

# RCA TEST AND MEASURING EQUIPMENT

for SERVICE • LABORATORIES • INDUSTRY • SCHOOLS



## TELEVISION CALIBRATOR (WR-39A)

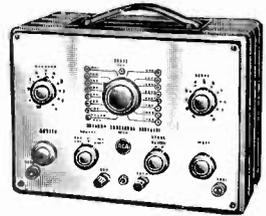
**Variable-Frequency Oscillator:**  
 Frequency Ranges (continuous coverage): 19-110 Mc; 170-240 Mc  
 Output Voltage: Better than 0.28 peak-to-peak volts at any frequency (0.1 RMS volts)  
 Output Impedance.....100 ohms  
 Attenuator Range.....100/1  
 Impedance at "Mod In" Jack.....5000 ohms

**Crystal Oscillators:**  
 Primary Standard Frequency: 2.5 Mc; Accuracy  $\pm 0.01\%$   
 Modulating Standard Frequency: 0.25 Mc; Adjustable for exact zero-beat with 2.5 Mc crystal; Accuracy:  $\pm 0.037\%$   
 (Modulating crystal can be zero-beat against primary crystal)

**Heterodyne Detector Sensitivity:**  
 External Signal Beating Against VFO: 1 millivolt  
 External Signal Beating Against Crystals: 10 millivolts

**Audio Amplifier:** Gain (approx.).....1000 times  
 Output.....0.3 max. watts  
 Loudspeaker.....3-inch cone, alnico magnet type  
 Dimensions.....10" x 13½" x 7½"

The WR-39A is a marker signal generator, a dual crystal standard, and a heterodyne frequency meter with built-in audio amplifier and speaker. The marker VFO operates on fundamentals, and produces strong marker pips on scope traces anywhere within its specified frequency ranges. For regular signal-generator and calibrator applications, the VFO also can be used on second-harmonic frequencies, thus giving continuous coverage from 19 mc to 480 mc. For stagger-tuned alignment work, the VFO can be amplitude-modulated by an audio oscillator. This crystal combination will calibrate any signal source over the range of 250 kc to 480 mc. Unit is complete with signal injection cable. Shipping weight, 15 lbs. Sugg'd User Price: \$250.00



## TV SWEEP GENERATOR (WR-59A)

**IF Center-Frequency Ranges:**  
 Picture Intermediate, first band.....5-15 Mc  
 Picture Intermediate, second band.....20-30 Mc  
 Picture Intermediate, spare.....25-40 Mc (adjust.)  
 FM Intermediate.....10-11.5 Mc  
 Television RF Channels 1-13: 44-50, 54-60, 60-66, 66-72, 76-82, 82-88, 174-180, 180-186, 186-192, 192-198, 198-204, 204-210, 210-216 Mc

**Video Band.....0-10 Mc**  
**Sweep Widths (variable):**  
 Picture Intermediate (first and second bands): 0-10 Mc  
 Picture Intermediate (spare).....0-10 Mc  
 FM Intermediate.....0-1.5 Mc  
 TV Sound Intermediate.....0-2 Mc  
 Television Radio: 0 to at least 6 Mc on channel 1; 0-7.5 Mc on channel 2; 0-8 Mc on channels 3-13  
 Video.....100 kc - 10 Mc  
 Output Voltage, all range: Better than 0.28 peak-to-peak volt

**Output Impedances:**  
 RF Ranges.....150-0-150 ohms, normal load  
 IF & Video Ranges.....100 ohms cable termination

**Attenuator Ranges:**  
 RF Ranges.....20000/1  
 IF & Video Ranges.....4000/1

**Maximum Amplitude Variation While Sweeping:**  
 All ranges,  $\pm 1$  db

**Horizontal Sweep:**  
 Phase Range: 0-160°; Frequency: 60 cps;  
 Amplitude: 5.6 peak-to-peak volts  
 Dimensions.....10" x 13½" x 7½"

WR-59A is a frequency-modulated sweep-alignment generator. It generates signals of fundamental frequency on all ranges, except video, Pix 5-15, and Pix 20-30 which are beat frequency (on these bands, band-pass filters are used) which are preset for speed and accuracy. The ranges include all 13 TV rf channels, picture and sound IF, video, prewar pix IF, the standard FM intermediate, and a spare 25-40 Mc channel. Sweep width is continuously variable, and output level is flat within 1 db in all positions. The output will match balanced or unbalanced lines, and is variable over wide limits by means of an elaborate piston attenuator. The unit develops a sweep frequency signal for a scope, and phasing control is provided. An additional feature is return-trace blanking which produces a zero-reference line on the cathode-ray tube. The unit is complete with rf and if/rf output cables. Shipping weight, 20 lbs. Sugg'd User Price: \$325.00



## MASTER VOLTOHMYST ELECTRONIC METER (WV-95A)

**DC Voltmeter Ranges:** 0 to 5-10-50-100-500-1000 dc volts; Input Resistance: 11 megohms on all ranges  
**AC Voltmeter Ranges:** 0 to 1-5-10-50-100-500-1000 RMS volts; Frequency Response: 30 cps to 20 kc; Input Impedance: 0.5 megohms shunted by 125  $\mu\text{f}$

**DC Ammeter Ranges:** 0-10, 0-100  $\mu\text{a}$ , 0 to 1-10-100 ma, 0-1, 0-10 amps.

**Ohmmeter Ranges:** 0.1 ohm to 1000 megohms in six ranges; Center-Scale Indications: 10, 100, 1000, 10000 ohms; 0.1, 10 megohms

**Capacitance Meter Ranges:** 4 $\mu\text{f}$  to 1000  $\mu\text{f}$  in six ranges; Center-Scale Indications: 100, 1000  $\mu\text{f}$ ; 0.01, 0.1, 1, 10  $\mu\text{f}$

(NOTE: The following data apply to the WV-95A when used with RCA Diode Probe WG-275 which is supplied on separate order.)

**RF Voltmeter Ranges:** 0 to 5-10-50-100 RMS volts from 30 cps to 17.5 Mc; 0 to 5-10-30 RMS volts from 17.5 to 75 Mc; 0-5, 0-10 RMS volts from 75 to 250 Mc  
 Input Impedance: 625000 ohms shunted by 15.6  $\mu\text{f}$  at 1 Mc; 32000 ohms shunted by 14.5  $\mu\text{f}$  at 10 Mc; 100 ohms shunted by 13  $\mu\text{f}$  at 250 Mc

**Meter Indications:** RMS value of sine-wave voltage, 0.354 peak-to-peak value of recurrent complex-wave voltage  
 Dimensions.....10" x 13½" x 7½"

The WV-95A is truly the "master" electronic multimeter. It combines in one case an ac voltmeter, dc voltmeter, ohmmeter, dc microammeter, dc milliammeter, capacitance meter, and a dc ammeter. The instrument is ac line operated. The carefully balanced meter is virtually burn-out proof; it has a full scale accuracy of  $\pm 2\%$ , and it may be zero-centered for discriminator alignment work. The capacitance circuit includes a polarizing voltage for measurement of electrolytic capacitors. The entire electrical system is insulated from the metal case which may be grounded separately. Accessories available on separate order include a 100-Mc crystal probe WG-263, and a 250-Mc peak-to-peak diode probe, WG-275. Unit is complete with three test leads and two test cables with plugs and clips. Shipping weight, 15 lbs. Sugg'd User Price: \$152.50





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## TEST OSCILLATOR (WR-67A)



The WR-67A combines speed, accuracy, convenience and over-all dependability in signal injection and alignment work. A range switch allows for the quick selection of three fixed frequencies of 1500, 600, and 455 kc . . . or smoothly variable fundamental frequencies from 100 kc to 30 Mc, plus useful harmonics out to 90 Mc. Add to this — a temperature compensated oscillator . . . special signal-injection probe . . . both step and vernier attenuators . . . double shielding . . . six-band drum dial with easy-to-read, four-foot scale spread . . . scale accuracy of  $\pm 2\%$  adjustable modulation level for internal and external modulation . . . power-line filter to minimize rf leakage . . . and 400-cycle signal source — More features than can be found in most signal generators. Shipping weight, 20 lbs. Sugg'd User Price: \$89.50

Frequency Range: Continuous from 100 kc to 31 Mc. Band A: 100-260 kc; Band B: 260-650 kc; Band C: 635-1600 kc; Band D: 1.6-4.7 Mc; Band E: 4.4-12.8 Mc; Band F: 10.5-31 Mc.  
Calibration Accuracy..... $\pm 2\%$

Fixed Frequencies.....455, 600, 1500 kc

Output Voltage: Continuously variable, 5  $\mu$ v to 1 volt RMS

Internal Modulation: 400 cps; adjustable from 0% to 50%

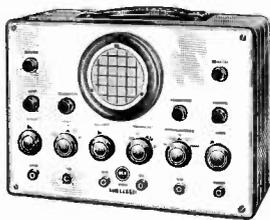
External Modulation: 2 RMS volts req., for 30% mod. to 17000 cps

Audio Output......25 max. RMS volts

RF Output Impedance.....10-1000 ohms  
(Varies with attenuator setting)

Dimensions.....10" x 13 $\frac{1}{2}$ " x 7 $\frac{1}{2}$ "

## 3" OSCILLOSCOPE (WO-55A)



The WO-55A oscilloscope is a visual electronic voltmeter. It is equipped with a calibrating facility and a regular multi-meter range switch. Voltages can be read directly on the clip-on graph screen at the same time waveforms are being studied. Push-pull vertical and horizontal amplifiers provide good fidelity and considerably more output than needed for the 3" CR tube. This allows the trace to be greatly expanded for observation of pattern detail. The scope has a retractable light shield and all usual oscilloscope features. It is a quality instrument, rugged, stable, linear, and well-suited for TV-FM alignment and other oscilloscope applications in the laboratory, factory, field installation, and service shop. Shipping weight, 15 lbs. Sugg'd User Price: \$129.50

Deflection:  
Vertical Amplifier: Better than 1.33 peak-to-peak volts/inch 0.46 RMS volt/inch  
Vertical Deflecting Electrodes: Better than 120 peak-to-peak volts/inch 42 RMS volts/inch  
Horizontal Amplifier: Better than 1.5 peak-to-peak volts/inch 0.53 RMS volts/inch  
Horizontal Deflecting Electrodes: Better than 135 peak-to-peak volts/inch 48 RMS volts/inch  
Amplifier Gain (both amplifiers).....90 times  
Input Impedance:  
Vertical Amplifier: 0.5 megohm, shunted by 55  $\mu$  $\mu$ i  
Horizontal Amplifier: 0.5 megohm, shunted by 37  $\mu$  $\mu$ i  
Horizontal Deflecting Electrodes: 5.6 megohms, shunted by 12  $\mu$  $\mu$ i  
Sine-Wave Frequency Response (both amplifiers):  
Flat within  $\pm 10\%$  from 7-40000 cps  
Flat within  $\pm 20\%$  to 70 kc  
Down less than 50% at 200 kc  
Horizontal Sweep Range.....15-50000 cps  
Auxiliary Sine-Wave Sweep Frequency: 60 cps  
Calibrator Voltage.....10 peak-to-peak volts  
Deflecting Capability:  
The beam can be expanded off-screen for observation of pattern detail  
Dimensions.....10" x 13 $\frac{1}{2}$ " x 7"

## AUDIO OSCILLATOR (WA-54A)



The WA-54A Audio Oscillator is a portable, completely self-contained ac operated instrument for generating sinusoidal voltages within the frequency range of 20 to 17,000 cycles per second . . . easily adaptable for measuring the fidelity of radio receivers, frequency response of audio amplifiers, and modulation characteristics of small transmitters, also used for determining frequencies and mechanical speeds. Tapped output transformer makes it possible to match the oscillator output to load impedances most frequently encountered . . . electronic "eye" serves as calibration indicator, output level indicator, and pilot lamp. Frequency settings are read from a large, easy-to-read drum dial. Shipping weight, 19 lbs. Sugg'd User Price: \$152.50

Frequency Range (continuous).....20 cps to 17 kc

Output Impedance:  
High-Level Balanced.....250, 500, 5000 ohms  
High-Level Unbalanced.....62.5, 125, 1250 volts  
Low-Level Unbalanced.....10000 min. ohms

Output Voltage (approx.):  
No Load (high level).....40 RMS volts  
With 5000-Ohm Load.....25 RMS volts  
With 500-Ohm Load.....7.9 RMS volts  
With 250-Ohm Load.....5.5 RMS volts  
No Load (low level).....2.5 RMS volts

Output Variation (loaded).....less than  $\pm 2$  db

Distortion.....less than 5% RMS

Dimensions.....10" x 13 $\frac{1}{2}$ " x 7 $\frac{1}{2}$ "

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## AUDIO VOLTMETER (WV-73A)

Voltage (AC).....0.001 to 1000 volts  
 Frequency Range.....20 to 20,000 cycles  
 Input Impedance.....1 megohm and 25  $\mu$ f  
 Power Supply.....105/125 volts; 50/60 cycles  
 Dimensions.....13½" w; 10" h; 7½" deep  
 Weight.....15 lbs.  
 Finish (Case).....Blue-Gray  
 (Panel).....Anodized Aluminum

Ideal for measuring voltages in high-impedance circuits. Logarithmic scale and overlapping attenuator assure accuracy even when pointer is at either end of scale. Excellent frequency response. Sugg'd User Price: \$149.50



## ADVANCED VOLTOHMYST (WV-75A)

DC (6 ranges).....0 to 1000 volts  
 AC (6 ranges)  
 Using probe directly.....0 to 100 volts  
 Using probe and multipliers.....0 to 1000 volts  
 Frequency Response:  
 Using probe directly.....30 cycles to 250 Mc  
 Using probe and multipliers.....30 cycles to 15 kc  
 Input Impedance (using probe directly):  
 At 1 Mc.....625 Kilohms; 15.6  $\mu$ f  
 Resistance (6 ranges).....0 ohms to 1000 megohms  
 Power Supply (AC).....105/125 volts, 50/60 cycles  
 Dimensions.....6½" w; 9½" h; 6¼" deep

For High-Frequency, FM, TV, UHF and pulse work. Newly-developed diode probe permits peak-to-peak AC voltage readings to 250 Mc. WV-75A is really 6 instruments: VHF Voltmeter, Audio Voltmeter, AC Voltmeter, DC Voltmeter, Ohmmeter, FM Indicator. Meter is burn-out proof. The WV-75A employs a push-pull DC Vacuum Tube Voltmeter circuit characterized by excellent linearity and stability. Sugg'd User Price: \$125.00.



## ULTRA-SENSITIVE DC MICROAMMETER (WV-84A)

Readings.....0.001  $\mu$ a to 1 ma full scale  
 Six Ranges.....0.01; 0.1; 1.0; 10; 100; 1000  $\mu$ a  
 Voltage Drop at Full Scale (all ranges) 0.5 volts  
 Power Supply (Batteries).....2-1½ volts A (RCA VS106)  
 2-22½ volts B (RCA VS102)  
 Dimensions.....6¼" w; 9½" h; 5¼" deep  
 Weight (including batteries).....9½ lbs.

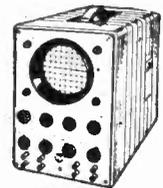
Reads from 0.001 to 1000 microamperes in six separate ranges. Useful for measuring high values of resistance; may be used as high resistance voltmeter. Approaches galvanometer sensitivity. Electronic protected non-burn-out meter. Accuracy, 0.01 range,  $\pm$  5% of full scale reading; other ranges  $\pm$  4%. Ideal for weak-current measurements in phototubes, multiplier phototubes, etc. Sugg'd User Price (less batteries): \$100.00.



## INDUSTRIAL OSCILLOSCOPE (WO-60C)

Deflection Sensitivity:  
 Vertical Amplifier.....0.020 RMS volt/inch  
 Horiz Amplifier.....0.024 RMS volt/inch  
 Input Impedance:  
 Vert or Horiz Amp.....1 meg shunted by 22  $\mu$ f  
 Frequency Response:  
 Sine Wave.....Flat  $\pm$  10%; 5-80,000 cycles  
 Flat  $\pm$  20%; 2-100,000 cycles  
 Square Wave.....No tilt or overshoot 20-5000 c  
 Sawtooth Time Base.....3 to 30,000 cycles/sec  
 Power Supply.....105/125 volts, 50/60 cycles  
 Dimensions.....9½" w; 14" h; 19¼" deep

Portable scope with wide variety of uses. Excellent phase-shift characteristics, 1-f response. Holds high sensitivity even with violent shock. Designed for fast changeover from one type persistence C-R tube to another. Useful range 0.5 to 300,000 cycles. Sugg'd User Price: \$345.00.



## PORTABLE OSCILLOSCOPE (WO-79A)

Frequency Range:  
 Vertical Amplifier.....10 cycles to 5 Mc  
 Horizontal Amplifier.....10 cycles to 500 kc  
 Deflection Sensitivity:  
 Vert. Amplifier.....0.18 RMS volt/in  
 Horizontal Amplifier.....0.46 RMS volt/in  
 Sawtooth Time Base.....20 cycles to 250 kc/sec  
 Triggered Time Base.....Repetition to 50 kc/sec  
 Blanking.....Return trace blanked on triggered definition  
 Power Supply.....105/125 volts, 50/60 cycles  
 Dimensions.....8¼" w; 14¼" h; 16¼" deep

For detailed observation and accurate measurement of voltages produced by TV synch. and deflection circuits, ignition systems, pulse generators, etc. Wide horiz. deflection—up to twice screen diam. Calibrated meter for voltage measurements. Built-in delay line. Triggered sweep. Sugg'd User Price: \$550.00.



## LABORATORY OSCILLOSCOPE (715-B)

Vertical amplifier flat to 11 Mc. Triggered and linear sweep. One microsecond markers. Sugg'd User Price: \$2400. Write for catalog.

## DC OSCILLOSCOPE (WO-27A)

Both vertical and horizontal amplifiers flat from from 0 to 100,000 cycles. 5" C-R tube, quickly interchangeable. Sugg'd User Price: \$1150.

All prices in effect 5/1/49.



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The ideal instrument for radio servicing. In one instrument, at one price, you get 6 testing devices: DC Voltmeter; Ohmmeter; AC Voltmeter; A-F Voltmeter; Outputmeter; FM Indicator. New features include diode for AC measurements, linear AC scale for all ranges; RCA Crystal probe WG-263 (available on request). Sugg'd User Price: \$79.50.

Electronic DC Voltmeter Range.....0-3; 10; 50; 100; 500; 1000 volts  
 Input Impedance.....10 megohms constant  
 Electronic Ohmmeter Range.....0-1,000; 10,000; 100,000 ohms; 0-1; 10; 1000 megohms  
 Internal Source.....3 volts  
 Electronic AC Voltmeter Range.....0-5; 10; 50; 100; 500; 1000 volts  
 Power Supply.....105/125 volts; 50-60 cycles  
 Dimensions.....6 $\frac{3}{4}$ " w; 9 $\frac{1}{4}$ " h; 6 $\frac{3}{4}$ " deep  
 Weight.....14 lbs.  
 Finish.....Grey wrinkle, brush chrome panel

## VOLTOHMYST (195-A)



Portable electronic voltmeter-ohmmeter and ammeter combination for mobile, industrial or rural use. Works anywhere without AC power source thereby extending famous Volt-Ohmyst features to places remote from power lines. Neon panel lamp lights when battery is used. Unusually long battery life with normal use. Sugg'd User Price: \$59.50 (Less batteries).

DC Ranges.....0-3; 10; 30; 100; 300; 1000 v  
 Input Resistance.....11 megohms constant  
 AC Ranges.....0-10; 30; 100; 300; 1000 v  
 Sensitivity.....1000 ohms per volt  
 Ohmmeter Ranges.....0-1000; 10,000; 100,000 ohms; 0-1; 10; 1000 megohms  
 DC Ammeter Ranges.....0-3; 10; 30; 100; 300 milliamp; 0-10 amp  
 Batteries.....Four 1 $\frac{1}{2}$ v "A"; two 45v "B"  
 Dimensions.....6 $\frac{1}{4}$ " w; 9 $\frac{1}{2}$ " h; 5 $\frac{1}{2}$ " deep  
 Weight (incl. batteries).....9 lbs.

## BATTERY VOLTOHMYST (WV-65A)



Eliminates shock hazard between ac-dc chassis and ground, speeds detection of receiver faults with high-line tests, and facilitates testing of receivers at the design-center value of 117 volts. A six-position switch and three secondary receptacles afford maximum flexibility and operating convenience. Sugg'd User Price: \$8.95

Primary:  
 Line Voltage Range.....105-130 volts  
 Switch Positions.....105, 110, 115, 120, 125, 130 volts  
 Frequency.....50-60 cycles  
 Secondary:  
 Output Voltages (approx.).....105-117-130  
 Power Output at unity power factor (Max.):  
 Cont. Oper. (30°C Amb.).....100 watts  
 Intermitt. Oper. (30°C Amb.).....150 watts  
 Regulation (at 100 volt-amperes).....10%

## ISOTAP ISOLATION TRANSFORMER (WP-24A)



Makes any VoltOhmyst a VHF Voltmeter. Reads flat to 100 Mc. Adapts VoltOhmyst for HF, FM or TV test needs, within sensitivity range of the instrument. Withstands DC loads of 250 volts. Sugg'd User Price: \$8.95.

Input Voltage.....22 rms volts (max)  
 Frequency Range.....1000 cycles to 175 Mc  
 Frequency Response..... $\pm$  10% from 1 kc to 100 mc  
 Overall Accuracy..... $\pm$  7.5% at full scale  
 Input Capacity.....3.5  $\mu$ f

## CRYSTAL PROBE (WG-263)

## DIODE PROBE (WG-275)

The RCA Diode Probe WG-275 is designed to operate in combination with RCA VoltOhmyst Electronic Meters WV-75A or WV-95A; it enables these instruments to read RMS peak-to-peak voltages at frequencies from 30 cycles to 250 Mc. The probe fits coaxial "T" connectors, and permits direct measurement of voltages in coaxial lines.

The full-wave circuit of the WG-275 eliminates errors inherent in half-wave probes for measurements of unsymmetrical waves.

Sugg'd User Price: \$30.00

Frequency Response:  
 Direct to Probe.....30 cps to 250 Mc  
 Direct Supplied Leads.....30 cps to 30 Mc  
 Effective Input Resistance and Capacitance Direct to Probe:  
 At 1 Mc.....625000 ohms shunted by 15.6 uuf  
 At 10 Mc.....32000 ohms shunted by 14.5 uuf  
 At 250 Mc.....100 ohms shunted by 13 uuf  
 Maximum Input Voltages:  
 Direct to Probe  
 30 cps to 17.5 Mc.....100 RMS volts  
 At 75 Mc.....30 RMS volts  
 At 250 Mc.....10 RMS volts  
 Meter Indication:  
 Sine Waveform.....RMS volts  
 Complex Recurrent Waveform: 0.354 of peak-to-peak voltage.  
 (The peak-to-peak voltage of both sine and complex waveforms equals the meter indication times 2.83).



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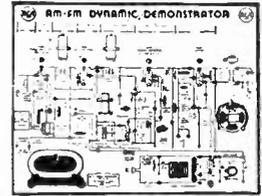
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## AM-FM DYNAMIC DEMONSTRATOR (WE-82A)

Frequency Range.....550 to 1800 kc  
 AM i-f......455 kc  
 FM i-f......10.7 Mc  
 RF (AM) Sensitivity......200 microvolts  
 Power Supply......105/125 volts, 50/60 cycles  
 Discriminator......Foster-Seeley  
 Dimensions......45" w; 33" h; 6" deep  
 Weight......25 lbs.

A working schematic diagram of a typical 5-tube superheterodyne radio. Parts are mounted near proper symbols; wired to operate. Pin jacks on 5 color sections make experiments, described in instructions, easy to perform. Has discriminator circuit for FM if demonstration. Sugg'd User Price: \$99.50



## FM SWEEP GENERATOR (WR-53A)

I-F Oscillator:  
 Frequency Range......8.3 to 10.7 Mc  
 Output......1 microvolt to 0.1 volt  
 R-F Oscillator:  
 Frequency Range......85 to 110 Mc  
 Output......5 microvolts to 0.1 volt  
 Power Supply......105/125 volts, 50/60 cycle  
 Finish (Case)......Blue-Gray  
 (Panel)......Anodized Aluminum  
 Dimensions......13½" w; 9¾" h; 7½" deep

Designed especially for rapid and accurate alignment of FM receivers. Produces an i-f sweep frequency of 0 to 200 kc adjustable band width, which can be centered on any i-f from 8.3 to 10.7 Mc. Also has CW or AM signal in 85 to 110 Mc range for oscillator and mixer alignment. Sugg'd User Price: \$89.50



## OSCILLOSCOPE (WO-58A)

Vertical Amplifier:  
 Deflection—0.18 RMS volt/in  
 Sine-Wave Frequency Response:  
 Flat within ±20% from 5 cycles to 2 Mc  
 Frequency response curve has no positive slope above 1 kc  
 Square-Wave Response:  
 Tilt and overshoot less than 2% from 30 to 50,000 cycles  
 Rise time less than 0.15 μ sec from 10% to 90% of total rise  
 Horizontal Amplifier:  
 Sine-Wave Frequency Response:  
 Flat within ±10% from 6 to 100,000 cycles

5" oscilloscope affording accurate presentation of synchronizing pulses, deflection waveforms, and composite video signals. Peak-to-peak voltages of waveforms can be read during operation. Defective waveforms can be traced step-by-step. The crystal probe can be plugged into the kine-scope socket of the receiver under test to observe video-amplifier response. Sugg'd User Price: \$345.00.



## RIDER CHANALYST (162-C)

R-F, I-F range......100 kc to 1700 kc  
 attenuation......10,000 : 1  
 Osc. channel range......600 kc to 15 Mc  
 attenuation......10 : 1  
 A-F range......0.1 volt to 1000 volts  
 DC range......± 5, 25, 125, 500 volts  
 Wattage indicator......30-250 watts  
 Power supply......105/125 volts, 50/60 cycles  
 Dimensions......16" w; 9" h; 10¾" deep  
 Weight......28 lbs.

Can be used to quickly check presence, absence or character of signal at any point in any AM receiver. Enables serviceman to determine wattage, voltage and signal level thruout the set. All tests can be made simultaneously for monitoring intermittent receivers. Sugg'd User Price: \$162.50.



## REGULATED POWER SUPPLY (WP-23A)

Specifications:  
 Regulated DC Output Voltage..300 max. volts  
 Range (continuously adjustable)......0-300 dc volts  
 Current Capability  
 From 120-300 volts......120 max. ma  
 From 60-120 volts......80 max. ma  
 From 0-60 volts......60 max. ma  
 Ripple Voltage...Less than 8 RMS millivolts  
 Unregulated DC  
 Output Voltage.....Approx. 600 dc volts  
 Current Capability......120 max. ma  
 Ripple Voltage......0.1 RMS volt  
 Auxiliary Unregulated AC  
 Output Voltage......6.3 volts  
 Current Capability......5 amperes  
 Input Power Requirement......105-125 volts, 50/60 cycles, 175 max. watts.  
 Dimensions......Height, 10"; width, 13½"; depth, 7½"

A general purpose d-c power source with excellent voltage regulation output provides an adjustable voltage which remains constant over wide ranges of load impedance and line voltage variations — eliminates the need for constant measurement and readjustment of supply voltages each time a circuit change is made. Primarily intended as an extremely stable "B" supply, the WP-23A is also useful as a low-impedance "C" bias supply. Shipping weight 25 lbs. Sugg'd User Price: \$130.00.





# SYLVANIA ELECTRONIC EQUIPMENT



## TUBE TESTERS



Type 140

Here's the last word in tube testers made for discriminating distributors, radio servicemen and industrial users. This convenient on-the-spot tester can check more than 500 tube types under actual operating conditions. Size:  $5\frac{1}{4}$ " x  $14\frac{3}{16}$ " x 15". Weight: 18 lbs.

Features: Shorts Test at voltage low enough to prevent tube damage, high enough for full brilliancy on indicator. All tube elements tested under dynamic conditions. Fingertip Controls. Tests all styles of receiving tubes. Large  $4\frac{1}{2}$ -inch meter; 8-foot cord. Price: \$59.50.

## FM-AM SIGNAL GENERATOR



Type 216

Supplies all signals necessary for complete alignment of FM and AM receivers. Frequency range 80 kc to 120 mc. Sweeps of  $\pm 350$  kc,  $\pm 75$  kc, and  $\pm 15$  kc. 1-volt output. Price \$189.50.

## POLYMER DC VOLTAGE MULTIPLIER

With this new DC Voltage Multiplier, the 1,000 vdc range setting on your Sylvania Polymermeter will read 10,000 vdc full scale! Add this accessory to your Polymermeter and you have a Kilovoltmeter for testing TV circuits. Type 222 (10 KV) for the Polymermeter Types 134 and 134Z. Type 223 (10 KV) for Polymermeter Type 221. Only \$9.95!



Type 224 (30 KV) for Polymermeter Types 134 and 134Z; Type 225 (30 KV) for Polymermeter Type 221. \$12.50.

Type 226 Conversion Cartridge (for 20,000 Ohm/Voltmeter). \$2.00.

## POLYMER Type 221

The perfect multi-purpose meter for AM-FM-TV servicing. Tests receivers, transmitters, industrial electronic equipment. Highly accurate. New circuit provides superior stability. New rf probe feature provides increased flexibility in use. All essential accessories no extra charge. Price: \$99.50.



## OSCILLOSCOPES (Types 131 and 132)

### OSCILLOSCOPE Type 132

Giant 7" tube and special push-pull amplifiers place this sensational instrument in a class by itself. Check wide response, high input impedances, low amplifier distortions. Priced as low as many smaller oscilloscopes. Has jack for intensity modulation. Widely used by service dealers and industrials for AM-FM-TV testing. Price: \$144.50.



### OSCILLOSCOPE Type 131

Flexible in its many applications, this complete 'scope is priced within reach of every pocketbook. High input impedances, excellent sensitivity and amplifier response. Price: \$69.50.



Wide range — 20-20,000 cycles, flexible, accurate. Negative feedback minimizes output distortion. Ideal for receiver, transmitter, PA servicing. High output permits testing speakers direct. Stabilized R-C circuit. Price: \$129.50.

## MODULATION METER X-7018

Monitors modulation percentage and speech quality. Compact and economical. Helps keep transmission efficient and comply with



FCC overmodulation regulations. Indicates carrier shift. Price: \$29.50.



Type 145  
AUDIO OSCILLATOR

See your Sylvania Distributor or write Sylvania Electric Products Inc., Radio Tube Division, Emporium, Pa.

## TELEVISION STANDARD SIGNAL GENERATOR MODEL 90

This signal generator was designed to meet the most exacting standards required for high definition television use.

### CARRIER FREQUENCY:

**RANGE:** Continuously variable from 20 to 250 megacycles, in eight ranges.  
**ACCURACY:** Crystal frequency standard permits setting to .01%. Dial scale may be set to 0.1%.  
**STABILITY:** Warm-up drift less than .05%.  
**LEAKAGE:** Less than 10 microvolts.

### MODULATION:

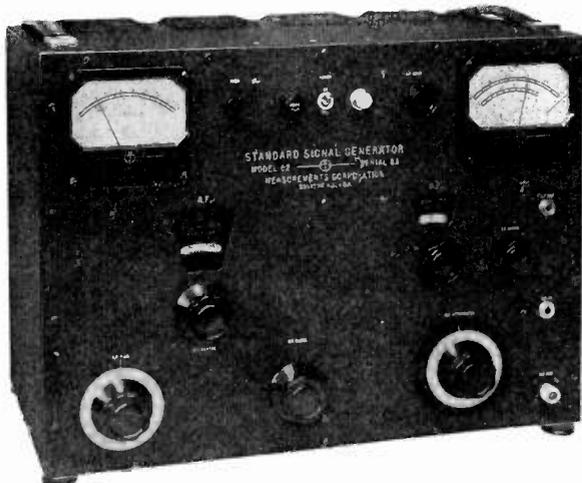
Continuously variable from zero to 100%.  
**ENVELOPE:** Sinusoidal, or composite television. Bandwidth to 3 db is 4 Mc. Rise time from 10% to 90% modulation 0.15 microsecond. Overshoot less than 5%. Slope less than 5% on 60 cycle square wave.  
**INPUT IMPEDANCE:** 75 ohms  $\pm$  10% (RMA Standard)  
**INPUT LEVEL:** 1.5 volts peak to peak minimum level for 100% modulation. Black negative polarity.  
**MODULATION PERCENTAGE:** Zero to 110%; plate modulation.

### OUTPUT:

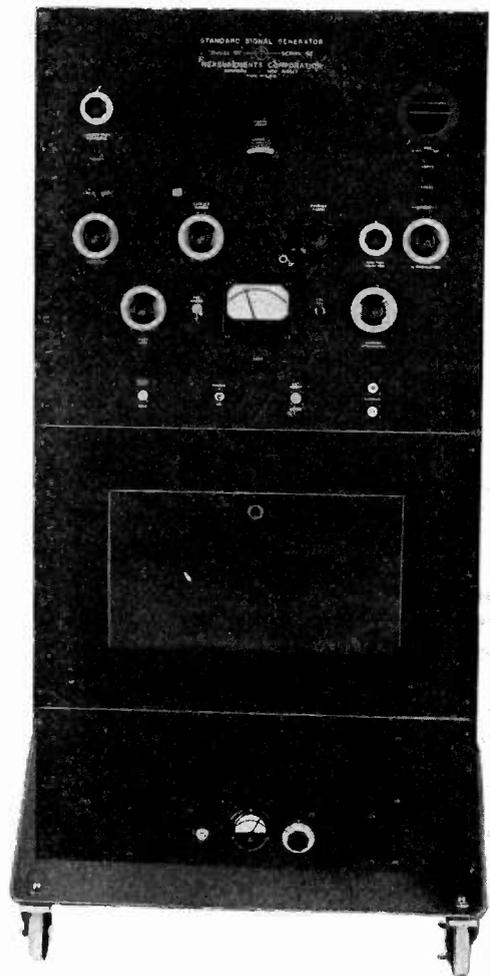
**LEVEL:** Continuously variable from 0.3 microvolt to 0.1 volt balanced to ground (measured at 100% modulation level).  
**IMPEDANCE:** (a) 107 ohms line to line (balanced).  
(b) 53.5 ohms line to ground (unbalanced).  
(c) Suitable pads may be employed to alter these impedances.

### DIMENSIONS:

**OVERALL:** Height—58 $\frac{3}{4}$ " ; Width—28 $\frac{1}{4}$ " ; Depth—25 $\frac{1}{2}$ " .  
**WEIGHT:** Model 90—302 pounds.  
External Voltage Regulator: 92 pounds.  
**POWER SUPPLY:** 117 volts, 60 cycles. 700 watts.



**LEAKAGE AND STRAY FIELD:** Less than 1 microvolt from 80 kilocycles to 50 megacycles.  
**POWER SUPPLY:** 117 volts, 50-60 cycles. 75 watts.  
**DIMENSIONS:** 15" high x 19" wide x 11 $\frac{3}{4}$ " deep overall.  
**WEIGHT:** 50 pounds.



## STANDARD SIGNAL GENERATOR MODEL 82

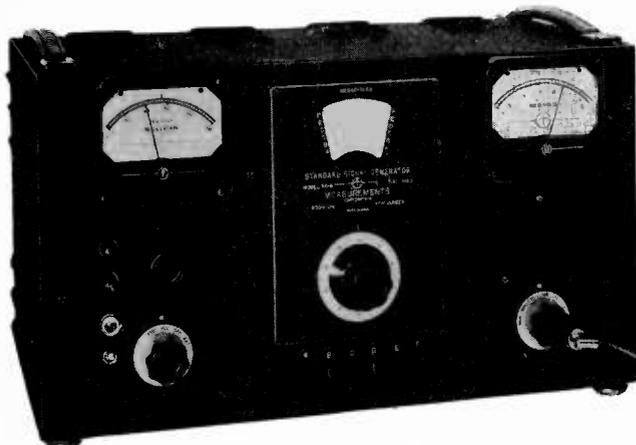
**FREQUENCY RANGE:** 20 cycles to 200 kilocycles in four ranges. 80 kilocycles to 50 megacycles in seven ranges, plus one blank range.

**FREQUENCY CALIBRATION:** Each range is individually calibrated. 20 cycles to 200 kilocycles, accurate to  $\pm$ 5%. 80 kilocycles to 50 megacycles, accurate to  $\pm$ 1%.

**OUTPUT VOLTAGE AND IMPEDANCE:** 0-50 volts across 7500 ohms from 20 cycles to 200 kilocycles. (The output voltage and impedance in this range can be reduced by an external attenuator). 0.1 microvolt to 1 volt across 50 ohms over most of the range from 80 kilocycles to 50 megacycles.

**MODULATION:** Continuously variable 0-50% from 20 cycles to 20 kilocycles from internal variable oscillator.

**HARMONIC OUTPUT:** Less than 1% from 20 cycles to 20 kilocycles; 3% or less from 20 kilocycles to 50 megacycles.



**POWER SUPPLY:** 117 volts, 50-60 cycles. 115 watts.  
**DIMENSIONS:** 11" high x 20" long x 10 1/4" deep, overall.  
**WEIGHT:** Approximately 55 pounds.

### STANDARD SIGNAL GENERATOR MODEL 65-B

**FREQUENCY RANGE:** 75 kilocycles to 30 megacycles in 6 push button ranges.

**FREQUENCY CALIBRATION:** The frequency dial is direct reading and individually hand calibrated for each range. It is accurate to  $\pm 0.5\%$ .

**OUTPUT VOLTAGE:** Continuously variable from 0.1 microvolt to 2.2 volts.

**OUTPUT IMPEDANCE:** 5 ohms to 0.2 volt, rising to 15 ohms at 2.2 volts.

**MODULATION:** Continuously variable from 0 to 100%. Modulation depth is indicated directly by a meter on the panel. Modulation may be obtained either from an internal source of 400 or 1000 cycles or from an external source.

**ENVELOPE DISTORTION:** Less than 4% at 100% modulation at 1 megacycle.

**LEAKAGE:** Less than 0.1 microvolt leakage with attenuator set for 0 output.

### STANDARD SIGNAL GENERATOR MODEL 80

**FREQUENCY RANGE:** 2 to 400 megacycles in 6 bands, individually calibrated direct reading dial.

**FREQUENCY ACCURACY:**  $\pm 0.5\%$ .

**OUTPUT VOLTAGE:** Continuously variable from 0.1 to 100,000 microvolts.

**OUTPUT IMPEDANCE:** 50 ohms.

**MODULATION:** Amplitude modulation is continuously variable from 0 to 30%. Modulation depth is indicated by a meter on the panel. An internal 400 or 1000 cycle audio oscillator is provided. Modulation may also be applied from an external source. Pulse modulation may be applied to the oscillator from an external source through a special connector.

**LEAKAGE AND STRAY FIELD:** Attenuator leakage less than 0.1 microvolt. Power line leakage less than 0.5 microvolt. Stray fields less than two microvolts.

**POWER SUPPLY:** 117 volts, 50 to 60 cycles. 70 watts.



**DIMENSIONS:** 10 3/4" high x 19" wide x 9 1/2" deep, overall.  
**WEIGHT:** Approximately 45 pounds.

**ACCESSORIES:** (Order with instrument) Recommended — 80-ZH4 Cable; 80-ZH3 Pad. Available — 80-ZH1 Pad; 84-Z2-1 Cable; 84-Z2-2 Cable; 84-Z2-3 Cable; UG-201/U Adapter.

### FM STANDARD SIGNAL GENERATOR MODEL 78-FM

**FREQUENCY RANGE:** 86 to 108 megacycles, individually calibrated dials. Accurate to  $\pm 0.5\%$ .

**OUTPUT VOLTAGE:** 1 to 100,000 microvolts.

**LEAKAGE:** Less than 1 microvolt.

**MODULATION:** Deviation continuously variable from 0 to 300 kc. Indicated on directly calibrated dial. 400 cycle internal audio oscillator. Can be modulated from an external source providing 6 volts across 5000 ohms.

**FIDELITY:** Flat within two db from DC to 15,000 cycles. Distortion is less than 1% at 75 kilocycles deviation. Transient response is excellent.

**POWER SUPPLY:** 117 volts, 50 to 60 cycles. 36 watts.

**DIMENSIONS:** 10" high x 13" wide x 7" deep, overall.

**WEIGHT:** Approximately 20 pounds.



### MODEL M-275 I.F. CONVERTER

**CARRIER FREQUENCIES:** 4.5, 10.7, 21.7 Mc.

**OUTPUT VOLTAGE:** 10 microvolts to 1.0 v. when used with Model 78-FM.

**BAND WIDTHS:** 5% down,  $\pm 250$  Kc. from center frequency.

This instrument is designed to be used with the Model 78-FM Standard Signal Generator to provide output frequencies in the I.F. range.

**AMPLITUDE MODULATION:** Provision for external AM up to approximately 80%, combined with, or exclusive of, FM. There is negligible spurious FM due to AM. The envelope distortion is less than 10% at 80% modulation.

# Laboratory Standards MEASUREMENTS CORPORATION

## STANDARD SIGNAL GENERATOR

### MODEL 84

**FREQUENCY RANGE:** 300 to 1000 megacycles, individually calibrated direct reading dial.

**FREQUENCY ACCURACY:**  $\pm 0.5\%$ .

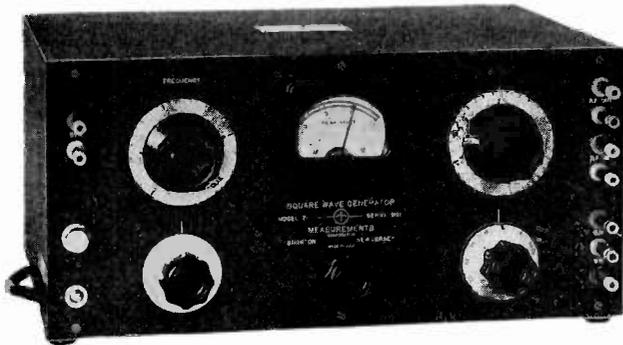
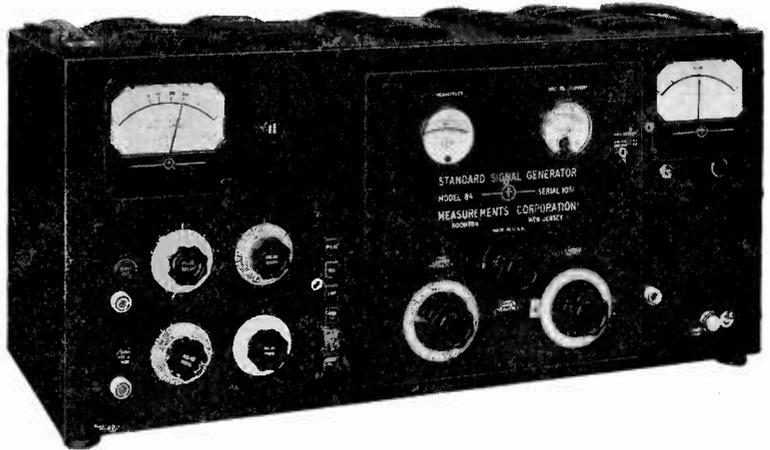
**OUTPUT VOLTAGE:** Continuously variable from 0.1 to 100,000 microvolts.

**OUTPUT IMPEDANCE:** 50 ohms.

**AMPLITUDE MODULATION:** Continuously variable from 0 to 30% indicated directly on panel meter. Internal sine-wave oscillator; choice of 400, 1000, or 2500 cycles is provided. External modulation up to 30 kilocycles may be applied.

**PULSE MODULATION:** Repetition rate continuously variable from 60 to 100,000 cycles. Pulse width continuously variable from 1 to 50 microseconds indicated on directly calibrated dial. Pulse delay (with respect to synchronizing output) continuously variable from 0 to 50 microseconds indicated on directly calibrated dial. May be synchronized with an external sine-wave or pulse source.

**POWER SUPPLY:** 117 volts, 60 cycles, 230 watts (with regulator).  
**DIMENSIONS:** 12" high x 26" wide x 10" deep, overall.  
**WEIGHT:** Approximately 135 pounds, including external line voltage regulator.  
**ACCESSORIES:** Included with each instrument are four connecting cables, external voltage regulator.



## SQUARE WAVE GENERATOR MODEL 71

Recommended for television testing and many different applications in developing AM, FM and TV equipment where square-wave analysis is of great importance.

**FREQUENCY RANGE:** 6 to 100,000 cycles.

**WAVE SHAPE:** Rise time less than 0.2 microseconds with negligible overshoot.

**OUTPUT VOLTAGE:** Step attenuator giving 75, 50, 25, 15, 10, 5 peak volts fixed and 0 to 2.5 volts continuously variable.

**SYNCHRONIZING OUTPUT:** 25 volts peak.

**R. F. MODULATOR:** 5 volts maximum carrier input. Translation gain is approximately unity—Output impedance is 600 ohms.

**POWER SUPPLY:** 117 volts, 50-60 cycles, 100 watts.

**DIMENSIONS:** 7" high x 15" wide x 7 1/2" deep, overall.

**WEIGHT:** Approximately 20 pounds.

## PULSE GENERATOR MODEL 79-B

This instrument is specially adapted for plate pulsing of the Model 80 Standard Signal Generator.

**FREQUENCY RANGE:** 60 to 100,000 cycles.

**PULSE WIDTH:** Continuously variable from 0.5 to 40 microseconds.

**OUTPUT VOLTAGE:** Approximately 150 volts positive with respect to ground.

**"SYNC" OUTPUT:** 75 volts positive with respect to ground. Displaced by 1/2 period from pulse output.

**"SYNC" INPUT:** May be synchronized with as little as 2 volts peak from an external source.

**POWER SUPPLY:** 117 volts, 50-60 cycles, 115 watts.

**DIMENSIONS:** 10" high x 13 3/8" wide x 10 1/2" deep, overall.

**WEIGHT:** Approximately 31 pounds.



**MEASUREMENTS CORPORATION** BOONTON · NEW JERSEY

# Laboratory Standards MEASUREMENTS CORPORATION

## U.H.F. RADIO NOISE and FIELD STRENGTH METER MODEL 58

This versatile, portable instrument is useful in measuring signal-to-noise ratios, noise levels and for field strength surveys on television and FM transmitters.

**FREQUENCY RANGE:** 15 to 150 megacycles in five bands—dial directly calibrated in megacycles.

**INPUT VOLTAGE RANGE:** 1 to 100,000 microvolts across 72 ohm balanced line. 1 to 100 microvolts on semi-logarithmic output meter, balanced resistance attenuator with ratios of 10, 100 and 1000 ahead of all tubes.

**GAIN STANDARDIZATION:** Internal "shot noise" diode provides calibration standard. Special dial eliminates need for charts.

**CIRCUIT:** Superheterodyne circuit with tuned RF amplifier eliminates image response.

**BAND WIDTH:** 150 kilocycles @ 2X down.



**POWER SUPPLY:** Built-in regulated dual power supply for operation from either 117 volts AC or 6 volts DC. 70 watts (on AC).

**STANDARD EQUIPMENT:** Power cables, 15 foot antenna cable, 9 inch loop antenna, carrying strap, and complete instruction book.

**DIMENSIONS:** 16" wide x 9" high x 11" deep, overall.

**NET WEIGHT:** 35 pounds.

## A VERSATILE "GRID-DIP" METER MEGACYCLE METER — MODEL 59

Widely used by engineers, servicemen and amateurs in television, FM, taxi radio, aircraft radio and other electronic work. An ideal low sensitivity receiver for signal tracing.

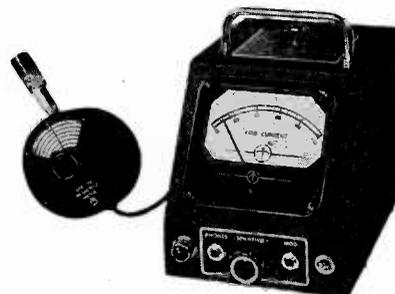
**FREQUENCY:** 2.2 Mc. to 400 Mc.; seven plug-in coils.

Hand calibrated dial, accurate to  $\pm 2\%$ .

**MODULATION:** CW or 120 cycles; or external.

**DIMENSIONS:** Power Unit, 5 $\frac{1}{8}$ " wide; 6 $\frac{1}{8}$ " high; 7 $\frac{1}{2}$ " deep. Oscillator unit, 3 $\frac{3}{4}$ " diameter; 2" deep.

**POWER SUPPLY:** 117 volts, 50-60 cycles; 20 watts.



## VACUUM TUBE VOLTMETER — MODEL 62

A general-purpose zero current voltmeter for the rapid, accurate measurement of AC or DC voltages. No zero adjust necessary when changing ranges.

**RANGE:** Push button selection of 5 ranges—1, 3, 10, 30 and 100 volts full scale AC or DC.

**ACCURACY:**  $\pm 2\%$  of full scale on each range, both DC and sine-wave AC.

**INDICATION:** Linear for DC and calibrated to indicate RMS values of a sine-wave or 71% of the peak value of a complex wave on AC.

**FREQUENCY ERROR:** Less than 10% from 30 cycles to over 150 megacycles. Resonant frequency of the probe with input terminals shorted is 350 megacycles.

**INPUT IMPEDANCE:** The input capacitance is approximately 7 mmf. The input resistance is a function of frequency.

**POWER SUPPLY:** 117 volts AC, 50 to 60 cycles.

**DIMENSIONS:** 4 $\frac{3}{4}$ " wide x 6" high x 8 $\frac{1}{2}$ " deep overall.

**WEIGHT:** Approximately 8 pounds.



## PEAK VOLTMETER MODEL 67

True peak values of complex wave forms encountered in radio and allied electronic work may be measured accurately with the Model 67. It indicates the true peak-to-peak value of symmetrical and asymmetrical waveforms varying from low frequency

square waves to pulses of less than five microseconds duration.

Full scale values of .03 to 300 volts peak-to-peak or .01 to 100 volts r.m.s. of a sine-wave in five decade ranges are indicated on semi-logarithmic scales.

**MEASUREMENTS CORPORATION BOONTON · NEW JERSEY**

# PRECISION

# TEST EQUIPMENT

STANDARD OF ACCURACY

All prices are subject to change without notice

## Series E-400 Wide Range Sweep Signal Generator Narrow and Wide Band Sweep Direct Reading from 2 to 480 Megacycles



Incorporating selected and true ultra-high frequency components and circuits, Series E-400 has been Application Engineered specifically for modern F.M. and TV. oscillographic alignment methods.

Stressing utmost simplicity of operation, flexibility, stability and accuracy, Series E-400 affords an unparalleled standard of performance and value.

Through careful, intensive development, "Precision" engineers have "designed out" costly, extraneous elements that might lead to undue early obsolescence. As a result, Series E-400 is a *fundamental requirement* for the efficient TV-F.M. Service Laboratory.

### FEATURES

- \* **Direct Frequency Reading** — 2 to 480 MC in 7 bands without skip. Harmonically calibrated from 240 to 480 MC.
- \* **6 Position Rotary Band Switch** covers complete spectrum. Last position provides pure crystal oscillator only. No coil switching. Multiple oscillator B supply switch assures maximum frequency accuracy and stability.
- \* **6 1/2" Etched Aluminum Tuning Dial** — Engine turned finish.
- \* **1500 Point Vernier Scale** permits close calibration and simple resetting of odd frequencies.
- \* **Engraved Transparent Lucite Frequency Indicator** affords readings free from parallax.
- \* **Voltage Regulated Oscillators** free of power supply variations.
- \* **The Basic Circuit and Tube Complement** — Uses 2 separate 6C4 high frequency beat oscillators plus a 6J6 reactance-modulated high frequency oscillator. This positively minimizes generation of unwanted extraneous signals. Also employs a 6J6 mixer-buffer, a 6C4 multiple crystal oscillator and a 6J6 final marker-mixer amplifier. 6X5 full wave rectifier. VR-105 voltage regulator.
- \* **Selected, True High Frequency Circuit Components** render high operating efficiency, stability and accuracy. Uses ceramic and air dielectric trimmer, coupling, by-pass and loading capacitors; rugged ceramic-lucite suspended National SLF tuning condenser; modern miniature HF tubes; mica-filled low-loss sockets; shock mounted reactance modulator; multi-section copper-plate shielding; etc.
- \* **Narrow and Wide Band Sweep** — 0 to 1 MC and 0 to 10 MC continuously adjustable. Permits easy band width setting for both F.M. and TV. requirements.
- \* **Dual Continuous R.F. Attenuators** triple shielded. Smooth, stepless, effective control from extra high output for single stage alignment to minimum levels for multi-stage adjustments.
- \* **Wide Range Phasing Control** for Hor. sweep of oscilloscope.
- \* **Multiple Crystal Marker-Calibrator** built-in. Simultaneously accommodates 4 crystals individually rotary selected. .01% accuracy 10.7 MC and 2 MC crystals furnished as standard equipment. Crystal signal separately attenuated for internal or external use.
- \* **Crystal Calibrated and Control** — Each instrument calibrated against crystal standards. The 2 MC crystal, as furnished, provides for crystal monitoring in addition to use as calibrator for external signal generators.
- \* **Terminated RG/U Coaxial Output Cable** for efficient signal transmission with minimum standing wave effects. LOW-HIGH taps plus open line switch for extra high as well as normal output signal level requirements.
- \* **8 Element Double Section Balanced Line Filter** plus Thorough Multi-Section Copper Plate Shielding of instrument assures minimum leakage and radiation.
- \* **Simultaneous A.M. and F.M. test facilities** for anti-A.M. check of F.M. second detector circuits. A.M. input jacks also permit use as an H.F. A.M. Generator.

## Series ES-500 High Sensitivity, Wide Range, 5" Oscilloscope Vertical Amplifier Range to 7 Megacycle Sensitivity 20 Millivolts per Inch



Series ES-500 affords the ultimate in performance, visibility and operational flexibility at moderate cost. "Precision" engineers have incorporated every necessary basic feature which they have found to be required to meet the needs of the rapidly advancing art of electronics, A.M., F.M., and TV.

The combination of Series ES-500 and Series E-400 Sweep Signal Generator truly represents an *Application Engineered BASIC TELEVISION and F.M. SERVICE LABORATORY.*

### FEATURES

- \* **High Sensitivity, Extended Range, Voltage Regulated, Vertical Amplifier** — 20 MV (.02 V) per inch deflection sensitivity. 10 cycles to 1 MC response. 2 megohms input resistance. Approx. 22 mmfd. input capacity.
- \* **Frequency Compensated Vertical Input Step Attenuator** — X1, X10, X100 plus continuous variable gain control in cathode follower input stage.
- \* **20 Millivolt Vertical Sensitivity** — particularly desirable for diversified TV., F.M. and A.M. circuit analyses, especially when aligning low gain single stages and performing tests involving low output analytical devices.
- \* **Extended Range Horizontal Amplifier** — 500 MV (.5 V) per inch deflection sensitivity adequate for most all "H" drive purposes. 10 cycles to 1 MC response at full gain. 1/2 megohm input resistance. Approx. 20 mmfd. input capacity.
- \* **Linear Multi-Vibrator Sweep Circuit** — 10 cycles to 30 KC plus line or external sweep.
- \* **Amplitude Controlled, 3-Way Synch. Selection** — Internal-External-Line.
- \* **"Z" Axis Modulation** input facility for blanking, timing, etc.
- \* **Sweep Phasing Control** for sinusoidal line sweep usage. Wide angle bridge circuit.
- \* **Direct H and V Plate Connections** and Audio Monitoring phone pin jacks behind rear cover plate. No screws to remove.
- \* **High Intensity CR Patterns** through use of adequate high voltage power supply with 2X2 rectifier.
- \* **The Circuit and Tube Complement** — 6J5 Vertical input cathode follower. 6AK5 first "V" amplifier. 7AD7 second "V" amplifier and CR driver. 7W7 Horizontal amplifier-CR driver. 6SN7 Multi-vibrator internal linear sweep oscillator. 5Y3 low voltage rectifier. 2X2 high potential rectifier. VR-150 vertical amplifier voltage regulator. 5CP1/A CR Tube.
- \* **8 Four-Way Lab. Type Input Terminals** — Take banana plugs, phone tips, bare wire or spade lugs.
- \* **Light Shield and Mask** removable and rotatable.
- \* **Extra Heavy-Duty Construction** and components to assure "Precision" performance.
- \* **Heavy Gauge, Etched-Anodized, No-Glare, Aluminum Panel.**
- \* **Fully Licensed** under patents of W. E. and A. T. & T. Co's.
- \* **Series ES-500 (illustrated)** — In louvered, black ripple, heavy gauge steel case. Size 8 1/4" x 14 1/2" x 18". Complete with light shield, calibrating mask and instruction manual.  
Code: Quick. **NET PRICE \$149.50**
- \* **External Deviation** input facility for sweep frequencies other than internal source.
- \* **Fuse Protected** at panel extractor fuse post.
- \* **Heavy Gauge, Etched-Anodized Aluminum Panel.**
- \* **Fully Licensed** under W. E., A. T. & T. and Remco patents.
- \* **Series E-400 (illustrated)**—In Louvred, portable, copper-plated case. Size 10 1/2" x 12" x 6". Complete with test cables, 2 crystals and elaborate Technical Manual.  
Code: Nancy. **NET PRICE \$124.70**
- \* **E-400-PM** — Consists of E-400 on 12 1/4" x 19" steel panel for standard rack mount. Complete as above.  
Code: Niece. **NET PRICE \$127.55**

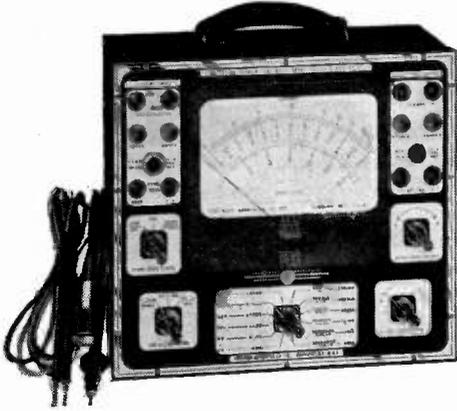
**Series TV Super-High Voltage Television Safety Test Probes On Page F-15**

# PRECISION

# TEST EQUIPMENT

STANDARD OF ACCURACY

All prices are subject to change without notice



- \* **EV-10-MCP** (illustrated) In black ripple finished, heavy gauge steel case. Size 10 1/2" x 12" x 6". Complete with tubes, battery, and test probes.  
Code: Place. NET PRICE \$89.95
- \* **EV-10-P** In hardwood portable case with tool compartment.  
Code: Phone. NET PRICE \$92.70
- \* **EV-10-PM** Consists of Series EV-10 on steel panel. Size 12 1/4" x 19" for standard rack mount.  
Code: Panel. NET PRICE \$92.70

### ★ SERIES RF-10 VACUUM TUBE R.F. PROBE

An accessory item to Series EV-10, the RF-10 Vacuum Tube Probe provides direct means for measurement of super-sonic, R.F. and U.H.F. voltages. Connects directly to Series EV-10 panel. Employs type 9002 tube probe rectifier. All operating voltages are applied through connecting cable. Complete with operating instructions.  
Code: Probe. NET PRICE \$14.40

## Precision Series EV-10 VTVM - Megohmmeter

with 7" Full-View Meter

Plus standard 1000 Ohms per Volt Functions.  
Ranges to 6000 Volts • 2000 Megs. • 12 Amps. • +70 DB.

A WIDE-RANGE ZERO-CENTER ELECTRONIC INSTRUMENT, stressing the utmost in performance, accuracy, and ease of manipulation. Series EV-10 permits rapid check of voltage, current, and resistance conditions encountered in modern A.M., F.M., and TV. Networks, without materially disturbing circuit under analysis.

### IMPORTANT FEATURES

- \* **VOLTAGE REGULATED — BRIDGE TYPE CIRCUIT:** direct reading VTVM, with practical freedom from tube and line voltage variations.
- \* **ZERO-CENTER VTVM —** Indicates both magnitude and polarity with reversal of test prods.
- \* **MASTER RANGE SELECTOR.**
- \* **SHIELDED COAXIAL TEST PROBES.**
- \* **DUO-BALANCED ELECTRONIC-BRIDGE OHMMETER —** Provides unusually high accuracy.
- \* **TELEPHONE CABLED,** plastic insulated, hook-up wire.
- \* **7" RECTANGULAR METER** 400 microampere,  $\pm 2\%$ .
- \* **1% wire and metallized resistors.**

### RANGE SPECIFICATIONS

- \* **Eight Zero-Center VTVM Ranges.**  
 $\pm 3, \pm 6, \pm 12, \pm 60, \pm 300, \pm 600, \pm 1200, \pm 6000$  volts D.C.  
Input Resistance—  
Constant 13 1/3 megohms to 600 volts.  
26 2/3 megohms at 1200 volts.  
133 1/3 megohms at 6000 volts.
- \* **Six Circuit Probing, Zero-Center, V.T.V.M. Ranges:**  
 $\pm 3, 6, 12, 60, 300, 600$  volts D.C.
- \* **Six Ohmmeter-Megohmmeter Ranges:** (self-contained).  
0-2000-200,000 ohms.  
0-2-20-200-2000 megohms.
- \* **Eight A.C.-D.C. and Output Voltage Ranges** at 1000 ohms per volt.  
0-3-6-12-60-300-600-1200-6000 v.
- \* **Seven D.C. Current Ranges:**  
0-600 microamperes.  
0-3-12-60-300-1200 MA. 0-12 amps
- \* **Eight DB Ranges:** —26 to +70 DB.
- \* **VTVM Ranges to 60,000 volts,** for Television and similar high voltage, low current applications, are available via use of the Series TV Test Probe described on page F-15.

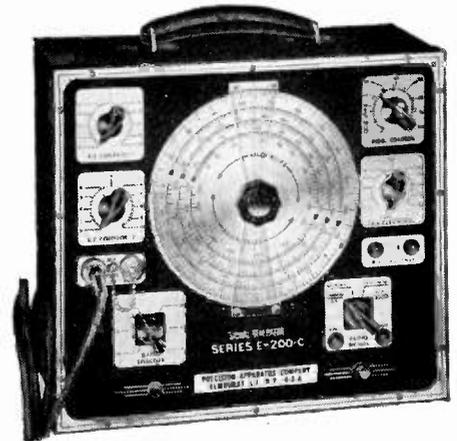
## Precision Series E-200-C Signal Generator

A Modern Multi-Band Signal Generator  
for A.M., F.M., and Television Alignment.

Featuring "Servicing by Signal Substitution." The Dynamic Speed Approach to Receiver Alignment and Adjustment Problems.

### SPECIFICATIONS

- \* **FREQUENCY COVERAGE:** 88 KC. to 120 MC. 30 MC. on fundamental.
- \* **6 1/2" Dial** direct reading in 8 bands to 120 MC. No charts required.
- \* **ACCURACY — CONSTANCY OF CALIBRATION:** 1% accuracy on all bands. Uses "PRECISION" developed "UNIT-OSCILLATOR" construction.
- \* **0-1000 POINT VERNIER SCALE,** direct reading to one part in 1000.
- \* **THE CIRCUIT—**single-ended 6SJ7 in stable E.C.O. circuit—modulated by a 6C5 sine-wave audio oscillator. 5Y3 Full wave rectifier.
- \* **400 CYCLE SINE-WAVE AUDIO OSCILLATOR —** over 50 volts output.
- \* **DUAL R.F. ATTENUATORS —** smooth stepless control of R.F. signal.
- \* **SHIELDING —** Compartment shielding of vital components — Power transformer electrostatically shielded—A.C. line is R.F. filtered.
- \* **SHIELDED COAXIAL OUTPUT CABLE** and (LO-HI) cable connectors.
- \* **FOUR TYPES OF SIGNALS —** "Unmod. R.F.", "400 cycle Mod. R.F.", "EXTERNALLY Mod. R.F.", "400 cycle Audio Output."
- \* **DIRECT READING VARIABLE MODULATION —** 0-100% — triples signal utility as against obsolete fixed modulation of only 30 or 40%.
- \* **DIRECT READING A.V.C. SUBSTITUTION SYSTEM —** Overcomes alignment troubles arising from receiver A.V.C. Supplies ITS OWN A.V.C. VOLTAGE.
- \* **HAND CALIBRATED —** Each instrument is INDIVIDUALLY calibrated.
- \* **FULLY LICENSED** under patents of A. T. & T. and W. E. Co's.
- \* **Not only an efficient Signal Generator** for purposes of alignment but also SPECIFICALLY DESIGNED for "Servicing by Signal Substitution."
- \* **IDEAL MARKER GENERATOR —** Exceptional stability and high accuracy renders Series E-200-C an excellent variable frequency Marker Generator for use with the Series E-400 or similar high quality Sweep Signal Generator.



\* **Series E-200-C —** (illustrated) In black ripple finished, portable steel case. Size 10 1/2" x 12" x 6". Complete with tubes, output cable and FREE copy of "Servicing by Signal Substitution."  
Code: Trade. NET PRICE \$67.25

\* **E-200-C-PM —** Consists of Series E-200-C on steel panel size 12 1/4" x 19", for standard rack mount.  
Code: Trace. NET PRICE \$69.70



"SERVICING BY SIGNAL SUBSTITUTION" 11th Edition . . . The modern ECONOMICAL solution to your daily service problems . . . Nothing complex to learn, no extraneous equipment to purchase. A systematic method of DYNAMIC SIGNAL ANALYSIS based entirely on fundamentals . . . Fully described in a bound illustrated text "Servicing by Signal Substitution." This highly valuable book is supplied with Series E-200-C at no charge.  
Additional copies available at your Precision distributor or directly from factory at 40c per copy.

# PRECISION

# TEST EQUIPMENT

STANDARD OF ACCURACY

All prices are subject to change without notice

## Series 10-54 *Electronamic Test Master*

Combination Tube Performance Tester, Battery Tester, and 35 Range, Push-Button Operated, Supersensitive, A.C.-D.C. Set Tester. Ranges to 6000 Volts, 60 Microamps, 12 amps, +70DB, 60 Meg. 20,000 Ohms per Volt D.C.—1000 Ohms per Volt A.C.

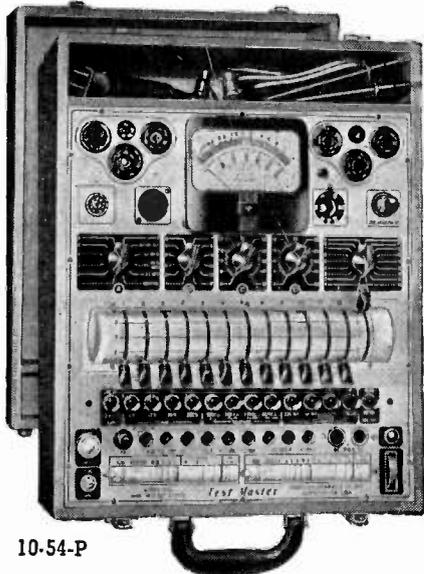
ELECTRONAMIC (Reg. U. S. Patent Office)

**More than just Mutual Conductance:** (Technical details in main catalog)

Series 10-54 affords to the discriminating instrument purchaser, THE COMPLETE PORTABLE SERVICE LABORATORY; engineered to meet the expanding needs of modern radio electronics. Provides every necessary facility for high speed, reliable tube and circuit testing associated with Industrial Electronics, Communications, Radio (A.M.-F.M.), Television, Laboratory, etc. . . .

### TUBE AND BATTERY TESTING FEATURES

- \* A TUBE "PERFORMANCE" TESTER: "Precision" ELECTRONAMIC circuit, effectively tests all tubes over a complete "Path of Operation" not just at one arbitrary operating point or for just one inconclusive characteristic.
- \* TESTS ALL MODERN TUBE TYPES: Noval 9 pin, 7 pin Acorn, dual capped H.F. tubes, Single-Ended TV, and F.M. amplifiers, low power transmitting tubes, sub-miniature types, etc. . . . including direct facilities up to twelve element prongs!
- \* ABSOLUTE FREE-POINT LEVER ELEMENT SELECTION: Highest possible, practical order of obsolescence insurance. Locates every tube element regardless of base position.
- \* ABSOLUTE FREE-POINT, INTER-ELEMENT SHORT-CHECK and Visible Filament Continuity System.
- \* DUAL SHORT-CHECK SENSITIVITY: Permits special application tube selection.
- \* INDIVIDUAL TUBE SECTION TESTS of multi-section tubes.
- \* A.M. and F.M. CATHODE RAY TUNING INDICATORS directly tested.
- \* FILAMENT VOLTAGES  $\frac{3}{4}$  to 117 V.
- \* BALLAST UNIT TESTS.
- \* NOISE and CONDENSER TESTS.
- \* MICRO-LINE ADJUSTMENT via continuously variable line voltage control.
- \* PILOT and SIGNAL LIGHT TESTS.
- \* ACCURACY of test circuits closely maintained by use of individual, internal calibrating controls.
- \* ROLLER TUBE CHART: BUILT-IN.
- \* EXTRACTOR FUSE POST.
- \* Test circuits completely transformer-isolated from power line.
- \* TELEPHONE-TYPE, CABLED, plastic-insulated, moisture-resistant wire.
- \* 4 $\frac{1}{2}$ " FULL VISION METER: 50 microampere, 2% accuracy.
- \* TESTS RADIO A, B and C DRY BATTERIES via a "PRECISION" engineered circuit which performance checks each battery under actual load conditions. Battery quality read directly on a 3-color scale.



