CATALOG No. 12

HICKOK

Radio and Television Service Equipment

PANELINE

TESTERS ARE PANELS

BASIC TEST METHODS

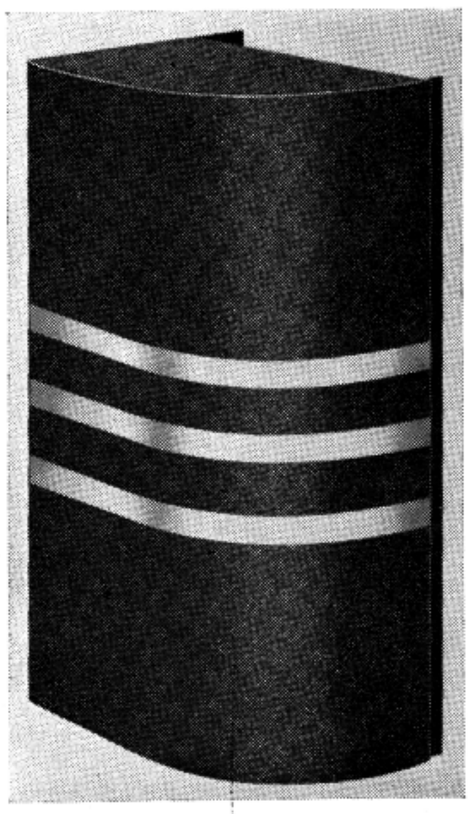
TWO ROUNDED END COLUMNS AND LAMPS

SET UP ANY HICKOK TESTERS AS SHOWN IN THIS CATALOG. PRESTO! THERE'S YOUR PANEL.

THE HICKOK ELECTRICAL INSTRUMENT COMPANY
CLEVELAND, OHIO U. S. A.

PANELINE END COLUMNS, REFLECTORS AND LAMPS

Nothing else to buy. Extremely flexible. Testers can be arranged for any type bench or panel and to suit your own individual requirements.
All instruments made same height. Same finish. No cutting or fitting necessary.



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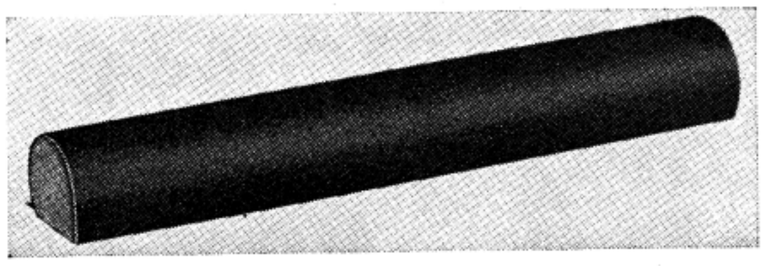
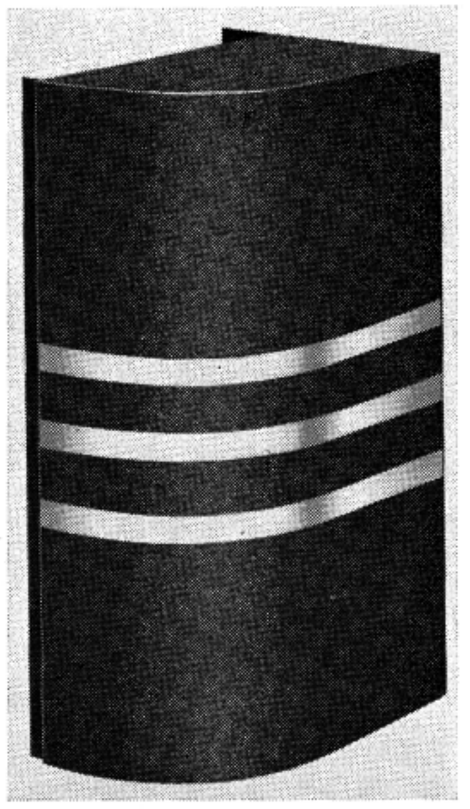


END COLUMNS CAN BE SUPPLIED TO FIT ANY COMBINATION OF TESTERS SHOWN IN THIS CATALOG. STANDARD TESTERS CAN BE INSTANTLY ARRANGED TO MAKE DISPLAY PANEL SIMILAR TO ONE SHOWN ON FRONT COVER OF THIS CATALOG.

Designed to use one reflector per tester. When ordering reflectors and lamps be sure to specify for what testers so that correct width reflector can be supplied.



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MODEL 510X RADIO TUBE AND SET TESTER MEASURING DYNAMIC MUTUAL CONDUCTANCE IN MICROMHOS

TESTS TUBES TO MANUFACTURERS AND ENGINEERING STANDARDS

Model 510X
Size: 14" x 13¾" x 6".

THREE RANGES: 0-3000, 0-6000, 0-15,000 MICROMHOS

WITH FIVE INCH RECTANGULAR METER — SCALE LENGTH OVER 4½ INCHES.

NOTE: The Unit of Mutual Conductance is the Micromho. If a Tube Tester does not read in Micromhos it is not a Dynamic Mutual Conductance Tester.

INCLUDES A.C., D.C. VOLTS, OHMS, MILLIAMPERES, CAPACITY, LEAKAGE, INDUCTANCE ,OUTPUT AND DECIBEL MEASUREMENTS.

TESTS ALL TUBES, OCTAL, LOKTAL AND TUBES UP TO AND INCLUDING 117 VOLT FILAMENT.

Contains sensitive test for noisy tubes.

INDICATIONS, SET TESTER SECTION:

Reliable electronic rectifiers for A.C. Volts. No Copper oxide rectifiers used on any ranges. No burnt out rectifiers, no trouble. Linear scale. A.C. Volts: 0-20, 0-200, 0-500, 0-1000—Readable as low as .1 volt. A.C. voltmeter used to read output. D.C. Volts: 0-20, 0-200, 0-500, 0-1000. 1000 ohms per volt, all ranges. D.C. Milliamperes: 0-20, 0-200. Ohms .1 to 25 Megohms in 3 overlapping ranges. NO BATTERIES USED. Capacity. .0001 to 24 Microfarads in 3 overlapping ranges. Checks leakage in electrolytic condensers with polarizing voltage.

INDICATIONS TUBE TESTER SECTION:,

Delivers filament voltages up to 117 in consecutive steps. No obsolescence! Micromhos: 0-3000, 0-6000, 0-15000. Also expressed in English reading scale "Good", "Replace" and "Doubtful" three colors. Diodes tested separately for emission. Highly accurate line test on meter — Extremely stable.

