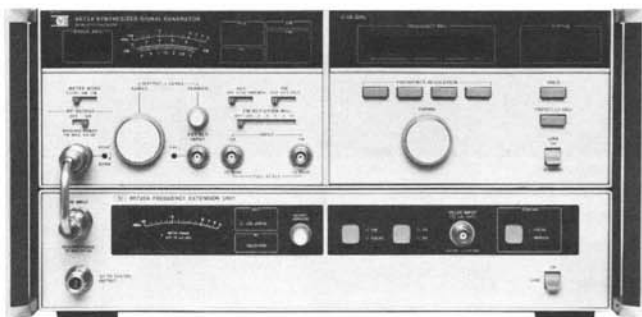


# SIGNAL GENERATORS

## Synthesized Signal Generators, Pulse Modulator

Models 8672A, 8672S and 11720A

- Frequency coverage to 18 GHz
- AM, FM pulse\* modulation
- Low spurious and phase noise (\*HP 8672S only)



HP 8672S



### HP8672A and 8672S Synthesized Signal Generators

The HP 8672A Synthesized Signal Generator delivers precise microwave signals over the 2.0 to 18.0 GHz frequency range. It features calibrated and leveled output power, AM/FM modulation capability, and full HP-IB programmability.

The HP 8672S consists of an HP 8672A and an HP 86720A frequency extension unit. Specifications for the HP 8672S are identical to those of a standard HP 8672A for the 2 to 18 GHz frequency range with the exception of 1 dB less maximum output power and no AM modulation below 2 GHz. It also adds pulse modulation capability over the entire 10 MHz to 18.0 GHz frequency range.

Existing HP 8672A Signal Generators can be retrofitted to the HP 8672S configuration by ordering the HP 86720A Frequency Extension Unit and an HP 11731A or 11732A Frequency Extension Retrofit Kit.

### HP 8672A and 8672S Specifications

#### Frequency Characteristics

**Frequency range:** HP 8672A: 2.0–18.0 GHz (18.6 GHz overrange)  
HP 8672S: 0.01–18.0 GHz (18.6 GHz overrange)

#### Frequency bands and resolution:

Band 0:	0.01 - 2.0 GHz	1 kHz
Band 1:	2.0 - 6.2 GHz	1 kHz
Band 2:	6.2 - 12.4 GHz	2 kHz
Band 3:	12.4 - 18.0 GHz	3 kHz

**Time base:** internal 10 MHz ( $<5 \times 10^{-10}$ /day aging rate) or external 5 or 10 MHz.

**Frequency switching time:**  $<20$  ms to be within specified resolution, all bands.

#### Spectral Purity

**Single-sideband phase noise:** same as HP 8673B/C/D

**Harmonics (up to maximum frequency, output level meter readings  $<0$  dB on 0 dBm range and below):**  $<-25$  dBc.

**Sub-harmonics and multiples thereof:**  $<-25$  dBc, Bands 1-3.

**Spurious (CW and AM modes):** Same as HP 8673B/C/D

#### Output Characteristics

**Output level (+15°C to +35°C):** HP 8672A: +8 to -120 dBm  
HP 8672S: +13 dBm to -120 dBm, 0.01–2.0 GHz; +2 dBm to -120 dBm, 2.0–18.0 GHz

**Flatness (0 dBm range, +15°C to +35°C):**

HP 8672A: same as HP 8673B/C/D

HP 8672S: same as HP 8672A degraded by  $\pm 0.25$  dB

**Remote programming output level resolution:** 1.0 dB.

**Source impedance:** 50 ohms nominal.

#### Modulation Characteristics

**Amplitude Modulation:** same as HP 8673B/C/D (2-18 GHz)

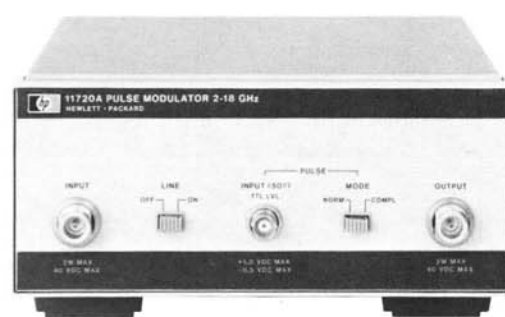
**Frequency Modulation:** same as HP 8673B/C/D (2-18 GHz)

**Pulse Modulation:** HP 8672S only

$>80$  dB ON/OFF ratio;  $<15$  ns rise/fall times; peak pulsed power within 1.0 dB of level selected in CW mode for 0.01–2 GHz, uncalibrated for 2.0–18.0 GHz.

