

# SIGNAL GENERATORS

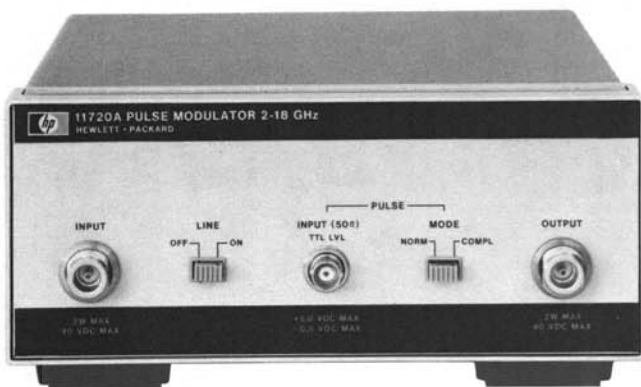
## Pulse modulator, frequency doublers

11720A, 11721A, 10515A, 11690A



- 2 to 18 GHz
- <10 ns rise and fall times
- >80 dB ON/OFF ratio

- Increased signal generator frequency range



11720A

### 11720A Pulse Modulator

The 11720A Pulse Modulator is a high performance microwave pulse modulator covering the range of 2 to 18 GHz. Because of this wide frequency coverage, it can be used to increase the modulation capabilities of many microwave sources (sweepers or signal generators) and eliminate the need for several individual modulators in broadband applications.

In addition to wide frequency coverage, the 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.

The modulator used in the 11720A is a unique series-shunt PIN diode switch offering superior performance to that of a simple shunt-diode switch which reflects the input power back to the source in the "off" state. In the 11720A the series components reduce this reflection without significantly increasing the insertion loss.

The 11720A contains all the necessary modulator drive circuitry to achieve specified performance so that a standard pulse generator, or any other source that can deliver >3 V peak into 50 ohms, can supply the input. In addition, a normal/complement function is provided to adapt the 11720A to positive-true or negative-true logic inputs.

#### 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.

#### Pulse input

**Normal mode:** >3 V (on), <0.5 V (off).

**Complement mode:** <0.5 V (on), >3 V (off).

**Impedance:** 50 Ω nominal.

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

**Power:** 100, 120, 220, 240 V +5, -10%, 48-400 Hz; 25 VA max.

**Weight:** net, 2.6 kg (5 lb 12 oz); shipping, 3.6 kg (8 lb).

**Size:** 101 mm H x 212 mm W x 290 mm D (4.0" x 8.4" x 11.4").

### 11721A Frequency Doubler

The 11721A Doubler is an ideal accessory for extending the useable 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 11721A will work well with any RF source with an output in the range 50 to 1300 MHz.



11721A



11690A

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

#### 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 Ω nominal.

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

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

**Size:** 161 L x 30 W x 20.5 mm H (6 3/8" x 1 3/16" x 13/16").

**Weight:** net, 181 g (6.4 oz); shipping, 335 g (11.8 oz).

### 11690A Frequency Doubler

The 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 1100 MHz with band overrange). All 8640's indicate the correct doubled output frequency on a dial or counter when the 512-1024 MHz range is selected. The 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 1st and 3rd input harmonics are suppressed >20 dB. Connectors are BNC.

### 10515A Frequency Doubler

The 10515A is an ideal accessory to extend the frequency range of signal generators, sources, and frequency synthesizers such as the HP 606, 608, and 8660 Signal Generators. With input frequencies of 0.5-500 MHz, it provides a doubled output in the range of 1-1000 MHz. Its transformer-coupled full-wave rectifier circuit has a very flat frequency response (typically <±2 dB over the entire frequency range). It can also be used as a very broadband detector for low level amplitude modulation because it has no internal dc return path. Conversion loss is <14 dB worst case for inputs between +7 and +23 dBm, and connectors are BNC.

#### Ordering Information

**11720A** Pulse modulator

**Option 910:** Extra Operating & Service Manual

**11721A** Frequency doubler

**11690A** Frequency doubler

**10515A** Frequency doubler

#### Price

\$2600

add \$ 5

\$ 285

\$ 180

\$ 200