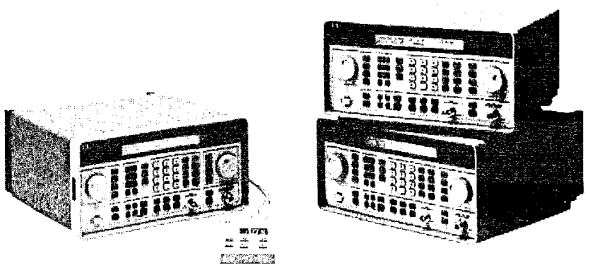
SIGNAL SOURCES

Economy RF Signal Generators

HP 8647A, 8648A/B/C/D

- ±1 dB level accuracy through 2.5 GHz
- 4 Hz residual FM at 500 MHz
- *Electronic attenuator (1 GHz models)*
- +10/+13 to −136 dBm output power
- *Simple, dependable operation*
- Pager signaling (HP 8648A Option 1EP)



HP 8648A/B/C/D

HP 8647A and HP 8648A/B/C/D Synthesized Signal Generators

Superior Value in Economy Signal Generators

The HP 8647A and 8648A/B/C/D family of synthesized signal generators delivers solid performance and reliability at an affordable price. These signal generators provide the features and performance needed for semi-automated receiver testing and for use in a variety of general-purpose applications over a 100 kHz to 4000 MHz frequency range.

High Reliability and Simplicity

Designed to Hewlett-Packard's stringent quality specifications, these signal generators provide consistent performance. The all-electronic attenuator in the HP 8647A and 8648A, easily handles millions of amplitude cycles with highly repeatable output levels.

An easy-to-use front panel interface shortens the operator's learning curve and increases productivity. A front panel organized in functional blocks speeds identification of the task and simplifies operation.

Ideal for Manufacturing and Semi-Automated Test

The HP 8647A and 8648 series are ideal for manufacturing high-volume products such as cordless telephones, pagers, and two-way radios. The HP 8647A is the basic model providing essential performance. The HP 8648 series provides enhancements in frequency range, residual FM, level accuracy, *and phase noise, in addition to optional high power, pulse* modulation, and waveform modulation. The HP 8648 provides ±1 dB absolute amplitude accuracy up to 2.5 GHz. All of the models offer ultra stable dc FM, with ±500 Hz carrier frequency accuracy below frequencies of 1001 MHz, and low RF leakage.

Applications such as receiver tuning and alignment benefit from the simple user interface. These signal generators are so easy to learn and use that experienced operators are no longer required. With 300 full storage registers and ten user-definable sequences, the signal generator easily adapts to any test procedure. Once setups are stored in registers, operators can quickly sequence through them, either from the front panel or through a remote keypad (HP 83300A). In addition, the HP 83301A memory interface provides the means to transfer register information from one HP 8647/8 to another.

For automated test applications, the HP 8647/8 offers full HP-IB programmability and uses SCPI programming codes. In addition, the HP 8648 series reduces software development costs by providing full HP-IB code compatibility with the HP 8656B and 8657A/B signal generators.

New Cost-Effective Pager Testing

The HP 8648A with Option 1EP provides an economical, one-box solution for pager test. Option 1EP adds the pager encoding capability for POCSAG, FLEX, and FLEX-TD formats to the HP 8648A. Ideal for pager test applications, the HP 8648A with Option 1EP offers superior frequency accuracy, deviation accuracy, and dc FM performance.

