

electronic instruments
for LABORATORY and PRODUCTION

Sensitive RF Voltmeters

Sensitive DC Voltmeters

Capacitance & Inductance Bridges

RF Admittance Bridges

AC and DC Null Detectors

RF Distortion Meters



Boonton *ELECTRONICS* Corporation

MORRIS PLAINS, NEW JERSEY
Telephone: 201-539-4210

SENSITIVE BROAD-BAND RF VOLTMETERS

Where low level voltage measurements over a wide frequency range must be made, the Model 91 is the indispensable tool as evidenced by their wide acceptance in transistor and network testing. Three models offer different combinations of sensitivity, accuracy, and frequency range to satisfy a variety of needs.



Model 91D

	91D	91CA	91C
Voltage Ranges	300 μ V-3v	300 μ V-3 v	1 mv -3 v
Accuracy, Full Scale:	2%	5%	5%
db Range:	80	80	70
Power Sensitivity:	0.0018 μ watt	0.0018 μ watt	.02 μ watt
Frequency Range:	10 KC-1200 MC	10 KC - 600 MC	10 KC - 600 MC
Waveform Response:	RMS below 0.03 v at higher levels.	changing to peak reading (calibrated in RMS)	
DC Output:	1.5 v into 1000 Ω	NONE	NONE
Included Accessories:	91-12B Probe 91-13B Probe Tip 91-14A Type N "Tee" Adapter 91-15A 50 Ω Termination	91-3C Probe 91-8B 50 Ω Adapter 91-13B Probe Tip	91-3C Probe 91-8B 50 Ω Adapter 91-13B Probe Tip
Optional Accessories:	91-8B 50 Ω Adapter 91-8B-1 75 Ω Adapter 91-8B-2 93 Ω Adapter 91-4C 1 KC to 250 MC Probe	91-6B Unterminated BNC Adapter 91-7B 100:1 Voltage Divider 91-8B-1 75 Ω Adapter 91-8B-2 93 Ω Adapter 91-4B 1 KC to 250 MC Probe	
Price Including Kit Shown:	\$750.00	\$550.00	\$450.00



Model 91CA

Rack mounted models available at \$25.00 extra.

SENSITIVE DC NULL DETECTOR MODEL 56A

The high degree of voltage or current sensitivity in combination with the high input resistance of this detector permits greater read-out with lower test voltages when used with Wheatstone bridges. The 1000 to 1 meter scale compression virtually eliminates the need for sensitivity range switching in the production testing of components.



Voltage Sensitivity:	1 μ v to 100 v dc in 8 ranges.
Input Resistance:	10 megohms on all ranges.
Floating Input:	Allows maximum flexibility in connecting to external circuits.
Max. Sensitivity per Division:	0.5 μ v
Modes of Operation:	HUNT provides 60 db of meter scale compression. CALIBRATE provides a linear meter scale.
Amplifier Gain:	0 to 100,000 continuously variable.
Amplifier Output Capability:	\pm 1.0 ma into 1,000 ohms
Price:	\$450.00 Rack mounted 56A-R available at \$25.00 extra.

SENSITIVE DC METER MODEL 95A

In this instrument 42 ranges of dc voltage and current measurements have been provided, yet the utmost simplicity in switching and meter reading has been retained. Where high sensitivity and high input resistance for voltage measurements, or the extreme in current sensitivity are required, the choice of the 95A is dictated.



Voltage Full Scale:	10 μ v to 1,000 v in 17 ranges.
Current Full Scale:	1 μ a to 1 a in 25 ranges.
Meter Scales:	1, 3, 10, etc.
Input Voltmeter Resistance:	10 megohms on all ranges.
Accuracy:	\pm 3% of full scale.
Amplifier Gain:	0 to 100,000 continuously variable.
Amplifier Output Capability:	\pm 1.0 ma into 1,000 ohms
Floating Input:	than 500 megohms from input circuit to case.
Supplied with:	4 ft. test leads.
Price:	\$550.00

DC VOLTMETER AMPLIFIER MODEL 97A

Wide voltage range, high input resistance, the easily read zero center meter and the over-all simplicity of operation make this the ideal instrument for general purpose dc measurements.



Voltage Range Full Scale:	300 μ v to 1,000 v in 14 ranges.
Max. Sensitivity Per Div.:	10 μ v.
Meter Scales:	1, 3, 10, etc.
Accuracy:	\pm 3% of full scale.
Input Resistance:	10 megohms to 100 megohms varying with range.
Zero Drift:	Less than 2% of full scale after warm-up.
Amplifier Gain:	-60 to +70 db in fixed steps of 10 db
Amplifier Output Capability:	\pm 0.5 ma into 1500 ohms or \pm 1 v unloaded on all ranges.
Price:	\$375.00

All Prices F.O.B. Morris Plains, N. J.

