

Precision
Simulators
from...



completely portable
**communications
service monitors**

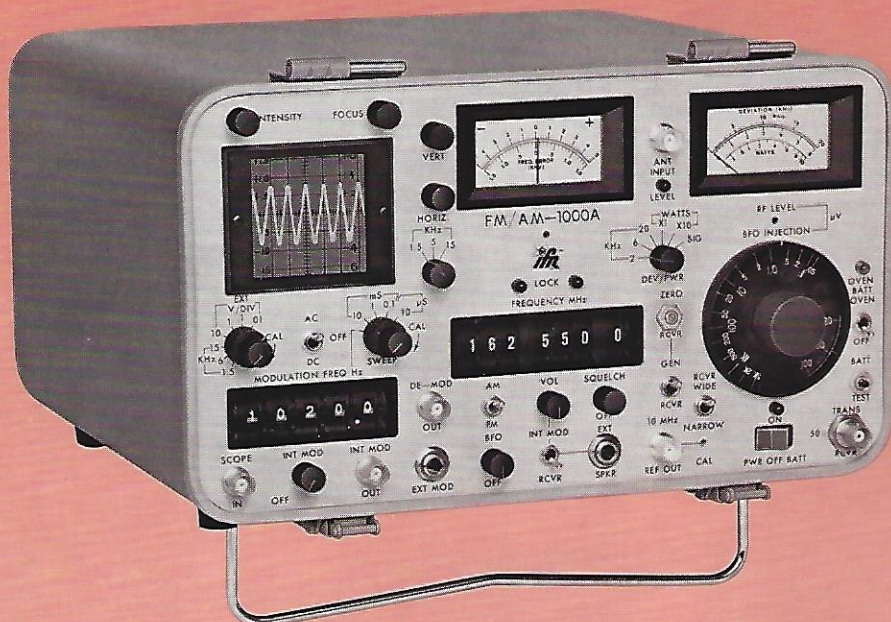
FM/AM-1000A and FM/AM-1000S





COMMUNICATIONS SERVICE MONITORS

FM/AM-1000A



The FM/AM-1000A Communications Service Monitor is a self-contained, full featured portable package.

- Offers complete FM/AM signal generator coverage from 100 Hz to 1 GHz, receiver from 1 MHz to 1 GHz
- Sensitive receiver requires no plug-ins
- Measures transmitter frequency error and power, FM or AM
- Measured or generated deviation is displayed on oscilloscope and meter
- Tone generator built-in
- Convenient size package contains rechargeable batteries for portable use
- 250 kHz IF displayed on oscilloscope for AM modulation monitoring

FCC Certification—Part 15

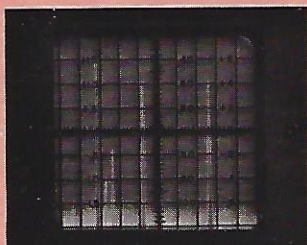
FM/AM-1000S

with Built-in Spectrum Analyzer

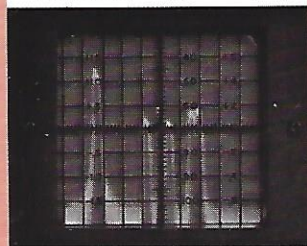
The FM/AM-1000S offers a combination of advantages that no other Communications Service Monitor can match. In addition to the features of the FM/AM-1000A, the FM/AM-1000S includes a built-in spectrum analyzer.

- 75 dB dynamic range on screen with calibrated graticule
- 30 kHz bandwidth
- Dispersion variable from ± 0.5 MHz to ± 5 MHz

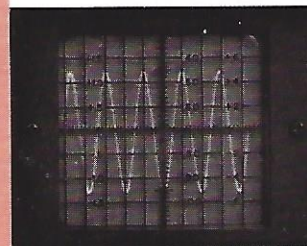
Both A and S units carry two-year limited warranty.



WIDE DISPERSION:
Analyzer sweeps ± 5 MHz from selected frequency (10 MHz span)



NARROW DISPERSION:
Analyzer sweeps ± 0.5 MHz from selected frequency (1 MHz span)



OSCILLOSCOPE:
Oscilloscope features DC to 1 MHz frequency response



GENERAL:

IFR's broad experience in producing avionics test equipment is now applied to the communications industry with the introduction of *portable*, yet complete service instruments...units in which ease of use without sacrificing versatility are prime features.

Transmitter monitoring functions (Frequency Error, Deviation, Power, etc.) are displayed on front panel meters or the oscilloscope, which doubles as a general purpose service tool. Accurate frequency measurements are made possible by the oven-stabilized master oscillator which is easily referenced to WWV during normal operation of the Service Monitor.

Internal modulation is provided by a frequency synthesized tone generator in 0.1 Hz increments to 10 kHz to facilitate sub-audible tone squelch and tone selective signaling tests. A front panel connector provides a convenient modulation

tones output. Low frequency FM response facilitates swept receiver IF alignments when used in conjunction with the oscilloscope. The generator can also be externally modulated down to 2 Hz for testing data transmission systems. A built-in Beat Frequency Oscillator (BFO) permits single-sideband and CW monitoring.

