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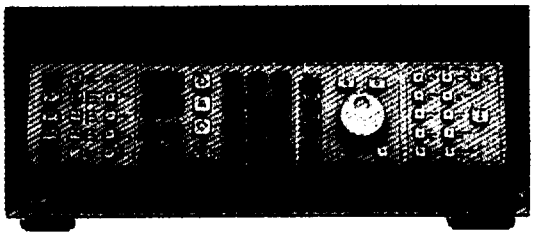
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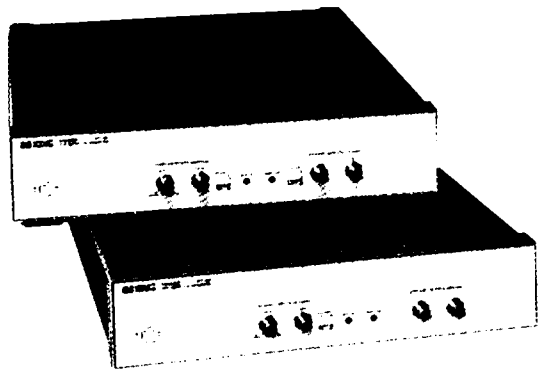
- High-performance, versatile modulation source
- Analog phase modulation for telemetry signals
- BPSK, QPSK, 8PSK, 16QAM, 64QAM, digital modulation, and pulse
- Direct-sequence spread spectrum modulation with chip widths to 7 ns



HP 8780A

DESIGNED FOR HP-IB SYSTEMS

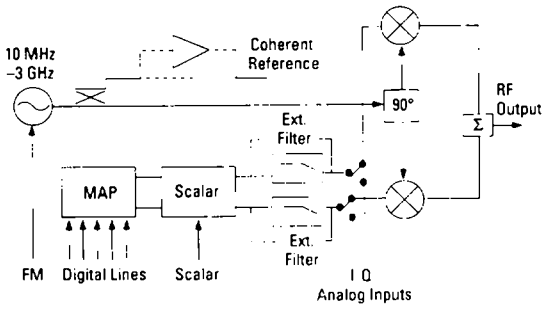
- Wideband FM: over 200 MHz p-p deviations
- 700 MHz modulation bandwidth using I/Q or vector
- 10 MHz to 3 GHz IF testing
- Pulse modulation with 1-ns rise times
- Coherent carrier output



HP 11846B Opt 001/002

HP 8780A Vector Signal Generator

The HP 8780A vector signal generator is a synthesized IF source with exceptional modulation for modern receiver and component testing. It is capable of modulation bandwidths almost 100 times wider than previous synthesizer and has a built-in digital baseband (Map) to simplify generation of common digital modulations. Its extra-wide modulation bandwidth comes from a vector modulator that effectively doubles baseband modulation bandwidths for 700 MHz of output modulation. The vector signal generator's wideband modulation is complemented with an unmodulated coherent carrier output for demodulation of test signals.



HP 8780A Block Diagram

The HP 8780A vector signal generator offers a wide variety of modulation using both digital and analog inputs. It generates many standard digital modulations like QPSK and 16QAM and traditional modulations like FM, AM, and pulse. By combining the different modulation types, signals as diverse as Barker-coded radar pulses and Doppler-shifted satellite signals can be simulated.

Applications

The HP 8780A vector signal generator is well suited for receiver measurements where wideband or complex modulations are required. It can be used as a calibrated transmitter to test modern radar EW receivers or communication receivers using vector I/Q modulation techniques. It provides a stable, coherent carrier for phase measurement. It can also be upconverted if receivers operate at frequencies higher than 3 GHz.

Analog Phase Modulation for Telemetry

HP 8780A Option H02 offers analog phase modulation capability, which can be used to generate satellite telemetry signals. A ground station needs linear phase modulation to communicate with the satellite and establish command and control. The HP 8780A with Option H02 can generate the signals used during both on-ground and in-orbit testing.

PI/4 DQPSK and JCT Modulation

The HP 11846B (with Option 001 or 002) is an accessory for use with the HP 8780A or HP 8782B vector signal generators. The HP 11846B with Option 001 is used with a vector signal generator to provide NADC (North American Dual-mode Cellular) and JDC (Japan Digital Cellular) for simulating telephone system transmissions. The 11846B with Option 002 is for use with one of the vector signal generators to simulate JCT (Japan Cordless Telephone) system transmissions.

Digital HDTV/CATV Signal Simulation

The HP 8782B-K03 is an accessory for use with the HP 8780A or 8782A/B vector signal generators. The HP 8782B-K03 is used with a vector signal generator to simulate digitally modulated broadcast signals. The HP 8782B-K03 can also provide the required analog filtering required to prevent one of these signals from spreading into an adjacent channel. The bandwidth and cutoff of these filters is easily adjusted by user. The HP 8782B-K03 is controlled via HP 82335B HP-IB card and Windows-based software program.