10-54-P

### CIRCUIT TESTING FEATURES

A complete, wide-range, high speed, push-button operated, super-sensitive test set without any additional panel controls. Self-contained.

- \* Six D.C. Voltage Ranges: 20,000 ohms per volt.
- \* Six A.C. Voltage Ranges: 1000 ohms per volt.
- \* Six Output Ranges at 1000 ohms per volt. 0-6-12-60-300-1200-6000 volts.
- \* Ranges to 60,000 Volts D.C. via use of Series TV Super high voltage test probe. Not included with 10-54. See Page F-15.
- \* Seven D.C. Current Ranges: 0-60-120 microamperes, 0-1-2-12-120-1200 MA, and 0-12 amperes.
- \* Four Self-Contained Resistance Ranges: 0-6000-600,000 ohms; 0-6-60 megohms.
- \* Six Decibel Ranges from -20 to +70 DB.
- \* Automatic Push-Button range selection.
- \* 1% Wirewound and Metallized Resistors.

10-54-P (illustrated above) Hardwood, tapered, portable case, 13 $\frac{3}{4}$ "x17 $\frac{1}{4}$ "x6 $\frac{3}{4}$ ". With ohmmeter batteries and high voltage test leads. Code: Habit.

NET PRICE \$134.40

10-54-C (see 10-12-C illustration and description below) In modern, attractively finished, steel counter cabinet.

Code: Handy, Complete: NET PRICE \$137.70

10-54-PM (see 10-12-PM illustration and description below) In standard Panel Mount, with dust cover.

Code: Harem, Complete: NET PRICE \$137.70

## Series 10-12 *Electronamic Tube Master*

Truly Free-Point Tube and Battery Performance Tester.

ELECTRONAMIC (Reg. U. S. Patent Office)

**More than just Mutual Conductance:** (Technical details in main catalog)

The 10-00 Series of TUBE and TEST MASTERS represent the culmination of many years' development of tube testing equipment to meet the exacting needs of the rapidly advancing field of electronics.

Incorporating the "PRECISION" ELECTRONAMIC Tube Performance Testing Circuit, plus an advanced, "PRECISION" developed, multiple element, master lever selector system, it truly can be said that the MASTER 10-00 Series offers, to the discriminating equipment purchaser, the highest possible practical order of test results and anti-obsolescence insurance.

### TUBE AND BATTERY TESTING FEATURES

The Series 10-12 Electronamic Tube Master incorporates the same time-proven circuit and exacting performance details described for the Series 10-54, above, under the heading: "Tube and Battery Testing Features."

\* 10-12-P (see 10-54-P illustration and description above) In hardwood, tapered, portable case with tool compartment. Code: Facil.

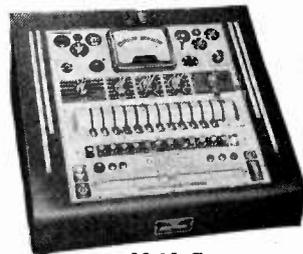
Complete: NET PRICE \$96.10

\* 10-12-C (illustrated at right) In modern, chrome-trimmed, round edged counter cabinet. Fine dull black ripple finish on heavy gauge steel. Size 17"x17 $\frac{7}{8}$ "x7 $\frac{1}{2}$ " sloping to 3" at front. Code: Faith.

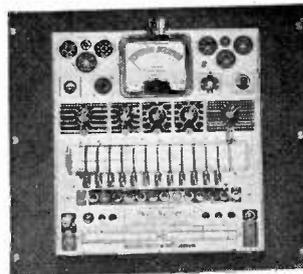
Complete: NET PRICE \$99.40

\* 10-12-PM (illustrated at right) Consists of 10-12 chassis, mounted onto standard size steel panel, 17 $\frac{1}{2}$ "x19" with dust cover. Fine, dull black ripple finish.

Code: Favor. Complete: NET PRICE \$99.40



10-12-C



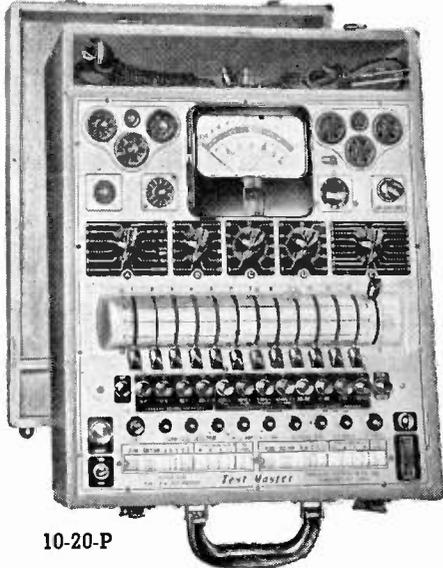
10-12-PM

# PRECISION

# TEST EQUIPMENT

STANDARD OF ACCURACY

All prices are subject to change without notice



10-20-P

- \* **10-20-P** (illustrated above) In hardwood, portable case with tool compartment. Size 13 $\frac{3}{4}$ "x17 $\frac{1}{4}$ "x6 $\frac{3}{4}$ ". Complete with ohmmeter batteries and test leads. Code: Daily. Complete: NET PRICE \$119.80
- \* **10-20-C** (see 10-12-C illustration and description, page F-13) In standard panel mount finished, steel counter cabinet. Code: Dance. Complete: NET PRICE \$123.10
- \* **10-20-PM** (see 10-12-PM illustration and description, page F-13) In standard panel mount with dust cover. Code: Dandy. Complete: NET PRICE \$123.10

## Series 10-20 *Electronamic Test Master*

Combination Master Electronamic Tube Performance Tester, Battery Tester and 34 Range A.C.-D.C. Push-Button Operated Circuit Tester. 1000 Ohms per Volt A.C. and D.C.

ELECTRONAMIC (Reg. U. S. Patent Office)

**More than just Mutual Conductance:** (Technical details in main catalog)

A complete, rugged service laboratory incorporating the time-proven "PRECISION" ELECTRONAMIC Tube Performance Tester, combined with full standard 1000 ohms per volt A.C. and D.C. Multi-Range features: PLUS a complete radio A, B and C Battery Tester.

Ideally suited and particularly engineered for thorough general purpose radio-electronic maintenance, service and installation.

### TUBE AND BATTERY TESTING FEATURES

The Series 10-20 TEST-MASTER provides the identical tube and battery performance testing features as outlined for the Series 10-54 on page 5.

### CIRCUIT TESTING FEATURES

Wide-range, high speed, push-button operated set testing functions provide ranges to: 3000 volts, 600 microamperes, 12 amperes, 10 megohms, +70 DB. ALL SELF-CONTAINED.

- \* SIX A.C.-D.C.-OUTPUT VOLTAGE RANGES at 1000 ohms per volt. 0-6-12-60-300-1200-3000 volts.
- \* SIX D.C. CURRENT RANGES: 0-600 microamperes. 0-6-60-300-1200 MA. and 0-12 amps.
- \* FOUR SELF-CONTAINED RESISTANCE RANGES: 0-1000-100,000 ohms: 0-1-10 megs.
- \* SIX DB RANGES from -20 to +64 DB.
- \* 4 $\frac{1}{8}$ " WIDE VISION METER: 400 microamperes,  $\pm 2\%$ .
- \* 1% WIREWOUND AND METALLIZED RESISTORS.
- \* ONLY 2 TIP JACKS serve all standard ranges.
- \* AUTOMATIC INTERLOCKING PUSH-BUTTON RANGE SELECTION.
- \* ALL CIRCUITS ISOLATED FROM POWER LINE.

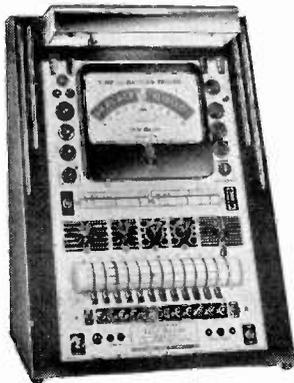
## Series 10-15 *Electronamic Tube Master*

Ultra-Modern, De Luxe Tube and Battery Merchandiser with large 9" meter.

ELECTRONAMIC (Reg. U. S. Patent Office)

**More than just Mutual Conductance:**

(Technical details in main catalog)



10-15

- \* **10-15 Tube and Battery Merchandiser.** (Illustrated) Heavy gauge steel cabinet in fine, dull black ripple, with chrome trim and reflector. Size 24" high, 17 $\frac{1}{2}$ " wide, base depth 10" tapering to 4" at top. Code: Gable. Complete: NET PRICE \$132.65
- \* **10-15-PM** (see 10-22-PM illustration at right) On heavy gauge steel panel with dust cover. Panel 22 $\frac{3}{4}$ "x19" for standard rack mount. Fine, dull black ripple finish. Code: Gavot. Complete: NET PRICE \$127.50

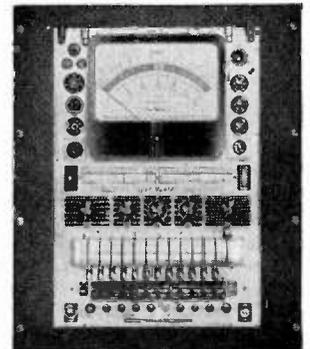
## Series 10-22 *Electronamic Test Master*

De Luxe Tube-Battery Merchandiser and Circuit Tester with large 9" Meter. 1000 ohms per volt A.C. and D.C.

ELECTRONAMIC (Reg. U. S. Patent Office)

**More than just Mutual Conductance:**

(Technical details in main catalog)

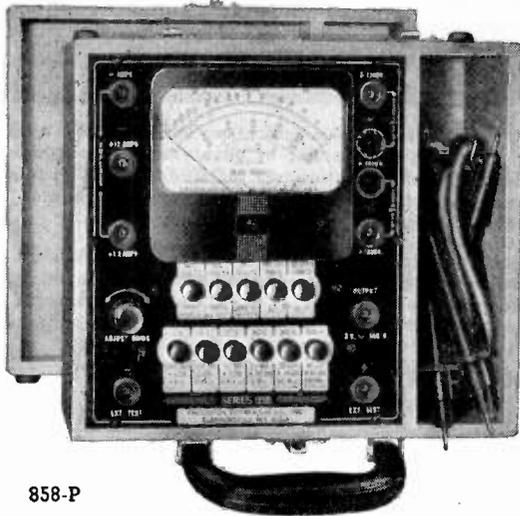


10-22-PM

- \* The Series 10-22 De Luxe Electronamic Service Laboratory is electrically identical to the Series 10-20 above.
- \* Incorporates every sales promotional advantage of the Series 10-15, at left, plus a complete 34 range A.C.-D.C. push-button operated, Multi-Range Test Set.
- \* Tube and Service Facilities are emphasized with this modern, impressive "Precision" engineered instrument.
- \* Ideal for behind-the-counter installation, also ideal for insertion into the center of tube stock-display shelving.
- \* **10-22 Combination Tube and Battery Merchandiser plus A.C.-D.C. Multi-Range Set Tester.** In same cabinet illustrated for the model 10-15 (at left). Complete with test leads and ohmmeter batteries. Code: Gauge. Complete: NET PRICE \$155.15
- \* **10-22-PM** (illustrated) On heavy gauge steel panel with dust cover. Panel 22 $\frac{3}{4}$ "x19" for standard rack mount. Fine, dull black ripple finish. Code: Gamut. Complete: NET PRICE \$150.00

**PRECISION****TEST EQUIPMENT**  
STANDARD OF ACCURACY

All prices are subject to change without notice



858-P

- \* **858-P** (illustrated) In hardwood, portable case, with tool compartment. Size 9"x10"x4 1/2". Complete with ohmmeter batteries and high voltage test leads. Code: Judge. NET PRICE \$49.94
- \* **858-L** In modern bakelite case (as illustrated for Series 847-L below). Complete with ohmmeter batteries and high voltage test leads. Code: Jetty. NET PRICE \$47.94

**Series 858 High Sensitivity Multi-Master**  
Dual-Range SensitivityHigh Speed, A.C.-D.C. Multi-Range<sup>o</sup> Test Set. 54 Ranges to 6,000 Volts, 60 Microamperes, 12 Amps, 600 Megs. +70DB. 20,000 and 1,000 Ohms per Volt D.C. 1,000 Ohms per Volt A.C.

Series 858 MULTI-MASTER features a "Precision" designed, positive action Push-Button Range and Function selection system, affording the ultimate in operational efficiency.

Designed for reliable measurements in modern T.V., F.M., A.M. and other critical electronic circuits where only minute current drain of the measuring instrument can be tolerated.

The dual-range sensitivity feature provides the equivalent of another instrument at standard 1000 ohms per volt sensitivity, in conformance with many point to point voltage readings listed by receiver service manuals.

When employed in conjunction with the Series TV super-high voltage test probe (described below), direct reading facilities to 60,000 volts are provided.

**SPECIFICATIONS**

- \* EIGHT D.C. VOLTAGE RANGES both 20,000 and 1000 ohms per volt.
- \* EIGHT A.C. and OUTPUT VOLTAGE RANGES at 1000 ohms per volt 0-3-6-12-60-300-600-1200-6000 volts.
- \* EIGHT D.C. CURRENT RANGES: 0-60-120 microamperes. 0-1.2-12-120-600 MA. 0-1.2-12 amps.
- \* SIX RESISTANCE RANGES: self-contained to 60 megohms. 0-6000-60,000-600,000 ohms. 0-6-60-600 megohms.
- \* EIGHT DB RANGES: -26 to +70DB.
- \* Two Pin Jacks for all standard ranges.
- \* 4 3/4" 50 microamp. meter.  $\pm 2\%$ .
- \* 1% Wire and Metallized Resistors.
- \* Safety Jacks for 6000 volt ranges.
- \* HIGHEST GRADE MATERIALS and plastic insulated wiring employed.
- \* ETCHED AND ANODIZED, heavy gauge aluminum panels: resistant to moisture and wear.

**Series TV Super High Voltage SAFETY TEST PROBES\***  
Voltage Ranges to 60,000 Volts D.C. With standard V.T.V.M. or high sensitivity V-0-M

\*Patent Applied For.

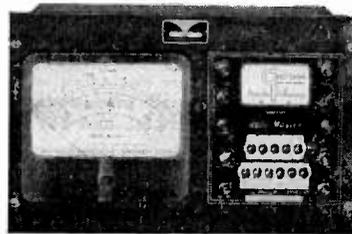
"Precision" engineering solves the high voltage TV. test problem with utmost safety to the operator. Series TV. has been custom designed for YOUR safety FIRST. Cartridge style high voltage tubular multiplier permits use of a single "TV." probe with most popular high sensitivity test sets and V.T.V.M.'s. (See reverse side of "Precision" price sheet for details.)

The brief features below reveal that Series TV. has been specifically engineered as a true High Voltage Testing Device.

- \* Custom Molded Polystyrene Head, heavy duty bakelite handle and barrier, specially machined internal lucite components, all spell out "HIGH VOLTAGE ENGINEERED."
- \* High Dielectric Anti-Leakage Paths and wide, multi-channelled guard-barrier reiterate "HIGH VOLTAGE ENGINEERED."
- \* Internal and External Protective Grounding — Full handle length grounded internal flash-over-shield. External, grounded arc-back barrier. HIGH VOLTAGE ENGINEERED!
- \* Heavy Duty Shielded Connecting Cable for connection to test instrument.
- \* Ceramic, Helical Film-Type, Cartridge Multiplier manufactured specifically for VERY HIGH VOLTAGE APPLICATION. Removed and changed without tools!
- \* Positive Grounds and HV Connections via high compression contact springs.
- \* Series TVP—Test Probe less multiplier cartridge, with instructions. Code: Ebony. NET PRICE \$12.35
- \* Series TV-1 (illustrated) with cartridge for "Precision" Series EV-10 VTVM. Code: Elegy. NET PRICE \$15.45
- \* Series TV-2 with cartridge for "Precision" (or any) 20000 ohms/V. test set with 6000 V. range. Code: Every. NET PRICE \$15.45
- \* TVM — Cartridge Multipliers only for Series TV. See reverse side of "Precision" price sheet.

**Series 866 De Luxe Multi-Master**

Panel-Mounted, A.C.-D.C. Test Set, 9" Meter and Remote-Control Selector Unit. 5000 and 1000 Ohms per Volt D.C. 1000 Ohms per Volt A.C.



A laboratory type, high sensitivity test set indispensable to the well equipped, modern test laboratory and electronics classroom.

The extra-large 9" meter and remote-control selector unit afford unparalleled operational efficiency with maximum physical

meter protection via panel mounting above the work level.

RANGE SPECIFICATIONS OF SERIES 866 are similar to those described for Series 858 above. 5000 and 1000 ohms/V.D.C.

54 ranges to 6000 volts, 300 microamperes, 12 amperes, 200 megohms, +70 DB.

- \* 866 (illustrated) In standard panel mount, size 19"x12 1/4" with dust cover. Complete with high voltage test leads and ohmmeter batteries. Code: Novel. NET PRICE \$71.65

**Series 847 Dual Sensitivity Multi-Master**  
5000 and 1000 Ohms per Volt

Physically similar to Series 858 at top of page, the Series 847 is a moderate sensitivity, wide range test set specifically prescribed for applications wherever ruggedness is of greater import than extremely high sensitivity. Range specifications are identical to the Series 866 above.

- \* 847-L — Code: Index NET PRICE \$47.65
- \* 847-P — Code: Ivory NET PRICE \$50.90

**PRECISION****TEST EQUIPMENT**  
STANDARD OF ACCURACY

All prices are subject to change without notice



612-C

- \* **612-C** (illustrated) In modern, chrome-trimmed, counter cabinet. Black ripple finish. Size 16" x 13½" x 7", sloping to 3" at front. Code: Bison. Complete: \$71.90
- \* **612-P** In hardwood, portable case (as illustrated for 654, below). Size 12" x 13" x 6". Code: Begin. Complete: \$69.50
- \* **612-MCP** Open style Metal Case Portable. Size 10½" x 12" x 6". Code: Brine. Complete: \$66.65
- \* **612-PM** In standard size panel mount 12¼" x 19" with dust cover. Code: Blaze. Complete: \$69.50

- \* TESTS ALL MODERN TUBE TYPES including 7 pin Acorns, Noval 9 pin, dual capped H.F. tubes, F.M. and TV. amplifiers.
- \* FILAMENT VOLTAGES ¾ to 117 volts.
- \* ABSOLUTE FREE-POINT 10 element lever selection for merit and short tests.
- \* 4½" METER, 2% ACCURACY.
- \* DUAL SHORT-CHECK SENSITIVITY.
- \* INDIVIDUAL TESTS OF MULTI-SECTION TUBES including tuning indicators.
- \* BALLAST UNIT TESTS.
- \* MICRO-LINE ADJUSTMENT.

- \* NOISE and CONDENSER TEST pin jacks.
- \* Pilot Light Test Socket.
- \* DYNAMIC "UNDER-LOAD" TEST for all popular radio A, B, and C dry batteries.
- \* Built-in, brass geared roll chart.
- \* Anodized, deep-etched, heavy gauge aluminum panel, resistant to wear.
- \* Panel-mounted Fuse Extractor Post.
- \* Telephone type cabled, plastic-insulated, moisture resistant hook-up wire.
- \* Each instrument individually calibrated and sealed.

**TUBE AND BATTERY TESTING FEATURES****Series 612 Cathode Conductance Tube Tester**A Modern, Free Point, Lever Operated  
Tube and Battery Tester.

The new "600" Series brings to the field of modern electronic tube checking the **highest practical order of obsolescence insurance with utmost simplicity of operation, AT MODERATE COST.** This has been achieved with full conformity to the well-known "Precision" standards of quality, workmanship, and performance.

The "600" tube testing parameters are based upon the well-established, time-proven emission testing principles as have been recommended by both tube manufacturers and R.M.A. The "600" line affords advanced design features and performance which render it incomparable amongst instruments in its category and price range.

**Series 654****COMBINATION TUBE,  
BATTERY AND SET TESTERS****Series 620**

20,000 OHMS PER VOLT D.C.  
1,000 OHMS/VOLT A.C. • Ranges to 6,000 V.,  
120 Microamperes, 12 Amps., 60 Megs., +70 DB.

1,000 OHMS PER VOLT A.C. AND D.C.  
STANDARD SENSITIVITY • Ranges to 3,000 V.,  
12 Amperes, 10 Megohms, +64 DB.



654-P

- \* SERIES 654 is an economical, compact High Sensitivity Service Laboratory designed to meet the specific needs of modern electronics service and maintenance, A.M., F.M., and TV.

Series 654 incorporates the identical tube and battery testing features of the Series 612 above, PLUS a complete wide range, high sensitivity A.C.-D.C. circuit tester.

- \* SERIES 620 is identical to the Series 654, at left, except for the lower D.C. multi-range meter sensitivity and related range differences as indicated above.

Provides every essential feature for general purpose test and check of modern radio and electronic equipment.

Series 620 is the logical choice as a highly rugged, reliable "Precision" quality instrument at moderate cost.

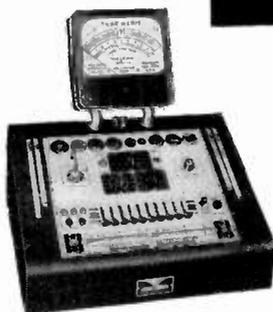
The Series 654 and 620 are available in the same four model types as described for the Series 612 above.

**NET PRICES**

	Code	Net Price		Code	Net Price
* 654-P	Hardy	\$106.40	* 620-P	Local	\$94.10
* 654-MCP	Hurry	103.55	* 620-MCP	Lofty	91.25
* 654-C	House	108.90	* 620-C	Loyal	96.50
* 654-PM	Heart	106.40	* 620-PM	Legal	94.10

**CIRCUIT TESTING FEATURES**

- \* 5 D.C. Voltage Ranges: 20,000 ohms per volt.
- \* 5 A.C. and Output Voltage Ranges: 1000 ohms per volt  
0-12-60-300-1200-6000 volts.  
Ranges to 60,000 Volts D.C. via use of Series TV. Super high voltage test probe. Not included with 654. See page F-15.
- \* 6 D.C. Current Ranges: 0-120 microamperes. 0-1.2-12-120 MA. 0-1.2-12 Amperes.
- \* 3 Wide Resistance Ranges  
0-6000-600,000 ohms. 0-60 Megs.  
Self-contained batteries.
- \* 5 Decibel Ranges from -12 to +70 DB.
- \* Fully Rotary Selective Ranges and Functions.
- \* Only 2 Pin Jacks for all standard ranges.
- \* Recessed 6,000 V. safety pin jacks.
- \* 50 microampere, 45° Wide-Angle meter.
- \* 1% Wirewound and film-type resistors.
- \* All circuits isolated from power line.



614

**Series 614 DE LUXE TUBE AND BATTERY MERCHANDISER**Modern, Counter Type Tube and Battery Tester  
with Large 7" Chrome Trimmed Meter.

The Series 614 is designated for the progressive tube and battery department wherein an exceptionally attractive instrument is desired to step-up tube and battery sales with minimum investment.

The 7" meter provides a full view of test results.

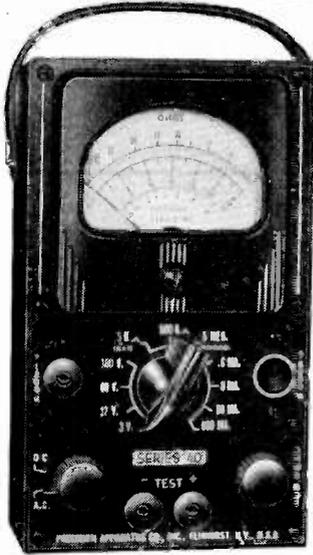
The tube and battery testing circuit of Series 614 is electrically identical to that described for Series 612 at top of page.

- \* 614 Tube and Battery Merchandiser (illustrated) — in modern, chrome-trimmed, fine black ripple finished cabinet. Offset mounted meter. Cabinet size 16" x 13½" x 7", slopes to 3".  
Code: Early. NET PRICE \$89.30

# PRECISION

# TEST EQUIPMENT

STANDARD OF ACCURACY



\* Series 40 (illustrated) In molded bakelite case with plastic handle. 3 3/4" x 6 1/4" x 2 1/2". Complete with ohmmeter batteries and test leads. Code: Visit. NET PRICE \$24.75

## Series 40 Compact Wide-Range Circuit Tester

31 Range A.C.-D.C. Test Set . . . Self-Contained to 6000 Volts, 600MA, +70DB, 5 Megohms with Full Size 3" Rectangular Meter. 1000 Ohms per Volt A.C. and D.C.

In molded bakelite carrying case. Series 40 meets the need for a compact, yet rugged test set to withstand hard usage as is imposed by the service technician, maintenance engineer, production inspector, trouble-shooter, etc.

The Series 40 offers every advanced design feature and full-bodied components as are regularly incorporated in "Precision's" larger multi-range test sets, including: Rotary Range Selection—1% shunts and multipliers—heavy duty insulated pin jacks—Large numeralled, easy reading meter.

**ALL RANGES, including 6000 volts and 5 Megohms, are SELF-CONTAINED NO EXTERNAL BATTERIES OR MULTIPLIERS ARE REQUIRED.**

### RANGE SPECIFICATIONS

- \* 6 A.C.-D.C. AND OUTPUT VOLTAGE RANGES at 1000 ohms per volt. 0-3-12-60-300-1200-6000 volts.
  - \* 4 D.C. CURRENT RANGES: 0-6-6-60-600 MA.
  - \* 3 RESISTANCE RANGES: 0-5000-500,000-5 megohms.
  - \* 6 DECIBEL RANGES -22 to +70 DB.
  - \* FULL SIZE 3" RECTANGULAR METER: 400 microamperes ±2%.
  - \* 1% WIRE & FILM-TYPE RESISTORS.
  - \* ONLY 2 PIN JACKS serve all standard functions.
  - \* Recessed 6000 volt safety jack.
  - \* Anodized, etched aluminum panel: resistant to moisture and wear.
- LC-2 LEATHER INSTRUMENT CASE:** Genuine top-grain heavy cowhide case, custom designed for the Series 40. Richly finished in dark brown. Code: Young. NET PRICE \$4.95

## Series 85 High Sensitivity Test Set

20,000 Ohms per Volt D.C. 1,000 Ohms per Volt A.C.  
34 Self-Contained Ranges to 6000 Volts,  
120 Microamperes, 12 Amperes, -70DB, 60 Megohms.

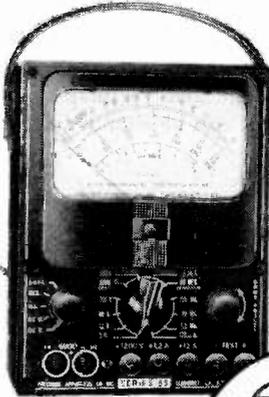
The Series 85 is a bakelite cased, laboratory styled, portable instrument.

Combining high sensitivity with small overall size, Series 85 is "Application Engineered" for production, lab., school and service-maintenance phases of modern electronics: A.M., F.M., and TV.

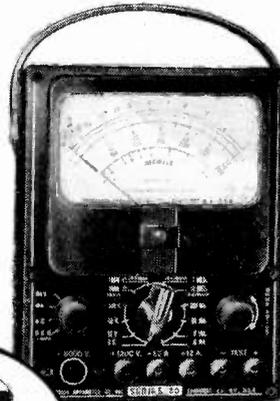
\* When used with the Series TV super-high voltage test probe, D.C. voltage ranges up to 60,000 volts are provided for Television and similar high potential, low current circuits. See page F-15.

### SPECIFICATIONS

- \* 6 D.C. Voltage Ranges: 20,000 ohms per volt.
- \* 6 A.C.-Output Voltage Ranges: 1000 ohms per volt 0-3-12-60-300-1200-6000 volts.
- \* 6 D.C. Current Ranges: 0-120 microamps. 0-1.2-12-120 MA and 0-1.2-12 amps
- \* 4 Resistance Ranges: Self-contained. 0-6000-600,000 ohms; 0-6-60 megs.
- \* 6 Decibel Ranges: -26 to +70DB
- \* 4 5/8" Rectangular Meter. 50 Microampere. 2% accuracy.
- \* 1% Wire & Film-type Resistors.
- \* Rotary Range Selection: All standard functions at 2 pin jacks.
- \* Recessed 6000 volt safety jacks.
- \* Anodized, heavy gauge, etched aluminum panel: resistant to moisture and wear.
- \* Series 85 (illustrated) in molded bakelite carrying case with plastic handle. 5 1/2" x 7 1/8" x 3". Complete with ohmmeter batteries and test leads. Code: Waist. NET PRICE \$38.75



Series 85



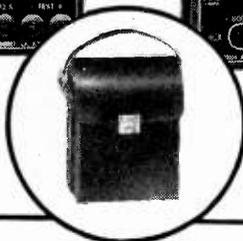
Series 80

The Series 80, laboratory styled, rotary selective, multi-range circuit tester has been designed to meet the same high calibre performance standards as the Series 85 (at left) but is specifically intended for use wherein greater resistance to electrical and physical overload is of more importance than extremely high sensitivity.

"Application Engineered" for general purpose industrial and radio service-maintenance-test requirements.

### SPECIFICATIONS

- \* 6 A.C.-D.C.-Output Voltage Ranges: 1000 ohms per volt. 0-6-12-60-300-1200-6000 volts.
- \* 6 D.C. Current Ranges: 0-6-6-60-300 MA and 0-1.2-12 amps.
- \* 4 Resistance Ranges: Self-Contained. 0-1000-100,000 ohms. 0-1-10 megohms.
- \* 6 Decibel Ranges: from -20 to +70DB.
- \* 4 5/8" Rectangular Meter: 400 microampere, 2% accuracy.
- \* 1% Wirewound and Film-type Resistors.
- \* Recessed 6000 volt safety jack.
- \* Anodized, etched aluminum panel resistant to moisture and wear.
- \* Series 80 (illustrated) In molded bakelite carrying case with plastic handle. 5 1/2" x 7 1/8" x 3". Complete with ohmmeter batteries and test leads. Code: Weave. NET PRICE \$32.70



Series LC-1

### LC-1 LEATHER INSTRUMENT CASE

Custom designed for the Series 80 and 85. Includes a tool and test lead compartment.

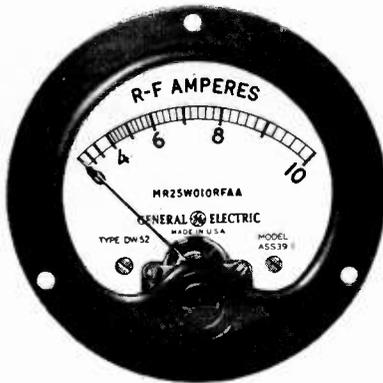
Genuine-top-grain heavy cowhide with water-proof lined suede interior. Adjustable hand or shoulder strap. Positive snap-lock. Richly finished in dark brown. Code: Yearn. NET PRICE \$8.75

All prices are subject to change without notice



# ELECTRIC INDICATING INSTRUMENTS For Panel Mounting

*Internal-pivot Direct-current and Radio-frequency Types*



These small panel instruments are particularly suitable for use in radio and other communications equipment where compactness, especially minimum depth behind the panel, is essential. Thinness is obtained by the use of a unique single-unit, high-torque element of the permanent-magnet, moving-coil type. In this element, the pivots, instead of being secured to the outside of the armature winding, are solidly mounted on the inside of the armature shell.

G-E internal-pivot instruments are available in a variety of standard ratings to measure direct current and voltage (Type DW-51), and radio-frequency current (Type DW-52). They are of the 2½-inch classification. The behind the panel depth is 0.89 inch of the molded Textolite case.

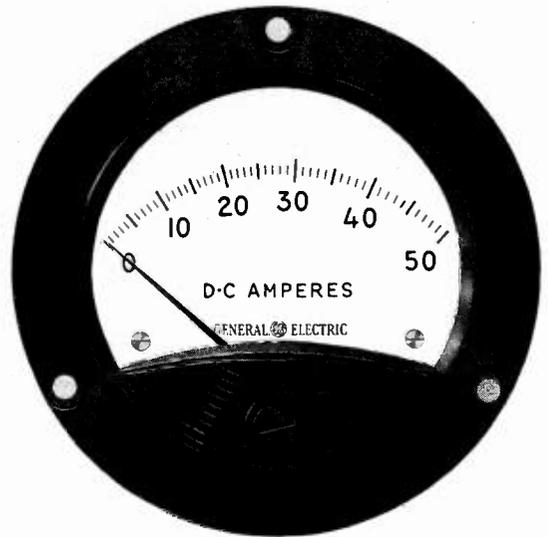
## OTHER TYPES

Many other types of G-E indicating instruments are available for panel mounting. They include 3½ inch a-c, d-c, r-f, and rectifier types in standard round cases as well as in rectangular cases, such as the one shown below. Also 2½-inch alternating-current and rectifier type instruments. Still other types can be supplied to meet unusual requirements.

## LISTINGS

Range	Approx. Resistance in Ohms	Cat. No.	Price*
1 5 20 50 100 150 volts (d-c)	1,000	258X65	\$12.00
	5,000	258X68	12.00
	20,000	258X72	12.00
	50,000	258X74	12.00
	100,000	258X76	12.50
	150,000	258X77	13.00
1 5 25 100 200 500 milliammeters (d-c)	25	258X90	10.50
	7.4	258X93	10.50
	2.16	258X96	10.50
	.50	258X98	10.50
	.252	259X1	10.50
	.100	259X4	10.50
50 100 200 500 microammeters (d-c)	2,030	259X5	19.00
	693	259X7	18.00
	302	259X9	14.00
	68.5	259X11	12.50
1 5 10 amperes (r-f)	.29	259X13	16.50
	.034	259X16	16.50
	.017	259X19	16.50
100 200 500 milliammeters (r-f)	6.8	259X22	15.50
	4.0	259X25	15.50
	.62	259X28	15.50

\* Manufacturers' suggested retail prices.

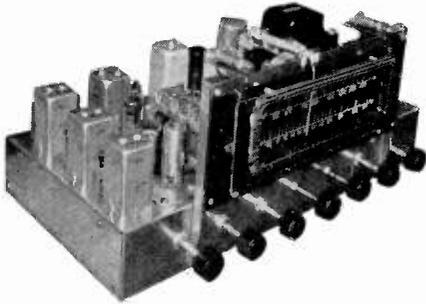


Type D0-71 3½-inch instrument for panel mounting



## BROWNING FM-AM TUNER — MODEL RJ-20

Designed for high-fidelity receiving application in the AM broadcast and FM bands.



### MECHANICAL FEATURES

- Edgelighted slide-rule dial with large tuning ratio.
- Height 7½"; width, 17"; depth, 9"
- Weight: RJ-20, 18½ lbs. shipping 24 lbs.
- Model RJ-22: Rack type with black leatherette panel, 8¾" high, 19" wide and 9¾" deep; shipping 38 lbs.

### ELECTRICAL FEATURES

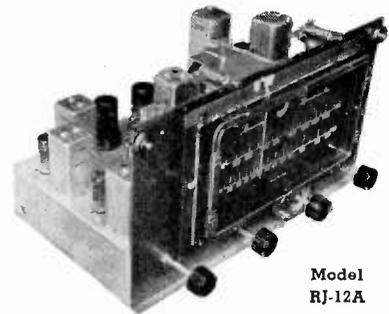
- For FM—88 to 108 MC, and AM—530 to 1650 KC. Armstrong FM circuit.
- 20 db quieting with 6½ microvolts on FM; 5 microvolts sensitivity on AM.
- Separate RF and IF on both bands; no coil switching.
- Variable bandwidth AM IF gives full 9 KC band on broad and 4 KC on narrow position.
- FM audio response flat from 15 to 15,000 cycles ± 3 db.
- 20,000-ohm output impedance; 300 or 72 ohms input for FM provided.
- Tubes: five 6AU6; one 7F8; two 6AL5; one 12AU7; one 6SK7; one 6SA7; one 6SG7; one 6AL7 tuning eye; one 5Y3 rectifier.

## BROWNING FM-AM TUNER — MODEL RJ-12A

Engineered for high-fidelity reception in the FM band. The AM section provides high sensitivity and selectivity as well as quality reception in the broadcast band.

### ELECTRICAL FEATURES

- For the FM band—88 to 108 MC and broadcast band—530 to 1650 KC.
- Less than 10 microvolts needed to produce 20 db noise reduction in the FM band; sensitivity of 5 microvolts in the AM broadcast band.
- Separate RF and IF systems on both bands; no coil switching.
- Drift compensated.
- FM audio response flat from 20 cycles to 15000 cycles within ± 1½ db.
- AM audio response flat from 20 to 6600 cycles ± 3 db; IF's triple tuned.
- Miniature tubes used as FM RF and IF amplifiers assure maximum gain.
- FM uses 2-stage cascade limiting circuit to insure maximum noise rejection.
- High-impedance output for connection any high-quality audio amplifier.
- Phono position on channel selector switch to provide volume control directly on the tuner; phono input connection in back of tuner.
- FM-AM on one antenna with 300 ohms input with twin lead cables.
- Power supply, optional, requires 250 volts d-c at 65 MA and 6.3 volts a-c at 4 amperes.
- Major Armstrong's circuit on FM.
- 6AL7 tuning eye for accurate tuning on both FM and AM.
- Operates on 115 volts, 60 cycles. 80 volt-amperes input when used with Browning model PF-12 power supply.
- Tubes: three 6AU6; one 7F8; one 6SK7; one 6SG7; two 6SJ7; one 6H6; one 6SA7; one 6AL7 tuning eye; one 1N34 crystal detector.



Model RJ-12A

### MECHANICAL FEATURES

- Easily mounted in book-cases, drawers, shelves and cabinets.
- Dial escutcheon supplied with unit. Edge lighted dial—slide rule type.
- Available with black leatherette finished panel for rack mounting (RJ-14).
- Power supply is small separate unit for mounting in confined spaces.
- Dimensions: height 7¾"; width 13½"; depth 9". Power supply: height 6"; width 3½"; depth 8". Rack type tuner; height 8¾"; width 19"; depth 9".

Model	Weight	Shipping Weight
RJ-12A—FM-AM Tuner . . .	12 lbs. . . .	16 lbs.
RJ-14A—Rack Panel Model . .	24 lbs. . . .	30 lbs.
PF-12—Power Supply . . . .	8 lbs. . . . .	9 lbs.

## BROWNING FM TUNER — MODEL RV-10

Designed for high-fidelity reception in the new high-frequency FM band.

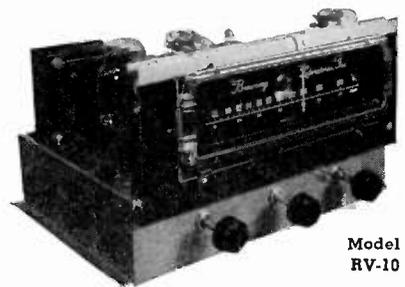
### ELECTRICAL FEATURES

- Receives signals in the FM band extending from 88 to 108 megacycles.
- Less than 10 microvolts needed to produce complete limiting.
- Newly developed miniature tubes used for RF section and IF amplifier.
- Two-stage cascade limiter used to ensure freedom from noise.
- Tuned RF stage used to increase gain and reduce image interference.
- High impedance output to feed any high-fidelity amplifier.
- PHONO-FM switch permits instant transfer of input signals.
- Power supply self contained.
- Employs Armstrong FM circuit.
- Tuning eye indicates correct tuning.
- 115 volt, 60 cycle AC operation. 65 volt-amperes input.

- Tube complement: three Type 6AU6, one 7F8, two 6SJ7, one 6H6.
- Tuning eye indicator (6AL7). Type 5Y3 rectifier tube.

### MECHANICAL FEATURES

- Physically small. Can be easily mounted in cabinets, shelves, bookcases, drawers, and the like.
- Dial escutcheon, knobs, shielded interconnecting wire and connectors supplied with each unit.
- Attractive edgelighted dial calibrated in megacycles and channel numbers.
- Rugged construction, all components of the highest quality.
- Also available with standard rack panel (Designation Model RV-11).
- Dimension: RV-10—Height 6½", Width 11", Depth 8¾". RV-11—Height 8¾", Width 19", Depth 8¾".

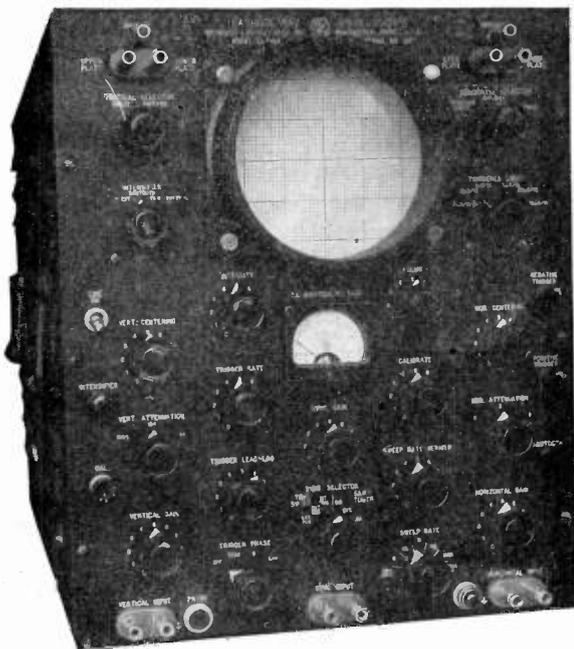


Model RV-10

Model	Weight	Shipping Weight
RV-10	10½ lbs.	14 lbs.
RV-11 Rack Panel Mtg.	15 lbs.	21 lbs.



## BROWNING OSCILLOSYNCHROSCOPE — MODEL OL-15B



### MECHANICAL FEATURES

- Steel cabinet finished in black wrinkle with 1/8" aluminum panel.
- Panel finished in black leatherette with all labels engraved directly on panel.
- Copper-plated steel chassis with lacquer finish.
- Controls grouped according to function for convenience of operation.
- Components arranged for electrical efficiency and ease of servicing.
- Dimension: Height 15 3/4", Width 12 3/4", Depth 19 3/4".
- Weight: 95 lbs. Shipping weight: 150 lbs.

A laboratory instrument designed for the observation of wave forms and transient phenomena requiring a variety of time bases, triggers, phasing and delay circuits, and extended range amplifiers. It may be used for work on laboratory applications where extremely short pulses or phenomena of irregular occurrence rate must be studied. It is also designed for television, communication, radar, and facsimile work. The special features are combined with the functions of a standard oscilloscope with greater ease and convenience of operation as a result of improved design.

### ELECTRICAL FEATURES

- Five-inch 5J1 cathode-ray tube with 4000V accelerating potential for improved intensity and definition of images.
- Sawtooth sweep with range of 5 cycles per second to 500 kilocycles per second permitting observation of radio frequency wave forms.
- Single sweep triggered time base for observation of transient phenomena or phenomena of varying repetition rates.
- Internal trigger generator and built-in phasing circuit for use with single sweep time base.
- Extended range amplifiers. The vertical amplifier is flat within 3 db. from 10 cycles per second to 6 megacycles per second. The horizontal amplifier is flat within 1 db. from 5 cycles per second to 1 megacycle per second. Maximum vertical deflection sensitivity is .05 R.M.S. volts per inch.
- The response curve of the vertical amplifier which is linear and without positive slope from 10 cycles to 4 megacycles has transient response such that a 100 kilocycle square wave with rates of rise and fall in the order of 500 volts per microsecond is faithfully reproduced.
- Low-capacitance, high-impedance probe for use with vertical amplifier. Voltage attenuation of probe is 10:1.
- Provisions for direct connection to all deflection plates.
- Internal or external blanking of beam for timing purposes and for elimination of retraces.
- Voltage regulation of all low-level stages for stability of operation under varying line voltage conditions.
- Built-in voltmeter and calibrating circuit for determining deflection sensitivity at any setting of the gain controls.
- Tube complement: three 6C4, one 6AC7, one 6AG5, five 6AG7, two 807, five 6SN7, two 6SJ7, three 6SH7, three 6V6GT, one 884, two 2X2A, one 5R4GY, one 6X5GT, one VR-105.

Net Price \$1275.00 F.O.B. Winchester, Mass.

## BROWNING SWEEP CALIBRATOR — MODEL GL-22

Designed for use with oscilloscopes and synchrosopes as a source of timing markers for the measurement of sweep intervals.

### ELECTRICAL FEATURES

- Provides markers of 0.1, 0.5, 1.0, 10, 100 microseconds either positive or negative with variable amplitude to 50 volts.
- Generates variable width, variable amplitude gate for blanking or timing purposes.
- Contains own trigger generator with positive and negative trigger outputs.
- Markers may be initiated from external trigger or from internal generator. May be synchronized with triggers up to 100 KC. repetition rate.
- Voltage regulator to timing circuits.
- 115 volt, 50 cycle operation. 110 volt-amperes input.
- Tube complement: one Type 6BE6, one 2D21, one 6J6, one 6V6GT, two 6SN7, one 5Y3GT, one VR-105, one 6AL5, one 6AQ5, one 6X5GT.

Net Price \$290.00 F.O.B. Winchester, Mass.



### MECHANICAL FEATURES

- Provided with steel cabinet finished in black wrinkle.
- Panel finished in black leatherette with labels engraved into surface.
- All output connections on front panel.
- Insulated universal binding posts used for output connections.
- Dimensions: Height 7", Width 14", Depth 8".
- Weight: 20 lbs. Shipping weight: 28 lbs.



**BROWNING MODEL TAA-16 AMPLIFIER**

High gain audio amplifier feeding AC voltmeter for measurement of standing wave ratios with slotted lines. Many other similar uses.

**ELECTRICAL FEATURES**

- 500- to 5000-cycle range with **broadband** or **selective** controls on front panel.
- 15-microvolt sensitivity in **broadband** position and 10 microvolts in **selective** position.
- Meter scales 0-10 and standing-wave voltage ratio.
- Panel switch for bolometer voltage application.
- Master gain control switch provides attenuation factors of 1, 10 and 100.
- Power supply electronically regulated for stability.
- 60 volt-amperes input at 115 volts 60 cycles.
- Tubes: three 6SJ7GT; one VR-105; two 6V6GT; one 6H6GT; one 5Y3GT rectifier.

**MECHANICAL FEATURES**

- Rack panel in black wrinkle steel cabinet, 9" x 20" x 12".
- Panel black leatherette finish with engraved characters.
- Input tube shock mounted for low microphonics.
- Weight 30½ lbs. Shipping weight 45 lbs.

**NET PRICE COMPLETE WITH TUBES (FOB Winchester, Mass.) \$390.00**

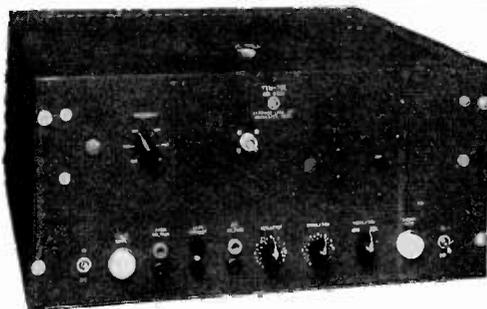
**BROWNING MODEL TVN-7  
POWER SUPPLY AND SQUARE-WAVE MODULATOR**

The basic unit of a signal generator in the super-high-frequency range. Square-wave modulator for low-powered velocity-modulated tubes such as the 417A, 2K28 and 2K25.

**ELECTRICAL FEATURES**

- Range of cathode voltage is 28 to 480 volts, continuously variable. Provision is made for 180 to 300 volt range.
- Range of reflector voltage is 15 to 150 volts controllable from panel.
- Provision is made for grid pulse modulation or reflector pulse modulation. Amplitude of grid pulse is 60 volts while the reflector pulse voltage is 100 volts maximum.
- Square-wave modulation frequency is variable from 600 to 2500 cycles.
- Provisions are made for external modulation.
- 110-115-volts, 60-cycle operation with 170 volt-amperes input.
- Tubes: one type 5Y3; two OD3/VR150; one 6SN7; one 6V6; one 6A3; one 5R4GY; one 6SJ7.

**NET PRICE \$210.00 FOB Winchester, Mass.**



**MECHANICAL FEATURES**

- Designed for rack mounting; cabinet finished at extra cost.
- Black wrinkle, engraved-steel panel.
- 8¾" x 19" x 11"; Weight 33 lbs. Shipping weight 50 lbs.

**BROWNING MODEL P-4-E CATHODE RAY SYNCHROSCOPE**



Designed for viewing recurrent phenomenon where the duration of the phenomenon is short with respect to the intervals of occurrence.

**ELECTRICAL FEATURES**

- Five-inch cathode-ray tube.
- Triggers generated from internal oscillator at repetition rates of 500, 1000, 2000, and 4000 p.p.s. or from external oscillator.
- Sweeps available at approximately ½, 5, 10, and 25 microseconds per inch internally synchronized; can be externally triggered.
- Internal source of calibration voltage of ½ micro-second period for sweeps.

- Return trace blanked out internally.
- Low-gain, broad-band video amplifier preceded by 954 detector.
- Tubes: two 2X2/879; one 5Z3; one 954; one 6AC7; one 6AG7; six 6SN7GT; two 6SL7GT; one 6SK7GT; one 7V7; one 5LP1.

**MECHANICAL FEATURES**

- 8¾" x 14¼" x 20" steel cabinet, black wrinkled.
- Labels engraved in panel surface.
- Ruled screen for cathode-ray tube face.
- Weight: 45 lbs. Shipping weight 55 lbs.

**NET PRICE \$440.00 F.O.B. Winchester, Mass.**

**BROWNING CAPACITANCE RELAY  
MODEL DD-20**

Detects and translates small capacitance changes into action.

**ELECTRICAL FEATURES**

- Operates relay circuit on changes in capacitance of 0.25 mmfd.
- Indicates capacitance changes as small as .005 mmfd.
- Indicates mechanical movements as small as .00001 inches.
- Relay operation provides closed circuit, open circuit, or 115 volts a/c at 10 amperes.
- Electronically regulated power supply for maximum stability.
- Operation frequencies variable from 50 to 150 kilocycles.
- 105-125 volt, 60 cycle operation. 80 volt-amperes input.
- Tubes: three 6V6GT; one 6SA7; three 6SJ7; one 6H6; one 6N7; one VR-90; one 80.

**NET PRICE \$225.00 F.O.B. Winchester, Mass.**



**MECHANICAL FEATURES**

- 8¾" rack panel, mounted in black wrinkle steel cabinet.
- Aluminum panel finished in black leatherette.
- All labels engraved into panel surface.
- Antennae or capacitance leads enter rear of chassis.



**BROWNING WWV STANDARD FREQUENCY CALIBRATOR — MODEL RH-10**



Specifically designed for receiving transmissions from radio station WWV on either 5 or 10 megacycles and employing these as primary frequency standards. Provisions are made so that secondary standards which are in subharmonic relation with WWV transmissions may be accurately compared. Filters are employed so that the 440 or 4000 cycle modulation may also be used as primary standards.

**ELECTRICAL FEATURES**

- Pre-tuned for 5 and 10 megacycles per second reception of radio station WWV. Either frequency may be selected by switch. On special order, pre-tuned frequencies of 2.5 and 5, or 10 and 15 megacycles per second may be substituted.
- Sensitivity better than 1/2 microvolt on any band. Antenna input impedance is high to permit use of single wire antenna. Tuned doublet may be used if desired.
- Selectivity 10 db down at 5. KC off resonance.
- Excellent image rejection minimizes interference. Rejection ratio is more than 50 db.
- Front panel provisions are made for coupling secondary standard or other RF sources and comparing their fundamentals or harmonics with WWV transmission.
- Cathode ray audio indicator permits comparison between RF source and WWV transmission within 1/10 cycle per second using zero beat method.
- A dual filter system allows the selection at will of either the 440 or 4000 cycle modulation of WWV. Either may be employed as a primary frequency standard. Output voltage adjustable from 0 to 5. volts.
- Voltage supplied to stable local oscillator is regulated to reduce to a minimum frequency drift.
- Panel speaker has a separate control which allows the output to be varied at will.
- 100-125 volts AC operation. 85 volt-amperes input.
- Tube complement: one Type 6S17, three 6SK7, one 6SA7, one 6SN7, one 6J5, one 6SQ7, one OD3/VR-150, one 5Y3, one 6U5.

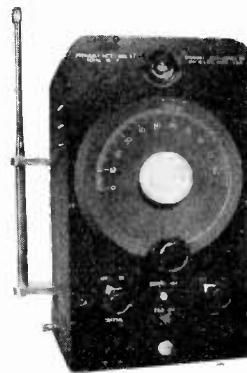
Net Price \$250.00 F.O.B. Winchester, Mass.

**MECHANICAL FEATURES**

- Either rack panel with dust cover or steel cabinet.
- Aluminum panel is finished in black leatherette with engraved labels.
- Large fluted knobs are provided.
- Panel connectors are standard universal binding posts which will also accommodate banana-type plugs.
- Dimensions: Cabinet Mounting—Height 9", Width 19", Depth 11". Rack Mounting—Height 8 3/4", Width 19", Depth 10 1/2".
- Weight: Cabinet Mounting 30 lbs., Shipping Weight 45 lbs. Rack Mounting 25 lbs., Shipping Weight 40 lbs.

**BROWNING FREQUENCY METERS**

Browning frequency meters are precision-built instruments designed to check frequencies in various ranges from 100 kilocycles to 500 megacycles. Custom-built and hand-calibrated, each of the meters listed below is equipped with a 100 KC CRYSTAL USED AS SECONDARY STANDARD WHICH IS EASILY COMPARED WITH WWV RADIATIONS ALLOWING EVERY FREQUENCY METER TO BE CHECKED IN THE FIELD. Some of the outstanding electrical features are:



**MODEL S-4**

- From 1 to 5 specified frequencies on 1.5-70 mc. range.
- Accuracy ± .0025% of the specified frequency.
- Stable electron-coupled oscillator used in special circuit.
- Visual detection of zero beat with cathode-ray indicator.
- 110-115-volt ac/dc operation with 40 volt-amperes input.
- Telescoping antenna on side of case.
- Tubes: one 6SC7; one 6SA7; one 6J5; one 6SK7; one 6U5; one 25Z6 and one VR90 voltage regulator.

**MODEL S-6**

- Range: 100 kilocycles to 100 megacycles, in 5 bands.
- Accuracy 0.025% of the frequency measured.
- Harmonic amplifiers permit use of harmonics up to 50 mc.
- Visual and audio detection of zero beat.
- 110-115 volt ac/dc operation with 40 volt-amperes input.
- Telescoping antenna on side of case.
- Tubes: one 6SK7; one 6SL7; one 6SF5; one 6U5; one 5Y3GT; one VR90.

**MODEL S-7**

- Calibrated for One or Two frequencies in 72-76 and/or 152-162 mc. bands.
- Accuracy .005% of the specified frequency.
- Deviation chart supplied for instant determination of deviation from assigned frequency.
- Cathode-ray indicator for accurate setting of ECO calibration.
- 105-115-volt ac/dc operation with 40 volt-amperes input.
- Telescoping antennae on side of case.
- Tubes: one 6SL7; one 6SA7; one 6J5; one 6SK7; one 25Z6; one VR-90; and one 6U5 tuning indicator.

**MECHANICAL FEATURES OF ALL MODELS**

- Rugged steel cabinet with 1/8" aluminum panel.
- Machined main dial graduated in 100 divisions over 180 degrees. Vernier allows reading of 1/10 of dial division.
- Panel finished in black leatherette.
- All labels engraved in panel surface.
- Dimensions: 13 1/4" high, 7 7/8" wide, 6 7/8" deep.
- Weight: 15 lbs. Shipping weight 18 1/2 lbs.

**BROWNING FREQUENCY METER — MODEL S-5**

Designed for checking the frequencies of police, fire department, railroad, marine and other special-service transmitters operating between 30 and 500 megacycles.



**ELECTRICAL FEATURES**

- Custom-built and hand-calibrated for one, two, or three frequencies between 30 and 500 megacycles.
- Accuracy: .0025% of the specified frequency.
- Deviation chart supplied for determination of deviation from assigned frequency.
- 100 KC crystal in temperature regulated oven is used as secondary standard with long time frequency stability.
- Temperature compensated electron-coupled oscillator uses precision split-stator variable condenser with no moving contacts.
- Voltage regulated supply for crystal and electron-coupled oscillators.
- 105-115 volt, 60 cycle AC operation. 65 volt-amperes input.
- Telescoping antenna for easy coupling to transmitter.
- Tube complement: one Type 6C4, two 9001, two 6SJ7, three 6J5, one 5Y3GT, one VR-90.

**MECHANICAL FEATURES**

- Rugged steel cabinet and 1/8" steel panel.
- Electron-coupled oscillator built on 3/16" aluminum sub-chassis.
- Worm drive to tuning condenser with dual indicators provides 5000 dial divisions for tuning range.
- Panel finished in black leatherette.
- Labels engraved into panel surface.
- Standard rack panel used. Unit may be incorporated in a rack with other equipment if desired.
- Dimensions: Height 8 3/4", Width 19", Depth 9".
- Weight: 35 lbs. Shipping weight: 50 lbs.

Prices Net (Complete with tubes) F.O.B. Winchester, Mass.  
 1 Band . \$340.00    2 Bands . \$380.00    3 Bands . \$420.00

## MODEL 630 VOLT-OHM-MIL-AMMETER



Model 630

A Beautiful, streamlined Tester that is simple to operate. Only one switch—selects both circuit and range. A really new selector switch, completely enclosed and protected. Eliminates loss between contacts. Retains contact alignment permanently. Molded construction keeps dirt out. Unit construction—resistors, shunts, rectifiers, batteries—all housed in a molded base integral with the switch. All resistors are Precision Film or Wire-wound types—sealed for permanent accuracy, each in separate molded compartment. Large 5½" meter (RED • DOT Lifetime Guaranteed), black and red scale markings. Batteries easily replaced—double-spring tension grip assures permanent contact. Pre-calibrated rectifier. Molded black case, 3¾" × 5½" × 7½", with removable leather strap handle. Black molded panel with white markings.

### RANGES

- D. C. VOLTS: 0-3-12-60-300-1200-6000, at 20,000 Ohms/Volt (For greater accuracy on TV and other High Resistance circuits.)
- A. C. VOLTS: 0-3-12-60-300-1200-6000, at 5,000 Ohms/Volt (For greater accuracy in Audio and other High Impedance A. C. circuits.)
- DECIBELS: -30, +4, +16, +30, +44, +56, +70 (For Direct Reading of Output Levels.)
- D. C. MICROAMPERES: 0-60, at 250 M. V.
- D. C. MILLIAMPERES: 0-1.2-12-120, at 250 M. V.
- D. C. AMPERES: 0-12, at 250 M. V.
- OHMS: 0-1000-10,000 (4.4-44 at center scale.)
- MEGOHMS: 0-1-100 (4400-440,000 center scale.)
- OUTPUT: Condenser in series with A. C. Volt ranges

MODEL 630.....U. S. A. DEALER NET \$37.50

### CARRYING CASE

MODEL 639, black leather, strap handle, snap-over cover.....DEALER NET \$5.75

## MIRROR SCALE VOLT-OHM-MIL-AMMETER

Widest range tester of its type with additional brand new features: Long 5" mirror scale for better reading accuracy; Resistance ranges to 40 Megohm; Low Ohm Range 0-2000 (12 ohms center scale); D. C. Volt ranges with dual sensitivity (10,000/20,000 Ohm/Volt) provide double the number of full scale readings of average testers. A. C. Volt ranges at 10,000 Ohm/Volt permit checking many audio and high impedance A. C. circuits where a vacuum tube voltmeter usually is required. Low voltage ranges permit direct measurement of many bias and output voltages. Special film type resistors provide greater stability on all ranges.

6" RED • DOT Lifetime guaranteed meter. Long mirror scale guarantees greater reading accuracy. Insulated, black molded case with removable strap handle, 2½" × 5½" × 6". Molded black panel with white markings. Leads and instructions furnished.

Weight: Approx. 3 lbs.

### 39 RANGES

- D. C. VOLTS: 0-1.25-5-25-125-500-2500, 20,000 Ohm/Volt
- 0-2.5-10-50-250-1000-5000, 10,000 Ohm/Volt
- A. C. VOLTS: 0-2.5-10-50-250-1000-5000, 10,000 Ohm/Volt
- D. C. MICROAMPS: 0-50, at 250 Millivolts
- D. C. MILLIAMPS: 0-1-10-100-1000, at 250 Millivolts
- D. C. AMPERES: 0-10, at 250 Millivolts
- OHMS: 0-2,000-200,000 (12-1200 center scale)
- MEGOHMS: 0-40 (240,000 ohms center scale)
- DECIBELS: -30, +3, +15, +29, +43, +55, +69. (Reference level "0" DB at 1.73 V. on 500 Ohm line.)

OUTPUT: Condenser in series with A. C. Volt ranges

Accessories available to special order for extending ranges: External pin jack shunts for A.C.-D.C. Current ranges, resistors for volt ranges, battery and resistors for Ohms ranges. MODEL 625-NA, U. S. A. DEALER NET \$45.00

### CARRYING CASE

Attractive black leather carrying case with strap handle. Leather flap folds over the top and snaps in place.

MODEL 629 CASE, U. S. A. DEALER NET \$5.50



Model 625-NA

## POCKET-SIZE VOLT-OHM-MILLIAMMETER



Model 666-HH

A precision-manufactured marvel of compactness that provides a complete miniature laboratory for D. C. and A. C. voltage, Direct Current and Resistance analyses. Its many ranges, attractive appearance and other unique features provide an answer to the Volt-Ohm-Milliammeter requirements of radio service-men and amateurs, industrial engineers, laboratory technicians, etc. Refinements in design feature:

Greater scale readability on the 3" RED • DOT Lifetime guaranteed instrument with black and red scale markings.

Simplified switching provides greater ease in changing ranges.

Lower jack contact resistance and trouble-free plug-in connections by use of banana-type jacks. Banana jacks at top of panel reduce possibility of connecting leads over panel controls or meter scales.

Greater stability on voltage ranges by use of special resistors throughout and on current ranges by use of 250 M. V. instrument.

### RANGES

- D. C. VOLTS: 0-10-50-250-1000-5000, 1000 Ohm/Volt
- A. C. VOLTS: 0-10-50-250-1000-5000, 1000 Ohm/Volt
- D. C. MA: 0-10-100-500, at 250 Millivolts
- OHMS: 0-2000-400,000 (12-2400 center scale)

Attractive new streamlined black molded case, completely insulated, 3¼" × 5½" × 2½". Black molded panel with white markings. Battery self-contained, plug-in type, 1.5 V. Eveready No. 935 or equivalent. 50" test leads with clips and plugs furnished.

Weight: 1½ lbs.

Accessories available to special order for extending ranges: External pin jack shunts for A. C.-D. C. Current ranges, resistors for volt ranges, battery and resistors for Ohms ranges. MODEL 666-HH, U. S. A. DEALER NET \$22.00

### CARRYING CASE

Attractive black leather carrying case with strap handle. Leather flap folds over the top and snaps in place.

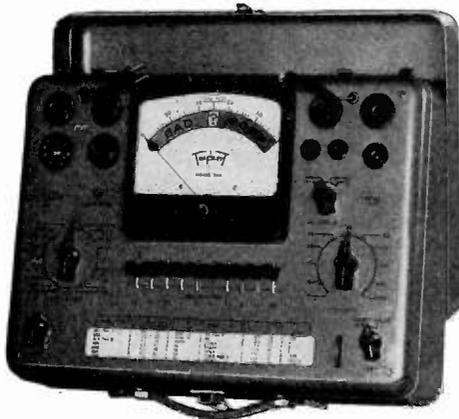
MODEL 669 CASE, U. S. A. DEALER NET \$4.75

ALL PRICES ARE SUBJECT TO CHANGE — ALL MODELS SUBJECT TO REVISION

# Radio



# Testers



Model 3413

### TUBE TESTER

CONCLUSIVE tube tests for value, inter-element shorts and leakage. FULLY-BALANCED, MULTI-PURPOSE CIRCUIT; with accurately calibrated values for all makes of tubes—more than an emission test in the special switching flexibility.

AN APPLIANCE CHECK lead permits "short" and "continuity" test of motors, leads, resistance elements, etc. NEON SHORT TEST shows slightest inter-element short or leakage while cathodes are hot. NEW 3-POSITION LEVER SWITCHES give individual control for each tube element. (See center panel.)

TUBES TESTED—All receiving types, gaseous rectifiers, resistor and ballast tube continuity, and pilot lamps. SOCKETS: 4, 5 and 6 prong; 7 prong large and small with combination for pilot lights and flashlight bulbs; 8 prong octal; 8 prong loctal; 5 prong bantam; 7 prong miniature; 7 prong subminiature; and 9 prong. Only one socket used for each tube base type eliminating possibility of plugging into the wrong socket.

LINE VOLTAGE INDICATOR permits observation and adjustment for line fluctuations. FILAMENT VOLTAGES (Full Range)—0.75 to 110 Volts in 19 steps. 6" meter with RED • DOT Lifetime guarantee, has 3-color GOOD-?-BAD scale. Brightly illuminated SPEED ROLL TUBE CHART located with markings below switches for convenience in testing. New tubes can be calibrated without manufacturers' data.

COUNTER-PORTABLE Type Case, metal, 15 1/4" x 11 1/2" x 6 1/4", finished in attractive baked-on "hammered" tan enamel. Panel with brown markings. Power supply—115 Volt, 50-60 cycle A. C.  
Weight: 20 lbs.

MODEL 3413 TUBE TESTER.....  
U. S. A. DEALER NET.....\$66.75

Triplet lever switching makes possible an exclusive combination of tube testing advantages including maximum circuit flexibility, simplicity of operation and anti-obsolescence design.

1. Thorough test of all tube elements.
2. Individual control of each tube element.
3. New tube test data can be set up without delay.
4. Lever switching is faster and more accurate.
5. No plugging into wrong socket.
6. Minimum number control settings needed.



MODEL 3480

### COMBINATION TUBE TESTER VOLT-OHM-MIL-AMMETER

VOLT-OHM-MIL-AMMETER RANGES:

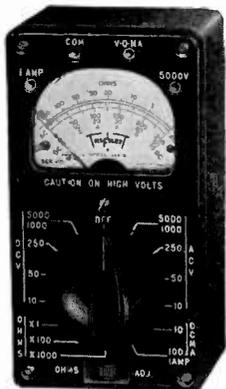
- D. C. VOLTS: 0-3-12-60-300-1200, at 10,000 Ohms/Volt
  - A. C. VOLTS: 0-3-12-60-300-1200, at 2000 Ohms/Volt
  - D. C. AMPS: 0-12, at 250 M. V.
  - D. C. MILLIAMPS: 0-1.2-12-120, at 250 M. V.
  - OHMS: 0-1000-10,000 (10-100 at center scale)
  - MEGOHMS: 0-1-50 (10,000-500,000 Ohms at center scale)
- OUTPUT: Output Jacks, condenser in series with A. C. ranges.

TUBE TESTER-VOLT-OHM-MIL-AMMETER—A Combination Tester for conclusive tube testing and complete voltage, current and resistance analyses. Tube Tester has a fully-balanced, multi-purpose test circuit for emission, short and open element tests. See Model 3413 for complete details. GOOD-?-BAD tube testing and Volt-Ohm-Mil-Ammeter ranges are easily readable on the 6" RED • DOT Lifetime Guaranteed meter with multi-color scale. Volt-Ohm-Mil-Amp. markings are black on white except A. C. are red and 0-1000 Ohms are green.

COUNTER-PORTABLE Type Case, metal, has highly attractive two-tone "hammered" baked-on enamel finish, 15 1/4" x 11 1/2" x 6 1/4". Detachable hinged cover, strap handle.

Weight: 25 lbs.  
MODEL 3480 COMBINATION TESTER.  
U. S. A. DEALER NET.....\$98.75

### POCKET-SIZE VOLT-OHM-MIL-AMMETER



Model 666-R

#### RANGES

- D.C. VOLTS: 0-10-50-250-1000-5000, at 1000 Ohms per volt
- A.C. VOLTS: 0-10-50-250-1000-5000, at 1000 Ohms per volt
- D.C. MA.: 0-10-100, at 250 M.V.
- D.C. AMP.: 0-1, at 250 M.V.
- OHMS: 0-3000-300,000 (20-2000 center scale)
- MEGOHM: 0-3 (20,000 Ohm center scale) (Compensated Ohmmeter circuit.)

A New Pocket-Size Volt-Ohm-Mil-Ammeter with these latest specialized features meet your needs for A.C. and D.C. Voltage, Direct Current and Resistance analyses.

Enclosed selector switch of molded construction keeps dirt out. Retains contact alignment permanently. A Triplet design representing the culmination of a quarter-century of switch making experience. UNIT CONSTRUCTION—All resistors, shunts, rectifier and batteries housed in a molded base integral with the switch. Eliminates chance

for shorts. Direct connections. No Cabling. All precision film or wire-wound resistors are mounted in their own compartment—assures greater accuracy.

3" 0-200 Microammeter, 250 M.V., RED • DOT Lifetime guaranteed against defects in materials or workmanship. Red and black markings on a white background. Easy-to-read scale.

Pre-calibrated rectifier unit and batteries easily replaced. One 1.5 Volt Eveready #935 and two 1.5 Volt Eveready #915, or equivalent, self-contained.

Handy pocket-size, black molded case is completely insulated. Size: 3 1/8" x 5 7/8" x 2 1/8". Leather strap handle. Black molded panel with engraved white markings.

