

SYNTHESIZED SIGNAL GENERATOR

6060A

NEW



6060A

6060A Synthesized Signal Generator

- 100 kHz to 1050 MHz, 10 Hz resolution
- -137 to +13 dBm output, 0.1 dB resolution
- AM and FM, internal and external
- Non-harmonic spurious products less than -60 dBc and harmonics less than -30 dBc
- Built-in diagnostics and error code display
- IEEE-488
- Reverse power protection (optional)
- Non-volatile memory
- Relative frequency and amplitude modes

Low Cost, High Performance

The Fluke 6060A is a fully programmable, synthesized signal generator covering 0.1 to 1050 MHz. It is designed for applications which require good modulation, frequency, and output level performance with moderate spectral purity for a low price. The 6060A is well suited for testing a wide variety of RF receivers (particularly in-band), and RF devices, such as filters, amplifiers, and mixers.

Performance Summary

The 6060A has the capabilities needed for in-band RF testing. Output frequencies from 100 kHz to 1050 MHz are selectable with 10 Hz resolution. Non-harmonic spurious products are less than -60 dBc and harmonics less than -30 dBc across the entire frequency range. Levels, adjustable from -137 dBm to +13 dBm, can be selected with 0.1 dB resolution.

Amplitude and frequency modulation is standard. Simultaneous internal and external modulation is also standard. A special low-rate, ac-coupled external FM capability can be ordered as a special option.

IEEE-488 Compatible Interface Option

All 6060A functions are accessible via the optional IEEE-488 interface option. The 6060A can process a command string, update the signal output accordingly, and settle in less than 100 ms. A "talk-only" feature is provided as well.

Using the IEEE-488 interface, multiple 6060As can be set to track one another in amplitude, frequency, or modulation in a master/slave configuration. As the front panel step-up or step-down key is pressed on the master instrument, the other 6060As will follow. This process streamlines frequency tracking applications such as mixer testing, and amplitude tracking applications like two-tone intermodulation tests.

Operational Features

A built-in microprocessor handles all the operational functions, whether from the front panel or the IEEE-488 interface. These functions include:

- **Keyboard Parameter Entry and Fluke Bright-digit Editing.**
- **Increment Step Function**, to allow an operator to vary frequency, amplitude, or modulation in specific increments.
- **Memory Store and Recall**, for seven complete front panel set-ups (50 set-ups with the non-volatile memory option).
- **Relative Amplitude** allows compensation for cable losses in test set-ups.
- **Relative Frequency** speeds testing of frequencies relative to a reference, during filter testing or receiver selectivity measurements.

Self-Test Capability

Built-in diagnostics and error code displays provide immediate feedback of incorrect operation. Also, the 6060A performs a series of internal digital and analog tests at power-up and isolates problem areas immediately via a coded display on the front panel. These internal checks may be accessed and initiated at any time from the front panel. Special service and troubleshooting test routines are contained within the unit to aid in calibration and maintenance.

Options Summary

Along with the IEEE-488 option, there are several other options to choose from to help tailor the 6060A to fit unique application requirements. The 6060A has a reverse power protection option (Option 870) rated at 50 watts and 50V dc; a high stability reference (Option 130) with $\pm 5 \times 10^{-10}$ /day aging rate; a non-volatile memory option (Option 570) to store up to 50 separate front panel settings; a rear only RF output option (Option 830); and a sub-harmonic reference option (Option 131).

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Specifications

Frequency

Frequency Range: 0.1 to 1050 MHz. Output frequency is displayed on an 8½-digit display

Frequency Resolution: 10 Hz

Switching Speed: <100 msec typical (within ±100 Hz of selected value)

Frequency Accuracy: Referenced to internal free-air 10 MHz crystal oscillator, <±0.5 ppm/month; <±5 ppm for 25°C ±25°C (see also Option 130). Internal 10 MHz reference TTL signal available at rear panel (see also Option 131)

Amplitude

Amplitude Range: -137 to +13 dBm (+13 dBm peak on AM), with overrange to -147 and +19 dBm, displayed on a 3½-digit display. Fixed-range output, selected by special function, allows more than 12 dB of vernier without attenuator switching

Amplitude Resolution: 0.1 dB. Annunciators for dB, dBm, V, mV, and μV provided on the display

Switching Speed: <100 msec typical (within 0.1 dB of selected value)

