AM-FM Signal Sources

- ☐ YIG Linearity
- ☐ AM and FM Modulation
- ☐ Electronic Sweep Capability
- ☐ 0·5% Frequency Accuracy
- ☐ L.E.D. Frequency Readout
- ☐ Phase-lock Capability

The 6150 series of microwave AM–FM Signal Sources is a range of tunable solid state instruments which use the MI Sander's designed YIG gunn oscillators, Type 6100 series, as active r.f. elements. The frequency ranges of the units are essentially wide band and are detailed on the table overleaf. The output frequency can be varied manually by a front panel potentiometer control or remotely via a rear panel BNC input. In both cases, an LED digital display indicates the frequency to 0·5% accuracy and offers excellent resetability and speed of operation.

The 6150 series offer significant advantages over mechanically tuned instruments and can be used as stable CW signal sources with minimal residual FM.

The YIG gunn oscillator is fitted with an FM coil with a wide input bandwidth and linear deviation capability. The input to this coil is independant of the main tuning coil and can be used for fine frequency control and external phase locking to achieve crystal stability.

The electronically tuned YIG gunn oscillator can be driven from an external control signal so that the inherent tuning capability can be used to remotely preset, step or sweep the microwave frequency. These capabilities make these signal sources ideal for systems applications.

All AM functions are performed by a PIN modulator fitted to the signal sources. This multi-function component can control the r.f. output level over a 20 dB dynamic range and can be used to apply AM from either the internal 1 KHz squarewave modulation circuit or from an external AM pulse input.

The 6587 levelling amplifier is compatible with these instruments and can be connected such that swept frequency signals can be produced with output levelling.

The signal sources produce a dc output voltage proportional to frequency, via a rear panel socket, which can be used to drive external recording devices such as X–Y pen recorders or display oscilloscopes. This facility is available in both the manual or externally controlled mode.

A mains selector switch on the instrument enables the units to be operated from either a 230V or 110V mains supply.

SPECIFICATIONS

MODEL	6158	6150
FREQUENCY RANGE	8·0—12·4 GHz	10·0—15·0 GHz
R.F. POWER OUTPUT		
Minimum	10 mW	10 mW
Typical	20 mW	20 mW
FREQUENCY ACCURACY AT 20°C AND MAXIMUM R.F. POWER	0·5%	0·5%
FREQUENCY PULLING		
External	0·1% DUE TO 2:1 V.S.W.R.	0·1% DUE TO 2:1 V.S.W.R.
Internal	0·1% DUE TO 10 dB CHANGE IN LEVEL CONTROL	0·1% DUE TO 10 dB CHANGE IN LEVEL CONTROL
FREQUENCY STABILITY		
(Typical) ①		
Short Term ②	0·005%	0·005%
Long Term ③	0·01%	0·01%
SPECTRAL PURITY		
Residual f.m.	10 p.p.m.	10 p.p.m.
Harmonic Content	−25 dBc	−25 dBc
R.F. LEVEL CONTROL		
(Internal and External) ④	20 dB	20 dB
AMPLITUDE MODULATION		
Internal Depth ④ (1 kHz ±100 Hz min)	20 dB	20 dB
External Depth ④	20 dB for 20 Volts Input	20 dB for 20 Volts Input
Rise Time	1 μsec	1 μsec
FAST FM INPUT		
Deviation	±20 MHz for ±10 Volt Input	±20 MHz for ±10 Volt Input
Maximum Rate	100 kHz	100 kHz
SWEEP CAPABILITY		
Input	0 to +10 Volts for full sweep. Start frequency determined by frequency control setting.	0 to +10 Volts for full sweep. Start frequency determined by frequency control setting.
Maximum Sweeprate	100 Hz	100 Hz
Output	0 to +10 Volts for full sweep, reduced for narrow band	0 to +10 Volts for full sweep, reduced for narrow band
OUTPUT LEVELLING USING AMPLIFIER TYPE 6587	Within ±0·1 dB (Plus Coupler and Detector Variation)	Within ±0·1 dB (Plus Coupler and Detector Variation)
OUTPUT CONNECTOR	Precision Stainless Steel 'N' Type Female 50 Ω	Precision Stainless Steel 'N' Type Female 50 Ω
POWER REQUIREMENTS	100–125 or 200–250 volts, 50–60 Hz, 50 VA	100–125 or 200–250 volts, 50–60 Hz, 50 VA
DIMENSIONS AND WEIGHT	Height 98 mm 3⅞ in; Width 270 mm 10½ in; Depth 254 mm 10 in; Weight 4·5 kg 10 lb	Height 98 mm 3⅞ in; Width 270 mm 10½ in; Depth 254 mm 10 in; Weight 4·5 kg 10 lb

① After 1 hour warm-up in a constant environment.

② Over a 5 minute period and with a settling time of 15 minutes, after the frequency change.

③ Over a 1 hour period.

④ AM depth is dependent on r.f. level control settings and external modulation input. As only one modulator is used for all AM functions it therefore has a summation capability of 20 dB.