COMPARE THESE HICKOK FEATURES:

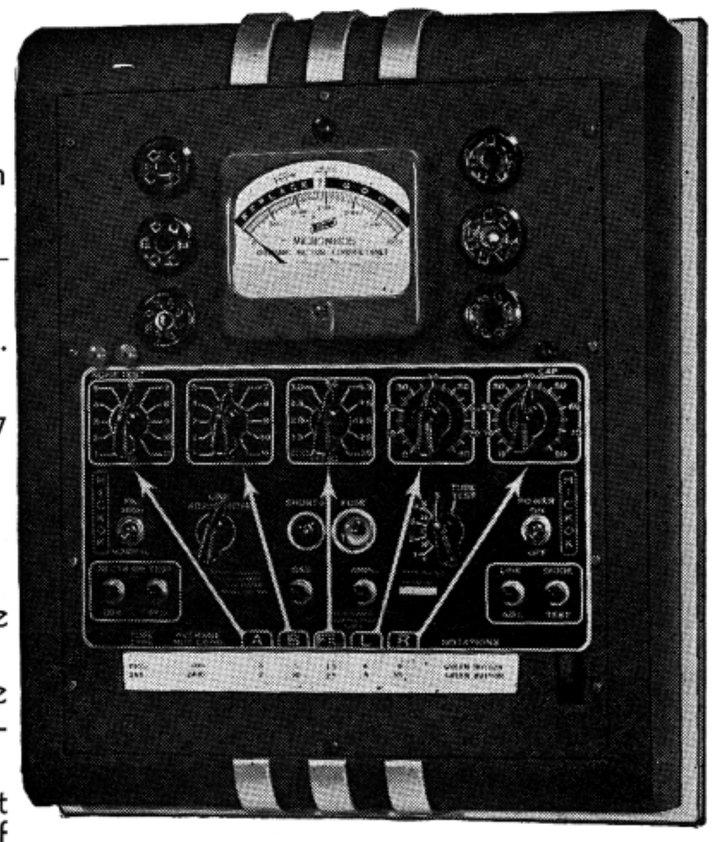
1. Uniform Scale for both A.C. and D.C. Volts. 2. True Dynamic Mutual Conductance. 3. Sufficient plate current to accurately check both Power and Mutual Conductance. 4. Each tube element receives proper voltage. 5. Checks gas content accurately. 6. Detects both short and open elements. 7. Elements tested separately in multi-element tubes. 8. Short tests made hot or cold. 9. Selector switches take care of all future tubes. 10. Sells more tubes—culls them closer. 11. No complications. No Customer confusion. 12. Rectified current is used on both Plate and Grid. NO COPPER OXIDE RECTIFIERS USED. 13. A.C. Voltmeter accurate on Audio Frequencies. 14. Instructions supplied for reading Decibels. 15. Checks inductance of chokes with or without D.C. Component of Current. 16. Checks leakage in electrolytic or paper condensers. 17. Measures hum in filter systems. 18. Method of measuring Dynamic Mutual Conductance patented.

MODEL 530 TUBE TESTER MEASURING DYNAMIC MUTUAL CONDUCTANCE IN MICROMHOS

TESTS TUBES TO MANUFACTURERS AND ENGINEERING STANDARDS

(Illuminated Dial)

THREE RANGES: 0-3000-6000-15000 MICROMHOS
(PATENTED)



NOTE: The Unit of Mutual Conductance is the Micromho. If a Tube Tester does not read in Micromhos it is not a Dynamic Mutual Conductance Tester.

The only dual reading units made indicating Dynamic Mutual Conductance in Micromhos — also Good, Replace, Doubtful.

New roll chart, greatly enlarged and simplified. See arrows pointing to chart on tester panel. Most simple of all to operate.

TESTS ALL TUBES, INCLUDING OCTAL, LOKTAL, AND UP TO AND INCLUDING 117 VOLT FILAMENT TYPES.

Contains sensitive test for noisy tubes.

TECHNICAL DESCRIPTION OF 530C AND 530P TUBE TESTERS:

Rectified current is used to energize both plate and grid. Superimposed on the rectified voltage in the grid circuit is an alternating signal voltage.

The large square meter responds only to the change in plate current caused by the signal on the grid. The meter is not affected by the steady value of plate current, except in diodes and rectifiers in which plate current is indicated.

The 530 type testers are truly Dynamic Mutual Conductance Testers. In twin and multi-element tubes, the components are tested separately, determining the dynamic mutual conductance of each component. In twin grid tubes each grid is energized separately, determining the relative function of each. Diode plates are tested separately.

EXCLUSIVE FEATURES:

1. Reads Dynamic Mutual Conductance DIRECTLY in MICROMHOS which is standard engineering practice. No Graphs. 2. Sufficient Plate Current to accurately check both emission and Mutual Conductance simultaneously. 3. Each tube element receives proper voltage. Rectified current is used on both Plate and Grids. 4. Checks gas content on meter. Gassy tubes ruin the operation of even the best radio receivers. 5. Detects both short and open elements. 6. Elements tested separately in multi-element tubes. 7. Short tests made hot or cold. 8. Selector switches take care of all tubes. 9. Mutual Conductance readings not affected by amount of plate current. 10. Ninety-four unused switch positions for future tubes, only 50 used. All positions wired. 11. Only one setting to make. No complications. No customer confusion. 12. Tests Diode plates separately. 13. Tests all ballast tubes. 14. Tests Magic Eye Tubes. 15. Tests New Battery tubes. 16. Tests Gas tubes: OZ4, OA4, 874, Octal, Loktal and to 117 Volt.

The Hickok method of indicating as embraced in this tester, is the result of years of experience in the manufacture of direct reading Dymanic Mutual Conductance Tube Testers, to conform to all manufacturer's standards of practice.

MADE IN EITHER PORTABLE OR COUNTER TYPE AS SHOWN — SPECIFY WHEN ORDERING.

Size: 530C, Counter Type, 14″ x 16″ x 6″.
Size: 530P, Portable Type. 14¾″ x 13″ x 6″.

MODEL AC-47-A LABORATORY RADIO TUBE TESTER

MOST ACCURATE TUBE TESTER AVAILABLE. ACCURACY WITHIN 1½%. MICROMHOS AND PLATE CURRENT INDICATED DIRECTLY IN MANUFACTURERS STANDARD VALUES.

Exclusive Hickok Features:

Applies Direct Current (standard manufacturers ratings) to PLATE and SCREEN GRID.

Indicates MICROMHOS DIRECTLY. Also plate current. Readings can be compared to manufacturers specifications. Scale, 0-3000 micromhos.

Tests both sections of dual purpose tubes separately, indicating MICROMHOS of each section.

Tests both plates of rectifier tubes separately.

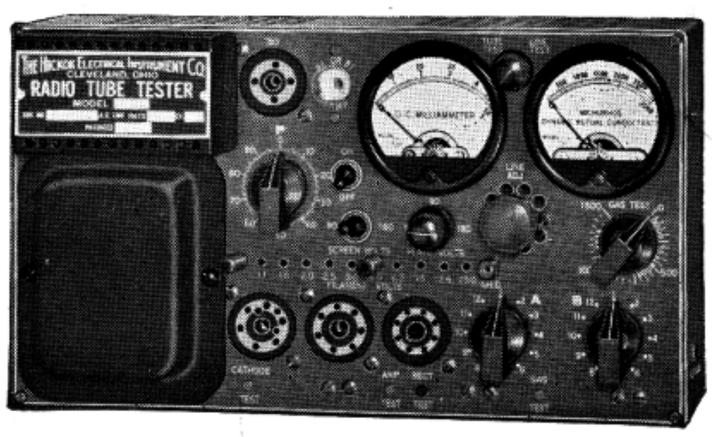
Tests both plates of diode tubes separately.

Gas content indicated directly on "Good" — "Bad" scale. Also indicates gas in actual microamperes.

Cathode leakage accurately measured.

TESTS ALL TUBES INCLUDING OCTAL, LOKTAL, 117 VOLT FILAMENT, ETC., WITHOUT THE USE OF ADAPTORS.