Amplitude Accuracy: ±1.5 dB 0.4-1050 MHz

Output Impedance: 50 ohms, nominal

Output SWR: <2.0; <1.5 below 1 dBm ≥400 kHz

Spectral Purity

Spurious: <-60 dBc for offsets greater than 10 kHz

Harmonics: <-30 dBc

Residual FM (0.3 to 3 kHz band): <13 Hz rms from 245 to 512 MHz; <27 Hz rms elsewhere

Residual FM (0.05 to 15 kHz band): <30 Hz rms from 245 to 512 MHz; <60 Hz rms elsewhere

Residual AM: <0.1% rms (-60 dBc) in 0.05 to 15 kHz band

Amplitude Modulation

Depth Range: 0 to 99%, with 1% resolution (displayed on 2-digit front panel display)

Accuracy: ±(2% + 4% of setting), for 0.1 to 3 kHz rates, depths to 90%, and peak amplitude of +13 dBm

Distortion: <2% THD, to 30% AM; <3% THD, to 70% AM; <5% THD, to 90% AM

Bandwidth: 20 Hz to 30 kHz, 3 dB

Incidental FM: <0.3 fm for internal rates and 30% AM

Frequency Modulation

Deviation Ranges: 100 to 999 Hz; 1 to 9.99 kHz; and 10 to 99.9 kHz (displayed on 2-digit front panel display)

Maximum Deviation: Lesser of 99.9 kHz and $2f_{mf0}$ above 245 MHz, or $2f_m(f_0+800)$ below 245 MHz, where f_0 is in MHz and f_m in kHz (f_0^{-100})/3 kHz below 0.4 MHz [f_0 in kHz]

Accuracy: ±7% for rates of 0.3 to 20 kHz (0.3 to 1 kHz for $f_0 < 0.4$ MHz)

Distortion: <1% THD for rates of 0.3 to 20 kHz (0.3 to 1 kHz for $f_0 < 0.4$ MHz) and >100 Hz deviation

Bandwidth: 0.02 to 100 kHz, 3 dB unspecified for $f_0 < 0.4$ MHz

Incidental AM: <1% AM at 1 kHz rate

Modulation Source

Internal: 400 Hz and 1 kHz, ±3% for 20°C to 30°C (add ±0.1%/°C outside this range). Selectable from the front panel

External: 1 volt peak input (MOD IN BNC) provides indicated modulation index. Input impedance = 600 ohms, nominal

Modes: INTAM; INTFM; EXTAM; EXTFM; INTAM and FM; EXTAM and FM; and INT(AM and/or FM) and EXT(AM and/or FM), in all nine combinations. Input impedance = 560 ohms, nominal, when EXTAM and FM are both enabled

Option Specifications

All options are factory installable, only.

High Stability Reference Option (-130)

Aging Rate: <±5 x 10⁻¹⁰/day, after 21 days

Temperature Stability: <±2 x 10⁻¹⁰/°C. Oven remains powered during standby

Installation: Mounts inside rear panel; includes auxiliary power supply

Sub-Harmonic Reference Option (-131)

Input: 1, 2, 2.5, 5, and 10 MHz, 0.3 to 4V p-p, sine or squarewave into 50 ohms (nominal)

Input Connector: Additional BNC on rear panel, labeled REFIN (10 MHz IN/OUT is relabeled 10 MHz OUT)

IEEE-488 Compatible Interface Option (-488)

Functions: All front panel controls except the power switch are programmable via the IEEE-488 interface. Instrument status is also available remotely. Store/recall memory may be accessed via an external controller. The memory data can be reloaded into the 6060A without modification. In the "talk-only" mode, the appropriate commands are output to control another 6060A, 6070A, or 6071A when the front panel step-up or step-down keys are pressed or activated. The 6070A and 6071A only have Frequency Step control.

The 6060A supports the following IEEE-488 functions SH1, AH1, T5, L3, SR1, RL1, PP0, DC1, DT1, C0, E2

Non-Volatile Memory Option (-570)

Description: Up to 50 front panel control settings can be retained for 2 years. Battery power is used when the 6060A is in standby or the power cord is not attached.