Specifications

Frequency
HP 8647A: 250 kHz to 1000 MHz
HP 8648A: 100 kHz to 1000 MHz
HP 8648B: 100 kHz to 2000 MHz
HP 8648C: 100 kHz to 3200 MHz
HP 8648D: 9 kHz to 4000 MHz
Resolution:
HP 8647A: 1 Hz; **HP 8648A/B/C/D:** 0.001 Hz
Display: 10 Hz
Switching Speed (typical)
HP 8647A: <120 ms
HP 8648A/B/C/D: <1001 MHz: <75 ms; ≥1001 MHz: <100 ms
Accuracy (after one hour warm-up and within one year calibration): Typically $\pm 3 \times 10^{-8}$ x carrier frequency in Hz, $\pm 0.15 \times 10^{-6}$ x carrier frequency in Hz for Option 1E5 (typically $\pm 0.072 \times 10^{-6}$ x fc)
Internal Reference Oscillator
Accuracy and Stability (calibration adjustment dependent; after one hour warm-up and within one year of calibration), *± aging rate ± temperature effects ± line voltage effects*

	Standard Timebase	Option 1E5
Aging	< ±2 ppm/yr	< ±0.1 ppm/yr; < ±0.0005 ppm/day
Temperature	< ±1 ppm	< ±0.01 ppm
Line Voltage (±5%)	< ±0.5 ppm	N/A

Output: 10 MHz, typically >0.5 V_{rms} into 50 Ω
External Reference Oscillator Input: Accepts 2, 5, 10 MHz ±5 ppm, and a level range of 0.5 V to 2 V_{rms} into 50 Ω
Spectral Purity
Harmonics (output ≤4dBm): < −30 dBc
Subharmonics (output ≤ +4 dBm) <1001 MHz: −60 dBc; ≥1001 MHz: −50 dBc; >3200 MHz: −40 dBc
Nonharmonics (>5 kHz offset, ≤ +4 dBm output level)
HP 8647A
< −60 dBc (−55 dBc from 220 to 250 MHz)
HP 8648A/B/C/D
<249 MHz: < −55 dBc; <2001 MHz: < −54 dBc
<1001 MHz: < −60 dBc; ≤4000 MHz: < −48 dBc
Residual FM (CCITT, rms)
HP 8647A
<249 MHz: <20 Hz, typically <11 Hz
<501 MHz: <10 Hz, typically <6 Hz
≤1000 MHz: <20 Hz, typically <11 Hz
HP 8648A/B/C/D
<249 MHz: <7 Hz, typically <4 Hz
<501 MHz: <4 Hz, typically <2 Hz
<1001 MHz: <7 Hz, typically <4 Hz
<2001 MHz: <14 Hz, typically <8 Hz
≤4000 MHz: <28 Hz, typically <12 Hz
SSB Phase Noise (at 20 kHz offset, typical)
HP 8647A
@ fc 500 MHz: < −110 dBc/Hz; @ fc 1000 MHz: < −106 dBc/Hz
HP 8648A/B/C/D
@ fc 500 MHz: < −120 dBc/Hz; @ fc 3000 MHz: < −106 dBc/Hz
@ fc 1000 MHz: < −116 dBc/Hz; @ fc 4000 MHz: < −104 dBc/Hz
@ fc 2000 MHz: < −110 dBc/Hz
Output
Range
HP 8647A and 8648A: +10 to −136 dBm
HP 8648B/C/D: ≤2500 MHz: +13 to −136 dBm; >2500 MHz: +10 to −136 dBm
Max. Power with Option 1EA (High Power) on HP 8648B/C/D only

Freq. (MHz)	<0.1	≤1000	≤1500	≤2100	≤2500	≤4000
Power (dBm)	+17	+20	+19	+17	+15	+13

Display Resolution: 0.1 dB
Accuracy *(specified power <13 dBm to −127 dBm)*
HP 8647A: ±1.5 dB
HP 8648A/B/C/D (applies at 25° ±5° C):
≤2500 MHz: ±1.0 dB
≤3200 MHz: ±1.5 dB (≥ −100 dBm; +3.0 dB < −100 dBm)
≤4000 MHz: ±2.0 dB (≥ −100 dBm; +3.0 dB < −100 dBm)
Reverse Power Protection (watts into 50 Ω)
HP 8647A and 8648A: 50 watts
HP 8648B/C: 25 watts <1001 MHz; 1 watt ≥1001 MHz
HP 8648D: 50 watts ≤2000 MHz; 25 watts ≤4000 MHz