

Table 1-1. Signal Generator Specifications

Warranted performance, 20 minutes after turn-on within operating temperature range.

**FREQUENCY (8 1/2-Digit Display)**

RANGE ..... 0.01 MHz to 1050.0 MHz in 3 bands:  
 0.01 MHz to 244.99999 MHz,  
 245 MHz to 511.99999 MHz,  
 512 MHz to 1050 MHz.

RESOLUTION ..... 10 Hz.

ACCURACY ..... Same as reference (See REFERENCE).

REFERENCE (Internal) ..... The unit operates on an internal free-air 10-MHz crystal oscillator, aging  $< \pm 0.5$  ppm/month and  $< \pm 5$  ppm for  $25^{\circ}\text{C}$ ,  $\pm 25^{\circ}\text{C}$ . Internal reference signal (10 MHz) available at rear connector, level  $> 0$  dBm, terminated in 50 ohms.

REFERENCE (External) ..... Accepts 1, 2, 2.5, 5, or 10-MHz signal. Level of 0.3V to 4.0V p-p into 50 ohm termination.

**AMPLITUDE (3 1/2-Digit Display)**

RANGE (Indicated) ..... +13 (+13 peak on AM) to -127 dBm; (Autoranging 6-dB step attenuator).

RESOLUTION ..... 0.1 dB ( $< 1\%$  or 1 nV in volts).

ACCURACY .....  $\pm 1.0$  dB ( $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ) at and above 0.4 MHz; below 0.4 MHz  $\pm 2$  dB at or above -100 dBm and  $\pm 3$  dB below -100 dBm.

SOURCE SWR .....  $< 1.5$  below 1 dBm and at or above 0.4 MHz;  $< 2.0$  elsewhere.

**SPECTRAL PURITY (CW ONLY)**

SPURIOUS .....  $< -60$  dBc for offsets greater than 10 kHz. Fixed frequency spurs are  $< -60$  dBc or  $< -140$  dBm whichever is larger.  $< -55$  dBc for frequencies  $< 100$  kHz.

NOTE

"dBc" refers to decibels relative to the carrier frequency, or in this case, relative to the signal level.

HARMONICS .....  $< -30$  dBc from 0.1 MHz to 1050 MHz.  
 $< -26$  dBc from 0.01 MHz to 0.1 MHz.

# INTRODUCTION AND SPECIFICATIONS

**Table 1-1. Signal Generator Specifications (cont)**

RESIDUAL FM (rms in 0.3-kHz to 3-kHz Band) .....	<10 Hz for 245 MHz to 512 MHz; <20 Hz elsewhere (20°C ±5°C).
RESIDUAL FM (rms in 0.05-kHz to 15-kHz Band) .....	<22 Hz for 245 MHz to 512 MHz; <44 Hz elsewhere (20°C ±5°C).
RESIDUAL AM (in 0.05-kHz to 15-kHz Band) .....	<-60 dBc.
<b>AMPLITUDE MODULATION (2-Digit Display)</b>	
DEPTH RANGE .....	0% to 99%.
RESOLUTION .....	1%.
ACCURACY .....	±(2% + 4% of setting) for internal rates, for depths 90% or less and peak amplitude of +13 dBm or less.
DISTORTION .....	<1.5% total harmonic distortion (THD) to 30% AM, <3% to 70% AM, <5% to 90% AM at internal rates, except for frequency >950 MHz and carrier power >+8 dBm, where specified performance is <3% THD to 70% AM, <5% THD to 90% AM.
BANDWIDTH (3 dB) .....	20 Hz to 30 kHz.
INCIDENTAL FM .....	<0.3f <sub>m</sub> for internal rates and 30% AM.
<b>FREQUENCY MODULATION (3-Digit Display)</b>	
DEVIATION RANGES .....	100 Hz to 999 Hz, 1 kHz to 9.99 kHz, and 10 kHz to 99.9 kHz.
MAXIMUM DEVIATION .....	Lesser of 99.9 kHz and 2f <sub>m</sub> above 245 MHz, or 2f <sub>m</sub> (f <sub>o</sub> +800) below 245 MHz, where f <sub>m</sub> is in MHz; (f <sub>o</sub> -100)/3 kHz, below 0.4 MHz (f <sub>o</sub> in kHz).
RESOLUTION .....	3 digits.
ACCURACY .....	±7% for rates of 0.3 kHz to 20 kHz (0.3 to 1 kHz for f <sub>o</sub> <0.4 MHz) and >100-Hz deviation.
DISTORTION .....	<1% THD for rates of 0.3 kHz to 20 kHz (0.3 to 1 kHz for f <sub>o</sub> <0.4 MHz) and >100-Hz deviation.
BANDWIDTH (3dB) .....	0.02 kHz to 100 kHz; unspecified for f <sub>o</sub> <0.4 MHz.
INCIDENTAL AM .....	<1% AM at 1-kHz rate, for the maximum deviation or 50 kHz, whichever is less.

