

F. M. Signal Generator



- Frequency range: 10 to 470 Mc/s
- No multipliers or mixers
- Drift $\pm 25 \times 10^{-6}$ ten minutes
- Stepped as well as continuously-variable incremental tuning
- Internal modulation at 1 and 5 kc/s

F.M. Signal Generator

FREQUENCY

Range: 10 to 470 Mc/s in five bands:
10 to 22 Mc/s 110 to 240 Mc/s
22 to 48 Mc/s 240 to 470 Mc/s
48 to 110 Mc/s

Main Tuning: Controlled via precision slow-motion drive. Total scale length, approximately 60 inches.

Calibration Accuracy: 1%.

Fine Tuning: Uncalibrated control provides cover of approximately 25 kc/s.

Frequency Stability: After warm-up, 0.0025% or better in 10-minute period.

Attenuator Reaction: Negligible below 50 mV; not greater than 0.1% above.

Incremental Frequency Control: Carrier shift is variable from -100 to +100 kc/s by continuous and stepped control. The stepped control has three negative and three positive shift positions, each with independent preset adjustment, and one zero shift position. Shift is monitored by meter with two ranges, -20 to +20 kc/s and -100 to +100 k/s.

Incremental Accuracy: Direct accuracy varies inversely with carrier frequency from within 10% to 20% of f.s.d. Using correction chart supplied, accuracy at all carrier frequencies is within 10% of f.s.d.

Spurious Signals: Total harmonic content is less than 10%. There are no sub-harmonics.

The Marconi F.M. Signal Generator TF 1066B/1 covers the range 10 to 470 Mc/s. Direct carrier-frequency generation without multipliers ensures the complete absence of spurious sub-harmonics in the output, and its direct-reading incremental tuning system brings ease and accuracy to bandwidth measurement.

Stability and purity of signal are enhanced by the use of a rigid cast r.f. box and a transistor-regulated d.c. filament supply for the r.f. oscillator; and there are preset potentiometers to simplify setting up and to enable you to choose your own values of stepped incremental shift.

F.M. deviation is variable up to 100 kc/s and a.m. depth up to at least 40%. Modulation can be applied internally at 1 or 5 kc/s, or externally between 30 c/s and 15 kc/s. For both internal and external modulation, f.m. deviation or a.m. depth is directly indicated.

The open-circuit output voltage is continuously variable from 0.2 μ V to 200 mV and is derived via a source impedance of 50 ohms. The level of output is controlled by a piston attenuator with a $4\frac{1}{2}$ -inch dial bearing two scales, one calibrated directly in units of voltage and the other in decibels relative to 1 μ V.

R.F. OSCILLATOR

The heart of the TF 1066B/1 Generator is its craftsman-built r.f. unit employing the Marconi-patented system of contactless waveband selection in a highly developed form. It is this system, supported by such measures as fully stabilized h.t. and l.t. supplies, which yields the excellent frequency stability figure of 0.0025% over a 10-minute period; this is equivalent to a drift of less than 800 c/s per minute at 300 Mc/s—a point of performance that allows the user to take full advantage of the incremental tuning facilities even when making protracted measurements.

MODULATION

Frequency modulation is applied via a ferrite reactor coupled to the oscillator tuned circuit. For amplitude modulation, variation of carrier amplitude is obtained by applying the modulating voltage directly to the anode of the r.f. oscillator.

Modulation is monitored by a meter with two scales, both of which indicate either f.m. deviation in kc/s or a.m. depth in percentage, depending upon the type of modulation in use.

INCREMENTAL TUNING SYSTEM

An outstanding feature of the TF 1066B/1 is its incremental tuning system by which small, precise changes can be made in carrier frequency, either continuously variable or stepped, and read directly from a panel meter. The stepped control provides six preset incremental shifts up to ± 100 kc/s—a feature which greatly facilitates rapid checking of receiver bandwidth during production testing. Both incremental frequency controls vary the d.c. applied to the reactor used for frequency modulation.

In addition to the incremental tuning arrangements there is a fine frequency control for setting the Generator accurately to the centre frequency of a narrow-band system under test.

RACK MOUNTING

An alternative version, TF 1066B/1R, is available for mounting in a standard 19-inch rack.