DIFFERENTIAL DC VOLTMETER AMPLIFIER MODEL 98A

The three terminal voltmeter has numerous applications where the conventional two terminal voltmeter cannot be used such as in measuring the difference between two off-ground voltages or where grounding problems exist. A critically balanced input attenuator makes this the true differential voltage measuring instrument needed in these applications.



Voltage Range Full Scale:	300 μ v to 1,000 v in 14 ranges.
Max. Sensitivity Per Div.:	10 μ v.
Meter Scales:	1, 3, 10, etc.
Accuracy:	3% of full scale from 1 mv up.
Input Resistance:	10 meg. to 50 meg. (varying with range) balanced to ground.
Common Mode Rejection:	Approximately 80 db.
Zero Drift:	Less 2% of full scale after warm-up.
Amplifier Gain:	-60 to +70 db in fixed steps of 10 db
Amplifier Output Capability:	\pm 0.5 ma into 1500 ohms or \pm 1.5 v unloaded on all ranges.
Price:	\$450.00



100KC CAPACITANCE BRIDGE MODEL 74C

This is a self-contained, precision, three-terminal bridge designed for the measurement of low values of capacitance and their shunt conductances. The 100KC test frequency (where lead inductance errors are minimized) is the optimum frequency for highest sensitivity consistent with minimum errors. The 74C is the ideal general purpose instrument for the measurement of capacitances such as interelectrode capacitance, diode transistor capacitances, transformer inter-winding capacitance, and the temperature coefficient of capacitance.

Capacitance Range: .0002 $\mu\mu\text{f}$ to 11,000 $\mu\mu\text{f}$
 Capacitance Accuracy: Generally $\pm 0.25\%$
 Conductance Range: .001 to 1,000 m mhos
 Shunt Resistance Range: 1,000 ohms to 1,000 megohms
 Self-contained 100 KC oscillator-detector.
 Direct or grounded capacitance measurements.
 Provision for differential capacitance measurements.
 Built-in DC bias supply for semiconductor testing available.
 Price: \$1,050. -74C, \$1,125. -74C-S8

1 MC CAPACITANCE BRIDGES MODELS 75A & 75B

In the Model 75A the basic design of the 74C Capacitance Bridge, which has been so thoroughly proven by industry acceptance, has been extended to permit operation at 1 MC. This test frequency has been adopted to satisfy the requirement of many of the MIL Specifications on capacitors, and also to permit measurements to be made closer to the operating frequency of many components.

In the Model 75B the inclusion of a 0.1 pf range has extended capacitance measuring capability by one order of magnitude over previously available equipment. This sensitivity of capacitance measurement, which may be used for differential measurements, makes the 75B the ideal instrument for temperature coefficient of capacitance measurements.

These bridges are available with built-in d-c bias supplies to facilitate the measuring of semi-conductors. These models are designated 75A-S8 and 75B-S8.

Model 75A

Capacitance Range: 200 μpf to 1000 pf
 Direct or grounded capacitance measurements
 Provision for using external osc-det in 20 KC to 1 MC range.
 Price: \$1,125.-75A, \$1,200.-75A-S8

Model 75B

Capacitance Range: 20 μpf to 1000 pf
 Direct Capacitance measurements only
 Price: \$1,375.-75B, \$1,450.-75B-S8

Common Characteristics

Capacitance Accuracy: 0.25% + range factor
 Conductance Range: 0.01 to 1000 μmhos
 Shunt Resistance Range: 1000 Ω to 100 megohms

Self-contained 1 MC oscillator-detector
 Provision for differential capacitance measurements.
 Built-in DC bias supply for semiconductor testing.



RF ADMITTANCE BRIDGE MODEL 33A



Capacitance Range: 0 to 150pf
 Conductance Range: 0 to 25,000 μmhos (40 Ω)
 Frequency Range: 1 to 100 Mc (7 steps)
 Accuracy: Capacitance 1% Conductance 2%
 (+ range factors)
 D.C. Bias: Internal -5 to +100v Ext. to 250v
 Price \$2000

The 33A Radio Frequency Admittance Bridge represents the latest contribution by Boonton Electronics in the field of high frequency capacitance and conductance measurements. Ideal for measurements on semiconductor devices, it incorporates a novel bridge network that provides adequate range, resolution, and accuracy under the required d-c bias conditions. All variable elements in the bridge are air capacitors thus insuring continuous smooth operation without calibration deterioration thru-out the life of the instrument.

