HICKOK

TEST EQUIPMENT

Catalog 61D

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1910 - 1961

HICKOK

Recognized For Excellence For 51 Years

Since 1910, the name "HICKOK" inscribed on electrical and electronic instruments has been the assurance of the finest and most dependable in electronic test equipment. For longer than there has been an "electronics" industry, HICKOK engineering has continually pioneered in the development of highest quality, versatile, reliable test and indicating instruments.

From the days of Marconi's wireless, into the age of semiconductors, HICKOK has led the way in such important developments as:

- The first Dynamic Mutual Conductance Tube Tester, universally accepted as providing the standard test of a vacuum tube...HICKOK tube testers have been widely emulated—they have never been surpassed.
- The friction-free, Taut-Band Meter—eliminating friction from pivots, jewels and hairsprings.
- 250° Scale Meters.
- Sub-miniature, ruggedized meters built to military specifications.
- And now, in the Transistor Age—a full line of transistor testing instruments featuring the same ease of operation, unmatched versatility, unexcelled reliability that have characterized HICKOK products for more than half a century.

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DYNAMIC BETA® TRANSISTOR TESTER

MODEL 870—This new instrument fills a recognized need for a transistor test instrument that can provide meaningful measurements of both a-c and d-c beta. It is ideal for quality control, incoming inspection and sorting and other assignments requiring precise measurement of transistor performance.

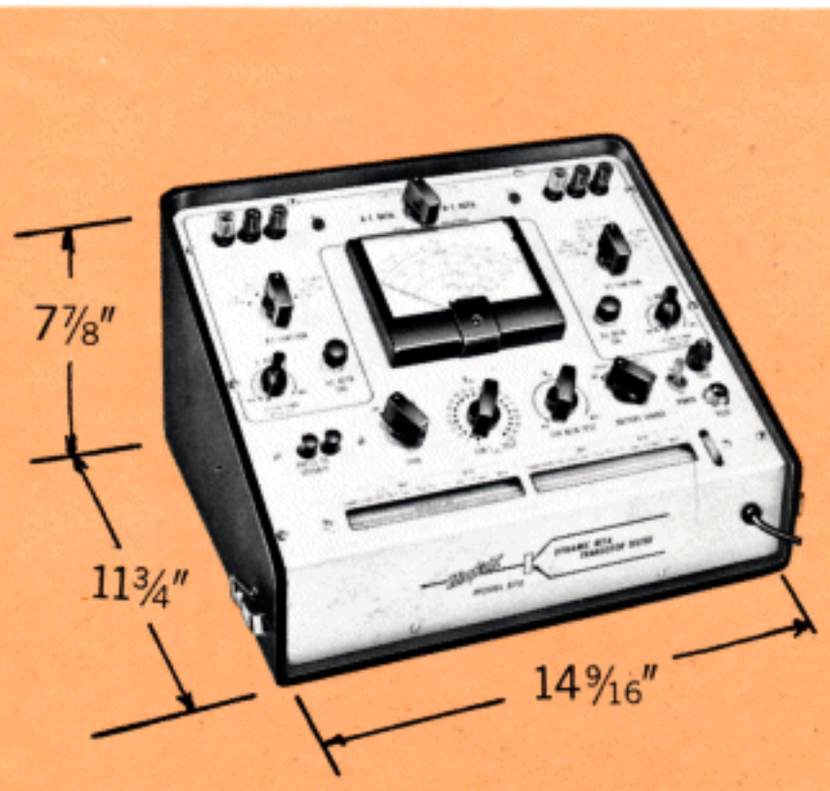
To provide fast, accurate set-ups, vital to efficient volume testing, the instrument has a speed-engineered control layout. All a-c beta test controls are on the left side of the panel; d-c beta test controls on the right. Common controls are placed under the meter, above the handy roll chart containing set-up information for more than 1500 transistors. The Model 870 can also be set up by using handbook information—making it indispensable for custom tests to individual performance requirements in specific applications.

MODEL 870

MODEL 870

FEATURES:

- *Tests transistors as recommended by manufacturers at specified I_c, V_{ce}, and I_b*
- *Checks Collector Saturation Voltage (V_{ce}-SAT)*
- *Provides low voltage, high current tests—excellent for switching transistors*
- *Controls provide maximum set-up flexibility combined with speed-engineered layout for volume testing of transistors*
- *Complete with roll chart giving test data for over 1500 transistors, including imported types*



CASE SPECIFICATIONS
Furnished in black leatherette portable case with detachable cover. 7⅞" H, 14⁹⁄₁₆" W, 11¾" D. 15 lbs. net weight.

