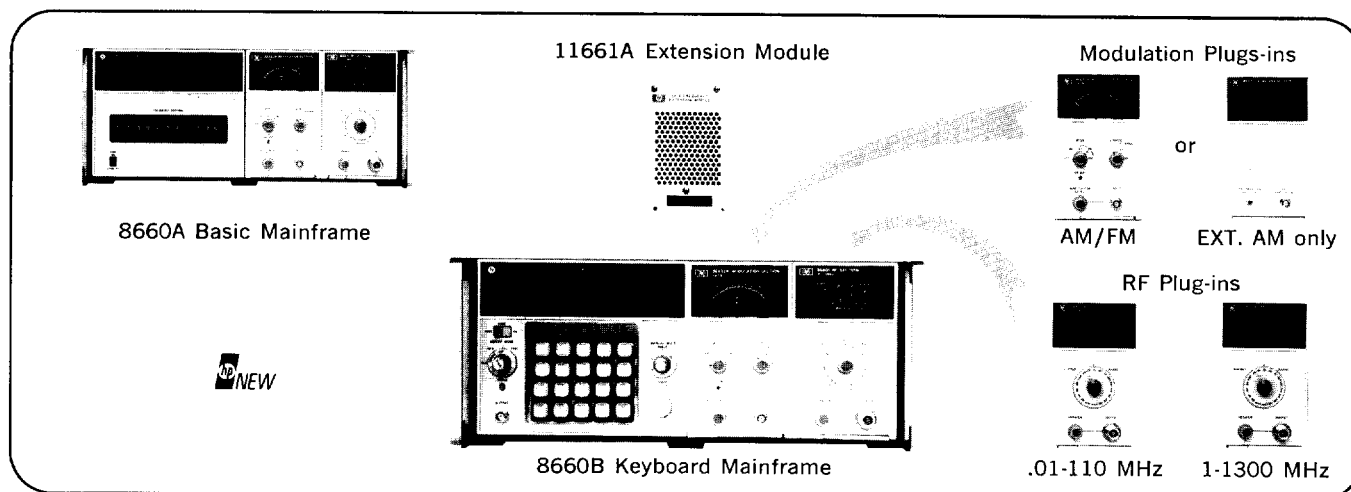


SIGNAL GENERATORS**SYNTHESIZED SIGNAL GENERATORS**

Programmable, 10 kHz to 1300 MHz

Models 8660A, 8660B

**Features**

- 1 Hz frequency resolution
- 80 dB spurious
- 3×10^{-8} /day stability
- Plug-in RF and modulation sections
- Completely TTL programmable

Applications

- Programmable RF source for automatic systems
- Precision receiver testing
- L.O. in high stability communication systems
- Laboratory frequency standard
- Swept testing of narrowband devices

The 8660A/B family is a modular plug-in system. Each complete system includes: 1) an all solid-state synthesized signal generator mainframe, 2) at least one RF section plug-in, and 3) either a modulation section or the 86631A Auxiliary Section Plug-in.

Mainframes

There are two different synthesized signal generator mainframes to choose from. Both feature complete TTL programming of frequency, output level, and modulation. Both mainframes can also be operated either from the internal 10 MHz crystal reference oscillator or an external frequency standard at 1 MHz, 2 MHz, 5 MHz, or 10 MHz.

The 8660A Mainframe uses front panel thumbwheel switches to select CW output frequency with a resolution of 1 Hz. An optional version of the mainframe with 100 Hz resolution is also available. With the 86601A Option 001 RF Section and 86631A Auxiliary Section plug-ins installed, the 8660A is an ideal programmable RF source for automatic systems. With the standard 86601A RF Section and the 86632A AM/FM Modulation Section installed, the 8660A becomes a complete Synthesized Signal Generator.

The 8660B keyboard mainframe combines all the capability of the 8660A with a keyboard control panel. Added capabilities of the 8660B include digital sweep, frequency stepping, synthesized search, and a ten digit numerical LED display.