Will not fit in Paneline.



Size: 12 1/16″ x 6¾″ x 3″.

MODELS 170X & 180X UNIVERSAL CRYSTAL CONTROLLED SIGNAL GENERATORS

WITH NINE OUTPUT SELECTIONS

Size: 13″ x 13″ x 7″.

1. Frequency Modulated R.F. Output. (30 KC Sweep). **2.** Amplitude Modulated R.F. Output (400 Cycles). **3.** Unmodulated R.F. Output.

Four Crystal-controlled outputs. Accuracy 0.01%

4. 100 KC Modulated (400 Cycle)—100 KC to 15,000 KC. **5.** 100 KC Unmodulated —100 KC to 15,000 KC. **6.** 1000 KC Modulated (400 Cycle)—1000 KC to 100 Megacycles. **7.** 1000 KC Unmodulated—1000 KC to 100 Megacycles.

8. 100 to 10,000 Cycle Variable Audio Frequency Output. **9.** 400 Cycle Fixed Audio Output.

All Ranges Controlled by Output Attenuator.

Self-Contained Power Level Meter. Three Ranges. −10 to +6, +6 to +22, +22 to +38. Model 180X Only.

Six Fundamental continuously variable RF Ranges 100 to 250 KC, 250 to 650 KC, 650 to 1600 KC, 1.6 to 4.0 MC, 4.0 to 10 MC, 10 to 30 MC. 100″ of Direct Reading Scale. Output voltage from 1 microvolt to over 100,000 microvolts on all ranges. Accuracy better than ½%.

Two Negative Resistance Audio Frequency Oscillators. 0 to 400 cycles, fixed, 100 to 10,000 cycle variable. Accuracy approximately 5%. Output voltage continuously variable from 0 to 1.0 Volt.

All coils are air-trimmed for capacity and laboratory adjusted for inductance.

TUBES: The tubes used are the type 6K7, type 6C6, type 6SK7 and type IV. All these tubes are the latest 6 volt heater type tubes, and are operated sufficiently below their normal rating to insure long life and uniform service.

POWER: The Oscillator includes a complete built-in power supply consisting of a transformer, rectifier and filter. It may be operated from any 110 volt A.C. line, 40 to 65 cycles, other voltage and frequencies available at slight additional cost.

CABLES: Each oscillator comes completely equipped and supplied with all necessary connecting cables. Complete and 27 page manual furnished with each signal generator. The operator will find these instructions very helpful for practical service work.

Complete Operating Instructions, Containing Useful Service Data.

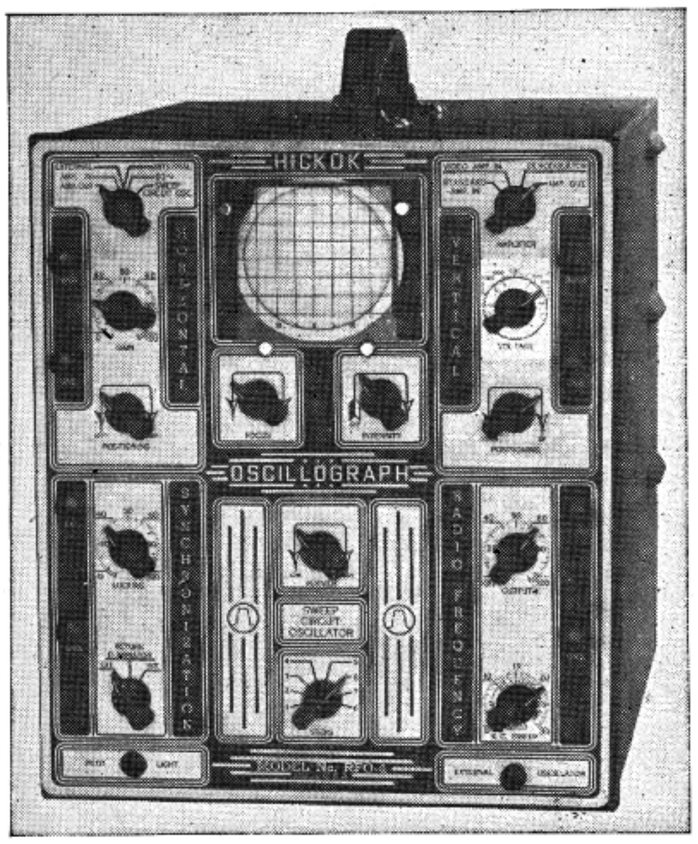
MODELS 170 AND 180

Models 170 and 180 are identical electrically to Models 170X and 180X and are wired for crystal control but the crystal is not included in shipment. Crystal can be installed at any later date without returning the signal generator to the factory.

MODEL RFO-4 OSCILLOGRAPH

FOR COMPLETE VISUAL ANALYSIS

SELF-CONTAINED DEMODULATOR, VIDEO AMPLIFIERS, SIGNAL TRACER, VISUAL A.C. VACUUM TUBE VOLTMETER 0.2 TO 1000 VOLTS.



Size: 11″ x 13″ x 15¼″

Use this oscillograph in both RF and IF stages.

Single or consecutive stage by stage trouble shooting from antenna post to speaker.

Simplifies connections. Variable width sweep from 0-30 KC. Selectivity measurements. Visual alighment at 665 KC or any harmonic thereof to 5 megacycles without the use of an external oscillator.

In conjunction with an external oscillator, produces an audio frequency output continuously variable from 0 to 15 KC. Also, visual development of audio frequency response curve.

FEATURES — 1. Return trace eliminator. (Simplifies alignment of A.F. and R.F. circuits). 2. Horizontal amplifier for sweep expansion. 3. High Sensitivity amplifiers. (0.2 volts per inch). 4. Trapezoidal patterns for percent modulation measurements. 5. Calibrated screen. 6. Cathode ray tube rotation adjustable by means of flexible mounting. 7. Easy operation due to simplicity of controls. 8. Dual sweep for development of any type single or double response curve. 9. Video Amplifiers. 10. Signal tracer.

UNIVERSAL DESIGN — Every facility for research and laboratory measurements. Model RFO-4 is made up of seven different units: Horizontal Panel, Tube Panel, Vertical Panel, Demodulator, Synchronization and Return Eliminator Panel, Sweep Circuit Oscillator Panel and Radio Frequency Modulator Panel. Each section contains the control needed for all oscillographic measurements.

For complete visual analysis and trouble shooting, some method is necessary for viewing the high frequency signal before it reaches the second detector and is demodulated to an audio frequency. Only in the Model RFO-4 is the usefulness of the oscillograph extended to make these measurements and tests. This is made possible by the incorporation of a video (wide band) amplifier which permits frequencies up to 3.5 megacycles to be amplified and viewed on the cathode ray tube screen. Also by the incorporation of a demodulator and suitable amplifier, the RF signal can be picked off any place from the antenna to the second detector, demodulated and viewed directly on the screen.