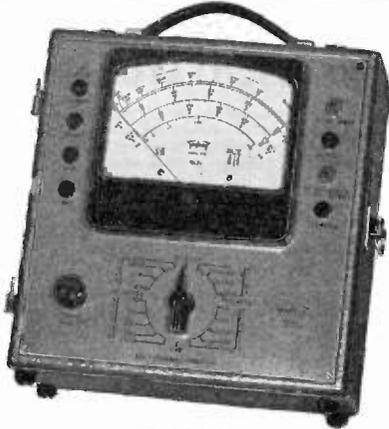
Furnished complete with batteries, 50" test leads and instruction book at an amazingly low price.

Weight: 1 1/2 lbs.  
MODEL 666-R... U.S.A. DEALER... NET \$24.50

CARRYING CASE  
MODEL 669, black leather, strap handle, snap cover... U.S.A. DEALER NET... \$4.75

# Radio **TRIPOLET** Testers

## SENSITIVE VOLT-OHM-MIL-AMMETER 20,000 OHMS PER VOLT



Model 2405-A

- D. C. VOLTS: 0-10-50-250-500-1000, 20,000 Ohm/Volt
- D. C. AMPS: 0-10, at 250 Millivolt
- D. C. MILLIAMPS: 0-1-10-50-250, at 250 Millivolt
- D. C. MICROAMPS: 0-50, at 250 Millivolt
- A. C. VOLTS: 0-10-50-250-500-1000, 1000 Ohm/Volt
- A. C. AMPS: 0-0.5-1-5-10, at 1 Volt-Amp
- OHM-MEGOHM: 0-4000-40,000 Ohms — 0-4-40 Meg. (Self-contained batteries.)
- OUTPUT: Condenser in series with A. C. Volt ranges
- DECIBELS: -10 to +15, +29, +43, +49, +55. (Reference Level "0" DB at 1.73 V. on 500 Ohm line.)
- CONDENSER TEST: Capacity check of Paper condensers

A perfect combination—ultra sensitive, extra large meter, impressively cased for either shop or portable use. Incorporates the ultimate sensitivity, 20,000 ohms per volt in a conventional meter of extreme accuracy.

6" Meter. RED • DOT Lifetime guarantee. 5 3/4" long scale enables easy reading. Plug-in, pre-calibrated rectifier simplifies replacement. Ruggedly constructed selector switch. "OHMS ADJUST" provides adjustment for all resistance ranges with maximum accuracy. Connections made through low contact resistance banana jacks. "SQUARE LINE" case, 10" x 10" x 5 3/4", tan enamel finish has detachable, hinged cover. Leads and instructions furnished.

Weight: Approx. 11 lbs.  
MODEL 2405-A.....  
U. S. A. DEALER NET.....\$59.75

## HIGH VOLTAGE PROBES

For measuring the high voltage employed in television receivers and in other applications, external probes are available for ranges from 10,000 to 30,000 D. C. Volts for Models 625-NA, 630, 666-HH, 2405-A and 2451. Specify Tester Model when requesting quotations or ordering.

The completely insulated Polystyrene test probe contains the voltage dropping resistors, high stability composition type, protected from moisture with a sealed-in covering of Silicone high voltage insulating compound. An additional safe-guard is the guard-type handle. Each lead consists of a 48-inch high voltage wire with probe at one end and banana plug on the tester end. Probe is 11 3/4" long.

## PORTABLE V-O-MA SHUNTS

Portable, external shunts as high as 120 Amps. are available to extend the current ranges of testers including Models 625-NA, 630, 666-HH, 2405-A and 3480. Shunt must be ordered for the specific tester with which it is to be used because of spacing and millivolt drop. Plug-in type connections are made by plugging shunt into the tester MA terminals. Connections for Portable shunts are made by using 12" leads. Quotations upon request.

### TO EXTEND OHMMETER RANGE MODEL 666-HH

A plug-in ohmmeter multiplier for Model 666-HH. Compact tubular insulator with resistor, battery and plug. Will extend Model 666-HH Ohmmeter range to 4 megohms.  
No. 9467.....DEALER NET \$3.85

## APPLIANCE TESTERS

### VOLTS - AMPS - WATTS

ELECTRICAL CIRCUIT ANALYZER of new advanced design for measuring the power wattage, current consumption, and line voltage of all household appliances and small motors under actual operating conditions. Just the tester for watt, current and volt analyses of electric refrigerators, washers, radios, ironers and other appliances, including ranges operating on 220-Volt single phase three-wire and three phase three-wire systems. Power used by the smallest appliance is readily checked on the extremely low scale

range of 0-20 watts (fused to prevent damage from accidental overload). All switches and leads are ample to carry full load continuously.

### RANGES

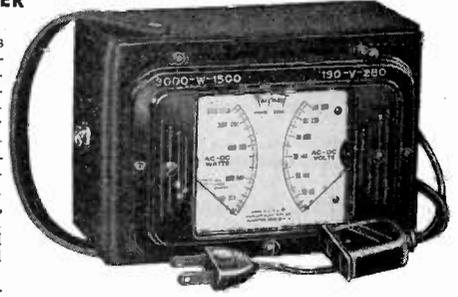
- A. C. WATTS: Single-Phase, 130 V.—0-10-20-250-500-1000-2000
- Single-Phase, 260 V.—0-20-40-500-1000-2000-4000
- Three-Phase, 260 V.—0-80-2000-4000-8000
- A. C. CURRENT: 0-0.13-0.26-3.25-6.5-13-26 Amps
- A. C.-D. C. VOLTS: 0-130-260

Model 666 Meter, Electro-dynamometer type, RED • DOT Lifetime Guarantee, with 5.6" scale. "SQUARE LINE" metal case, 10" x 10" x 5 3/4", finished in tan "hammered" enamel with brown markings on the panel. Hinged, detachable cover has compartment for accessories and leads. One set 5 ft. (Two-Wire) leads with male plug at one end and terminals at other end for connection to tester binding posts; one set 2 1/2 ft. leads with dual socket at one end and terminals at other end for connection to tester binding posts.

Weight: Approx. 11 lbs.  
MODEL 2470.....U. S. A. DEALER NET \$76.75

### DUAL-METER TESTERS

Models 2002 and 2000-A are real helpers for installations and servicing. Show power consumption of industrial equipment, radios, electric ranges, refrigerators, washers and other household appliances under actual running conditions.



Model 2002

on either D. C. or A. C. between 25 and 133 cycles. Checks Watts and Volts simultaneously! Shows if voltage remains within limits under operating loads. Simple operation, clearly marked switches, easy reading long Twin meter scales. Leather carrying case, 6 1/2" x 4 1/2" x 3 1/4", with strap handle, has flap cover to protect meter which is fixed in the case. Space for leads. Leather case eliminates possibility of scratching enamel appliance finishes.

Weight: 2 lbs.

MODEL 2002.....U. S. A. DEALER NET \$35.75  
Ranges: 0-1500-3000 Watts A. C.-D. C. at 10 Amp. normal, 20 Amp. max., 40 Amp. momentary; 0-130-260 A. C.-D. C. Volts.

MODEL 2000-A.....U. S. A. DEALER NET \$34.75  
Ranges: 0-750-1500 Watts A. C.-D. C. at 5 Amp. normal, 10 Amp. max., 20 Amp. momentary; 0-130-260 A. C.-D. C. Volts.

Models 2005-2006 — designed for those preferring Voltmeter-Ammeter method of testing household appliances and industrial applications. Simultaneous line voltage and current drain readings.

MODEL 2005.....U. S. A. DEALER NET \$33.00  
Ranges: 0-10 A. C.-D. C. Amp.; 0-130-260 A. C.-D. C. Volts.

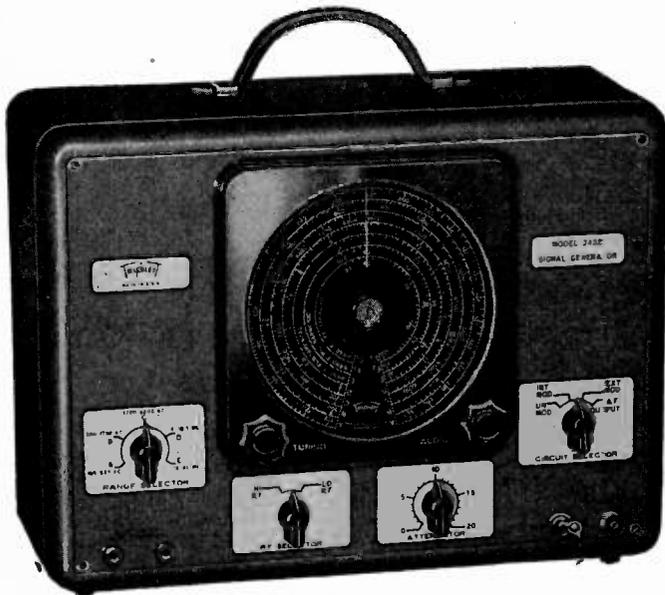
MODEL 2006.....U. S. A. DEALER NET \$33.00  
Ranges: 0-25 A. C.-D. C. Amp.; 0-130-260 A. C.-D. C. Volts.

ALL PRICES ARE SUBJECT TO CHANGE — ALL MODELS SUBJECT TO REVISION

# Radio



# Testers



Model 3432

**RANGES**

- |                |                     |
|----------------|---------------------|
| A—165-525 KC   | E—18-40 MC          |
| B—500-1750 KC  | Harmonics to 120 MC |
| C—1700-6200 KC | E2—36-50 MC         |
| D—6-18.5 MC    | E3—54-120 MC        |

## TEST OSCILLATOR

A wide-range oscillator with uniformly illuminated dial. Seven long scales with widely separated divisions easily read, have five fundamental ranges—165 KC to 40 MC, and two harmonic ranges directly calibrated 36 to 120 MC.

Unique new feature is the brightly illuminated dial providing distinct illumination of scale markings without the least possibility of glare. Lighting also provides an "ON-OFF" indicator.

The dial is big (330°) with seven scales quickly readable at a glance. It has 10 to 1 ratio vernier tuning for ease of adjustment.

**RANGE SELECTOR** — 5 position follow-up coil switching with complete shielding.

**R. F. SELECTOR** — Provides High and Low R. F. Output.

**OUTPUT ATTENUATOR** — Provides fine control of R. F. Output to Coaxial output cable connector.

**CIRCUIT SELECTOR** — Provides for internally modulated signal (Variable 0 to 100% at 400 cycles). Variable amplitude of external modulation 40 to 15,000 cycles, unmodulated signal or variable audio 0-10 Volts at 400 cycle.

**DOUBLE SHIELDING**—All R. F. and audio circuits are double shielded with copper plated steel shields.

Metal case, 15½"×11½"×6¼", with tan enamel finish. Has leather strap handle for ease in carrying. Power: 115 volt, 50-60 cycle A. C. (electrostatic shielded transformer).

Weight: 14½ lbs.

MODEL 3432.....U. S. A. DEALER NET \$69.50

## A.M.-F.M. SIGNAL GENERATOR

FM-AM Signal Generator with frequency coverage from 100 KC to 120 MC in 10 bands; plus additional 50 MC from fixed oscillator giving fundamental coverage continuously variable to 170 MC.

**OUTPUT** — 1 volt on low ranges from 100 KC to 20 MC and approximately 250,000 Microvolts on the high ranges.

**SWEEP WIDTH VARIABLE IN THREE RANGES**  
60KC (+30 KC)    300KC (+150KC)    600KC (+300KC)

Other outstanding engineering features include: (1)—Deviation control of a fixed frequency reactance modulated oscillator. (2)—Output Meter for measuring relative R. F. output of generator. (3)—Double copper plated steel shielding throughout greatly minimizes R. F. leakage. (4)—Co-axial cable output lead with shielded impedance coupler for direct capacitance or balanced doublet connection. (5)—110 Volt A. C. line filter prevents leakage through power supply. (6)—Ladder attenuator with coarse and fine R. F. output adjustment. (7)—High R. F. Voltage output jack. (8)—High A. F. output available. (9)—Built-in provision for crystal oscillator calibration reference. Crystal not supplied. (10)—Air trimmer capacitor and permeability adjusted oscillator coils. (11)—Voltage regulated power supply for oscillator stability. (12)—Heterodyne Detector for frequency measurement. (13)—External A. M. modulation may be used. (14)—Attractive and easily read dial. (15)—Horizontal synchronized sweep voltage available. (16)—Best available components used throughout.

Metal case, 15½"×11½"×8¼", finished in lustrous black suede enamel with red and white panel markings. Power: 115 Volt, 50-60 cycle A. C. Weight: 25 lbs.

MODEL 3433.....U. S. A. DEALER NET \$173.25

ALL PRICES ARE SUBJECT TO CHANGE — ALL MODELS SUBJECT TO REVISION



Model 3433

**10 VARIABLE FREQUENCY BANDS**

- |               |                |
|---------------|----------------|
| A—100-200 KC  | F—3.5-7 MC     |
| B—200-400 KC  | G—7-14.5 MC    |
| C—400-820 KC  | H—14.5-27.5 MC |
| D—820-1700 KC | I—27.5-55 MC   |
| E—1.7-3.5 MC  | J—55-120 MC    |

(170 MC output available by adding the 50 MC fixed oscillator signal to 120 MC signal.)

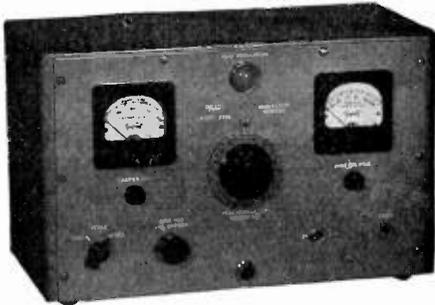
# Radio



# Testers

## RADIO AMATEUR EQUIPMENT

### MODULATION MONITOR



Model 3296

With this new MODULATION MONITOR for radio amateur, police and Marine radiophone use, you've solved the problem of getting maximum efficiency from your transmitter. Four separate circuits for measuring amplitude modulation: (1) Percent Modulation (average). (2) Peak Flash Percent Modulation. (3) Carrier Shift. (4) Audio Output for Headphone. Unique advantages of this new model include the following: Peak Indicator may be preset for any percent of modulation from 20-120, and provides instantaneous flash when predetermined modulation level is reached. Percent modulation meter provides rapid up and slow down swing. Plug into your A. C. line—make simple coupling to the transmitter output and the monitor is ready for operation. R. F. and A. F. stages are isolated and separated by ample shielding. Tuned input circuit is coupled to R. F. source by a vario-coupler. R. F. power requirements are small.

TUNING RANGES: 1550-2950 KC (Police Band) 14,000-14,400 KC  
 3500-4000 KC 28,000-30,000 KC  
 7000-7300 KC Audio Frequency  
 60-10,000 CPS

CASE: Metal, with dark gray "hammered" enamel finish; overall dimensions: 15½"X9"X8". Weight: 20 lbs. Power: 115 Volt, 50-60 cycle A. C.

MODEL 3296.....U. S. A. DEALER NET \$109.75

### VU METER

### DB METER

Volume Unit and Decibel Meters are used to measure sound or noise levels in amplifiers for Public Address, Theatres, Broadcasting Studios, Broadcasting Static Equipment, etc.

VU meters are used for volume level measurements — including broadcast monitoring. Internal impedance 3900 Ohms. Steady state reference 1 Milliwatt. For 600 Ohm line. 0-100% scale also —20 to +3 VU. Specify Type "A" or "B" scale.

MODEL 426 VU.....\$23.10  
 MODEL 426 (Illuminated). 25.10

DB Meter permits the operator to make instant adjustments to prevent sound blasting or distortion. Up 6, down 10 DB. Zero DB at 1.73 volt, 500 ohms, 6 milliwatts. Standard damping furnished unless highly damped is specified.

426 DB (Dealer Net) \$15.20  
 321-T, 327-T " " 13.60

### HIGH RANGE D.C. VOLTMETERS FOR AMATEURS

Designed particularly for radio amateurs. High range 3" D. C. Voltmeters—1000 ohms per volt. Provided with special external metalized multipliers mounted on bakelite strip. Specify this type when ordering, or standard voltmeters will be furnished. Available 3" case, Models 321-T, 327-T:

Range	Price	Range	Price
0-1000.....	\$11.90	0-4000.....	\$11.90
0-2000.....	11.90	0-5000.....	12.80
0-3000.....	11.90		

### FREQUENCY METER

A new band-switching, tuned Absorption type Frequency Meter covering five amateur bands. Incorporates the new germanian crystal and a D. C. Milliammeter indicator for greater sensitivity. Direct calibration on panel—no coils to change; switching permits instantaneous band change. Audio jack is provided for monitoring of phone signals—another new feature. Fully shielded. Calibration is in megacycles in the following bands: 3.5-4 MC; 7-7.3 MC; 14-14.4 MC; 20-21.5 MC; 28-30 MC. Coil is removable and other coils may be substituted for special bands, if desired.

USEFUL FOR CHECKING: (1) Fundamental frequency of oscillating circuits. (2) Presence, order and amplitude of harmonics. (3) For parasitic oscillations. (4) Neutralization of R. F. amplifiers. (5) Standing wave ratio on transmission lines. (6) Presence of undesirable or small quantities of R. F. (7) Monitoring of phone signals.

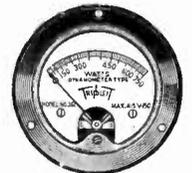
A fully shielded unit of compact pocket size. Overall height, including coil, 7½"; width 2½"; depth 2¼". Attractive gray "hammered" enamel finish with black trim.  
 MODEL 3256.....U. S. A. DEALER NET \$16.25



Model 3256

### WATTMETERS — ELECTRODYNAMOMETER

These instruments can be used on single phase A. C. or D. C. as Wattmeters. On special order they can be made up as voltmeters or ammeters. Instruments are self-contained to 300 Volts—10 Amperes. Over that external connection can be made. For use on frequencies up to 133 cycles per second. Available in three-inch model 361. Case dimensions same as 321-T, except for depth, 2" back of the flange (2½" over studs). Wattmeters can be combined in the Triplet Twin case with a voltmeter or Ammeter. Accuracy within ±2%. Standard ranges as follows:



#### MODEL 361 — SINGLE PHASE

Range Watts	Normal Voltage	Normal Amps.	Sc. Div.	Net Price
0-75	150	1 ½	75	16.00
0-150	150	1	75	16.00
0-300	150	2	60	16.00
0-750	150	5	75	16.00
0-1500	150	10	75	16.00
0-150	300	½	75	17.60
0-300	300	1	60	17.60
0-600	300	2	60	17.60
0-1500	300	5	75	17.60
0-3000	300	10	60	17.60

#### DOUBLE RANGE WATTMETERS (Double Voltage Limits Only)

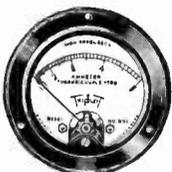
0-75-150	150-300	½	75	21.60
0-150-300	150-300	1	75	21.60
0-300-600	150-300	2	60	21.60
0-750-1500	150-300	5	75	21.60
0-1500-3000	150-300	10	75	23.40

### SENSITIVE RELAYS

Highly sensitive Triplet relays are of the D'Arsonval Moving Coil type, carefully designed to give dependable, satisfactory performance. Since relays cover such a wide field and most of them are made to special order, no standard models are listed. Each application should be accompanied with information specifying maximum and minimum currents and voltages which will pass through relay coil and contact points, etc.

### R.F. AMMETERS

Triplet R. F. Ammeters are the same case size and appearance as corresponding D. C. Models. Internal couples normally furnished at prices shown. If external couples are required, please specify on order, adding \$3.70 net to price of instruments listed below. External couples only (less meter), with 2 ft. leads are \$4.70 net each.



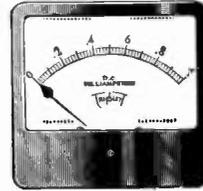
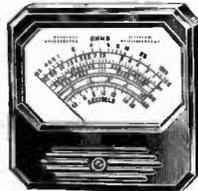
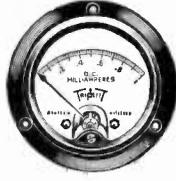
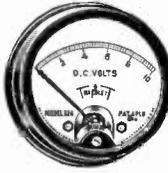
Range	Approx. Res.	Models 241-T, 243-T	Models 242-T, 247-T	Models 341-T, 347-T	Models 342-T, 442, 446	Models 441, 441-A, 447, 541	Model 746
0.5 Amps.....	.93	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30
0-1 Amps.....	.35	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30
0-1.5 Amps.....	.21	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30
0-2.5 Amps.....	.13	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30
0-5 Amps.....	.06	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30
0-10 Amps.....	.03	\$ 6.90	\$ 7.90	\$ 9.50	\$10.30	\$17.30	\$17.30

ALL PRICES ARE SUBJECT TO CHANGE — ALL MODELS SUBJECT TO REVISION

# Measuring



# Instruments



221-T, 321-T D. C.  
231-S, 331-S A. C.

227-T, 327-T D. C.  
237-T, 337-T A. C.

324, 524 D. C.  
334, 534 A. C.

422, 521 D. C.  
432, 531 A. C.

426 D. C., 436 A. C.

636, 736 A. C.  
626, 726 D. C.

Models		Scale Lengths		Flange	Body Dia.	Body Depth		Material	Case (Mounting)	
D. C.	A. C.	D. C.	A. C.			D. C.	A. C.		Type	Style
221-T	331-S	1.76"	1.58"	2 1/4" Dia.	2 3/8"	1 1/8"	1 1/8"	Molded	Flush	Rim
222-T	332-S	1.76"	1.58"	2 3/8" Dia.	2 3/8"	1 1/8"	1 1/8"	Metal*	Flush	Rim
223-T	333-S	1.76"	1.58"	2 3/8" Dia.	2 3/8"	1 1/8"	1 1/8"	Metal*	Flush	Rear Clamp
227-T	337-S	1.76"	1.58"	2 3/8" Sq.	2 3/8"	1 1/8"	1 1/8"	Molded	Flush	Rear Screws
321-T	331-S	2.49"	2.22"	3 1/2" Dia.	2 3/4"	1 1/2"	1 1/2"	Molded	Flush	Rim
322	332	2.49"	2.22"	3 1/2" Dia.	2 3/4"	1 1/2"	1 1/2"	Metal*	Flush	Rim
324	334	2.49"	2.22"	3 1/2" Dia.	2 3/4"	1 1/2"	1 1/2"	Metal*	Projection	Rear Studs
327-T	337-S	2.49"	2.22"	3 1/2" Sq.	2 3/4"	1 1/2"	1 1/2"	Molded	Flush	Rear Screws
421	431	3.11"	2.78"	4 1/4" x 3 1/2"	2 3/4"	1 1/2"	1 1/2"	Molded	Flush	Rim
421-A	431-A	3.11"	2.78"	3 1/2" x 4"	2 3/4"	1 1/2"	1 1/2"	Molded	Flush	Rear Clamp
422	432	3.11"	2.78"	4 3/8" Dia.	3 3/8"	1 1/2"	1 1/2"	Molded	Flush	Rim
426	436	3.11"	2.78"	4 1/4" x 4"	3 3/8"	1 1/2"	1 1/2"	Molded	Flush	Rear Screws
427	437	3.73"	3.4"	4 1/4" x 4 1/2"	3 3/8"	1 1/2"	1 1/2"	Molded	Flush	Rear Screws
521	531	3.11"	2.78"	5 1/4" Dia.	4 3/8"	1 1/2"	1 1/2"	Molded	Flush	Rim
524	534	3.11"	2.78"	4 3/8" Dia.	4 3/8"	1 1/2"	1 1/2"	Molded	Projection	Rear Studs
626	636	5.6"	5.3"	6" x 5 3/8"	3 1/2"	1 1/2"	1 1/2"	Molded	Flush	Rear Screws
726	736	6"	5.75"	7 3/8" x 6 3/8"	3 1/2"	1 1/2"	1 1/2"	Molded	Flush	Rear Screws

\*Molded base.

### D.C. VOLTMETERS — 125 Ohms per Volt

Range	Code	Models 221-T, 222-T, 223-T, 227-T	Models 321-T, 322, 324, 327-T	Models 421, 421-A, 422, 426	Models 427, 521, 524	Model 626	Model 726
0-5	TRCXK	\$ 5.80	\$ 6.80	\$ 8.40	\$ 9.20	\$ 10.30	\$ 16.20
0-10	TRDWD	5.80	6.80	8.40	9.20	10.30	16.20
0-25	TRFUF	5.80	6.80	8.40	9.20	10.30	16.20
0-50	TRGTG	5.80	6.80	8.40	9.20	10.30	16.20
0-100	TRSHH	5.80	6.80	8.40	9.20	10.30	16.20
0-150	TRIRI	5.80	6.80	8.40	9.20	10.30	16.20
0-300	TRLOL	7.60	8.60	10.20	11.00	12.10	18.00

### D.C. VOLTMETERS — 1000 Ohms per Volt

Range	Code	Models 221-T, 222-T, 223-T, 227-T	Models 321-T, 322, 324, 327-T	Models 421, 421-A, 422, 426	Models 427, 521, 524	Model 626	Model 726
0-10	TAIGA	\$ 8.40	\$ 9.40	\$ 11.00	\$ 11.80	\$ 12.90	\$ 18.80
0-150	TAINE	8.70	9.70	11.30	12.10	13.20	19.10
0-300	TRULL	10.80	11.80	13.40	14.20	15.30	21.20
0-500	TURAL	12.20†	13.20†	14.80†	15.60†	16.70†	22.60†
0-1000	TURIN	25.20*	26.20*	27.80*	28.60*	29.70*	35.60*

If sensitivity is not specified on orders for D. C. Voltmeters, 125 Ohms is normally supplied. †Indicates instruments supplied with external wire-wound series resistors at prices shown. \*Supplied with external resistor boxes at prices shown above. ‡All other instruments are self-contained. Double-range panel voltmeters available on special order. Prices on request.

### D.C. MICROAMMETERS

Range	Approx. Resis.	Code	Models 221-T, 222-T, 223-T, 227-T	Models 321-T, 322, 324, 327-T	Models 421, 421-A, 422, 426	Models 427, 521, 524	Model 626	Model 726
0-50	1770	TALBE	\$ 16.99	\$ 17.90	\$ 19.50	\$ 20.30	\$ 21.40	\$ 27.30
0-100	900	TRARA	15.00	16.00	17.60	18.40	19.50	25.40
0-200	360	TARDY	11.80	12.80	14.40	15.20	16.30	22.20
0-500	156	TWIRL	8.10	9.10	10.70	11.50	12.60	18.50

### D.C. MILLIAMMETERS

Range	Approx. Resis.	Code	Models 221-T, 222-T, 223-T, 227-T	Models 321-T, 322, 324, 327-T	Models 421, 421-A, 422, 426	Models 427, 521, 524	Model 626	Model 726
0-1	55	TRAAN	\$ 6.90	\$ 7.90	\$ 9.50	\$ 10.30	\$ 11.40	\$ 17.30
0-15	6.6	TRFFS	5.80	6.80	8.40	9.20	10.30	16.20
0-25	4	TRGGT	5.80	6.80	8.40	9.20	10.30	16.20
0-50	2	TRHHU	5.80	6.80	8.40	9.20	10.30	16.20
0-100	1	TRJJV	5.80	6.80	8.40	9.20	10.30	16.20
0-150	0.6	TRKXK	5.80	6.80	8.40	9.20	10.30	16.20
0-200	0.5	TRLLY	5.80	6.80	8.40	9.20	10.30	16.20
0-250	0.4	TRMMZ	5.80	6.80	8.40	9.20	10.30	16.20
0-300	0.33	TRNNA	5.80	6.80	8.40	9.20	10.30	16.20
0-500	0.2	TRROB	5.80	6.80	8.40	9.20	10.30	16.20

### D.C. AMMETERS

Range	Approx. Resis.	Code	Models 221-T, 222-T, 223-T, 227-T	Models 321-T, 322, 324, 327-T	Models 421, 421-A, 422, 426	Models 427, 521, 524	Model 626	Model 726
0-1	0.05	TALUS	\$ 5.80	\$ 6.80	\$ 8.40	\$ 9.20	\$ 10.30	\$ 16.20
0-10	0.005	TROCK	5.80	6.80	8.40	9.20	10.30	16.20
0-25	0.002	TANGS	5.80	6.80	8.40	9.20	10.30	16.20
0-50	0.0016	TANGO	5.80	6.80	8.40	9.20	10.30	16.20

Self-contained up to and including 50 Amperes. Shunts 75 Amperes (50 M.V.) and higher are switchboard type with 5 ft. leads. Prices on request.

### A.C. VOLTMETERS

Range	Approx. Ohms per Volt	Code	Models 231-S, 232-S, 233-S, 237-S	Models 331-S, 332-S, 334, 337-S	Model 431, 431-A, 432, 436	Models 437, 531, 534	Model 636	Model 736
0-5	4	TERSE	\$ 5.80	\$ 6.80	\$ 8.40	\$ 9.20	\$ 10.30	\$ 16.20
0-10	10	TRUMP	5.80	6.80	8.40	9.20	10.30	16.20
0-150	125	TOYTE	6.90	7.90	9.50	10.30	11.40	17.30
0-300	144	TWEAK	8.50	9.50	11.10	11.90	13.00	18.90

### A.C. AMMETERS

Range	Approx. Resis.	Code	Models 231-S, 232-S, 233-S, 237-S	Models 331-S, 332-S, 334, 337-S	Model 431, 431-A, 432, 436	Models 437, 531, 534	Model 636	Model 736
0-3	0.2	TULIP	\$ 5.80	\$ 6.80	\$ 8.40	\$ 9.20	\$ 10.30	\$ 16.20
0-5	0.1	TEUCH	5.80	6.80	8.40	9.20	10.30	16.20
0-10	0.05	TEHEE	5.80	6.80	8.40	9.20	10.30	16.20
0-25	0.01	TELEO	5.80	6.80	8.40	9.20	10.30	16.20

### A.C. MILLIAMMETERS

Range	Approx. Resis.	Code	Models 231-S, 232-S, 233-S, 237-S	Models 331-S, 332-S, 334, 337-S	Model 431, 431-A, 432, 436	Models 437, 531, 534	Model 636	Model 736
0-10	2670	TEETH	\$ 6.90	\$ 7.90	\$ 9.50	\$ 10.30	\$ 11.40	\$ 17.30
0-15	1150	TOUSY	5.80	6.80	8.40	9.20	10.30	16.20
0-50	82	TEMPT	5.80	6.80	8.40	9.20	10.30	16.20
0-100	21	THARM	5.80	6.80	8.40	9.20	10.30	16.20
0-200	6.7	TRFFT	5.80	6.80	8.40	9.20	10.30	16.20
0-500	0.8	THEOS	5.80	6.80	8.40	9.20	10.30	16.20

ALL PRICES ARE SUBJECT TO CHANGE — ALL MODELS SUBJECT TO REVISION — OTHER RANGES AVAILABLE

# Radio

# TRIPLET

# Testers



Model 3434

### A FEW REASONS YOU'LL WANT MODEL 3434

- ★ Continuously variable sweep width from 100 KC to 12 MC.
- ★ Main frequency dial marked with channels and frequencies.
- ★ Variable Marker provides continuous tuning over all present TV Video and Sound IFs. Mirrored dial.
- ★ Absorption type Marker in addition to pip type.
- ★ Straight-line frequency calibrated dials.

### A NEW TV-FM SWEEP SIGNAL GENERATOR WITH BUILT-IN MARKERS

#### FREQUENCY COVERAGE

Sweep Center Frequency: Range 1— 0- 60 MC  
 Range 2— 60-120 MC  
 Range 3—120-240 MC

Sweep Width: .1-12 MC  
 (Continuously Variable)

Marker Frequency: 19.5- 40 MC (Fundamental)  
 39 -240 MC (Harmonic)

Crystal Frequency: To 20 MC (Fundamental)  
 Can be used to produce Harmonics to 216 MC. (Crystals not furnished.)

Modulation: 400 Cycles on both Crystal and Marker frequencies.

Audio: 400 Cycles.

Model 3434 provides a complete service laboratory for TV-FM servicing and other electronic requirements. No gaps in frequency. Continuous tuning over all TV-FM bands. Provisions for simultaneous presentation of two Markers. Audio output for quick check on video and sound amplifiers. Ladder type attenuator for coarse and fine output adjustment. Shielded. Copper plated steel construction throughout. Modulation of Markers to facilitate alignment of traps, etc. Line filter. Phase controlled sweep voltage for scope horizontal input. Stability increased by ceramic trimmers, zero temperature coefficient capacitors, silver plated coils, regulated power supply and rugged construction.

Attractive steel case, black enamel suede finish. 15 $\frac{1}{2}$ " x 11 $\frac{3}{8}$ " x 8 $\frac{1}{4}$ ". Copper plated feet for improved grounding. Black, white and red etched markings on aluminum panel.

Accessories—Co-Axial cables for low-loss RF output. Heavy braid strap. Rubber covered leads for audio and sync output and additional ground.

Power: 105-115 Volt, 50-60 Cycle, 55 Watts.  
 Weight: 23 lbs.

MODEL 3434—U.S.A. DEALER NET \$149.50

### NEW 5" TV-FM OSCILLOSCOPE TAILORED FOR TELEVISION

#### VERTICAL AMPLIFIER

Frequency Range—Flat within  $\pm 20\%$ .  
 20 Cycles to 1 MC with deflection sensitivity of .1 RMS Volts/Inch  
 20 Cycles to 100 KC with deflection sensitivity of .02 RMS Volts/Inch

#### HORIZONTAL AMPLIFIER

Frequency Range—Flat within  $\pm 20\%$  from 20 Cycles to 250 KC.  
 Deflection sensitivity—5 RMS Volts/Inch

INPUT IMPEDANCE—Vertical Amplifier—2 Megohms in parallel with 25 MMF.  
 Horizontal Amplifier—2 Megohms in parallel with 25 MMF.

#### MAXIMUM INPUT POTENTIAL

Vertical Amplifier—400 Volts max. DC or Peak.  
 Horizontal Amplifier—400 Volts max. DC or Peak.

LINEAR TIME BASE—10 c.p.s. to 60 KC.

INTENSITY MODULATION—Return trace eliminator.

SYNCHRONIZING SIGNAL—.03 RMS Volt required.

CALIBRATING METER—Calibrated in Peak-to-Peak Volts: 0-3, 0-10.

PHASE HORIZONTAL SWEEP—Phase controlled Sweep voltage of line frequency.

VERTICAL PATTERN—Provides selection of polarity to be observed.

ATTENUATION—Coarse and fine control over Vertical Input. Fine control over Horizontal Input.

SIGNAL TRACING feature provided by Headphone Output. Enables detection of hum modulation, spurious interference, etc.

ESCUTCHEON—Telescoping to provide shaded Cathode Ray Tube. Large 5" Cathode Ray Tube.

SHIELDING—Copper plated steel construction throughout. Cathode Ray tube adequately shielded from stray fields.

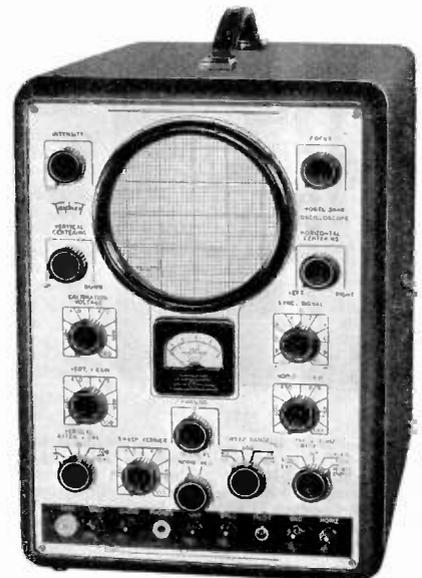
CASE—Metal, with black suede enamel finish, 15 $\frac{1}{2}$ " x 11 $\frac{3}{8}$ " x 16". Leather handle. Copper plated feet for improved grounding.

PANEL—Black, red and white characters etched on aluminum.

ACCESSORIES—Co-Axial lead for Vertical Input. Rubber covered leads for Sync, Horiz. Input and Ground. Heavy braid grounding strap.

POWER—105-115 Volts, 50-60 Cycles, 80 Watts.

WEIGHT—20 lbs.



Model 3140

#### SPECIALIZED FEATURES:

- ★ Wide Frequency Range: 20 Cycles to 1 MC.
- ★ Provision for changing polarity to vertical input amplifiers—keeps wave form on Cathode Ray tube showing in conventional manner. (Exclusive Trip-lett feature!)
- ★ Calibrated meter for comparison voltage measurements.
- ★ Return trace eliminator.

# Radio



# Testers

## QUALITY-ENGINEERED, LOW COST TV-FM SWEEP SIGNAL GENERATOR

MODEL 3435 answers your needs for a quality engineered TV-FM Sweep Signal Generator at an unusually low price. Designed particularly for the service engineer who has his own provision for an external Marker (any good AM Generator).

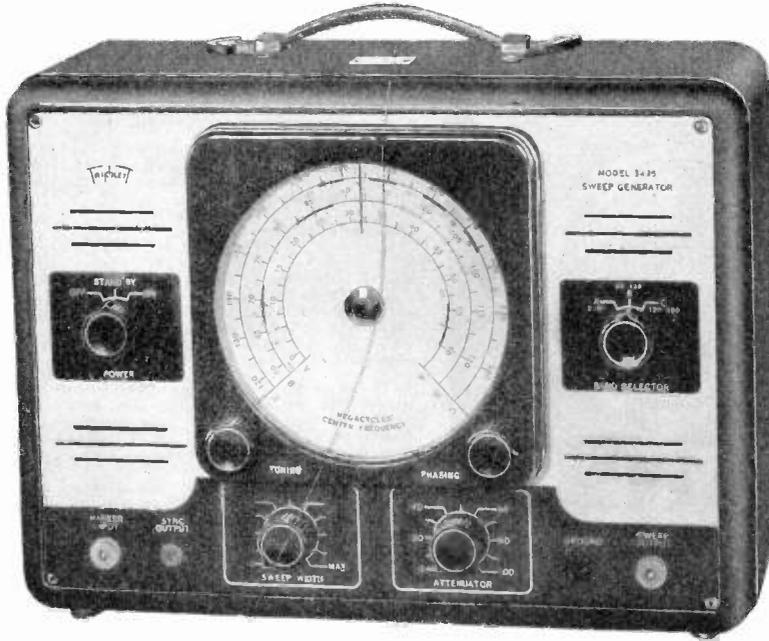
Buying this sensational new Model will enable you to materially reduce your investment in a Sweep Signal Generator, if you have a good AM Signal Generator to use as the Marker. Connection of external Marker is made simply and quickly through a panel connector. If you do want an external Marker see Triplet Models 1235 Variable Marker or 1236 Crystal Marker.

Model 3435 provides continuous range coverage to 240 MC for all TV Carrier and IF frequencies. No gaps in frequency. Continuous tuning is provided over all TV-FM bands. Continuously variable sweep width control. Sweep at any width between .1 to 12 MC. Phase controlled sweep voltage for scope horizontal input. Main frequency dial marked with channels as well as frequencies. Large and easy to read. Standby switch for temporary silencing of Generator during other work on equipment under test. Shielding and wiring designed for good control over output. Copper plated steel construction throughout. Static shielded power transformer. Miniature tubes used for high frequency circuits. Stability increased by use of ceramic trimmers, zero temperature coefficient capacitors, silver plated coils, and rugged construction.

Metal case with black suede enamel finish. 15 1/2" x 11 1/2" x 6 1/4". Leather handle. Copper plated feet for improved grounding when working over metal work bench top. Panel has black, white and red characters etched on aluminum.

Accessories—Co-Axial cables for low-loss RF output. Heavy braid ground strap. Rubber covered leads for Sync output and additional ground.

Power—105-115 Volts. 50-60 Cycles, 25 Watts. Wt.: 15 lbs.  
MODEL 3435—U.S.A. DEALER NET \$99.50



### Model 3435 FREQUENCY COVERAGE

- Sweep Center Frequency:  
 Range 1— 0- 60 MC (Fundamental)  
 Range 2— 60-120 MC "  
 Range 3—120-240 MC (Harmonic)  
 Sweep Width: 0-12 MC (Continuously Variable)

## ABSORPTION TV-IF MARKER



Model 1235

Frequency Coverage:  
10 to 50 MC in two bands.

Triplet first to provide:  
Control over amplitude of Marker dip.

Standby feature. Removed from circuit by merely turning switch.

Other special features:  
May be used with any type Sweep Generator.

Two tuning ranges providing complete coverage of all present TV-IF frequencies and ample provision for the future.

Designed as companion unit for 3435 Sweep Generator.

Although designed as a companion unit for Triplet Model 3435 Sweep Signal Generator, it can be used with any Sweep Generator as an external Marker. There are no complications in use, for connection is made quickly and easily through a panel connector. A standby switch is provided for temporary silencing of Generator during other work on equipment under test. Attenuation—continuously variable from 0 to maximum of Marker dip.

Copper plated steel construction throughout. Large 4" dial has two easy-to-read scales etched on the dial.

Metal case, with black suede enamel finish, 7 7/8" x 6 5/8" x 4 1/2". Metal handle. Copper plated feet for improved grounding when working over metal work bench top. Panel is black and red etched on aluminum.

Accessories—Co-Axial cable for low-loss connection to Sweep Generator. Coaxial cable for connection to test setup.

Power: None required. Weight: 4 lbs.  
MODEL 1235 . . . . . U.S.A. DEALER NET . . . . . \$24.50

## NEW CRYSTAL MARKER

Frequency Coverage:  
Up through 19 MC on crystal (fundamentals)  
Up through 216 MC on crystal (harmonics)  
(Crystals not included.)

Model 1236 provides Marker frequencies of crystal controlled accuracy for TV & FM, IF or RF requirements. By purchasing ONLY those crystals needed for a particular TV service area and the most-used IF frequencies, this new unit provides utmost Marker accuracy and offers a speedy selection of the desired crystal-controlled signal.

This Marker saves plenty of time in checking band-pass characteristics of curves—simply throw the switch to the desired crystal—eliminating delays resulting from constant tuning and retuning required in the use of variable markers. Signals for the most accurate and fastest means of aligning local oscillators in TV receivers and many other applications. When using a 1 MC crystal, Model 1236 becomes a standard for checking other signal generators or receivers.

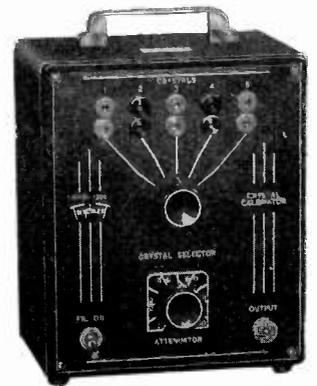
Designed as a companion unit to Triplet 3435, it receives its power by plugging into a panel jack in the Sweep Generator.

Attenuation—Low impedance single control T-pad attenuator, continuously variable. Shielding—Copper plated steel construction throughout. Stability—Increased by use of latest high-frequency techniques.

Metal case, black suede enamel finish, 7 7/8" x 6 5/8" x 4 1/2". Metal handle. Copper plated feet. Black, red and aluminum etched panel.

Accessories—Coaxial cable for low-loss connection to Sweep Generator.

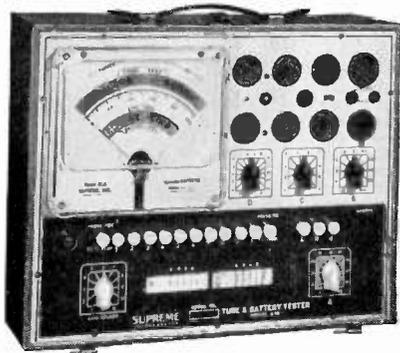
WEIGHT: 3 3/4 lbs.  
MODEL 1236 . . . . . U.S.A. DEALER NET . . . . . \$19.50



Model 1236

# SUPREME INSTRUMENTS

## Newest Engineering Developments



**MODEL 600**  
**TUBE AND SET TESTER**



**MODEL 660**  
**DELUXE 5" OSCILLOSCOPE**  
**FOR**  
**TELEVISION**

Supreme's Time Tested Emission Tube Tester with all Multi-meter functions—Battery Tester (including the 67.5 volt). Truly a portable laboratory.

Sockets for all tubes (including nine-pin) and a spare for the new one yet to be developed. You'll enjoy using this instrument long after others are obsolete and discarded.

**DESCRIPTION—Meter—**7" Clear Plastic—NO GLASS to break. Over 6" of calibrated scale plus mirrored arc for accurate readings. Supreme built rugged meters can "Take It." Flexible—Supreme's patented Filament Return selector switch insures only one socket for each type tube. This one feature guards against obsolescence. Roll Chart—Illuminated—double width—ample room for all tube listings. No binding—plus one year free tube setting service. Multi-meter Ranges—Operate at the touch of a button—No roaming test leads. Case—Metal in beautiful Hammerloid finish with removable cover, new type leather carrying strap.

**SPECIFICATIONS—DC Volts—**7 ranges of 0/5/10/50/250/500/1000/2500 volts. Lowest reading of .1 volt. All ranges 1000 ohms per volt. Push-button selection of ranges. **AC Volts—**6 ranges of 0/10/50/250/500/1000/2500 volts. Rectifier guaranteed as any other part. Double bridge circuit affords maximum of scale linearity and rectifier protection. Circuit temperature compensated to correct rectifier reading over wide range of temperatures. **DC Current—**7 ranges: 0-1000 microamperes 1/5/10/50/250/500/1000 milliamperes and 1/10 amperes. Lowest reading 1 microampere. All shunts wire wound. **Output Volts—**6 ranges of 0/5/10/50/250/500/1000 volts. Ideal for receiver alignment. No external condenser necessary. **Ohmmeter—**5 ranges of 0/200/20,000/200,000 ohms and 2/30 megohms. Center scale of low range 3.5 ohms. Lowest reading 0.1 ohms. Ideal for checking low resistance coils such as voice coils and oscillator coils. **Battery Tests—**Provides proper loads for most commonly used A and B portable batteries. Condition of battery under load is read on English reading scale. 1.5 v—4.5 v—6.0 v—67.5 v—90.0 v—95.0 v. **Power Supply—**100-133 volts—50/60 cycles. Special voltages and frequencies on request. Note: Test Leads furnished with this instrument.

SIZE—11" x 15" x 6 3/4". SHIPPING WEIGHT—20 pounds.

Dealer Net Cash Price..... **\$117.50**

**SPECIFICATIONS FOR MODEL 660 DELUXE 5" OSCILLOSCOPE:**  
**DEFLECTION SENSITIVITY—**Vertical Amplifier—Direct to Vert. Amp. Input..... .1 v RMS. Horizontal Amplifier—Direct to Hor. Amp. Input..... .14 v RMS. **SWEEP OSCILLATOR—**Range of 7 cycles to 100 KC. in six steps. Synchronization: Int. Ext. **TUBE COMPLEMENT—**Cathode Ray Tube..... 5CP1. Rect. tube High Voltage..... 5Z3. Rect. tube Low Voltage..... 5Z3. Vertical Amplifier—1st stage Cathode Follower..... 6J5. 2nd stage Voltage Amplifier..... 6AC7. 3rd stage Power Amplifier..... 2-6AG7. Horizontal Amplifier—1st stage Cathode Follower..... 6J5. 2nd stage Voltage Amplifier..... 6AC7. 3rd stage Power Amplifier..... 2-6AG7. Sweep Generator—Generator tube..... 6SN7. Sweep control tube..... 3/4 6SN7. Z Axis Amplifier—Amplifier Tube..... 3/4 6SN7. Voltage Regulator..... 2-1/25 watt neon. Probe—Cathode Follower Tube..... 6C4. **INPUT IMPEDANCE—**Probe 9 mmf 5 meg. Vert. Amp. direct 5 mmf 5 meg. Hor. Amp. direct 10 mmf 5 meg. Z Axis Amp. direct 10 mmf .5 meg. **PERFORMANCE DATA—**Vertical Amplifier—Sine Wave frequency response: Plus or minus 2 db. 5 cycles to 5 mc. down 6 db. at 7 mc. Gain Control: Independent of frequency within range of the amplifier. Phase shift: Less than 1° at 60 cycles (overall). Square wave response: 30 cycles to 150 kc. Horizontal Amplifier—Sine Wave frequency response: Plus or minus 2 db. 5 cycles to 1.5 mc. down 6 db. at 2 mc. Gain Control: Independent of frequency within range of the amplifier. Phase shift: Less than 1° at 60 cycles (overall). Square wave response: 30 cycles to 50 kc. Z Axis Amplifier—Sine Wave frequency response: Plus or minus 2 db. 100 cycles to 100 kc. down 6 db. at 150 kc. **POWER SUPPLY—**110-125 volts, 50/60 cycles, 250 watts maximum.

SIZE—12" x 16" x 19". SHIPPING WEIGHT—70 pounds.

Dealer Net Cash Price..... **\$276.80**

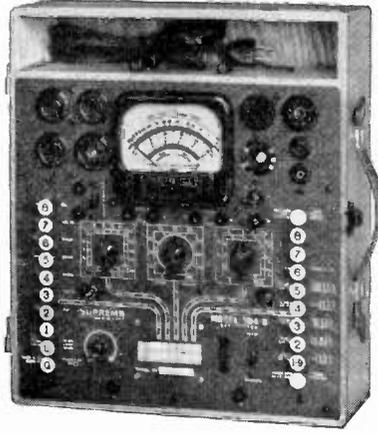
### MODEL 616 TUBE AND BATTERY TESTER

Same as Model 600 Tube and Set Tester described above, less Multi-Meter functions.

Dealer Net Cash Price..... **\$87.45**

### MODEL 504-B COMBINATION TESTER

Contains a Multi-meter, battery tester, condenser tester and proven emission tube tester in one instrument. A unique switching circuit divides these functions with a minimum of complex switches, pin jacks and controls.



**DESCRIPTION—Meter—**Large 4" square face meter, 500-microampere. Speed—Push-button operated. Rugged—Meter of special Alnico design for portable testers. "Can Take It." Flexible—Simple, yet Universal Floating Filaments feature insures against obsolescence. Simplicity—Roll chart carries full data for tube setting. No roaming test leads when using multi-meter—only push a button. Tube Setting Service—Additional tube setting data supplied for one year at no extra charge. Professional Appearance—Sturdy metal case. Panel grey wrinkle, white letters and markings; red highlights. Hardware plated, leather carrying handle. **SPECIFICATIONS—DC Volts—**7 ranges of 0/5/25/100/250/500/1000/2500 volts. Lowest reading of .1 volts. All ranges 1000 ohms per volt. Push-button selection of ranges. **AC Volts—**5 ranges of 0/5/10/50/250/1000 volts. Rectifier guaranteed as any other part. Double bridge circuit affords maximum of scale linearity and rectifier protection. Circuit temperature compensated to correct rectifier reading over wide range of temperatures. **DC Current—**7 ranges of 0-500 microamperes 2.5/10/50/250 milliamperes and 1/10 amperes. Lowest reading 10 microamperes. All shunts wire wound. **Output Volts—**5 ranges of 0/5/10/50/250/1000 volts. Ideal for receiver alignment. No external condenser necessary. **Ohmmeter—**5 ranges of 0/200/20,000/200,000 ohms and 2/30 megohms. Center scale of low range 3.5 ohms. Lowest reading 0.1 ohms. Ideal for checking low resistance coils such as voice coils and oscillator coils. **Condenser Tester—**Covers Electrolytic and Paper or Electrostatic condensers. Provides tests for Electrolytic Capacitors, including high voltage filters and low voltage-high capacity bypass condensers to be checked under their normal working voltages. The following voltages are supplied to be applied across the Electrolytic Condensers: 450/300/250/200/100/50/25 volts. English reading "Good-Bad" scale. **Battery Tests—**Provides proper loads for most commonly used A and B portable batteries. Condition of battery under load is read on English reading scale. **Power Supply—**100-133 volts—50/60 cycles. Special voltages and frequencies on request. Note: Test Leads furnished with this instrument.

SIZE—14 3/8" x 12 1/8" x 4 3/8". SHIPPING WEIGHT—20 pounds.

Dealer Net Cash Price..... **\$102.50**

# SUPREME INSTRUMENTS

## MODEL 666 Combination A.F. & R.F. Oscillator



### SPECIFICATIONS

**Meter**—Large three-inch round meter used to set the desired amount of amplitude modulation. Variable from 0 to 80%. **Simplicity**—All frequencies on the R. F. Oscillator read on two scales. Both A.F. and R.F. push-button operated. **Attenuator**—R.F. Oscillator has ladder type four position resistor push-button attenuator. Also, vernier control from maximum to minimum on either of the four steps of the multiplier. A.F. output is controlled from minimum to maximum with continuously variable control. **Laboratory Appearance**—This fine instrument is housed in beautiful golden tone, lock cornered, natural finish oak case. Black ribbed steel panel with silver and red highlights. **Tube Line Up**—6X5 Rectifier. 6SK7 A.F. Beat Oscillator. 6SK7A.F. Beat Oscillator. 6SK7 R.F. Oscillator. 6C5 A.F. Oscillator Mixer. 6C5 A.F. Amplifier. 6F8 Audio Vacuum Tube voltmeter-frequency modulation control tube. 6F8 R.F. vacuum tube voltmeter-F.M. Oscillator. 6K6 Buffer Mixer.

### DESCRIPTION R.F. OSCILLATOR

**Ranges**—5 band 65/205 KC, 205/650 KC, 650/2050 KC, 2050/6500 KC, 6.5/20.5 MC. Harmonics above 60 MC. **Tuning Mechanism**—Dual ratio from tuning knob to dial. One direct for speed, a second about 5 to 1 for vernier settings. **Accuracy**—Low end of band tuned with iron core inductors. High end of band tuned with air dielectric trimmers providing for greatest accuracy possible with printed scales. **Meter** used to set carrier level at a predetermined value, aligned for an accurate and variable per cent of modulation by the A.F. Oscillator. **Frequency Modulator**—F.M. signal available over range of R.F. Oscillator. Frequency modulated approximately plus or minus 15 KC. Rate of frequency modulation 120 cycles per second. 60 cycle time base provides for automatic positive synchronization.

### A.F. OSCILLATOR

**Range**—15 to 15,000 cycles. **Output Impedances**—Center tap transformer of 50/600/5,000 ohms. High impedance resistor of 50,000 ohms. **Distortion**—Approximately 5%. **Voltage Output**—Open circuit 35 volts. **Frequency Characteristics**—Plus or minus 1 db between 30 and 10,000 cycles. 15 cycles and 15,000 cycles down approximately 2 db. **Attenuator**—Controls voltage output from 0 to maximum. **Power Output**—Approximately 150 milliwatts. **Power Supply**—110-125 volts—50/60 cycles. Special voltages and frequencies on request.

SIZE—15 1/2" x 11 1/2" x 8 3/4". SHIPPING WEIGHT—33 pounds.

Dealer Net Cash Price..... \$141.60



## AUDOLYZER MODEL 688

Used for tracing signals through sets of this range. Also used to check frequency of receiver's oscillator, I.F. or R.F. **Gain Measurements**—By moving Audolyzer probe from stage to stage of a receiver and noting audolyzer's meter voltage reading, stage, tube or transformer gain or loss is determined. **A.V.C. Measurements**—Use proper range of electronic voltmeter and check A.V.C. voltage developed under actual operating conditions. Also use the electronic voltmeter for adjusting A.V.C. circuits. **Distortion Check**—Since the signal is monitored by a speaker, distortion can easily be noted by ear at all times. By checking signal through various stages the improper operating stage of a receiver can easily be located and faulty component found. **Condenser Tester**—Leaky, shorted, or old condensers can be quickly found. **A. F. Input**—Additional leads supplied for monitoring audio circuit at same time regular probe is used for monitoring R.F. circuit. Also used for checking high impedance pickups, microphone, and other audio devices. **A. F. Output**—Output of the audolyzer brought out to the additional probe for use in checking any circuit or part requiring a high audio voltage. **Power Supply**—100-125 volts—50/60 cycles. Special voltages and frequencies upon request. **Note**: Test Leads furnished with this instrument.

SIZE—15 1/2" x 11 1/2" x 8 3/4". SHIPPING WEIGHT—32 pounds.

Dealer Net Cash Price..... \$149.50

## MODEL 661 OSCILLATOR

### DESCRIPTION

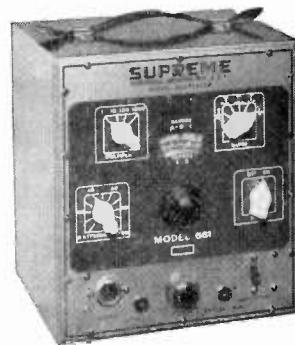
**Simple Operation**—All ranges read on two basic scales, accurately calibrated at both ends. **Dual Tuning Ratio**—One for speed—one for vernier adjustments. **Stability**—Electron coupled circuit, impregnated iron tuned inductors and air dielectric trimmers provide the maximum frequency stability. **Guards** against shift due to line voltage, aging, temperature, and humidity. **Ladder Multiplier**—Four steps from minimum to maximum. Also, continuously variable control. **Double shielding** minimizes leakage. **Shielded line cord**. **Illuminated Hair Line Dial**.

### SPECIFICATIONS

**R. F. Ranges**—65-205 KC; 205-650 KC; 650-2050 KC; 2050-6500 KC; 6.5-20.5 MC, Harmonics to 82 megacycles. **Audio Frequency**—400 cycles—voltage output continuously variable from minimum to maximum. **Internal Modulation**—R. F. Carrier modulated at approximately 50% at 400 cycles. Can be cut off to provide unmodulated signal. **External Modulation**—Jack provided for external audio modulation. **Professional Appearance**—Housed in heavy steel case; Blue Hammerloid finish. Supplied complete with shielded test leads and instructions. **Power Supply**—110-125 volts 50/60 cycles. Special voltage and frequency on request.

SIZE—9 1/2" x 8 1/4" x 7 3/8". SHIPPING WEIGHT—15 pounds.

Dealer Net Cash Price..... \$72.50



## MODEL 655 OSCILLOSCOPE

### DESCRIPTION AND SPECIFICATIONS

**Flexible, Easily Operated**—All controls have been grouped on the front panel. **Switches Arranged for External Synchronization and for External Horizontal Sweep.** **Tube Components**—5Y3G Low Voltage Rectifier. 5Y3G High Voltage Rectifier. 6SJ7 Vertical Amplifier. 6SJ7 Horizontal Amplifier. 885 Saw-tooth Oscillator. 5CP1 Cathode Ray Tube. **Sweep Oscillator** has a frequency range of approximately 20 to 80,000 cycles selected in seven ranges. **Linear control** provided for fine adjustment between ranges. **Synchronization control** provided for positive locking of pattern on screen. **Vertical Amplifier**—Frequency response 20 cycles to approximately 100 kilocycles. Circuit will pass 60 cycle square wave. **Sensitivity** rated at approximately .3 volts RMS per inch deflection. **Horizontal Amplifier**—Frequency response 20 cycles to 75 kilocycles. Will handle 60 cycle square wave deflection. **Sensitivity** rated at approximately .3 volts RMS per inch deflection. **Note**: Test Leads furnished with this instrument.

SIZE—12" x 9 1/2" x 18". SHIPPING WEIGHT—32 pounds.

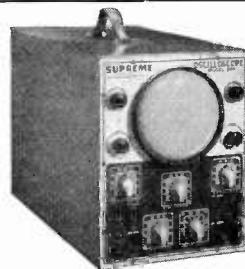
Dealer Net Cash Price..... \$126.50

## SUPREME 3" OSCILLOSCOPE MODEL 650

Essentially the same as Model 655 except that the voltage sensitivity of the amplifiers is approximately .5 volts RMS per inch deflection on the No. 650. In Model 650, a type 3AP1 Cathode Ray tube is used. **Note**: Test Leads furnished with this instrument.

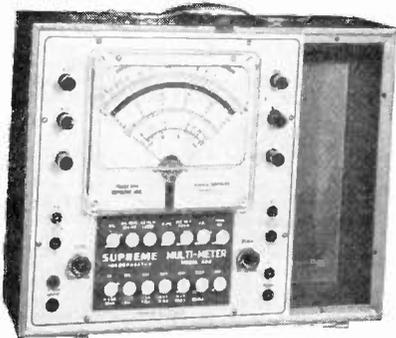
SIZE—13 1/8" x 11 3/8" x 7 1/8". SHIPPING WEIGHT—23 pounds.

Dealer Net Cash Price..... \$99.95



# SUPREME INSTRUMENTS

## Supreme by Comparison

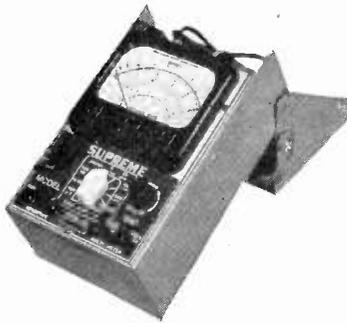


### MODEL 644 DELUXE PORTABLE SET TESTER

**DESCRIPTION AND SPECIFICATIONS:** Meter—50-microampere—Large 7" clear plastic—NO GLASS to break—with mirrored arc. Operation—All ranges (with the exception of the AC and DC, 10 and 50-ampere ranges) are selected by push-button operation. Double Meter Sensitivity—The Model 644 has two direct current sensitivities. 1000 ohms per volt for regular DC measurements and 20,000 ohms per volt for measurements in high resistance circuits. Direct Current Ranges—9 ranges consisting of 0/100 microamperes, 1/5/25/100/500 milliamperes, 1/10/50 amperes. AC Current Ranges—3 ranges of 0/1/10/50 amperes. DC Volt Ranges—Total of 14 ranges, 7 ranges at 1000 ohms per volt, and 7 ranges at 20,000 ohms per volt, 0/5/25/100/250/500/1000/5000 volts. AC Volt Ranges—7 ranges at 1000 ohms per volt, 0/5/25/100/250/500/1000/5000. Output Volt Ranges—7 ranges of 0/5/25/100/250/500/1000/5000. Covers all necessary ranges to provide indications for aligning receivers with Signal Generators. Decibels—5 ranges of -10/+9, 0/+23, 0/+35, 0/+43, 0/+49. Calibrated for 500-ohm line. Resistance Ranges—7 total ranges. Low Ohms—(linear scale) two ranges of 0/5 and 0/5 full scale. A minimum reading of .01 ohms is indicated by one full division on meter scale. High Ohms—(non-linear scale) 0/500, 5000, 500M, 5 megohms, 50 megohms. All ranges are operated with self-contained batteries. Note the extremely wide range of .01 ohms to 50 megohms without additional power supply. Power Supply—Battery operated on all ranges, batteries supplied.

**CARRYING CASE**—sturdy metal carrying case finished in Blue Hammerloid—Panel beautiful satin aluminum and blue with maroon trim.  
Note: Test Leads furnished with this instrument.  
SIZE—11" x 15" x 6 3/4" SHIPPING WEIGHT—15 pounds.  
Dealer Net Cash Price

**\$79.95**



### MODEL 640

## MULTI-METERS

### A POPULAR COMPACT POCKET LABORATORY

### MODEL 542



### MODEL 640 MULTI-METER

The New Model 640 is a fitting companion to the extremely popular Model 542 which is so well known to radio servicemen or wherever electronic equipment is used. The Model 640 uses a 50-microampere movement which has a sensitivity of 20,000 ohms per volt. All ohmmeter ranges including the 20 megohm range are operated by batteries furnished with the instrument and contained in its sturdy metal carrying case.

**D-C VOLT RANGES**—(20,000 ohms per volt), 0/5/25/100/500/1000/5000. (First scale division .1 volt). **D-C VOLT RANGES**—(1000 ohms per volt), 0/5/25/100/500/1000/5000. **A-C VOLT RANGES**—(1000 ohms per volt), 0/5/25/100/500/1000/5000. **DECIBEL RANGES**: -10/+9, 0/+23, 0/+35, 0/+49. **D-C CURRENT RANGES**—0/100 microamperes, 0/10/100/500 milliamperes. **RESISTANCE RANGES**—3 ranges, 0/2000/20M/20 megohms. **OUTPUT VOLT RANGES**—6 ranges, 0/5/25/100/500/1000/5000.

**CARRYING CASE**—Sturdy steel case with hinged cover to protect meter. Finished in grey wrinkle.

Size: 5" x 7 1/2" x 3". Shipping Weight: 4 pounds.

Dealer Net Cash Price **\$39.45**

### MODEL 542 POCKET MULTI-METER

A regular little pocket laboratory with a case only 5 7/8" x 3 1/4" x 2 1/4" in size, weighing but 23 ounces—24 ranges—just as accurate and even more convenient than you would expect to find in an instrument twice its price. 4 DC mil ranges (with first scale division 5 microamperes) of 0/0.3/6/30/150; 4 DC volt ranges (with first scale division 0.1 volt) of 0/6/150/300/1500; 4 ohms ranges (with 1 ohm first scale division and 25 ohms center scale) of 0/2,000/20,000/200,000/2 meg; 4 AC volt ranges (with first scale division 0.1 volt) of 0/6/30/150/600; 4 output ranges of 0/6/30/150/600; 4 decibel ranges of -6/+10, +8/+24, +22/+38, +34/+50. The Model 542 is not a toy—it uses a full size 3" square meter with a rugged, accurate 200 microampere movement and a knife edged pointer. This movement has a sensitivity of 5000 ohms per volt. All ohmmeter ranges, including the megohm ranges, are operated by batteries furnished with the instrument and contained within its durable black moulded bakelite case.

Size: 5 7/8" x 3 1/4" x 2 1/4". Shipping Weight: 2 pounds. **\$25.20**  
Dealer Net Cash Price

In metal case as illustrated, **\$29.20**

### MODEL 632 MULTI-METER

SUPREME Model 632 gives the radio serviceman a large, easily read, seven-inch SUPREME plastic meter together with a total of 38 ranges. It makes an ideal instrument for installing in a work bench or for portable use. It requires no "squinting" to read this meter. **D-C VOLT RANGES**—0/5/25/100/250/500/1000/5000, at 1000 ohms per volt. **A-C VOLT RANGES**—0/5/25/100/250/500/1000/5000, at 1000 ohms per volt.

**OUTPUT VOLT RANGES**—0/5/25/100/250/500/1000/5000, at 1000 ohms per volt. Provides the proper ranges for indications when aligning receivers. **DECIBEL RANGES**: -10/+9, 0/+23, 0/+35, 0/+43, 0/+49. **D-C CURRENT RANGES**—6 ranges provided, 0/5/25/100/250/500/1000 milliamperes. Two ampere ranges of 0/10/25 are provided. **CAPACITANCE RANGES**—For convenience in reading capacitances of electrolytic capacitors and the larger paper capacitors three capacitance ranges of .1/4, 1/40, and 10/400 microfarads are provided. **RESISTANCE RANGES**—A total of 5 ranges, 0/2000/20M/200M, 2 megohms. 20 megohms provide facilities for reading most any resistor found in electronic equipment.

**CARRYING CASE**—Sturdy metal carrying case finished in Blue Hammerloid—Panel beautiful satin aluminum and blue with maroon trim. NOTE: Test Leads furnished with this instrument.

Size: 11 3/4" x 8 1/2" x 4 3/4". Shipping Weight: 16 pounds

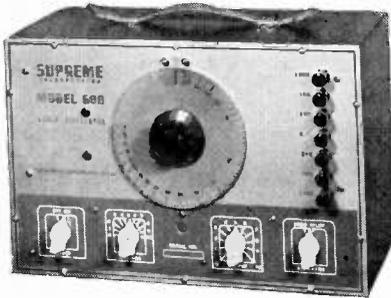
Dealer Net Cash Price **\$46.50**



# SUPREME INSTRUMENTS

## Supreme by Comparison

### MODEL 680 AUDIO GENERATOR



The Model 680 continuously variable audio oscillator is SUPREME'S answer to a multitude of requests from the radio servicemen and members of the various sound and acoustical industries for a practical Audio Oscillator. This Beat Frequency Oscillator meets the most exact requirements for the average radio service shop, manufacturers of radios, public address, motion picture sound industry, and other audio apparatus and acoustical material, educational and research laboratories, maintenance and design engineers.

**DESCRIPTION AND SPECIFICATIONS:** **FREQUENCY RANGE**—15 cycles to 15,000 cycles. Dial calibration spread over a 12-inch arc covering 280 degrees. Large 6-inch metal dial with laboratory type tuning knob. **OUTPUT IMPEDANCES**—250/500/5,000 ohms. Each impedance center-tapped for push-pull and other balanced input systems. **ATTENUATOR**—Output continuously variable from minimum to maximum. Linear marks around attenuator for reference settings. **OUTPUT VOLTAGE**—Open circuit approximately 65 RMS volts at 5,000 ohms section. Properly loaded, this section produces 50 volts total or 25 volts either side of center tap. 250-ohm section and 500-ohm section voltages are approximately 9 to 14 respectively. **WAVE FORM**—Sinusoidal type wave form with harmonic distortion at least 30 db below fundamental at 5,000 cycles and at least 25 db below fundamental at 50 cycles. Total distortion approximately 5%. Hum from power supply negligible with output control set at maximum. **FREQUENCY RESPONSE**—Output virtually flat over frequency range. Plus or minus 1 db from 30 cycles to 10,000 cycles. 2 db down at 30 and 15,000 cycles. **SIMPLE OPERATION**—All controls logically arranged for speed and simplicity of operation. Neon lamp for zero adjustment. **STABILITY**—Special shielding and highly impregnated in-lens. **PROFESSIONAL APPEARANCE**—Housed in Hammerloid finish steel case. Leather carrying handle. **POWER SUPPLY**—110-125 volts 50/60 cycles. Special frequencies and voltages upon request. **NOTE:** Test Leads furnished with this instrument. **SIZE**—13 1/4" x 9" x 6 7/8". **SHIPPING WEIGHT**—21 pounds. **\$82.95**

ductors provided for minimum drift during warm-up period and normal operation. **DEALER NET CASH PRICE**.....

