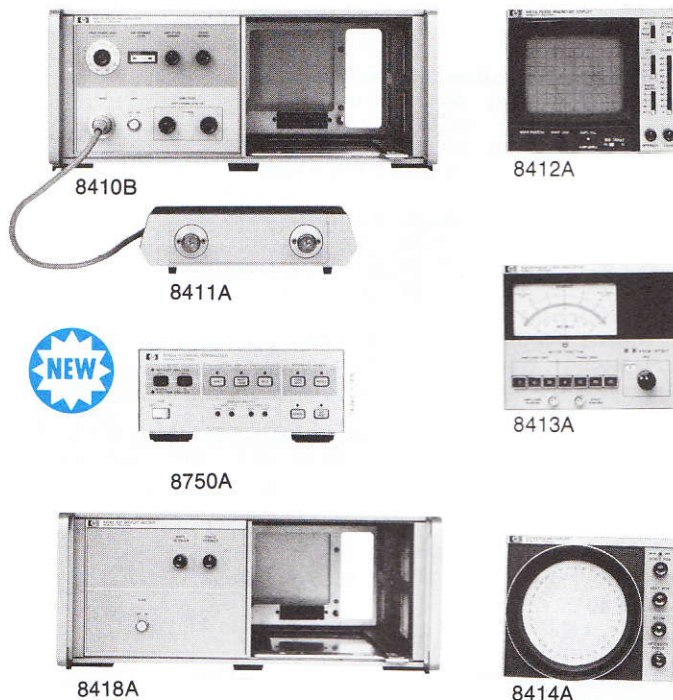




# NETWORK ANALYZERS

## Individual instruments

### 8410 family



## Specifications

### 8410B/8411A Network Analyzer

**Function:** 8411A converts RF signals to IF signals for processing in 8410B mainframe. 8410B is the mainframe for display plug-in units. Mainframe includes tuning circuits (octave bands or multioctave bands when used with HP 8620/86290 sweep oscillator), IF amplifiers and precision IF attenuator.

**8410B frequency range:** 0.11 to 18 GHz.

**8411A frequency range:** 0.11 to 12.4 GHz.

**Opt 018:** 0.11 to 18 GHz.

**8411A input impedance:** 50 ohms nominal. SWR <1.5, 0.11 to 8.0 GHz; <2.0, 8.0 to 12.4 GHz; typically increases to a 10:1 SWR, 12.4 to 18 GHz.

**Channel isolation:** >65 dB, 0.1 to 6 GHz; >60 dB, 6 to 12.4 GHz; >50 dB, 12.4 to 18 GHz.

#### Amplitude

**Reference channel:** -16 to -26 dBm, 0.11 to 18 GHz; -16 to -36 dBm, 0.11 to 12.4 GHz.

**Test channel:** -10 to -78 dBm from 0.11 to 12.4 GHz; -10 to -68 dBm from 12.4 to 18 GHz.

**Maximum RF input to either channel:** 50 mW.

**IF gain control:** 69 dB range in 10 dB and 1 dB steps with a maximum cumulative error of  $\pm 0.2$  dB.

#### Phase

**Phase range:** 0 to 360°.

**Control:** vernier control  $\leq 90^\circ$ .

**Connectors (8411A):** APC-7.

**Power:** 115 or 230 V ac  $\pm 10\%$ , 50-60 Hz, 70 watts (includes 8411A).

#### Weight

**8410B:** net, 14.9 kg (33 lb). Shipping, 18.5 kg (41 lb).

**8411A:** net, 3.2 kg (7 lb). Shipping, 4.5 kg (10 lb).

#### Size

**8410B:** 191 H  $\times$  425 W  $\times$  467 mm D ( $7\frac{1}{2}$ "  $\times$   $16\frac{3}{4}$ "  $\times$   $18\frac{3}{8}$ ").

**8411A:** 67  $\times$  228 W  $\times$  143 mm D ( $2\frac{5}{8}$ "  $\times$  9"  $\times$   $5\frac{5}{8}$ ") exclusive of connectors and cable.

### 8412A Phase-Magnitude Display

**Function:** plug in CRT display unit for 8410B. Displays relative amplitude in dB and/or relative phase in degrees between reference and test channel inputs versus frequency.