SIGNAL TRACER — It is often desirable to be able to follow the signal from the antenna post on to the speaker by means of a pair of ear phones or auxiliary loud speaker. The signal tracer in the Model RFO-4 enables this to be done by merely connecting the phones into the jack on the front panel and setting the vertical control switch to the demodulator position. The signal can then be heard as well as seen simultaneously as it is traced through the receiver

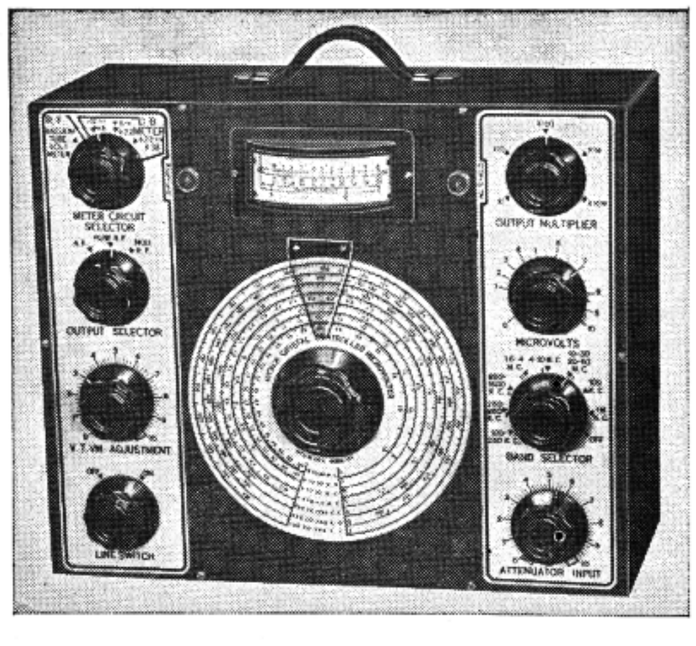
MODEL 19X CRYSTAL CONTROLLED MICROVOLTER

CALIBRATED OUTPUT IN MICROVOLTS FROM 100 KC TO 30 MEGACYCLES

Self-contained vacuum tube voltmeter, power level meter and crystal give more measurements than any other signal generator.

Over 250 Crystal Controlled, modulated or unmodulated outputs — from 100 KC to 15,000 KC every 100 KC and from 1000 KC to 100 megacycles every 1000 KC. Accuracy better than .01%.

GAIN PER STAGE — SELECTIVITY — SENSITIVITY.
All standardized by self-contained vacuum tube voltmeter.
Calibrated Output Ranges: R.F. — ½ microvolt to 100,000 on all ranges.
A.F. — 0 to 1.0 volt.
DECIBELS, TRIPLE RANGES: −10 to +6, +6 to +22, +22 to +38 db.
100 INCHES OF DIRECT READING FREQUENCY SCALES.
ACCURACY BETTER THAN ½%.
Radio Frequency Ranges Calibrated Directly 100 KC to 60 Megacycles.



Size: 13″ x 16″ x 7″.

TECHNICAL DESCRIPTION AND DETAILS OF 19X

The radio frequency oscillator covers, in six ranges, from 100 KC to 30 megacycles on fundamentals direct reading to 60 megacycles. The dial is directly calibrated in kilocycles and megacycles and contains over 100″ of direct reading scales. A type 6J5 tube is used in an electron coupled oscillator circuit.

CRYSTAL CONTROL — Model 19 includes a built-in crystal oscillator providing a modulated or unmodulated output accurate to better than 100 parts in one million. Selection of either 100 KC or 1000 KC by merely turning Band Selector switch to desired frequency. Crystal can be used for checking or calibrating the main variable oscillator throughout its entire range.

MODULATOR — The 400 cycle modulator supplies the 400 cycle modulating voltage for the radio frequency section and modulates this to approximately 35% throughout the entire range of the radio frequency oscillator. The output from this modulator may also be switched to the attenuator network so that a 400 cycle calibrated audio output of 1.0 volt is available.

ATTENUATOR — The input to the attenuator serves the dual purpose of attenuating either the radio frequency or audio frequency output to a predetermined level across the attenuator output. This gives direct calibration of the radio frequency section from ½ microvolt to 100,000 microvolts on all ranges and from 0-1.0 volts of audio frequency. The built-in vacuum tube voltmeter is used to standard the voltage across the attenuator network so that the calibration of this unit holds true.

DECIBEL METER AND VACUUM TUBE VOLTMETER — The built-in decibel meter is so arranged that it can be either connected into the vacuum tube voltmeter circuit or switched to an external circuit which provides three ranges of decibels. The switching of this meter from the vacuum tube voltmeter circuit to the output circuit does not in any way upset the calibration or frequency of the signal generator and thereby provides a means of setting exact input in microvolts to a receiver.

RADIO FREQUENCY COILS — All radio frequency coils are wound on ceramic forms and impregnated with special lacquer, making them moisture proof and not subject to inductance change with humidity or temperature. Each coil is individually calibrated for inductance and air trimmed for capacity, thereby giving an accuracy better than ½% on all radio frequency ranges.

SHIELDING — Each high frequency unit in the signal generator is completely shielded, giving triple shielding on the radio frequency output. Triple filtering is also used in the power supply input.

ACCESSORIES — Supplied complete with sell-contained dummy antenna, necessary cables, and concise, practical operating instructions.

MODEL 110 UNIVERSAL VACUUM TUBE VOLTMETER

DUAL PURPOSE — UNIVERSAL DESIGN

SEVEN D.C. RANGES — 1.5-3.0-15-75-150-750-7500 Volts.

HIGH FREQUENCY A. C. VOLTMETER Four Ranges—1.5-3-50-150 Volts.

HIGH FREQUENCY VOLTMETER — The high frequency A.C. voltmeter utilizes a type 955 acorn low capacity tube at the end of the test probe so that the loading of the circuit under test is held to the low value of approximately 5 micro-micro-farad capacity.

FREQUENCY ERROR — With the test probe in place, the resonance frequency of the input circuit is approximately 150 megacycles and megligible frequency error may be expected up to this value. If it is necessary to measure frequencies above this the test probe may be removed increasing the resonance frequency to over 200 megacycles.

ZERO ADJUST — A single zero adjustment is necessary for all of the high frequency and D.C. ranges and once this has been set it is possible to change to any range without resetting to zero.

OVERLOAD — Another desirable feature of the A.C. and D.C. ranges is that excessive overload cannot in any way damage the meter or equipment. In fact two or three hundred volts can be accidentally applied to the 1½ volt A.C. range with little possibility of damage to the equipment. When measuring A.C. voltages it is not necessary to provide a D.C. return path between the input circuit and ground since the input circuit is taken through a capacity to the diode rectifier and then on to a D.C. amplifier.

D.C. VOLTMETER — Seven ranges of D.C. are provided with zero center so that the chassis or ground of the voltmeter may be connected direct to the chassis of the receiver or television set under test, and if the voltage under test is positive with respect to ground the meter will read up scale and if negative with respect to ground the meter will read down scale. The input impedance of the D.C. section is 24 megohms up to 150 volts and 700 megohms up to 7500 volts.

POWER SUPPLY — 100 to 130 volts A.C. 40 to 60 cycles. Other voltages and frequencies available at slight extra cost. Power consumption 20 watts.

TUBE COMPLEMENT:
6X5 Rectifier, 955 vacuum tube voltmeter tube, and 6K5G vacuum tube voltmeter amplifier.

Size: 11″ x 13″ x 7″.