### SUPREME PANEL METERS

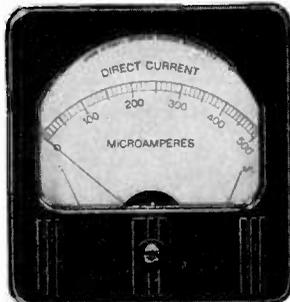
FEATURING A NEW DESIGN FOR GREATER EFFICIENCY!

ALNICO BAR MAGNET AND SOFT SINTERED POLE PIECES

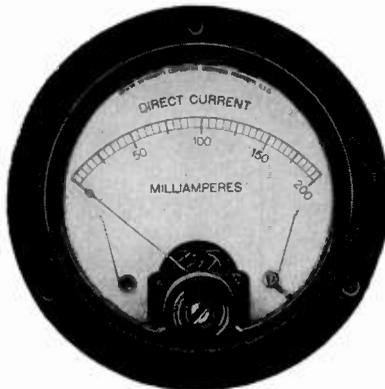
DOUBLE BRIDGE CONSTRUCTION—SIMPLE RUGGED ASSEMBLY



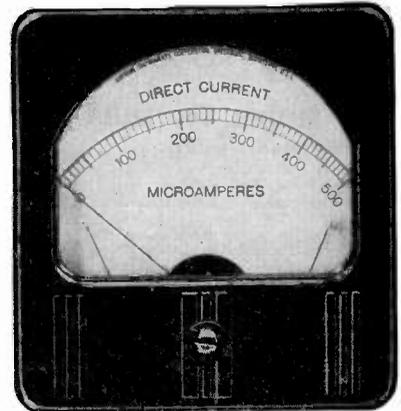
CASE MODEL 2400—2" round



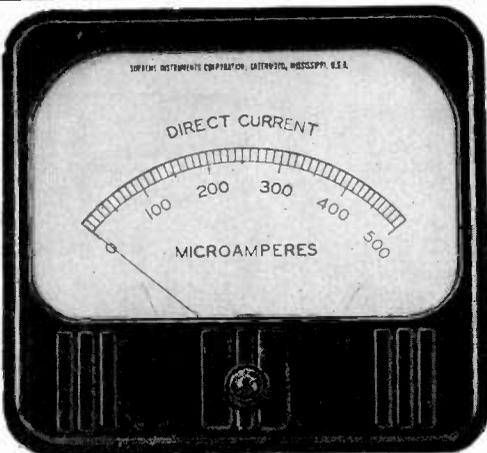
CASE MODEL 2100—2" sq.



CASE MODEL 3400—3" round



CASE MODEL 3100—3" sq.



CASE MODEL 4100—4" sq.

### "HAIRLINE" ACCURACY ASSURED BY:

- (1) Efficient Alnico Bar Magnet.
- (2) Double Bridge Construction.
- (3) Selected Pivots and Jewels.
- (4) Strong, Tough Pointer.
- (5) Simple rugged assembly insures permanent alignment.
- (6) High torque movement reduces friction.

For More Complete Information Write for the Supreme Meter Catalog.

**SUPREME INCORPORATED**  
Greenwood, Mississippi, U. S. A.

# ★ Simpson

INSTRUMENTS THAT STAY ACCURATE

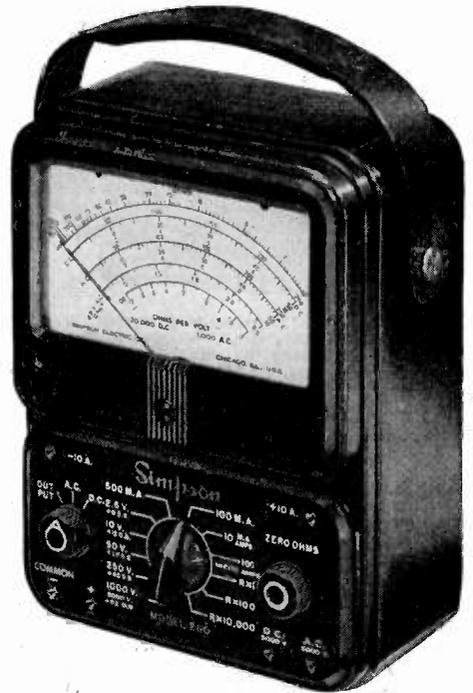
**MODEL 260**  
Set Tester

*World's Most Popular  
High Sensitivity Set Tester  
For Radio and TELEVISION*

There are more Simpson 260 high sensitivity volt-ohm-milliammeters in use today than all others combined. No other instrument of its kind has approached the world-wide popularity of the Simpson 260. In no other tester of its kind will you find the combination of useful ranges, accuracy, ruggedness, beauty and sensitivity developed to such a high degree of perfection.

Removal of the Model 260 from its heavy, handsome case of molded bakelite, will disclose how it differs from most set testers. You will see a sub-panel with a score of small recesses each holding a separate resistor or other component. You will notice complete absence of cable wiring. All connections are short and direct, thus offering a strength and firmness of assembly and the finest of insulation to reduce chances of shorts. All components are readily accessible. The front panel is a thing of beauty and long life. Pin jacks are recessed so no metal parts are exposed. All figures and symbols are molded into a heavy Bakelite panel and filled with durable white for long wear and legibility.

At 20,000 ohms per volt the 260 is highly dependable, rugged and accurate. Its practically negligible current consumption assures remarkably accurate voltage readings. It provides DC current readings as low as 2 microamperes and up to 10 amperes. Dependable resistance readings can be made up to 20 megohms and as low as 1/5 ohm. With the 260 you can measure automatic frequency control diode balancing circuits, grid currents of oscillator tubes and power tubes, bias of power detectors, automatic volume control diode currents, high-mu triode plate voltage, as well as a wide range of other measurements which cannot be checked with ordinary servicing instruments.



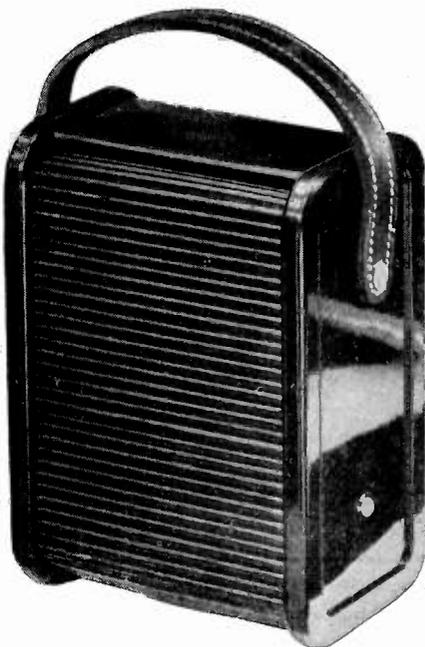
**RANGES**

Model 260 Volt-Ohm-Milliammeter  
20,000 Ohms per Volt DC, 1,000 Ohms per Volt AC  
Volts, AC and DC: 2.5, 10, 50, 250, 1000, 5000  
Output: 2.5, 10, 50, 250, 1000 Milliamperes, DC: 10, 100, 500 Microamperes, DC: 100 Amperes, DC: 10  
Decibels (5 ranges): -12 to +55 DB.  
Ohms: 0-2000 (12 ohms center), 0-200,000 (1200 ohms center), 0-20 megohms (120,000 ohms center).

**25,000 VOLT DC PROBE FOR TELEVISION TESTING**

Complete, nothing to add, for use with Model 260. Weight: 6 oz. Shipping weight: 8 oz.

DEALER'S NET PRICE, complete with Instructions.....\$12.85



**MODEL 260 SET TESTER IN ROLL TOP SAFETY CASE**

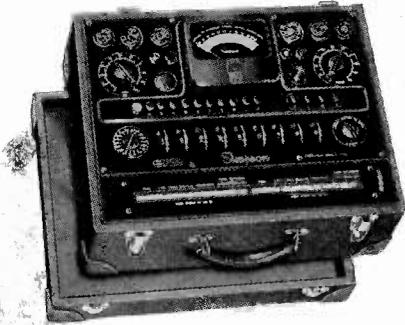
The Model 260, when placed inside our patented housing of heavy molded bakelite and permanently fastened in position, offers the highest degree of efficient, economical instrument protection. Now you can buy the famous 260 complete in this roll top safety carrying case with its built-in lead compartment at less than the price of a 260 and a leather carrying case. A flick of the finger rolls the top up and the instrument is ready to use. A downward flick rolls the top down and your instrument is fully protected.

**DEALER'S NET PRICES**

Model 260, complete with test leads and Operator's Manual.....\$38.95  
(Size: 5 1/4" x 7" x 3 1/8". Weight: 3 1/2 lbs. Shipping Wt.: 5 lbs.)  
Leather Carrying Case..... 8.00  
Model 260 in Roll Top Safety Case, complete with test leads and Operator's Manual..... 45.95  
(Size: 5 3/8" x 9" x 4 3/4". Weight: 6 1/2 lbs. Shipping Wt.: 9 lbs.)  
Model 260 available in standard all black or two tone tan and brown, at above prices. Specify color desired.

# Simpson

**I N S T R U M E N T S T H A T S T A Y A C C U R A T E**



## MODEL 330 Mutual Conductance Tube Tester

*With Simpson Patented "No Backlash" Roll Chart*

The Simpson Model 330 tests tubes in terms of PERCENTAGE of rated DYNAMIC MUTUAL CONDUCTANCE, a direct indication of tube performance with reference to the manufacturer's STANDARD MICRO-MHO rating. The colored zones on the dial coincide with the percentage scale to indicate good, fair, weak or definitely bad tubes. Tubes are tested at audio frequency (2500 cycles) with voltages applied automatically over the entire operating range, reproducing more completely than ever before the actual conditions, under which a tube normally functions. A compact assembly of ten push button switches and nine rotary switches of six positions each provide infinite combinations for tube circuit selection.

When you have finished a tube test, the Simpson one button automatic reset returns all switches to the normal position.

For 105-125 volts, 50-60 cycles.

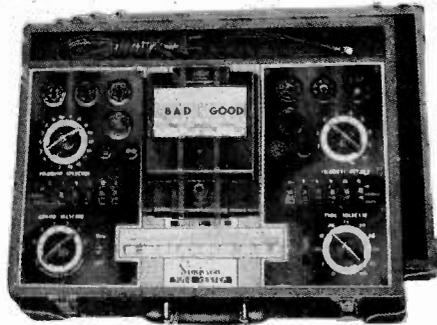
Size: 16"x12 1/2"x6 3/4", Weight: 22 lbs.

Shipping Weight: 27 lbs.

Roll Chart Portable, DEALER'S NET PRICE, complete with Operator's Manual.....\$145.75

Roll Chart Counter, DEALER'S NET PRICE, complete with Operator's Manual.....\$149.85

Portable Model available as per your request in these color combinations: Black panel with black leatherette case. Gray panel with maroon leatherette case. Tan and brown panel with brown leatherette case. Counter model also available in above color combinations, but with natural finish wood case. Color optional at above prices.



## MODEL 555 Tube Tester

Here is a tube tester Simpson engineered to test all tubes for today's radio receivers and any that may be developed within the foreseeable future. It is outstanding in its simplicity of operation and its attractive appearance.

### Check These Many Features

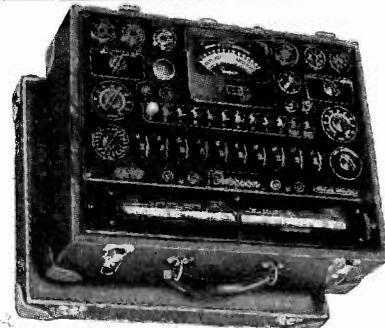
- Basic RMA recommended circuit. Tests any tube regardless of base connections or internal connections of elements.
- Simpson designed 3-position lever operated toggle switches with molded rotor carrying silver plated contacts, self-cleaning through wiping action.
- Sockets for all receiving tubes on the market.
- Provision for future tube developments.
- No adapters or special sockets required.
- Properly fused, provides for line adjustment from 100 to 130 volts; smooth vernier control.
- Beautiful modern panel of shining, silver and black anodized enduring aluminum.
- Large illuminated meter for easy readings.
- Unique jewel-like molded lucite housing encloses Neon bulb indicating shorts and inter-element leakages.
- Line adjustment control below dial opening. Easy to operate.
- Case of sturdy plywood with heavy fabricoid covering, slip hinges.
- Simpson Patented "No Backlash" Roll Chart.

For 100-130 volts, 50-60 cycles.

Size: 16 3/4"x12 1/2"x6". Weight: 14 lbs.

Shipping Weight: 19 lbs.

DEALER'S NET PRICE, complete with Operator's Manual .....\$79.50



## MODEL 335 Plate Conductance Tube Tester

*With Simpson Patented "No Backlash" Roll Chart*

Model 335 tests tubes under conditions simulating actual use in a radio set. The dial indicates percentage of rated plate conductance. With a minimum of settings a reading is quickly obtained which is a percentage of the tube's rated value.

Regardless of tube load, filament voltages are automatically maintained with minimum variation.

Each tube element is individually connected to the proper potential. Reliable short test is provided and Diodes are tested on low voltage. When you have finished a tube test, the Simpson one button automatic reset returns all switches to the normal position.

Tests all receiving tubes, including 9 pin miniatures, and sub-miniatures as used in hearing-aids, etc. Space is provided for new sockets.

For 105-125 volts, 50-60 cycle.

Size: 16"x12 1/2"x6 3/4". Weight: 17 1/2 lbs.

Shipping Weight: 27 lbs.

DEALER'S NET PRICE, complete with Operator's Manual .....\$108.50

Available as per your request in these color combinations: Black panel with black leatherette case. Gray panel with maroon leatherette case. Tan and brown panel with brown leatherette case. Color optional at above price.

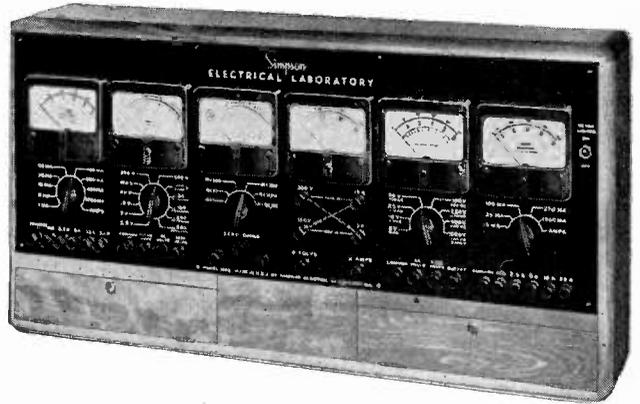
# Simpson

INSTRUMENTS THAT STAY ACCURATE

SIMPSON ELECTRIC CO.

## SIMPSON MODEL 1005 ELECTRICAL LABORATORY

All the functions of over 60 separate instruments combined in one unit. Here is a complete test unit for use by radio, electronic, and electrical technicians in laboratories, shops, and service departments.



The Electrical Laboratory is adaptable for testing all electrical appliances, small motors, circuits, radio sets, etc. All of the instruments are indirectly illuminated, and all lights are controlled by one switch located at the right side of the panel. The panel is of lustrous, long-wearing anodized aluminum. Cabinet is natural finish birch, sturdily constructed. Two compartments for accessories and instructions, with hinged doors, are located at the base of the cabinet. All connections are made to binding posts located on the panel. Test leads and Break-in plug are furnished.

Meter No. 1 (D.C. Milliammeter and Ammeter)	Meter No. 2 (D.C. Microammeter and Voltmeter)	RANGES OF MODEL 1005				Meter No. 5 (A.C. Voltmeter, Output and DB meter)	Meter No. 6 (A.C. Milliammeter and Ammeter)
		Meter No. 3 (Ohmmeter)	Meter No. 4 (Wattmeter)				
0-1 MA. D.C.	0-2.5 Volts D.C.	0-500 Ohms (5 ohms center)	0-300 Watts A.C.	0-5 Volts A.C.	0-5 MA. A.C.		
0-5 MA. D.C.	0-5 Volts D.C.	0-5000 Ohms (50 ohms center)	0-600 Watts A.C.	0-10 Volts A.C.	0-25 MA. A.C.		
0-10 MA. D.C.	0-10 Volts D.C.	0-50,000 Ohms (500 ohms center)	0-1500 Watts A.C.	0-25 Volts A.C.	0-100 MA. A.C.		
0-25 MA. D.C.	0-50 Volts D.C.	0-500,000 Ohms (5,000 ohms center)	0-3000 Watts A.C.	0-50 Volts A.C.	0-250 MA. A.C.		
0-50 MA. D.C.	0-100 Volts D.C.	0-5 Megohms (50,000 ohms center)		0-100 Volts A.C.	0-1000 MA. A.C.		
0-100 MA. D.C.	0-250 Volts D.C.	0-50 Megohms (500,000 ohms center)		0-250 Volts A.C.	0-2.5 Amps A.C.		
0-250 MA. D.C.	0-500 Volts D.C.			0-500 Volts A.C.	0-5 Amps A.C.		
0-500 MA. D.C.	0-1000 Volts D.C.			0-1000 Volts A.C.	0-10 Amps A.C.		
0-1000 MA. D.C.	0-5000 Volts D.C.			0-5000 Volts A.C.	0-25 Amps A.C.		
0-2.5 Amps D.C.	(20,000 ohms per volt)			Rectifier type			
0-5 Amps D.C.	0-50 Microamps			1000 ohms per volt			
0-10 Amps D.C.	0-100 Microamps			DB Ranges			
0-25 Amps D.C.	0-250 Microamps			-10 to +55			
	0-500 Microamps			output ranges same as volts except 5000 Volt Range			

Size 33-9/16" x 16-13/16" x 9". Weight: 37 lbs. Shipping Weight: 54 lbs. Dealer's Net Price, complete with Leads and Break-in Plug and Operating Instructions \$218.00

## SIMPSON MODEL 445

Tube and Set Tester with the famous Simpson "No Backlash" Roll Chart

Model 445 combines a 20,000 ohms per volt Set Tester and a Plate Conductance Tube Tester. The tube tester dial indicates percentage of rated plate conductance which can also be considered as a percentage of mutual conductance since, in most cases, the amplification factor remains constant. Tests the new 9-pin miniature tubes and sub-miniature tubes.

The volt-ohm-milliammeter set tester provides the ranges that have made the Simpson Model 260 the most famous set tester in the world.

### HIGH VOLTAGE PROBE FOR TELEVISION SERVICING AVAILABLE

25,000 volts DC — 20,000 ohms per volt.

Weight: 6 oz. Shipping Weight: 8 oz.

DEALER'S NET PRICE, complete with Instructions.....\$12.85

### RANGES

Volts (20,000 ohms per volt D.C., 1000 ohms per volt A.C.): 0-2.5, 10, 50, 250, 1000, 5000.

Milliamperes (D.C.): 0-10, 100, 500. Microamperes (D.C.): 0-100.

Output (A.C.) volts: 2.5, 10, 50, 250, 1000.

Ohms: 0-2000 (12 ohms center) 0-200,000 (1200 ohms center) 0-20 megohms (120,000 ohms center).

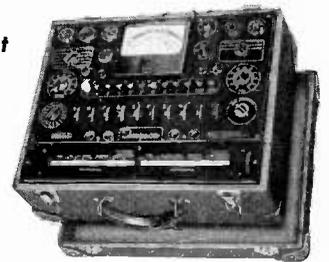
Size: 16"x12 1/2"x6 3/4". Weight: 20 lbs. Shipping Weight: 26 lbs. DEALER'S NET PRICE, complete with Test Leads and Operator's Manual.....\$137.50

Available as per your request in these color combinations: Color optional at above price.

Black panel with black leatherette case.

Gray panel with maroon leatherette case.

Tan and brown panel with brown leatherette case.



## THE SIMPSON PATENTED "NO BACKLASH" ROLL CHART

The exclusive "No-Backlash" feature automatically takes up the slack in the paper chart and, by keeping the chart in constant tension, makes it impossible to turn the selector wheel without moving the chart. This results in precision selection at all times. The "No-Backlash" feature also prevents the paper chart from tearing, insures proper alignment, and presents at all times a neat, flat surface.

The selector wheel gear ratio makes it possible for tube selections to be obtained with a minimum of effort.

The entire Roll Chart mechanism is securely fastened to the instrument panel. Quick access to the roll chart can be obtained by removing four panel screws, so that the addition of tube data or the mounting of a new chart is a matter of a few minutes.

In addition to the neat, flat reading surface made possible by the "No-Backlash" feature, the lucite window was designed so that only two settings appear, which is especially convenient for the settings of multi-purpose tubes.

# Simpson

**SIMPSON ELECTRIC CO.**  
CHICAGO, ILLINOIS

**INSTRUMENTS THAT STAY ACCURATE**

## MODEL 415A WITH BUILT-IN SWEEP CIRCUIT

The AM bands cover the complete frequency range from 75 KC to 130 MC and the FM bands, from 2 MC to 115 MC. A wide sweep of 1 MC is provided, which is more than adequate for FM alignment. A synchronization potential for locking in the scope trace is available. When used with an oscilloscope, the Model 415A is the correct answer to FM servicing.

### Note These Many Features

1. Direct reading dial with continuous coverage from 75 Kilocycles to 130 Megacycles in the following ranges: 75-200; 200-600; 550-1800 Kilocycles and 1.7-4.2; 5-16.51; 16-32; 31-65; 62-130 Megacycles. Fundamental to 65 MC.
2. Practically independent of line voltage fluctuation. Calibration is stable regardless of wide variations in line voltage.
3. RF output is controlled through its entire range, eliminating the necessity of a separate connection for high uncontrolled output as found in other signal generators.
4. Modulation from 0 to 100%, using either the 400 cycle internal sine wave or an external source. A range from 0 to over 9 volts of 400 cycle sine wave is available for external use.
5. Modulation up to 100% from below 60 cycles per second to over 10 Kilocycles per second.
6. Each Signal Generator is individually calibrated against a crystal controlled frequency standard.

**PANEL** — Lustrous black anodized aluminum. Dial is encased in a molded bakelite escutcheon with glass covering for protection against damage and dirt. Functional switches and controls are mounted on engraved molded bakelite panels.

**CASE** — Steel, copper plated for shielding effect and finished in gray durable wrinkled enamel. Leather carrying handle.

**SHIELDING** — In addition to the overall shielding offered by the case and panel, the coils and tuning condenser are individually shielded, and an additional shield is placed over these two assemblies. This series of shields together with other factors reduce leakage to an absolute minimum.

**COILS** — Low loss RF coils are individually calibrated by means of variable inductance and variable minimum capacitance. These



For 105-130 volts, 50-60 cycle.  
Size: 5 $\frac{5}{8}$ "x11 $\frac{3}{8}$ "x15 $\frac{1}{8}$ ". Weight: 18 $\frac{1}{2}$  lbs.  
Shipping Weight: 25 lbs.

DEALER'S NET PRICE, complete with  
Operator's Manual .....\$145.00

adjustments provide the means for greatest possible accuracy in calibration.

**BAND SELECTOR** — The rotating turret coil assembly permits the use of the shortest possible wiring, resulting in minimum circuit capacitance and permits quick selection of any frequency range.

**CONDENSER** — A two section tuning condenser using either one section or the other provides for ideal inductance to capacity ratio on all bands. Smooth vernier tuning permits accurate adjustment of the selected frequency.

## MODEL 340 SIGNAL GENERATOR

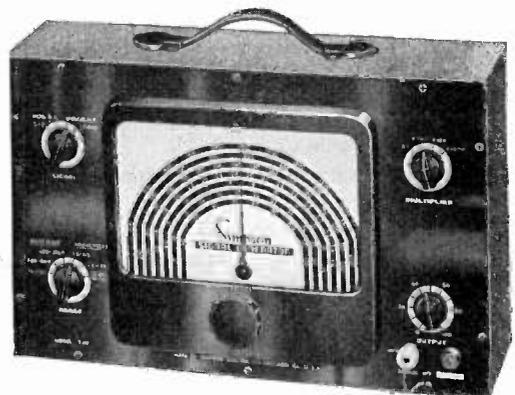
75 Kilocycles to 120 Megacycles—fundamentals to 30 Megacycles. From its lustrous black anodized panel to the big nine-inch dial and knife edge pointer that mean easy readability, the Model 340 is an instrument packed with Simpson engineering refinements for greatest utility and long-lasting accuracy.

An electron coupled circuit, using three tubes—full wave rectifier, modulator, and oscillator — and standard 30% modulation at 400 cycles, assures extreme stability and output uniformity. Close settings are permitted by a smooth vernier control.

RF coils provide range of 75-220; 200-600; 550-1700 KC; and 1.5-4.5, 4.2-14; 9-30; 36-120 megacycles. Fundamentals range to 30 MC, and the dial is direct reading to 120 MC.

Shielding in the Model 340 is complete; coils, attenuator, and signal selector being individually shielded. The oscillator and modulator are sealed in a rigidly welded, entirely closed chassis. In addition, the line cord is shielded, thus reducing leakage to a negligible point.

The signal output is controlled through a step attenuator and non-inductive potentiometer, providing smooth and complete control of the signal output. A special jack is provided in the Model 340 to obtain high output on the 120 MC band.



For 105-130 volts, 50-60 cycles.  
Size: 16"x10"x6". Weight: 15 $\frac{1}{4}$  lbs.  
Shipping Weight: 20 lbs.

DEALER'S NET PRICE, complete with  
Operator's Manual .....\$76.85

# ★ Simpson

SIMPSON ELECTRIC CO.

INSTRUMENTS THAT STAY ACCURATE



## MODEL 266 VACUUM TUBE VOLTMETER

Ideal for TV - AM - FM

Extremely accurate and packed full of important features. This fine Simpson instrument offers a 1 volt range for the full scale deflection necessary in measuring low RF voltages; a zero center switch embracing all DC voltage ranges for discriminator circuit alignment; a special probe with low input capacitance of approximately 4 micro-microfarads for checking RF voltages.

DC volt input resistance ranges from 50 to 200 megohms; AC volt input impedance at 60 cycles is approximately 10 megohms. The primary of the power transformer is well-regulated—holding close control over filament as well as plate voltage, and the DC input circuit is filtered so that the pressure of superimposed alternating currents does not affect DC measurements.

Housed in a sturdy case of attractive hardwood. The shining silver and black anodized aluminum panel includes a convenient well for holding the AC probe. In addition, there is a large, clearly marked 4 1/2" meter for quick, easy readings, and a compartment in the rear of the case for leads.

### 25,000 Volt DC Probe for Television Testing

Complete, nothing to add, for use with Model 266

Weight: 6 oz. Shipping Weight: 8 oz.

DEALER'S NET PRICE, complete with Instructions.....\$14.85

### RANGES

Volts: (AC and DC) 0-1, 5, 10, 50, 100,  
250, 500, 1000, 5000  
Milliamperes, DC: 0-1, 5, 10, 50, 100,  
250, 500  
Amperes DC: 0-10  
Ohms: 0-1000 (10 ohms center)

0-10,000 (100 ohms center)  
0-100,000 (1000 ohms center)  
0-1 megohm (10,000 ohms center)  
0-10 megohms (100,000 ohms center)  
0-100 megohms (1 megohm center)  
0-1000 megohms (10 megohms center)

For 105-125 volts, 50-60 cycle.  
Size: 8 1/2" x 9 1/2" x 8". Weight: 10 1/4 lbs.  
Shipping Weight: 14 lbs.  
DEALER'S NET PRICE, complete with  
Leads, AC Probe and Operator's Manual .....\$114.00

## MODEL 379 BATTERY TESTER

Designed in accordance with the engineering specifications of leading battery manufacturers, this compact instrument is so ruggedly built that it will stand a lifetime of hard usage. The loading resistors have an accuracy of 1% and properly load all radio and hearing aid A and B batteries.

A single rotary switch selects the voltage of the battery under test and brings into line the correct loading resistor. The full 3" dial has three separate arcs, one for all radio A batteries, one for hearing aid A batteries, and one for all B batteries.

A percentage scale shows the exact condition of the battery in percentage of full voltage. The voltage reading can be quickly obtained by multiplying the percentage reading by the selector-switch voltage setting.

Size: 3"x5 7/8"x2 1/2". Weight 1 1/4 lbs. Shipping Wt. 3 lbs.

DEALER'S NET PRICE, including Test Leads and

Operator's Manual .....\$21.50

Leatherette covered Carrying Case, with compartment for leads..... 5.00

Case colors available as per your request. Now Model 379 can be supplied in either black or two tone tan and brown. Color optional at above price.



## MODEL 380 WAVEMETER MODULATION INDICATOR

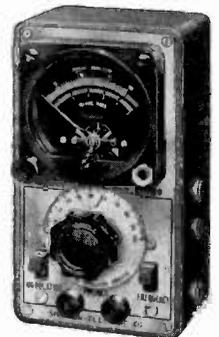
The ideal instrument for the Ham.

1. An accurate band-spread wavemeter, and a sensitive 0-100 microammeter as a resonance indicator.
2. Separate plug-in coils for 10, 20, 40 and 80 meter bands supplied — coils for other bands available at slight extra cost.
3. Additional between-band coverage available at the flip of a switch.
4. Extremely sensitive field strength indicator.
5. Push button switch for dual meter sensitivity.
6. Provision for headphones for use in station monitoring and quality control.
7. A direct-reading Percentage Modulation Indicator with the instrument calibrated at 0-110% Modulation.
8. Designed to function on the 144, 235, and 420 megacycle bands without coils, but with a quarter wave antenna section.
9. Extremely rugged construction.
10. Used as a field strength indicator to determine radiation pattern.

Size: 3"x5 7/8"x2 1/2". Weight: 2 lbs. Shipping Weight: 4 lbs.

DEALER'S NET PRICE, complete with 4 coils, 2 ft. antenna, and Operator's Manual.....\$37.85

Leatherette covered carrying case, with separate compartments for the instrument and 4 coils..... 8.00



INSTRUMENTS THAT STAY ACCURATE

### MODELS 240 and 230 VOLT-OHM-MILLIAMMETERS

These two "Micro-Tester" portables are famous throughout the world for their ruggedness and built-in accuracy. They exemplify the construction features and utility that distinguish the entire Simpson line shown in this section.

Both are shock-proof and incorporate the celebrated Simpson movement with its FULL BRIDGE-TYPE CONSTRUCTION AND SOFT IRON POLE PIECES. Resistors are in matched pairs to provide the greatest possible accuracy for all ranges.

Model 240 — the "Hammeter" — was designed for the additional voltage and sensitivity demanded in radio testing. With its maximum voltage range of 3000 AC or DC, it was the first self-contained pocket portable instrument built expressly to check high voltage and all the component parts of transmitters and receivers.

Model 230, with a maximum voltage of 1000 volts AC or DC, is ideal for most industrial testing. Its ranges are adequate for most line voltages, for telephone, teletype, and general purpose testing.

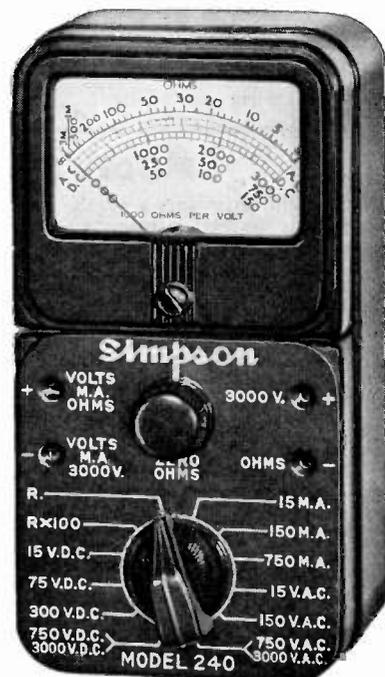
Both models are housed in heavily molded bakelite cases, with all numbers and symbols recessed in the panel and filled with white enamel for greatest legibility and ease of reading. Both have full size 3" meters.

#### MODEL 240 AC and DC VOLT-OHM-MILLIAMMETER RANGES

AC Volts: 0-15, 150, 750, 3000 (1000 ohms per volt)  
 DC Volts: 0-15, 75, 300, 750, 3000 (1000 ohms per volt)  
 DC Milliampers: 0-15, 150, 750  
 Ohms: 0-3000 (center scale 30)  
 0-300,000 (center scale 3000)

Accuracy: DC 3% — AC 5%  
 Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>4</sub> lbs. Shipping Weight: 2<sup>1</sup>/<sub>2</sub> lbs.

DEALER'S NET PRICE, complete with Leads and Printed Instructions.....\$24.60  
 Leatherette Case ..... 5.00  
 Case colors available as per your request. Now Model 240 can be supplied in either black or two tone tan and brown. Color optional at above price.



#### MODEL 230 AC and DC VOLT-OHM-MILLIAMMETER RANGES

AC Volts: 0-10, 250, 1000 (400 ohms per volt)  
 DC Volts: 0-10, 50, 250, 1000 (1000 ohms per volt)  
 DC Milliampers: 0-10, 50, 250  
 Ohms: 0-1000, 0-100,000

Accuracy: DC 3% — AC 5%  
 Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>4</sub> lbs.  
 Shipping Weight: 3 lbs.

DEALER'S NET PRICE, complete with Leads and Printed Instructions.....\$23.40  
 Leatherette Case ..... 5.00  
 Case colors available as per your request. Now Model 230 can be supplied in either black or two tone tan and brown. Color optional at above price.





# Simpson

SIMPSON ELECTRIC CO.

INSTRUMENTS THAT STAY ACCURATE

## MODEL 370 AC AMMETER

(With self-contained current transformer)  
(For use on 60 cycles)

In the Model 370, a current transformer and indicating instrument have been combined in one small case to meet the consistent demand for a small multiple range AC ammeter, at a price that you can afford. Its many uses include the measurement of current drawn by all types of electric appliances and motors, heating elements, lamps, radio sets, etc.

Size: 3"x5 7/8"x2 1/2". Weight 1 1/2 lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE ..... \$18.50  
Test Leads with Prods ..... \$1.25 extra  
Test Leads with Alligator Clips and Insulated Sleeves ..... 1.25 extra  
Case colors available as per your request. Now Model 370 can be supplied in either black or two tone tan and brown. Color optional at above price.

### RANGES

0-1, 0-2.5, 0-5, 0-10, 0-25  
Amps.



## MODEL 371 AC VOLTMETER

This instrument is a "must" for the industrial service kit or the lineman. Designed primarily for testing line voltages applied to motors, heating equipment or other industrial installations, the ranges are such that many additional applications will suggest themselves.

Size: 3"x5 7/8"x2 1/2". Weight: 1 1/4 lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE ..... \$16.75  
Test Leads with Prods ..... \$1.25 extra  
Test Leads with Alligator Clips and Insulated Sleeves ..... 1.25 extra  
Case colors available as per your request. Now Model 371 can be supplied in either black or two tone tan and brown. Color optional at above price.

### RANGES

0-150, 0-300, 0-600 volts



## MODEL 372 OHMMETER

A complete instrument with self-contained batteries. Has a wide range from .2 ohms to 50 megohms. "Ohms" adjuster compensates for variations in battery voltages. Wire wound and matched metallized resistors are used throughout. The basic movement has a sensitivity of 85 microamperes.

Size: 3"x5 7/8"x2 1/2". Weight: 1 1/2 lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE, complete with Test Leads ..... \$23.20  
Case colors available as per your request. Now Model 372 can be supplied in either black or two tone tan and brown. Color optional at above price.

### RANGES

0-500 ohms (5 ohms center)  
0-5000 ohms (50 ohms center)  
0-50,000 (500 ohms center)  
0-500,000 (5000 ohms center)  
0-5 Meg. (50,000 ohms center)  
0-50 Meg. (500,000 ohms center)



## MODEL 373 DC MILLIAMMETER

The Model 373 provides for DC current measurements from .02 to 1000 MA. This tester is ideal for radio servicing and experimental work; checking burglar alarm circuits, railroad signal systems, telephone work, etc.

Size: 3"x5 7/8"x2 1/2". Weight 1 1/4 lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE ..... \$18.25  
Test Leads with Prods ..... \$1.25 extra  
Test Leads with Alligator Clips and Insulated Sleeves ..... 1.25 extra  
Case colors available as per your request. Now Model 373 can be supplied in either black or two tone tan and brown. Color optional at above price.

### RANGES

0-1, 5, 10, 25, 50, 100, 250,  
0-1000 MA.



# ★ Simpson

**SIMPSON ELECTRIC CO.**

**INSTRUMENTS THAT STAY ACCURATE**

## MODEL 374 DC MICROAMMETER

Incorporates a basic movement of 50 microamperes sensitivity with self-contained shunts for all other ranges. This tester can be used with external resistors or multipliers as a high sensitivity voltmeter at 20,000 ohms per volt. It is of particular value in photoelectric cell and other experimental work. The meter may be shorted out of the circuit by setting the selector knob to "short" position.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE.....\$20.90  
 Test Leads with Prods.....\$1.25 extra  
 Test Leads with Alligator Clips and Insulated Sleeves.....1.25 extra  
 Case colors available as per your request. Now Model 374 can be supplied in either black or two tone tan and brown. Color optional at above price.

**RANGES**  
 0-50, 100, 250, 500, 1000  
 Microamperes



## MODEL 375 DC AMMETER

(Self-Contained)

A new multi-range instrument which is extremely useful in testing the current in DC circuits. Provides a complete range from a fraction of an ampere to 25 amperes without the necessity of using auxiliary external shunts. Excellent for checking auto radios and experimental work in DC circuits.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE.....\$18.70  
 Test Leads with Prods.....\$1.25 extra  
 Test Leads with Alligator Clips and Insulated Sleeves.....1.25 extra  
 Case colors available as per your request. Now Model 375 can be supplied in either black or two tone tan and brown. Color optional at above price.

**RANGES**  
 0-1, 2.5, 5, 10, 25  
 Amperes



## MODEL 376 AC VOLTMETER

(Rectifier Type 1000 ohms per volt)

An AC Voltmeter, especially useful in circuits where a limited amount of current is present. Makes an excellent output meter when used with proper condenser. The wide variety of ranges covers both primary and secondary voltage ranges of transformers used in radio sets, toys and appliances.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>4</sub> lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE.....\$18.25  
 Test Leads with Prods.....\$1.25 extra  
 Test Leads with Alligator Clips and Insulated Sleeves.....1.25 extra  
 Case colors available as per your request. Now Model 376 can be supplied in either black or two tone tan and brown. Color optional at above price.

**RANGES**  
 0-5, 10, 25, 50, 100, 250,  
 500, 1000 AC volts



## MODEL 377 DC VOLTMETER

(Resistance 1000 ohms per volt)

Measures all dry battery voltage, both A and B, for radio sets, also grid and plate voltage and filament voltage in battery-operated sets. High ranges may be used for checking DC line voltage.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE.....\$18.25  
 Test Leads with Prods.....\$1.25 extra  
 Test Leads with Alligator Clips and Insulated Sleeves.....1.25 extra  
 Case colors available as per your request. Now Model 377 can be supplied in either black or two tone tan and brown. Color optional at above price.

**RANGES**  
 0-1, 2.5, 5, 10, 25, 50,  
 100, 250, 500, 1000  
 DC Volts



## MODEL 378 AC MILLIAMMETER

(With self-contained current transformer)

Here is the instrument that answers your need for a low cost, handy size milliammeter that combines a current transformer and an indicating instrument in one case. It offers five separate ranges, making it suitable for a wide variety of testing jobs.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs. Shipping Weight: 3 lbs.

DEALER'S NET PRICE.....\$20.50  
 Test Leads with Prods.....\$1.25 extra  
 Test Leads with Alligator Clips and Insulated Sleeves.....1.25 extra  
 Case colors available as per your request. Now Model 378 can be supplied in either black or two tone tan and brown. Color optional at above price.

**RANGES**  
 0-5, 25, 100, 250,  
 1000 MA.



# ★ Simpson

SIMPSON ELECTRIC CO.

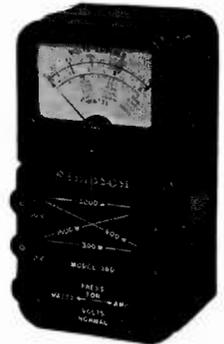
INSTRUMENTS THAT STAY ACCURATE

## SIMPSON MODEL 390 VOLT-AMP-WATTMETER

Ruggedly constructed for full load, continuous operation, the Simpson Model 390 is the first tester of its size ever made to give you volt, ampere and wattage readings in one compact instrument. It embraces two ranges each of voltage and current, providing four wattage ranges which cover practically all types and makes of appliances. The panel has volt-ampere combinations clearly indexed to the proper wattage range on the scale, which makes the instrument easy to use. All readings are shown on one meter. In normal position, the meter indicates volts. Ampere and watt readings are obtained by depressing button on the panel. The widely separated binding posts make it possible for the Model 390 to be used as an individual voltmeter or as an ammeter. The Model 390 has a molded bakelite case with all figures recessed in the panel, which are filled with white enamel for better legibility.

Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs. Shipping Weight: 4 lbs.

DEALER'S NET PRICE, complete with Break-in plug, leads and Operator's Manual.....\$39.50  
 Leatherette Covered Carrying Case, with compartment for Break-in plug and leads..... 5.00  
 Leather case ..... 8.00  
 Case colors available as per your request. Now Model 390 can be supplied in either black or two tone tan and brown. Color optional at above price.



### RANGES

AC Current, 60 cycles  
 Volts: 0-150, 0-300  
 Amperes: 0-3, 0-15  
 Watts: 0-300, 0-600, 0-1500,  
 0-3000

## SIMPSON AC-DC VOLT-WATTMETERS

### MODELS 391 and 392

Designed for simultaneous reading of volts and watts, each of these handy little testers has two separate 3" square meters, one for volts and one for watts. Each has a built-in cord and plug for connection to the line outlet, and a receptacle for connecting the appliance under test. The ranges for each meter are selected by separate toggle switches recessed in the molded bakelite case. The low power consumption combined with the high efficiency of these instruments results in negligible loss and error in reading.

#### Model 391 (3000 watts max.)

Ranges: AC or DC  
 Volts: 0-130, 0-260  
 Watts: 0-1500, 0-3000  
 Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs.  
 Shipping Weight: 4 lbs.

DEALER'S NET PRICE, with Operating Instructions.....\$30.00  
 Leatherette carrying case..... 5.00  
 Case colors available as per your request. Now Model 391 can be supplied in either black or two tone tan and brown. Color optional at above price.

#### Model 392 (5000 watts max.)

Ranges: AC or DC  
 Volts: 0-130, 0-260  
 Watts: 0-1000, 0-5000  
 Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs.  
 Shipping Weight: 4 lbs.

DEALER'S NET PRICE, with Operating Instructions.....\$35.00  
 Leatherette carrying case..... 5.00  
 Case colors available as per your request. Now Model 392 can be supplied in either black or two tone tan and brown. Color optional at above price.



## MODEL 385 TEMPERATURE INDICATOR

This is the newest addition to the Simpson Appliance Tester line. You will find this a compact instrument which is ideal for measuring temperatures from +70° F to as low as -50° F, where fast accurate temperature readings are important. The scale is designed so that the center portion is expanded, making the most widely used temperatures easy to read. The Model 385 is ideal for use in the refrigeration service field and wherever temperature readings are important, such as deep freeze units, home refrigerators, walk-in coolers and air conditioning units. The temperature readings can be taken at the end of the 15' lead which is supplied with the unit. The lead cord is small in diameter, making it possible to close the door of the equipment, thus obtaining temperature indications under actual conditions.

The probe can also be immersed in liquids where critical temperatures must be maintained.

Range: -50° to +70° F.  
 Battery, self-contained  
 Size: 3"x5<sup>7</sup>/<sub>8</sub>"x2<sup>1</sup>/<sub>2</sub>". Weight: 1<sup>1</sup>/<sub>2</sub> lbs.  
 Shipping Weight: 4 lbs.

DEALER'S NET PRICE, complete with Test Lead and Operating Instructions.....\$30.00  
 Leatherette Carrying Case..... 5.00  
 Case colors available as per your request. Now Model 385 can be supplied in either black or two tone tan and brown. Color optional at above price.



# ★ Simpson

INSTRUMENTS THAT STAY ACCURATE

SIMPSON ELECTRIC CO.

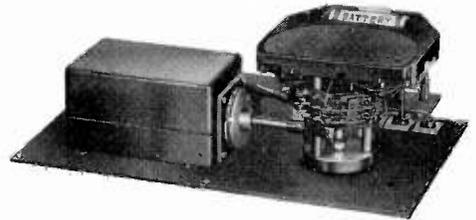


## SIMPSON MODEL 221

## ROTO RANGER

(High Sensitivity AC-DC  
Volt-Ohm-Milliammeter)

### INSIDE THE ROTO RANGER



Twenty-five separate meters at the turn of a switch. That is what you get in the new Simpson Model 221 Roto Ranger. The necessity of reading numerous scales, so common in ordinary volt-ohm-milliammeters, is forever eliminated when you own a Roto Ranger. The chances for errors in making readings are reduced to a minimum. The Model 221 provides a separate direct reading scale for each range and does it automatically. Calibrations are not cramped. Each scale is full size, the same as it would be for a separate instrument. As the selector switch on the panel is moved to the range desired, an ingenious mechanism rotates the proper range into position behind the meter window.

The Model 221 has a direct current sensitivity of 20,000 ohms per volt and is ideal for research and experimental work where correct readings, quickly obtained, are essential. It is also ideal for critical industrial applications, where reading errors may result in costly material spoilage or serious production errors. In addition the Roto Ranger is the modern and final answer for the radio, radar, television and X-ray technician who must trouble shoot speedily and accurately. It is Simpson patented.

With this super-sensitive instrument you can measure automatic frequency control diode balancing circuits, grid currents of oscillator tubes and power tubes, bias of power detectors, automatic volume control diode currents, rectified radio frequency current, high- $\mu$ -triode plate voltage and a wide range of unusual conditions which cannot be checked by ordinary servicing instruments.

The panel is of brilliantly gleaming black anodized aluminum; ranges and other markings are in the shining silver finish of the natural aluminum base. The case is of sturdy wood construction, leatherette covered, with heavy black bakelite handle, and includes a handy compartment for leads. Slip hinges on the cover permit quick removal.

Your first glance behind the panel of the Roto Ranger will show you an instrument that is radically different. The maze of wires common to most test instruments is gone—replaced by two clean housings. One is a bakelite box containing the drum that holds the range scales and the meter movement; the other the bakelite sub-panel of the meter circuit. Bakelite is used for the drum housing because it provides high insulation qualities for the meter and protection to the fine drum mechanism.

Model 221 has been carefully designed throughout to provide strength and simplicity of assembly, and the consequent accessibility of components. Molded of sturdiest bakelite, it possesses the requisite number of tiny recesses to provide separate pockets for resistors. This separation of resistors means orderly assembly, highest possible accessibility, and added insulation for preventing shorts; all connections are short and direct, eliminating the need for cable wiring. Each battery has a compartment of its own and is easily reached for replacement. These are refinements typical of Simpson manufacture, refinements that have made Simpson instruments finer than any similar instruments on the market.

### RANGES

20,000 ohms per volt DC, 1000 ohms per volt AC  
Volts, AC: 2.5, 10, 50, 250, 1000, 5000  
Volts DC: 2.5, 10, 50, 300, 1000, 5000  
Milliamperes, DC: 10, 100, 500  
Microamperes, DC: 100  
Amperes, DC: 10  
Output: 2.5, 10, 50, 250, 1000  
Ohms: 0-2000 (12 ohms center), 0-200,000 (1200 ohms center),  
0-20 megohms (120,000 ohms center)  
Size: 12 $\frac{3}{4}$ "x10 $\frac{1}{8}$ "x5 $\frac{3}{8}$ ". Weight: 9 lbs. Shipping Weight: 13 lbs.  
Price, complete with test leads and Operator's Manual.....\$69.85

### HIGH VOLTAGE PROBE AVAILABLE FOR TELEVISION SERVICING

30,000 volts DC — 20,000 ohms per volt  
Weight: 6 oz. Shipping Weight: 8 oz.  
DEALER'S NET PRICE, complete with Instructions.....\$12.85

# Simpson

SIMPSON ELECTRIC CO.

INSTRUMENTS THAT STAY ACCURATE

## TWO-INCH ROUND OR RECTANGULAR INSTRUMENTS

### DIRECT CURRENT MILLIAMMETERS

Model 125 (Rd.—Open Face), 126 (Shroud) and 127 (Rectangular)

Range	Price
0-1	\$6.90
0-5	6.90
0-10	6.90
0-15	6.90
0-25	6.90
0-50	6.90
0-100	6.90
0-150	6.90
0-200	6.90
0-250	6.90
0-300	6.90
0-500	6.90
0-1000	6.90

### ALTERNATING CURRENT

#### AMMETERS

Model 155 (Rd.—Open Face), 156 (Shroud) and 157 (Rectangular)

Range	Price
0-1	\$6.75
0-3	6.75
0-5	6.75
0-10	6.75

0-50	\$6.90
0-100	6.90
0-150	7.35
0-300	8.55

### ALTERNATING CURRENT VOLTMETERS

Model 155 (Rd.—Open Face), 156 (Shroud) and 157 (Rectangular)

Range	Price
0-5	\$6.75
0-10	6.75
0-15	6.75
0-25	6.75
0-50	6.75
0-100	6.75
0-150	8.40
0-300	9.60
0-500	12.00

### DIRECT CURRENT VOLTMETERS

Model 125 (Rd.—Open Face), 126 (Shroud) and 127 (Rectangular)

Range	Price
0-5	\$6.90
0-10	6.90
0-15	6.90
0-25	6.90

(Continued in next column)

## WATTMETERS — Electro-dynamometer Type

RANGES	2 INCH Model 175 (Rd.—Open Face), 176 (Shroud), and 177 (Rectangular)	3 INCH Model 75 (Rd.—Open Face), 76 (Shroud), and 77 (Rectangular)	4 1/2 INCH Model 79 (Rectangular)
0-75 Watts 150 V— .75 A	\$16.95	\$18.00	\$23.40
0-150 Watts 150 V— 1.5 A	16.95	18.00	23.40
0-300 Watts 150 V— 3.0 A	16.95	18.00	23.40
0-750 Watts 150 V— 7.5 A	16.95	18.00	23.40
0-600 Watts 300 V— 3.0 A	18.75	19.80	25.20
0-1500 Watts 300 V— 7.5 A	18.75	19.80	25.20
0-3000 Watts 300 V—15.0 A	18.75	19.80	25.20

## RADIO FREQUENCY AMMETERS

(Internal Thermocouple Type)

Model 35—3 inch round case.  
Model 36—3 inch shroud case.  
Model 37—3 inch rectangular case.

Ranges: 0-1, 0-1.5, 0-2, 0-2.5, 0-3, 0-5, 0-10 Amperes—\$9.60  
0-15, 0-20 Amperes—\$12.00.

Model 135—2 inch round case.  
Model 136—2 inch shroud case.  
Model 137—2 inch rectangular case.

Ranges: 0-1, 0-1.5, 0-2, 0-3, 0-5, 0-10 Amperes—\$8.40.

## VU METERS

Two types of scales are available with all VU Meters. Both meet the standards set up by Bell Laboratories. The "A" scale stresses the level in VU and is primarily used in monitoring wire lines. The "B" scale stresses percent use of the transmitter output and is the standard for broadcast service.

## VOLUME LEVEL INDICATORS

(Copper Oxide Rectifier Type)

Model 45—3 inch round open face; Model 46—3 inch round shroud case; Model 47—3 inch rectangular case.

### DB METERS

Calibrated for use on 500 ohm line. Power 6MW.

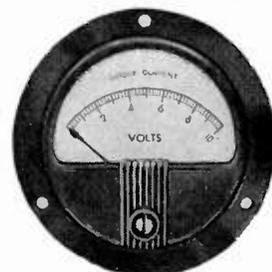
General Purpose	45, 46 or 47 -10 to +6DB Meter—Resistance 2500 ohms.....	\$13.20
	45, 46 or 47 -10 to +6DB Meter—Resistance 5000 ohms.....	\$16.50
High Speed	45, 46 or 47 -10 to +6DB Meter—Resistance 5000 ohms.....	\$24.00
Low Speed	45, 46 or 47 -10 to +6DB Meter—Resistance 5000 ohms.....	\$24.00
General Purpose	Model 145—2 inch round case. Model 146—2 inch shroud case. Model 147—2 inch rectangular case.	
	145, 146 or 147 -10 to +6DB Meter—Resistance 2500 ohms.....	\$11.50
	145, 146 or 147 -10 to +6DB Meter—Resistance 5000 ohms.....	\$14.40

Model 45, 46 or 47 (Not Illuminated) "A" Scale or "B" Scale.....	\$21.00
Model 49 (Not Illum'd) "A" Scale or "B" Scale (4 1/2 in. rectangular).....	24.00
Model 49 (Illuminated) "A" Scale or "B" Scale (4 1/2 in. rectangular)....	28.50

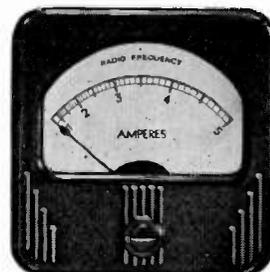
## 4 1/2" RECTANGULAR INSTRUMENTS

MODEL 29 D.C.		MODEL 59 A.C.	
MA		AMPS	
0-1	\$8.85	0-1	\$9.00
0-10	8.85	0-3	9.00
0-50	8.85	0-5	9.00
0-100	8.85	0-10	9.00
0-200	8.85		
0-500	8.85		
VOLTS		VOLTS	
0-10	\$8.85	0-15	\$9.00
		0-150	10.50
		0-300	12.60

All Prices Dealer's Net



2" ROUND CASE—SHROUD STYLE. Flange diameter, 2 3/4"; depth overall, 2 5/8"; body diameter, 2 1/4"; scale length, 1 7/8". Bakelite case.



2" RECTANGULAR CASE. 2 3/8" square. Mounts in round hole. Body diameter, 2 1/8". Bakelite case.



2" ROUND CASE—OPEN FACE STYLE. Flange diameter, 2 3/4"; depth overall, 2 5/8"; body diameter, 2 1/4"; scale length, 1 7/8". Bakelite case.



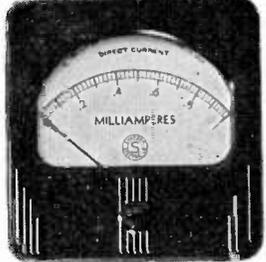
# Simpson

**SIMPSON ELECTRIC CO.**  
CHICAGO, ILLINOIS

**INSTRUMENTS THAT STAY ACCURATE**



**3" ROUND CASE — SHROUD STYLE.** Flange diameter, 3 1/2"; depth overall, 2 1/4"; body diameter, 2 3/4"; scale length, 2-9/16". Bakelite case.



**3" RECTANGULAR CASE.** Width, 3"; height, 3 1/8". Mounts in round hole. Body diameter, 2 3/4". Bakelite case.



**3" ROUND CASE — OPEN FACE STYLE.** Flange diameter, 3 1/2"; depth overall, 2 1/4"; body diameter, 2 3/4"; scale length, 2-9/16". Bakelite case.



**THREE-INCH ROUND OR RECTANGULAR INSTRUMENTS**

**DIRECT CURRENT VOLTMETERS**

Model 25 (Rd.—Open Face), 26 (Shroud) and 27 (Rectangular)

Range	
0-3	\$7.95
0-5	7.95
0-10	7.95
0-15	7.95
0-25	7.95
0-50	7.95
0-100	7.95
0-150	8.40
0-200	9.00
0-300	9.90

(1000 ohms per volt)

Model 25 (Rd.—Open Face), 26 (Shroud) and 27 (Rectangular)

Range	
0-50	\$9.30
0-100	9.60
0-200	9.90
0-300	10.20
0-500	10.50
0-1000	11.85

**DIRECT CURRENT MILLIAMMETERS**

Model 25 (Rd.—Open Face), 26 (Shroud) and 27 (Rectangular)

Range	
0-1	\$7.95
0-3	7.95
0-5	7.95
0-10	7.95
0-15	7.95
0-25	7.95
0-50	7.95
0-100	7.95
0-150	7.95
0-200	7.95
0-250	7.95
0-300	7.95
0-500	7.95
0-1000	7.95

**DIRECT CURRENT MICROAMMETERS**

Model 25 (Rd.—Open Face), 26 (Shroud) and 27 (Rectangular)

Range	
0-50	\$17.25
0-100	15.00
0-200	12.60
0-500	8.90

**DIRECT CURRENT AMMETERS**

Model 25 (Rd.—Open Face), 26 (Shroud) and 27 (Rectangular)

Range	
0-1	\$7.95
0-3	7.95
0-5	7.95
0-10	7.95
0-25	7.95
0-50	7.95
30-0-30	7.95

**ALTERNATING CURRENT VOLTMETERS**

Model 55 (Rd.—Open Face), 56 (Shroud) and 57 (Rectangular)

Range	
0-3	\$7.35
0-5	7.35
0-10	7.35

*(Continued in next column)*

0-15	\$7.35
0-25	7.35
0-50	7.35
0-100	7.35
0-150	8.85
0-300	10.20
0-500	12.90

**ALTERNATING CURRENT AMMETERS**

Model 55 (Rd.—Open Face), 56 (Shroud) and 57 (Rectangular)

Range	
0-1	\$7.35
0-3	7.35
0-5	7.35
0-10	7.35
0-15	7.35
0-25	7.65
0-50	8.40

**ALTERNATING CURRENT MILLIAMMETERS**

Model 55 (Rd.—Open Face), 56 (Shroud) and 57 (Rectangular)

Range	
0-15	\$7.35
0-25	7.35
0-50	7.35
0-100	7.35
0-250	7.35
0-500	7.35

**HIGH RANGE D.C. PLATE VOLTMETERS**

*(Complete with External Resistor)*

Model 25—3 inch round case. Model 26—3 inch shroud case.  
Model 27—3 inch rectangular case.

Ranges: 0-1500, 0-2000, 0-3000, 0-4000 volts. \$11.85  
Range: 0-5000 12.75

*(Price includes resistor)*

External resistors supplied with high range voltmeters are contained in bakelite cases with binding posts for connections.

**RECTANGULAR LUCITE ILLUMINATED METERS**

3 INCH 3" wide, 3 1/8" high. Mounts in round hole. Body diameter, 2 3/4"		2 INCH 2 3/8" square case. Mounts in round hole. Body diameter, 2-3/16"	
DIRECT CURRENT VOLTMETERS MODEL 27	DIRECT CURRENT MILLIAMMETERS MODEL 27	DIRECT CURRENT VOLTMETERS MODEL 127	DIRECT CURRENT MILLIAMMETERS MODEL 127
0-10	\$9.45	0-1	\$8.40
0-50	9.45	0-10	8.40
0-150	9.90	0-50	8.85
0-300	11.40	0-150	10.05
0-500	12.00	0-300	10.05
0-1000	13.35		
0-2000	13.35		
0-3000	13.35		
0-4000	13.35		
0-5000	14.25		
RADIO FREQUENCY AMMETERS MODEL 37	ALTERNATING CURRENT VOLTMETERS MODEL 57	RADIO FREQUENCY AMMETERS MODEL 137	ALTERNATING CURRENT VOLTMETERS MODEL 157
0-1	\$11.10	0-1	\$14.85
0-2	11.10	0-2	14.85
0-3	11.10	0-3	14.85
0-5	11.10	0-5	14.85
			Above prices include external thermocouple*
			0-10 \$8.25
			0-15 8.25
			0-150 9.90
			0-300 11.10

\*Because of the Lucite construction there is no room to place a thermocouple within the 2" meter. Prices therefore include an external thermocouple.  
All Prices Dealer's Net

# ★ Simpson

INSTRUMENTS THAT STAY ACCURATE

## MODEL 480 FM-TV GENESCOPE

The Simpson Model 480 Genescope is the result of many months of painstaking research and it is offered as our interpretation of a modern FM and TV instrument providing all the necessary signal sources for the proper alignment and servicing of FM and TV receivers.

In addition to a signal source, the Genescope includes a high sensitivity oscilloscope of unique advanced design, complete in every detail and equipped with a high frequency crystal probe for signal tracing.

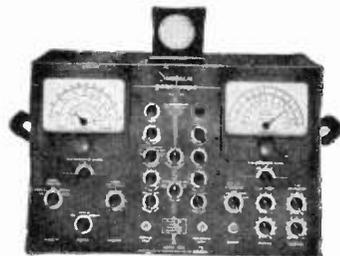
The variable oscillator sections are mounted one on each side of the oscilloscope section and are provided with large precision vernier dials having a 20:1 ratio and 1000 division logging scales. They are easy to read and can be quickly set for to an exact frequency.

Modern FM and TV development and servicing requires the use of test equipment made to exacting standards. With this in mind we offer you the Genescope with the assurance that everything possible has been done to make it the most accurate, flexible and convenient instrument available.

There are many vital component parts in the Genescope, almost all of which have been made to our exacting standards within our own modern plants. Most of these vital components have been developed and designed by us and substantial sums have been spent on modern tooling. The care we have taken to properly design and produce these parts is worthwhile assurance that the Genescope will render many years of uninterrupted service and always produce accurate results.

The center section of the Genescope contains the oscilloscope and all associated controls. The cathode ray tube of the oscilloscope is mounted vertically in the case in order to conserve bench space. The pattern on the tube is brought into view by use of a highly polished adjustable mirror at the top of the cabinet. The mirror may be quickly adjusted for any position of the operator. The tube face is placed well below the top surface of the cabinet in order to shield it from incident light thus producing a clear, sharp image unhampered by narrow angle light shields. The mirror when closed provides adequate protection for the cathode ray tube when not in use.

Direct connection to vertical and horizontal deflection plates and other internal functions are available through removable cover on the front panel.



### RANGES

#### FREQUENCY MODULATED OSCILLATOR

Band A—2-120 megacycles  
 Band B—140-260 megacycles  
 Sweep width variable from zero to 15 megacycles  
 Sweep rate 60 cycles per second  
 Specially designed frequency sweep motor  
 Continuously variable attenuator

#### AMPLITUDE MODULATED OSCILLATOR

Band A—3.2-16 megacycles  
 Band B—15-75 megacycles  
 Band C—75-250 megacycles  
 30% modulation at 400 cycles or unmodulated  
 Continuously variable attenuator  
 Visual method of beat frequency indication  
 Crystal calibrator — 5 megacycles  $\pm .05\%$   
 Audio Oscillator 400 cycles  
 AM and FM oscillator sections provided with large, easy to read dials with 20-1 vernier control and 1000 division logging scale.  
 Output impedance 75 ohms  
 Step attenuator for control of output

### OSCILLOSCOPE

Vertical and Horizontal amplifiers are balanced DC type.  
 Frequency response essentially flat to 200 KC. Will respond to over 3 megacycles at lower output.  
 Vertical input sensitivity 30 MV per inch peak to peak. Horizontal input sensitivity 50 MV per inch peak to peak. Input resistance .5 meg for low input, 10 meg for high input. 60 cycle sine sweep or linear sweep from 3 cycles to 60 KC.  
 Adjustable synchronization — internal, external or line frequency.  
 Provisions for internal blanking or Z axis modulation.  
 Direct deflection plate sensitivity:  
 Vertical—10 volts per inch peak to peak  
 Horizontal—15 volts per inch peak to peak

Size: 22"x14"x7 $\frac{1}{2}$ ". Weight 39 lbs.  
 Shipping Weight 48 lbs.

DEALER'S NET PRICE complete with Test Leads and Operator's Manual.....\$375.00

## Model 479 TV-FM Signal Generator



A modern instrument for today's TV-FM problems. Exactly the same circuits, ranges and functions as the Model 480, described above, with the exception of the oscilloscope.

Size 17"x14"x7 $\frac{1}{2}$ ". Weight 29 lbs.  
 Shipping Weight 35 lbs.

DEALER'S NET PRICE  
 with Test Leads  
 and Operator's Manual **\$245.00**

# ★ Simpson

INSTRUMENTS THAT STAY ACCURATE

## MODEL 351 TV ANTENNA COMPASS

This valuable instrument is another example of Simpson television pioneering. One man can do a better installation job in less time than it used to take two men.

Model 351 takes the physical form of a ruggedly built pocket-size meter which connects by a simple insulation-piercing alligator clip to the video input of the cathode ray tube in the television receiver.



By an extension cord, it is carried to the antenna site. With a test pattern tuned in on the area's weakest station, the antenna is simply located and rotated for maximum deflection of the TV Antenna Compass. It is as simple as that. Identifies ghosts, too. And much more accurate than trusting to the old fashioned "human eye-and-headphones" method of shouting instructions back and forth from the living room to the roof—which has always resulted in only an approximate best orientation of the antenna. Can also be used to peak the RF mixer and oscillator sections. In that way you actually peak the set right on the station itself.

Size  $4\frac{3}{4}'' \times 4\frac{1}{4}'' \times 1\frac{9}{16}''$ . Weight 1 lb. Shipping Weight 4 lbs.

DEALER'S NET PRICE—Complete with  
Termination Box and Printed Instructions..... **\$16.35**

## MODEL 184 MICRO TUNER

Tuning indicator for use on FM and Television receivers.

Enables operator to tune to the exact mid point of the band for perfect audio reception.

Of particular value to owners of television receivers which are equipped with a fine tuning control.

Supplied with 4 ft. flexible celanese covered lead which includes isolating resistor and special clip for attaching to tube prong.

Easily installed.

An excellent extra profit item for the dealer making television installations. Results in less call-backs.

Size:  $2\frac{1}{4}'' \times 2\frac{1}{2}'' \times 1\frac{3}{4}''$ . Weight 8 ozs. Shipping weight 2 lbs.

DEALER'S NET PRICE with Printed Instructions..... **\$7.50**



## HIGH VOLTAGE TV PROBE

Here are Simpson's three High Voltage Test Probes for Television servicing, each designed for use with the models listed here. They are molded of high temperature polystyrene to provide high dielectric strength and maximum insulation. Their small diameter permits reaching in small spaces and narrow openings.

Size Diameter  $\frac{9}{16}''$ , Length  $11\frac{1}{2}''$ . Weight 6 oz. Shipping Weight 2 lbs.



### DEALER'S NET PRICES

High Voltage Probe for 260 (25000 V) Complete, nothing to add..... **\$12.85**

High Voltage Probe for 221 (30000 V) Complete, nothing to add..... **12.85**

High Voltage Probe for 266 (25000 V) Complete, nothing to add..... **14.85**

**HICKOK**

# TEST EQUIPMENT

## NEW DYNAMIC MUTUAL CONDUCTANCE DISPLAY TUBE MERCHANDISER . . . WITH 9-Inch Illuminated Meter

**Most Outstanding  
and Customer Convincing  
Display Tube Tester  
Ever Designed**

ROLL CHART COVERS MANY HUNDREDS OF TUBE TESTS—INCLUDING NEW NINE PIN TYPES. EMPLOYS THE FAMOUS HICKOK PATENTED DYNAMIC MUTUAL CONDUCTANCE METHOD. LARGE ENGLISH READING DIAL—AND MICROMHO RANGES ARE THERE—WHERE YOU NEED THEM.

Let your customers see for themselves the condition of their tubes. The 533-DM builds customer confidence—helps you sell—makes more profit for you on over-the-counter sales. It is a quality built, accurate testing unit—and looks it. It's a sure-fire sales booster. Panel is modern, legible and lasting, with satin chrome finish.

Easy to read scales have MICROMHO ranges of 0-3,000, 0-6,000, 0-15,000 and English legends reading "Replace," "Doubtful" and "Good."

In selector switches complete flexibility has been provided to take care of all base pin connections; but in routine testing seldom more than one or two manipulations are necessary. It is easy to use.

Roll chart in the panel makes tube data easy to find.

Gas test provision quickly detects gassy tubes (which ruin AVC and IF stages).

Tests diodes separately with low voltage to prevent paralysis of the tube elements.

Tests all present-day tubes including Octal, Loktal, Miniature, Ballast, Magic Eye Tubes, and Nine Pin Tubes.

Will remain up-to-date for years and years. Provision for new tube designs is made.

Pure rectified D.C. current is used to energize plates and grids using two rectifiers.

Has all latest filament voltages. Dial is marked in voltage.

Tested and approved by the leading tube users in the country. Choice of high grade engineers.

Tests grid controlled rectifier tubes.

Size—26 $\frac{3}{4}$ " high, 17" wide, 11" deep.

Shipping Weight—50 lbs.; net, 32 lbs.

Power Supply—100-130 Volts, 50-60 Cycles.

Tube Complement—1 No. 83, 1 No. 5Y3GT.



**Model 533DM  
Net Price \$144.65**

## SPECIAL "D" SERIES DISPLAY EQUIPMENT

**To Sell and Safeguard  
Your Service**

**Start to build your business  
this sure-fire way NOW!**

**Separate Display Cases Available for Any  
of These Hickok Testers You Already Have!**

Most Convenient "Fit All Space" panels that are possible to design.