Reverse Power Protection Option (-870)

Protection Level: Up to 50 watts from a 50 ohm source or 50V dc, from 0.1 to 1050 MHz (dc blocking capacitor at output)

Trip/Reset: Flashing RFOFF annunciator indicates a tripped condition. Pushing RFON/OFF button on front panel will reset the output. Protection is not provided when the instrument is in off

Rear RF Output and MOD Input Option (-830)

Description: Moves front panel RF OUTPUT and MOD INPUT connectors to the rear panel

Low-Rate AC-Coupled External FM Option (-651)

Maximum Deviation: 10 kHz

Droop: 15% typical on a 10 Hz squarewave

Bandwidth: 0.5 Hz to 100 kHz, 3 dB, typically

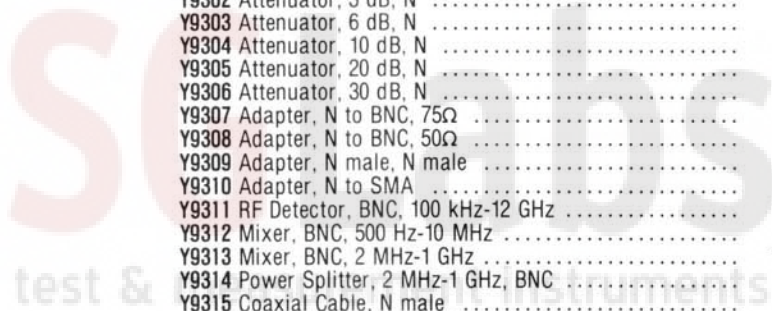


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General Specifications

Temperature: 0 to 50°C, operating; -40 to 75°C, non-operating
Humidity: 0 to 95% RH to 30°C; 0 to 75% RH to 50°C, operating
Altitude: 3,050m (10,000 feet), operating
Shock and Vibration: Per MIL-T-28800C, except spectral purity may be degraded; 5 to 15 Hz at 0.06 in; 15 to 25 Hz at 0.04 in; and 25 to 55 Hz at 0.02 in
EMI: Radiated emissions induce $3 \mu V$ into a 1 inch diameter, 2 turn loop, 1 inch from any surface as measured into a 50 ohm receiver. Also compliance with the following standards:
 CE03, MIL STD 461B Power and interconnecting leads, 0.015 to 50 MHz;
 RE02, MIL STD 461B 14 kHz to 10 GHz, method RE02-1 and RE02-2 of MIL STD 462;
 RS03, MIL STD 461B 14 kHz to 10 GHz, at 1 volt/meter;
 FCC Part 15 (j), Class A;
 (Designed to meet VDR 0871 Class B)
Power: 100V, 120V, 200V, 240V ac $\pm 10\%$, 47 to 63 Hz, <math><180 VA</math>; <math><15 VA</math> standby with Option 130
Size: 50.8 cm L x 43.1 cm W x 13.3 cm H (20 in L x 17 in W x 5¼ in H)
Weight: <math><15.9 kg</math> (35 lb)



Model

January 1985 prices

6060A Signal Generator \$4500

Options

6060A-130 High Stability Reference 850
6060A-131 Sub-Harmonic Reference 250
6060A-488 IEE-488 Interface 300
6060A-570 Non-Volatile Memory 400
6060A-651 Low Rate Run 300
6060A-830 Rear Output and Modulation Input 100
6060A-870 Reverse Power Protection 200

Accessories (Also see page 230)

Y6001 Rack Mount Kit, includes 24" slides 260
Y9100 Attenuator, 50 Ohm, 6 dB, BNC 50
Y9101 Attenuator, 50 Ohm, 14 dB, BNC 50
Y9102 Attenuator, 50 Ohm, 20 dB, BNC 50
Y9103 50 Ohm Feedthru Termination, BNC 30
Y9111 3 ft (0.91m) 50Ω Cable, BNC 15
Y9112 6 ft (1.83m) 50Ω Cable, BNC 15
Y9300 Directional Coupler, BNC 210
Y9301 Min-Loss Pad, 50Ω to 75Ω 260
Y9302 Attenuator, 3 dB, N 85
Y9303 Attenuator, 6 dB, N 90
Y9304 Attenuator, 10 dB, N 90
Y9305 Attenuator, 20 dB, N 90
Y9306 Attenuator, 30 dB, N 90
Y9307 Adapter, N to BNC, 75Ω 15
Y9308 Adapter, N to BNC, 50Ω 15
Y9309 Adapter, N male, N male 15
Y9310 Adapter, N to SMA 40
Y9311 RF Detector, BNC, 100 kHz-12 GHz 135
Y9312 Mixer, BNC, 500 Hz-10 MHz 95
Y9313 Mixer, BNC, 2 MHz-1 GHz 130
Y9314 Power Splitter, 2 MHz-1 GHz, BNC 90
Y9315 Coaxial Cable, N male 60
Y9316 Cap, Non-shorting, BNC 5
Y9317 50Ω Termination, N 90

After-Warranty Service (See page 227)

SC1-6060A, per 90-day interval 756

FOR LEASE
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