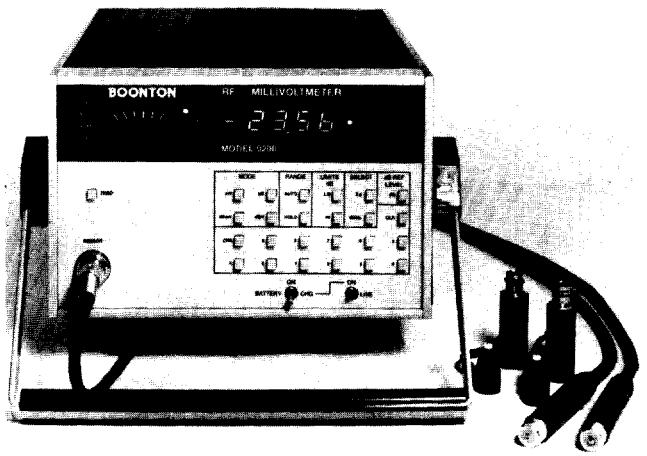
RF Millivoltmeter
Model 9200



Model 9200 is a microprocessor-controlled rf millivoltmeter that measures rf voltage from 200 μV to 300 V in the 10 kHz to 1.2 GHz frequency range. Performance features and operating conveniences not previously available make this a unique instrument whether under manual or bus control.

TWO CHANNEL AND DIFFERENTIAL VOLTAGE MEASUREMENTS

A second channel input option (option -03) provides a duplicate set of input amplifiers and circuits with a rear-panel connector for a second voltage probe. The 9200 can then display channel 1 or channel 2, or their instantaneous difference expressed in dB (channel 3). This option is particularly useful when measuring gain or loss.

VOLTAGE PROBES

Data for voltage probes is stored in a nonvolatile memory. This includes both sensitivity and range linearization requirements. Data for replacement probes can be entered into the nonvolatile memory by operating an internal switch that allows an alternate use of the front panel keys. No further calibration is required. Probe accessories are available for measurements on unterminated, terminated, and thru-line transmission systems of either 50 Ω or 75 Ω characteristic impedance.

DISPLAY

The 4-digit display reads either in millivolts or in dB relative to the voltage appearing across a selected power reference, such as dBm (50 Ω). The reference impedance Z_o may be entered as any value between 50 and 600 Ω. In addition, measurements can be made in terms of dBmV and dBV. An uncalibrated analog meter indicates voltage levels for peaking or nulling operations.

AUTOMATIC ZERO

A zero correction function stores the zero offsets of each range and then automatically corrects all subsequent readings. It may be activated locally or via the bus.

HIGH AND LOW DB LIMITS

High and low dB limits can be entered separately into channel 1 and channel 2. A panel annunciator and rear-panel TTL outputs indicate an out-of-limits condition.

DC DECORDER OUTPUT

A rear-panel dc output supplies 10 Volts full scale that is linear with voltage over each decade range in the mV mode, or linear in dB over the entire 80 dB range in any of the dB modes.

BUS INTERFACE

A field installable bus interface allows all instrument functions to be bus programmable, except the on-off power switch, and provides full data outputs according to bus standards.

SPECIFICATIONS

Voltage Range: 200 μV to 3 V (300 V to 700 MHz with 91-7C 100:1 Divider) in 8 ranges

Voltage Display: 1.000, 3.000, 10.00, 30.00, 100.0, 300.0, 1000, and 3000 mV fs

DB Range: 80 dB in 8 ranges with 0.01 dB resolution

DB Display: dBmV (0 dB equivalent to 1 mV), dBV (0 dB equivalent to 1 V), or dBm (0 dB equivalent to the voltage across selectable Z_o reference when 1 mW is dissipated)
Z_o Reference: from 50 Ω to 600 Ω
dB Offset: selected to 0.01 dB resolution; display range ±99.99 dB

Ranging: Autoranging, plus hold-on-range. Individual ranges may be selected via bus interface option

Frequency Range: 10 kHz to 1.2 GHz (uncalibrated indications to 8 GHz)

Waveform Response: RMS to 30 mV, calibrated in rms of a sinewave above 30 mV (RMS to 3 V and 700 MHz with 91-7C 100:1 Divider)

Recorder output: 10 V full scale proportional to indicated voltage (mV mode) over each range, or 8 V equivalent to 0 dBm regardless of Z_o (dB mode) with a sensitivity of 1 V per 10 dB change over the entire range.

Accuracy:
Millivolt Range

Voltage level	±1% fs plus*		
300 mV to 3 V	±1%	±3%	±10% rdg.
200 μV to 300 mV	rdg.	rdg.	± 7% rdg.

10 kHz 150 MHz 700 MHz 1.2GHz

*below 1 mV change expression to ±2% fs plus

dBm (50 Ω) Range

dBm level (50 Ω)	$\frac{dB_{fs}-dB_{rdg}}{50}$ plus*		
+2 to +23 dBm			1.0 dB
-61 to +2 dBm	0.15 dB	0.35 dB	0.7 dB

10 kHz 150 MHz 700 MHz 1.2 GHz

*below -47 dBm change expression to $\frac{dB_{fs}-dB_{rdg}}{25}$ plus

Zero: Automatic, operated by front panel key switch

dB limits: Front panel selectable dB limits, range ±99.99 dB. Front panel LIM annunciator indicates out-of-limits condition. Rear panel TTL outputs indicate high or low condition.

FURNISHED ACCESSORIES

RF Probe with low noise cable and connector	91-12F
50 Ω BNC Adapter; 1 kHz to 600 MHz	91-8B
Removable Probe Tip with grounding clip lead	91-13B

OPTIONAL ACCESSORIES (See pages 19-21)

Low Frequency Probe, 1 kHz to 250 MHz	91-4C
Unterminated BNC Adapter	91-6C†
100:1 Voltage Divider, 50 kHz to 700 MHz	91-7C
Type N Tee Adapter, 1 kHz to 1.2 GHz	91-14A
Type N 50 Ω termination (use with 91-14A)	91-15A*†
Unterminated Type N Adapter	91-16A
Storage container for accessories	91-18B
Accessory Kit;	91-24A*
Comprises 91-6C, 91-7C, 91-14A, 91-15A, 91-18B	

*Available in 75 Ω versions (Reduced freq. range.)
†Available with male input (91-6G, 91-14B)

Rack Mounting Kit (Single)	950000
Rack Mounting Kit (Dual)	950001

OPTIONS:

01 IEEE 488 Bus Interface. Duplicates all front panel functions except on/off power switch. Output string gives mode, channel, data, status, and range.

03 Input Channel 2. Allows display of either Channel 1 or Channel 2, or Channel 3 which is CH1 minus CH2 expressed in dB. Includes second 91-12F rf probe, 91-8B and 91-13B. Precludes use of option -02.

04 Rear input. Duplicates front panel Channel 1 input connector.