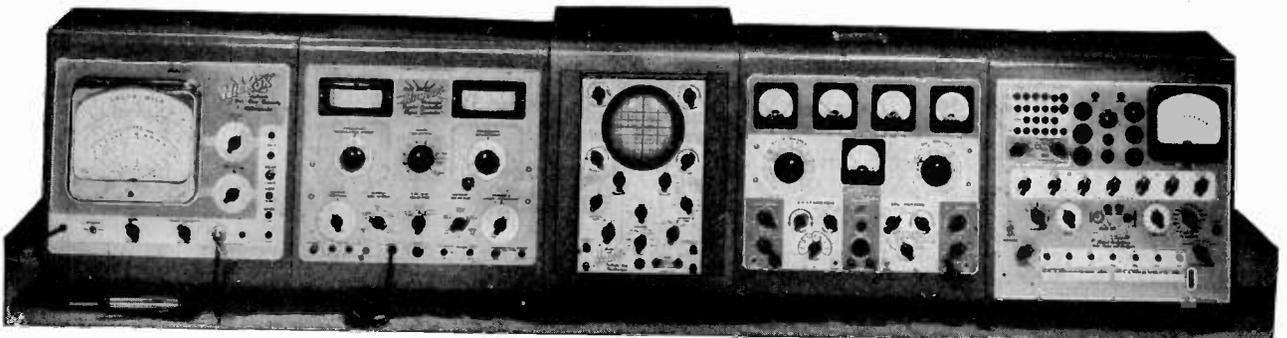
Makes a Most Magnificent, Solid and "Stay Put" Layout.

Can be arranged in Sections or Multiples of Associated Units for Specialized Service. Rearrangement may be made as desired. Show Your Service "Know-How." Put it out where your customers can see it.

"D" SERIES WILL SELL IT—CLINCH IT—SAFEGUARD IT. The following instruments are available in display cases—Models 209A—288X—195B—534B—292X—505A—533—610A.

Size, each case: 18 $\frac{1}{4}$ " high, 17" wide, 11" deep. (Oscilloscope cases: 18 $\frac{1}{2}$ " deep)

Weights: Approximately same as regular models.

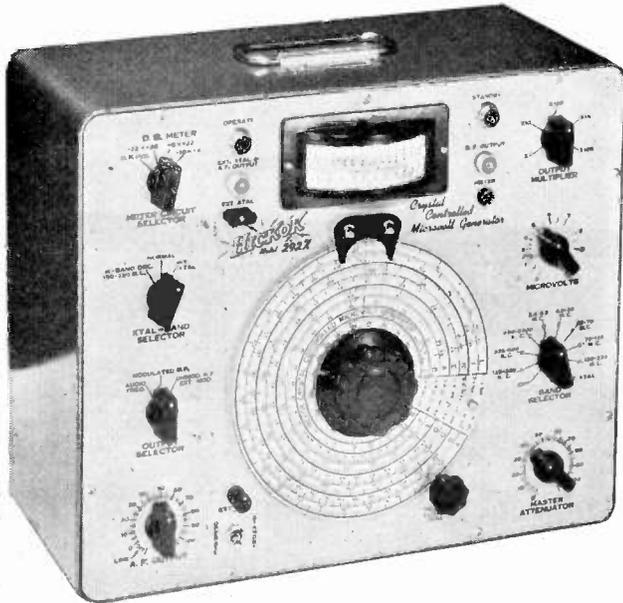




**HICKOK**

# TEST EQUIPMENT

## NEW MICROVOLT SIGNAL GENERATOR for AM, FM, TV and Mobile Bands



Model 292-X

**Net Price \$195.00**

**TECHNICAL CHARACTERISTICS** — Fundamental Frequency Coverage: Bands A through G — 125 kc to 110 mc; Band H — 150 to 220 mc. Output Calibrated: 1 to 100,000 microvolts. Output Impedance: X1, X10, and X100 microvolts — 5 ohms; X1K — 30 ohms. X10K — 0 to 100 ohms. Modulation Fixed: 400 cycles. AF Output: 0-2 volts. The Model 292-X is wired for a plug-in type crystal (152-162 mc), with accuracy to .005%. Self-Contained crystal oscillator circuit has crystal jack on front panel permitting crystal outputs at any frequency from 250 kc to 20 mc on fundamentals; and to over 250 mc on harmonics. Type CCO-56 Crystal Oscillator unit available with frequency accuracy to .005% for Mobile Band coverage. Self-Contained Decibel Meter: —10 to  $\pm 38$  DB in 3 ranges. Tube Complement: 1 6SN7, 2 6J6, 1 6SG7, 1 6X5GT. Power Consumption: 35 watts at 115 volts. Meter Model: 50; 105-125 V., 50-70 cycles, A.C. 14" x 10 1/2" x 8"; 29 lbs. Net: 38# Ship. Satin Chrome Panel. Blue lacquered steel case.

**Model 292-X—125 kc to 220 mc on fundamentals.***THE ONLY SIGNAL GENERATOR WITH ALL THESE*

### FEATURES

- Covers all AM, FM, TV and Mobile Frequencies
- Measures Input of Units under test
- Modulated and Unmodulated Output from 1 to 100,000 microvolts
- Cast Aluminum Attenuator for Minimum Signal Leakage
- May be externally modulated from 15 to 10,000 cycles per second
- Decibel Meter for faster servicing
- Self-contained Crystal Oscillator Circuit — Crystals from 250 kc to 20 mc are available
- Over 100 inches of scale
- Most accurate Microvolt Generator available for practical radio servicing

### OPTIONAL

Crystal Oscillator for Accuracy to .005% in 152-162 mc Mobile Range.

This new HICKOK Model 292-X is the only popularly priced Microvolt Generator available that covers both Upper Channel TV and Mobile frequencies — on fundamentals.

## LINEARITY-PATTERN GENERATOR Model 620—Crystal Controlled (L. P.)



Model 620

**Net Price \$144.85**

**TECHNICAL CHARACTERISTICS** — Output Frequencies: 4 channel — 3 through 5 inclusive. However, for servicing, only one channel is necessary. Output Voltage: 50 to 5,000 Microvolts. All modulating frequencies are crystal controlled. Horizontal lines: 8 or 9. Vertical lines: 12. Selection of Horizontal or Vertical lines can be made separately or simultaneously as a Cross-Hatch pattern. Power: 105-125V., 60 cycles AC. Net weight: 11 1/2 lbs. — Ship. weight: 18 lbs. Beautiful blue hammertex steel case with satin chrome panel. Supplied complete with test leads.

**PROVIDES A STABLE VIDEO PATTERN**  
**At Any Time for Alignment**  
**and Trouble Shooting**

**NOW INDEPENDENT OF STATION OPERATION**  
**THE MODEL 620 GIVES YOU THESE OUTSTANDING**

### FEATURES

- Provides Stable Linear TV Pattern at any time
- Checks Relative Receiver Sensitivity
- Detects Hum in Horizontal Deflection Circuits
- Provides Means for Checking and Aligning of:  
Horizontal and Vertical Linearity and Drive Controls  
Horizontal and Vertical Width, Height and Hold Controls  
Horizontal A.F.C. Circuits
- Fast and Easy to use: Merely connect to receiver antenna
- Extremely useful in fringe areas where reception during installation is lacking or questionable

Today's Video serviceman needs an independent and more accurate pattern to rapidly trouble shoot in television servicing. The HICKOK Model 620 Cross-Hatch Generator has a high enough output to obtain a clear picture on the screen of any TV receiver. With a HICKOK 620 you can rapidly service in borderline areas where broadcast reception is unpredictable. You can align more hours per day — for more profit.

**HICKOK**

# TEST EQUIPMENT

## UNIVERSAL CRYSTAL CONTROLLED SIGNAL GENERATOR Models 277, 277X and 288X

The Universal Crystal Controlled Signal Generators, Models 277, 277X and 288X, are specifically designed to meet the many and varied needs of the radio engineer and service man working with frequency and amplitude modulated receivers and with television equipment. The wide range in radio-frequencies and audio-frequencies available, with the many choices of type of modulation, makes these Models most versatile and practical instruments.

All three models are the same except for the following features: 0.01% accurate crystal controlled outputs, both amplitude modulated at 400 cycles and unmodulated, offered in Models 288X and 277X only. Self-contained decibel meter with 42" cable, Model 288X only.

### SPECIAL FEATURES

Complete frequency modulation coverage with three variable bandwidths of sweep: 0-30 kc, 0-150 kc, 0-450 kc. Frequency modulation at two self-contained modulating frequencies: 60 cycles and 400 cycles. Provisions for external amplitude and frequency modulation to 15,000 cycles. Self-contained amplitude modulation at 400 cycles. Continuously variable audio frequency from 0-15,000 cycles. Audio frequency and radio frequency outputs are continuously variable from zero to maximum. 60 cycle synchronized sweep voltage is available for use with an oscillograph.



Model 288-X

**Net Price, \$169.20**

### SPECIFICATIONS

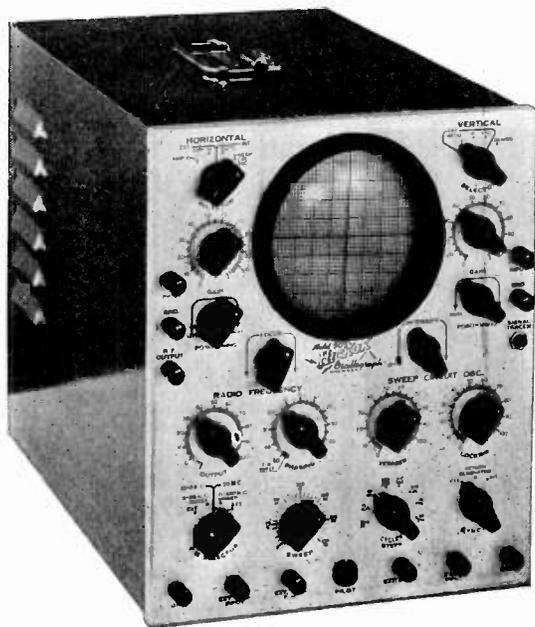
Dimensions—14" x 16½" x 7"  
Net Weight—25 lbs.—Ship. 36 lbs.  
Meter—Model 51X, Model 288X only

Scale—over 100"  
Satin-chrome finish panel  
Blue baked Hammertex finished case.

**POWER SUPPLY:** 105-125 V, 50-70 cycles, A-C. Power Consumption: 20 watts at 115 volts. Amplitude Modulated, Pure R-F Frequency Range: 100 kc-110 mc. Frequency Modulated R-F Frequency Ranges: Narrow Band (0-30 kc Sweep): 100 kc to 110 mc in 7 ranges: Wide Band (0-150-450 kc Sweep) 1 mc to 160 mc in 7 ranges. Modulation: Amplitude Modulation—400 cycles; Frequency Modulation—0-450 kc variable sweep, 50 mc. modulating frequency 60 cycles; 0-150 kc variable sweep, 50 mc, modulating frequency 400 cycles; 0-30 kc variable sweep, 1000 kc, modulating frequency 60 cycles; External Modulation—Amplitude or frequency modulation, variable 0-15,000 cycles. A-F Range: Fixed at 400 cycles, variable from 0-15,000 cycles. Crystal Controlled Output (Models 277X and 288X only)—100 kc, Unmodulated: 100 kc-15 mc, utilizing harmonics; 100 kc, 400 cycle amplitude modulated: 100 kc-15 mc, utilizing harmonics; 1000 kc, Unmodulated: 1000 kc-125 mc, utilizing harmonics; 1000 kc, 400 cycle amplitude modulated: 1000 kc-125 mc, utilizing harmonics. Output: R-F, continuously variable from 0 to maximum (with multipliers X1, X10 and X100); A-F, continuously variable from 0 to maximum, linear control, for both 400 cycle and variable frequency outputs. Synchronized Sweep Voltage: for horizontal deflection of oscillograph (60 cycles.) DB Meter Range (Model 288X only): -10 to +6, +6 to +22, +22 to +38. Tube Complement—1 6C4, 2 6SN7, 1 6SJ7, 1 6X5G.

**HICKOK**

# TEST EQUIPMENT



Model 505-A

**Net Price: \$179.00**

Power Supply: 105-125 V, 50-70 cycles, A-C. Deflection Sensitivity: Vertical—0.03 volts (rms)/inch. Horizontal—0.3 volts (rms)/inch. Horizontal, Direct—45 volts (rms)/inch. Input Impedance: Vertical—1 megohm, 25 mmf. Horizontal, Direct—3 megohm. Tube Complement: 1 5UP-1—cathode ray tube, 1 6SN7—r-f oscillator and mixer, 1 6J5, 1 6AG7—vertical amplifier, 1 6J7—horizontal amplifier, 1 6SQ7—reactance tube, 1 5Y3—high voltage rectifier, 1 5Y3—low voltage rectifier, 1 884—sweep circuit oscillator.

## NEW AM, FM, TV OSCILLOSCOPE Model 505-A

Specifically designed for use with frequency modulated, amplitude modulated and television equipment. Permits a complete visual analysis of the electrical and electronic circuits of the i-f and r-f bands as well as the audio frequency stages. The effectiveness of a tube or circuit as an amplifier, rectifier, or source of special wave shapes may be readily determined.

Interprets modulation, phase relations, voltage amplitudes, distortion, etc. Responds accurately to voltages in wide ranges of both frequencies and amplitudes.

### SPECIAL FEATURES

Wide band, high gain vertical amplifier, 30 cycles to 1 megacycle. Self-contained wide-band frequency modulated oscillator with variable sweep width, 0-450 kc. Self-contained narrow-band frequency modulated oscillator with variable sweep width, 0-30 kc. Signal tracer jack is incorporated so that, when used in conjunction with a speaker or ear phones, the signal may be simultaneously seen and heard. Provisions for modulation by an external audio frequency source to provide the equivalent of a frequency modulated transmitter for receiver checks. Self-contained mixer circuit provided so that when used in conjunction with any good external oscillator, wide band or narrow band frequency modulated outputs may be produced within the frequency limits of the external oscillator. High sensitivity amplifiers. Calibrated screen. Has self-contained frequency modulated oscillator. Can be used with any signal generator for servicing FM or AM sets.

### SPECIFICATIONS

Dimensions—14" x 11½" x 15½"  
Net Weight—32 lbs.—Ship. 42 lbs.  
Cathode Ray Tube—5"  
Satin-chrome finish panel  
Blue baked Hammertex finished case

## NEW 5" HIGH SENSITIVITY AM, FM, TV OSCILLOSCOPE

### Model 195-B

With this oscillograph you can align I. F. transformers, trace trouble, analyze wave shape of signal, determine unknown frequencies, amplify and view very weak signals. Has big 5" screen, extra high gain vertical amplifiers, sinusoidal sweep circuit and phasing control for proper I. F., R. F. and discriminator alignment.

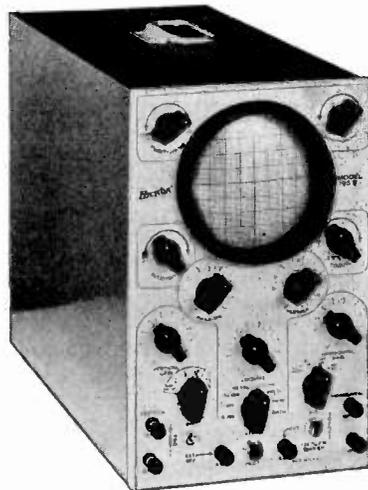
### TECHNICAL CHARACTERISTICS

- Power supply required: 105-125 V, 50-70 cycles A.C.
- Power Consumption: 50 Watts at 115 Volts
- Deflection Sensitivity:
  - Vertical—.03 Volt (rms) per inch
  - Vertical, Direct—15 Volts (rms) per inch
  - Horizontal—.15 Volt (rms) per inch
  - Horizontal, Direct—20 Volts (rms) per inch
- Input Impedance:
  - Vertical—1 meg, 25 mmf
  - Vertical, Direct—2.2 meg
  - Horizontal—4 meg, 35 mmf
  - Horizontal, Direct—2.2 meg
- Frequency Range:
 

Amplifier, Vertical—30 cycles to 1.0 mc

Amplifier, Horizontal—10 cycles to 50 kc
- Tube Complement:
 

Tube	Function
1 6SJ7	Horizontal Amplifier
1 884	Sweep Circuit Oscillator
1 6AC7	Vertical Amplifier
1 6SN7	Vertical Amplifier and Cathode Follower
1 6X5	Low Voltage Rectifier
1 5Y3	High Voltage Rectifier
1 5UP1	Cathode Ray Tube
- Size: 8½" wide x 18½" deep x 13" high  
Net Weight: 27½ lbs.—Ship. 38 lbs.



Model 195-B

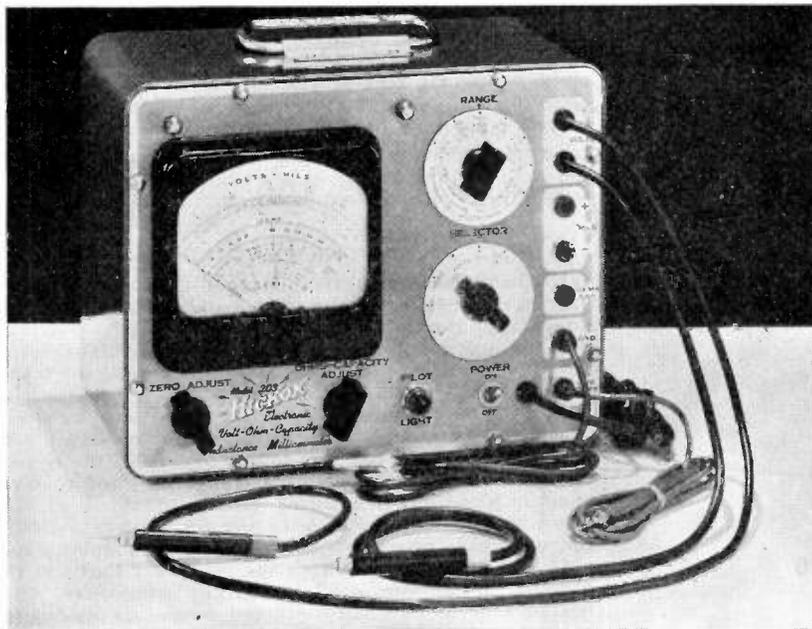
**Net Price: \$156.00**

**HICKOK**

# TEST EQUIPMENT

## ELECTRONIC VOLT-OHM-CAPACITY MILLIAMMETER

### Model 203



Model 203

A universal test instrument for all radio and electronic service work. Accurately and easily measures wide ranges of inductances, capacitances, resistances, currents and voltages, both A.C. and D.C.

**Net Price**  
**\$89.40**

Model PR-203 — Same as above except with probe as shown below on Model 209-A.

**Net Price \$99.60**

High input impedance prevents loading when making voltage tests. Measurement of inductances are possible with the use of a conversion chart supplied in the instruction book. Damage due to overload is

impossible in all except current measurements. Regulated power supply incorporated permits normal operation and accuracy with wide line voltage fluctuation.

#### SPECIFICATIONS

Dimensions—9" x 11½" x 7"  
Net Weight—13 lbs.—Ship. 20 lbs.  
Meter—Model S44A  
Satin-chrome finish panel  
Blue baked Hammertex finished case

POWER SUPPLY: 105-125 V, 50-70 cycles. Ranges: Volts, A-C and D-C 0-3, 12, 30, 120, 300, 1200. Mills (D-C): 0-3, 12, 30, 120, 300, 1200. Cap.: 0-10,000 mmf in 2 ranges, 0-1000 mf in 5 ranges. Ind.: 50 mh-100 henries. Ohms: 0.1 ohm to 10,000 megohms in 7 ranges. Frequency: A-C up to approximately 5 megacycles may be measured. Input Impedance: Volts D-C: 15 megohms. Volt A-C: 12 megohms. Tube Complement: 6X5GT A-C rectifiers, 6SJ7 cathode follower, 6SN7GT vacuum tube voltmeter, OD3/VR150 voltage regulator.

## NEW ELECTRONIC VOLT-OHM-CAPACITY MILLIAMMETER

### LARGE LABORATORY SIZE

### GIANT 9-INCH METER — MODEL 209-A

This new giant size instrument matches the size and attractiveness of the Hickok complete line of test equipment. Large 9-inch meter improves ease of operation. Has all the technical characteristics of the Model 203 above, and in addition has a 1200 Volt D.C. scale, and a new Peak-to-Peak Voltmeter to measure peak to peak or RMS values of A.C.

The new Zero-Center scale on D.C. permits much faster alignment than other similar instruments.

#### SPECIFICATIONS

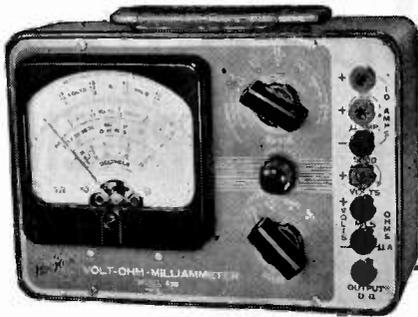
Dimensions—14" x 16½" x 8"  
Meter—Hickok Model S-22  
Weight—18 lbs. Net.—25 lbs. Ship.  
Blue baked Hammertex finish

**Net Price: \$119.40**  
Including probe and all leads.



**HICKOK**

# TEST EQUIPMENT



Model 435-A

**Net Price, \$37.50**

## VOLT OHM MILLIAMMETER

### Model 435-A

The Model 435 is built to the highest Hickok standards of engineering design, workmanship and material. The meters used in these Volt-Ohm-Milliammeters are especially built by Hickok for this service. The movement is large and rugged and the very high torque weight ratio gives lively, instantaneous pointer action. The movement is curve-corrected by an exclusive Hickok process which gives a higher accuracy at all points on the scale.

### SPECIAL FEATURES

20,000 ohms per volt sensitivity on D.C.  
A-c power is not required for operation—especially convenient in many areas. Microampere, milliampere and ampere measurements provide an extremely wide range in current measurements. A.C. voltage output with D.C. components may be measured. Decibel power output measurements from -20 to +29 db may be made. Wide ranges in A.C. and D.C. voltage and resistance values may be measured.

### SPECIFICATIONS

Dimensions—6" x 8¼" x 4"  
Net Weight—3½ lbs.—Ship. 10 lbs.  
Meter—Model S48  
Satin-chrome finished panel  
Blue backed crackle lacquer finished case

Ranges—AC Volts and DC Volts: 0-2.5, 10, 50, 250, 1000, 5000; Ohms 0-10 megohms (4 ranges); Microamperes: 0-50; Milliamperes: 0-2.5, 10, 50, 250, 1000; Amperes: 0-10; Decibels: -20 - +3, -8 - +15, +6 - +29; Output Volts: 0-2.5, 10, 50, 250, 1000, 5000. Sensitivity: A.C. Volts: 5000 ohms/volt; D.C. Volts: 20,000 ohms/volt; Meter: 40 microamperes. Battery Complement: 1 Dry Battery, Radio C, 4.5 volts.

## VOLT-AMPERE WATTMETER

### Model 900-B

Electrical Appliance Tester and Circuit Analyzer.  
True to the Finest Hickok Tradition

**Net Price, \$59.07**

For Measuring Actual Values of Volts, Amperes and Watts.  
Ranges: A.C. Watts: 0-20-100-500-1000-2000. A.C. Amperes: 0-1.3-6-5-13-26. A.C. Volts: 0-130-260. A.C. Milliamperes: 0-260.

Scale is 3¾" long, clear and legible. The Model 900-B Volt-Amp-Wattmeter has been designed for all A.C. appliance-testing, from bell transformers and clocks to electric ranges operating on the 220-volt three-wire Edison system. The extremely low range of 0-20 watts will measure the power consumed by the smallest of appliances and is protected from accidental overload by a fuse. For measuring electric ranges the Number 9A and 9B special leads are available with standard three-wire range connectors. It tests appliances while in actual operation, indicating wattage consumption, amperes, and line voltage.

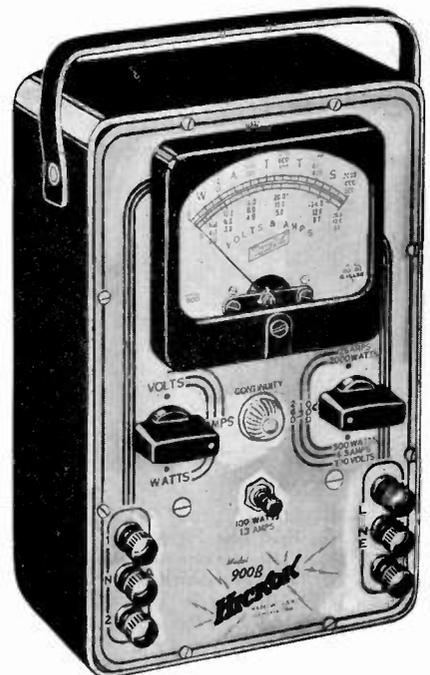
Mounted in a durable welded steel case with strap handle and rubber bumpers. Detachable leads, for small appliances, are furnished. Test leads with prods also included.

Service men will find a wattmeter especially handy for checking all A.C. sets.

Part No. C-105—This external current transformer is designed to give ranges of 5,000 and 10,000 watts and 65 and 130 amperes when used with Model 900-B. Part No. C-105 transformer may be installed in lead compartment of carrying case. When transformer and carrying case are ordered together, transformer will be installed before shipping.

Model 900-B—Size: 9½" high, 6¼" wide, 3" deep.

Shipping Weight: 8½ lbs.—Net 6½ lbs.



Model 900-B

# **FREEED** Precision LABORATORY TEST EQUIPMENT



1



2



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4



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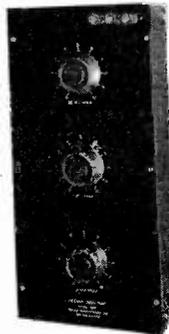
7



8



9



10



11

- 1. Type No. 1030 Low Frequency "Q" Indicator
- 2. Type No. 1110 Incremental Inductance Bridge
- 3. Type No. 1020 Megohmmeter
- 4. Type No. 1060 Vacuum Tube Voltmeter
- 5. Type No. 1140 Null Detector
- 6. Type No. 1010 Comparison and Limit Bridge
- 7. Type No. 1160 Inductor Decade 10x1. Hy 10x.1 Hy 10x.01 Hy
- 8. Type No. 1161 Inductor Decade 10x.1 Hy 10x.01 Hy 10x.001 Hy
- 9. Type No. 1162 Inductor Decade 10x.01 Hy 10x.001 Hy 10x.0001 Hy
- 10. Type No. 1164 Inductor Decade 10x10 Hy 10x1 Hy 10x.1 Hy
- 11. Type No. 1040 Vacuum Tube Voltmeter

**FREED TRANSFORMER CO., Inc.—INSTRUMENTS DIVISION**

# Shurite PANEL METERS



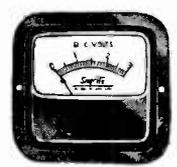
Model 550-AC



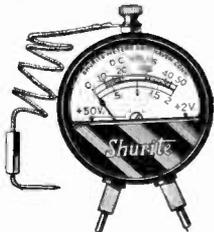
Model 550-DC with Zero Adjuster



Model 650-AC



Model 950-DC(or AC)



Model 450

Shurite panel meters are attractive, rugged, dependable instruments with accuracy well within 5%. All models are metal, telephone-black finish, all require 2 3/32" hole. DC meters are polarized-vane solenoid type, AC meters are double vane repulsion type.

Advantages of this complete line.

All-metal dials, age and moisture resistant, lithographed in black on white for high visibility.

Improved design, with new coil frames and attached insulators for greater rigidity, yet interchangeable in other respects with similar type of instrument formerly available.

Improved appearance, with concealed coils, full view scales, and attractive styling and finish.

Guarantee: All Shurite meters are guaranteed to users against defective workmanship and material, and will be repaired or replaced if sent to the factory postpaid with 25¢ handling charge within one year after date of purchase.

Model 550-DC, flush case, narrow ring, round, has long U-bracket.

Model 550-AC, flush case, narrow ring, round, has ring clamp.

Models 650-DC and 650-AC, flush case, wide round flange, have screw holes for mounting, hardware included.

Models 950-DC and 950-AC, flush case, square flange, have screw holes for mounting, hardware included.

### IMPORTANT—How To Order:

For all standard models, give: (1) Model Number, (2) Range, (3) Stock Number. If Model number and stock number are not stated, Model 550 will be supplied.

### ZERO ADJUSTERS(Z)

Zero Adjusters are available only on Models 550-DC and 650-DC. No zero adjuster on Model 950. When ordering, add Z to stock number. Example: Stock number for Model 550-DC voltmeter, 0-1 volt range—without zero adjuster is 5101. With zero adjuster, it is 5101-Z.

### PANEL CALIBRATION(S)

Meters are calibrated for non-magnetic panels. If for magnetic (steel) panel mounting, specify thickness and overall size of panel, and add-S to stock number when ordering, as 5101-S. If thickness of panel is not specified, meter will be supplied for .040 panel.

(Prices shown are net for individually boxed meters)

## DC AMMETERS

RANGE	MODEL 550*		MODEL 650*		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Amps.						
0-1	5201	\$1.30	6201	\$1.40	9201	\$1.45
0-3	5202	1.30	6202	1.40	9202	1.45
0-5	5203	1.30	6203	1.40	9203	1.45
0-8	5204	1.30	6204	1.40	9204	1.45
0-10	5205	1.30	6205	1.40	9205	1.45
0-15	5206	1.30	6206	1.40	9206	1.45
0-25	5207	2.00	6207	2.10	9207	2.15
0-50	5208	2.00	6208	2.10	9208	2.15
1-0-1	5209	1.30	6209	1.40	9209	1.45
3-0-3	5210	1.30	6210	1.40	9210	1.45
5-0-5	5211	1.30	6211	1.40	9211	1.45
6-0-6	5212	1.30	6212	1.40	9212	1.45
10-0-10	5213	1.30	6213	1.40	9213	1.45
20-0-20	5214	1.40	6214	1.50	9214	1.55
30-0-30	5215	1.80	6215	1.90	9215	1.95
0-0-50	5216	2.00	6216	2.10	9216	2.15

\*For zero adjuster, add 30¢ to price and Z to stock number. No zero adjuster on Model 950.

## AC AMMETERS

RANGE	MODEL 550		MODEL 650		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Amps.						
0-1	5501	\$2.35	6501	\$2.45	9501	\$2.50
0-3	5502	2.35	6502	2.45	9502	2.50
0-5	5503	2.35	6503	2.45	9503	2.50
0-10	5504	2.35	6504	2.45	9504	2.50
0-30	5505	2.50	6505	2.60	9505	2.65
0-50	5506	3.00	6506	3.10	9506	3.15

## DC MILLIAMMETERS

RANGE	MODEL 550*		MODEL 650*		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Ma.						
0-3**	5314	\$2.60	6314	\$2.70	9314	\$2.75
0-3	5301	2.00	6301	2.10	9301	2.15
0-5	5302	1.85	6302	1.95	9302	2.00
0-10	5303	1.75	6303	1.85	9303	1.90
0-15	5304	1.35	6304	1.45	9304	1.50
0-25	5305	1.35	6305	1.40	9305	1.45
0-50	5306	1.30	6306	1.40	9306	1.45
0-100	5307	1.30	6307	1.40	9307	1.45
0-150	5308	1.30	6308	1.40	9308	1.45
0-200	5309	1.30	6309	1.40	9309	1.45
0-300	5310	1.30	6310	1.40	9310	1.45
0-400	5311	1.25	6311	1.35	9311	1.40
0-500	5312	1.25	6312	1.35	9312	1.40

\*\* 500 ohm internal resistance. Sensitive type; moving magnet construction—patent pending. Scale arc 75°

\*For zero adjusters add 30¢ to price and Z to stock number. No zero adjuster on Model 950.

## AC MILLIAMMETERS

RANGE	MODEL 550		MODEL 650		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Ma.						
0-10	5607	\$2.65	6607	\$2.75	9607	\$2.80
0-25	5601	2.35	6601	2.45	9601	2.50
0-50	5602	2.35	6602	2.45	9602	2.50
0-100	5603	2.35	6603	2.45	9603	2.50
0-250	5604	2.35	6604	2.45	9604	2.50
0-500	5605	2.35	6605	2.45	9605	2.50

## DC VOLTMETERS

RANGE	MODEL 550*		MODEL 650*		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Volts						
0-1	5101	\$1.25	6101	\$1.35	9101	\$1.40
0-3	5102	1.30	6102	1.40	9102	1.45
3-0-3	5103	1.30	6103	1.40	9103	1.45
0-5	5104	1.30	6104	1.40	9104	1.45
0-6	5105	1.30	6105	1.40	9105	1.45
0-8	5106	1.30	6106	1.40	9106	1.45
0-10	5107	1.35	6107	1.45	9107	1.50
0-15	5108	1.40	6108	1.50	9108	1.55
0-20	5109	1.40	6109	1.50	9109	1.55
0-25	5109	1.30	6109	1.40	9109	1.45
0-50	5122	1.35	6122	1.45	9122	1.50
0-25H**	5110	2.40	6110	2.50	9110	2.55
0-50H**	5111	2.80	6111	2.90	9111	2.95
0-75	5112	1.40	6112	1.50	9112	1.55
0-100	5113	1.50	6113	1.60	9113	1.65
0-100H**	5114	3.00	6114	3.10	9114	3.15
0-150	5115	1.70	6115	1.80	9115	1.85
0-150H**	5116	3.00	6116	3.10	9116	3.15
0-300H**	5117	3.25	6117	3.35	9117	3.40
0-500H**	5118	3.75	6118	3.85	9118	3.90
0-750H**	5119	4.50	6119	4.60	9119	4.65
0-8-160	5120	2.25	6120	2.35	9120	2.40

\*For zero adjuster, add 30¢ to price and Z to stock number.

\*\*H denotes high resistance. No zero adjuster on Model 950.

## AC VOLTMETERS

RANGE	MODEL 550		MODEL 650		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Volts						
0-4	5401	\$2.35	6401	\$2.45	9401	\$2.50
0-6	5402	2.35	6402	2.45	9402	2.50
0-10	5403	2.35	6403	2.45	9403	2.50
0-15	5404	2.35	6404	2.45	9404	2.50
0-50	5405	3.00	6405	3.10	9405	3.15
0-150	5406	3.10	6406	3.20	9406	3.25
0-300	5407	3.70	6407	3.80	9407	3.85
0-600	5408	4.50	6408	4.60	9408	4.65
0-750	5409	5.10	6409	5.20	9409	5.25

## RESISTANCE METERS

RANGE	MODEL 550		MODEL 650		MODEL 950	
	Stock No.	Net Each	Stock No.	Net Each	Stock No.	Net Each
Ohms. Volts						
10,000 4.5*	6701	\$1.80	6701	\$1.90	9701	\$1.95

\* Requires 3 flashlight cells for resistance readings but does not require resistor for voltage readings.

## FLANGE ADAPTER RING

A sturdy flange ring for use with any Model 550 (round) Shurite meter where a flange mount is preferred. Makes appearance similar to Model 650. Wide flange, 2 1/2" dia. Telephone black finish. Screws, lockwashers and nuts included. Model 5-A, NET.....\$0.18

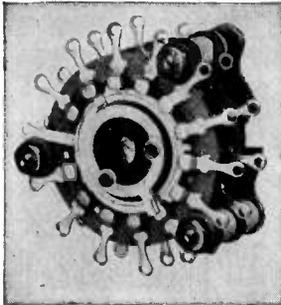
## POCKET TYPE METERS

A series of Shurite pocket meters using the Model 450 case is in production. Model 450 has nickel plated case, with two or three terminals, depending on ranges. Ranges suitable for pre-war and post-war batteries, portable radio batteries and many other electrical applications, including polarity indication types have been made, although they are not regularly stocked.

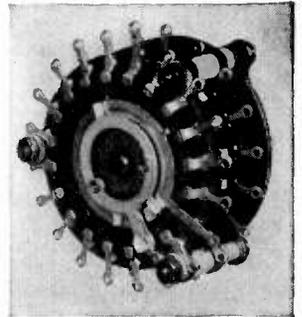
For ordering, use stock number regularly listed, changing the first digit to 4. For example, a 0-3 DC ammeter as illustrated becomes Stock No. 4202 as a pocket meter.

To arrive at price, add \$0.40 to catalog price of Model 550 meters sold at \$1.70 or less; add \$0.30 for meters sold at \$1.75 and above. For details, request Bulletin "Shurite Pocket Types."

## INSTRUMENT AND TESTER SWITCHES (LAMINATED) Rotary Selector — Single and Multi-Gang — Non-Shorting and Shorting\*



SS-14-2



SS-20-2

The switch that's IN LAST PLACE on the trouble-shooter's check list . . . AND PROUD OF IT!

J-B-T Instrument Type Rotary Selector Switches were designed and developed to meet the need for trouble-free, dependable performance in hard service. These superior switches are used extensively in high quality test equipment, portable instruments, inspection setups and experimental circuits. Available in two basic types—14 and 20 position—the design gives extra contacts in minimum space. One to six decks.

**FEATURES:**

**Reliability**—Rigid, 3-post deck suspension, instead of the usual 2; all parts heavily coin silver plated to meet 200 hour salt spray test; ball bearing action, beryllium-copper spring, and special design detent wheel assure positive indexing. Laminated plastic decks and rotors selected for maximum mechanical and dielectric strength.

**Exceptional Compactness**—14-position switch takes 13 circuits and "off" in 2" circle; 20-position switch handles 19 circuits and "off" in 2-23/32" circle. Additional decks require only 5/16" spacing per section.

**Low Contact Loss**—Double-grip collector arms, and large-area contacts, silver to silver, result in an average contact resistance of .007 ohms or less during the useful life of the switch.

**Ample Dielectric**—Normal make-and-break with resistance load, 25 Ma. at 300 volts AC or DC; normal carrying capacity (not

make-and-break), 1 amp.; maximum momentary capacity (not make-and-break), 5 amp.; maximum voltage between contacts and ground, 1000 volts R.M.S.; between decks and ground, 2000 volts R.M.S.

\*Standard items, but not regularly stocked, check with your distributor.

**BASIC 14-POSITION:** Knob supplied only on individually packed units—not on bulk orders unless specified. Collector arm placed directly opposite to flat of shaft, unless otherwise specified. Contact lugs and common lugs positioned as shown, 13 contacts per deck. One to six decks; for each additional deck (or gang) add 5/16" to depth. Continuous rotation type supplied unless otherwise specified. Adjustable Stop supplied when requested. Panel Locator available on special order. Special stabilizing end ring used on switches with three or more decks. Panel locator positioned as shown unless otherwise specified on bulk orders.

**BASIC 20-POSITION:** Knob supplied only on individually packed units—not on bulk orders unless specified. Collector arm placed directly opposite to flat on shaft, unless otherwise specified. Contact lugs and common lug positioned as shown, 19 contacts per deck, continuous rotation types. One to six decks; for each additional deck, add 5/16" to depth. Continuous rotation type supplied unless otherwise specified. Panel locator positioned as shown unless otherwise specified on bulk orders.

### LAMINATED SWITCHES, SS-14 TYPE

(14 positions: angular indexing 25° 43')

Model	Positions Per Circuit	Circuits Per Deck	Decks or Gangs	Shorting, Non-Shorting	Net Price, Individually Boxed, Including Knob
SS-14-1	14	1	1	N-S	\$1.35
SS-14-1A*	5†	2	1	N-S	1.40
SS-14-1S*	14	1	1	S	1.35
SS-14-1CS‡	14	1	1	CS	1.70
SS-14-2	14	1	2	N-S	1.65
SS-14-2A*	5†	2	2	N-S	1.75
SS-14-2S	14	1	2	S	1.65
SS-14-2CS‡	14	1	2	CS	2.30
SS-14-3	14	1	3	N-S	2.05
SS-14-3S*	14	1	3	S	2.05
SS-14-4	14	1	4	N-S	2.65
SS-14-6	14	1	6	N-S	3.85

\*Standard items, but not regularly stocked; check with your distributor.

†Denotes correction in former catalogs; 5 positions include 4 "live" and 1 "off".

‡Complete shorting — all contacts shorted except one in use.

### LAMINATED SWITCHES, SS-20 TYPE

(20-positions: angular indexing, 18°)

Model	Positions Per Circuit	Circuits Per Deck	Decks or Gangs	Shorting, Non-Shorting	Net Price, Individually Boxed, Including Knob
SS-20-1	20	1	1	N-S	\$1.75
SS-20-1A*	5§	2	1	N-S	1.80
SS-20-1S*	20	1	1	S	1.75
SS-20-2	20	1	2	N-S	2.20
SS-20-2S*	20	1	2	S	2.20
SS-20-3	20	1	3	N-S	2.95
SS-20-4	20	1	4	N-S	3.60
SS-20-6	20	1	6	N-S	5.10

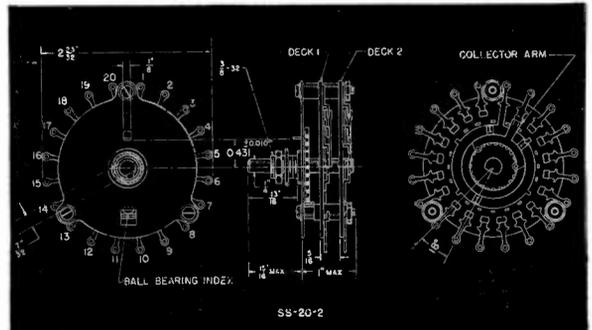
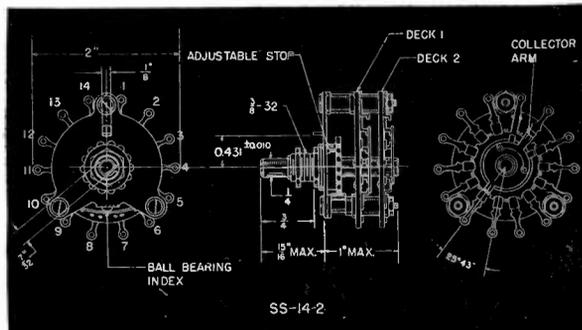
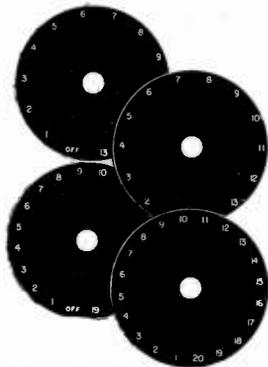
\*Standard items, but not regularly stocked; check with your distributor.

§Denotes correction in former catalogs; 6 positions include 5 "live" and 1 "off".

### ETCHED DIAL PLATES

SS-14 or MS-14 Series  
SS-20 or MS-20 Series

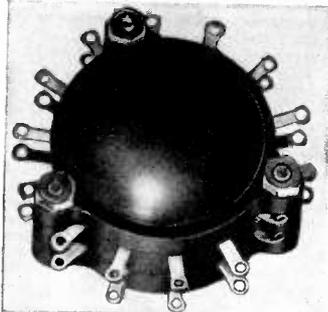
- EP-13  
off thru 13 .....\$0.19
- EP-14  
1 thru 14 .....\$0.19
- EP-19  
off thru 19 .....\$0.19
- EP-20  
1 thru 20 .....\$0.19



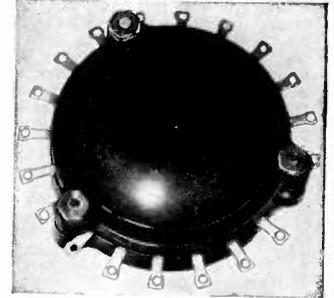
Special stabilizing end ring used in 14-position switches with three or more decks.

## BRAND NEW! MOLDED ROTARY SELECTOR SWITCHES

Fully Enclosed — Single and Multi-Gang — Shorting and Non-Shorting\*



MS-14-2



MS-20-1

- All moving contacts enclosed — eliminates dirt and corrosion.
- Contact lugs permanently integrated into switch assembly.
- Sturdy construction with 3-post deck suspension, double grip collector arms, and rectangular drive shaft through decks for precision indexing.
- Interchangeable, electrically and mechanically, with J-B-T 14- and 20-position laminated switches, widely used by industry and Armed Services.

### FEATURES:

For description of rigid 3-post construction; heavy coin silver plating to meet 200-hour salt-spray test; excep-

tional compactness; .007 ohm average contact resistance; current-carrying capacity and voltage breakdown, see adjoining page on SS-14 and SS-20 laminated switches. Besides fully enclosing all the moving contact parts, the molded switches differ from the laminated construction in the design of the detent mechanism, but both types provide the positive indexing which quickly identifies the superior quality of J-B-T switches.

**BASIC 14-POSITION MOLDED (MS-14):** 13 circuits and "off" per deck in 2" circle for compactness. Molded end cover regularly supplied on MS-14 series. Knob included with individually boxed units — not on bulk orders unless specified. Collector arm placed directly opposite to flat of shaft, so that knob pointer points to live contact. Common or "off" contact lug is bent down for ready identification. Internal construction: double-grip collector arms hold contact lug on upper and lower surfaces; collector ring is self-wiping. One to six decks add  $\frac{1}{16}$ " per deck (or gang) to depth; for special orders beyond six decks indexing mechanisms at top and bottom of switch are recommended, adding 1" extra to overall depth. Continuous rotation type supplied unless adjustable stop (type MAS) is ordered or, on quantity orders, pre-set fixed stops are specified. Panel locator is available on quantity orders when specified; on MS-14-4 and MS-14-6, extra hex nut and longer screw are supplied for inverting supporting screw nearest common, thus converting into panel locator.

**BASIC 20-POSITION MOLDED (MS-20):** 19 circuits and "off" per deck in 2" circle for compactness. Molded end cover regularly supplied. Knob included with individually boxed units — not on bulk orders unless specified. Collector arm placed directly opposite to flat of shaft, so that knob pointer points to live contact. Common or "off" contact lug is bent down for ready identification. Internal construction: double-grip collector arms and self-wiping collector ring are standard construction. One to six decks; add  $\frac{1}{16}$ " per deck (or gang) to depth. Continuous rotation type supplied; on quantity orders, pre-set fixed stops are available. Panel locator available on quantity orders when specified; on MS-20-4 and MS-20-6, extra hex nut and longer screw are supplied for inverting supporting screw nearest common, thus converting into panel locator.

### MOLDED SWITCHES, MS-14 TYPE

(14 positions; angular indexing 25° 43')  
Continuous rotation, no stops

Model	Positions Per Circuit	Circuits Per Deck	Decks or Gangs	Shorting, Non-Shorting	Net Price, Individually Boxed Including Knob
MS-14-1	14	1	1	N-S	\$1.35
MS-14-1S*	14	1	1	S	1.35
MS-14-2	14	1	2	N-S	1.65
MS-14-2S*	14	1	2	S	1.65
MS-14-3	14	1	3	N-S	2.05
MS-14-4	14	1	4	N-S	2.65
MS-14-6	14	1	6	N-S	3.85

\*Standard items not regularly stocked; check with your distributor.

### MOLDED SWITCHES, MS-20 TYPE

(20 positions; angular indexing 18°)

Continuous rotation, no stops

Model	Positions Per Circuit	Circuits Per Deck	Decks or Gangs	Shorting, Non-Shorting	Net Price, Individually Boxed Including Knob
MS-20-1	20	1	1	N-S	\$1.75
MS-20-1S*	20	1	1	S	1.75
MS-20-2	20	1	2	N-S	2.20
MS-20-2S*	20	1	2	S	2.20
MS-20-3	20	1	3	N-S	2.95
MS-20-4	20	1	4	N-S	3.60
MS-20-6	20	1	6	N-S	5.10

\*Standard items not regularly stocked; check with your distributor.

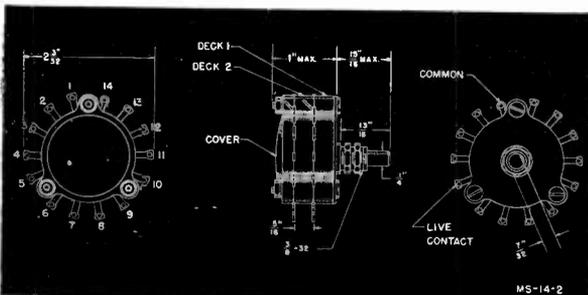
### ADJUSTABLE STOP MOLDED SWITCHES, MAS-14 TYPE

(14 positions; angular indexing 25° 43')

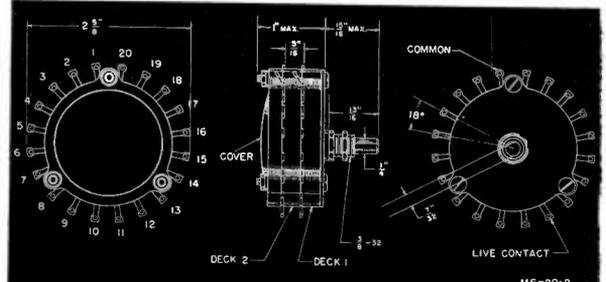
IMPORTANT: Enclosed adjustable stop mechanism located on panel side of switch will increase over-all switch length  $\frac{3}{16}$ ".

Model	Positions Per Circuit	Circuits Per Deck	Decks or Gangs	Shorting, Non-Shorting	Net Price, Individually Boxed Including Knob
MAS-14-1	14	1	1	N-S	on application
MAS-14-1S*	14	1	1	S	on application
MAS-14-2	14	1	2	N-S	on application
MAS-14-2S*	14	1	2	S	on application
MAS-14-3	14	1	3	N-S	on application
MAS-14-4	14	1	4	N-S	on application
MAS-14-6	14	1	6	N-S	on application

\*Standard items not regularly stocked; check with your distributor.



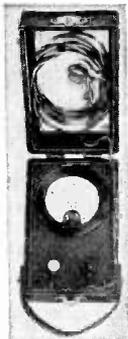
MS-14-2



MS-20-2

## APPLIANCE TEMPERATURE TESTERS

**A NEW IDEA IN TESTERS** — The need for scientific but sturdy portable test equipment in the appliance service field is met by this exclusive line. Here the user profits from J-B-T's wide experience in building field test sets for many well-known manufacturers of ranges, irons, refrigerators, deep freeze units, and similar equipment. All J-B-T testers include the principle of remote reading of temperature,—and temperature measures the real usefulness of the appliance.



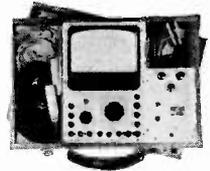
**MODEL 32-JP-4.** Checks oven temperature of gas and electric ranges and other appliances. Ideal for testing and setting thermostats. Has binding posts for quick attachment of thermocouples listed below to check irons, toasters, waffle-bakers, roasters, clothes dryers, etc. Exceptionally fast, continuous response; automatically compensates for ambient temperature. For full details see Bulletin JP-104. Range 0—650° F; black leatherette case 6" x 3 3/8" x 3 3/4". Complete with SA-116 5 1/2' calibrated thermocouple, clip for attaching to grill, and convection shield for steady readings.....\$23.75

**MODEL 32-JP-3.** A very popular oven tester with all the features of Model 32-JP-4 except that no carrying strap is included, and the thermocouple supplied is attached permanently instead of to binding posts. This model is extensively used for service work, sales demonstrations and inspection. Range 0-650° Fahrenheit; 10° divisions readable to 2 1/2'; automatically compensated for ambient temperature. For more details, see Bulletin JP-103. Complete with attached SA-116 5 1/2' calibrated thermocouple, clip and shield.....\$22.75



### ALL-PURPOSE TESTER

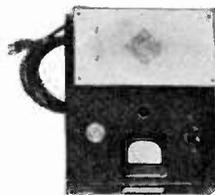
**MODEL 61-JRT.** This 9-in-1 tester is the very latest for accurate temperature adjustment and precise electrical circuit analysis. For ranges, refrigerators and many other appliances. Rapidly reads four cold zones, —100° to +80°F, up to 14' distant; two heat zones, 0—600°F, up to 5 1/2' distant; one voltage range, 0—300 A.C.; and, with transformer, two current ranges, 0—30 and 0—60 amps., A.C. Sturdy, polished walnut case 15 1/2" x 10 3/8" x 4 3/4" with handle and slip hinges. Two-color etched metal panel. Separate switches protect bulb and ammeter circuits. Requires one standard flash-light cell, replaceable in the field. Temperature scale accuracy ±2% of full scale. A.C. readings ±5% (±3% for rectifier). Space for four SA-162 Resistance Bulbs with 14' polyethylene lead, two SA-116 thermocouples with clip and shield, one pair of 4' electrical leads with prods and plugs, 6' jumper leads, and enclosed transformer. Other accessories, listed below, may be added for testing irons, grills, roasters, toasters, etc. As described, except including two SA-162 resistance bulbs, two SA-116 thermocouples, necessary electrical leads, and AS-TR-2 built-in transformer.....\$97.50



For more details, see Bulletin JRT-349.

**MODEL 61-JRT (LESS TRANSFORMER).** Same unit, same scales, except does not read in amperes; AS-TR-2 transformer assembly omitted.....\$85.00

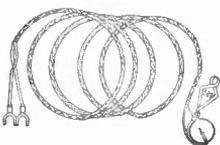
### IRON TESTER



**MODEL 32-JIT.** Self-contained bench type tester; checks all makes of irons; measures thermostat temperatures; and shows open or short circuits. Automatically compensated for room temperature. Also indicates operating temperature of the sole plate (working surface) on non-electric or cordless irons. Black metal case; overall size 10" x 12" x 5 1/2"; scale 0—650° F, 15 amp. fuse, 6' cord, 110-volt, 50-60 cycles.....\$28.75

## ATTACHMENTS AND SPARE PARTS

### THERMOCOUPLES

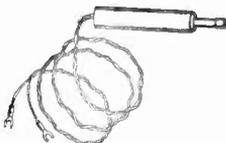


**SA-116 with SHIELD and CLIP.** Flexible No. 22 gauge iron constantan, asbestos insulated, 5 1/2', with attachment clip and convection shield; for use with Models 32-JP-1, 32-JP-2, 32-JP-3 and 32-JP-4 oven testers; also 60-JRT and 61-JRT all-purpose testers. ....\$1.65

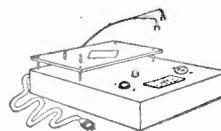
**SA-175 (PLAIN TIP).** For roasters, waffle irons, etc., 5 1/2' iron constantan flexible No. 22 gauge, asbestos insulated, with small ball tip; used where clip and shield of SA-116 not suitable; for Models 32-JP-2, 32-JP-4, 60-JRT, and 61-JRT.....\$1.30

**SA-176 (for TOASTERS, etc.)** 5 1/2' iron constantan No. 22 gauge, asbestos insulated, with special disc to collect heat; easily attached to 32-JP-2 and 32-JP-4 oven testers, also 60-JRT and 61-JRT. ....\$2.25

**SA-300 (FOR SURFACE READINGS).** Spring-type iron constantan in Transite tip with handle and 5' No. 22 gauge lead for extremely rapid heat readings; for attachment to 32-JP-3, 32-JP-4, 60-JRT and 61-JRT appliance testers .....\$5.00



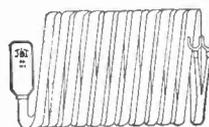
**SA-301 (REPLACEMENT TIP FOR SA-300).** Transite tip and thermal element only .....\$2.50



**IRON TESTER THERMOCOUPLE, MODEL IT-1.** This attachment is identical with the 32-JIT, except there is no meter. It is easily connected to Models 32-JP-2, 32-JP-4, 60-JRT and 61-JRT. Shows open circuits and shorts, checks sole plate temperatures and thermostats on all types of irons. ....\$14.75

**SA-170 (REPLACEMENT THERMOCOUPLE for IRON TESTERS 32-JIT and IT-1).** Thermocouple and lead, including aluminum plate and special tip, quickly installed in the field.....\$1.90

### RESISTANCE BULBS (FOR COLD TESTING)



**SA-142.** For use only with Model 60-JRT; calibration is not interchangeable with SA-162; has no embossed number.....\$5.00

**SA-162.** For use only with Models 50-50 and 61-JRT; identified by embossed part number.....\$5.00

**CL-90 CLAMP.** Metal clamp for holding SA-142 and SA-162 resistance bulbs in contact with surfaces up to 1/4".....\$0.25

### TRANSFORMERS

**AS-TR-2.** Attachment for compartment of 61-JRT all-purpose tester, completely housed, with jumper lead and panel; reads 30 and 60 AC amp. scales on tester.....\$15.00

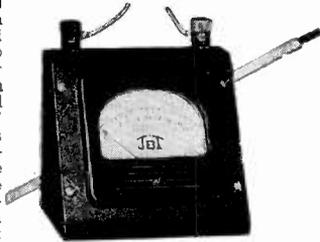
**AS-TR-3.** Attachment for increasing usefulness of 60-JRT all-purpose tester. Includes side rails for attaching inside compartment; fully housed. Reads 30 and 60 AC amp. by dividing volt scale by 10 or 5.....\$16.50

## TEMPERATURE INDICATORS

**WHERE TO USE:** To check heat rise of motors, transformers and coils; for laboratory furnaces, inspection set-ups, for remote indication of infra-red and other oven temperatures; and to maintain controlled industrial processes such as heat treating and annealing. When used with selector switch, permits centralized reading of one to ten thermocouples, as in Diesel exhaust manifold applications.

### MODEL 32-J

**MODEL 32-J PYROMETER IN SN-3 STAND.** Mounted in sloping front black metal stand, 4 1/4" high x 4 3/8" deep x 4 1/8" wide. Compensated for ambient temperature. Medium resistance system, damped for quick reading on 2 3/8" scale, assures ruggedness and pointer stability. To retain the accuracy of the installation: use only the type and resistance of thermocouple and lead which are provided; do not cut extra lead—coil it—change in length changes calibration. A protection tube is not generally required. Many users find it convenient to keep an extra couple and lead on hand.



### MODEL 32-J IN SN-3 STAND

0°—650° F—350° C, includes SA-91 thermocouple, SA-84 lead, and CB-1 connector block..... \$27.50  
 0°—1200° F—650° C, includes SA-87, SA-82, and CB-1..... 27.50  
 0°—2000° F—1100° C, includes SA-87, SA-82, and CB-1..... 27.50

**MODEL 32-J IN SN-5 STAND** (not illustrated). With 3 binding posts to accommodate flexible extra lead and thermocouple for hard-to-reach locations.

0°—650° F with SA-91 thermocouple, SA-84 lead, CB-1 connector block, and SA-86 flexible lead and thermocouple..... \$31.00

## TEMPERATURE

**LEAD WIRES.** To bring the reference junction within the pyrometer, compensating or extension lead wires should always be used. See the instrument dial for (1) the kind of lead and (2) combined resistance of lead and thermocouple. Standard leads include:

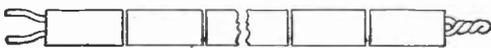
**SA-82** 6' compensating lead for chromel-alumel couples; duplex, stranded; asbestos-insulated, cotton-braid impregnated with moisture-proof and flame-proof compound; terminals at instrument end; other end tinned for connector block ..... \$1.40

**SA-83** 26' compensating lead for chromel-alumel as above \$4.40

**SA-84** 6' extension lead for iron-constantan, 1938 calibration; duplex; moisture-proof and flame-proof; prepared as above \$1.40

**SA-85** 26' extension lead for iron-constantan, 1938 calibration; similar to above ..... \$4.40

**SA-86** 7' iron-constantan thermocouple and lead combined; twisted pair No. 20 Ga., asbestos-insulated—for intermittent use on 600° F scales; terminals at instrument end; other end welded; (resistance is not interchangeable with SA-84 nor with SA-85) ..... \$1.70



**THERMOCOUPLES.** For pyrometers and leads above, J-B-T thermocouples are carefully selected, standardized, and tested.

**SA-87** 12" No. 14 Ga. chromel-alumel, 2-hole ceramic beads, fits 5/16" hole; welded tip ..... \$2.80

**SA-88** same except 24" No. 14 Ga. .... \$3.50

**SA-89** 12" No. 8 Ga. chromel-alumel, 2-hole ceramic beads, fits 7/16" hole; welded tip ..... \$2.80

**SA-90** same except 24" No. 8 Ga. .... \$3.50

**SA-91** 12" No. 14 Ga. iron-constantan, 1938 calibration; 2-hole ceramic beads, fits 5/16" hole; welded tip ..... \$2.35  
**Flexible Thermocouple,** 7' length, see SA-86 lead wire.

### MODEL 60-JPS

**MODEL 60-JPS.** This portable makes it easy to know temperatures at one to ten locations. Excellent for study of heat in various parts of the same equipment, or in a battery of units. Knife-edge pointer, 5.6" scale. Heavy-duty thermocouple switch has average contact resistance of .00075 ohms or less. Automatically compensated for ambient temperature, indoors or outdoors. To retain accuracy of 1% full scale, use leads and thermocouples equal to resistance and e.m.f. vs. temperature characteristics for which instrument is calibrated. Medium resistance system assures portability. Housed in natural-finish wood case 1 3/8" x 8 5/8" x 4 5/8" over rubber feet. A "must" for inspection, maintenance, and engineering.



**60-JPS**—0°—600° F with SA-86, 7' thermocouple and lead for small apertures..... \$92.60  
**60-JPS**—0°—1200° F with SA-88, SA-82, and CB-1..... 95.00  
**60-JPS**—0°—2000° F with SA-88, SA-82, and CB-1..... 95.00  
**60-JP**—For one thermocouple only; furnished with thermocouple and lead same as 60-JPS, but without selector switch.  
 0°—600° F, with SA-86..... \$67.60  
**60-JP**—0°—1200° F, with SA-88, SA-82, and CB-1..... 70.00  
**60-JP**—0°—2000° F, with SA-88, SA-82, and CB-1..... 70.00

**Note:** When ordering additional thermocouples, specify couples and leads as above. Centigrade equivalent scales available on order.

### Model 70-J

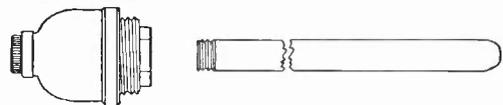
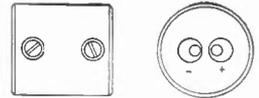
**MODEL 70-J PYROMETER,** for accurate reading at a distance, has full 6" scale and spade pointer, with accuracy of 1% of total scale deflection. Automatically compensated for ambient temperature. Molded case mounted in metal protecting shell 7 3/8" x 8 1/8" x 1 1/2". Connections through bottom of case for wall or front-of-board mounting. When ordering, specify which standard scale range: 0°—600° F for 1938 std. I-C; 0°—1200° F for C-A; 0°—2000° F for C-A thermocouples.



**PRICE,** including 24" thermocouple and 26' lead..... \$60.00  
**Note:** Centigrade equivalent scales available on order.

## ACCESSORIES

**CONNECTOR BLOCK Model CB-1.** Lava connector block, withstands high temperatures, accommodates all thermocouples up to No. 6 Ga. Heavy brass connectors keep contact resistance low. Can be used independent of connector head. .... \$1.50



**CONNECTOR HEAD Model CH-6.** Connector head encloses connector block and rigidly supports protection tube around thermocouple. Opens for thermocouple inspection without disconnecting circuit. Normally supplied with reducing bushing for 1/2" i.p.s. Composition bushing at top can be removed for permanent 1/2" conduit installation. Including block..... \$2.50

**PROTECTION TUBES** protect and support "base-metal" thermocouples such as above. Used in permanent installations at higher temperatures, or in damaging atmospheres. One end is closed, other end normally threaded for 1/2" i.p.s. Proper quality of tubing is very important.

**No. 1 Wrought Iron**—For temperatures to 1200° F in oil baths, brazing, and general intermittent duty.

**TU-11** No. 1—12 inches \$1.50      **TU-12** No. 1—24 inches \$2.00

**No. 7 Alloy**—27% chromium, iron; seamless drawn tube; for cyanide pots, salt baths with cyanide, open fire with sulphurous content; to 2300° F.

**TU-5** No. 7—12 inches \$6.25      **TU-6** No. 7—24 inches \$9.85

**No. 9 Alloy**—62% nickel, 13% chromium; seamless drawn; for salt baths without cyanide; for gas and oil open fire furnaces and general use, except sulphurous atmospheres; to 2300° F.

**TU-2** No. 9—12 inches \$4.75      **TU-3** No. 9—24 inches \$8.25

**Note:** For temperatures above 2300° F; platinum, platinum-rhodium thermocouples are available.

## VIBRATING REED FREQUENCY METERS (PATENTED)

J-B-T Vibrating Reed Frequency Meters are used extensively in radio, telephone, and television service, on engine generator sets, in laboratories, in many types of electronic equipment, on panel and control boards in central stations and industrial plants—wherever constant or known frequency is important to efficient operation of equipment.

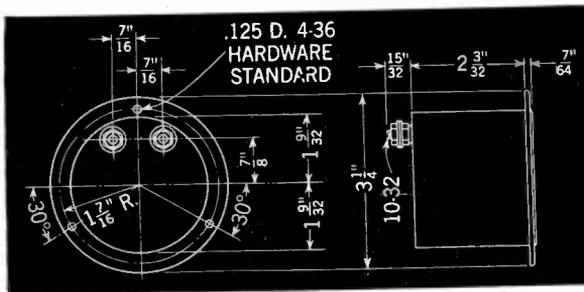
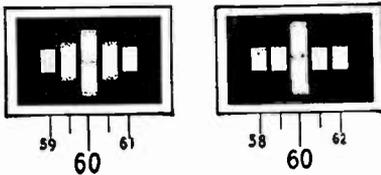
### PRINCIPLE OF OPERATION:

Simple in design, the J-B-T Meter consists of a case, base, dial and central mounting frame, with a series of spring steel reeds screwed to a reed mounting bar, individual driving coil surrounding each bank of reeds, permanent magnet, series resistor and terminal studs.

Each reed is adjusted to respond by resonance to but one frequency. As the alternating current (or interrupted direct current) excites the driving coil, the one reed "in tune" with the frequency in the coils will respond by vibrating rapidly because of permanent magnet polarization and induced magnetism from the coil. The instrument is adapted to specified operating voltage by a series resistor. Frequency of the current is read on the graduated face of the instrument.

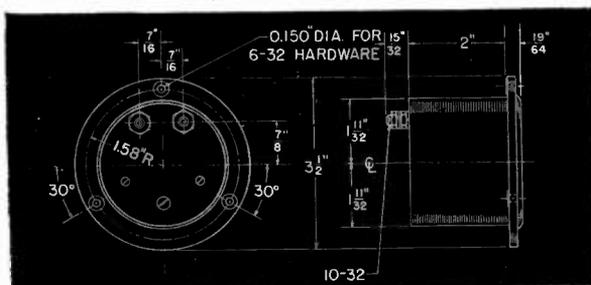
### ADVANTAGES:

Some standard models are available in either half cycle or full cycle steps, as shown below on two meters indicating a frequency of 60 cycles.



Above: Models 30-F, 31-F, 33-F, 34-F; Metal Case

Below: Models 30-FX, 31-FX, 33-FX, and 34-FX; Molded Case Meets Mounting Dimensions of JAN-1-6 and AWS



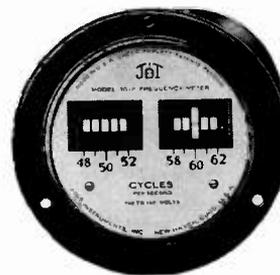
Both response patterns are extremely easy to read. In the half-cycle instrument the response is broad; in the full-cycle instrument the response is sharp.

Guaranteed accuracy of  $\pm 0.3\%$  or better of the frequency being measured, depending on the model. High fatigue safety factor for continuous operation, and outstanding temperature stability. Temperature compensators are not required.

All meters are permanently calibrated at the factory and do not require subsequent adjustment. Accuracy is not affected by wave form or external magnetic fields. Built with no pivoted parts and with lock washers at every critical point, these rugged meters can take rougher treatment than many instruments.

### CAUTION:

If a meter plugged in on a 60 cycle AC power line does not indicate a frequency of exactly 60 cycles, trust the meter! Power supply may momentarily be off-frequency due to changing load conditions beyond the control of Utility. All J-B-T Vibrating Reed Frequency Meters are accurately calibrated at the factory, entirely independent of frequency of power supply.



MODEL 30-F

### MODEL 30-F

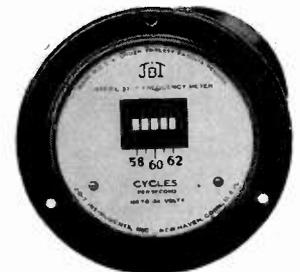
**Range:** 48-52 and 58-62 cycles. Double window for ease of reading frequency in either range. Often specified for export. 100-130 volts; 130 ohms per volt; 1 watt power consumption. Accuracy  $\pm 0.3\%$ . Flush panel mounting. For details, Bulletin VF-43.

30-F, 48-52 and 58-62 cy., 3/4" Metal Case ..... \$25.00  
30-FX, 48-52 and 58-62 cy., 3/2" Molded Case, AWS mtg. .... \$25.00

### MODEL 31-F

Used in standby power equipment. Handy for accurately measuring frequency of power source. Five reeds, 58-62 cycles. Other characteristics same as Model 30-F. For details, Bulletin VF-43).

31-F, 58-62 cy., 3/4" Metal Case ..... \$21.50  
31-FX, 58-62 cy., 3/2" Molded Case, AWS mtg. .... \$21.50



MODEL 31-F

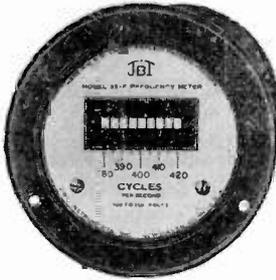
### MODEL 34-FX

Used where a broader frequency band is desirable. Nine reeds, 56-64 cycles, or in half-cycle steps (accuracy  $\pm 0.2\%$ ) 58-62 cycles. 100-130 volts; 130 ohms per volt; 1 watt power consumption. Flush panel mounting. For details, Bulletin VF-43.

