Ballantine Laboratories, Inc.

3440A True RMS RF Millivoltmeter

Product Summary

The 3440A measures the true rms of low level RF and microwave signals to over 1GHz. High rms accuracy, traceable to NIST, is assured regardless of waveshape. Common calibration errors are eliminated through temperature compensation of the probe detector diodes; double shielding protects the interchangeable probes from rough handling and pickup. Relative gain or loss measurements are simplified by a 0 dB reference adjustment. DC output proportional to the ac input is provided for analog recorders and to allow operation as an ac-dc converter.

Product Features

- NIST traceable True RMS: 100 µV to 30 mV; 10 kHz to 1.2 GHz (usable to 2.4 GHz)
- Volts and dB Operation: Measures 100 µV to 300 V and -60 dB to +60 dB
- Accuracy ± (1% FS + 1% reading) to 150 MHz, NIST traceable
- RF detector probes field replaceable

Product Specifications

Frequency Range

Calibrated to 10 kHz to 1.2 GHz. Usable <10 kHz to >2.4 GHz

Response

True RMS to 30 mV, changing gradually to peak detector calibrated in rms of a sine wave above 30 mV.

Voltage Ranges

1 mV full scale to 3 V full scale in eight ranges: 1/3/10 scale sequence.
Usable: <100 µV to 3 V rms.
Optional Model 1340A divider extends range to 300 V.

Decibel Ranges

-59 dBm to +23 dBm in eight 10 dBm steps. Reference: 0 dBm=1 mV into 50 W .
Note Optional Model 1340A divider extends range to +63 dBm. Contact factory for price and delivery on other dB references and scales.

Crest Factor (True RMS Ranges)

	3440A				3440A with Capacitive Divider			
Voltage Range	1mV	3 mV	10 mV	30 mV	0.1 V	0.3 V	1 V	3 V
Crest Factor	420 to 42	42 to 14	14 to 4.2	4.2 to 1.4	420 to 42	42 to 14	14 to 4.2	4.2 to 1.4

Accuracy

	Signal Frequency		
Voltage Ranges	10 kHz to 150 MHz	150 MHz to 700 MHz	700 MHz to 1.2 GHz
1 mV to 300 mV	± (1% fs + 1% ind)	± (1% fs + 3% ind)	± (1% fs + 7% ind)
1 V to 3 V	± (1% fs + 1% ind)	± (1% fs + 3% ind)	± (1% fs + 10% ind)

Temperature Effect

(Outside 15°C to 25°C reference conditions)

Temperature (C°)	Add to % ind accuracy
0° to 10°	4%
10° to 15°	1%
25° to 30°	1%
30° to 40°	4%

Meter

Three scales and anti-parallax mirror are provided. Top scale is 0 to 10 and is 4.4 inches long. The middle scale is 0 to 3. The bottom scale is -10 to +3 dB.

Indicator Unrest (1 mV FS range)

Unrest of the meter pointer will be <±1% FS above 500 µV indication, <±2% FS between 300 µV and 600 µV and <±5% from 100 µV to 300 µV.

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Normal Response Time
Less than 1 sec on the 3 mV to 3 V ranges; 3 sec on the 1 mV range. Meter recovers to within 10% of final indication within 1 min after removal of 3 V rms overload on 1 mV range.

Meter Response Time Switch
A front panel switch selects normal and slow response times when measuring input signals that are stable, amplitude variable, or noisy.

Probe
A detachable probe containing the RF detector is provided. Accessories provided with the probe are a convenience spring tip adapter with ground clip and a 50 W terminated adapter mating with BNC or Type N connectors. The shielded probe cable is 4 ft (1.2 m) long and terminated in a locking quick-disconnect connector at the front panel.

VSWR
The VSWR using the probe with the non-loading Tee connector in a 50 W system is no greater than 1.3 from 10 kHz to 1.2 GHz.

Power Sensitivity
The probe requires less than 1.9 nW of input power at 300 µV input voltage when used with the non-loading Tee connector in a 50 W system.

Overvoltage
The probe input is fully protected to 10 V ac on all ranges and frequencies. Maximum DC input is ±400 V on all ranges.

DC Recorder Output
A rear panel set of binding posts provides >+1 V dc full scale deflection on "10" ranges and 0.948 V on "3" ranges into an open circuit. Source impedance is 1000 W (±5%). The dc output is short-circuit proof. Output voltage is directly proportional to meter deflection and the rms value of the probe input voltage, which allows for use as an ac to dc converter.

Probe Reference
A REL REF control allows continuously variable reduction of sensitivity by a minimum of 3.3 dB. It permits 0 dB reference level change and is useful in setting the meter to a convenience scale mark when performing relative gain or loss measurements. A detented position is provided for normal measurements.

Power
A fused power selector safety switch and receptacle on the rear panel selects one of four ac operating voltage ranges. Input power: 20 VA maximum.

90 to 108 V (100 V); 48 to 420 Hz, 103 to 130 V (115 V); 48 to 420 Hz
198 to 238 V (220 V); 48 to 420 Hz, 216 to 260 V (240 V); 48 to 420 Hz

Environmental
Temperature: Storage: -54°C to +85°C, Oper.: 0°C to 50°C, Ref.: 15°C to 25°C
Humidity: 0 to 80% RH to 50°C without condensation, 0 to 95% RH to 35°C
Altitude: Storage: 0 to 15 Km (50,000 ft), Operating: 0 to 3 Km (10,000 ft)
Shock and Vibration: Complies with MIL-T-28800, Class 3, Style E.
EMI: Meets MIL-STD-461A for CS-01, CS-06 and RS-03 to 400 MHz at 1 V/m
Safety: Meets conditions of MIL-T-28800, Class 3, Style E.

Size & Weight
Height: Case: 133 mm (5.25") Overall: 147 mm (5.8")
Width: Case: 220 mm (8.3") Overall: 220 mm (8.66")
Depth: Case: 280 mm (11") Overall: 306 mm (12")
Weight: 2.7 kg Net (6 lbs) 5.2 kg (Shipping (11.5 lbs)