Swept testing of very narrowband devices such as crystal filters is made possible by the 8660B's digital sweeping capability. The selected sweep width is divided into either 100 or 1000 discrete steps depending on the sweep speed selected, and

the RF output is synthesized at each step. The result is a very linear sweep with extremely low residual FM.

For receiver testing and similar applications which require frequency to be changed in uniform increments, a frequency stepping capability is provided on the 8660B. For example, if a receiver with 50 kHz channel spacing is being tested, 50 kHz can be entered on the keyboard. Then the step \uparrow or step \downarrow buttons will step the frequency to the next higher channel or lower channel respectively.

A unique synthesized search provides the dial tuning convenience of a signal generator while maintaining synthesizer signal quality. As the dial is rotated, the output frequency is tuned up or down in discrete synthesized steps which may be chosen as small as 1 Hz. When the 8660B is used as a local oscillator in a manual communication receiver, the synthesized search dial is very helpful in quickly locating unknown signals while maintaining the full-spectral purity of the synthesizer.

The ten-digit LED readout provides a continuous display of the selected CW or center frequency, with momentary contact pushbuttons to display sweep width, frequency step size, or a partially entered new command.

Plug-in RF sections

Two RF sections are presently available for 8660 Mainframes. The 86601A covers the 10 kHz to 110 MHz frequency range, and the 86602A used in conjunction with the 11661A Frequency Extension Module covers 1 MHz to 1300 MHz. Both RF sections have 1 Hz frequency resolution and 159 dB calibrated attenuators. In the remote mode, the output level can be programmed in 1 dB steps from +13 dBm to -146 dBm (1 V to .01 μ V).

Plug-in modulation sections

The 86632A Modulation Section provides AM and FM modulation capability. Internal modulation is provided at 400 Hz and 1 kHz. A switch selects ac or dc coupling of external modulation inputs. A modulation meter indicates AM percent or FM peak deviation. The 86632A is completely programmable through the 8660 Mainframe.

An 86631A Auxiliary Section must be installed in the mainframe if the AM/FM modulation section is not installed. The auxiliary section provides necessary interconnections for mainframe operation and provides external amplitude modulation capability. The 86631A is not programmable.

8660A/B Partial Specifications

(Refer to Technical Data Sheet for complete specifications)

8660A/B Synthesized Signal Generator Mainframes

Frequency accuracy and stability: CW frequency accuracy and long term stability are determined by reference oscillator in 8660A/B Mainframe ($3 \times 10^{-8}/24$ hours) or by external reference if used.

Reference oscillator

Internal: 10 MHz quartz oscillator. Aging rate less than ± 3 parts in 10^8 per 24 hours after 72-hour warmup. (± 3 parts in 10^9 per 24 hours optional, Option 001).

External: rear panel switch allows operation from any 1 MHz, 2 MHz, 2.5 MHz, 5 MHz, or 10 MHz signal at a level between 0.2 V and 2.0 V rms into 170 ohms.

Reference output: rear panel BNC connector provides output of reference signal selected at a level of at least 0.5 V rms into 170 ohms.

Remote programming

Functions

8660A: all front panel frequency, output level, and modulation functions are programmable.

8660B: CW frequency, frequency stepping (STEP \uparrow , STEP \downarrow), output level, and modulation are programmable.

Switching time: less than 5 ms to be within 100 Hz of any new frequency selected. Less than 100 ms to be within 5 Hz of any new frequency selected.

Maximum stepping rate: 1 ms per step.

Programming input

Connector type: 36-pin Cinch Type 57 (mating connector supplied).

Logic: TTL compatible (negative true).

General

Operating temperature range: 0° to $+55^\circ\text{C}$.

Power: 115 or 230 V $\pm 10\%$, 50 to 60 Hz; approx 200 W.

Size: 16 $\frac{3}{4}$ " wide, 7" high, 21 $\frac{1}{2}$ " deep (426 x 178 x 547 mm).

