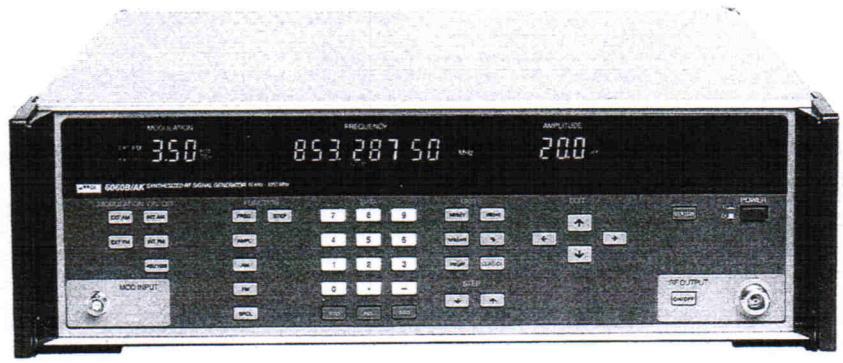
Synthesized RF Signal Generators

6060B/AK

GPIB IEEE-488



6060B/AK

6060B/AK Pager & Communications Testing Signal Generator

- 10 kHz to 1050 MHz
- ±1 dB Absolute Level Accuracy from +13 dBm to -127 dBm
- Residual FM <8 Hz at 500 MHz
- RFI leakage <0.5 microvolts
- Compatible with digital paging codes
- 50 location non-volatile memory

The 6060B/AK is a special-purpose version of the 6060B, that has improved noise characteristics and enhanced Frequency Modulation capabilities. It is designed for radio communications testing; in particular, applications in which digital signaling using FSK is used in addition to voice.

This enhanced modulation characteristic of the 6060B/AK enables it to work well with digital squelch and digital paging systems. It will accommodate very low rate paging codes including Motorola, Golay-Sequential Code (GSC) NEC, NTT and British-Post-Office-Code-Standardization-Advisory-Group (POCSAG).

Specifications

Technical Specifications

Frequency

Frequency Range: 10 kHz to 1050 MHz. Output frequency is displayed on an 8-digit display
Frequency Resolution: 10 Hz
Switching Speed: <100 ms 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 Options -130 and -132). Internal 10 MHz reference sinewave output signal available at rear panel

Reference Output

Frequency: 10 MHz, sinewave
Level: 0 dBm min into 50 ohms
Source Impedance: 50 ohms nominal

External Reference

Input Frequency: 1, 2, 2.5, 5, 10 MHz
Input Level: .3 to 4V pk-pk, sinewave or squarewave
Input Impedance: 50 ohms nominal

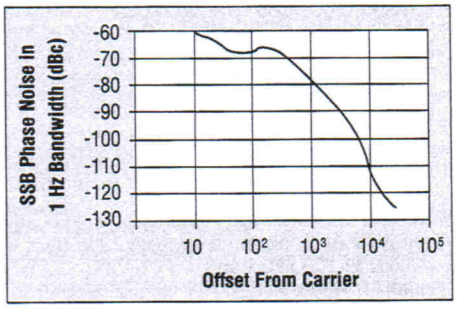
Amplitude

Amplitude Range: -127 to +13 dBm (+13 dBm peak on AM), with overrange to -147 and +19 dBm, displayed on a 3-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: ±1.0 dB 0.4-1050 MHz (20°C ±5°C)
Output Impedance: 50 ohms, nominal
Output SWR: <2.0; <1.5 below 1 dBm 2400 kHz
RF Leakage: <0.5 µV at carrier frequency

Spectral Purity

Spurious: <-60 dBc for offsets greater than 10 kHz, (-55 dBc <100 kHz)
Harmonics: <-30 dBc (-26 dBc <100 kHz)
Residual FM (0.3 to 3 kHz band): <8 Hz rms from 245 to 512 MHz; <16 Hz rms elsewhere
Residual FM (0.05 to 15 kHz band): <12 Hz rms from 245 to 512 MHz; <24 Hz rms elsewhere
Residual AM: 0.1% rms (-60 dBc) in 0.05 to 15 kHz band (-55 dBc <100 kHz)

Typical SSB Phase Noise @ 500 MHz (with internal reference)



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: <1.5% THD, to 30% AM; <3% THD, to 70% AM; <5% THD, to 90% AM for <950 MHz and levels <+8.0 dBm
Bandwidth: 20 Hz to 30 kHz, 3 dB
Incidental FM: <0.3 f_m 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 $2f_m f_0$ 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: (3 dB) 0.5 Hz-100 kHz for <400 kHz carrier frequency
Droop: 15% on a 10 Hz squarewave
Incidental AM: <1% AM at 1 kHz rate and deviation of 50 kHz

**The terms GPIB and IEEE-488 may be used interchangeably throughout this catalog.*

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; IN TAM 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
Recommended Digital Interface: Encoder output should idle at 0V, and swing ±1 volt when paging

Sub-Harmonic External Reference

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

Non-Volatile Memory

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

Reverse Power Protection

Protection Level: Up to 50 watts from a 50 ohm source or 50V dc, from 10 kHz 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.

Option Specifications

All options are factory installable only.

High Stability Reference Option (-130)
Aging Rate: $<\pm 5 \times 10^{-10}$/day, after 21 days
Temperature Stability: $<\pm 2 \times 10^{-10}$/°C. Oven remains powered during standby
Installation: Mounts inside rear panel; includes auxiliary power supply

Mid Stability Reference Option (-132)
Aging Rate: $\pm 5 \times 10^{-7}$/mo, after 21 days
Temperature Stability: $\pm 1 \times 10^{-7}$ (0° to 50°C)

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

Rear RF Output and MOD Input Option (-830)
Description: Moves front panel RF OUTPUT and MOD INPUT connectors to the rear panel

General Specifications

Temperature: 0 to 50°C, operating; -40 to 75°C, non-operating
Humidity: 1 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 <0.5 µV at output frequency 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; FCC Part 15 (j), Class A;
Power: 100V, 120V, 200V, 240V ac ±10%, 47 to 63 Hz, <180 VA; <15 VA standby with Option -130
Size: 55.3 cm L x 43 cm W x 13.3 cm H (21.8 in L x 17 in W x 5 in H)
Weight: <15.9 kg (35 lb)

Included with Instrument: Manual, power cord, serialized and dated calibration certificate

Ordering Information

Model

January 1990 prices

6060B/AK Signal Generator	$5750

Options

-130 High Stability Reference	$1250
-132 Mid Stability Reference	400
-488 IEEE Interface	395
-488K IEEE-488 Interface	415
-830 Rear Output and Modulation Input	125

See option compatibility chart at the beginning of this section.

Accessories (Also see Section 17)

Y6001 Rackmount Kit, w/24" slides	$ 295
Y9100 Attenuator, 50Ω, 6 dB, BNC	55
Y9101 Attenuator, 50Ω, 14 dB, BNC	55
Y9102 Attenuator, 50Ω, 20 dB, BNC	55
Y9103 50Ω Feedthru Termination, BNC	35
Y9111 50Ω Cable, BNC, 3 ft (0.91m)	20
Y9112 50Ω Cable, BNC, 6 ft (1.83m)	20
Y9301 Min-Loss Pad, 50Ω to 75Ω	75
Y9307 Adapter, N to BNC, 75Ω	25
Y9308 Adapter, N to BNC, 50Ω	20
Y9315 Coaxial Cable, N male to N male, 6 ft	75
Y9316 Cap, Non-shorting, BNC	10
Y9317 50Ω Termination, N	95