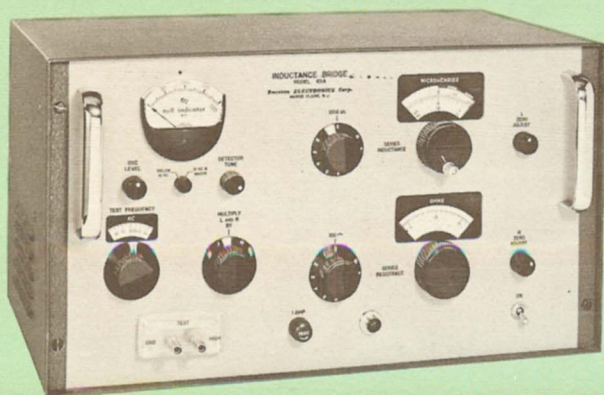
VARIABLE FREQUENCY CAPACITANCE BRIDGE MODEL 75C



Test Frequency: 5 Kc to 500 Kc
 Capacitance Range: 200 μpf to 1000 pf (direct)
 Capacitance Accuracy: 0.25% (+ range factors)
 Conductance Range: 0.001 μmhos to 1000 μmhos
 D.C. Bias Built-in for semiconductor testing
 Price \$1,900.00

The Model 75C is a versatile direct-capacitance (three-terminal) bridge with its measuring frequency continuously adjustable from 5 Kc to 500 Kc. The Wien bridge oscillator, multi-stage tuned detector, and power supply are self-contained. No accessories are required for normal use. It provides essentially the same convenience of operation and general performance characteristics as our fixed frequency models (74C, 75A, and 75B) and permits the investigation of frequency influence on the test. The signal level across the test is continuously variable from a maximum of about 3 v. to a minimum of less than 10 mv.

WIDE RANGE PRECISION INDUCTANCE BRIDGES MODEL 63A & 63C



These are Maxwell type inductance bridges for measuring both series inductance and series effective resistance of coils over a wide frequency range. Unique features include their self-contained, continuously variable oscillators and detectors, plus the ability to make precision measurements of either high or low Q impedance without error due to false or sliding balance points. The two models differ only in frequency and measuring ranges.

63A

Inductance Range: 0.002 μh to 1.1 h
 Inductance Accuracy: Generally $\pm 0.25\%$
 Inductance Resolution: Generally .01%
 Series Resistance Range: .002 ohm to 110K ohms.
 Frequency Range: 1 KC to 100 KC.
 Exceptional stability for temperature coefficient work.
 No false or sliding nulls.
 Price: \$1,850.00

63C

0.0002 μh to 110 mh
 Generally $\pm 0.25\%$
 Generally 0.01%
 0.0002 to 11 K ohms
 5 KC to 500 KC

Same as 63A



TUNED LOW FREQUENCY NULL DETECTOR MODEL 51A

The 51A AC Null Detector is a sensitive cathode ray indicating type detector which is turnable over the range of 20 cycles to 200 KC. It is intended primarily as an indicator for use with low frequency impedance bridges. A phase adjusting network permits observing separately the effect of varying the resistance and the reactance controls of the bridge. Balance can be observed either on the built-in CRT or on an external meter.

Frequency Range:	20 cycles to 200 KC in 12 ranges.
Sensitivity:	Approx. 10 microvolts for 1/4 inch peak to peak CRT deflection or 100 uamp.
Input Impedance:	Approx. 1 megohm shunted by 100 uuf.
Discrimination:	35 to 40 db against the 2nd harmonic, depending on frequency.
Price:	\$2,100.00 F.O.B., Morris Plains, N. J.



RF DISTORTION METER AND VOLTMETER MODEL 85B-85C

These Distortion Meters reduce the complex process of measuring the total distortion in radio frequency sources to a simple operation requiring but a few seconds to perform. The extreme ease with which this can be done encourages the refining of the design of oscillators, amplifiers or other rf source devices. The instrument also includes a sensitive rf voltmeter with probe, equivalent to the 91C, which can be used for external low level rf voltage measurements.

Frequency Range:	1 to 100 MC - 85B 0.1 to 6 MC - 85C
Sensitivity:	60 db below 1 volt.
Accuracy:	±2 db.
Input Impedance:	Approximately 50 ohms.
RF Voltmeter Characteristics:	Identical with 91C.
Supplied with:	91-3A Probe, 91-8A 52 ohm Adapter, and 91-9A Input Cable.
Price:	\$825.00 F.O.B., Morris Plains, N. J.

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