Model SG1200
Signal Generator
9kHz–1.2GHz

The Model SG1200 is a light weight 2U (3.5″) high signal generator with a frequency bandwidth of 9 kHz to 1.2GHz. The signal generator offers a comprehensive modulation capability and offers the convenience of control from the front panel and remote communications using either GPIB or RS-232. The signal generator has rear panel connectors for easy installation into a rack mounted system. The SG1200 provides electronic trip protection which protects the generator output against reverse power up to 50 watts.

SPECIFICATIONS

FREQUENCY
- Range ..... 9 kHz to 1.2 GHz
- Resolution ..... 1 Hz
- Phase incrementing ..... 0.09°
- Accuracy ..... See Frequency Standard

RF OUTPUT
- Range ..... Minus 140 dBm to +13 dBm
- Resolution ..... 0.1 dBm

  AM modulation-The maximum RF output level decreases linearly with increasing AM modulation to +7 dBm at 99.9% depth.
- Accuracy ..... ±0.8 dBm
- Temperature Coefficient ..... ±0.02 dB/°C
  Over range +17°C to +27°C
- Units ..... µV, mV, EMF or PD; dB relative to 1 µV, 1mV, EMF or PD; or dBm.

NOTE: Conversion between dB and linear units may be achieved by pressing the appropriate units key (dB or V, mV, µV). The output level can be normalized for 75Ω operation with an impedance converter.

ATTENUATOR HOLD ..... Minimum 10 dB adjustment while holding mechanical attenuator in the same range

VSWR
- Output levels < -5 dBm ..... VSWR < 1.3:1
- Output levels > -5 dBm ..... VSWR < 1.5:1

RF OUTPUT CONNECTOR ..... 50Ω type N connector

OUTPUT PROTECTION ..... Protected from a source of reverse power up to 50 W from 50 Ω or 25 W from a source VSWR 5:. Can be reset from front panel or GPIB/RS-232 interfaces.

SPECTRAL PURITY ..... At RF levels up to +7 dBm
- Harmonics ..... better than -30 dBc typically; minus 25 dBc typically up to +13dBm
- Non-Harmonics (for offsets >3 kHz) ..... better than minus 70dBc up to 1GHz;
  better than minus 64dBc from 1GHz to 1.2 GHz
- Residual FM (FM off) ..... < 4.5 Hz RMS deviation in a 300 Hz to 3.4 kHz unweighted bandwidth at 1GHz.
- Single Side Band (SSB) Phase Noise ..... Better than -124 dBc/Hz@20 kHz offset with Fc = 470 MHz
  Typically -121 dBc/Hz@20 kHz offset with Fc = 1 GHz
- Carrier leakage ..... <0.5µV PD at the carrier frequency in a two turn 25mm diameter loop, 25mm from the surface of the signal generator.
- ΦM on AM ..... Typically 0.1 radians at 30% depth at 470 MHz

MODULATION MODES ..... Internal and external modulation can be simultaneously enabled to allow combined amplitude and frequency (or phase) modulation.

Pulse modulation can be used in combination with the other forms of modulation from an external pulse source.

FREQUENCY MODULATION

Resolution ..... 1 Hz

Deviation .....

CW Range (MHz)	Max Deviation (kHz)
600 – 1200	6400
300 – 600	3200
150 – 300	1600
75 – 150	800
37.5 – 75	400
18.75 – 37.5	200
0.009 – 18.75	100

Accuracy@1kHz ..... ±4%

Bandwidth (1 db) ..... DC to 275 kHz (DC coupled)
10 Hz to 275 kHz (AC coupled)
20 Hz to 275 kHz (AC coupled with ALC)

Group Delay ..... < 5µS to 100 kHz

Carrier Frequency Offset (DC coupled) ..... < 1% of the set frequency deviation

Distortion ..... < 1%@1kHz rate for deviation up to 20% of max available deviation
Typically 0.1% for deviations of 2% of max available deviation
< 3% at max available deviation

FSK (FREQUENCY SHIFT KEYING) ..... 2 Level and 4 Level FSK
External data connected to TRIGGER connector (2 Level) or TRIGGER and PULSE connectors (4 Level)
NOTE: Rear panel PULSE input is labeled FSK2