### 2 to 18 GHz Pulse Modulator

- $<10$  ns rise and fall times
- $>80$  dB ON/OFF ratio



HP 11720A

### General

**Programming:** all functions HP-IB programmable except line switches and meter mode.

**Operating temperature range:** 0 to +55°C.

**Power:** 100, 120, 220, 240V, +5%, -10%, 48–66 Hz; 400 VA max.

**Weight:** HP 8672A: net 27 kg (60 lb); shipping 32.5 kg (72 lb).

HP 8672S: net 39.5 kg (87 lb); shipping 43.6 kg (96 lb).

**Size:** HP 8672A: 133 mm  $\times$  425 mm  $\times$  603 mm (5.25"  $\times$  16.75"  $\times$  23.75") H  $\times$  W  $\times$  D

HP 8672S: 222 mm  $\times$  425 mm  $\times$  620 mm (8.8"  $\times$  16.8"  $\times$  24.4") H  $\times$  W  $\times$  D

### HP 11720A Pulse Modulator

The HP 11720A Pulse Modulator is a high performance microwave pulse modulator covering the range of 2 to 18 GHz.

In addition to wide frequency coverage, the HP 11720A features extremely short rise and fall times ( $<10$  ns) and a high on/off ratio ( $>80$  dB), making it suitable for almost any pulsed RF application.

### HP 11720A Specifications

**Frequency range:** 2 to 18 GHz.

**ON/OFF ratio:**  $>80$  dB.

**Rise and fall times:**  $<10$  ns.

**Insertion loss:**  $<6$  dB, 2 to 12.4 GHz;  $<10$  dB, 2 to 18 GHz.

**Maximum RF input power:** +20 dBm.

**Maximum repetition rate:**  $>5$  MHz.

**Minimum RF pulse width:**  $<50$  ns.

**Video feedthrough:**  $<60$  mV peak-to-peak.

### Ordering Information

	Price
HP 8672A Synthesized Signal Generator	\$41,000
Option 006: Chassis slide kit	+\$45
Option 907: Front panel handle kit	+\$55
Option 908: Rack mounting flange kit	+\$33
Option 909: Combination of Opt. 907 plus 908	+\$80
Option W30: Two additional years of return to HP warranty	+\$1,000
Option 910: Extra operating and service manual	+\$60
HP 8672S Synthesized Signal Generator	\$58,500
Option 006: Chassis slide kit	+\$80
Option 009: Delete internal pulse modulator	-\$1,100
Option 010: Delete pulse modulator and step attenuator	-\$1,700
Option 908: Rack flange kit	+\$55
Option 913: Rack flanges for standard front panel handles	+\$45
Option 910: Extra operating and service manuals	+\$80
HP 86720A Frequency Extension Unit	\$20,000
HP 11731A Frequency Extension Retrofit Kit	\$1,000
HP 11732A Frequency Extension Retrofit Kit	No Charge
HP 11712A Support Kit	\$1,200
HP 11720A Pulse Modulator	\$4000
Option 910: Extra manual	+\$5.00
Option W30: Two additional years of return to HP warranty	+\$100



# SIGNAL GENERATORS

## Accessories, Frequency Doublers

Models 11509A, 11687A, 11690A, 11710B, 11721A

393

- Additional capabilities for signal generators



HP 11687A



HP 11509A



HP 11710B



HP 11690A



HP 11721A

### HP 11509A Fuseholder

Accidental burnout of attenuators in HP 8640 and HP 8654 signal generators can be prevented by using this fuse element between the signal generator and a transceiver. The fuseholder has a frequency range of dc to 480 MHz, insertion loss of  $\leq 1$  dB, SWR of  $\leq 1.35$  (50 $\Omega$  load), and Type N connectors. Ten extra fuses are furnished.

### HP 11687A 50-75 $\Omega$ Adapter

This 50-75 $\Omega$  adapter with Type N connectors is recommended for use with HP 8640, 8642, 8654, 8660, 8656, and 8662 signal generators for measurements in 75 $\Omega$  systems. The voltage calibration on the output level meter is unaffected by use of the adapter, but 1.76 dB must be subtracted from the dB scale on the meter to determine the output in dBm into 75 $\Omega$ . Frequency range is dc to 1300 MHz.