In addition to the features of the FM/AM-1000A, the FM/AM-1000S contains a versatile Spectrum Analyzer in the oscilloscope module. This permits off-the-air monitoring of transmitter spectrums, as well as providing a general purpose spectrum analyzer/oscilloscope for general shop use. The FM/AM-1000S also replaces the oven-stabilized crystal-controlled master oscillator with a temperature compensated crystal oscillator (TXCO). The TXCO does not require any warm-up time to stabilize, making the unit ready to use as soon as power is applied.

SPECIFICATIONS:

SIGNAL GENERATOR

Frequency Range:	100 Hz to 999.9999 MHz in 100 Hz frequency synthesized, phase-locked increments
Frequency Accuracy:	$\pm 0.00005\%$, derived from Master Oscillator
Modulation:	Internal: 5 Hz to 9999.9 Hz, frequency synthesized in 0.1 Hz phase-locked increments. Accuracy controlled by Master Oscillator AM: 10 Hz to 5 kHz, 0-90% FM: 0 to ± 15 kHz External: AM: 3.0 V (± 1 V) p-p produces 100% modulation FM: 6.0 V (± 2 V) p-p, 2 Hz to 15 Hz, produces ± 15 kHz deviation Generator may be modulated simultaneously from internal and external sources and internal tone generator may be externally keyed for sequential tone coding
Quieting:	42 dB below 3.3 kHz deviation at 1 kHz
Output Power:	Continuously variable from -133 dBm to -33 dBm ($0.05 \mu\text{V}$ to $5000 \mu\text{V}$)
Output Attenuator Accuracy:	± 2.5 dB to 400 MHz; ± 3.0 dB, 400 MHz to 999.9999 MHz

RECEIVER

Frequency Range:	300 kHz to 999.9999 MHz. Sensitivity reduced below 1 MHz
Sensitivity:	Better than $2 \mu\text{V}$ ($1 \mu\text{V}$ typical)
Bandwidth:	Narrow: Rcvr, ± 7 kHz; Detector Audio, 8 kHz Mid: Rcvr, ± 100 kHz; Detector Audio, 8 kHz Wide: Rcvr, ± 100 kHz; Detector Audio, 80 kHz
Beat Frequency Oscillator:	Variable injection level of 2 to 5,000 μV for calibrated signal strength measurements. Frequency variable ± 1.5 kHz
Monitoring:	Frequency Error and Deviation simultaneously displayed on scope and panel meters. AM modulation percentage information displayed using scope 250 kHz IF envelope
Meter Zeroing:	Automatic or Manual zeroing of Frequency Error Meter
Quieting:	Deviation measurements down to 0.1 kHz

MASTER OSCILLATOR

Accuracy:	FM/AM-1000A: Ovened crystal oscillator provides accuracy of .00005% of selected signal generator output frequency after 20 minute warm-up FM/AM-1000S: TXCO provides accuracy, excluding aging and calibration errors, of 0.00001% of selected signal generator output frequency (0° to $+50^\circ$ C internal test set temperature range) with no warm-up required
Aging Stability:	2 to 3 ppm during first year, 1 ppm per year thereafter

POWER MEASUREMENTS

Range:	0 to 10 watts and 0 to 100 watts. Accuracy $\pm 10\%$ of full scale to 225 MHz
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FM/AM-1000A and FM/AM-1000S

SPECIFICATIONS continued

TONE FREQUENCY MONITORING

**Measurement
Techniques:**

Precision internal tone generator is selectable with the scope time-base switch to produce a Lissajou scope pattern from a received tone, enabling accurate off-the-air tone frequency measurements

OSCILLOSCOPE

3 dB Bandwidth: AC or DC inputs, 1 MHz with external vertical DC input at one-half full deflection

SPECTRUM ANALYZER—FM/AM-1000S

Dynamic Range: 75 dB (–30 dBm to –105 dBm)

Dispersion: Variable from ± 0.5 MHz to ± 5 MHz from center frequency (1 to 10 MHz span)

Bandwidth Resolution: 30 kHz

PHYSICAL CHARACTERISTICS:

Power:

Conveniently portable with self-contained battery that automatically recharges when AC line is connected. Battery operation typically is 1 hour with scope off and 40 minutes with scope on before recharge is required. Operates on 110/230 VAC 50-400 Hz, 80 watts, and 11 to 28 VDC. Typical DC currents 4.3 A at 12 V and 1.85 A at 28 V

Thermostatically controlled cooling fan for increased component life

Dimensions:

12.5" wide, 8" high, 18.5" deep

Weight:

40 lbs. Rugged all metal construction, designed for field and bench use

Service Facilities

IFR service centers are located in London, England; Paris, France; Mississauga, Ontario, Canada; and at our plant in Wichita, Kansas. Units sent to service centers for repair are given high priority for quick return to the owner. Calibration and certification service is also provided at our service centers.

Warranty

IFR Precision Simulators are covered by a limited two-year warranty against defective parts and workmanship. (Optional equipment carries a 30 day warranty, batteries carry a 90 day warranty.)

Metrology

We now offer our customers a complete calibration check service on their test sets. Using sophisticated electronic equipment, our Metrology Lab will check critical parameters and furnish a complete traceability chart. A report is issued certifying that the test set meets published specifications and that equipment used is traceable to the National Bureau of Standards to the extent they allow.

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