MODEL 120 INDICATING CRYSTAL MULTIVIBRATOR

THE FOUR PURPOSE UNIT INCLUDING:

Size: 11″ x 13″ x 6″.

INDICATING ELECTRONIC D.C. VOLTMETER.
Five Ranges—Zero Center—0-5-10-50-100-500 Volts D.C. with negligible current drain. 16 megohm input impedance on all ranges. Any D.C. voltages can be measured directly, either positive or negative with respect to ground without affecting the circuit under test. Excellent for measuring A.V.C. voltages during actual operation. Ideal as an output meter for alignment by the A.V.C. voltage method when using either modulated or unmodulated signal.

CRYSTAL CONTROLLED OUTPUT FREQUENCY:
Over 250 crystal controlled output frequencies from 100 KC to 15,000 KC every 100 KC and from 1000 KC to 100 megacycles every 1000 KC, modulated or unmodulated.
The crystal balance control enables the 100 KC crystal to be set accurately to better than 1.0 cycle per million. An excellent tool for accurate alignment required by modern receivers and for checking signal generator calibration.

MULTIVIBRATOR:
The Model 120 also incorporates a 10 KC multivibrator which will produce a modulated or unmodulated crystal controlled signal on every broadcast channel from 540 to 1600 KC. (540-550-560 etc.) A very practical freqnency source for the alignment of push button type receivers since it will produce an crystal controlled signal on any broadcast frequency. The output of the 10 KC multivibrator may be used up as high as 10 or 15 megacycles depending upon the sensitivity of the receiver and its ability to discriminate between signals 10 KC apart.

EXTERNAL CRYSTAL ALIGNMENT:
In the alignment of communication type receivers which use crystal intermediates it is very essential that the intermediate frequency transformers be aligned to within a very few cycles of the actual frequency of the crystal to be used in these stages. By removing the crystal from the receiver and inserting it in the jack marked external crystal the Model 120 will produce the fundamental frequency of the crystal which is to be used in the receiver and this frequency either modulated or unmodulated may be used for the exact alignment of the intermediate frequency stages of the receiver under test.

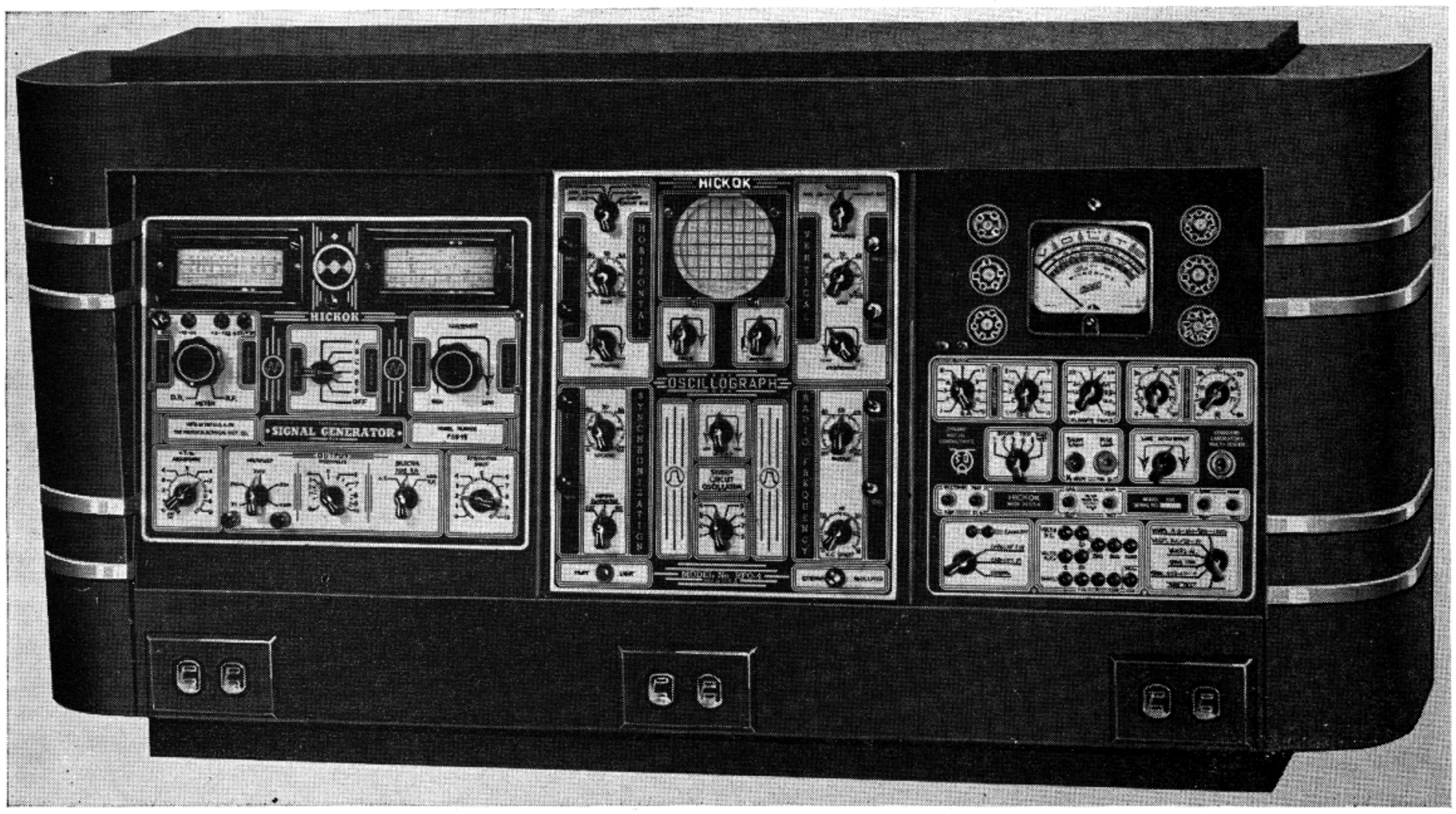
TECHNICAL DESCRIPTION AND DETAIL
Model 120 operates from any power supply from 40 to 60 cycles, 110 volts A.C. Other voltages and frequencies available at slight additional cost.

TUBE COMPLEMENT:
6X5 full wave rectifier, 1852 crystal oscillator, 6N7 10 KC multivibrator, and 6C5 vacuum tube voltmeter.

ACCURACY:
Accuracy of electronic voltmeter plus or minus 2% on all ranges. The accuracy of the 1000 KC output plus or minus .01%. Accuracy of 100 KC and 10 KC multivibrator unadjusted approximately .01%. When adjusted by crystal balance control accuracy can be held better than 1.0 cycle per million.

MODEL 60 SHOW LAB ILLUMINATED SERVICE PANEL

MOST ATTRACTIVE AND CONVENIENT DISPLAY UNIT EVER DEVISED



Size 44 inches wide — 24 inches high — 12 inches deep. All steel. Dark blue smooth crystal finish. Chrome trim. Instruments same finish with satin silver panels to match. Weight 40 pounds, panel only.
Six convenient receptacles, all with fuses, to connect units being tested. Line cord and plug. On and Off switch, etc. Panel shown with Model 180X Signal Generator, RFO-4 Oscillograph and 510-X Radio Tube and Set Tester. Also supplied with any one, two or three test unit shown in this catalog except 19-X and 210-X Testers.