### HP 11690A Frequency Doubler

The HP 11690A extends the frequency range of all HP 8640 series signal generators by doubling the 256-512 MHz frequency band up to 1024 MHz (to 110 MHz with band overrange). All HP 8640s indicate the correct doubled output frequency on a dial or counter when the 512-1024 MHz range is selected. The HP 11690A will also perform well with any source meeting the input requirements of 200-550 MHz at +10 to +19 dBm. Conversion loss is  $< 13$  dB, output flatness has  $< 4$  dB total variation, and the first and third input harmonics are suppressed  $> 20$  dB. Connectors are BNC.

### HP 11710B Down Converter

The HP 11710B Down Converter is an accessory for the HP 8640 and HP 8654 series signal generators. Frequency inputs from 50.01 to 61 MHz are down converted to the 10 kHz to 11 MHz range respectively. The output level and modulation functions of the HP 8640 and HP 8654 remain calibrated. A straight-through selection switch allows the input to pass through unchanged, and thus minimizes the necessity to move cables when testing. Option 001 provides rails and semi-rigid coax for combining the HP 11710B with an HP 8654A/B Signal Generator.

### HP 11710B Specifications

#### Input

**Down-conversion mode:** 50.01 to 61.00 MHz at  $\leq 0$  dBm.

**Straight-through mode:** 0.01 to 1100 MHz (dc coupled).

#### Down-Converted Output

**Frequency range:** 10 kHz to 11 MHz.

**Level range:** 0 to  $-107$  dBm

**Level flatness:** RF source flatness  $\pm 0.5$  dB (referred to 4.0 MHz).

**Total level accuracy:**  $\pm 1$  dB plus input level accuracy.

**Harmonics:**  $> 35$  dB below the carrier (dBc).

**Intermixing spurious:**  $> 60$  dBc.

**Local oscillator feed-through (50 MHz):**  $< -100$  dBm.

### Internal Reference Characteristics

**Time base output:** 1 MHz or 5 MHz selectable, nominally  $> 0.5$  V p-p into 500 $\Omega$ . This will drive an HP 8640B external time base input.

**Typical overall accuracy:** (within 3 months of calibration and from 15°C to 35°C):  $\pm 2$  ppm.

### General

**Operating temperature range:** 0° to 55°C.

**Power requirements:** 100, 120, 220, 240V (+5%, -10%), 48 to 440 Hz; 25 VA maximum.

**Weight:** net, 3.2 kg (7 lb); shipping, 4.5 kg (9 lb).

**Size:** 102 H  $\times$  266 W  $\times$  295 mm D (4"  $\times$  10.5"  $\times$  11.6"). 1/2 MW  $\times$  4 H  $\times$  11 D System 1 Module.

### HP 11721A Frequency Doubler

The HP 11721A Doubler is an ideal accessory for extending the usable frequency range of signal generators, frequency synthesizers, or other signal sources. Operating on input frequencies of 50 MHz to 1300 MHz, it provides a doubled output in the range of 100 MHz to 2600 MHz. The HP 11721A will work well with any RF source with an output in the range 50 to 1300 MHz.

The 50 $\Omega$  passive circuit of the HP 11721A offers low conversion loss, low spurious, and excellent flatness over its entire frequency range when operated above +10 dBm.

### HP 11721A Specifications

**Input frequency range:** 50 to 1300 MHz.

**Output frequency range:** 100 to 2600 MHz.

**Conversion loss (+13 dBm input, 50 to 1280 MHz):**  $< 15$  dB.

**Spurious referenced to desired output frequency f (+13 dBm input with harmonics  $< -50$  dBc, 50 to 1280 MHz):**  $f/2$ ,  $-15$  dB;  $3f/2$ ,  $-15$  dB.

**Input SWR:** 1.5 typical.

**Input/output impedance:** 50 $\Omega$  nominal.

**Operating temperature range:** 0° to +50°C.

**Connectors:** input, type N male; output, type N female.

**Size:** 161 L  $\times$  30 W  $\times$  20.5 mm H (6 3/8"  $\times$  1 1/16"  $\times$  1 1/16").

**Weight:** net, .02 kg (0.5 lb); shipping, 0.4 kg (1 lb).

### Ordering Information

HP 11509A Fuseholder

HP 11687A 50 $\Omega$ -75 $\Omega$  Adapter

HP 11690A Frequency Doubler

HP 11710B Down Converter

Opt 001 Combining Kit

Opt 910 2 sets of operation/service manuals (11710-90005)

HP 11721A Frequency Doubler

Fast ship product — see pg. 734

### Price

\$285

\$215

\$325

\$3,295

\$165

\$6

\$720

Sg Labs

www.sg-labs.it

email: m.sev@sg-labs.it

tel. +39 0755149360