HP 8780A Partial Specifications

Frequency

Range: 10 MHz to 3 GHz
Resolution: 1 Hz

AC Coupled Frequency Modulation

Rates (3 dB frequencies): 20 Hz to 12 MHz
Deviation Ranges: 50 kHz to 50 MHz peak-to-peak (up to >200 MHz p-p possible with slightly higher distortion by overdriving FM input)

Digital Modulation

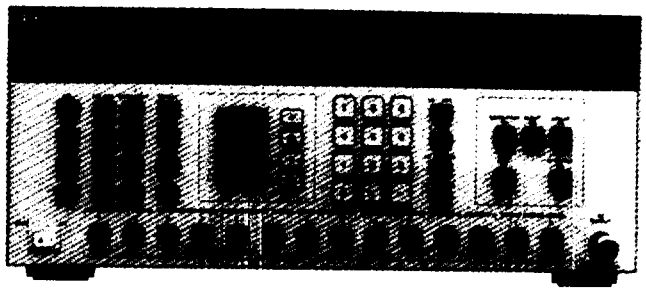
Modulation Types: BPSK, QPSK, 8PSK, 16QAM (64QAM with Opt 064), Arbitrary 2-State, Burst (except 64QAM)

Ordering Information	Price
HP 8780A Vector Signal Generator	$71,400
Opt 001 Rear Panel Output and Modulation Inputs	+ $460
Opt 002 +10 dBm Coherent Carrier Output	$3,060
Opt 064 64 QAM Modulation	$3,570
Opt H02 Analog Phase Modulation	$2,500
HP 11846B π/4 DQPSK I-Q Generator	$5,390
Opt 001 NADC/JDC Format	$0
Opt 002 JDCT (PHP) Format	$0
HP 8782B-K03 Digital Video Source/Filter	$40,000

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

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SIGNAL SOURCES
Digital I/Q Modulation
HP 8782B, 8782B-K03, 11846B



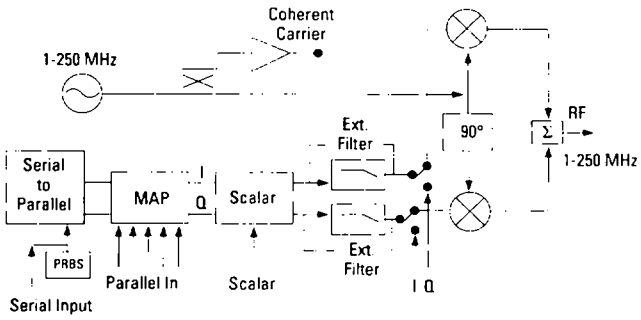
DESIGNED FOR HP-IB SYSTEMS

HP 8782B

- 1 MHz to 250 MHz covers 70 and 140 MHz IFs
- Calibrated 100 MHz BW I/Q vector modulation inputs
- BPSK, QPSK, 8PSK, 16QAM, 256QAM digital modulation and burst
- Internal pseudo-random binary sequence generator
- AM/SCALAR modulation to simulate flat fading
- Coherent carrier output
- Optional 1 GHz LO for up conversion to 750 MHz to 1.25 GHz

HP 8782B Vector Signal Generator

The HP 8782B vector signal generator is a second-generation synthesized generator providing IF signal generation for research and development and manufacturing. It supports a wide range of built-in digital modulation from BPSK to 256QAM for RF and microwave terrestrial and satellite communications applications. Its 1 MHz to 250 MHz frequency range, covers most of the IF frequencies in commercial receivers. An internal pseudo-random bit sequence (PRBS) generator makes all digital modulation possible without using external digital data sources. The HP 8782B also provides an unmodulated coherent carrier output for testing receivers and subsystems before carrier recovery circuits are working. Its cost is substantially lower than that of the HP 8780A vector signal generator.



HP 8782B Simplified Block Diagram

The HP 8782B offers a wide variety of digital modulation using either the internal PRBS generator or a user data source. It generates calibrated test signals as well as specified modulation impairments such as quadrature errors, I/Q imbalance, carrier leakage, and flat fading.

Applications

Using the HP 8782B to align digital radios in manufacturing can improve radio quality. Instead of relying on a golden standard modulator from Research and Development, the HP 8782B can provide calibrated constellations with extremely low quadrature error and amplitude imbalance. Customers can also simulate transmitter impairments by using the HP 8782B to test receiver performance margins.

HP 8782B Partial Specifications

Frequency
Range: 1 to 250 MHz
Resolution: 1 Hz
RF Output Level: +7 to −100 dBm for all formats

Digital Modulation
Modulation Types: BPSK, QPSK, 8PSK, 16QAM, 64QAM, 256QAM, 9PRS, 25PRS, 49PRS, 81PRS
PRBS: Internal pseudo-random binary sequence generator with $2^{23}-1$ sequence length

Analog I/Q Inputs:
Frequency Response: DC to 40 MHz (−0.5 dB)

Burst Modulation
Burst Rates: 0 to 50 MHz
Burst DC On/Off Ratio: >50 dB at 70 MHz carrier typical >50 dB from 1 to 250 MHz

AM/SCALAR Modulation
Sensitivity: 0 to −1 V for 0 to full-scale output power
Frequency Response: DC to 50 kHz at 70 MHz carrier frequency

PI/4 DQPSK and JCT Modulation

The HP 11846B (with Option 001 or 002) is an accessory for use with the HP 8780A or HP 8782B vector signal generators. The HP 11846B with Option 001 is used with a vector signal generator to provide NADC (North American Dual-mode Cellular) and JDC (Japan Digital Cellular) for simulating telephone system transmissions. The HP 11846B with Option 002 is for use with one of the vector signal generators to simulate JCT (Japan Cordless Telephone) system transmissions.

Digital HDTV and CATV Modulation

The HP 8782B-K03 is an accessory for use with the HP 8780A/8782A or 8782B vector signal generators. The HP 8782B-K03 is used with a vector signal generator to simulate the new digital HDTV and/or digital cable TV transmissions. The HP 8782B-K03 can also be used with the HP 8981B to simulate a digital HDTV or cable TV receiver. Note: These products can be used to simulate broadcast or cable TV transmissions. However, these products can not simulate the high bit rates required for satellite transmission simulations.

Ordering Information

	Price
HP 8782B Vector Signal Generator	$35,700

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