MODELS 210X & 4800-S ZERO CURRENT VOLTMETER TESTERS

INFINITE OHMS PER VOLT

The giant Model 210X with its 9¼" meter is the most recent addition to the complete coverage testers featuring the famous Hickok Zero Current Voltmeter circuit. You can now get zero current testers in compact portable type with suitable carrying case or a larger display panel type for mounting in your Paneline. Special ranges have been included for television service and additional low ranges give more accurate measurements of the smaller values.

THE ZERO CURRENT VOLTMETER OFFERS MANY ADVANTAGES — Infinite ohms per volt. It is no longer necessary to worry along with 5000, 20,000 or 25,000 ohms per volt when you can have infinite ohms per volt with absolutely no current drain from the circuit under test. AVC, AFC and other high resistance circuit voltages are accurately measured without disturbing the operation of the set. Connection can be made directly to the grid cap of any RF or IF tube to measure the operating bias voltage directly.

MODEL 210X JUMBO RADIO AND TELEVISION ZERO CURRENT TESTER

DISPLAY PANEL TYPE

METER — Large open face Hickok built meter 9¼" wide x 8¾" high with a scale length of 8¾".

GENERAL — Case 13" high x 16" wide x 7" deep. Finish in blue wrinkle with etched aluminum panel.

RANGES — 1000 and 10,000 Volts D.C. at 88,888 ohms per volt. 2.5, 25 and 250 Volts D.C. at infinite ohms per volt (Zero Current Voltmeter). 2.5, 25, 250 and 2500 Volts D.C. at 1000 ohms per volt. 2.5, 25, 250 and 2500 Volts A.C. at 1000 ohms per volt. 500 Microamperes D.C. 2.5, 25, 250 D.C. Milliamperes. 2.5 and 25 D.C. Amperes. 5 Amperes A.C.

CAPACITY — Three ranges covering from .0001MFD. to 200 MFD.

RESISTANCE — Four ranges covering from .05 ohms to 50 megohms.

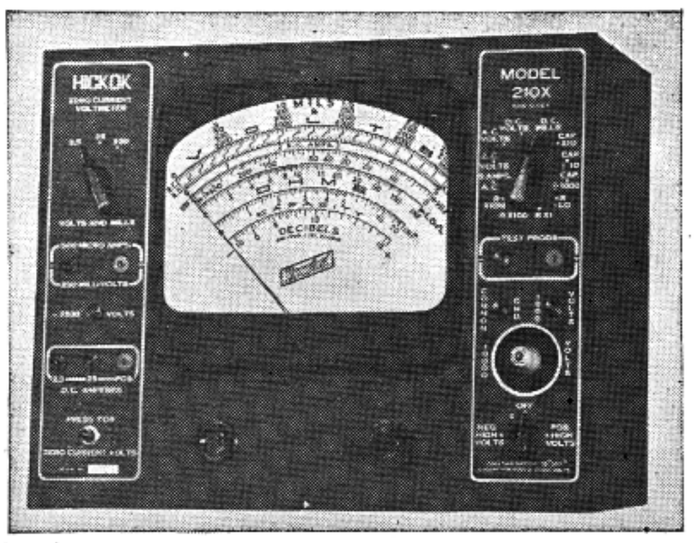
DECIBELS — Three ranges from −20 to +3, +23 and +43.

SPECIAL FEATURES:

The 5 ampere A.C. range is wired directly through to a convenience outlet on the front of the panel where any receiver or other appliance may be plugged in and the power consumed by it measured directly on the 5 ampere A.C. scale of the meter. The circuit is so constructed that this receptacle is completely isolated from all other meter circuits so the test prods may be used for any other ranges without danger of coming in contact with this 110 volt circuit.

All ranges and functions have been grouped around rotary switches for the greatest convenience of operation. All voltage and current ranges are selected by the one three position rotary switch to the left of the meter and all other ranges ,with the exception of some that are included for special purposes, are grouped around the selector switch to the right of the meter.

All balancing rheostats and potentiometers are controlled by the one knob below the meter. Three different types of voltage ranges for three special types of service. Infinite ohms per volt, 88,888 ohms per volt, and 1000 ohms per volt.



Meter 9¼" Wide. 8¾" High.
Scale Length 8¾".
Size: 13" x 16" x 7".

MODEL 4800-S PORTABLE ZERO CURRENT VOLTMETER TESTER

With built-in Multi Selector Unit, and socket analysis Cable.

The portable Model 4800-S includes many of the features listed for the model 210X above, but is not intended to be mounted in the Paneline.

It may be mounted in the Model 60 Show-Lab.

BUILT-IN MULTI SELECTOR UNIT.

CABLES AND ACCESSORIES FOR ALL TUBES — New improved long life jacks for series or parallel connections. Connections may be made to any or all tube elements. Gives quick and convenient method for complete socket analysis without disturbing any of the connections in the set under test.

RANGES — 10-50-250 D.C. Volts at infinite ohms per volt (Zero Current Voltmeter. 2.5-10-50-250-500-2500 D.C. Volts at 1000 ohms per volt. 2.5-10-50-250-500-2500 A.C. Volts at 1000 ohms per volt.

RESISTANCE — Five ranges covering from .1 ohm to 10 megohms.

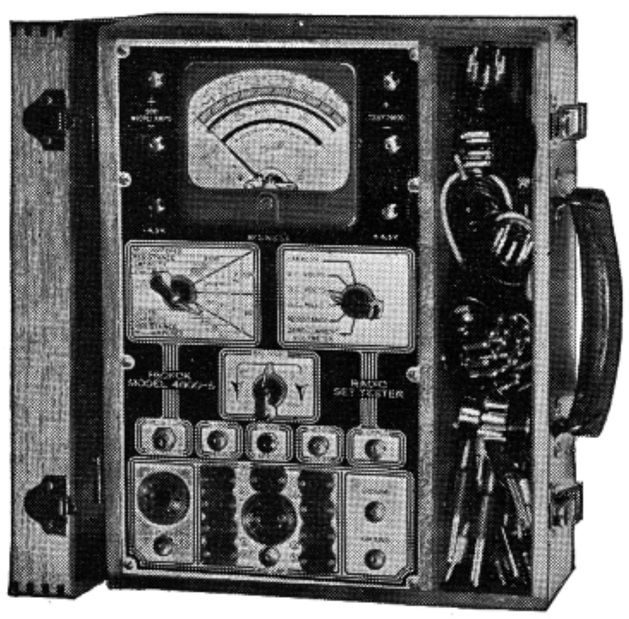
CAPACITY — Five ranges covering .0001 mfd. to 200 mfd. 500 D.C. Microamperes. 0-1-5-50-500 D.C. Milliamperes. 0-10-50-250-500 output ranges.

DECIBELS, IMPEDANCE, INDUCTANCE and A.C. ripple (hum) measurements.

SPECIAL EXTERNAL SHUNTS — The Model 4800-S is calibrated in millivolts so external shunts can be used for higher D.C. current ranges. A specially designed two range shunt, 5-50 amperes (250MV) ,is available at slight extra cost. (See price sheet). Other shunts on special order.