34-F, 56-64 cy., 3/4" Metal Case ..... \$24.75  
34-FX, 56-64 cy., 3/2" Molded Case ..... \$24.75  
34-F, 58-62 cy., 3/4" Metal Case ..... \$26.25  
34-FX, 58-62 cy., 3/2" Molded Case, AWS mtg. .... \$26.25



MODEL 34-FX



### MODEL 33-F

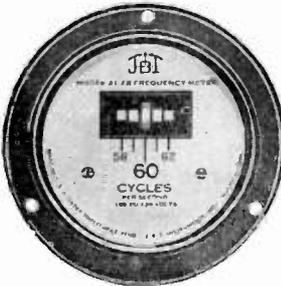
400-cycle. Used for measuring frequency of high-cycle power sources, including new heavy aircraft. Accuracy  $\pm 0.3\%$ . Nine reeds, 380 to 420-cycle range. 100-130 volts; 70 ohms per volt; 1.75 watts power consumption. Flush panel mounting. For details, see Bulletin VF-43-1A.

33-F, 380-420 cy., 3 1/4" Metal Case ..... \$31.00  
 33-FX, 380-420 cy., 3 1/2" Molded Case, AWS mtg. .... \$31.00

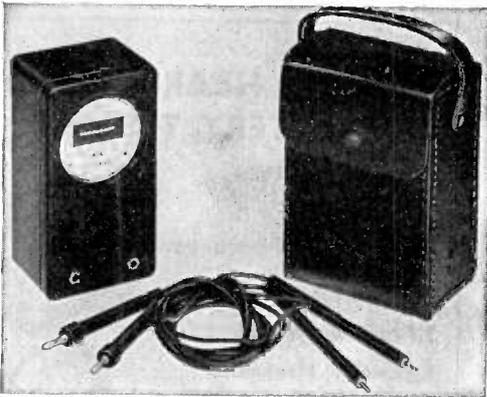
### MODEL 21-FX

Smallest frequency meter manufactured. Meets ASA (AWS) C39.2-1944 in depth of case as well as in mounting dimensions and mounting hardware. Matches other 2 1/2" panel instruments. Weighs only 4 1/2 oz. 100-130 volts; 5 reeds; 58-62 cycles; 190 ohms per volt; 0.6 watt power consumption. Also 116 to 124 cy.; 160 ohms per volt; 0.7 watt power consumption. 390 to 410 cy.; 85 ohms per volt; 1.3 watts power consumption. Flush panel mounting. For details, see Bulletin VF-43-1B.

21-FX, 58-62 cy., 2-11/16" Molded Case ..... \$20.50  
 21-FX, 116-124 cy., 2-11/16" Molded Case, AWS mtg. ... \$23.00  
 21-FX, 390-410 cy., 2-11/16" Molded Case ..... \$25.00



## PORTABLE FREQUENCY TESTERS



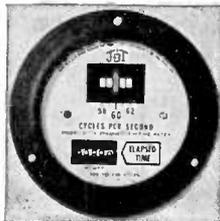
**MODEL 33-FP-9L.** Handy, compact, portable instrument of exceptional accuracy even under poor wave-form conditions, fluctuating voltage or external magnetic disturbances. Meets exacting test requirements of aviation, signal and communication equipment. Housed in sturdy molded case 5 7/8" x 3 1/2" x 2 5/8" with leather carrying case 6 3/8" x 4 1/4" x 2 3/4". 4' leads are supplied complete with sharp 5" insulated test picks and banana plugs. Electrical characteristics identical with 400 cycle 33-F. Model 34-FP-9L electrical characteristics identical with 60-cycle 34-FX.

33-FP-9L, 380-420 cy. (Supersedes Model 33-FP-9) ..... \$43.25  
 34-FP-9L, 56-64 cy. (Supersedes Model 34-FP-9) ..... 37.00

## ELAPSED TIME-FREQUENCY METER

**MODEL 31-FE.** A unique panel instrument which combines the elapsed time meter or running time meter with frequency reeds. It is especially useful on motor generator sets and on electrical equipment where maintenance routine calls for periodic servicing. Reads 9,999.9 hours; 58-62 cycles at 110-130 volts. Self-starting.

31-FE ..... \$30.00



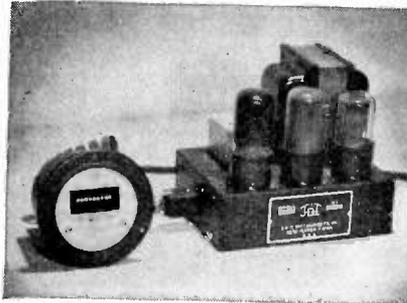
## VACUUM TUBE FREQUENCY METERS

(PATENTS PENDING)

**PRINCIPLES OF OPERATION:** J-B-T Models 33-VTF and 39-VTF Vacuum Tube Frequency Meters provide the maximum degree of accuracy in measuring frequencies located within definite bands. A multi-vibrator circuit in the electronic unit divides the incoming frequency by two, three or higher integers, then measures resultant frequency on a reed instrument.

**WHERE USED:** These models are especially useful for checking audio-oscillators, frequency converters, radar equipment, and for standardizing less accurate frequency measuring units.

**ADVANTAGES:** **Extreme Accuracy:** Within  $\pm 0.25\%$  for any indicated frequency. **Permanent Accuracy:** Calibrated at factory — no subsequent calibration or standardization required. **Temperature Drift Eliminated:** No initial stabilization period required. **Burn-Out Proof:** No protection needed against accidental frequencies above the range being measured. **Few Controls:** No complicated operation. **Stability of Circuit:** Accuracy of reading is independent of line voltage variation. No voltage regulator, external or internal, is required.



Model 33-VTF with cover removed. Vacuum tube unit attaches to rear of panel, meter is flush.

### MODEL 33-VTF, FIELD TYPE

Frequency ranges: 380-420 cycles; 760-840 cycles; 1140-1260 cycles; available singly or in combination. (See Model 33-F for single range 380-420 cycle meters). Voltage range: 100-130 volts. Power to operate the units is obtained from an

inverter or other source of frequency being measured. Power consumption: approximately 20 watts. This model requires no power supply other than the source whose frequency is being checked. Input impedance: approximately 650 ohms. Tubes used: 1-6N7-GT/G multi-vibrator; 1-6V6-GT/G amplifier; 1-6X5-GT/G rectifier. Size 4 5/8" x 5 1/2" x 6"; weight: approximately 6 lb. Black wrinkle finish. Frequency meter is 3 1/2" standard flush panel mounting. Connecting leads included.

### MODEL 33-VTF

Single range 760-840 cy. .... \$110.00  
 Single range 1140-1260 cy. .... 117.50  
 Double range 760-840; 1140-1260 cy. .... 125.00

## MODEL 39-VTF, LABORATORY TYPE

Frequency ranges: Basic range, 380-420 cycles. Multiplier switch permits use in ranges of 2, 3, 4, 6 and 9 times the fundamental range. (400, 800, 1200, 1600, 2400 and 3600 cycle bands). Voltage range: 100-350 volts. Power consumption: Approximately 25 watts at 115 volts. 60 cycles. Input sensitivity: 500,000 ohms. Size: housed in metal cabinet 8" x 10" x 8" with sloping panel.

Model 39-VTF, Series A— \$257.00



Model 39-VTF, Series A, showing portability

## ELAPSED TIME METER

**MODEL 31-EX.** To record operating time of 60 cycles, 115 volts, A.C. electrical and electronic equipment, this instrument registers in 1/10 hour steps to 9,999.9 hours, then automatically re-sets. Molded 3 1/2" case matches "X" frequency meters, fully encloses all parts. Popular for tube-life, maintenance schedules, machine time, etc.

31-EX ..... \$14.50





TYPE NF-2C

# EMICO PRECISION INSTRUMENTS

FOR  
PANELS AND TEST SETS

Electro Mechanical Instrument Co.  
813 Chestnut Street, Perkasio, Pa.



TYPE RF-2C

EMICO panel and test meters are rugged and reliable instruments. Cases are of steel and finished in durable black. DC meters have the new HI-TORQ magnetic movements and are accurate to well within 5%. AC meters are of the moving iron type and are also accurate to within 5%.

MOUNTING—All model NF-2C and RF-2C meters will fit into a  $2\frac{1}{8}$ " diameter hole and are mounted by means of a U. clamp.

DESIGN—EMICO meters are designed to give satisfactory service under the most severe conditions. They are styled to add to the prestige and appearance of electrical equipment.

PRICES—Prices listed are net and include all hardware and individual boxing.

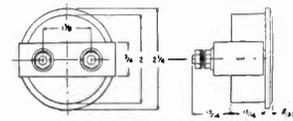
CALIBRATION—Since the instruments are calibrated in steel cases, their accuracy is not affected by panels made of magnetic materials of nominal thickness.

GUARANTEED—All EMICO instruments are guaranteed against defective material and workmanship for a period of one year after date of purchase, and will be repaired or replaced if sent to the factory postpaid with a 50c handling charge.

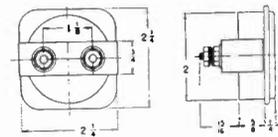
EMICO instruments are available in quantities to jobbers or manufacturers in the following sizes: NF-2", RF-2", RF-2 $\frac{1}{2}$ ", and RF-1 $\frac{1}{2}$ " at 3% accuracy. We invite your inquiries on instruments for special application.

## DEALERS' PRICE LIST

DC AMMETERS		MODEL NF-2C		MODEL RF-2C	
Range	Catalog Number	Dealers' Net Price	Catalog Number	Dealers' Net Price	
0-1	2101	1.30	2201	1.40	
0-5	2102	1.30	2202	1.40	
0-10	2103	1.30	2203	1.40	
0-20	2104	1.30	2204	1.40	
0-30	2105	1.30	2205	1.40	
1-0-1	2109	1.30	2209	1.40	
3-0-3	2110	1.30	2210	1.40	
6-0-6	2111	1.30	2211	1.40	
10-0-10	2112	1.30	2212	1.40	
15-0-15	2113	1.30	2213	1.40	
20-0-20	2114	1.30	2214	1.40	
30-0-30	2115	1.30	2215	1.40	
<b>DC MILLIAMMETERS</b>					
0-3	2121	\$1.90	2221	\$2.00	
0-5	2125	1.85	2225	1.95	
0-10	2126	1.75	2226	1.85	
0-20	2127	1.30	2227	1.40	
0-30	2128	1.30	2228	1.40	
0-50	2129	1.30	2229	1.40	
0-100	2130	1.30	2230	1.40	
0-150	2130-A	1.30	2230-A	1.40	
0-200	2130-B	1.30	2230-B	1.40	
0-300	2131	1.30	2231	1.40	
0-500	2132	1.30	2232	1.40	
<b>DC VOLTMETERS (LOW RESISTANCE)</b>					
0-1	2134	\$1.30	2234	\$1.40	
0-3	2135	1.30	2235	1.40	
0-3-0-3	2136	1.30	2236	1.40	
0-5	2136-A	1.30	2236-A	1.40	
0-8	2136-B	1.30	2236-B	1.40	
0-10	2137	1.30	2237	1.40	
0-50	2138	1.40	2238	1.50	
<b>DC VOLTMETERS (HIGH RESISTANCE)</b>					
(100 ohms/volt except 150 and 300 volt ranges are 200 ohms per volt)					
0-10	2140	\$2.00	2240	\$2.10	
0-30	2141	2.25	2241	2.35	
0-50	2142	2.60	2242	2.70	
0-150	2143	2.70	2243	2.80	
0-300	2144	2.70	2244	2.80	
<b>AC AMMETERS</b>					
0-1	6101	\$2.25	6201	\$2.35	
0-3	6102	2.25	6202	2.35	
0-5	6103	2.25	6203	2.35	
0-10	6104	2.25	6204	2.35	
0-25	6105	2.50	6205	2.60	
0-50	6106	2.75	6206	2.85	
<b>AC MILLIAMMETERS</b>					
0-25	6125	\$2.25	6225	\$2.35	
0-50	6126	2.25	6226	2.35	
0-100	6127	2.25	6227	2.35	
0-250	6128	2.25	6228	2.35	
0-500	6129	2.25	6229	2.35	
<b>AC VOLTMETERS</b>					
0-5	6135	\$2.25	6235	\$2.35	
0-10	6136	2.25	6236	2.35	
0-15	6137	2.25	6237	2.35	
0-25	6137-A	2.25	6237-A	2.35	
0-50	6138	2.25	6238	2.35	
0-150	6139	3.30	6239	3.40	
0-300	6140	3.90	6240	3.95	



TYPE NF-2C



TYPE RF-2C

## EMICO HEARING AID BATTERY TESTER

MODEL 103A

Note These Features:

- Unbreakable Metal Case
- Beautifully Finished Case
- Powerful Mechanism
- Color-Fast Metal Dial
- Easily Read Dial
- Reliably Accurate
- Will Not Drain Batteries



Designed to Test  
All Types of  
2 Volt "A" Batteries  
and 2 $\frac{1}{2}$ , 30 and 45 Volt "B" Batteries

Available also in  
0-9 and 0-90 Volt Range —  
Specify Model 103B

Write to Factory for Prices

# DUMONT

## Cathode-Ray TUBES ★ OSCILLOGRAPHS ★ EQUIPMENT



### DU MONT TYPE 164-E 3" CATHODE-RAY OSCILLOGRAPH

★ A compact, portable instrument especially suitable for laboratory, shop, or field work. The 3" cathode-ray tube operates at an accelerating potential of 1,100 volts, thus providing brilliant, well-defined traces. Both amplifiers have uniform frequency response over their operating range: the single-stage vertical

amplifier has a voltage gain of approximately 43; the horizontal amplifier, which serves to amplify either sweep or externally applied signals, has a voltage gain of approximately 55. For added convenience, deflection signals may be applied directly to the cathode-ray tube without removing the cabinet.



### DU MONT TYPE 208-B 5" CATHODE-RAY OSCILLOGRAPH



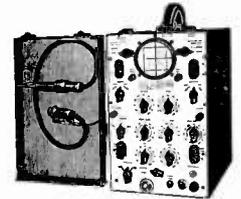
★ A moderately priced 5" instrument embodying many recent improvements that facilitate its application to the great majority of laboratory and production requirements. The Type 208-B is furnished with a 5" intensifier-type, high vacuum tube which operates at an accelerating potential of 1,400 volts, thus insuring trace brilliance. Freedom from

origin distortion, sharp focus at all deflecting frequencies, and a high deflection sensitivity that permits the viewing of moderately low-potential signals without the use of amplifiers, are additional features. The wide-band amplifiers provide symmetric deflection, and are direct-coupled to eliminate "electrical backlash" in the position-control circuits.

### DU MONT TYPE 224-A 3" CATHODE-RAY OSCILLOGRAPH

★ The wide-range response of this instrument provides faithful reproduction of all wave-forms with steep fronts and resultant large-harmonic content, thereby permitting the study of signals such as pulses and square waves involving

frequency components as high as 5 megacycles. Numerous combinations of signal-input connections at the front panel provide added flexibility and convenience of operation. A special feature is the provision for intensity modulation of the grid of the cathode-ray tube. Included is a test probe with cable shielded to eliminate stray pickup for high-frequency work.



### DU MONT TYPE 274-A 5" CATHODE-RAY OSCILLOGRAPH

★ The Du Mont Type 274-A Cathode-ray Oscillograph was developed as an inexpensive, general-purpose instrument for laboratory, radio service, and educational applications. The Type 274-A serves as an excellent null-indicator on inductance-

capacitance bridges, as a means of viewing voltage waveforms, as an output meter, as a means for measuring time and amplitude of pulses, as an indicator in studies of sound, light, electricity, and electronics, and many for other general applications.

### THE DU MONT TYPE 241 — CATHODE RAY OSCILLOGRAPH

The Du Mont Type 241, like the Type 224-A is designed as a high frequency oscillograph. Employing a 5-inch cathode ray tube, the Type 241, however, supplies the operator with greater visibility. The frequency response of the vertical amplifier is uniform within 30% to 2 megacycles, and uniform within 50% to 4 megacycles. This wide frequency response allows faithful reproduction of signals which are rich in harmonic content. The sensi-

tivity of the instrument, using the Y-axis amplifier, is 0.07 rms volts per inch. The beam-modulation circuit of the Type 241 is equipped with a Z-axis amplifier. Timing markers may be impressed on the trace by applying an intensity modulation signal, of either polarity, to this amplifier. A shielded, high-impedance input probe insures efficient coupling of the signal to the Y-axis amplifier of this instrument.



**For Oscillograph Prices and Specifications See Other Side**



# Cathode-Ray TUBES ★ OSCILLOGRAPHS ★ EQUIPMENT



## DU MONT TYPE 185-A ELECTRONIC SWITCH



★ The Du Mont Type 185-A Electronic Switch may be used in conjunction with any oscillograph to observe two related or unrelated signals simultaneously on the screen of the cathode-ray tube. The zero axes of the two signals may be displaced for individual study of either pattern. The two patterns may also be superimposed for comparative studies. A typical application is the use of one channel for the signal to be studied while using the second channel for a timing signal.

### SPECIFICATIONS

Switching rate: 10 to 2000 times/sec.  
 Frequency response: d-c to 5 kc.  
 Voltage gain: 10.  
 Input resistance: 0.1 meg.  
 Output resistance: 50,000 ohms.  
 Maximum input voltage: 150 v.

Maximum signal output: 75 v. peak-to-peak.  
 Dimensions: 11½" h., 7¾" w., 13" d.  
 PRICE: Cat. #1072-A, 115 v, 40-60 cps.....\$105.00  
 PRICE: Cat. #1073-A, 230 v, 40-60 cps.....\$105.00

## DU MONT SCALES AND FILTERS

★ The Type 216 Calibrated Scales provide a convenient means for making relative and quantitative measurements with the cathode-ray oscillograph. They are mounted on the cathode-ray screen by the celluloid clips.

Type No.	Description	Cat. No.	Price
216-A	3" Cal. Scale	1129-A	\$0.85
216-C	5" Cal. Scale	1128-A	1.20
216-D	5" Log. Decrement Scale	1130-A	2.25
216-E	5" Q Scale	1131-A	2.25
216-F	5" Polar Coordinate Scale	1132-A	2.50
216-G	5" Green Filter	1133-A	2.10
216-H	5" Blue Filter	1134-A	2.10
216-J	5" Amber Filter	1135-A	2.10
216-K	Calibrated, polar coordinate, green translucent scale, 0.720° clockwise		6.50
2518	Calibrated acrylic scale, with rectangular mask		5.15
2519	Calibrated acrylic scale with circular mask		8.95
2520	Calibrated acrylic scale with circular mask		4.00

## DU MONT TYPE 264-B VOLTAGE CALIBRATOR



★ The Du Mont Type 264-B Voltage Calibrator is designed to measure the peak-to-peak voltage of any signal viewed on a cathode-ray oscillograph. It may be used with any commercial cathode-ray oscillograph. Its square-wave output is continuously variable from 0 to 100 volts in 4 ranges. By throwing a selector switch, the signal to be measured or any of 4 ranges of calibrating voltage is applied to the input of the oscillograph, eliminating the need to switch leads between signal and calibrating voltage. Amplitude measurements of any part of a complex, composite waveform may be made with the Type 264-B.  
 Range: 0-0.1; 0-1.0; 0-10; 0-100 volts.  
 Accuracy: ± 5% of full scale on each range.  
 Input Impedance: 20 μμ (signal connected through calibrator).  
 Size: 4½" x 8" x 5¾"; wt. 5 lbs.

PRICE: Catalog #1441-A 115 v. 50-60 cps. ....\$39.50  
 Catalog #1442-A 230 v. 50-60 cps. ....\$39.50

## DU MONT CATHODE-RAY TUBES

Type	Cat.	Price	Type	Cat.	Price
3AP1A	2201-A	\$14.85	5CP2A	2232-A	\$40.40
3AP11A	2206-A	16.50	5CP7A	2235-A	42.40
3GP1A	2211-A	22.00	5CP11A	2236-A	37.65
3GP11A	2216-A	23.65	5JP1A	2251-A	67.50
3JP1	2025-A	24.00	5JP2A	2252-A	73.00
3JP2	2026-A	27.50	5JP7A	2255-A	75.00
3JP7	2029-A	28.75	5JP11A	2256-A	70.25
3JP11	2030-A	25.65	5LP1A	2261-A	39.50
5BP1A	2221-A	24.75	5LP2A	2262-A	45.00
5BP11A	2226-A	27.50	5LP7A	2265-A	47.00
5CP1A	2231-A	34.90	5LP11A	2266-A	42.25

## TYPE 2521 MAGNETIC SHIELD

★ The Type 2521 Magnetic Shield is designed for use with the Du Mont Type 5CP1A Cathode Ray Tube. Over-all length, including the tube base clamp is 17¼ inches. Maximum diameter is approx. 5½ inches.

PRICE: Catalog #1438-A .....\$22.75

## DU MONT OSCILLOGRAPH SPECIFICATIONS

Instrument Type Number	Input Impedance					Frequency Range		Deflection Factor (RMS) V/in.					Linear Time Base	Dimensions in Inches		
	Amplifier		Y-Direct		Probe	Y-Amp	X-Amp	Y-Amp	X-Amp	Y-Dir	X-Dir	Probe	Continuous	H	W	D
	Y	X	Bal	Unbal												
164-E	1.0 meg.	0.8 meg.				5 cps-100 kc	5 cps-100 kc	0.70	0.55	30	30		15-30,000 cps	11¾	7¾	14
208B	2.0 meg.; 30 uuf	5.0 meg.; 25 uuf				2 cps-100 kc	2 cps-100 kc	0.01	0.5	21	22		2-50,000 cps	15¾	8¾	20¼
224-A	2.0 meg.; 30 uuf	2.0 meg.; 30 uuf	10.0 meg.; 20 uuf	5.0 meg.; 25 uuf	1.0 meg.; 20 uuf	20 cps-2 mc	10 cps-100 kc	0.1	0.7	25	28	0.4	15-30,000 cps	14¾	8¾	15¾
274-A	1 meg.; 40 uuf	1 meg.; 40 uuf	4.7 meg.; 50 uuf			20 cps-100 kc	20 cps-100 kc	0.2	0.25	16	18		8-30 k cps.	14	8¾	19¾
241	2 meg.; 40 uuf	2 meg.; 40 uuf	5 meg.; 20 uuf	5 meg.; 25 uuf	1 meg.; 10 uuf	20 cps. 2 mc	50 cps. 100 kc.	0.07	0.7	22	21	0.7	15-30,000 cps.	17½	10¾	21

## ORDERING DATA FOR DU MONT OSCILLOGRAPHS

Type	Description	Cat.	Price	Type	Description	Cat.	Price
164-E	115 v, 40-60 cps, 3AP1A	1064-A	\$124.50	208-B	230 v, 40-60 cps, 5LP7	1151-A	\$285.00
164-E	230 v, 40-60 cps, 3AP1A	1065-A	124.50	224-A	115 v, 40-60 cps, 3GP1A	1191-A	290.00
164-E	115 v, 40-60 cps, 3AP11A	1066-A	124.50	224-A	115 v, 40-60 cps, 3GP11A	1203-A	290.00
164-E	230 v, 40-60 cps, 3AP11A	1067-A	124.50	241	115 v, 50-60 cps, 5JP1A	1192-A	458.00
208-B	115 v, 40-60 cps, 5LP1A	1146-A	285.00	241	115 v, 50-60 cps, 5JP11-A	1205-A	458.00
208-B	230 v, 40-60 cps, 5LP1A	1147-A	285.00	274-A	115 v, 50-60 cps, 5BP1A	1420-A	124.50
208-B	115 v, 40-60 cps, 5LP11A	1148-A	285.00	274-A	115 v, 50-60 cps, 5BP11A	1422-A	124.50
208-B	230 v, 40-60 cps, 5LP11A	1149-A	285.00	274-A	230 v, 50-60 cps, 5BP1A	1423-A	124.50
208-B	115 v, 40-60 cps, 5LP7	1150-A	285.00	274-A	230 v, 50-60 cps, 5BP11A	1425-A	124.50

THE NAME MARION MEANS  
THE MOST IN METERS



# MARION ELECTRICAL INSTRUMENT COMPANY

Manchester, New Hampshire

EXPORT DIVISION 458 BROADWAY NEW YORK 13, U. S. A. CABLES: MORHANEX

IN CANADA: THE ASTRAL ELECTRIC COMPANY, SCARBORO BLUFFS, ONTARIO

## MARION TRULY HERMETICALLY SEALED 2½" AND 3½" ELECTRICAL INDICATING INSTRUMENTS... 100% GUARANTEED!

### Sealed like a vacuum tube

Marion Glass-To-Metal Truly Hermetically Sealed Electrical Indicating Instruments are guaranteed for six months. You get top performance . . . critical accuracy . . . at a price no higher than that of most competitive unsealed instruments.

Additional economy is offered in Marion's special replacement offer. After the initial six-month guarantee expires, any 2½" and 3½" type, ranging from 200 microamperes upward, will be replaced, regardless of whether the instrument has been overloaded, burned out, or mis-treated . . . provided the seal has not been broken, for a flat fee of \$1.50. Instruments with sensitivity greater than 200 microamperes will be replaced for \$2.50.



### SPECIFICATIONS

Model HM2 — 2½"      Model HM3 — 3½"

- There are no rubber gaskets, and no cement seals.
- Can withstand all extremes of temperature and humidity, required by any service, or test specification, without deterioration to the seals, or harm to the efficiency of the moving system.
- Windows are of double thickness tempered glass processed for solder sealing, and are highly resistant to shock.
- Instruments are completely dehydrated and are filled with dry air at sea level pressure.
- A newly designed crowned crystal permits greater scale length, reduces shadows, and makes for better visibility.
- Magnetic shielding permits interchangeability on any type of panel without affecting calibration; can be supplied silver plated for extra R.F. shielding.
- Silver clad beryllium copper hair springs reduce zero shift at all temperatures.
- Standard Kovar glass bead type terminals with solder lugs.

### MARION "4 FOR 1" FEATURE

Interchangeable Round and Square Colored Flanges . . . one instrument can thus fill four different needs:

1. ROUND



2. ROUND FOR STEEL PANEL



3. RECTANGULAR



4. RECTANGULAR FOR STEEL PANEL



- Instruments manufactured in accordance with AWS Spec. C-39.2 1944 and JAN I-6 plus hermetic sealing.
- They are positively interchangeable—Type HM2 with AWS Types MR24 and 25; Type HM3 with AWS Types MR 34 and 35.

### RANGES DC INSTRUMENTS

DC MICROAMPERES  
0-30  
0-50  
8-100  
0-200  
0-500  
0-800

DC MILLIAMPERES  
0-1      0-50  
0-1.5      0-100  
0-3      0-200  
0-5      0-250  
0-10      0-500  
0-15      0-800  
0-25

DC MILLIVOLTS  
0-15  
0-25  
0-50  
0-100

DC VOLTS  
0-1.5      0-25  
0-3      0-50  
0-5      0-150  
0-10      0-250  
0-15      0-500

### AC INSTRUMENTS

0-5 Volts AC  
0-15 Volts AC  
0-50 Volts AC

0-150 Volts AC  
0-250 Volts AC  
0-500 Volts AC

THE NAME MARION MEANS  
THE MOST IN METERS



# MARION ELECTRICAL INSTRUMENT COMPANY

Manchester, New Hampshire

EXPORT DIVISION 450 BROADWAY NEW YORK 13, U. S. A. CABLES MORHANEX

IN CANADA: THE ASTRAL ELECTRIC COMPANY, SCARBORO BLUFFS, ONTARIO



Model 52N

Models 52N and 52S are standard 2 1/2" class instruments, the 52N meeting JAN 1-6 physical dimensions for MR 25 round series and the 52S meeting commercial standards for the 2 1/2" rectangular types. These instruments have gained popularity in portable radio equipment, pocket test equipment and general electrical service where space is at a premium.



Model 52S



Model 53RN



Model 57S

Model 57S is an 8 1/2" x 7" instrument with a large open face and an extra long scale. It is constructed with enlarged pole shoes, and with a higher torque movement than other Marion types in order to give maximum performance in an instrument of its size. This instrument is supplied with a very high damping factor and is not just an overgrown 3" meter. Overall accuracy of 1%, and can be supplied with mirror scales. The 57S finds wide application in large vacuum tube voltmeters, in multimeters, and as an easily read production instrument in many of the measuring and testing operations that are performed in any electrical or electronic manufacturing plant. It is commonly used, too, as a production ohm-meter, limit bridge indicator, and in such varied applications as vibration amplitude measurements and automotive tire balancing.

## MARION ILLUMINATED DIALS . . . EASILY SEEN! QUICKLY READ!

Marion's new design of instrument-dial illumination insures brilliance without glare. The technique employs a transparent lucite cavity and an especially developed alnico magnet with a reflector shaped front face that concentrates the rays on the warp-free, permanent translucent dial.

This dial illumination feature is available on all, except Marion Glass-To-Metal Truly Hermetically Sealed Meters.

## MARION STANDARD INSTRUMENTS

The most important ingredient of Marion design, engineering and construction is simplicity. Our instruments, in special and unusual types as well as conventional models, employ a minimum of parts, each selected for quality and durability. Combined with simplicity of design and engineering, this makes for better performance, under severe conditions, over longer periods of time. Whether your requirements demand custom-built or standard instruments, you can depend upon the functional simplicity of Marion designs to provide the most in service and value.



## MARION MULTI-RANGE METERTESTER

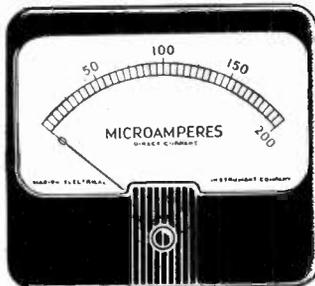
With self-contained power supply and control equipment for operation on 110 volts, AC, 60 cycles . . . for production testing, and calibration of DC instruments. The MARION METERTESTER is designed with many operational features which will definitely improve the production rates of any meter inspection department. Moreover, its accuracy is such that it may be used for checking purposes in any department and all laboratories employing instruments. It may also be used as a precise source of DC current and voltage. Overall accuracy is better than 1/2 of 1%. Basic sensitivity of the Mirror Scale Standard Instrument is 10 milliamperes. The complete unit is housed in a hand-rubbed, solid walnut carrying case.

For use in any department and all laboratories where instruments are employed and their performance must be carefully checked.

With self-contained power supply and control equipment for operation on 110 volts, AC, 60 cycles . . . for production testing and calibration of DC instruments. No additional accessories are required. Merely connect the two clips to the instrument under test, and proceed to analyze its accuracy and general performance.

### INCLUDES . . .

- Regulated Power Supply.
- Stepless Vacuum Tube Voltage Control.
- Large 8 1/2" Mirror Scale Standard Instrument, Hand Calibrated.
- Decade of .1% Accurate Manganin Wire Wound Resistors.



Model 55

Model 55 is a popular test equipment item, having a large case—4 3/4" x 4 1/8"—and long 100° scale. It is well suited for use in vacuum tube voltmeters, bridges and volt-ohm-milliameters. The internal construction is identical with that of the 53RN. Can be supplied with mirror scales for special applications.

### Ranges of MeterTester

0-25 UA	0-800 UA
0-50 UA	0-1 MA
0-100 UA	0-5 MA
0-200 UA	0-10 MA
0-400 UA	0-100 Volts
0-500 UA	



# MARION ELECTRICAL INSTRUMENT COMPANY

Manchester, New Hampshire

EXPORT DIVISION 458 BROADWAY NEW YORK 13, U. S. A. CABLES MORHANEX

IN CANADA: THE ASTRAL ELECTRIC COMPANY, SCARBORO BLUFFS, ONTARIO

THE NAME MARION MEANS  
THE MOST IN METERS

## A SPECIAL SERVICE FOR YOUR INDUSTRIAL CUSTOMERS

Marion has opened a Short Run Shop for the production of "special" instruments to meet your specifications . . . precision-built units that you can buy in sample lots.

You'll appreciate the savings in time, money and materials that this modern, completely equipped Short Run Shop can achieve for you. The high degree of functional simplicity and critical accuracy which Marion "Specials" offer, improve product performance . . . make it unnecessary for users to develop their own makeshift instruments with Special characteristics.

Your Marion specials will give the utmost in satisfaction, service and value . . . the same high standard of performance that has identified the regular line of Marion instruments for years.

Send us your specifications, we will send you a quotation.

### RANGES—For The Twelve Models Illustrated Here

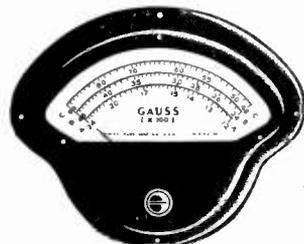
DC MICROAMPERES	DC MILLIAMPERES	DC AMPERES	DC MILLIVOLTS	DC VOLTS	AC VOLTS
0-20	0-1	0-250	0-1	0-15	0-5
0-30	0-1.5	0-250	0-1.5	0-25	0-3
0-50	0-3	0-800	0-3	0-50	0-5
0-100	0-5	0-5	0-100	0-10	0-150
0-200	0-10	0-10	0-15	0-15	0-250
0-500	0-15	0-15	0-25	0-25	0-500
0-800	0-25	0-25	0-50	0-50	
	0-50	Self-		0-150	
	0-100	contained		0-250	
	0-200	Shunts		0-500	

AVAILABLE IN ZERO CENTER AND OTHER RANGES ON SPECIAL ORDER



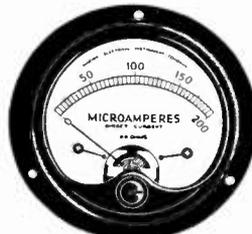
Model 53SN

Models 53RN and 53SN are standard 3 1/2" class instruments, the 53RN meeting JAN 1-6 physical dimensions for MR 35 round series and the 53SN meeting commercial standards for the 3 1/2" rectangular types. Application include radio and electrical test equipment, radio, radar, telegraph and telephone switchboards and general laboratory usage.



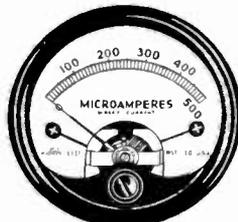
Model MCI—4"

Model MCI features the rugged Alnico construction of the Types 53RN, 54S, 55S, etc., plus the magnetic shielding which a steel case affords. Has a much longer scale than the standard 3 1/2" type. Normal accuracy is 1%, may be ordered to an accuracy of 1/2%, with hand-marked mirror scales. Every type MCI includes a shatterproof glass window. Applications include finer type of test equipment, switchboards and marine use where great precision and extreme ruggedness are required. Available at prices that are unusually economical for an instrument of this quality.



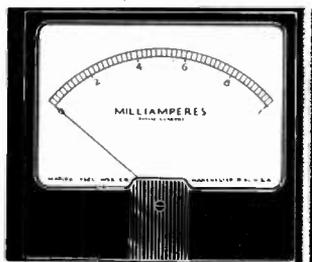
Model 53R

Model 53R features the sintered soft iron pole shoes, heavy Alnico magnet, and excellent overall accuracy. An enlarged face opening permits inclusion of more information on the scale when used for special applications. Applications include radio and electrical test equipment, radio, radar, telegraph and telephone switchboards, and general laboratory assignments.



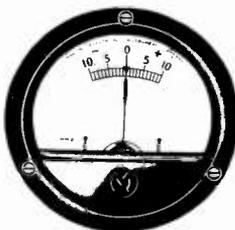
Model 52RM

Model 52RM is a narrow flange, brass cased instrument. (The brass case offers R. F. shielding for many applications.) It contains the same rugged Alnico movement and the same scale length that are common to the 52S and the 52N.



Model 56—6 1/2"

Model 56 is a 6 1/2" x 5 1/2" bakelite cased instrument of entirely new design with heavy cross sections to stand the most rugged use. It fills the need for an instrument between Models 55 and 57S which are 5 and 8 inch meters. It has a 100°, 5/2 inch arc and a large open face readily adaptable to multi arc dials. Supplied with large Alnico II magnets in milliammeter ranges and Alnico V in the more sensitive microammeter ranges. Employs a Marion Bulldozer bracket which assures rugged construction and long, dependable service. Ideal for equipment which needs a large dial easily read from a distance or with plenty of space for a multi-range scale.



NULL INDICATORS

Marion Null Indicators are extremely sensitive shaded pole piece D'Arsonval type galvanometers. They are used primarily as bridge and potentiometer balance indicators and in any application where an instrument with very high sensitivity about the zero or balance point is desired. We particularly recommend Types HM2 and HM3 because they are hermetically sealed instruments which completely shield the galvanometers from the effects of moisture and dirt, and external factors. Ideal for use in discriminator alignment of FM receivers and as general laboratory balance indicators.

THE NAME MARION MEANS  
THE MOST IN METERS



# MARION ELECTRICAL INSTRUMENT COMPANY

Manchester, New Hampshire

EXPORT DIVISION 458 BROADWAY NEW YORK 13, U. S. A. CABLES: MORHANEX

IN CANADA: THE ASTRAL ELECTRIC COMPANY, SCARBORO BLUFFS, ONTARIO

**BUILD YOUR OWN TEST**

**EQUIPMENT**

with the  
**MARION  
MULTI-RANGER  
METER**

- **ACCURATE!**
- **DURABLE!**
- **DEPENDABLE!**
- **A GREAT VARIETY OF SIZES!**

When it comes to **TEST EQUIPMENT** build your own with Marion Multi-Ranger Meters. They will solve your problem of finding reasonably priced instruments with the critical accuracy you demand for test equipment or other auxiliary equipment with multiple functions.

These Multi-Ranger Meters permit you to assemble a highly accurate instrument for use as a voltmeter, milliammeter, high and low resistance ohmmeter, AC voltmeter and decibel meter. — Build As Many Ranges As You Desire.

All instruments use Alnico Magnets, have full 100° three-color scales, feature the new, tough Marion "Bulldozer" moving system that insures long life under severe operating conditions plus the highest degree of accuracy.

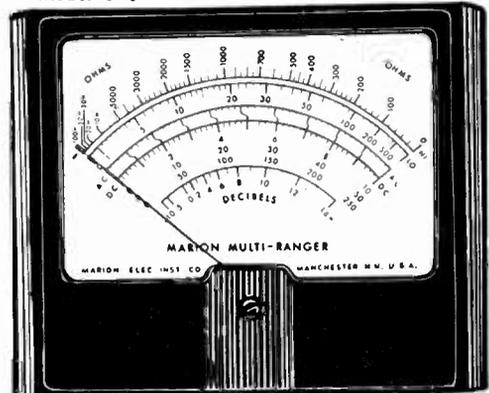
**MARION RESISTOR KIT  
NEW! LOW-PRICED! VERSATILE!**

Contains: 18 Resistors Ranging from .4 Ohms to 750,000 Ohms. A Schematic Diagram for Constructing Your Own Test Equipment.

It's easy to construct accurate, useful, versatile test equipment with the Marion Resistor Kit, used in conjunction with Marion Multi-Ranger Instruments. List \$12.50

**ASK YOUR DEALER . . . OR WRITE DIRECT**

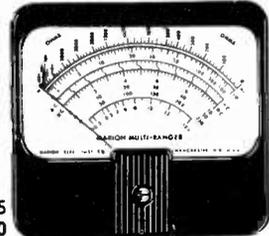
Model 575 List \$20.00



Model 535N  
List \$12.00



Model 55  
List \$15.00



**SCALE RANGES POSSIBLE  
WITH STANDARD RESISTOR KIT**

**VOLTS AC-DC**

0-10 Volts 0-250 Volts  
0-50 Volts 0-1000 Volts

**MILLIAMPERES**

0-1 MA 0-50 MA  
0-10 MA 0-500 MA

**OHMS**

0-500 Ohms 0-1 MEG  
0-100 M 0-10 MEG

**DECIBELS**

-10 — +14 decibels  
+ 4 — +28 decibels  
+18 — +42 decibels  
+30 — +54 decibels

**ALSO AVAILABLE  
WITH VTVM SCALES**

THE NAME "MARION" MEANS THE "MOST" IN METERS

Export Division  
458 Broadway  
New York 13, U. S. A.  
Cables MORHANEX

In Canada:  
The Astral Electric Company  
Scarboro Bluffs, Ontario



# MARION ELECTRICAL INSTRUMENT COMPANY

Manchester, New Hampshire

## STERLING PANEL METERS

### AMMETERS, VOLTMETERS, MILLIAMMETERS

FOR USE ON DIRECT AND ALTERNATING CURRENT  
A COMPLETE MODERN LINE

These improved STERLING Panel Meters while retaining the accuracy, beauty and ruggedness which have always characterized STERLING instruments, show a modern trend in the gracefully unique arrangement of the broader and more clearly defined scales. The meters for alternating current and direct current are perfectly matched and therefore suitable for mounting on the same panel. Both the A.C. and D.C. meters are of the permanent magnet, iron vane, solenoid type. This affords positiveness of action and breadth of movement suggestive of those of the D'Arsonval type. The large needle-tipped pointers and wide clearly marked scale divisions of these panel meters make them easily read.

STERLING Panel Meters may be had in any of the types illustrated.

SPECIAL COMBINATION A.C.-D.C. METERS WITH HAIR-SPRING REPULSION TYPE MOVEMENT FITTING SAME CASES, ARE ALSO AVAILABLE.

Standard package, 100 meters, Shipping weight 30 lbs.

ALL STERLING Panel Meters are guaranteed accurate within 5%.

#### Alternating Current Meters

A. C. VOLTMETERS		
Number	Range	List Price
870	0-4 Volts	\$3.00
871	0-6 Volts	3.00
872	0-10 Volts	3.00
873	0-15 Volts	3.00
874	0-150 Volts High Res.	4.75
875	0-300 Volts	5.75
876	0-600 Volts	6.60
877	0-750 Volts	8.50
878	0-10-140 Volts	4.75
879	0-50 Volts	3.60
910	0-30 Volts	3.00
911	0-75 Volts	3.60
912	0-250 Volts	5.25
913	0-500 Volts	6.60

A. C. MILLIAMMETERS		
Number	Range	List Price
880	0-25 Milliampères	\$3.00
881	0-50 Milliampères	3.00
882	0-100 Milliampères	3.00
883	0-250 Milliampères	3.00
884	0-500 Milliampères	3.00
914	0-300 Milliampères	3.00

A. C. AMMETERS		
Number	Range	List Price
886	0-1 Amperes	\$3.00
887	0-3 Amperes	3.00
888	0-5 Amperes	3.00
889	0-10 Amperes	3.00
890	0-20 Amperes	3.30
891	0-50 Amperes	3.60
892	0-30 Amperes	3.30
893	0-60 Amperes	3.75
894	0-75 Amperes	3.75
895	0-100 Amperes	3.75
915	0-2 Amperes	3.00
916	0-7½ Amperes	3.00
917	0-15 Amperes	3.30
918	0-25 Amperes	3.30
919	0-125 Amperes	*

\*Special—Price on Application

RESISTANCE METERS		
Direct Reading		
Number	Range	List Price
901	4.5 Volts, 10,000 Ohms	\$3.00
	3 Flashlight cells required.	
902	2 M. A., 9 Volts, 100,000 Ohms	4.40
	6 Flashlight cells required.	

#### Direct Current Meters

D. C. VOLTMETERS		
Number	Range	List Price
801	0-1 Volts	\$1.65
802	0-3 Volts	1.65
803	3-0-3 Volts	1.65
804	0-5 Volts	1.65
805	0-6 Volts	1.65
806	0-8 Volts	1.65
807	0-10 Volts	1.65
808	0-15 Volts	1.65
809	0-25 Volts	1.65
810	0-25 Volts High Res.	3.00
811	0-50 Volts	1.65
812	0-50 Volts High Res.	3.60
823	0-75 Volts	1.75
813	0-100 Volts	1.85
814	0-100 Volts High Res.	3.60
815	0-150 Volts	2.25
816	0-150 Volts High Res.	3.50
817	0-300 Volts	3.50
818	0-500 Volts	5.00
819	0-750 Volts	6.00
820	0-8-160 Volts	3.00

D. C. MILLIAMMETERS		
Number	Range	List Price
835	0-2 Milliampères	\$4.00
836	0-5 Milliampères	2.50
837	0-10 Milliampères	2.20
838	0-15 Milliampères	1.65
839	0-25 Milliampères	1.65
840	0-50 Milliampères	1.65
841	0-100 Milliampères	1.65
842	0-150 Milliampères	1.65
843	0-200 Milliampères	1.65
844	0-300 Milliampères	1.65
845	0-400 Milliampères	1.65
846	0-20-100 Milliampères	2.50
847	0-15-150 Milliampères	2.50
848	0-500 Milliampères	1.65

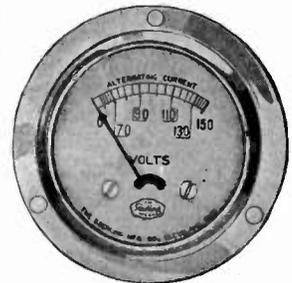
D. C. AMMETERS		
Number	Range	List Price
855	0-1 Amperes	\$1.65
856	0-3 Amperes	1.65
857	0-5 Amperes	1.65
858	0-10 Amperes	1.65
859	1-0-1 Amperes	1.65
860	3-0-3 Amperes	1.65
861	6-0-6 Amperes	1.65
862	10-0-10 Amperes	1.65
863	20-0-20 Amperes	1.65
864	0-15 Amperes	1.75
865	0-30 Amperes	2.20
866	0-50 Amperes	2.75
867	30-0-30 Amperes	2.20
868	0-20 Amperes	1.85
869	0-40 Amperes	2.75



TYPE 80

Flush case, narrow flange, standard finish black enamel. Circular adjustable back clamp for mounting.

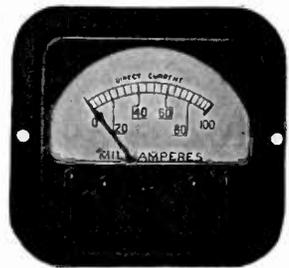
Diameter flange 2 5/8" Diam. case 2". Depth case 3/8". Requires hole 2 3/8" in Diameter Length terminals 1/8"



TYPE 70

Flush case, wide flange, standard finish black enamel. Screw holes in flange for mounting.

Diameter flange 2 5/8" Diam. case 2". Depth case 7/8" Requires hole 2 3/8" in Diameter



TYPE 68

Flush case, square flange, standard finish black enamel. Screw holes in flange for mounting. Width flange 2 5/8". Dia. case 2 3/8". Depth case 3/8".

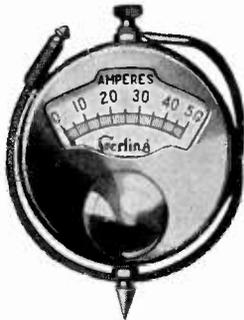
**Type 68 square flange case furnished for any range of meter at an additional list price of 40 cents each.**

# Sterling

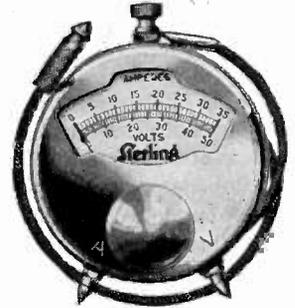
## STERLING POCKET METERS

### STANDARD LINE

**Direct Current Pocket Ammeters,  
Voltmeters and Voltammeters  
for all Purposes**



No. 24A Ammeter



No. 45 Voltmeter

STERLING Pocket Meters are useful in all kinds of battery testing, in railroad signal work, and in telephone and low-voltage electrical work generally. They are polarity indicators.

No. 24 Ammeter, for testing No. 6 dry cells. 0-35 ampere scale, 1 ampere divisions. List Price ..... \$1.85

No. 24A Ammeter for testing dry cells including the heavy-duty Ignition type of cell. 0-50 ampere scale, 1 ampere divisions. List Price, \$2.10

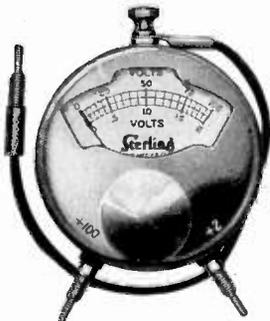
- No. 23 Ammeter, for photo-flash dry batteries. 0-20 amp. scale, 1/2 amp. div. List Price, \$2.25
- No. 33 Voltmeter for ordinary single cells and "Flashlight" cells, 0-3 v. scale, 1/10 v. div. List Pr., \$2.10
- No. 34 Voltmeter for "Hot Shot" and Radio batteries. 0-10 volt scale, 1/5 volt div. List Price, \$2.10
- No. 34A Voltmeter for 12 volt batteries. 0-16 volt scale, 1/2 volt divisions. List Price, \$2.30
- No. 34B Voltmeter for ordinary 22½ v. radio "B" batteries. 0-30 v. scale, 1 v. divisions. List Price, \$2.30
- No. 34C Voltmeter for testing ordinary 45 v. radio "B" batteries. 0-50 v. scale, 1 v. div. List Price, \$2.60
- No. 44 Voltammeter for "Hot Shot" and Radio batteries and No. 6 dry cells, 0-35 ampere scale, 1 ampere divisions; 0-10 volt scale, 1/5 volt divisions. List Price, \$2.50
- No. 44A Voltammeter for 12 volt batteries and No. 6 dry cells. 0-35 ampere scale, 1 ampere divisions; 0-16 volt scale, 1/2 volt divisions. List Price, \$2.75
- No. 45 Voltammeter for testing No. 6 dry cells and ordinary 45 volt radio "B" batteries. 0-35 ampere scale, 1 ampere divisions; 0-50 volt scale, 1 volt divisions. List Price, \$3.60
- No. 45A Voltammeter for testing dry cells including the heavy-duty Ignition type and ordinary 45 v. radio "B" batteries. 0-50 amp. scale, 1 amp. div.; 0-50 v. scale, 1 v. div. List Price, \$3.85

Meters 2¼" in diameter and ⅝" thick. Nickel finish. Standard package, ten instruments, ship. wt. 4 lbs.

### STERLING SPECIAL-PURPOSE POCKET METERS — NEW SERIES

#### Testers for Portable Radio Batteries

The special "A" and "B" dry batteries built for the operation of Portable Radio sets cannot be satisfactorily tested with ordinary battery testers. The new STERLING double voltmeters are designed for testing with correct loads the special "A" and "B" dry batteries used on Portable Radio sets. The new STERLING flexible plugs of these meters fit easily into the small closely spaced socket holes.



No. 38A Voltmeter



No. 31A Hearing Aid Tester

- No. 37A Voltmeter for 45 v. "B" batteries and 1.5 v. "A" batteries. Scale 0-50 v., 1 v. div. Scale 0-2 v., 1/10 v. div. Tests 45 v. "B" and 1½ v. "A" batteries. List Price, \$3.00
- No. 38A Voltmeter for 90 v. "B" batteries and 1.5 v. "A" batteries. Scale 0-100 v., 5 v. div. Scale 0-2 v., 1/10 v. div. Tests 45 v. and 90 v. "B" batteries and 1½ v. "A" batteries. List Price, \$3.25
- No. 39A Voltmeter for 90 v. and 135 v. "B" batteries and 1.5 v. "A" batteries. Scale 0-150 v., 5 v. div. Scale 0-2 v., 1/10 v. div. Tests 90 v. and 135 v. "B" batteries and 1½ v. "A" batteries. List Price, \$3.25
- No. 40A Voltmeter for 90 v. and 135 v. "B" batteries and 4.5 v., 6 v. and 7.5 v. "A" batteries. Scale 0-150 v., 5 v. div. Scale 0-10 v., 1/5 v. div. Tests 90 v. and 135 v. "B" batteries and 4½ v., 6 v. and 7½ v. "A" batteries. List Price, \$3.50
- No. 42A Graphic General Tester. Red and Green color chart for all standard batteries including 45 v. and 90 v. "B" batteries and 1.5 v., 4.5 v., and 7.5 v. "A" batteries. 0-100 v. scale for special sizes of "B" batteries, 5 v. div. Tests all Portable Radio batteries. List Price, \$6.00

#### Testers for Hearing Aid Batteries

- No. 31A Double voltmeter for special 30 or 45 v. "B" batteries and 1½ v. "A" batteries, scale 0-50 v., 1 v. div., scale 0-2 v., 1/10 v. divisions. Carefully engineered to impose the correct loads on the small delicate batteries used to operate vacuum tube hearing aids. Equipped with new STERLING flexible plugs. List Price, \$3.50
- No. 531 Plug-in—Safety type double voltmeter for testing hearing aid batteries. This new tester has the same capacity and scales as the No. 31A. No cord is necessary because the rigid plug-in type terminals are designed to fit hearing aid batteries having accessible keyed sockets. This arrangement makes it impossible to overload the No. 531 instrument or reverse the polarity while it is being used for testing hearing aid batteries. List Price, \$3.50
- No. 32A Double Voltmeter for special 22½ or 30 v. "B" batteries and 1½ v. "A" batteries, scale 0-35 v., 1 v. div., scale 0-2 v. 1/10 v. divisions. Equipped with new STERLING flexible plugs. List Price, \$3.50

Meters 2¼" in diameter and ⅝" thick. Nickel finish. Standard package, ten instruments, ship. wt. 4 lbs.

# WESTON INSTRUMENTS

## MODEL 769 HIGH FREQUENCY ELECTRONIC ANALYZER

A versatile three-in-one instrument built to Weston standards of quality. Provides a conventional Volt-Ohm-Milliammeter, a high impedance Electronic Volt-Ohmmeter, and a stable, probe type Vacuum Tube Voltmeter for use to 300 megacycles. RF and special D-C probe supplied. Complete stability is attained on all ranges from 3 to 1200 Volts and 200 Ohms to 2000 Megohms full scale.

### RANGES

#### VOLT-OHM-MILLIAMMETER

D-C VOLTS (at 10,000 ohms per volt):  
3/12/30/120/300/1200.†

A-C VOLTS (at 1,000 ohms per volt):  
3/12/30/120/300/1200.

DECIBELS: -6 to +62 in six ranges:  
1 milliwatt, 0 level, 600 ohm line.

D-C CURRENT: 300 microamperes  
1/1.2/6/30/120/600 ma.

RESISTANCE: 2,000/20,000/200,000 ohms  
full scale. 20/200/2,000 ohms center  
scale.

ACCURACY: D-C  $\pm 3\%$  A-C  $\pm 5\%$

† For higher ranges  
to 6000 volts d-c  
order Model 766  
Type 4 Televeter  
at \$21.00 net.

#### PROBE TYPE VACUUM TUBE VOLT METER

A-C VOLTS: 3/12/30/120.

DECIBELS: -6 to +42 in four ranges.  
1 milliwatt, 0 level, 600 ohm line.

ACCURACY:  $\pm 5\%$  (direct reading) at 50  
cycles to 150 megacycles.  
 $\pm 12\%$  (direct reading) at 150 to  
300 megacycles.  
 $\pm 8\%$  (with correction curve) at 150  
to 300 megacycles.

#### ELECTRONIC VOLT-OHMMETER

D-C VOLTS:  $\pm 3/12/30/120/300/1200$ .

RESISTANCE: 2,000/20,000/200,000 ohms  
full scale. 2/20/2,000 megohms full  
scale.

20/200/2,000/20,000/200,000 ohms  
center scale, 20 megohms center  
scale.

VOLTMETER RESISTANCE: 15 megohms on  
all ranges.

ACCURACY:  $\pm 4\%$  of full scale on all  
ranges.



MODEL 769

#### RF PROBE

FREQUENCY RANGE: 50 cycles to 300 mega-  
cycles.

INPUT RESISTANCE: 5 megohms.

INPUT CAPACITY: Approximately 5 micro-  
microfarads.

DIMENSIONS: 3 1/2" x 3 1/4".

Size: 10" x 13" x 6 1/8".

App. Wgt. 13 1/2 lbs.

PRICE ..... \$247.50 NET

## MODEL 785 INDUSTRIAL CIRCUIT TESTER

Established in industry as the most complete single  
unit for general maintenance and ultra-sensitive  
test purposes, particularly on electronic equipment.  
Provides 28 ranges for measuring D-C voltage and

current; A-C voltage and current; and resistance.  
Current and voltage ranges can be extended for  
insulation testing. Provisions for instantaneous cur-  
rent and voltage readings.

### RANGES

D-C Volts: (Full scale) 1/10/50/200/500-  
/1000 Volts (20,000 Ohms per volt),  
100 Millivolts direct or with external  
shunt.

Accuracy: 2% to 500 V.; 3% at  
1000 V.

A-C Volts: (Full scale) 5/15/30/150/300-  
/750 Volts (1000 Ohms per volt).

Accuracy: 3%.

D-C Current: (Full scale) 50 Microamps;  
1/10/100 Milliamps; 1/10 Amps.

Accuracy: 2%. Higher ranges with  
100 mv. shunts.

A-C Current: (Full Scale) .5/1/5/10 Amp-  
eres. Accuracy: 3% on 60 cycles.  
Higher ranges with external current  
transformers.

Resistance: (Full scale) 3,000/30,000/-  
300,000 Ohms; 3/30 Megohms.  
(Center scale) 25/250/2,500/25,000/-  
250,000 Ohms.

Sizes: 13" x 12 1/2" x 5 1/2"

Weight (complete) 13 1/2 Lbs.

Model 785 (Oak carrying case) \$157.50 Net

Model 785 (Steel case) ..... 127.50 Net



MODEL 785

## MODEL 798 TUBE CHECKER

The Model 798 Tube Checker uses a new method of proportional mutual conductance test-  
ing . . . the differential frequency system which provides readings similar to actual oper-  
ating conditions. This tube checker supplies mutual conductance and "Good-Bad" readings  
on all receiving tube types . . . tests all Voltage Regulator and low power type Thyatron  
tubes . . . has adjustable plate, screen, signal and grid bias voltages. Only six settings re-  
quired for most tubes . . . switching flexibility provides for testing future tubes as they are  
announced.

### SPECIFICATIONS

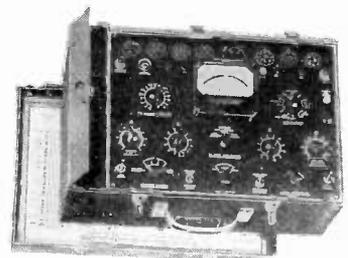
Tube Checker ranges: 3000/6000/12000  
micromhos.

Tube sockets: 4, 5, 6, and 7 prong, octal,  
loctal, miniature, acorn and 9 pin types.  
(Spare miniature socket provided.)

Power Requirements: 105/125 Volts, 50/  
60 Cycles A-C.

Size: 17 3/4" x 11 3/8" x 6 1/8"—Weight: 23  
Lbs.

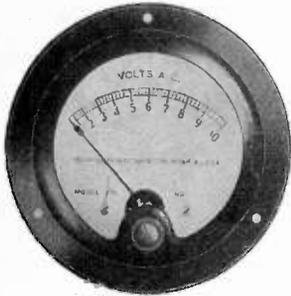
Price ..... \$291.50 NET



MODEL 798

**SUBJECT TO PRICE CHANGE OR WITHDRAWAL WITHOUT NOTICE**

# Weston RADIO INSTRUMENTS



Round Style



Rectangular Style

## PANEL INSTRUMENTS

These panel instruments reflect over half a century of instrument skill, and the Weston tradition of building instruments to the highest standards of dependability and service.

Models 301, 425 and 476 are available in round flush bakelite cases 3 1/2" or 3 3/8", and 3 1/4" metal cases with black finish; also in round surface metal and rectangular flush bakelite cases. Models 301 and 425 supplied in round surface bakelite cases. Models 506, 507, 517 regularly supplied in round flush 2 1/2" bakelite and black finished metal cases; flush narrow flange metal and rectangular flush bakelite cases with a clamp for panel mounting. Model 506 available in surface metal case. All are calibrated normally for use on non-magnetic panels. For magnetic panel use, instruments will be adjusted for steel panel thickness of .09". Order instruments in bakelite cases for use on circuits above 300 volts when it is not possible to connect in grounded side of line. For other instrument prices, write to Weston Electrical Instrument Corporation, Newark 5, New Jersey.

## 3 1/2" PANEL INSTRUMENTS

### MODEL 301—D-C VOLTMETERS

Approximate resistance of Model 301 in ohms per volt—1 to 40 volts, 62; 50 to 150 volts, 200; 200 volts, 250.

Range	Price	Range	Price	Range	Price
3	\$14.25	15	\$14.25	150	\$15.75
5	14.25	30	14.25	200	16.50
8	14.25	50	14.25		
10	14.25	100	15.00		

With Resistance of 1,000 ohms per volt

Range	Price	Range	Price
50	\$15.00	300	\$18.75
100	15.75	500	23.25
200	17.25	1000	30.75*
		3000	56.75*

\* Supplied with external resistor. Scale reading in kilovolts.

### MODEL 301—D-C MILLIAMMETERS \*

Range	Approx. Res. Ohms	Price	Range	Approx. Res. Ohms	Price
1	105	\$14.25	30	1.2	\$14.25
1.5	27	14.25	50	2.0	14.25
2	27	14.25	100	1.0	14.25
5	5.7	14.25	150	0.66	14.25
10	2.0	14.25	300	0.33	14.25
15	2.0	14.25	500	0.2	14.25

\* Milliammeters with ranges above 40 MA. are shunted, and have a drop of approximately 100 MV.

### MODEL 301—D-C AMMETERS \*

Single Ranges: 1/1.5/5/10/15/30/50 at \$14.25

\* Ammeters are supplied in self-contained ranges up to 50 amperes inclusive, and have a drop of 50 MV  $\pm$  5%. Ranges above 50 amperes require external shunts.

### MODEL 301—D-C MICROAMMETERS

Range	Price	Range	Price
50	\$28.25	200	\$18.00
100	27.00	500	18.00

## 2 1/2" PANEL INSTRUMENTS

### MODEL 506—D-C VOLTMETERS

Approximate resistance of Model 506 in ohms per volt: 3 to 150 volts, 125; 200 volts, 200.

Range	Price	Range	Price
3	\$11.25	10	\$11.25
5	11.25	15	11.25
8	11.25	50	11.25
		100	\$12.00
		150	12.75

### MODEL 506—D-C AMMETERS

Single Ranges: 1/1.5/5/10/15/30/50 at \$11.25

Ammeters, self-contained up to 50 amps., inclusive—drop 50 MV  $\pm$  5%

### MODEL 506—D-C MILLIAMMETERS

Range	Approx. Resis.	Price	Range	Approx. Resis.	Price
1	105	\$11.25	50	1	\$11.25
1.5	18	11.25	100	.5	11.25
2	18	11.25	150	.33	11.25
5	9.5	11.25	300	.16	11.25
10	3.2	11.25	500	.1	11.25
15	1.5	11.25			

Milliammeters above 40 MA are shunted—drop approximately 50 MV.

### MODEL 301—RECTIFIER TYPE A-C VOLTMETERS

Range	1000 ohms		2000 ohms	
	per volt	per volt	per volt	per volt
1		\$25.50	50	\$22.50
1.5		25.50	100	23.25
3	\$22.50	25.50	150	24.00
5	22.50	25.50	300	26.25
15	22.50	25.50		

### MODEL 301—RECTIFIER TYPE A-C MILLIAMMETERS

Range	Price	Range	Price
0.5	\$25.50	2	\$21.75
1	21.75	5	21.75

### MODEL 301—RECTIFIER TYPE A-C MICROAMMETERS

Range	Price
500	\$25.50

### MODEL 301 VU METER

A or B Scale	Price
	\$40.50

### MODEL 476—A-C AMMETERS

Single Ranges: 1/1.5/2/3/5/10/15/20/30/50 at \$14.25

### MODEL 476 A-C VOLTMETERS

Single Ranges: 1.5/3/5/8/10/15/30/50 at \$14.25

Range	Price	Range	Price
100	\$15.00	250	\$17.25
130	15.75	300	18.00
150	15.75	500	21.00

### MODEL 425—THERMOCOUPLE TYPE AMMETERS

Single Ranges: 1/1.5/2/3/5/10/15/20 at \$21.00

### MODEL 507—THERMO AMMETERS

For use on any frequency, including radio frequency. Single Ranges: 1/1.5/2/2.5/5/8/15/20 at \$18.00

### MODEL 517—A-C AMMETERS

Range	Approx. Resis. in ohms	Price	Range	Approx. Resis. in ohms	Price
1	.17	\$13.50	20	.0012	\$13.50
3	.024	13.50	30	.00085	13.50
5	.01	13.50	50	.00072	13.50
10	.0037	13.50			

### MODEL 517—A-C VOLTMETERS

Range	Approx. Ohms per volt	Price	Range	Approx. Ohms per volt	Price
5	10	\$13.50	50	52	\$13.50
10	14	13.50	130	110	15.00
15	14	13.50	150	110	15.00
25	26	13.50	250	167	16.50
			300	167	17.25

**SUBJECT TO PRICE CHANGE OR WITHDRAWAL WITHOUT NOTICE**

# ROLLER-SMITH INSTRUMENTS



BETHLEHEM, PENNA.

This line of panel instruments is ideally suited to the many varied uses in test units, analyzers, battery testers and chargers, radio tube testers, control panels, communication equipment, general testing panels and hundreds of other uses where **quality, accuracy, stability and economy** are important. Only the most common ranges are listed. Instruments are available in all practical ranges in a wide variety of case styles from 1 1/2" to 7" sizes. Contact the Representatives listed in the Representative Directory or write the factory for complete data.

Prices shown are list prices subject to trade discounts.



ROUND-FLUSH MOUNTING



SQUARE-FLUSH MOUNTING

DC MILLIAMMETERS									
Range	1 1/2"	List	2 1/2"	List	3 1/2"	List	4 1/2"	List	5 1/2"
0-1	152601	\$15.50	251601	\$10.50	351601	\$11.00	452601	\$13.50	
0-10	152607	15.50	251607	10.50	351607	11.00	452607	13.50	
0-100	152614	15.50	251613	10.50	351614	11.00	452614	13.50	
0-500	152620	15.50	251617	10.50	351620	11.00	452619	13.50	
DC AMMETERS									
0-1	152501	16.50	251501	11.50	351501	12.00	452501	14.50	
0-10	152507	16.50	251507	11.50	351507	12.00	452507	14.50	
0-30	—	—	251510	11.50	351511	12.00	452511	14.50	
DC MICROAMMETERS									
0-20	—	—	—	—	351640	29.50	452640	31.50	
0-50	—	—	251641	19.00	351641	19.50	452641	22.00	
0-100	—	—	251643	18.00	351643	18.50	452643	21.00	
0-200	—	—	251645	14.50	351645	14.50	452645	17.00	
0-500	152701	17.50	251647	12.50	351647	13.00	452647	15.50	
DC VOLTMETERS 1000 ohms per volt									
0-1.5	152802	16.50	251801	12.00	351802	12.50	452802	15.00	
0-10	152807	16.50	251806	12.00	351807	12.50	452807	15.00	
0-150	—	—	251813	12.00	351817	13.50	452816	16.00	
0-250	—	—	—	—	351819	14.50	452818	17.00	
0-500	—	—	—	—	351821	17.25	452820	19.50	
"VU" METERS — 20/0/+3 VU									
A and B scales per JAN — 1 — 6									
Scale A					351951	30.00	452951	32.50	
Scale B					351952	30.00	452952	32.50	
AC VOLTMETERS									
0-1.5			251201	11.50	351201	12.00	452201	14.50	
0-10			251206	11.50	351206	12.00	452206	14.50	
0-30			251209	11.50	351210	12.00	452210	14.50	
0-150			251213	12.50	351215	13.00	452215	15.50	
0-300			—	—	351218	14.00	452218	17.00	
AC AMMETERS									
0-1			251001	11.50	351001	12.00	452001	14.50	
0-3			251004	11.50	351005	12.00	452005	14.50	
0-5			251005	11.50	351006	12.00	452006	14.50	
0-10			251007	11.50	351008	12.00	452008	14.50	
0-30			251010	11.50	351012	12.00	452012	14.50	
RF AMMETERS									
Self Contained									
0-5 MA*			—	—	351671	50.00			
0-100 MA*			—	—	351677	50.00			
0-800 MA			251694	16.50	351694	17.00			
0-1 Amp.			251695	16.50	351695	17.00			
0-3 Amp.			251698	16.50	351698	17.00			
0-5 Amp.			251699	16.50	351699	17.00			
0-10 Amp.			251701	16.50	351701	17.00			
0-20 Amp.			251703	16.50	351703	17.00			

\* Available in vacuum type couples only.  
 3 1/2" available with expanded scale at \$5.00 list extra.  
 Center zero ranges available at no extra cost.  
 Most types available with internal illumination.

## ROLLER-SMITH, Bethlehem, Penna.

Electrical Indicating Instruments - Aircraft Instruments - Switchgear - Air and Oil Circuit Breakers  
 Rotary Switches - Relays - Precision Balances

## "RANGE MASTER" MODEL 10

An 8-in-1 Service Instrument, covers these 25 ranges:

- |  |  |
|--|--|
| 1. CAPACITY — .001-.1/.01-1/1-10 MFD.        | 5. D.C. CURRENT — 0-1/10/100/1000 MA.  |
| 2. A.C. CURRENT — 0-.15/1.5/15 AMPS.         | 6. RESISTANCE — 0-10,000/100,000/1 MEG. OHMS megohm.                             |
| 3. A.C. VOLTAGE — 0-1/10/100/500/1000 VOLTS. | 7. Special high range Ohmmeter to 2 megs. and 20 megs. without external battery. |
| 4. D.C. VOLTAGE — 0-10/100/500/1000 VOLTS.   | 8. Sensitive A.C. Microammeter to 1100 microamps.                                |



Model 10 (Illustrated) .....\$23.50 net  
 Model 10K (Complete KIT and Instructions)..... 17.95 net



## "RANGE MASTER" MODEL 10P

A Portable Model "Range Master" covering the same 25 ranges as the Model 10. Has polished oak case with handy tool compartment.

