Echo Mode: User-selectable delay, 0 to 5 seconds
Bit/Frame-Error-Rate Measurements: Class Ia, Ib, and II bits
MS Power Output Level Control: 0 to 15 with RF analyzer auto adjust
Measurement Coordination: Flexible control of burst and ARFCN
SACCH MEAS Results: RXLEV, RXQUAL, timing advance

Ordering Information
HP 8922A GSM RF Test Set
Opt 001 High-Stability Timebase (08922-61062)
Opt 002 Transit Protection (front panel cover, accessory pouch, and extended rear feet) (08922-61070)
Opt 910 Total of Two Sets of Operation Manuals (08922-90009) and Service Manuals (08922-90006)
Opt 913 Rack Mount Flange Kit (5062-4072)
Opt 915 Add Service Manual (08922-90006)
Opt W30 Extended Repair Service (see page 636)

HP 8922B GSM BS Test Set
Opt 001 High-stability Timebase (08922-61062)
Opt 002 Transit Protection (front-panel cover, accessory pouch, and extended rear feet) (08922-61070)
Opt 910 Total of Two Sets of Operation Manuals (08922-90010) and Service Manuals (08922-90006)
Opt 913 Rack Mount Flange Kit (5062-4072)
Opt 915 Add Service Manual (08922-90006)
Opt W30 Extended Repair Service (see page 636)

HP 8922G GSM MS Test Set
Opt 001 High-stability Timebase (08922-61062)
Opt 002 Transit Protection (front-panel cover, and extended rear feet) (08922-61070)
Opt 003 Protocol Logging (with HP 37900D)
Opt 005 Ciphering/Encryption Capability
Opt 012 GSM MS Test Software (HP 83212A)
Opt 910 Total of Two Sets of Operation Manuals (08922-90011) and Service Manuals (08922-90006)
Opt 913 Rack Mount Flange Kit (5062-4072)
Opt 915 Add Service Manual (08922-90006)
Opt W30 Extended Repair Service (see page 636)

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