SPECIAL GUARANTEED RECTIFIER

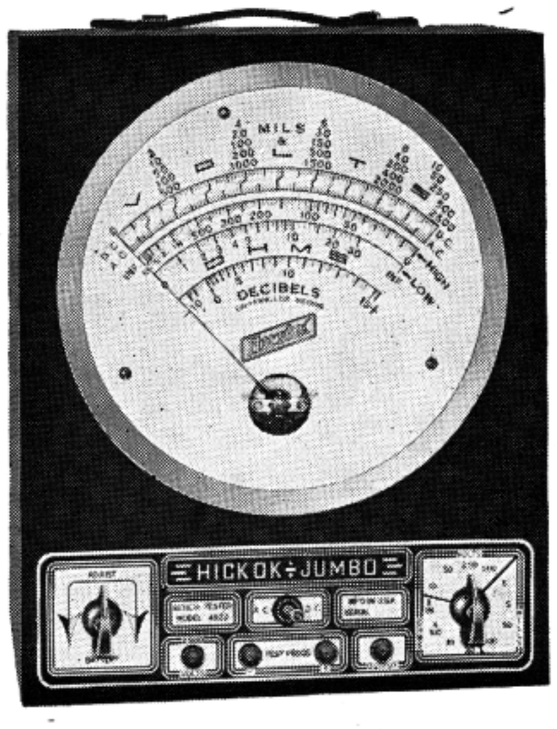
The rectifiers used in the A.C. voltmeter circuits of the Model 4800-S and Model 210X are of special heavy duty construction and are guaranteed to maintain their calibration against normal use and accidental overload. Any rectifier in the above instrument found to be defective will be replaced free of charge in our factory or at any of our authorized repair stations within a period of one year.



Size: 4800-S 10" x 12¾" x 5".

SET ANALYZERS OF ESTABLISHED REPUTATION

MODEL 4922 "JUMBO" VOLT OHM MILLIAMMETER



Nine Inch Meter—(X-RAY TYPE—In Production thirty years.) Scale over Seven Inches long. Clear, Accurate Readings.

TECHNICAL DESCRIPTION MODEL 4922 JUMBO VOLT OHM MILLIAMMETER

A new giant volt-ohm-milliammeter, setting new standards of test methods. The ranges have been extended to cover practically all applications of electrical measurements.

Servicing Radio Receivers	Aircraft Installations	Automobile Radios and
Public Address Systems	Telephone and Telegraph Services	Ignition Systems
Household Appliances	Sensitive Relay Control Circuits	Radio Transmitters and
Industrial Machinery	Motion Picture Sound Equipment	Their Associated Stuido Equipment

and many other applications too numerous to mention.

The large open-face scale is easily read at any angle and at considerable distance.

Extreme accuracy is assured by the Hickok exclusive curve correcting process, which corrects for the mechanical variations present in all D'Arsonval type instruments. By this process, you are assured high accuracy of indication at all points on the scale. Mechanical ruggedness, and ability to withstand severe overloads are built in this tester.

An unusually wide range of coverage is assured by the following ranges:

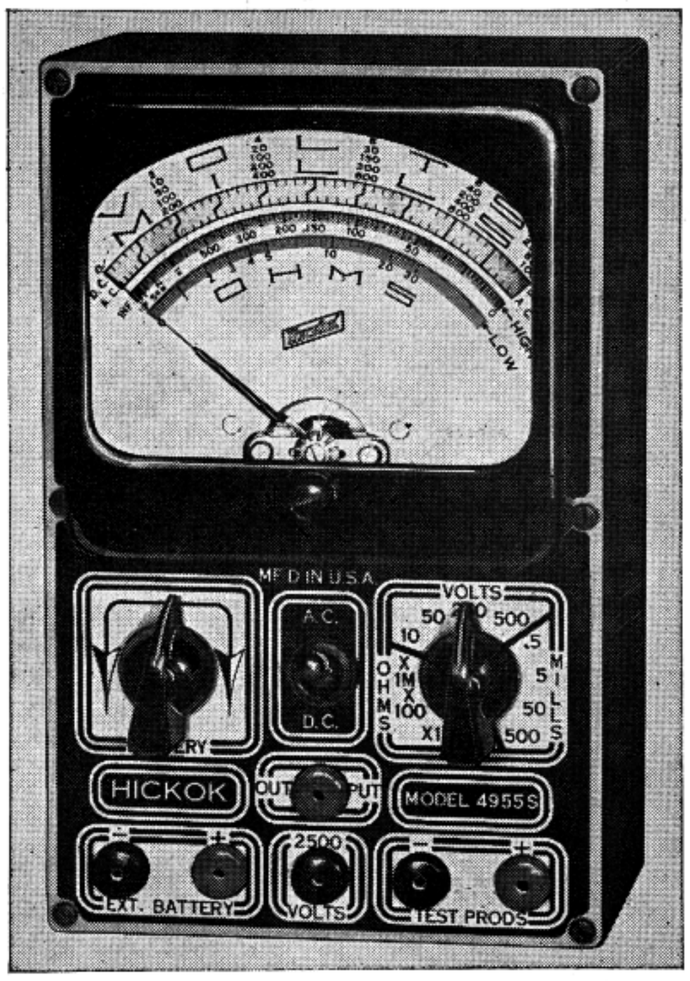
AC and DC volts, 0/10/50/250/500/2500.
DC microamperes, 0/500.
DC milliamperes, 0/5/50/500.
Resistance, 0/30 (8 ohms mid-scale), 0/10,000 (150 ohms mid-scale), 0/1 megohm (15,000 ohms mid-scale), and 0/10 megohms (150,000 ohms mid-scale).
Decibels −10, to +15.
A blocking condenser is provided so that the AC voltmeter may be used as an output meter.

GUARANTEED ACCURACY

All ranges, including the AC volts ranges, are guaranteed to have an accuracy within 3%, within an ambient temperature ranges of 50° to 90° F. This instrument incorporates a new type rectifier circuit, which will withstand twice the overload possible with any other type of rectifier circuit. If the rectifier fails within a period of one year from date of purchase, it will be replaced without charge.

EXTERNAL SHUNT FOR 5 AND 50 AMPERES

This two-range shunt is especially designed for use with the Model 4922 to give ranges of 5 and 50 amperes DC. It is particularly useful in the servicing of Automobile Radios, DC Farm Lighting Plants, and many similar applications.



MODEL 4955-S VOLT-OHM-MILLIAMMETER

ACCURACY WITHIN 2%

Hickok 4" square meter. Scale length 3¾".

FOR GENERAL CIRCUIT TESTING: Contains low ohm range—.05-30 ohms.

SCALE RANGES AS FOLLOWS:

A.C. VOLTS, 0/10/50/250/500/2500. D.C. VOLTS, 0/10/50/250/500/2500. OHMS, .05-30, .5-10,000, 50 ohms to 1 megohm, 500 ohms to 10 megohms. 8 ohms in the middle of the scale. D.C. MICROAMPERES, 0/500. D.C. MILLIAMPERES, 0/1/5/50/500.

A.C. voltmeter can be used as an output meter. These readings may be readily converted into decibels by means of chart furnished with instructions.

GUARANTEED ACCURACY: All ranges including the A.C. volts ranges, are guaranteed to have an accuracy of within 2%, within temperature range of 50 degrees to 90 degrees Fahrenheit. This instrument incorporates a new type rectifier circuit, which will withstand more overloads than any other type. The rectifier is guaranteed for one year.