Frequency shift ..... ±100kHz

Accuracy ..... As FM deviation accuracy

Timing jitter ..... ±3.2µS

Filter ..... 8th Order Bessel -3db@3.9kHz

PHASE MODULATION

Deviation ..... 0 to 10 radians, 0.01 Resolution

Accuracy@1kHz ..... ±4% excluding residual phase modulation

3db Bandwidth ..... 100 Hz to 10 kHz

Distortion ..... <3%@10 radians@1kHz modulation rate
Typically <0.5% for deviations up to 1 radian@1kHz

Modulation source ..... Internal LF generator; External Rear panel BNC

AMPLITUDE MODULATION

Range ..... 0 to 99.9%, 0.01%Resolution

Accuracy@1kHz ..... ±5% of set depth

1db Bandwidth ..... DC to 30 kHz (DC coupled)
10 Hz to 30 kHz (AC coupled)
20 Hz to 30 kHz (AC coupled with ALC)

Distortion ..... <3.5%@1kHz modulation rate (depths up to 80%)
<1.5%@1kHz modulation rate (depths up to 30%)

Modulation source ..... Internal LF generator; External Rear panel BNC

PULSE MODULATION

Frequency range ..... 9 kHz to 1.2 GHz

RF Output range ..... -140 dBm to +10 dBm; Useable to +13dbm when Pulse enabled

RF Level accuracy ..... additional ±0.1 dB/°C temperature coefficient when pulse enabled.

On/Off ratio ..... >80 db below 1.2 GHz

Rise and fall times ..... < 20nS (typically 10nS)

Pulse Input Control ..... ±10V maximum input
Rear panel BNC
Logic 0 (OFF) (0 V to 0.8 V)
Logic 1 (ON) (2.0 V to 5 V)

Maximum Repetition Frequency ..... 10 MHz

INTERNAL LF GENERATOR

Frequency range	0.01 Hz to 20 kHz
Resolution	5 digits
Frequency accuracy	See FREQUENCY STANDARD
Distortion	<0.1% THD@1kHz
Waveforms	Sine wave@20kHz
	Triangular wave@3kHz
	Square wave@3kHz
Square wave jitter	<6.4µS on any edge
Audio output	Rear panel BNC
	2 Vrms EMF with Source Impedance 600Ω

EXTERNAL MODULATION

Input	Rear panel BNC; 1 Vrms sine wave
Input Impedance	100 kΩ nominal

MODULATION ALC

Peak leveling	0.5 Vrms to 1.25 Vrms sine wave
High and low indicators	display input outside leveling range

SWEEP MODE

Control parameters	Start and stop values of carrier frequency
Linear sweep	Frequency step size 1 Hz minimum
Logarithmic	0.01% to 50% in 0.01% steps
Step time	50 mS to 10 S per step
Trigger	Rear panel BNC
Trigger modes	Single; Continuous; Start/Stop

FREQUENCY STANDARD

TCXO	10 MHz
Operating Temperature	0 to 55°C
Temperature Stability	Better than ±7 in 107
Ageing rate	±1 in 106 per year
External Input	Rear panel BNC
	1 MHz@200mVrms to 1.8Vrms into 1kΩ
	10 MHz@200mVrms to 1.8Vrms into 1kΩ
Output	Rear panel BNC; 10 MHz@2Vpk-pk into 50Ω

GENERAL

GPIB Communications	All functions except the supply switch are remotely programmable
	Designed in accordance with IEEE 488.2
	Complies with the following subsets in IEEE 488.1
	SH1, AH1, T6, TEØ, L4, LEØ SR1, RL1, PP0, DC1, DT1, C0, E2
RS-232 Communications	9 way male D-type connector
	Baud Rate 300 to 9600 bps
	Hardware handshake: DTR, RTS, CTS, DSR
	Software handshake: XON and XOFF
	Electrical Interface to EIA-232-D
AC Input	200 VA max
	90V to 132 V at 45 to 440 Hz
	188V to 264V at 45 to 66 Hz
Calibration Interval	2 years
Dimensions (HxWxD)	10.7x41.9x44.0 cm (4.21x16.49x17.32 in)
Weight	<8 kg (17.6 lb)

RANGE OF USE

Temperature	0 to 55° C
Humidity	Up to 93%@40° C
Altitude	Up to 3050 m (10,000 ft)