R.F. OUTPUT

Level: The source e.m.f. is continuously variable from 0.2 μ V to 200 mV. The attenuator dial shows the source e.m.f. both directly and in decibels relative to 1 μ V. The dial cursor can be positioned to indicate voltage across a 50-ohm load instead of source e.m.f.

Output Accuracy: Incremental, 0.2 dB; overall, 2 dB.

Source Impedance: 50 ohms; v.s.w.r. not greater than 1.25:1 using the 20-dB Pad, TM 4919, or 1.6 using the 6-dB Pad, TM 4919/1.

Stray Radiation: Negligible; permits full use of lowest output.

FREQUENCY MODULATION

Internal: Modulation frequencies: 1 and 5 kc/s. Deviation variable to 100 kc/s maximum and indicated on two meter ranges, 0 to 20 kc/s and 0 to 100 kc/s.

External: Modulation frequency range: 30 c/s to 15 kc/s. Deviation as for **Internal**. Input requirements: 25 volts across 5 k Ω for 100 kc/s deviation.

Deviation Accuracy: Direct accuracy for internal modulation varies inversely with carrier frequency from within 7% of f.s.d. to within 20% of f.s.d.; using correction chart supplied, accuracy at all carrier frequencies is within 7% of f.s.d. Accuracy over external modulation frequency range is within 5% of accuracy at 1 kc/s.

A.M. on F.M.: Typically, less than 5% modulation depth at maximum deviation.

Residual F.M.: The f.m. due to hum and noise is less than 100 c/s deviation.

AMPLITUDE MODULATION

Internal: Modulation frequencies: 1 and 5 kc/s. Modulation depth variable up to at least 40% and indicated on two meter ranges, 0 to 20% and 0 to 100%.

External: Modulation frequency range: 30 c/s to 15 kc/s. Modulation depth as for **Internal**. Input requirements: 10 volts across 1 M Ω for 40%.

Modulation Depth Accuracy: $\pm 5\%$ modulation on 0 to 20% range. $\pm 10\%$ modulation up to 40% on 0 to 100% range.

F.M. on A.M.: For 30% a.m., varies typically from 4 kc/s at 10 Mc/s to 60 kc/s at 100 Mc/s.

Residual A.M.: The a.m. due to hum and noise is better than 50 dB below 30% modulation.

POWER SUPPLY

200 to 250 volts, and 100 to 130 volts; 40 to 60 c/s; 90 watts. Fuses in mains, h.t. and l.t. circuits.

VALVES AND SEMICONDUCTORS USED

CG1-E; CS2-A; CTP1109; GET 114; TDOS-10E; OB2; 524G; 6AK5; 6AK6; 6C4; 6CD6G; 12AX7; 6L6G; 85A2.

DIMENSIONS AND WEIGHT

Height	Width	Depth	Weight
15½ in	21 in	10½ in	54 lb
39.5 cm	53.5 cm	27 cm	24.5 kg

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ACCESSORIES

SUPPLIED

Coaxial Free Plug: Type N, for r.f. output socket.

OPTIONAL

TM 4824

Output Lead: 50 ohm, 36 inches long; Type N plug both ends.

TM 4919/1

Attenuator Pad: 6 dB, 50 ohm, one end, Type N socket; other end, Type N plug.

TM 4919

Attenuator Pad: 20 dB, 50 ohm, one end, Type N socket; other end, Type N plug.

TM 4918

Matching Unit: N socket; other end, Belling-Lee 50 ohm to 75 ohm, one end, Type L734/P plug.

TM 4916

Matching Unit: 50 ohm unbal. to 300 ohm bal., one end, Type N socket; other end, solder tags.

TM 4917

D.C. Isolating Unit: One end, Type N socket; other end, crocodile clips.

TM 5753

Coaxial Fuse: Prevents damage to the Signal Generator attenuator through accidental application of r.f. or h.t. power to the circuit under test. Useful in transmitter/receiver testing.

Overload

Protection: Burns out at 0.4 watt.

Insertion Loss: Nominally 0.5 dB.

V.S.W.R.: 1.35 or less when terminated with a matched 50-ohm load, 1.6 or less when terminated with TF 1066B attenuator via 20-dB Pad, TM 4919.

Connectors: Type N.

Fuse: $\frac{1}{4}$ amp Littlefuse Cat. No. 361.062. 10 spares are supplied.

Dimensions: Length, $4\frac{7}{8}$ in; dia. $\frac{1}{8}$ in.

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