The instrument used in this volt-ohm-milliammeter is especially built by Hickok for this service. The movement is large and rugged, and a very high torque-weight ratio gives lively, instantaneous pointer action. Large, open face dial. Four colors are used on the scales to promote legibility. The movement is curve corrected by an exclusive Hickok process which gives a higher accuracy at all points on the scale. Permanently correct calibration. This complete self-contained unit is suited for industrial applications owing to its rugged construction. All parts are of the highest standard of quality and all resistors are moisture proof and accurately adjusted. This is the finest volt-ohm-milliammeter obtainable today. Regular leads supplied are 4' long with special insulated pin prods of proper diameter for insertion in the latest type tube socket.

Size, Model 4955-S 7" x 4½" x 3½". Metal etched panel.

Will not fit in Paneline.

EXTERNAL SHUNT FOR INCREASING RANGE TO 5 AND 50 AMPERES.

Size: 13" x 10" x 7".

MODEL TS-50 TEST SPEAKER

THE ONLY INSTRUMENT OF ITS KIND AVAILABLE

Note These Features:

AUDIO WATTS: RANGES—.1-1-10 Watts Indicating Directly on meter. Connect to any power circuit.

VIBRATOR TEST: Check Vibrator in Receiver either on the bench or in the car.

IMPEDANCE: Measure proper line and load impedance in all A.F. Circuits.

TRANSFORMER RATIOS: Check turns and impedance ratios in all transformers. Also fidelity or Frequency response.

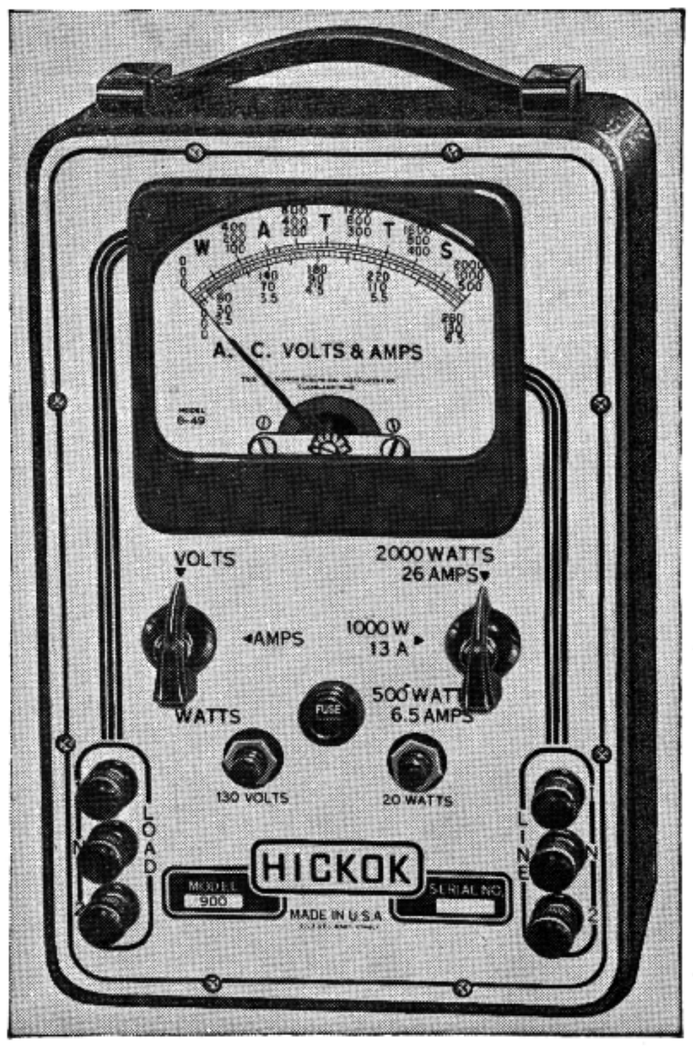
UNIVERSAL MATCHING SPEAKER AND FIELD: Either voice coil or plate input—straight or tapped field variable resistance.

PROVIDES AUDIO FREQUENCY WATTMETER, VIBRATOR TEST, SUBSITTUTE SPEAKER WITH UNIVERSAL MATCHING, VARIABLE RESISTANCE, SUBSTITUTE SPEAKER FIELD, ALSO D.C. AMMETER, 0-15 AMPS., D.C. VOLTMETER, 0-15 VOLTS AND A.C. VOLTMETER 0-10-100 VOLTS.

MODEL 900 ALL PURPOSE APPLIANCE TESTER

A.C. VOLTS — AMPERES — WATTS

TEN RANGES FOR FULL COVERAGE



Ideal for General A.C. Circuit Analyzing.

Tests Electric Refrigerators, Washers, Radios, Ironers, Ranges and all electrical appliances.

This compact A.C. multimeter has four ranges of watts, 0-20-500-1000-2000, four ranges of current—0-260 m.a.—6½-13-26 amps. and two ranges of Volts 0-130-260. A Dynamometer meter with a specially designed current transformer is employed with suitable switching to obtain all these ranges. Furnished in 60 cycle type. Twenty-five cycle models available. See price sheet.

Provision has been made for testing in two and three wire circuits. Detachable leads are furnished with each instrument for connection to small appliances.

A low range of 0-20 watts will measure the power consumed by electric clocks, bell ringing transformers and similar appliances, which remain on the line permanently. A fuse protects this range from accidental overload.

The high range is suitable for checking electric ranges operating on the three wire 220V. System. No. 9A and 9B leads have standard range connectors for this purpose. These are available on special order.

Will not fit in Paneline.

SEE PRICE SHEET FOR LEADS.

HANDY APPLIANCE TESTERS

DYNAMOMETER TYPE WATTMETERS

Shielded from effect of external magnetic fields

Scale length 2 1/32", diameter of case 2¾", depth 3", length of each cable 5 feet.

TO SERVICE Electrical Refrigerators, Washers, Toasters, Waffle Irons, Radios, and all Household Electrical Appliances .A most dependable high grade instrument which will withstand hard portable service. Provides a most thoroughly reliable method of accurately testing to compare actual wattage comsunption with rated specifiications.

SPECIFICATIONS AND PRICES

Complete with double end attachment cord and plugs as shown.

EQUIPPED WITH RED PUSH BUTTON "PUSH TO READ" TO PREVENT INITIAL STARTING LOAD DAMAGING INSTRUMENT.

Model No.	Range Watts	Volt Limit	Amp. Limit
4781	0-300	150	2
4783	0-750	150	5
4785	0-1500	150	10

Price of testers with 300 volt limit instead of 150, $4.50 extra. With both 150 and 300 volt limits, $5.75 extra.

Not available with double current ranges.

Will not fit in Paneline.

COMPLETE TECHNICAL DETAILS ON ANY INSTRUMENT LISTED IN THIS CATALOG UPON REQUEST.

THE HICKOK ELECTRICAL INSTRUMENT CO.

10514 DUPONT AVE., CLEVELAND, OHIO, U. S. A.

HICKOK

Electrical Instrument Co.,
10514 Dupont Ave. Cleveland, Ohio

All Hickok instruments are available on an easy time payment plan. See your distributor for full details, or if he cannot advise you, write The Specialty Finance Co., 605 Terminal Tower, Cleveland, Ohio, or communicate with factory.