#### Amplitude

**Range:** 80 dB display range with selectable resolutions of 10, 2.5, 1 and 0.25 dB/division.

**Accuracy:** 0.08 dB/dB from midscreen.

#### Phase

**Range:**  $\pm 180^\circ$  display range with selectable resolutions of 10, and  $1^\circ$ /division.

**Accuracy:** 0.065°/degree from midscreen.

**Phase offset:** 0.3°/20° step cumulative  $< 3^\circ$ .

**Power:** 23 watts supplied by mainframe.

**Weight:** net, 7.8 kg (17 lb). Shipping, 10 kg (22 lb).

**Dimensions:** 152 H  $\times$  186 W  $\times$  395 mm D ( $6$ "  $\times$   $7\frac{9}{32}$ "  $\times$  excluding front panel knobs).

### New 8750A Storage-Normalizer

**General:** the 8750A Storage-Normalizer provides digitally and normalized CRT displays when used with the 8412A Magnitude Display. Measurements are faster, easier and more accurate when the 8750A is employed because the CRT is flicker-free and frequency response errors are eliminated. The 8750A is compatible with the 8414A Polar Display.

**Power:** selection of 100, 120, 220, or 240V  $\pm 5\%$  - 10%. 48 to and  $\leq 20$  VA  $\leq 20$  watts).

**Weight:** net, 2.72 kg (6 lbs). Shipping, 5.0 kg (11 lbs).

Detailed specifications on page 459.

### 8413A Phase-Gain Indicator

**Function:** plug-in meter display unit for 8410B. Displays amplitude in dB between reference and test channel inputs versus phase in degrees. Pushbutton selection of meter function range.

#### Amplitude

**Range:**  $\pm 30$ ,  $\pm 10$ , and  $\pm 3$  dB full scale.

**Accuracy:**  $\pm 3\%$  of end scale.

**Log output:** 50 millivolts per dB up to 60 dB total.

#### Phase

**Range:**  $\pm 180$ ,  $\pm 60$ ,  $\pm 6$  degrees full scale.

**Accuracy:**  $\pm 2\%$  of end scale.

**Output:** 10 millivolts per degree.

**Phase offset:**  $\pm 180$  degrees in 10-degree steps.

**Accuracy:**  $\pm 0.2^\circ + 0.3^\circ/10^\circ$  step, cumulative  $< 2^\circ$ .

**Power:** additional 15 watts supplied by 8410B.

**Weight:** net, 4.9 kg (11 lb). Shipping, 6.7 kg (15 lb).

**Size:** 152 H  $\times$  186 W  $\times$  395 mm D ( $6$ "  $\times$   $7\frac{9}{32}$ "  $\times$   $15\frac{9}{16}$ ").

### 8414A Polar Display

**Function:** plug-in CRT display unit for 8410B. Displays amplitude and phase data in polar coordinates on 5-in. cathode ray tube.

**Range:** normalized polar coordinate display; magnitude calibrated 20% of full scale per division. Scale factor is a function of IF on 8410B. Phase calibrated in 10-degree increments over 360° range.

**Accuracy:** error circle on CRT  $\pm 3$  mm.

**Power:** additional 35 watts supplied by 8410B.

**Weight:** net, 5.8 kg (13 lb). Shipping, 8.1 kg (18 lb).

**Size:** 152 H  $\times$  186 W  $\times$  395 mm D ( $6$ "  $\times$   $7\frac{9}{32}$ "  $\times$   $15\frac{9}{16}$ ") excluding front panel knobs.

### 8418A Auxiliary Power Supply

**Function:** the 8418A power supply unit provides power for operating the 8412A, 8413A or the 8414A display units. Used in conjunction with the 8410B Network Analyzer, it provides the capability of viewing amplitude and phase readout in both rectangular and polar coordinates simultaneously. Option H01 adds a remotely programmable 0-70 dB IF attenuator required for autoranging in automatic applications.

**Weight:** net, 11.2 kg (25 lb). Shipping, 19.7 kg (44 lb).

**Size:** 177 H  $\times$  483 W  $\times$  450 mm D ( $6\frac{31}{32}$ "  $\times$  19"  $\times$   $17\frac{1}{4}$ ").

### Ordering information

**8410B mainframe**

**Opt 908:** Rack Flange Kit

**8411A Frequency Converter**

**Opt 018:** 0.11 to 18 GHz

**8412A Phase-Magnitude Display**

**8413A Phase-Gain Display**

**8414A Polar Display**

**8418A Auxiliary Power Supply**

**Opt H01:** Programmable 0-70 dB IF Attenuator

**8750A Storage-Normalizer**