Model 10P (Illustrated).....\$26.95 net  
 Model 10F (Same as Model 10P but has complete fuse protection on all ranges) 28.15 net

## "MULTI-TESTER" MODEL 30

Covers the following ranges:

- |  |   |
|--|---|
| A.C. VOLTS — 0-12.5/25/125/250/1250 volts. | D.C. CURRENT — 0-1/100 ma.                |
| D.C. VOLTS — 0-5/10/50/100/500/1000 volts. | RESISTANCE — 0-10,000/100,000/1 meg.ohms. |
|  | DECIBELS — From minus 10 to plus 57 Db.   |

Model 30 (Illustrated).....\$15.95 net  
 Model 30P (Portable model. Has polished oak case)..... 19.45 net  
 Model 30K (Complete KIT and Instructions)..... 13.95 net



## SIGNAL GENERATOR MODEL 300

The Signal Generator Model 300 features finger-tip selection of four accurately aligned frequencies. Special crystal position accommodates any standard crystal to adapt the Model 300 to a crystal frequency standard or TELEVISION MARKER OSCILLATOR. Four hundred cycle audio modulation, in or out. Supplies 456 Kc, 465 Kc, 600 Kc, and 1500 Kc, to cover 90% of all receivers manufactured. Works equally well with A.C.-D.C. sets. Complete with tubes and output probe.

Model 300 (Illustrated) .....\$16.95 net

## KILOVOLTER MODEL 4000

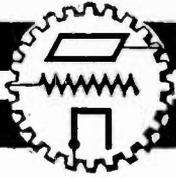
The Kilovoltmeter Model 4000 is designed to measure Television and X-Ray voltages up to 50,000 volts D.C. Sensitivity 50,000 ohms/volt, on 25 KV range. Has a 20 micro-ampere meter with an input impedance of 1250 Megohms. Has adequate safety precautions. RANGES: 0-25/50 KV D.C. Complete with polystyrene probe.

Model 4000 (Illustrated).....\$67.50 net

For further information on Bradshaw Test Equipment, write to Bradshaw Instruments Co.

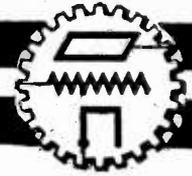


**GUARANTEE:** Every BRADSHAW instrument is FULLY GUARANTEED against defective parts or workmanship for **THREE MONTHS** after purchase.



# Industrial Instruments

## Electrical Test Equipment



### WHEATSTONE BRIDGE

● A carefully engineered bridge made for all around use in lab., plant, or field. Both models contain own  $4\frac{1}{2}$ -volt battery power supply and galvanometer. Provision for external batteries and galvanometer if desired. Ratio dial settings of .001, .01, .1, 1, 10, 100, and 1000 in both models. Also built-in resistance standards of 1, 10, 100, and 1000-ohm decades. Ratios are guaranteed to .05% tolerance. Resistance dial resistors to .1%. Self-cleaning, four-leaf phosphor bronze wiper switches with detent mechanism mounted below panel. Galvanometer of well-known moving-coil type. Separate binding posts for use of external galvanometer if desired, and for use of bridge as resistance decade. Hardwood case with removable cover.  $9\frac{1}{4}$ " x  $7\frac{1}{2}$ " x  $6\frac{1}{4}$ " h. Wt.  $9\frac{1}{4}$  lbs. net;  $12\frac{1}{4}$  lbs. shipping.

MODEL RN-1. Standard Portable Wheatstone Bridge, complete with batteries..... Net Price \$110.00

MODEL RN-2. Standard Portable Wheatstone Bridge with Murray & Varley Loops..... Net Price \$125.00

### MEGOHM METER

● For high-speed testing of condenser leakage resistance, insulation resistance and insulation measurements in production and inspection of components. Terminals for charging capacitors prior to test. Self-contained power source up to 200 volts. Arranged for use of external battery voltage supply up to 1000 volts. Internal checking standard to check and adjust calibration. Broad scale meter. Accuracy within 3% of full scale. Range of 1 megohm to 100,000 megohms on four multiplier ranges of 1, 10, 100, and 1000. Highest range can be extended to 500,000 megohms using external 1000 v. supply. Hardwood case. Sloping bakelite panel designed for production use.  $15$ " x  $8$ " x  $10$ " h. Wt. 19 lbs. net; 23 lbs. shipping.



MODEL L-2A. Megohm Meter with tubes..... Net Price \$145.00

MODEL L-2AU. Universal Model for use on 110-220 v. AC power line. available on special order..... Net Price \$160.00



### MEGOHM BRIDGE

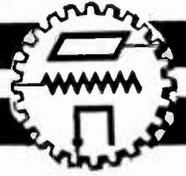
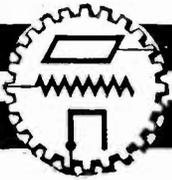
● A fast, accurate instrument for routine inspection work. May be used by laboratory workers, or production workers. Very simple to operate. "Magic Eye" replaces costly and delicate galvanometer. Operates from AC power line. Self-contained DC source. Accuracy within 5% from 1 to 15 on scale; as close as readable on remainder of scale. Hardwood case with slip-hinge removable cover.  $8$ " x  $5\frac{3}{4}$ " x  $7$ " h. Wt.  $6\frac{1}{4}$  lbs. net;  $8\frac{1}{4}$  lbs. shipping.

MODEL MB-4. 100 to 100,000 megohms. 500 v. DC Bridge source, Net Price \$60.00

MODEL MB-6. 100,000 ohms to 100 megohms; 10 megohms to 10,000 megohms..... Net Price \$60.00

MODEL MB-8. 1 megohm to 1000 megohms; 100 megohms to 100,000 megohms..... Net Price \$75.00

MODEL MB-11. 1 megohm to 1000 megohms; 10 megohms to 10,000 megohms; 100 megohms to 100,000 megohms..... Net Price \$120.00



### VOLTAGE BREAKDOWN TESTER

● A simple, positive, safe and quick means of testing voltage breakdown of materials and components. Step-up transformer accurately controlled by Variac. Continuously variable over entire range, 0 to 4,000 v. DC. For safety, load is limited to 5 milliamperes over full range. Also safety switch if unit is removed from case. Operates on AC line. Warning light indicates instrument is operative. Voltage breakdown indicated by red light.

**MODEL P-1.** Voltage Breakdown Tester with tubes. 15" x 8" x 10".  
Wt. 29 lbs. net; 32 lbs. shipping. (Not illustrated) Net Price \$150.00

**MODEL P-2.** Voltage Breakdown Tester with tubes and additional 0 to 3,000 v. AC outlet. 15" x 8" x 10". Wt. 29 lbs. net; 32 lbs. shipping. (Not illustrated) Net Price \$200.00

**MODEL P-3.** Voltage Breakdown Tester with tubes. Upright, crackle enamel finish cabinet of metal. Range 0 to 10,000 v. DC, 0 to 8,000 v. AC Net Price \$350.00



### RESISTANCE DECADES

● Available in standard models with resistance ranges of .9 to 999,999 ohms total.  $\pm 1\%$  of nominal accuracy. Self-cleaning, four-leaf phosphor bronze wiper switches with detent mechanism mounted below the panel. Hardwood case. Models DR-1 to DR-4, 5 3/4" x 8" x 4" h.; wt. 4 lbs. net; 6 lbs. shipping. Models DR-10 to DR-14, 4 1/8" x 6" x 4" h.; wt. 3 lbs. net; 5 lbs. shipping. Models DR-50 to DR-52, 6 1/8" x 9" x 4 1/4" h.; wt. 5 lbs. net; 7 lbs. shipping.



Model No.	Total Resistance Ohms	Decade Steps	Accuracy	Net Price
DR-1	999,000	9x(1,000 + 10,000 + 100,000)	$\pm 1\%$	\$ 50.00
DR-2	99,900	9x(100 + 1,000 + 10,000)	$\pm 1\%$	50.00
DR-3	9,990	9x(10 + 100 + 1,000)	$\pm 1\%$	45.00
DR-4	999	9x(1 + 10 + 100)	$\pm 1\%$	44.00
DR-10	.9	9x1	$\pm 1\%$	20.00
DR-11	9	9x1	$\pm 1\%$	20.00
DR-12	90	9x10	$\pm 1\%$	20.00
DR-13	900	9x100	$\pm 1\%$	20.00
DR-14	9,000	9x1,000	$\pm 1\%$	22.00
DR-50	9,999.9	9x(.1 + 1 + 10 + 100 + 1,000)	$\pm 1\%$	65.00
DR-51	99,999	9x(1 + 10 + 100 + 1,000 + 10,000)	$\pm 1\%$	70.00
DR-52	999,990	9x(10 + 100 + 1,000 + 10,000 + 100,000)	$\pm 1\%$	100.00

### CAPACITANCE DECADES

● This instrument is calibrated directly in capacitance so that reading from left to right, the dial settings will give the exact value in microfarads. Progressive adjustment in .01, or .001 mfd. steps depending on model. .001 to 11.1 mfd. can be obtained by group assembly. All units employ paper or mica capacitors of highest quality and stability. Hardwood case with hinged cover and snap lock. DK-3, DK-4 and DK-2A, 7" x 8" x 5 1/2" h.; wt. 8 lbs. net; 12 lbs. shipping. DK-10 and DK-11, 11" x 8 1/4" x 7" h.; wt. 10 lbs. net; 12 lbs. shipping.

Model	Capacitance Mfd. Steps	Accuracy	Dielectric	P.F.	Peak Volts	Net Price
DK-3	11.1 in .01	1%	paper	1%	150 DC	\$ 50.00
DK-4	1.11 in .001	1%	paper	1%	150 DC	\$ 50.00
			mica	.2%	400 DC	
DK-2A	1.11 in .001	1%	mica	.2%	700 DC	125.00
			throughout	.2%	500 AC	
DK-10	.111 in .0001	.5%	mica	1%	60 cycle	100.00
		or 10 mmfd.			700 DC	
DK-11	11.1 in .01	1%	paper	.2%	150 DC	125.00
		.5%	mica	.2%	700 DC	
					500 AC	
					60 cycle	



# FERRET Test Equipment

COASTWISE ELECTRONICS COMPANY, Inc.



## F. M.-TELEVISION SWEEP GENERATOR

### 20 M.C. Sweep Width — FERRET Model 720

Range — 0 to 260 M.C. on Fundamentals — 50 K.C. to 20 M.C. Sweep Width  
 Push-Button Control — All Miniature Tubes — Built-in Marker 19 to 40 M.C.  
 Pimper or Absorption Type

A revolutionary instrument for aligning any FM or Television receiver. Combination of push-buttons permits simultaneous use of crystal oscillator, internal audio oscillator, R.F. generator (modulated or C.W.) marker oscillator or sweep FM Television generator. This combination is not

possible with any other generator today. The unit is entirely independent of markers or external frequency standards since any marker frequency is possible from 19 m.c. to 40 m.c. on variable marker. Moreover, a crystal marker may be used and fully attenuated.

**\$164.95** DEALER PRICE  
 Slightly Higher  
 Eastern States

#### SPECIFICATIONS:

- Range: 0 to 260 m.c. (Fundamentals).
- Power: 110-120 volts, 50-60 cycles.
- Tubes: 6X4, 2-12AT7, 6C4, 3-6J6's.
- R.F.-AM (Mod. or C.W.) Sweep 50 k.c. to 20 m.c.
- Crystal oscillator.
- Dial: 9" Glass covered, calibrated directly on 8 bands.
- Case: Blue-gray Hammertone finished aluminum, with leather handle.
- Size: 10 1/4" high, 10 1/4" wide, 5 1/2" deep. Weight: 14 1/2 lbs. packed.

#### FEATURES:

- Range: 0 to 260 m.c.—all fundamentals.
- Sweep Width: 50 k.c. to 20 m.c.
- Crystal Oscillator.
- Variable Marker Oscillator: 19 to 40 m.c. Accuracy: 1% or better.
- Push-Button Control: Any of 4 oscillators or all 4 simultaneously.
- Crystal standard.
- Large 9" calibrated dial.
- Electronic Sweep.
- 5 to 1 Vernier drive.
- Accuracy: 1/2% on all bands.
- Temperature compensating circuits.
- Fully shielded — Low impedance output.
- Stand-by Switch for continuous operation.
- Provision for external modulation.
- Phasing Control.

## SIGNAL TRACER ELECTRONIC VOLT OHM METER

with SUB-MINIATURE 6K4 DIODE PROBE — Model 730



**\$99.95**  
 DEALER PRICE  
 Slightly Higher  
 Eastern States

Audio & R.F. Measurements to 300 M.C. Proximity Type Fused used in Lightweight Probe. High Gain Signal Tracer — No Hum with 5" Speaker Enclosed. Illuminated 8" Meter — 1 Volt R.F. Scale.

The FERRET Model 730 is the ultimate in a combined Signal Tracer and Vacuum Tube Volt Ohm Meter that incorporates features not found in competitor's lines at any price.

Accurate direct R. F. measurements up to 300 Megacycles for F. M. and television receivers are easily obtained. The same probe is used for the Signal Tracer and operates a hum-free rectifier.

In addition to the advanced type probe, the Model 730 offers improved features that make this combination instrument the most important single unit on the service bench,



Proximity Fuze Type  
 Lightweight Probe.

#### SPECIFICATIONS:

- Power: 110-120 volts, 50-60 cycles.
- Range: AC-DC 0-1, 3, 30, 100, 300, 1000, 3000.
- Ohms: Mid-scale 10 x 1 x 10 x 100 x 1000 x 100,000 x 1 megohm.
- Frequency: Audio to 300 megacycles.
- Tubes: 6X4, 2-12AU7, 6AQ5, 6AQ6, 6AL5, 6K4.
- Input Impedance: DC 10 megohms, AC 10 megohms.
- Probe: 6K4 Diode connected.
- Case: Aluminum, blue-gray Hammertone finish with leather handle.
- Size: 10 1/4" high, 10 1/4" wide, 5 1/2" deep. Weight: 13 1/2 lbs. packed.

#### FEATURES:

- AC-DC volt scale 0-1, 3, 30, 100, 300, 1000 and 3,000.
- Ohm scale 10, 100, 1000, 10,000, 100,000, 1 megohm and 10 megohm center scale.
- High impedance input 10 megohms DC, 10 megohms AC.
- Extremely accurate for all AC measurements to 300 megacycles.
- Four stage amplification for signal tracing. Sufficient gain for tracing signal from antenna without using receiver as amplifier with good tone and with enclosed Speaker.
- All resistors calibrated to ± 1%.
- All miniature tubes.
- 8" illuminated meter with multi-colored, easy to read scale.
- Special 1 volt R. F. scale.

## GERMANIUM CRYSTAL PROBE - Model A-100



**\$7.95** DEALER PRICE

A universal replacement lightweight probe, that will not deteriorate or wear out with normal use. An ideal unit for all types of meters, for the "ham," experimenter or beginner in building and converting various test instruments. No change in electrical characteristics with use. Shield seven inches long, one-half inch diameter.

#### SPECIFICATIONS:

- 1N34 Crystal.
- 1/2" diameter aluminum shield.
- RG/59U Coaxial cables, 36" long.
- Frequency Response: from 20 kilocycles to 110 megacycles.
- Individually boxed in attractive counter display carton with complete instructions and diagrams for its many uses.
- Packed: 6 Boxes to shipping container, weight: 2 1/2 lbs.; 12 Boxes to shipping container, 5 lbs.

# FERRET Test Equipment

COASTWISE ELECTRONICS COMPANY, Inc.



## AUDIO OSCILLATOR — Sine Wave - Square Wave — Model 710



**\$89.95** DEALER PRICE  
Slightly Higher  
Eastern States

An audio oscillator with recently developed features, that is outstanding in its field. Incorporates two units in one: a Sine Wave R.C. type oscillator with low distortion on all bands, and a Square Wave generator with the same frequency range. Provides a laboratory standard for all audio application and frequency response measurements in both designing and practical applications.

### SPECIFICATIONS:

- Power: 110-120 volts, 50-60 cycles.
- Range: 20 to 24,000 cycles. 3 bands.
- Tubes: 6X4, 6AQ5, 6AU6, 12AU7.
- Output: High impedance, 15 volts sine wave or square wave.
- Dial: 3 to 1 Vernier, red and black scale on white background, hairline pointer.
- Panel: 3-color iridescent blue-gray finish.
- Test Leads: Coaxial cable, RG/59U.
- Size: 10 1/4" x 10 1/4" x 5 1/2".
- Weight: 11 lbs. packed.

### FEATURES:

- R. C. type oscillator — does not use beat frequency circuit.
- Range: 20 to 24,000 cycles — 3 bands.
- All new-type miniature tubes.
- Accuracy: within 2% on all bands.
- True sine wave throughout range, with special feedback circuit for each band.
- Sine or square wave obtained by merely rotating panel switch.
- Transformers electrostatically shielded.
- Laboratory precision construction throughout.
- Vernier Drive — 3 to 1 ratio.

## SIGNAL GENERATOR Wide Range FM-AM-Television, Model 701

### All Miniature Tubes



**\$74.95**  
DEALER PRICE  
Slightly Higher  
Eastern States

A crystal-calibrated unit for AM, FM and Television receivers, operating on fundamental frequencies to 110 Megacycles. Output voltage of 1 volt, relatively constant from 170 K.C. to 110 M.C. Universal in scope, it serves the needs of modern radio servicing in both low and high frequency receivers. 9" calibrated dial.

### SPECIFICATIONS:

- Range: 170 k.c. to 220 m.c.
- Power: 110-120 volts, 50-60 cycles.
- Tubes: 6C4, 6AU6, 6X4.
- Dial: Large 9" three-colored scale, glass covered with molded es-cutechon.
- Output: 1. volt R.F. low impedance.  
Coaxial cable, 50 volts Audio high impedance.

### FEATURES:

- Range: 170 k.c. to 220 m.c. — Fundamentals to 110 m.c.
- Completely shielded for minimum radiation.
- Crystal calibrated, low loss, permeability tuned R.F. coils.
- Internal 225-cycle sine wave modulation — 0 to 100%.  
Calibrated directly on dial.
- 20 to 10,000 cycle external modulation for frequency response measurement.
- Turret coil construction with shortest possible leads for minimum leakage and maximum R.F. Stability. Follow-up shorting type switch — no dead spots.
- Electron coupled combination Hartley and Colpitts oscillator for high L.C. ratio, low drift and maximum stability to line voltage fluctuations.
- Low loss, low impedance, coaxial cable output.
- Ladder attenuator.
- Vernier drive: 3 to 1 ratio.
- Accuracy: 1% on all bands.

## DE LUXE TEST SPEAKER and Universal Substitutor — Model 721



**\$29.95**  
DEALER PRICE  
Slightly Higher  
Eastern States

Designed primarily to eliminate necessity of removing set-speaker from midget radios, consoles or auto radios for servicing. Compact, portable, lightweight unit, housing a specially constructed 6" PM speaker with exceptional tone quality and sufficient current rating to test any radio.

### SPECIFICATIONS:

- Field Impedance: 500, 1000, 1500 and 2500 Ohms.
- Current: 175 Milliamperes Maximum.
- Input: Universal. for single ended or tubes in push-pull.
- Speaker: 6" PM. Dustproof, of special construction; low resonant point.
- Size: 10 1/4" high, 10 1/4" wide, 5 1/2" deep.
- Weight: 8 1/2 lbs. packed.

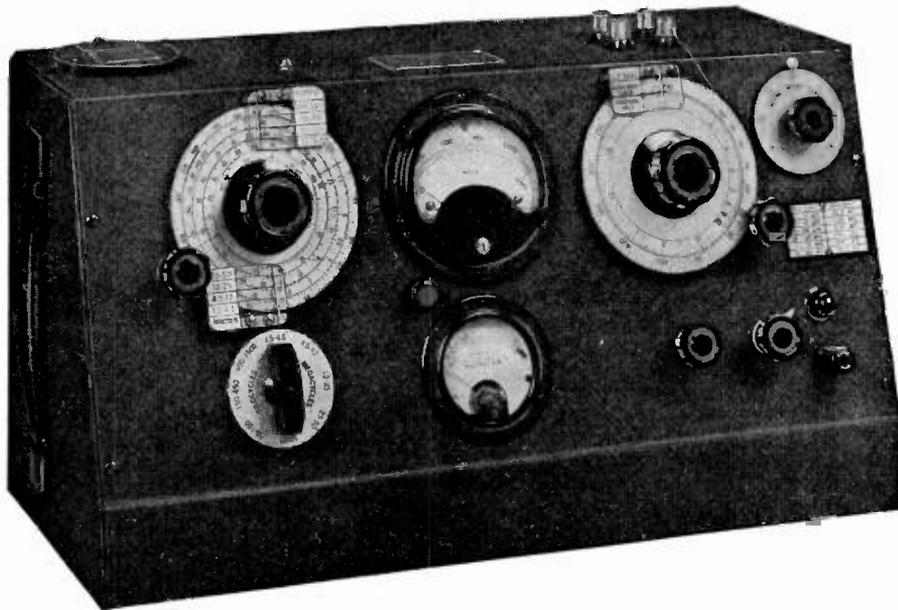
### FEATURES:

- Provides a substitution for choke, electrolytic condensers, coupling, by-pass condensers and a wide range of resistors.
- Speeds servicing — eliminates soldering until all defective parts are located and substituted.
- Voice coil connection permits substitution of any output transformer.
- Rotating input and field switches on front panel permits matching to any single or push-pull output tubes.

PRECISION  
FOR THE RADIO AND



INSTRUMENTS  
ELECTRONIC INDUSTRY



## Q-METER

TYPE 160-A

Radio frequency circuit design often requires the accurate measurement of Q, inductance, and capacitance values. For this application, the 160-A Q-Meter has become the universal choice of radio and electronic engineers throughout the country.

Each component part and assembly used in the manufacture of this instrument is designed with the utmost care and exactness. Circuit tolerances are held to values attainable only in custom built instruments.

The 160-A Q-Meter is designed specifically for the accurate and rapid measurement of Q, inductance, and capacitance. The basic method of measurement consists of measuring the voltage developed across a variable air capacitor connected as an element in a series resonant circuit. Essentially the Q-Meter is comprised of an 8 range RF oscillator, a Q measuring circuit with a main and vernier section tuning condenser, a vacuum tube voltmeter of special design which reads the voltage across the tuning condenser, and a voltage injection circuit which applies an accurately known voltage to the terminals of the series resonant circuit. In operation the Q circuit is resonated by means of the variable Q tuning capacitor and the voltage developed across this capacitor is indicated by means of the vacuum tube voltmeter which is calibrated directly in terms of Q. This method of measuring Q is simple, accurate, and requires only a single operation—resonating the circuit—to measure Q. Variations of this basic method of measurement are employed to determine effective inductance and capacitance as well as the dielectric properties of insulating materials

### SPECIFICATIONS

**Oscillator Frequency Range:** Continuously variable from 50 kc. to 75 mc. in eight self-contained ranges. (In conjunction with an external oscillator the frequency range of the Type 160-A Q-Meter may be extended from 50 kc. to 1 kc. for coil measurements).

**Oscillator Frequency Accuracy:** Generally better than  $\pm 1\%$ , except the 50-75 mc. range which is approximately  $\pm 3\%$ .  
**Range of Q Measurements:** The Q voltmeter is calibrated directly

in Q, 20-250. The "Multiply-Q-By" meter, which measures the oscillator voltage injected in the Q measuring circuit, is calibrated from  $\times 1$  to  $\times 2$  and also at  $\times 2.5$ . The reading of the Q voltmeter scale is multiplied by the setting of the "Multiply-Q-By" meter. Hence, the total range of circuit Q measurements is from 20 to 625. Condensers, dielectrics, etc., which are measured by placing these in parallel with the measuring circuit, may have Q's as high as 5000.

**Accuracy of Q Measurements:** The accuracy of the direct reading measurement of circuit Q (for Q voltmeter readings between  $Q=50$  and  $Q=250$ ) is approximately 5% for all frequencies up to the region of 30 mc. and decreases with increasing frequency. Correction may be made for the error above 30 mc. as it is principally a frequency effect. The accuracy of the measurement of condensers, dielectrics, etc. is generally better than 10% for Q's below 5,000 and up to 30 mc.

**Capacitance Calibration Range:** Main tuning condenser 30-450 mmf. calibrated in 1 mmf. divisions from 30 to 100 mmf. and in 5 mmf. divisions from 100 to 450 mmf. Vernier condenser, plus 3 mmf., zero, minus 3 mmf., calibrated in 0.1 mmf. divisions.

**Accuracy of Capacitance Calibration:** Main tuning condenser, generally better than 1% or 1 mmf., whichever is the greater. Vernier tuning condenser,  $\pm 0.1$  mmf. The internal inductance of the tuning condenser at the binding posts is approximately .015 microhenry.

**Voltmeter:** The Q voltmeter is also calibrated in volts. A specially calibrated tube, Type BRC 105-A tube, is used. Replacements may be made without recalibration.

**Power Supply:** 105-120 volts, 50-60 cycles. Also 210-240 volts, 50-60 cycles. Power consumption 50 watts.

**Dimensions:** Height 12.5", length 20", depth 8.5".

**Weight:** 25 lbs.

**Price:** \$625.00 F.O.B. Boonton, N. J., U.S.A.

**BOONTON RADIO**

BOONTON - N. J. - U. S. A.

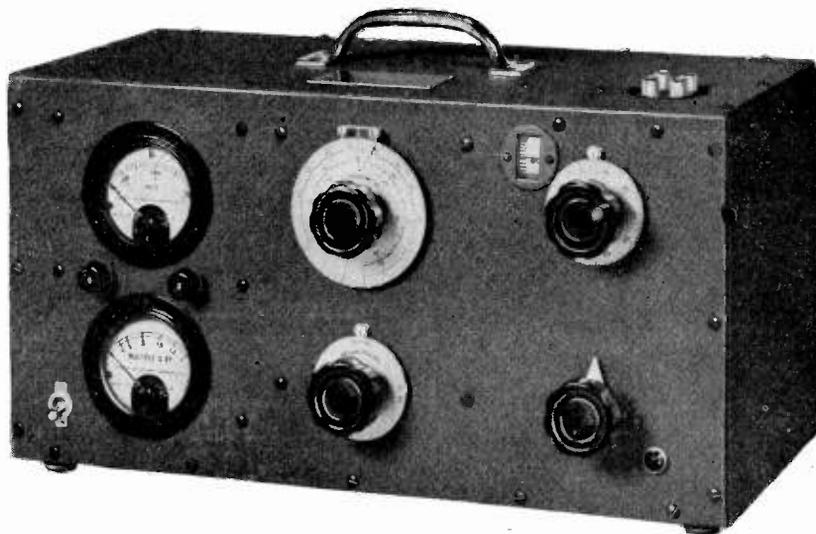
*Corporation*



## Q-METER

TYPE 170-A

The Type 170-A Q-Meter utilizes the same general operating principles and characteristics as the Type 160-A Q-Meter, but incorporates such structural modifications and design refinements as are required for accurate performance at the higher frequencies. This instrument is intended to supplement the low frequency Q-Meter by extending the range of measurement up to 200 mc.



### SPECIFICATIONS

Oscillator Frequency Range: Continuously variable from 30 mc. to 200 mc. in three ranges—Calibration accuracy  $\pm 1\%$ .

Range of Q Measurements: The Q voltmeter is calibrated directly in circuit Q, from 80 to 300. The "Multiply-Q-by" meter is calibrated from x1 to x4, hence the range of circuit Q measurements is from 80 to 1200.

Accuracy of Q Measurements: The accuracy of the direct reading measurement of circuit Q is  $\pm 10\%$  up to 100 megacycles and decreases with increasing frequency.

Capacitance Calibration of Q Capacitor: Range 11-60 mmfd. calibrated in unit mmfd. divisions. Accuracy: 1% or 0.5 mmfd., whichever is greater. Micrometer dial divided into 100 divisions.

Power Supply: 110-120 volts, 50-60 cycles. Also 220-240 volts, 50-60 cycles. Power consumption 50 watts. Dimensions: 17" x 10 $\frac{1}{2}$ " x 8 $\frac{3}{4}$ ".

Weight: 21 lbs.

Price: \$550.00, F.O.B. Boonton, N. J., U.S.A.

## QX CHECKER TYPE 110-A

The QX-Checker is a production type test instrument specifically designed to compare reactance and relative Q of RF components with approved standards. The two factors, reactance and relative Q, are separately indicated, one on a meter and the other on a condenser dial, so that the deviation of either from established tolerances is immediately shown. Built to laboratory standards, the QX-Checker is a sturdy, fool-proof instrument for use in production work by factory personnel.

### SPECIFICATIONS

Oscillator Frequency Range: 100 kc. to 25 mc. in 6 ranges using accessory plug-in coils (two coils furnished with each instrument).

Accuracy of Coil Checks: Coils may be checked against a standard to within about 0.2% with inductance values of 10 microhenries to 10 millihenries and Q of 100 or greater.



Capacitance Range: Capacitance values ranging between approximately 2-1000 mmf. may be checked against a standard to an accuracy of a few tenths of one mmf. if the Q of the capacitor is high.

Power Supply: 110-125 volts, 50-60 cycles, also 200-250 volts, 50 cycles.

Dimensions: Width 12 $\frac{1}{4}$ ", Depth 18". Height 8".

Weight: 26 lbs.

Price: \$340.00, F.O.B. Boonton, N. J., U.S.A.

**BOONTON RADIO**

BOONTON · N · J · U · S · A ·

*Corporation*

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INSTRUMENTS  
ELECTRONIC INDUSTRY

## FM SIGNAL GENERATOR

TYPE 202-B

The type 202-B FM Signal Generator has been developed to meet the needs of engineers engaged in the design of FM and television receivers for operation within the frequency range of from 54 megacycles to 216 megacycles.

This instrument has been proportioned for maximum conservation of laboratory bench space, with frequency dial, modulation and output meters positioned at eyelevel for maximum readability. The unit is finished in grey wrinkle enamel with engraved panel and is supplied complete with tubes and standard output cable.

### SPECIFICATIONS

**RF Range:** Frequencies from 54 mc. to 216 mc. are covered in two ranges, 54-108 mc. and 108-216 mc.

**Main Frequency Dial:** The two RF ranges are calibrated directly in megacycles to an accuracy of within  $\pm 0.5\%$ . The dial is also divided in 24 equal divisions for use with the vernier frequency dial.

**Vernier Frequency Dial:** The vernier frequency dial is divided in 100 divisions and is geared to the main dial through a gear train having a 24:1 ratio. The approximate frequency change per vernier division is 26 kc. on the low range and 52 kc. on the high range.

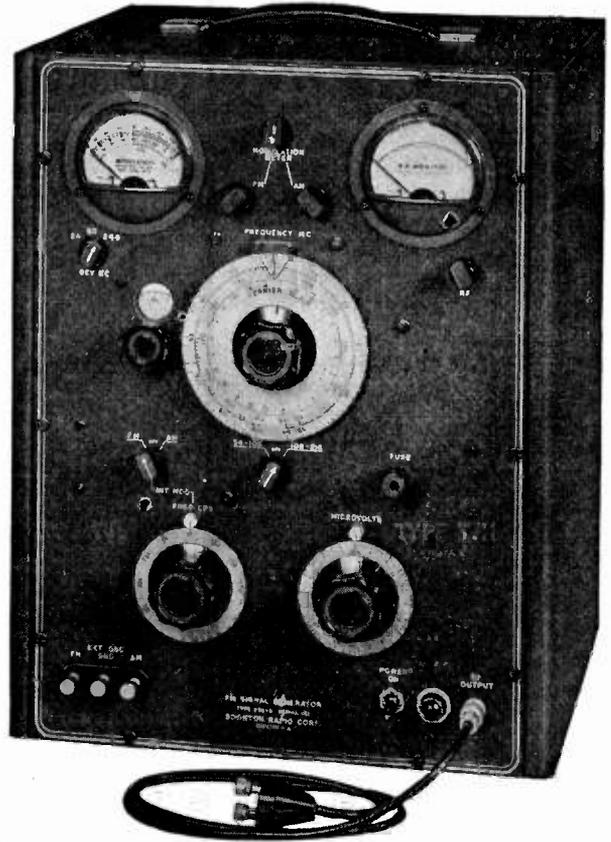
**Frequency Modulation (Deviation):** The FM deviation is continuously variable from zero to 240 kc. The modulation meter is calibrated in three FM ranges (1) zero to 24 kc., (2) zero to 80 kc. and (3) zero to 240 kc. deviation.

**Amplitude Modulation:** The modulation meter is calibrated at 30% and 50% amplitude modulation. AM is continuously variable from zero to 50%.

**Modulation Controls:** Separate potentiometers are provided for continuous control of FM and AM levels.

**Modulating Oscillator:** The internal AF oscillator may be switched to provide either frequency or amplitude modulation; it may also be switched off. External binding posts permit the use of an external AF oscillator for either FM or AM. Both internal and external AF oscillators may be used simultaneously, thus providing either FM or AM at two modulation frequencies simultaneously or simultaneous FM and AM. The internal AF oscillator provides eight fixed frequencies which may be selected by a rotary type switch—50, 100, 400 cycles and 1, 5, 7.5, 10 and 15 kilocycles, accurate to within 5%. The output voltage of the internal AF oscillator is available at the external binding posts for synchronizing or other purposes.

**RF Output Voltage:** The RF output voltage is continuously variable over a range from 0.1 microvolt to 0.2 volts at the terminals of the output cable. The impedance at the RF output jack, looking into the instrument, is 53 ohms resistive. The output cable has a 53 ohm resistance termination at the terminal end hence the output impedance of the unit with cable attached is 26.5 ohms.



**Distortion:** FM distortion at 75 kc. deviation is less than 2% when modulated with the internal AF oscillator or an external AF oscillator having 0.5% distortion or less. At 50% amplitude modulation the distortion is about 5% using the internal AF oscillator and decreases as the modulation percentage is reduced. An external AF oscillator may be employed for amplitude modulation if desired.

**Spurious RF Output:** All spurious RF output voltages are at least 30 db. below the desired fundamental. The RF leakage is very low.

**Fidelity Characteristics:** The deviation sensitivity of the FM modulation system as a function of frequency is constant from dc. to over 10 kc. At 15 kc. the deviation as indicated on the modulation meter is 0.5 db. higher than the true value. The amplitude modulation system is also flat to 10 kc., and departs from nominal by 1.0 db. at 15 kilocycles.

**Power Supply:** The power supply is self-contained in the instrument for use on 60 cycles, 110 volts.

**Accessories:** 203-A Frequency Converter (Frequency range 0.4 mc. to 25 mc.).

**Dimensions:** Height: 17"; Width: 13½"; Depth: 11½".

**Weight:** 35 lbs.

**Price:** \$975.00, F.O.B. Boonton, N. J., U.S.A.

**BOONTON RADIO**

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*Corporation*



## UNIVERTER TYPE 203-B

The Type 203-B Univerter, a frequency converter accessory having unity gain, is designed for use with the Type 202-B FM Signal Generator to provide additional frequency coverage of from 0.4 mc. to 25 mc. Since the 202-B FM Signal Generator covers a frequency range from 54 to 216 megacycles, the 203-B Univerter offers a simple means whereby the additional coverage of commonly used intermediate and radio frequencies may be obtained. This instrument also enables the frequency and amplitude modulation features of the 202-B instrument, as well as the attenuator calibration, to be utilized at these lower frequencies without causing any appreciable distortion.

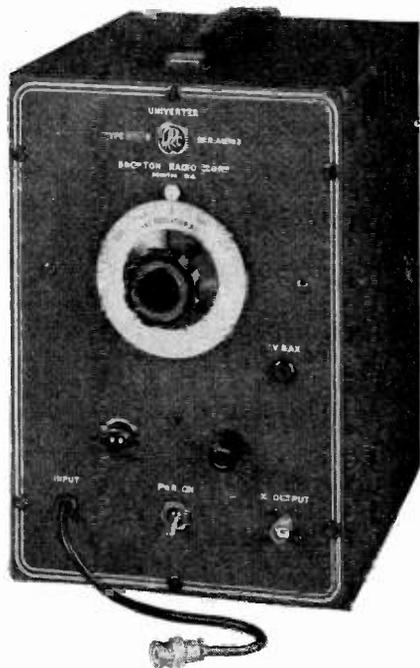
The 203-B Univerter matches the 202-B FM Signal Generator in styling and finish, and is supplied complete with tubes and instruction book.

### SPECIFICATIONS

**RF Range:** The Univerter, in combination with the 202-B FM Signal Generator, covers from 0.4 mc. to 25 mc. (0.1 mc. to 25 mc. with no carrier deviation). The RF voltage at the X1 OUTPUT jack is uniform within  $\pm 1$  db. over the frequency range of the instrument.

**Frequency Increment Dial:** This dial is calibrated in increments of 10 kc. from plus 250 kc. through zero to minus 250 kc.

**RF Output:** The RF output voltage at the X1 panel jack is continuously variable from 0.1 microvolt to 0.1 volt by means of the 202-B Signal Generator attenuator. For 0.2 volt input to the Univerter, the output is approximately 0.18 volt. The impedance at the RF output jack, looking into the instrument is approximately 60 ohms resistive. The RF output voltage at the 2 VOLT MAX. pin jack is uncalibrated but may be controlled from the attenuator of the 202-B FM Signal Generator. At this pin jack the internal impedance is approximately 470 ohms.



**Power Supply:** The 203-B Univerter is designed for use on 50-60 cycles, 115 volts  
**Dimensions:** H: 11 1/2" W: 7 3/8" D: 10 1/2"  
**Weight:** 11 lbs.  
**Price:** \$300.00, F.O.B. Boonton, N. J., U.S.A.

## BEAT FREQUENCY GENERATOR TYPE 140-A

This instrument has found universal acceptance because of its wide frequency coverage from 20 cycles to 5 megacycles. A five step decade attenuator provides a means by which extremely small output voltages can be accurately set and a six position switch enables any one of a variety of output impedances to be quickly selected.

### SPECIFICATIONS

**Frequency Range:** 20 cycles to 5 megacycles in two ranges.

**Low Range:** 20 to 30,000 cycles.

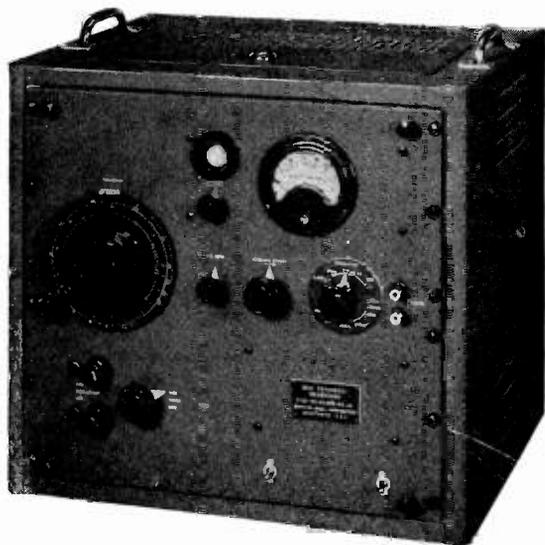
**High Range:** 30 kc. to 5 mc.

**Frequency Calibration:** Accuracy  $\pm 2$  cycles up to 100 cycles,  $\pm 2\%$  above 100 cycles.

**Stability:** About 5 cycles drift below 1000 cycles. On low range, drift becomes negligible percentage with increasing frequency. On high range, drift is 3% or less.

**Adjustment:** High and low ranges have individual zero beat adjustments. Low range may be checked against power line frequency with front panel 1 inch cathode ray tube.

**Output Power and Impedances:** Rated power output: One watt, available over the low frequency range from output impedances of 20, 50, 200, 500, 1000 ohms, and over both high and low frequency ranges from an output impedance of 1000 ohms.



**Distortion:** 5% or less at 1 watt output, 2% or less for 1/2 voltage output.

**Voltmeter Accuracy:**  $\pm 3\%$  of full scale reading.

**Power Supply:** 110-120 volts, 50-60 cycles, also 220-240 volts, 50-60 cycles.

**Power Consumption:** About 120 watts.

**Dimensions:** Width: 21 1/2", Depth: 15", Height: 19 1/2".

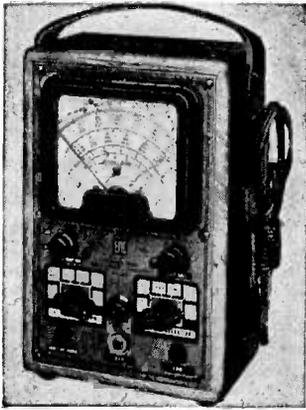
**Weight:** 86 lbs.

**Price:** \$1,050.00, F.O.B. Boonton, N. J., U.S.A.

**BOONTON RADIO**

BOONTON · N. J. · U. S. A.

*Corporation*



# E.M.C.

Gives More Measurement  
Value per Dollar

## THE E. M. C. MODEL 300 VACUUM TUBE VOLT-OHM-CAPACITY METER

The new Model 300 Vacuum Tube Volt-Ohm-Capacity Meter is an unusually stable, extremely compact instrument, with all of the inherent quality of

design and manufacture that is always built into all E.M.C. test instruments.

Its price — amazingly low — was made possible through the development of a new efficient circuit by E.M.C. engineers, which enabled great economies. Its large, accurate meter, mounted on a clearly defined, modern panel, makes operation a pleasure rather than a chore.

Sturdily cased in oak, this instrument will withstand rough usage, and will give complete satisfaction under all conditions. The Model 300 is supplied as an open-face bench model, or as a portable model complete with cover.

### SPECIFICATIONS

Uses 4½" meter.

DC Volts — 6 ranges: 0-3-10-30-100-300-1000 volts.

Input resistance 1 meg per volt on 0-3 and 0-10 ranges, 30 megohms input resistance on 0-30-100-300 and 1000 volts ranges.

1 megohm isolating resistor in probe.

AC Volts — 5 ranges: 0-10-30-100-300-1000 volts.

Approximately 1000 ohms per volt. Full wave tube rectification used.

Resistance — 6 ranges from 2 ohms to 1000 megohms.

Capacity — 4 ranges, from 25 micromicrofarads to 20 microfarads (.000025 mfd to 20 mfd).

Has zero center position available for lining up the discriminator of an FM radio.

Open Face Model, complete with leads, Dealer Price ..... **\$39.50**

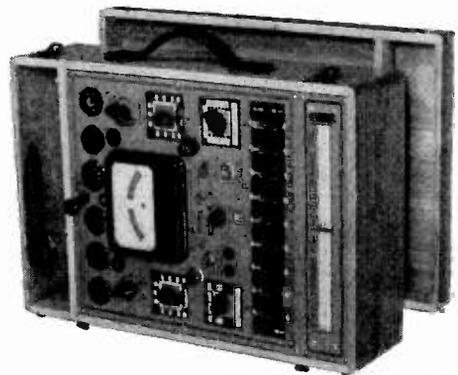
Model 300P, above model, in portable case with cover. Dealer Price ..... **44.50**

Model HFP, High Frequency Probe, for above models ..... **6.50**

## E. M. C. MUTUAL CONDUCTANCE TUBE TESTER — MODEL 200

### Check These Features

- ✓ Checks mutual conductance on a calibrated micromho scale, as well as an a "Reject-Good" scale.
- ✓ Checks 5 element tubes as pentodes.
- ✓ Checks tubes for gas content.
- ✓ Sufficient plate current to check both emission and mutual conductance.
- ✓ Detects both shorted and open elements.
- ✓ Complete switching flexibility allows all present and future tubes to be tested regardless of location of elements on tube base.
- ✓ Tests tubes for radio frequency and other noise.
- ✓ Tests all tubes from .75 volts to 117 filament volts.
- ✓ Tests all loctal, octal, and miniature tubes.
- ✓ Tests cold cathode, magic-eye, voltage regulator tubes, ballast resistors.
- ✓ Instrument is fused, and fuse is easily replaceable from front of panel.
- ✓ Individual sockets for each tube base type eliminates possible errors.
- ✓ Checks individual sections of multi-purpose tubes.
- ✓ Attractive four-color panel with plenty of eye-appeal. Hard wrinkle finish for durability.



### E.M.C. Series 200 Mutual Conductance TUBE TESTERS

	Net Prices
Model 200 BC . . . 4½" meter in sloping counter case .....	\$58.50
Model 200 BP . . . 4½" meter in hand-rubbed carrying case .....	62.50
Model R200 BC . . . Same as Model 200 BC plus built-in Roll Chart .....	64.50
Model R200 BP . . . Same as Model 200 BP plus built-in Roll Chart .....	68.50
Roll Chart unit in individual case .....	6.00
(For 220 v. operation add \$5.00 to above prices)	

**ELECTRONIC**  **MEASUREMENTS**  
CORPORATION

# E. M. C. Announces A Complete Line Of VOLOMETERS\*

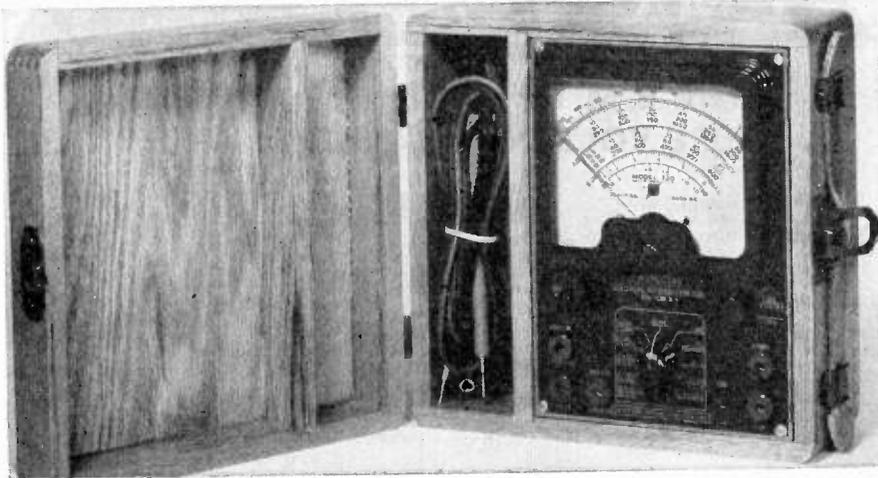
\*Reg. trade mark for volt-ohm-milliammeter

## MODEL 120

20,000 ohms per volt

Model 120 is the **ONLY** 20,000 ohms per volt instrument that gives you:

1. **WIDEST** resistance range (.2 ohm to 300 megs.)
2. **HIGHEST** AC voltage sensitivity (10,000 ohms per volt)
3. **LOWEST** PRICE — \$29.95, open face model; \$34.95 for Model 120-P (portable)



### Other Features Include:

1. AC voltage frequency range 30 cycles to 1 megacycle.
2. Rectifier and battery replaceable without soldering iron.
3. No external source of power needed for AC voltage measurements.
4. Special precision voltage multipliers accurate to 1%.

### Specifications:

- DC volts at 20,000 ohms per volt: 0-3v, 0-15v, 0-60v, 0-300v, 0-1500v, 0-6000v.
- AC volts at 10,000 ohms per volt: 0-6v, 0-30v, 0-120v, 0-6000v, 0-3000v, 0-6000v.
- DC current: 0-60 microamps, 0-6ma, 0-60ma, 0-600ma, 0-6 amps.
- Resistance: 0-3000, 0-300,000, 0-3 megs, 0-300 megs.
- Decibels: -4 to +11, +10 to +25, +22 to +37, +36 to +51, +50 to +65, +62 to +77.

## MODEL 105

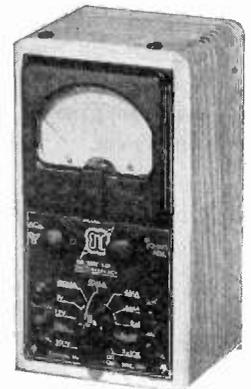
5000 ohms per volt

The Model 105 will accurately measure AC voltages from 25 cycles to 100 KC with no temperature errors, and without the necessity of plugging into any external source of power. For this reason it is invaluable for Audio or I.F. In addition, the Model 105 can be used to measure resistances from 1/2 ohm to 30 megohms.

### SPECIFICATIONS:

- 6 DC voltage ranges (approx. 5000 ohms per volt) 0 to 3-15-60-300-1500-6000 volts.
- 6 AC voltage ranges (approx. 2500 ohms per volt) 0 to 6-30-120-600-3000-6000 volts.
- 4 DC current ranges, 0 to .6-6-60-600 milliamperes.
- 3 resistance ranges, 0 to 3000-300,000 ohms; 0 to 30 megohms.
- 6 DB ranges, -10 to +77.

Open face model, Size: 6 3/8" x 3 1/2" x 3". ..... Price **\$22.95**  
 Portable Model. Complete with set of test leads. Size: 6 3/8" x 4 1/2" x 4 1/4". ..... Price **\$26.95**



MODEL 105

## MODELS 101A & 101B

1000 ohms per volt

Here is an unusually attractive, **EXCEPTIONALLY** LOW-PRICED volt-ohm-milliammeter. It is a rugged, flexible instrument, combining features which are not available in competitive models selling for more than double this price.

You will be convinced when you read the "Specifications" and "Special Features" that **MODEL 101 VOLOMETER** is just the instrument to have around the shop or lab whenever the type of measurement does not justify the use of expensive, complicated, highly sensitive equipment.

The fact that resistances between 1/20 OHM and 20 MEGS and AC voltages between 25 CYCLES and 1 MEGACYCLE in frequency can be measured with this unit, makes it a handy and very valuable instrument. In short, when it comes to value and versatility, **MODEL 101** really sets the pace.

### SPECIFICATIONS

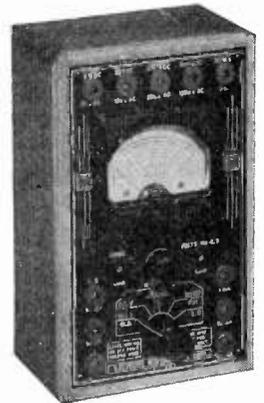
- 5 DC VOLTAGE RANGES (approx. 1000 ohms per v.): 0 to 6-60-300-600-3000 volts.
- 4 AC VOLTAGE RANGES: 0 to 12-120-600-1200 volts.
- 3 DC CURRENT RANGES: 0 to 6-60-600 milliamperes.
- 4 RESISTANCE RANGES: 0 to 200-2000-200,000 20 megohms.



MODEL 101B

Open face as shown.

Price ..... **\$20.95**  
 Size: 5 3/8" x 8 5/8" x 2 3/4".  
 In portable case.  
 Price ..... **\$24.95**  
 Size: 7 1/8" x 8 5/8" x 3 3/4"  
 Complete with test leads.



MODEL 101A

Open face as shown.

Price ..... **\$17.50**  
 Size: 4 1/2" x 7 1/2" x 3 1/4"  
 In portable case.  
 Price ..... **\$21.50**  
 Size: 6 1/4" x 7 1/2" x 3 1/4"  
 Complete with test leads.

# RADIO CITY PRODUCTS CO., Inc.

NEW YORK 1, N. Y.

## TEST EQUIPMENT



### COMBINATION TUBE TESTER

#### SET TESTER and CONDENSER TESTER MODEL 802NA

— EASY OPERATION — UP TO DATE —

— Only 5 switches for operating both Tube and Set Tester —



Tube Tester has speedy leakage-short tests between all elements. Separate noise test for tubes that otherwise test "good". Large scale  $4\frac{1}{2}$ " meter protected against burn out by special meter fuse for both multitester and tube tester. Complete unit also protected by separate fuse. Tests new and old types of tubes as well as ballast tubes. New gold plated copper oxide rectifier used for A.C. voltage measurements. Multipliers are matched for 1% tolerance.

#### RANGES

DC Voltmeter: 0-10-50-500-1000 at 1000 Ohms per Volt.  
AC Voltmeter: 0-10-50-500-1000.  
DC Milliammeter: 0-1-10-100-1000.  
DC Ammeter: 0-10 Amperes.  
Ohmmeter: 0-500-5000-1 Meg.-10 Meg. Low center scale.  
DB Meter: —8 to +55 decibels in four ranges.  
Four range output meter: Same as AC volts.

Model 802NA—supplied in handsome hardwood case, with special compartment for small tools, test leads (included), etc. Size:  $12\frac{3}{4}$ " x 12" x  $5\frac{1}{4}$ ". Weight: 11½ lbs. Complete with self-contained batteries, ready to operate.

Dealer Net Price ..... **\$59.50**

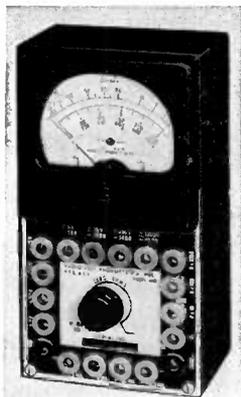
Servishop Model 8073—Combines Model 802NA with Model 730 signal generator fitted into the same case making a complete service shop containing TUBE TESTER — MULTITESTER — CONDENSER TESTER — A.M. SIGNAL GENERATOR — F.M. SIGNAL GENERATOR — AUDIO OSCILLATOR.

The A.M.—RF, as well as the F.M. signal generator are accurately set for the four needed calibration frequencies—two I.F. and two ends of the band. The audio oscillator has a 400 cycle output.

Model 8073—Housed in same overall case as Model 802NA, complete with all tubes, output leads, operating instructions etc.—ready to operate.

Dealer Net Price ..... **\$84.95**

### POCKET MULTITESTER MODEL 449A



Versatile multi-tester remarkably accurate. It's tops for general circuit testing and for speed in trouble-shooting. Uses a 3" square meter at 5,000 ohms per volt with a basic movement of 200 microamperes. Batteries are mounted in special spring clips readily accessible for replacement—no wires to solder. Combines 6 instruments in one small unit.

#### RANGES

DC Volts: 0-5-50-250-1000 Volts.  
AC Volts: 0-5-50-250-1000 Volts.  
DC MA: 5-10-100-1000 MA.  
Ohms: 0-2000-20,000-0-2-2. Meg-ohms.  
Decibels: —6 to +52 DB in four ranges.  
Output Meter: 0-5-50-250-1000.

Model 449A—Pocket Multitester supplied in black metal case complete with self-contained batteries. Ready to operate. Size  $5\frac{7}{8}$ " x  $3\frac{1}{8}$ " x  $2\frac{1}{8}$ ". Weight 1¼ lbs.

Dealer Net Price ..... **\$24.50**

Model 449AP—Same as 449A but supplied in portable oak case with leads.

Dealer Net Price ..... **\$28.50**

### DYNOPTIMUM TUBE TESTER

#### MODELS 322A AND 322AP

— Simple operation —  
only 4 switches used —

R. C. P. again demonstrates leadership in the design of this Tube Tester. Special noise test for tubes that otherwise test "good," gives a speedy leakage short test between all elements, tests new and old types of tubes, individual sections of multi-purpose tubes, and has provisions to check all miniature and sub-miniature tubes.



Model 322P

Complete instrument is protected against burn-out by line fuse immediately replaceable at front of panel.

This Model Features simplicity, speed of operation and compactness, in addition to its economical price.

Counter Model 322A (steel case—sloping panel). Size  $5\frac{1}{4}$ " x  $12\frac{3}{8}$ " x 8". Weight  $8\frac{1}{4}$  lbs.

Dealer Net Price ..... **\$37.95**

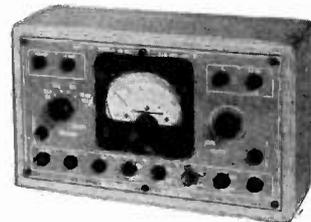
Portable Model 322AP. Size  $4\frac{7}{8}$ " x  $12\frac{1}{8}$ " x  $11\frac{3}{8}$ ". Weight 14¼ lbs.

Dealer Net Price ..... **\$41.95**

### AC-DC MULTITESTER MODELS 447A AND 447AP

The exceptional value in the 447A Model is made possible by the tremendous quantities produced. The resulting very low price is responsible for its great popularity. These units are in a class with other makes of testers that sell for considerably more.

A 3" square D'Arsonval meter is used, having an accuracy of 2%. Ring type shunt circuits are employed. Accuracy of AC voltage measurements are kept to closer tolerance by use of a new gold plated copper oxide rectifier with excellent current density characteristics.



Model 447A

#### RANGES

DC Voltmeter: 0-5-50-250-500-2500 Volts at 1000 Ohm per Volt.  
AC Voltmeter: 0-10-100-500-1000 Volts.  
Output Voltmeter: 0-10-100-500-1000 Volts.  
DC Milliammeter: 0-1-10-100-1000 MA.  
DC Ammeter: 0-1-10 Amperes.  
Ohmmeter: 0-10,000 Ohms—1 Megohm—10 Megohms Ext.  
Decibel Meter: —8 to +55 decibels.

Model 447A—Open face instruments supplied in hardwood case. Size 5" x  $8\frac{1}{2}$ " x 3". Weight 21 oz. Complete with batteries, ready to operate.

Dealer Net Price ..... **\$17.95**

Model 447AP—Portable type supplied in hardwood case with carrying handle, cover and test leads. Size  $6\frac{1}{2}$ " x  $8\frac{1}{2}$ " x  $4\frac{1}{2}$ ". Weight 24 oz. Complete with batteries, ready to operate.

Dealer Net Price ..... **\$21.95**

# RADIO CITY PRODUCTS CO., Inc.

NEW YORK 1, N. Y.

## TEST EQUIPMENT

### POCKET SIGNAL GENERATORS MODEL AM-710 — MODEL FM-720A



For "On The Job" service work both of these popular generators are a "must," and is an answer to the needs of thousands of servicemen, experimenters, and is ideal for production testing.

Model AM-710 generator provides broadcast band alignment by fixed frequencies of 550 Kc and 1500 Kc. Intermediate frequency alignment is provided for by fixed frequencies of 456 Kc and 465 Kc. Trimmers are provided for the purpose of recalibrating. Safe AC or DC operation. Isolation of case and chassis prevents any chance of shock, short circuit or burn-out.

Complete with tubes. Shielded output, cable and plug ready to operate. Housed in attractively designed case. Size 3" x 6" x 2 3/4".

Weight 2 lbs.

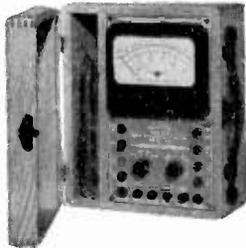
Dealer Net Price.....**\$17.95**

Model FM-720A generator is a companion unit and is actually FREQUENCY modulated sufficient for radio detectors and covers the entire FM band. All needed frequencies for FM servicing are instantly available at accurate calibration. Switch provides fixed frequencies of 9.1 megacycles and 10.7 megacycles for IF and 88 and 108 megacycles for the low and high ends of the band. Continuously variable attenuation is provided to prevent overloading.

Complete with tubes, shielded output, cable line cord and plug ready to operate. Housed in attractively designed metal case. Size 3" x 6" x 2 3/4". Weight 2 lbs.

Dealer Net Price.....**\$19.95**

### 450 SERIES HI-MEGOHM MULTITESTERS



Accurate HIGH MEGOHM RANGE requires NO batteries and NO tubes. Rectangular 4 1/2" meters provide excellent readability and are accurate within 2%.

Output ranges correspond to the AC voltage ranges. Hi-megohm ranges permit readings 50 megohm on type A and 1000 meg. on type C.

All bench type or open face models have dimensions 8 7/8" x 5 1/2" x 3 3/4". Weight 3 lbs. All portable models are designated by letter "P" and are furnished in attractive natural finish oak cases with leads. Case has hinged cover with latch and leather handle. Dimensions, 8 7/8" x 7 1/2" x 4 3/4". Weight 4 1/2 lbs.

#### MODEL 450A — 1000 Ohms per volt meter sensitivity

Ohmmeter: 0-5000-500,000 Ohms, 0-50 Meg.  
DC Volts: 0-5-50-125-500-2500.  
AC Volts: 0-10-100-250-1000.  
DC Milliamps: 0-0.5-10-100-1000.  
Decibels: —9 to +55 DB.

Dealer Net Price.....**\$20.95**

Model 450AP Dealer Net Price.....**\$24.95**

#### MODEL 450B — 5,000 Ohms per volt meter sensitivity

AC and DC Volts: Ranges same as for 450A and 450C.  
Ohmmeter: 0-5000-500,000 Ohms, 0-100 Megohms.  
DC Milliamps: 0-0.5-10-100-1000.  
Decibels: —9 to +55 DB.

Dealer Net Price.....**\$28.50**

Model 450BP Dealer Net Price.....**\$24.50**

#### MODEL 450C — 20,000 Ohms per volt meter sensitivity

Ohmmeter: 0-5000 Ohms 0-5-1000 Meg.  
DC Volts: 0-5-50-125-500-2500.  
AC Volts: 0-10-100-250-1000.  
DC Milliamps: 0-0.1-10-100-1000.  
Decibels: —9 to +55 DB.

Dealer Net Price.....**\$28.50**

Model 450CP Dealer Net Price.....**\$32.50**

Here are fine instruments that provide immediate measurements of high resistance values without the use of expensive bridges.

### SIGNAL GENERATOR MODEL 705A BOTH 30% AND 80% MODULATION

R. C. P. Model 705A Test Oscillator brings you a feature ordinarily found only in high-priced instruments—high and low percent modulation. Low harmonic output on low frequency bands. High percentage harmonics on high frequency band only. IDEAL FOR ALIGNMENT OF FM RECEIVER IF'S BY THE ZERO DISCRIMINATOR CURRENT METHOD.

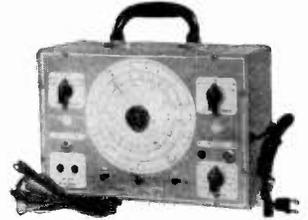
Dial calibration provides fundamental frequencies from 100 Kc to 25 Mc. Band "F" has been included to provide calibrated output using third harmonic of Band "E" to give direct frequency readings from 25 to 75 Mc. Band "F" harmonic output is sufficient for alignment of all present day FM receivers. Calibration is accurate within 2% per band for broadcast bands and within 3% for high frequency and FM bands. Ideal for direct-reading calibration of receivers.

Automatic shorting of coils not in use. Individual shielding of RF circuits, coil assembly and attenuator. Overall steel case, chassis and panel. Fused line supply.

Planetary drive condenser, double-ended indicator—Output can be modulated or unmodulated. Sinusoidal modulation frequency of 400 cycles also available for external application. Five step-ladder attenuator with vernier.

Model 705A—Complete, ready to operate. Size 8" x 11 3/4" x 5". Weight 11 lbs.

Dealer Net Price.....**\$49.50**



### DYNATRACER MODEL 777

A new signal tracer that establishes a new high in performance records — covers all AM - FM - TELEVISION receivers

Astonishing new design at economical cost that gives high amplification available only in the expensive tuned channel types. Operation is more simple.

TESTS MICROPHONES AND PHONOGRAPH PICKUPS directly through terminals provided

Negligible outside pickup of noise or hum. Extremely high sensitivity enables this instrument to pick up broadcast signals when connected to a short lead.

Checks noise pickup at antenna—checks operation of AVC-AFC-link and filter circuits. Detailed instructions give full information for checking all types of receivers and their components.

With this revolutionary signal tracer really hear the signal and any variation directly from antenna through each stage of r.f.-i.f.-a.f. step by step without operating any switch or changing to different channels in the instrument. You get readings or signal strength and directly measure gain per stage. Gain measurements made by accurate meter not possible with magic eye indicators.

Negligible Disturbance to circuit under test as input capacity is only 3 mfdms.

Attenuation of 10,000 to 1 by a ladder type of step attenuator with vernier control.

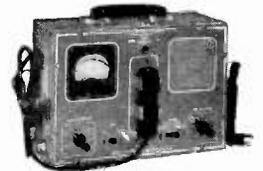
Sensitivity extremely high—10,000 microvolts full scale.

Traveling Detector—Convenient, insulated probe housing detector and amplifier at end of 50" lead.

Frequency coverage up through 150 megacycles.

Model 777—Beautiful hammertone grey finish — 4" Alnico V speaker, sensitivity control, microphone-phonograph input jack — traveling detector probe, sensitive milliammeter with associated switching control — ladder type step attenuator, vernier control — automatic control switch for speaker or meter or both or standby. Includes 6AT6, 7A7, 7B5, and 6X5 tubes. Complete, ready to operate, 105-135 volts. Weight 9 1/2" lbs. Size 6 3/4" x 8 1/2" x 11".

Dealer Net Price.....**\$41.50**

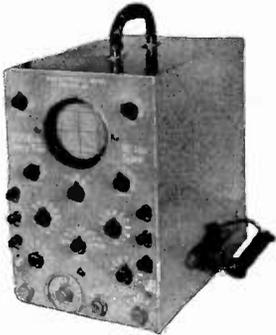


# RADIO CITY PRODUCTS CO., Inc.

NEW YORK 1, N. Y.

## TEST EQUIPMENT

### TEEVEE 90 OSCILLOSCOPE THE LATEST IN TELEVISION TESTING



Combines the two essential instruments needed in television testing: ALIGNMENT - SERVICE

- COMPLETE OSCILLOSCOPE (Can be used as such by itself)
- COMPLETE SWEEP GENERATOR

(Can be used independently)

Oscilloscope has its own variable linear sweep circuit from 10 to 45,000 CPS and has a sensitivity of 285 millivolts RMS per inch vertical and 320 millivolts RMS per inch for horizontal deflection. Input resistance is one megohm shunted by 20 mmfd. Sine wave response uniform from 5 cycles to 200 K.C. within  $\pm 2$ db.

Sinusoidal sweep with phasing control of 150 degree range is provided for use in conjunction with the internal RF sweep generator when testing band pass characteristics.

Absolute locking of pattern is obtained with linear time base control (left to right) from 10 cycles to 45,000 cycles in six ranges with vernier control. Synchronization provision for either internal positive or line frequency or external.

External jack provided for trace blanking. Requires  $\frac{1}{2}$  volt of negative pulse to blank a normal intensity level trace.

Independent sweep generator has a center frequency range of 1.5 to 45 megacycles giving a choice of any IF frequency desired. The band width can be varied continuously from 0.5 KC to 7 MC.

Attenuation of RF is continuously variable from 0 to 500 millivolts and the output is applied through low loss coaxial cable.

Traveling detector probe is included for observing signal at any point of the R.F. circuit under test.

Supplied complete with tubes, probe, coaxial output cable and operating instructions ready to operate.

For operation on 105-130 volts 50-60 cycles—power consumption 40 watts. Weight 25 lbs. Size 14 x 18 x  $12\frac{1}{2}$  inches. Finished in attractive hammertone grey.

Here are two instruments combined at actually the price of only one. Light enough and compact enough to easily take right out on the job with you—almost impossible with 2 separate units.

**TUBE COMPLEMENT—1-3BP1, 2-7G7, 2-6X5, 1-884, 1-6SA7GT/G, 1-7A4—Supplied complete with tubes, probe, coaxial output cable and operating instructions ready to operate** ..... **\$127.50**

### MULTITESTER MODEL 462



#### GIANT SIZE METER

20,000 Ohms per Volt D.C.  
5,000 Ohms per Volt A.C.  
NO FREQUENCY ERRORS

Unusual because of the many desirable features that are combined in one instrument. The size of the meter,  $6\frac{1}{2}$ " wide, provides a very long scale with excellent legibility so important for bench work.

Uses germanium crystal rectifier which has no frequency error for output measurements or even high radio frequencies. Uses individual unit cells for ohmmeter. Easy and economical to purchase and replace—snap into terminal clamps—no soldering.

#### RANGES

- D.C. Voltmeter 0/2.5/10/50/250/. 1000/5000 volts.
- A.C. Voltmeter 0/2.5/10/50/250/. 1000/5000 volts.
- D.C. Milliammeter 0/10/100/500 milliamperes.
- D.C. Microammeter 0/100 micro-

- amperes. Ohmmeter 0/200/200,000 0/20 megohms.
- Decibel Meter—10 to/55 db.
- Meter of 50 microampere sensitivity permits current readings of less than 1 microampere.
- Shunts and multipliers are calibrated to 1% accuracy.

Model 462 Multitester is a beautiful large instrument with  $6\frac{1}{2}$ " meter, bakelite panel and oak case. Size  $4\frac{1}{4}$ " x  $8\frac{1}{2}$ " x  $10\frac{1}{8}$ ". Weight 5 lbs.

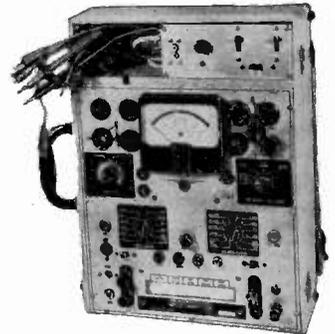
Dealer Net Price ..... **\$41.50**

Model 462P comes in a portable hinged cover oak carrying case having a tool compartment and includes deluxe pencil prod test leads. Size  $5\frac{1}{4}$ " x  $8\frac{1}{2}$ " x  $11\frac{3}{4}$ ". Weight 6 lbs.

Dealer Net Price ..... **\$45.95**

### SERVICESHOP MODEL 8573 EQUIVALENT TO A COMPLETE SERVICE SHOP

- Tube Tester
- Battery Tester
- Condenser Tester
- AM Signal Generator
- FM Signal Generator
- Audio Oscillator
- Complete Multitester



Never before in history has there been available an up-to-date tube tester providing for testing acorn tubes, miniature tubes—noval base tubes and sub-miniature tubes with the famous

Rollindex Roll Chart—combined with a battery tester and a complete multitester measuring AC and DC volts—DC milliamperes and amperes—ohms and megohms, decibels and output volts and also having a condenser tester, an AM signal generator, an FM signal generator and an audio oscillator.