Weight: net, 48 lbs (21,6 kg); shipping, 58 lbs (26,1 kg).

Price: Model 8660A, \$4900; Model 8660B, \$6000.

Options for 8660A and 8660B

Option 001: $\pm 3 \times 10^{-9}/24$ hrs; internal reference oscillator; add, \$300.

Option 002: no internal reference oscillator; less, \$350.

Option 003: operation from 50 to 400 Hz line; add, \$50.

Option 004: 100 Hz frequency resolution; less, \$500.

Option 009 (8660A only): LED Display indicates selected frequency in 1-2-4-8 BCD code; price: add, \$200.

86601A RF Section

Frequency range: 0.01 to 110 MHz; selectable in 1 Hz steps.

Output level: continuously calibrated from +13 to -146 dBm into 50 ohms; programmable in 1 dB steps.

Harmonics: < -40 dB.

Spurious: < -80 dB.

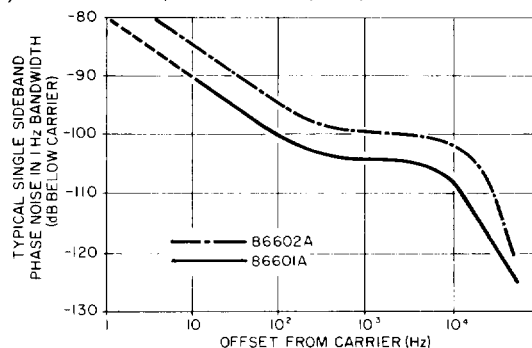
Amplitude modulation: (with 86631A or 86632A) 0 to 95%; maximum rate, 50 kHz at output frequencies above 4 MHz.

Frequency modulation: (with 86632A) maximum rate, 1 MHz; maximum deviation, 1 MHz.

Weight: net, 11 lbs (5 kg); shipping, 15 lbs (6,8 kg).

Price: Model 86601A, \$1975.

Options: Option 001: no RF output attenuator; output level adjustable from +13 to 0 dBm; less, \$600.



Typical Phase Noise Curves for 86601A and 86602A

86602A RF Section

Frequency range: 1 to 1300 MHz; selectable in 1 Hz steps.

Output level: continuously calibrated from +13 to -146 dBm into 50 ohms; programmable in 1 dB steps.

Harmonics: < -25 dB at output levels below +10 dBm.

Spurious

Non-line related: below 600 MHz -80 dB; above 600 MHz -80 dB within 45 MHz of carrier, -55 dB > 45 MHz from carrier.

Line related: -70 dB.

Amplitude modulation: (with 86631A or 86632A) 0 to 95% maximum rate, 50 kHz.

Frequency modulation: (with 86632A) maximum rate, 300 kHz; maximum deviation, 300 kHz.

Weight: net, approx 8 lbs (3,6 kg); shipping, 12 lbs (5,4 kg).

Options: same as 86601A.

Price: Model 86602A, \$2500.

11661A Extension Module

Must be installed in 8660A/B Mainframe to enable operation of 86602A RF Section.

Weight: net, approx 4 lbs (1,8 kg); shipping, 8 lbs (3,6 kg).

Price: Model 11661A, \$2000.

86632A Modulation Section

Provides AM/FM capability as described above when used with 86601A or 86602A RF Section. Includes modulation meter and 400 Hz and 1 kHz internal oscillators; completely programmable.

Weight: net, 7 lbs (3,2 kg); shipping, 11 lbs (5 kg).

Price: Model 86632A, \$900.

86631A Auxiliary Section

The 86631A Auxiliary Section must be installed in an 8660A or 8660B Mainframe in place of the modulation section if a modulation section is not used. A jack is provided on the front panel to allow external AM through the 86631A as described above.

Weight: net, 2 lbs (0,9 kg); shipping, 6 lbs (2,8 kg).

Price: Model 86631A, \$90.