Table 1-1. Signal Generator Specifications (cont)

MODULATION SOURCE			
INTERNAL .....	0.4 kHz or 1 kHz, $\pm 3\%$ for 20°C to 30°C; add $\pm 0.1\%/^{\circ}\text{C}$ outside this range.		
EXTERNAL .....	$\pm 5\text{V}$ max.; 1V peak provides indicated modulation index. Nominal input impedance is 600 ohms.		
MODES .....	Any combination of internal AM, internal FM, external AM, and external FM. Modulation may also be disabled. The nominal input impedance with both external AM and external FM enabled is 560 ohms.		
GENERAL			
TEMPERATURE			
Operating .....	0°C to 50°C (32°F to 122°F).		
Non-Operating .....	-40°C to 75°C (-40°F to 167°F).		
HUMIDITY RANGE			
Operating .....	95% to 30°C, 75% to 40°C, 45% to 50°C.		
ALTITUDE			
Operating .....	Up to 10,000 ft.		
VIBRATION			
Non-Operating .....	5 Hz to 15 Hz at 0.06 inch, 15 Hz to 25 Hz at 0.04 inch, and 25 Hz to 55 Hz at 0.02 inch, double amplitude (DA).		
SHOCK			
Non-Operating .....	Bench handling per MIL T 28800C Class 5, Style E.		
ELECTROMAGNETIC COMPATIBILITY .....			
	The radiated emissions induce $< 3\ \mu\text{V}$ ( $< 1\ \mu\text{V}$ of the Generator's output signal) into a 1-inch diameter, 2-turn loop, 1-inch from any surface as measured into a 50-ohm receiver.		
Also complies with the following standards:			
	CE03 of MIL-STD-461B (Power and interconnecting leads), 0.015 MHz to 50 MHz.		
	RE02 of MIL-STD-461B (14 kHz to 10 GHz).		
	FCC Part 15 (j), class A.		
	CISPR 11.		
SIZE .....	Width	Height	Depth
	43 cm	13.3 cm	50.8 cm
	17 in	5.25 in	20 in

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Table 1-1. Signal Generator Specifications (cont)

POWER .....	100, 120, 220, 240V ac $\pm 10\%$ , 47 to 63 Hz, <180 VA (<15 VA, with Option -130 installed, and the Generator turned off (standby)).
WEIGHT .....	<15.7 kg (35 lbs).
NON-VOLATILE MEMORY	
50 instrument states are retained for 2 years (typically), even without ac line power applied.	
REVERSE POWER PROTECTION	
PROTECTION LEVEL .....	Up to 50 watts from a 50-ohm source, 0.01 MHz to 1050 MHz. Withstands up to 50V dc. Protection is not provided when the Generator is off.
6060B OPTION -130 HIGH STABILITY REFERENCE	
AGING RATE .....	< $\pm 5 \times 10^{-10}$ /day, after 21 days continuous operation.
TEMPERATURE STABILITY .....	< $\pm 2 \times 10^{-10}/^{\circ}\text{C}$ (oven remains powered in standby).
6060B OPTION -132 MEDIUM STABILITY REFERENCE	
AGING RATE .....	< $\pm 1 \times 10^{-7}$ /month after 5 days continuous operation.
TEMPERATURE STABILITY .....	< $\pm 1 \times 10^{-7}/^{\circ}\text{C}$ (0 to 50 $^{\circ}\text{C}$ ) (no powered standby).
6060B OPTION -488 IEEE-488 INTERFACE (IEEE Std 488-1978)	
INTERFACE FUNCTIONS .....	SH1, AH1, T5, TE0, L3, LE0, SR1, RL1, PPO, DC1, DT1, CO, and E1.
6060B OPTION -651 LOW RATE EXTERNAL FM	
MAXIMUM DEVIATION .....	9.99 kHz.
DROOP .....	<15% on a 10-Hz square wave.
BANDWIDTH (3dB) .....	0.5 Hz to 100 kHz (typical).
MAX DC INPUT .....	$\pm 10$ mV.
INCIDENTAL AM .....	<1% AM at 1-kHz rate and deviation <10 kHz.
SUPPLEMENTAL CHARACTERISTICS	
The following characteristics are provided to assist in the application of the Generator and to describe the typical performance that can be expected.	
FREQUENCY SWITCHING SPEED .....	<100 ms to be within 100 Hz.

Table 1-1. Signal Generator Specifications (cont)

AMPLITUDE SWITCHING SPEED .....	<100 ms to be within 0.1 dB.
AMPLITUDE RANGE .....	Programmable to +19 dBm and -147.4 dBm, usable to +15 dBm. Fixed-range, selected by special function, allows for more than 12 dB of vernier without switching the attenuator.
NOISE (at 20-kHz offset) .....	<-113 dBc/Hz (except <-107 dBc/Hz below 245 MHz and above 512 MHz).
RESIDUAL FM (rms in 0.3 to 3 kHz)	Approximately a linear function of output frequency between the following typical band-edge values:  15 Hz at 0.1 MHz to 17 Hz at 244.99999 MHz.  6 Hz at 245 MHz to 8 Hz at 511.99999 MHz.  12 Hz at 512 MHz to 17 Hz at 1050 MHz.
EXTERNAL MODULATION .....	Annunciators indicate when a 1V peak signal is applied, $\pm 2\%$ , over a 0.02-kHz to 100-kHz band.
IEEE .....	All controls except the power switch and the internal/external reference switch are remotely programmable via IEEE-488 Interface (Std 488-1978). All status including the option complement are available remotely. The Store/Recall memory data may be transferred via an external controller. In talk-only, the appropriate commands are generated when the front panel step-up and step-down entries are made to control another 6060B, a 6060A, a 6070A, or a 6071A. (The 6070A and 6071A only have FREQUENCY STEP.)
FREQUENCY DRIFT .....	<1 ppm/hr after 1-hour warmup at constant ambient temperature using internal free-air crystal.