The amazing fine performance of this equipment is the result of the latest engineering design and improvement in the 805B combination tube and set tester combined with the all purpose Model 730 signal generator.

850 tube listings on roll chart. Jack provided for headphone test for noisy tubes that do not otherwise read "bad."

Latest type germanium crystal rectifier assures AC measurements free from temperature and frequency errors common to other rectifiers. Readable scale divisions on the ohmmeter start at 0.05 ohm to 25 megohms.

Battery Tester—All standard range batteries tested under rated loads

DC Volts	AC Volts	DC Milliamps	DC Amps	Ohms	Meg.	Decibels	Output Voltmeter
0	0	0	0	0	0	-8 to +15	0
2.5	10	.5	10	250	2.5	6 to 29	10
10	50	2.5		2500	25	20 to 43	50
50	250	10		25000		32 to 55	250
250	1000	50				46 to 69	1000
1000	5000	250					5000
5000		1000					

Model 8573—Complete with tubes, batteries and test leads, output leads, etc.—housed in beautiful natural finish oak case—hammertone grey panel. Weight 18 lbs.

Overall size  $16\frac{1}{2}$  x  $12\frac{3}{4}$  x  $5\frac{1}{4}$  inches. An outstanding value of all times at ..... **\$99.95**

Model 805B—Same unit as above less the all purpose Model 730 Signal Generator—Complete ..... **\$77.50**

### ROLINDEX



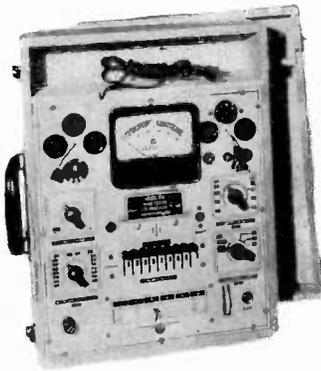
Model 105 Roll chart unit to be used in conjunction with Tube Tester Models 322, 322P, 322A, 322AP, 802N and 802NA. The unit is in a grey hammer-tone finish metal case with plastic window, designed to fit the test lead compartment.

Model 105—Dealer Net Price.... **\$7.50**

# RADIO CITY PRODUCTS CO., Inc.

NEW YORK 1, N. Y.

## TEST EQUIPMENT



### "Free-Point Return" Obsolescence Proof

#### TUBE TESTER MODEL 316

How many tube testers has obsolescence junked in your radio service career? If outmoded instruments deplete your income, you need this practically obsolescence-proof, free-point return tube tester. It enables you to test any tube type available today, or any that may be devised in the future. A noise jack permits easy detection of faulty microphonics in acorn, miniature, and standard tubes. A "must" dollar spent has to produce maximum value and test efficiency.

For the service shop where every instrument produces maximum value and test efficiency.

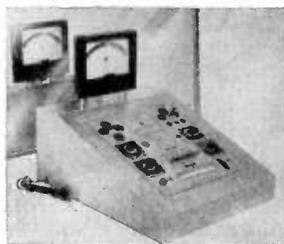
#### CHECK THESE FEATURES

- The free-point-return tester enables all measurements to be made with set in operation.
- The special circuit design allows testing of any tube type regardless of its filament voltage or base wiring.
- Unusual flexibility is attained by using lever-type switching for individual control of each tube element.
- A complete rollehart lists all current tube types in large, legible type.
- Tube tester has 4 1/2" rectangular meter with easy-to-read "Poor-Good" scale.
- Operates on 100-130 volt, 50/60 cycle AC power supply.
- In beautiful portable case of natural oak, with carrying handle and self-latching, removable cover.
- Size: 16 1/2" H. x 12 3/4" W. x 5 1/4" D. Weight: 13 lbs.

Model 316—Dealer Net Price..... **\$53.50**

#### MODEL 316DL

Similar to Model 316M with exception of meter. Meter is 7 1/2" double meter, giving the identical reading so that both the man in front of the counter as well as the person in back of the counter clearly read the condition of the tube. Size: 16" x 20" x 16". Weight: 21 lbs.



Model 316DL—Dealer Net Price..... **\$82.50**



#### MODEL 316M

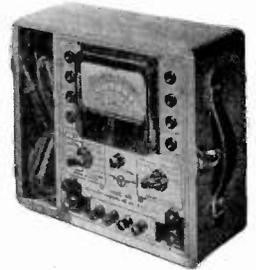
Tube merchandiser complete in handsomely finished all-steel case with 4 1/2" meter, complete, ready to operate. Size: 16" x 20" x 8 1/4". Weight: 19 lbs.

Model 316M—Dealer Net Price..... **\$69.95**

### ULTRA-SENSITIVE MULTITESTER MODEL 488-A

#### Check these features:

- The AC Ammeter is of the current transformer type with a voltage drop of only 0.4 volts at full scale 12-ampere range. Ideally suited for appliance and small motor tests.
- A sensitivity of 20,000 ohms per volt on DC and 1000 ohms per volt on AC measurements. Ideal for television receiver service.
- 6,000-volt AC and DC ranges can be used with safety. 15,000-volt test leads are supplied.
- The center of the low ohm scale reads 37 ohms, permitting extremely accurate readings.
- A wide-scale 4 1/2" meter with movement of 50 microamperes is accurate to 2% of full scale.
- All multipliers and shunts are matched and accurate to 1%.
- Sensitive readings are obtainable as low as 1 microampere, 0.25 ohm and .1 volt.
- Batteries are readily accessible.
- The unit has an overall accuracy of 3% on DC and 5% on AC voltages and currents.



#### RANGES

DC Voltmeter: 0-3-12-60-300-600-1,200-6,000 Volts.  
 AC Voltmeter: 0-3-12-60-300-600-1,200-6,000 Volts.  
 DC Milliammeter: 0-3-20-120-600 Milliampers.  
 DC Microammeter: 0-60-300 Microampers.  
 DC Ammeter: 0-12 Amperes.  
 AC Ammeter: 0-3-6-12 Amperes.  
 Ohmmeter: 0-3,000-300,000 -30,000,000 Oms.  
 Output Voltmeter: 0-3-12-60-300-600-1,200-6,000 Volts.

Model 488A—In golden oak carrying case, compartment, self-latching and detachable cover. Supplied with self-contained battery and test leads. Size: 11 1/2" H. x 9 3/4" W. x 6 1/4" D. Weight: 10 lbs.

Dealer Net Price..... **\$59.50**

### MODERNIZATION UNITS FOR TUBE TESTERS



For the many new tubes that have appeared on the market since 1946, practically every tube tester in use, as well as every new tube tester shipped from the factories up to April, 1947, is now obsolete to some degree.

Models 120 and 125 Modernization Units have a flexible cable with a plug that is simply inserted into the local socket of the old tube tester. There are spare blank sockets and spaces for additional sockets should new types of tube bases appear in the future. Tube Testing charts and data are supplied.

New miniature and subminiature sockets are provided. These units fit snugly into the compartments of the case proper or in the cover of portable types, such as Models 322P, 802N, 802NS. Use the chart below for specifying the correct model.

Modernization Kit No. 129 is supplied in kit form with prewired sub-panel that is mounted in place of one of the regular sockets. Instructions are given for changes in wiring and other connections to be made by the purchaser.

Modernization Kit No. 123 is similar to kit No. 129.

For Testers	308	310-312		800-801	803-804	
Model.....	309	313	314	315	801A-802	802N 801A 805
Order Unit.....	120-308	120-312*	129*	123*	120-800	125 120-803* 128*
Net Price	\$10.95	\$10.95	\$4.95	\$4.95	\$10.95	\$9.95 \$10.95 \$10.95

Hammertone gray panel — steel case. Size: 8" x 8" x 2 3/4". Weight: 1 1/2 lbs.

\*Supplementary tube test data is supplied in sheet form.

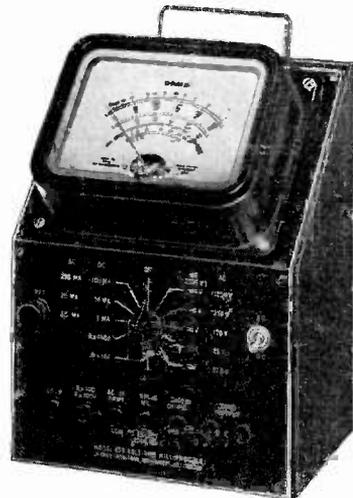
# Chicago INSTRUMENTS

**DEPENDABLE — ACCURATE  
RADIO, ELECTRICAL AND  
INDUSTRIAL TEST EQUIPMENT**

## PORTABLE BENCH-TYPE VOLT-OHM-MILLIAMMETER

**Multiplex Model 458. Volt-Ohm-Milliammeter. 1000 Ohms per volt. Net \$21.00**  
 Volts DC: 0-5/10/50/100/500/2000      Ohms Full Scale: 1000/200,000/2,000,000  
 Volts AC: 0-12.5/25/125/250/1250      Ohms Center Scale: 50/2250/22,500  
 Milliamperes DC: 0-1/10/100/      Output: -5 to + 55 Decibels  
 Milliamperes AC: 0-2.5/25/250      Size: 10 $\frac{1}{8}$ " x 6 $\frac{3}{4}$ " x 5 $\frac{1}{2}$ "

**Multiplex Model 458A. Volt-Ohm-Mils-Ammeter. Net \$26.00**  
 Similar to Model 458, but designed for wider coverage  
 Volts AC-DC: 0-2.5/10/50/250/1000/5000      Amperes AC: 0-0.5/1/5/10  
 Milliamperes AC-DC: 0-1/10/100      Amperes DC: 0-1/10  
 Ohms ranges same as Model 458.



MODEL 458

## PORTAPLEX PORTABLE INSTRUMENTS

**Model 431A AC-DC Volt-Ohm-Mils-Ammeter. Net \$16.60**  
 Volts AC-DC: 0-15/30/150/300/1500/3000 (1000 Ohms per volt)      Amperes DC: 0-7.5  
 Milliamperes DC: 0-1.5/150      Ohms Full Scale: 0-10,000/100,000/1 meg.  
 Ohms Center Scale: 60/600/6000  
 Size: 6 $\frac{1}{8}$ " x 3 $\frac{1}{4}$ " x 2 $\frac{3}{4}$ "

**Model 421D AC-DC Volt-Ohm-Milliammeter. Net \$20.00**  
 Volts AC-DC: 0-4/10/40/100/400/1000 (5000 Ohms per volt)      Ohms Full Scale: 0-10,000/100,000/1 meg.  
 Milliamperes DC: 0-4/40/100/400      Ohms Center Scale: 60/600/6000  
 Size: 6 $\frac{1}{8}$ " x 3 $\frac{1}{4}$ " x 3 $\frac{1}{4}$ "

**Model 433 Super High Sensitivity Volt-Ohmmeter. 20,000 Ohms per volt. Net \$20.00**  
 Volts DC: 0-3/30/300/600      Ohms Center Scale: 70/700/7000/70,000  
 Ohms Full Scale: 5000/50,000/500,000/5,000,000      Size: 5 $\frac{7}{16}$ " x 3 $\frac{9}{16}$ " x 3"

## FEATHERWEIGHT MINIATURE MODELS

(All models 3 15/16" x 2 7/8" x 2")

**Model 450 Volt-Ohm-Milliammeter. 1000 Ohms per volt. Net \$10.00**  
 Volts DC: 0-5/10/50/500/1000      Ohms Full Scale: 5000/50,000/500,000  
 Milliamperes: 0-1      Ohms Center Scale: 30/300/3000

**Model 451A AC-DC Volt-Ohmmeter with Output Ranges. Net \$14.00**  
 Volts DC: 0-10/50/100/500/1000 (1000 Ohms per volt)      Ohms Full Scale: 500,000  
 Volts AC and Output: 0-10/50/100/500/1000      Ohms Center Scale: 7200

**Model 451B Same as Model 451A but with 2500 Ohms per volt. Net \$15.00**

**Model 452 High Sensitivity Volt-Ohmmeter. 10,000 Ohms per volt. Net \$14.00**  
 Volts DC: 0-10/50/100/500/1000      Ohms Center Scale: 30/300/3000/30,000  
 Ohms Full Scale: 2000/20,000/200,000/2,000,000

**Model 453 Volt-Ohm-Milliammeter. Net \$12.50**  
 Volts DC: 0-15/30/150/300/1500      Milliamperes DC: 0-150  
 Volts AC and Output: 0-15/30/150/300/1500      Ohms Full Scale: 5000/50,000/500,000



MODEL 451A

## SIMPLEX VOLT-OHM-MILLIAMMETERS

**Model 371 Volt-Ohm-Milliammeter. Iron Vane Type. Net \$5.25**  
 Volts DC: 0-3/15/30/300      Ohms Full Scale: 10,000  
 Milliamperes: 0-25      Size: 1 $\frac{7}{8}$ " x 2 $\frac{3}{4}$ " x 3 $\frac{7}{8}$ "

**Model 312 AC-DC Volt-Ohm-Milliammeter. Repulsion Type Movement. Net \$6.75**  
 Volts AC and DC: 0-25/50/125/250      Ohms Center Scale: 2400  
 Milliamperes AC and DC: 0-50      MFD: .05 to 15.  
 Ohms Full Scale: 100,000      Size: 1 $\frac{7}{8}$ " x 2 $\frac{3}{4}$ " x 3 $\frac{7}{8}$ "

## POLARIZED TEST LEADS FOR ALL CHICAGO INSTRUMENTS

No. 1048 Low Resistance Test Leads, 48" Long. Tenite insulated prods. Net \$0.66

## DRY BATTERY TESTER

**Model 471 Dry Battery Tester. Net \$16.00**  
 Tests 1 $\frac{1}{2}$  volt — 10 volt and 10 volt — 150 volt batteries under specified load. Easy reading. 5 $\frac{1}{2}$ " rectangular meter makes battery sales easy.



BATTERY TESTER  
MODEL 471

**CHICAGO INDUSTRIAL INSTRUMENT CO.**

# The "STAR" Line of QUALITY TEST EQUIPMENT

## A Precision TUBE CHECKER at Minimum Cost



MODEL TE-1

Separate switching is provided for each pin of each socket so that any of the heater voltages or the plate voltage can be applied. With this versatile arrangement all standard receiving tubes can be checked no matter what the internal connections.

**\$29<sup>95</sup>**

### FEATURES

- Tests all receiving type tubes including the new series of seven and nine pin tubes now being released for FM and Television.
- Individual pin switching provides the maximum of flexibility in testing.
- 3" square wide vision meter.
- Tests individually all sections of multi-section tubes.
- Features a check for line voltage variations.
- Tests for shorts between all tube elements.
- Compact size — 9" x 7" x 3 1/2".
- Weight — six pounds.
- For use on 50 to 60 cycle, 115 V., AC lines.
- All instruments shipped complete with up to date tube charts.

## STAR TESTER MODEL M-11

The Model M-11 has been designed as a basic all around multi-tester for use by the radio serviceman and allied industries. All essential ranges are covered very adequately with excellent overlapping.

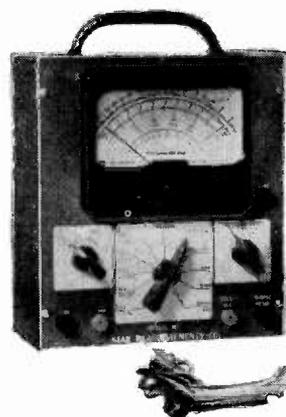
**\$22<sup>95</sup>**

### FEATURES

- A large, wide vision, 4 1/2", 400-microampere meter for ease of reading on all ranges.
- 27 separate ranges for measurement.
- 1,000 ohm per volt sensitivity AC and DC.
- Precision resistors throughout.
- Light weight — 4 pounds.
- Compact size — 9" x 7" x 3 1/2".
- All instruments shipped complete with batteries, test leads and instructions for use.

### DESIGN DATA

- 5 AC Voltage Ranges:  
0 to 10/50/250/500/1000 Volts.
- 5 DC Voltage Ranges:  
0 to 10/50/250/500/1000 Volts.
- 5 Output Meter Ranges:  
0 to 10/50/250/500/1000 Volts.
- 4 DC Current Ranges:  
0 to 1/10/100/1000 Ma.
- 3 Resistance Ranges:  
0 to 5,000/500,000 Ohms.  
0 to 5 Megohms.
- 5 Decibel Ranges:  
Overall Range from -10 to +54 Db.



## 10,000-VOLT STAR TESTER MODEL M-204

The Model M-204 is the high sensitivity, high voltage companion to the M-11. This unit has been engineered to give the maximum possible flexibility in the testing of all AM, FM and Television circuits.

**\$32<sup>95</sup>**

### FEATURES

- A large, wide vision, 4 1/2", 50-microampere meter for ease of reading on all ranges.
- 31 separate ranges for measurement.
- 5 resistance ranges with continuous coverage from zero to 50 megohms. Midscale on first range is 50 ohms.
- 20,000 ohms per volt sensitivity DC.
- 1,000 ohms per volt sensitivity AC.
- 10,000 volts maximum DC.
- 2,500 volts maximum AC.
- Precision resistors throughout.
- All instruments shipped complete with batteries and instructions for use. Test Leads are not included.

### DESIGN DATA

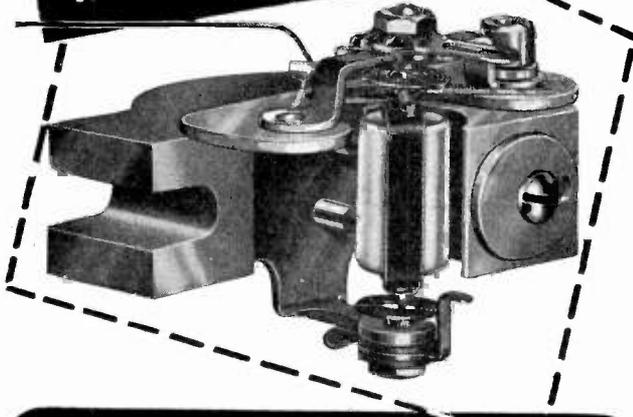
- 6 AC Voltage Ranges:  
0 to 2.5/10/50/200/1000/2500 Volts.
- 6 DC Voltage Ranges:  
0 to 2.5/10/50/250/1000/10000 Volts.
- 5 Output Meter Ranges:  
0 to 2.5/10/50/200/1000 Volts.
- 4 DC Current Ranges:  
0 to 50 Microamperes.  
0 to 1/50/1000 Ma.
- 5 Resistance Ranges:  
Continuous Overlapping from 0 to 50 Megohms.  
Rx1, Rx10, Rx100, Rx1000, Rx10000.
- 5 Decibel Ranges:  
Overall Range from -10 to +54 Db.
- Test Leads:  
TL-10 1,000 Volt.....\$0.65 per pair, net  
TL-100 10,000 Volt.....\$2.95 per pair, net



MODEL M-204

STAR MEASUREMENTS CO. • NEW YORK 56, N. Y.

# PRECISION MOVEMENTS



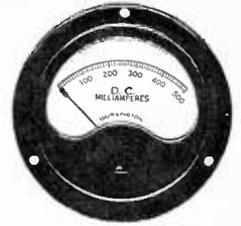
# Burlington PANEL INSTRUMENTS

AC and DC types are accurate to within 2% of full scale value at any point on the scale.

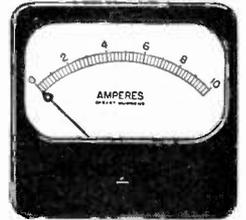
DC instruments combine extremely light weight moving elements and powerful alnico magnets to produce a torque to weight ratio which reduces frictional error to a minimum. This high torque to weight ratio permits use of pivots with ample pivot bearing surface to overcome effects of rough handling, shock, and vibration.

AC instruments are accurate over entire range of commercial power frequencies (25 to 125 cycles). These instruments are of repulsion vane type using carefully aged and impregnated field coils and multipliers which are wound with conductors of ample size so that temperature rise of the windings may be maintained at a minimum, even though instrument is subjected to continuous use in the circuit.

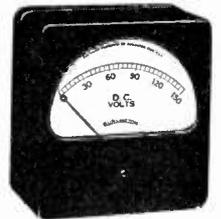
MODELS  
Direct Current  
421, 431, 441  
Alternating Current  
422, 432, 442



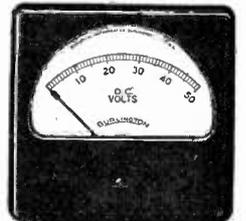
MODELS  
Direct Current  
731, 741  
Alternating Current  
732, 742



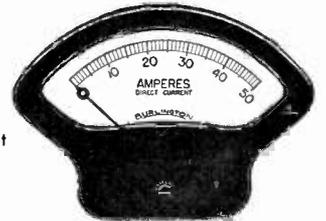
MODELS  
Direct Current  
141  
Alternating Current  
142



MODELS  
Direct Current  
521, 531  
Alternating Current  
522, 532



MODELS  
Direct Current  
841  
Alternating Current  
842



## CASE DIMENSIONS

Model No.		Body	Flange	Body Depth	Stud Length		Case
DC	AC				DC	AC	
141	142		4" x 4 1/4"	2"	3/4"	1"	Rectangular, front-of-board, Bakelite
421	422	2.156" Diam.	2.690" Diam.	1.4062"	5/8"	25/32"	Round, flush, Bakelite
431	432	2.796" Diam.	3 1/2" Diam.	1 1/2"	3/4"	3/4"	Round, flush, Bakelite
441	442	3.5625" Diam.	4 3/8" Diam.	1.4531"	3/4"	3/4"	Round, flush, Bakelite
521	522	2.156" Diam.	2 3/8" x 2 3/8"	1 3/8"	5/8"	25/32"	Square, flush, Bakelite
531	532	2.796" Diam.	3" x 3"	1 1/2"	3/4"	3/4"	Square, flush, Bakelite
731	732	2 1/4" Diam.	3 1/16" x 3 5/16"	1.0156"	3/4"	5/8"	Rectangular, semi-flush, Bakelite
741	742	2 3/4" Diam.	4" x 4 1/4"	1"	3/4"	3/4"	Rectangular, semi-flush, Bakelite
841	842	2 3/4" Diam.		1.2187"	3/4"	3/4"	Fan-shaped, semi-flush, Bakelite

See following page for prices and specifications.

# Burlington

# PANEL INSTRUMENTS

## D. C. MILLIAMMETERS

Range	Scale Div.	Approx. Res.	MODELS				
			421 521	431 531	731	441 841	141 741
0-1	50	47 ohms	\$6.60	\$7.05	\$7.20	\$7.80	\$7.95
0-5	50	10 ohms	5.70	6.45	6.60	7.20	7.65
0-10	50	5 ohms	5.70	6.45	6.60	7.20	7.65
0-15	30	9.34 ohms	5.70	6.45	6.60	7.20	7.65
0-25	50	5.6 ohms	5.70	6.45	6.60	7.20	7.65
0-50	50	2.8 ohms	5.70	6.45	6.60	7.20	7.65
0-100	50	1.4 ohms	5.70	6.45	6.60	7.20	7.65
0-150	30	.94 ohms	5.70	6.45	6.60	7.20	7.65
0-200	40	.7 ohms	5.70	6.45	6.60	7.20	7.65
0-250	50	.56 ohms	5.70	6.45	6.60	7.20	7.65
0-300	30	.466 ohms	5.70	6.45	6.60	7.20	7.65
0-500	50	.28 ohms	5.70	6.45	6.60	7.20	7.65
0-750	75	.186 ohms	5.70	6.45	6.60	7.20	7.65
0-1000	50	.140 ohms	5.70	6.45	6.60	7.20	7.65

## D. C. AMMETERS

Range	Scale Div.	Terminal Voltage Drop	MODELS				
			421 521	431 531	731	441 841	141 741
0-1	50	50MV	\$5.85	\$6.60	\$6.75	\$7.35	\$7.80
0-3	30	50MV	5.85	6.60	6.75	7.35	7.80
0-5	50	50MV	5.85	6.60	6.75	7.35	7.80
0-10	50	50MV	5.85	6.60	6.75	7.35	7.80
0-15	30	50MV	5.85	6.60	6.75	7.35	7.80
0-25	50	50MV	5.85	6.60	6.75	7.35	7.80
0-30	30	50MV	5.85	6.60	6.75	7.35	7.80
0-50	50	50MV	5.85	6.60	6.75	7.35	7.80
0-60	30	50MV	5.85	6.60	6.75	7.35	7.80
0-75	75	50MV	5.85	6.60	6.75	7.35	7.80
*0-100	50	50MV	5.85	6.60	6.75	7.35	7.80
*0-150	30	50MV	5.85	6.60	6.75	7.35	7.80
*0-200	40	50MV	5.85	6.60	6.75	7.35	7.80
*0-300	30	50MV	5.85	6.60	6.75	7.35	7.80
*0-400	40	50MV	5.85	6.60	6.75	7.35	7.80
*0-500	50	50MV	5.85	6.60	6.75	7.35	7.80
*0-600	30	50MV	5.85	6.60	6.75	7.35	7.80
*0-1000	50	50MV	5.85	6.60	6.75	7.35	7.80

\* Ranges above 60 amperes are supplied as 50MV movements to be used with external 50MV shunts.

## D. C. MICROAMMETERS

Range	Scale Div.	Approx. Res.	MODELS				
			421 521	431 531	731	441 841	141 741
0-50	50	1150 ohms	\$14.55	\$15.00	\$15.15	\$15.45	\$15.90
0-100	50	1150 ohms	12.00	12.45	12.60	12.90	13.35
0-200	40	330 ohms	9.75	10.20	10.35	10.65	11.10
0-500	50	225 ohms	7.95	8.85	9.00	9.75	10.65

## D. C. VOLTMETERS—200 Ohms Per Volt

Range	Scale Div.	MODELS				
		421 521	431 531	731	441 841	141 741
0-3	30	\$5.85	\$6.60	\$6.75	\$7.35	\$7.80
0-5	50	5.85	6.60	6.75	7.35	7.80
0-10	50	5.85	6.60	6.75	7.35	7.80
0-15	30	5.85	6.60	6.75	7.35	7.80
0-25	50	5.85	6.60	6.75	7.35	7.80
0-50	50	5.85	6.60	6.75	7.35	7.80
0-100	50	5.85	6.60	6.75	7.35	7.80
0-150	30	7.35	7.80	7.95	8.25	8.55
0-300	30	.....	8.55	.....	9.00	9.30

## D. C. VOLTMETERS—1000 Ohms Per Volt

Range	Scale Div.	MODELS				
		421 521	431 531	731	441 841	141 741
0-50	50	\$7.95	\$ 8.25	\$ 8.40	\$ 8.55	\$ 8.85
0-100	50	8.25	8.55	8.70	8.85	9.15
0-150	30	8.55	8.85	9.00	9.15	9.45
0-300	30	8.85	9.15	9.30	9.45	9.75
0-500	50	9.75	10.35	10.50	10.95	11.55
0-1000	50	.....	14.10	.....	14.70	15.30

Voltmeter ranges above those shown can be supplied as either 200 or 1000 ohm per volt instruments for use with external resistors. Prices on application.

## A. C. MILLIAMMETERS

Range	Scale Div.	Approx. Res.	MODELS				
			422 522	432 532	732	442 842	142 742
0-10	50	2020 ohms	\$5.70	\$6.30	\$6.45	\$7.20	\$7.50
0-15	30	1120 ohms	5.70	6.30	6.45	7.20	7.50
0-25	50	370 ohms	5.70	6.30	6.45	7.20	7.50
0-50	50	83 ohms	5.70	6.30	6.45	7.20	7.50
0-100	50	20 ohms	5.70	6.30	6.45	7.20	7.50
0-250	50	4 ohms	5.70	6.30	6.45	7.20	7.50
0-500	50	.8 ohms	5.70	6.30	6.45	7.20	7.50

## A. C. AMMETERS

Range	Scale Div.	Approx. Res.	MODELS				
			422 522	432 532	732	442 842	142 742
0-1.5	30	.072 ohms	\$5.70	\$6.30	\$6.45	\$7.20	\$7.50
0-5	50	.0108 ohms	5.70	6.30	6.45	7.20	7.50
0-10	50	.0038 ohms	5.70	6.30	6.45	7.20	7.50
0-15	30	.0018 ohms	5.70	6.30	6.45	7.20	7.50
0-25	50	.0008 ohms	5.70	6.30	6.45	7.20	7.50
0-30	30	.00079 ohms	5.70	6.30	6.45	7.20	7.50
0-50	50	.00048 ohms	5.70	6.30	6.45	7.20	7.50
*0-75	75	.00035 ohms	5.70	7.95	6.45	9.30	9.60
**0-100	50	.....	5.70	6.30	6.45	7.20	7.50
**0-150	30	.....	5.70	6.30	6.45	7.20	7.50
**0-200	40	.....	5.70	6.30	6.45	7.20	7.50
**0-250	50	.....	5.70	6.30	6.45	7.20	7.50
**0-300	30	.....	5.70	6.30	6.45	7.20	7.50
**0-400	40	.....	5.70	6.30	6.45	7.20	7.50

\* Models 422, 522, 732 ranges above 50 AMPS are supplied as 5 AMP movements for use with current transformers.

\*\* Models 432, 532, 442, 842, 142, 742 ranges above 75 AMPS are supplied as 5 AMP movements for use with current transformers

## A. C. VOLTMETERS

Range	Scale Div.	Ohms per Volt	MODELS				
			422 522	432 532	732	442 842	142 742
0-1.5	30	3.3	\$6.30	\$6.75	\$6.90	\$7.20	\$7.65
0-3	30	10	6.30	6.75	6.90	7.20	7.65
0-5	50	10	6.30	6.75	6.90	7.20	7.65
0-10	50	13	6.30	6.75	6.90	7.20	7.65
0-15	30	13	6.30	6.75	6.90	7.20	7.65
0-25	50	26	6.30	6.75	6.90	7.20	7.65
0-50	50	50	6.30	6.75	6.90	7.20	7.65
0-100	50	110	6.30	6.75	6.90	7.20	7.65
0-150	30	110	7.35	7.80	7.95	8.10	8.40
0-300	30	165	7.95	8.55	8.70	8.70	9.00
0-500	50	165	.....	8.85	.....	10.20	10.50
0-600	30	165	.....	9.15	.....	10.50	10.80

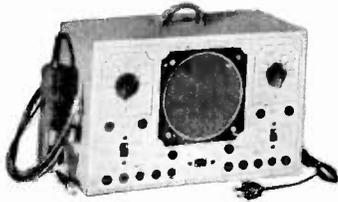
Ranges above 300 VOLTS in Models 422, 522, 732, and above 500 VOLTS in Models 432, 532, 442, 842, 142, 742 require external resistors or potential transformers. Prices on application.

# BURLINGTON INSTRUMENT COMPANY

# TEST CRAFT INSTRUMENT CO.

106 FIFTH AVENUE • NEW YORK 11, N. Y.

## The New Model TC-75 Universal COMBINATION TEST SPEAKER AND SIGNAL TRACER



- plus an experimental one-stage audio amplifier
- plus universal output transformer

### A Combination Test Speaker & Signal Tracer

- plus signal substitution
- plus resistor tester
- plus condenser tester
- plus resistor substitutor
- plus condenser substitutor
- plus output indicator
- plus substitute 100 V. DC power supply
- plus field substitutor
- plus voice coil substitution
- plus signal tracer

### A MUST FOR EVERY RADIO SERVICEMAN AND ENGINEER

**Specifications:** RESISTOR CONDENSER TESTER: 110-Volt DC power source for basic indication of either shorts or opens in both resistors and condensers. Leakage indication for condensers only. ● CAPACITY SUBSTITUTION: 7 capacity values available, .001, .01, .05, .10, .25 at 600 volts and 30 mfd. and 50 mfd. at 150 volts. Provides substitution of by-pass coupling and electrolytic condensers. ● RESISTOR SUBSTITUTION: 10 resistance values available, 400, 50K, 100K, 500K, 2 meg. and 5 meg. at 1/2-watt and 500, 1K, 1.5K and 2.5K at 15 watts. Provides substitution of grid bias and other types of resistors. ● OUTPUT INDICATOR: Neon type output indicator for receiver alignment. ● UNIVERSAL AND SUBSTITUTION SPEAKER: Field: —500, 1K, 1.5K and 2.5K ohms at 175 ma. Speaker: Permanent magnet type. Voice coil: 2.8 ohms. Input: single or push-pull. Output: Specially designed universal output type transformer. ● AUXILIARY DC POWER SUPPLY: An auxiliary 100 DC volt power source, one half on 117 L7, available for experimental and substitution purpose. ● AUXILIARY AUDIO AMPLIFIER: An auxiliary one stage of audio amplification, one half on 117 L7, available for experimental and substitution purpose. ● SIGNAL TRACER: Provides a signal tracer of the probe type, using a 1N34 crystal diode detector, the output of which is coupled into a one-stage audio amplifier.

This unit comes housed in a rugged battleship-gray, crackle-finished steel cabinet, complete with full operating instructions, ready to work on 110-125 Volts, AC 50-60 cycles. Size: 7" x 11" x 5".

Dealer's Net Price **\$29.50**

## The New Model TC-10 AC-DC QUALITY MULTITESTER



### A New Pocket-Size Volt-Ohm-Milli- ammeter

with features never before available in an instrument of this size and price. Quality engineered both electrically and mechanically, this instrument will satisfy the exacting requirements of the electronics engineer, laboratory worker or service man.

#### FEATURES:

- Compact, small in size: 6" x 3 1/4" x 2"
  - Handsome, telephone black panel
  - Uses D'Arsonval type of meter, 2% accuracy
  - All markings easily read and will not wear out with use
  - Housed in black metal case
- Specifications:** 5 AC VOLTAGE RANGES: 0-5/15/150/1500/3000 Volts. ● 5 DC VOLTAGE RANGES: 0-5/15/150/1500/3000 Volts. ● 3 DC CURRENT RANGES: 0-0.5/5/50 Ma. 0-1.5 Amps. ● 2 RESISTANCE RANGES: 0-100 Ohms, 0-100 K.

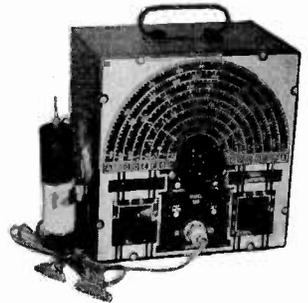
Complete, with self-contained batteries and all instructions.

Dealer's Net Price **\$12.85**

## The Model 999 — A Combination SIGNAL GENERATOR AND SIGNAL TRACER

### The Ultimate in Signal Tracing Procedure is Achieved by the Model 999

Enables you to use either the broadcast signal itself or the signal injected by the Signal Generator. This is especially useful when servicing "dead" or "intermittent" receivers. You will find the Model 999 is the greatest time-saver ever provided for, by combining a full range Signal Generator and Signal Tracer into one unit. The set up time for interconnecting, etc., is entirely eliminated.



### SIGNAL GENERATOR Specifications:

- Frequency Range: 150 Kilocycles to 50 Megacycles.
- The R.F. Signal Frequency is kept completely constant at all output levels. This is accomplished by use of a special grid-loaded circuit which provides a constant load on the oscillatory circuit. A grounded plate oscillator is used for additional frequency stability.
- Modulation is accomplished by Grid-blocking action which has proven to be equally effective for alignment of amplitude and frequency modulation as well as for television receivers.
- Positive action attenuator provides effective output control at all times.

- R.F. is obtainable separately or modulated by the Audio Frequency.
- **SIGNAL TRACER Specifications:**
- Uses the new Sylvania 1N34 Germanium Crystal Diode which, combined with a resistance-capacity network, provides a frequency range of 300 cycles at 50 Megacycles.
- Simple to Operate—Clips directly on to receiver chassis, no tuning controls.

- Provision is made for insertion of phones of any impedance, a standard Volt-Ohm-Milliammeter or Oscilloscope.
- The Model 999 comes complete with all test leads **\$28.85** and operating instructions.

## The New Model TC-50 TUBE AND SET TESTER

### A Complete Laboratory, All-Purpose Test-Instrument

This versatile tester will accurately test all up-to-date tubes.

#### TUBE TESTER

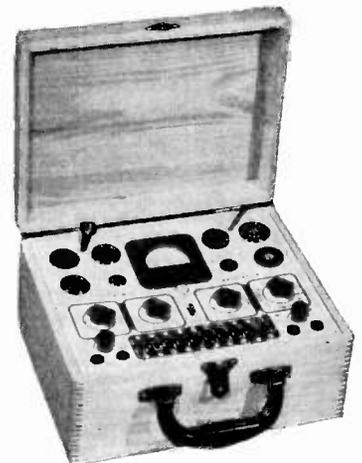
##### Specifications:

- Tests all up-to-date tubes including 4, 5, 6, 7, 7L, octals, loctals, television, magic eye, thyrtors, single-ended, floating filament, mercury vapor, new miniatures, etc.
- Tests pilot lights, all voltages.
- Tests by the popular emission method read directly on the scale of meter.
- Tests leakage and short tests of any element against all elements in all tubes.
- Tests both plates in rectifiers.
- Tests both diodes in multipurpose tubes.
- Tests individual sections such as diodes, triodes, pentodes, etc., in multipurpose tubes.
- Individual pin switch selection.
- Special compensation type of line voltage adjuster.
- Tests provided for approximately 600 tubes.

#### MULTIMETER

##### Specifications:

- DC VOLTAGE RANGES: 0-10/100/1000/5000 Volts. ● AC VOLTAGE RANGES: 0-10/100/1000/5000 Volts. ● DC CURRENT RANGES: 0-10/100/1 Amp. ● LOW RESISTANCE RANGE: 0-10,000 Ohms. ● MEDIUM RESISTANCE RANGE: 0-100,000 Ohms. ● HIGH RESISTANCE RANGE: 0-1 Megohm. ● OUTPUT VOLTS: 0-10/100/1000/5000 Volts. ● DECIBELS: 8 to +55 D.B. based on zero D.B., equals .006 Watts into a 500-Ohm line.



The New Model TC-50 combines seven instruments, DC V., AC V., DC M.A., Ohms, Output Meter, Decibel Meter and Tube Tester. Full scale accuracy to 2%. English Reading GOOD and BAD scale for testing tubes. Obsolescence reduced to absolute minimum. Simple and quick reading charts for tube testing. Multi-meter section affords most popular everyday measurements. Operates on 90-120 Volts, 60 cycles AC. Housed in a sturdy beautiful portable, hand-rubbed cabinet. Complete, with test leads, tube charts and all detailed, operating instructions. 8" x 10 1/2" x 5". **\$39.50**

Dealer's Net Price



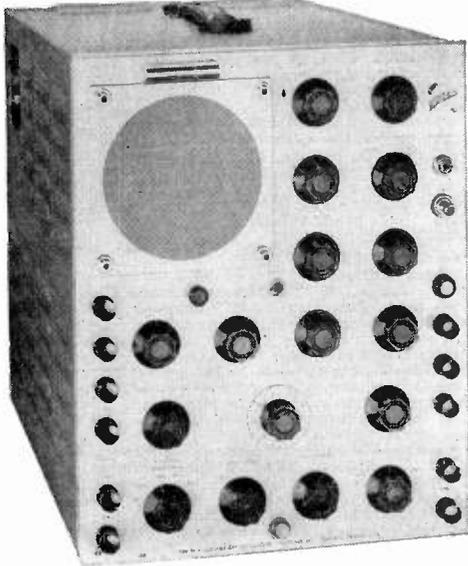
# TEKTRONIX, INC.

**CATHODE-RAY OSCILLOSCOPES & VIDEO TEST EQUIPMENT**

712 SOUTH EAST HAWTHORNE BOULEVARD  
TELEPHONE: EAST 6197

PORTLAND 14, OREGON  
CABLES: TEKTRONIX

**NEED WIDE BAND  
AND FAST SWEEPS?**



TEKTRONIX TYPE 511-AD OSCILLOSCOPE

\$845 f.o.b. Portland

VIDEO — 5 CPS — 10 MC.

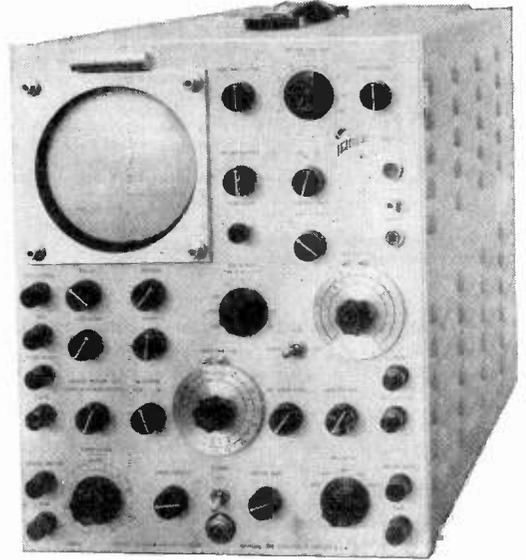
SWEEPS — .01 SECONDS TO .1 MICROSEC./CM.

The Type 511-AD, with its 10 mc. amplifier, 0.25 microsecond video delay line and sweeps as fast as .1 microsec./cm. is excellent for the observation of pulses and high speed transient phenomena. Sweeps as slow as .01 sec./cm. enable the 511-AD to perform superlatively as a conventional oscilloscope. The identical instrument without the video delay line is known as the Type 511-A, price \$795.00 f.o.b. Portland, Oregon.

The Types 511-A and 511-AD have broadened and further secured the position of leadership that was established by their predecessor, the Tektronix Type 511. Eminently satisfied users include leading universities, industrial organizations and independent research groups as well as the armed services and other governmental agencies.

- Direct reading sweep dials.
- Single, triggered or recurrent sweeps.
- Accurate calibration, both time and amplitude.
- All DC voltages electronically regulated.
- Sweep expansion of 5 times for any 20% of normal sweep.
- Individually adjusted for optimum transient response.

**NEED DC COUPLED AMPLIFIERS  
AND SLOW SWEEPS?**



TEKTRONIX TYPE 512 OSCILLOSCOPE

\$950 f.o.b. Portland

VIDEO — DC — 2 MC.

SWEEPS — .3 SECONDS TO 3 MICROSEC./CM.

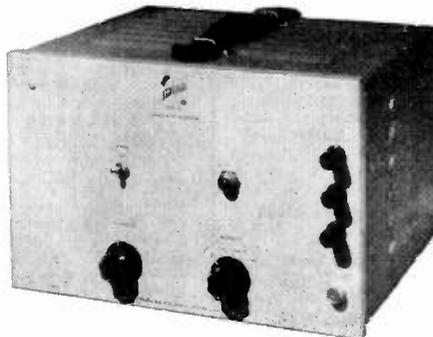
The Type 512 with a sensitivity of 5 mv./cm. DC and sweeps as slow as .3 sec./cm. solves many problems confronting workers in the fields where comparatively slow phenomena must be observed. Vertical amplifier bandwidth of 2 mc. and sweeps as fast as 3 microsec./cm. make it an excellent general purpose oscilloscope as well. The continuously variable sensitivity range of 10,000 to 1; the differential (push-pull) input circuit with high rejection of unwanted signal components; the revolutionary carrier type blanking circuit as well as many other exclusive features have resulted in an immediate acceptance of the Type 512 by prominent research personnel throughout the country.

### BOTH INSTRUMENTS FEATURE:

- RC probes for high impedance, low capacity input.
- Excellent image contrast in high ambient light.
- Design and fabrication integrity of highest degree.
- Choice of 5CP1A, 5CP7A or 5CP11A CRT, no added expense.
- Electrically welded all aluminum construction.
- Low weight (53 pounds — self-contained).

The Type 104 is a low cost generator of precision square waves in the frequency ranges most commonly used for general purpose wide band oscilloscope and amplifier testing. The instrument is supplied with four fixed frequencies; two in the range of 25 cycles to 10 kc., and two in the range of 25 kc. to 1 mc. By proper choice of the four available frequencies, the Type 104, when used in conjunction with a suitable wide band oscilloscope such as the Tektronix Type 511-A, Type 511-AD or Type 512, makes possible convenient adjustment of video amplifiers and observation of their transient response.

The Type 104 is normally supplied with the following frequencies: 50 cycles, 1 kc., 100 kc. and 1 mc. The 50 cycle square wave provides a quick test for the low frequency characteristics of amplifiers. The 1 kc.



TYPE 104 SQUARE WAVE GENERATOR

PRICE: \$195.00 f.o.b. Portland, Ore.

square wave is a convenient signal for quickly and accurately adjusting capacity compensated attenuators. The 100 kc. and 1 mc. square waves permit convenient adjustment of video amplifiers.

### FEATURES :

- RISE TIME: Less than .015 microsec., high frequencies. Less than 2 microsec., low frequencies.
- IMPEDANCE: 0 to 93 ohms HF., 0 to 20,000 ohms, LF, depending on attenuator settings.
- AMPLITUDE: 0 to 5 volts, HF., 0 to 50 volts LF, both continuously variable.
- DIMENSIONS: 9" high; 13 1/2" wide; 10 1/2" deep.
- WEIGHT: 18 pounds, self-contained.

# SUPERIOR TEST EQUIPMENT

## The New Model TV-10 TUBE TESTER



**SPECIFICATIONS:** ★ Tests all tubes including 4, 5, 6, 7, Octal, Lock-in, Peanut, Bantam, Hearing-aid, Thyatron, Miniatures, Sub-Miniatures, Novals, etc. Will also test Pilot Lights. ★ Tests by the well-established emission method for tube quality, directly read on the scale of the meter. ★ Tests for "shorts" and "leakages" up to 5 Megohms. ★ Uses the new self-cleaning Lever Action Switches for individual element testing. Because all elements are numbered according to pin-number in the RMA base numbering system, the user can instantly identify which element is under test. Tubes having tapped filaments and tubes with filaments terminating in more than one pin are truly tested with the Model TV-10 as any of the pins may be placed in the neutral position when necessary. ★ The Model TV-10 does not use any combination type socket. Instead individual sockets are used for each type of tube. Thus it is impossible to damage a tube by inserting it in the wrong socket. ★ Free-moving built-in roll chart provides complete data for all tubes. ★ Newly designed Line Voltage Control compensates for variation of any line voltage between 105 Volts and 130 Volts.

The Model TV-10 operates on 105-130 Volts, 60 Cycles A.C. Comes housed in a beautiful hand-rubbed oak cabinet complete with portable cover. Size: 6" x 11½" x 12". Shipping Weight: 14 lbs. **\$39<sup>50</sup>** NET

The New Model TV-20

## A COMBINATION 20,000 OHMS PER VOLT MULTI-METER and TELEVISION KILOVOLT METER

The Model TV-20 was designed to provide all the multi-meter measurement requirements of A.M., F.M., and Television. Unlike other recent models, which are actually standard V.O.M.'s converted to test the new Television Voltages, the Model TV-20 is a completely new unit. It provides the sensitivity, ranges and accessories which are needed to service F.M. and Television in addition to A.M. Radio.



### SPECIFICATIONS

- 9 D.C. VOLTAGE RANGES: (At 20,000 ohms per Volt) — 0-2.5/-10/50/100/250/500/1,000/5,000/50,000 Volts.
- 8 A.C. VOLTAGE RANGES: (At 1,000 ohms per Volt) — 0-2.5/10/-50/100/250/500/1,000/5,000 Volts.
- 5 D.C. CURRENT RANGES: 0-50 Microamperes; 0-5/50/500 Milliampere; 0-5 Amperes.
- 4 RESISTANCE RANGES: 0-2,000/20,000 ohms; 0-2/20 Meg.
- 7 D.B. RANGES: (All D.B. ranges based on Odb = 1 Mv. into a 600-ohm line)
 

— 4 to + 10 db	+ 36 to + 50 db
+ 8 to + 22 db	+ 42 to + 56 db
+ 22 to + 36 db	+ 48 to + 62 db
+ 28 to + 42 db	
- 7 OUTPUT VOLTAGE RANGES: 0 to 2.5/10/50/100/250/500/1,000 Volts.

**ADDED FEATURE:** The Model TV-20 includes an Ultra High Frequency Voltmeter Probe. When plugged into the Model TV-20, the V. H. Probe converts the unit into a Negative Peak-Reading H. F. Voltmeter which will measure gain and loss in all circuits including F.M. and T.V.

The Model TV-20 operates on self-contained batteries. Comes housed in beautiful hand-rubbed oak cabinet complete with portable cover, Built-in High Voltage Probe, H. F. Probe, Test Leads and all operating instructions. Size: 4½" x 10¼" x 11½". Shipping Weight: 10 lbs. **\$39<sup>95</sup>** NET

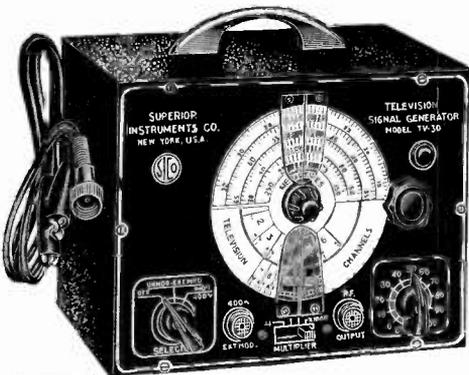
## The New Model TV-30 TELEVISION SIGNAL GENERATOR

Enables Alignment of Television I. F. and Front Ends Without the Use of an Oscilloscope!

**FEATURES:** ★ Built-in modulator may be used to modulate the R.F. Frequency also to localize the cause of trouble in the audio circuits of T.V. Receivers. ★ Double shielding of oscillatory circuit assures stability and reduces radiation to absolute minimum. ★ Provision made for external modulation by A.F. or R.F. source to provide frequency modulation. ★ All I.F. frequencies and 2 to 13 channel frequencies are calibrated direct in Megacycles on the Vernier dial. Markers for the Video and Audio carriers within their respective channels are also calibrated on the dial. ★ Linear calibrations throughout are achieved by the use of a Straight Line Frequency Variable Condenser together with a permeability trimmed coil. ★ Stability assured by cathode follower buffer tube and double shielding of component parts.

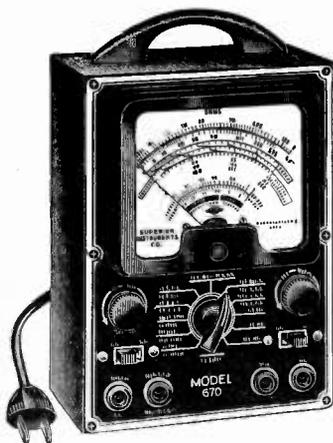
**SPECIFICATIONS:** FREQUENCY RANGE: 4 Bands—No switching. 18-32 Mc.; 35-65 Mc.; 54-98 Mc.; 150-250 Mc. AUDIO MODULATING FREQUENCY: 400 cycles (Sine Wave). ATTENUATOR: 4-position, ladder type with constant impedance control for fine adjustment. TUBES USED: 6C4 as Cathode follower and modulated buffer; 6C4 as R.F. Oscillator; 6SN7 as Audio Oscillator and power rectifier.

Model TV-30 comes complete with shielded co-axial lead and all operating instructions. Measures 6" x 7" x 9". Shipping Weight: 10 lbs. **\$29<sup>95</sup>** NET



Manufactured by  
**SUPERIOR INSTRUMENTS CO.**

# SUPERIOR TEST EQUIPMENT



## The New Model 670 SUPER METER

A Combination  
VOLT-OHM-MILLIAMMETER  
plus  
CAPACITY REACTANCE,  
INDUCTANCE and  
DECIBEL MEASUREMENTS

D.C. VOLTS: 0 to 7.5/15/  
75/150/750/1,500/7,500. A.-  
C. VOLTS: 0 to 15/30/150/  
300/1,500/3,000 Volts. OUTPUT  
VOLTS: 0 to 15/30/  
150/300/1,500/3,000. D.C.  
CURRENT: 0 to 1.5/15/50  
Ma.; 0 to 1.5 Amps. RESISTANCE:  
0 to 500/100,000  
ohms, 0 to 10 Megohms. CAPACITY: .001 to  
.2 Mfd., .1 to 4 Mfd.  
(Quality test for electro-  
lytics). REACTANCE: 700 to 27,000 Ohms; 13,000  
Ohms to 3 Megohms.

INDUCTANCE: 1.75 to 70 Henries; 35 to 8,000 Henries.  
DECIBELS: - 10 to + 18, + 10 to + 38, + 30 to + 58.

The Model 670 comes housed in rugged,  
crackle-finished steel cabinet complete with  
test leads and operating instructions. Size:  
5 1/2" x 7 1/2" x 3".

**\$28<sup>40</sup>**  
NET

## The New Model 770 — An Accurate Pocket-Size VOLT-OHM MILLIAMMETER

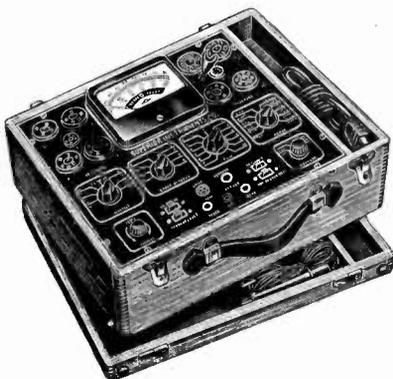
SENSITIVITY: 1000 OHMS PER VOLT

**FEATURES:** ★ Compact — measures 3 1/8" x 5 7/8" x 2 1/4". ★ Uses latest design 2% accurate 1 Mil. D'Arsonval type meter. ★ Same zero adjustment holds for both resistance ranges. It is not necessary to re-adjust when switching from one resistance range to another. This is an important time-saving feature never before included in a V.O.M. in this price range. ★ Housed in round-cornered, molded case. ★ Beautiful black etched panel. ★ Depressed letters filled with permanent white, insuring long-life even with constant use.

**SPECIFICATIONS:** 6 A.C. VOLTAGE RANGES: 0-15/30/150/300/1,500/  
3,000 Volts. 6 D.C. VOLTAGE RANGES: 0-7 1/2/15/75/150/750/1,500 Volts.  
4 D.C. CURRENT RANGES: 0-1 1/2/15/150 Ma.; 0-1 1/2 Amps. 2 RESISTANCE RANGES: 0-500 Ohms; 0-1 Megohm.  
The Model 770 comes complete with self-contained batteries, test leads and all operating instructions.



**\$13<sup>90</sup>**  
NET



## The New Model 777

### TUBE and SET TESTER

20,000 Ohms per Volt!!

#### Tube Tester Specifications:

★ Tests all tubes including 4, 5, 6, 7, 7L, Octals, Loctals, Television, Magic Eye, Thyratrons, Single Ended, Floating Filament, Mercury Vapor Rectifiers, New Miniatures, etc. Also Pilot Lights. ★ Tests by the well-established emission method for tube quality, directly read on the scale of the meter. ★ Tests leakages and shorts of any one element against all elements in all tubes. ★ Tests both plates in rectifiers. ★ Tests individual sections such as diodes, triodes, pentodes, etc., in multi-purpose tubes. ★ New type line voltage adjuster.

#### V.O.M. Specifications:

D.C. VOLTS: (at 20,000 Ohms per Volt), 0 to 7.5/15/75/150/750/1,500 Volts. A.C. VOLTS: (at 10,000 Ohms per Volt), 0 to 15/30/150/300/1,500/3,000 Volts. D.C. CURRENT: 0 to 1.5/15/150 Ma.; 0 to 1.5 Amps. RESISTANCE: 0 to 5,000/50,000/500,000 Ohms; 0 to 50 Megohms. DECIBELS: (Based on zero decibels equals .006 Watts into a 500-Ohm line) — 10 to + 18 db., + 10 to + 38 db., + 30 to + 58 db.

Model 777 operates on 90-120 Volts, 60 cycles A.C. Housed in beautiful hand-rubbed cabinet. Complete with test leads and detailed operating instructions. Size: 13" x 12 1/2" x 6".

**\$59<sup>95</sup>**  
NET

## FOR FM-AM-TELEVISION BUILD YOUR OWN SIGNAL TRACER and SAVE!!

Increasing production of F.M. and Television Receivers means MORE COMPLEX Receivers. Now more than ever this time-saving method of quickly and easily LOCALIZING the exact cause of trouble becomes the "must" method. Since 1939 when we first introduced our CHANNEL ANALYZER we have worked continuously developing and improving the "short-cut" method of Receiver servicing.

### The Only Signal Tracer in the Low Price Range Including BOTH METER and SPEAKER!!

**FEATURES:** ★ Comparative intensity of the signal is read directly on the meter — quality of the signal is heard in the speaker. ★ Simple to operate — only one connecting cable — no tuning controls. ★ Highly sensitive—uses an improved vacuum-tube voltmeter circuit. ★ Tube and resistor capacity network are built into the detector probe. ★ Built-in high gain amplifier —Alnico V speaker. ★ Completely portable — weighs 8 lbs. — measures 5 1/2" x 6 1/2" x 9".



We can supply the Model CA-12 completely wired, ready to operate: **\$29.95**

Model CA-12 kit includes ALL PARTS assembled and ready for wiring, circuit diagram and detailed operating data for the completed instrument

**\$21<sup>95</sup>**  
NET



Manufactured by

**SUPERIOR INSTRUMENTS CO.**



# TEST EQUIPMENT

*"Build 'em in one evening — they last a lifetime!"*

Now every radio serviceman, every radio amateur, can have precision test equipment at low cost. The famous EICO line of precision instruments long popular in the medium price field is now available IN KIT FORM at the sensationally low prices that save you almost half.

Anyone, professional and beginner alike, can assemble these high precision Vacuum Tube Voltmeters, Oscilloscopes, etc., so necessary for modern radio and television servicing. The simple, foolproof, step-by-step, schematic and pictorial diagrams accompanying each kit make assembly fast, easy and instructive.

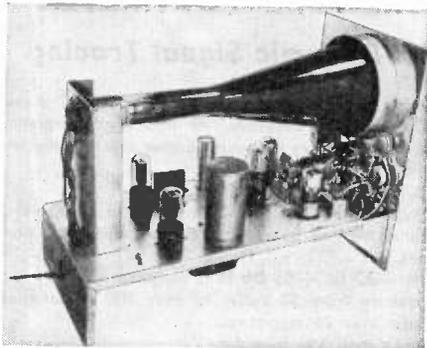


**EASY-TO-FOLLOW  
SCHEMATIC &  
PICTORIAL DIAGRAMS**

included with each kit. It's easy to assemble these precision instruments in one evening!

## MODEL 400K — 5" OSCILLOSCOPE

MODEL 400K — An indispensable aid for AM, FM, and Television. Horizontal sweep circuit 15 to 30,000 cycles. All controls on front panel. Linear sweep with 884 gas triode. Graph screen for measuring peak to peak voltages. Frequency response of horizontal and vertical amplifiers from 50 cycles to 50 KC. Input impedance 1 megohm and 50 mmfd. Etched panel for long life. Tube complement: 2-6SJ7, 2-5Y3, 1-884, 1-5BP1. Provision for external synchronization, test voltage and intensity modulation. Deflection sensitivity .65 volts per inch full gain. Kit contains all components, detailed instructions and pictorial diagrams. Nothing Else To Buy! Size: 8 1/2" w. x 13" h. x 17" d. Shipping weight: 29 lbs.



Complete Kit  
F.O.B. Brooklyn.....

**\$39.95**



**FACTORY WIRED AND TESTED**

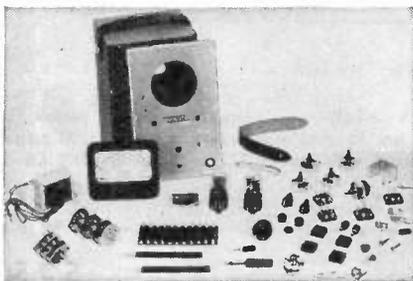
MODEL 400 — Fully wired, laboratory-quality 5" oscilloscope of the most advanced design and construction. Ready to use. Recommended for laboratories, service, production, education, etc. Excellent value! F.O.B. Brooklyn.....

**\$69.95**

## EICO MODEL 221K VACUUM TUBE VOLTMETER

*THE MOST USEFUL TOOL ON YOUR RADIO BENCH!*

DC and AC ranges 0-5, 10, 100, 500, and 1000 volts. Ohmmeter ranges from .02 ohms to 1,000 megohms in steps of Rx1, Rx10, Rx1,000, Rx10,000 and Rx1 megohm. Db scale from -20 to +55 Db in 5 ranges. DC input resistance is 25 megohms. AC input impedance is over 1 1/2 megohms. Diode AC rectifier for greater accuracy and wide frequency range to 30 KC. Large, rugged, 4 1/2" meter with all AC and DC readings on one simple scale. All multiplier resistors matched to 1% accuracy. Complete with 6H6, 6X5, 6SN7 tubes and test prods. All numbers etched into panel; can never rub off. Heavy gauge steel cabinet. Size: 9 7/8" x 6" x 5". Shipping weight: 10 lbs.



Complete Kit  
Nothing Else To Buy!.....

**\$23.95**



**ASSEMBLED VTVM**

MODEL 221 VTVM — Includes all the advantages of above. Completely assembled, hand calibrated and tested, and ready to use at the low price of .....

**\$49.95**

*All prices higher on West Coast*

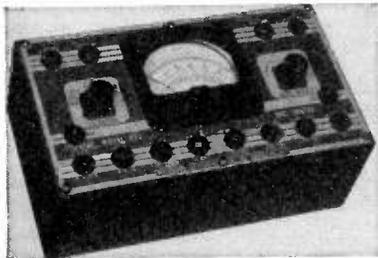
**ELECTRONIC INSTRUMENT COMPANY, INC. • BROOKLYN 12, N. Y.**



# TEST EQUIPMENT

*"Build 'em in one evening — they last a lifetime!"*

## MODEL 511K VOLT - OHM - MILLIAMETER



A MUST FOR EVERY SERVICEMAN!

MODEL 511K — The small, handy, all around meter that every repairman uses a thousand times a day. Large 3" meter, beautiful etched panel. Simple to assemble. A PERFECT KIT FOR BEGINNERS! Ranges: DC, 0/5/50/250/500/2500 volts. AC, 0/10/100/500/1000 volts. Output, 0/10/100/500/1000 volts. DC MA., 0/1/10. DC Amps., 0/1/10. Ohmmeter, 0/500/100,000 ohms/0/1 meg. Db meter —8 to +55 Db.

Complete  
KIT  
F.O.B.  
Brooklyn.....

**\$14.95**

ASSEMBLED — READY TO USE

MODEL 511 — Completely wired, tested and assembled at the factory. Rugged, built for heavy duty. F.O.B. Brooklyn.....

**\$17.95**



## EICO Model 113A MULTI- ANALYST

**Sensational  
Price  
Reduction!  
Formerly \$89.50**

MODEL 113A—A versatile instrument of a thousand uses. Combines the two most used instruments in the radio workshop, the vacuum tube voltmeter and an audible signal tracer. Self-contained isolation transformer.

The Audible signal tracer is ultra sensitive, contains a high gain 3-tube amplifier with exceptionally broad AM and FM frequency response and minimum circuit loading. Permits service engineer to trace signals in RF, IF, FM, Television and Audio circuits without making frequency adjustments, unsoldering wires on taking out tubes. The VTVM section has the same specifications as the Model 221 VTVM. A terrific buy at the new low price of \$69.95.

Tube complement: 1-6SJ7, 1-6V6, 1-6AT6, 1-6X5, 1-6H6 and 1-6SN7. Size: 8 1/2" x 11" x 7".

FACTORY BUILT, READY TO USE

Shipping weight: 20 lbs.

**\$69.95**

All prices higher on West Coast



## MODEL 210 VACUUM TUBE VOLTMETER

**For Visual Dynamic Signal Tracing**

A laboratory quality vacuum tube voltmeter. Huge 8 1/2" meter knife edge pointer and 2% accuracy. RF with high frequency tube rectification, flat frequency response to over 200 megacycles. Voltage measurements to 5,000 volts DC.

DC, 0-5, 10, 100, 500, 1000 and 5,000 volts.  
AC, R.F. (Diode type probe) 0-5, 10, 100, 500 and 1,000 volts.  
Ohmmeter measures from .2 ohms to 1,000 megohms in 6 convenient ranges.

Db readings from —20 to +55 Db in 5 ranges.  
AC and R.F. frequency from 50 cycles to over 200 megacycles.  
DC input resistance over 25 megohms.

AC input impedance over 1 1/2 megohms.  
All multiplier resistors are 1% precision (matched).  
Tube complement: 6 x 5, 1 - 6SN7, 1 - 6A L5.

Etched panel for long life.  
Size: 15" w. x 10" h. x 7" d.

Shipping weight:  
20 lbs.

F.O.B. Brooklyn.....

**\$69.50**

FACTORY BUILT, READY TO USE

## EICO MODEL P-75K H.F. PROBE



MODELS P-75K & P-76K — Germanium crystal probe for visual R.F. signal tracing, and measurements to over 200 megacycles. Can be used with Model 221 or 113A (P-75K), Oscilloscope (P-76K).

KIT  
Only.....

**\$3.75**

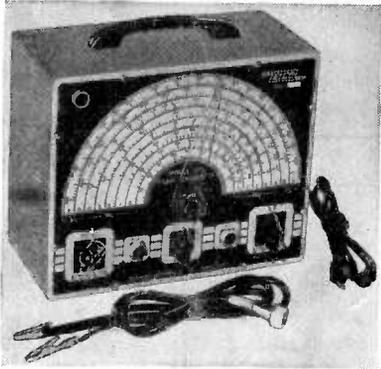
Same,  
assembled  
at factory.....

**\$7.50**

**ELECTRONIC INSTRUMENT COMPANY, INC. • BROOKLYN 12, N. Y.**

# EICO TEST EQUIPMENT & KITS

"Build 'em in one evening — they last a lifetime!"



## MODEL 320-K — SIGNAL GENERATOR KIT

An excellent instrument for service, lab, and school use. Can be used for FM-AM alignment and to provide TV marker frequencies. Highly Stable Hartley oscillator has range of 150 kc to 102 mc with fundamentals to 34 mc. Colpitts audio oscillator supplies pure 400 cycle sine wave voltage for modulation. Audio oscillator voltage can be used for testing distortion in audio equipment, bridge measurements, etc. Complete RF section featuring turnet-type coil assembly and ceramic insulated variable Condensers, can be aligned by use of any standard broadcast receiver. Size: 10" x 8" x 4 3/4". Handsome etched panel with easy-to-read calibrations. Easily assembled and aligned. Complete with tubes .....

**\$19.95**

FACTORY WIRED AND ALIGNED  
Model 320. Ready to use.....

**\$29.95**

## MODEL 145-K MULTI-SIGNAL TRACER KIT

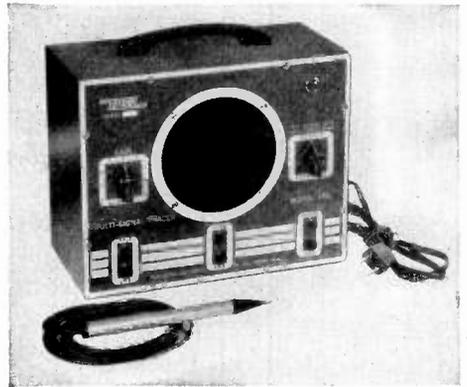
Versatile, high gain—high frequency instrument. Self-contained test speaker permits tracing of RF, IF, FM, audio, and video circuits. Has provision for visual tracing with VTVM, enabling actual stage-by-stage gain comparison. May also be used as a small public address or intercom system. Response is well over 200 mc. 3 color hammertone panel. 110-125 V. AC. Size 10" x 8" x 4 3/4". Comes complete with tubes and diode probe in kit form.

COMPLETE KIT .....

**\$18.95**

Model 145. Ready to operate.....

**\$28.95**



## SENSATIONAL! . . . NEW! . . . EICO MODEL 360-K TV-FM SWEEP SIGNAL GENERATOR KIT

ALL THESE LABORATORY-QUALITY FEATURES: • Crystal marker oscillator with variable amplitude. • Covers all TV and FM alignment frequencies between 500 kc and 228 mc. • Sweep width variable from 0-30 mc. with mechanical inductive sweep. • Extremely wide sweepwidth allows gain comparison of adjacent RF TV channels. • Provides for injection of external signal generator marker. • Phasing control included. • Vernier driven, calibrated tuning dial for master oscillator. • Large, easy-to-read dial is directly calibrated in frequencies. All center frequencies of TV channels clearly marked on panel. • Extremely stable oscillator gives clear, steady pattern. • Can be used with EICO Model 400-K or any other standard oscilloscope. • All components furnished, including handsome, lifelong 3-color etched panel, and durable steel cabinet. Comes complete with all tubes (including new, high-frequency miniature types): 6X5GT, 12AU7, two 6C4's. Crystal not included. Size: 10" x 8" x 6 3/4".

COMPLETE KIT .....

**\$29.95**

Model 360. Ready to use Sweep Signal Generator.....

**\$39.95**



## MODEL HVP-1 — HIGH VOLTAGE PROBE

At remarkable low cost, here is a probe for every use involving high voltages. Not a kit, but a complete, top-quality High Voltage Test Probe. Measures up to 10,000 or 30,000 Volts making it useful even for projection television. Special Helical-Wound Ceramic HV Multiplier Resistor, which is removable, makes it adaptable to most VTVM's and all 20,000 ohms per volt meters with 1000 or 5000 volt scales. Lucite head has high dielectric and low leakage path. Handle is made of multi-layer, plywood bakelite for greater insulation and high safety factor. Large flashguards for additional safety. Specify your instrument to your jobber.



Complete with resistor, ready to use .....

**\$6.95**

All prices higher on West Coast

**ELECTRONIC INSTRUMENT COMPANY, INC.**

**BROOKLYN 12, N. Y.**