Technical Specifications

I_{cbo} MEASUREMENTS — Measures I_{cbo} in the following ranges: 0-100 μa, 0-1 MA and 0-10 MA—with a variable V_{cb} of 0-100 volts

BETA RANGES—0-100 and 0-300, extendable to 600 by reducing AC test signal to 2½ μa.

BETA TEST COLLECTOR CURRENT—Continuously variable, 0-2 amps—permitting satisfactory beta measurement on power transistors rated 5 amps or more.

BETA TEST COLLECTOR VOLTAGE—Continuously variable, 0-5 volts.

SMALL SIGNAL AC BETA TEST—1000 cps signal provides 5 μa current flow in the base of the transistor, can be adjusted to provide 2½ μa current flow if desired to extend Beta range to 600.
V_{ce}— 0-5 volts, I_c— 0-5 MA

LARGE SIGNAL DC BETA TEST—I_c variable, 5 MA up to 2 amps. V_{ce} variable, 0-5 volts.

I_{ceo} TEST— Accomplished with reversal of Base and Emitter externally.

AC BRIDGE CIRCUIT — AC Bridge Circuit consists mainly of two high-gain amplifier stages and crystal diode bridge detector. Circuit is highly degenerative—providing stability. Input sensitivity of bridge amplifier is 50 millivolts peak-to-peak or 17.6 millivolts RMS for full deflection of meter.

METER SPECIFICATION—Hickok Model 66K—type meter has sensitivity of 100 μamps with internal resistance of 1000 ohms.

METER PROTECTION—Silicon diode type SD91 is connected across meter terminals. Diode will conduct and by-pass any excess current that could cause damage to the meter.

BETA TEST ACCURACY—Both AC Beta and DC Beta are well within 5%.

TRANSISTOR INPUT RESISTANCE MEASUREMENT—Accomplished with the aid of an external potentiometer and capacitor.

BUILT-IN ROLL CHART—Contains test data for over 1500 transistors.

ROLL CHART SUBSCRIPTION PLAN—New editions of the roll chart, containing test data on recently released transistors, are published semi-annually and automatically mailed to subscribers to the HICKOK Roll Chart Subscription Plan, providing a sure way of keeping test data up-to-date.

BATTERY POWER SUPPLY—Two rechargeable nickel cadmium batteries are kept in fully charged state with either high rate or trickle charge. Charging network is independent of the power on-off switch. Set on trickle, the batteries will be kept at full charge without damage to the batteries as long as the AC cord is plugged in.

POWER REQUIREMENTS—115 volts, 60 cycles AC, 40 watts
Furnished complete with instruction book.

Dynamic Beta®
IN-CIRCUIT TRANSISTOR TESTER

Now, for the first time, Hickok's Model 890 Dynamic Beta In-Circuit Transistor Tester enables industrial maintenance specialists, service technicians and production personnel to make *in-circuit* measurements on transistors—and at an accuracy of ±5%! No other in-circuit transistor tester can measure Beta to such accuracy.

The key to this new standard of accuracy is the unique, Hickok-developed (and patent-applied-for) method of neutralizing circuit impedance before tests are made. This neutralization effectively nullifies the loading effects of external circuit impedances and thereby eliminates the inaccuracies inherent with other methods, such as the "swamping" method. When required, the amount of external circuit impedance ("Z Ohms"), can be measured directly.

Utilizing an AC bridge principle, with the transistor input circuit elements as one arm of the bridge, the total impedance is nulled. With circuit impedances as low as 150 ohms, this effectively removes these elements from the circuit as a factor in the Beta measurement.

The versatile Model 890 will also measure I_{cbo}; for this measurement, of course, the transistor must be removed from the circuit.

Because of its new standard of accuracy, the Model 890 is an ideal maintenance, service and production line instrument. It can be used for incoming inspection of transistorized products and sub-assemblies as well as at various points during assembly to insure quality control as production advances. Its portability and easy operation make the 890 particularly suited to quick trouble shooting in maintenance and service work.

The instrument is simple to operate: Merely clip the color-keyed test leads to the appropriate transistor leads, neutralize the "Z Ohms" and proceed with the Beta measurement. External Input impedance ("Z Ohms") and Dynamic Input Resistance ("R_{in}"), are read from individual, carefully calibrated potentiometers.

MODEL 890

Technical Specifications

MODEL 890

FEATURES:

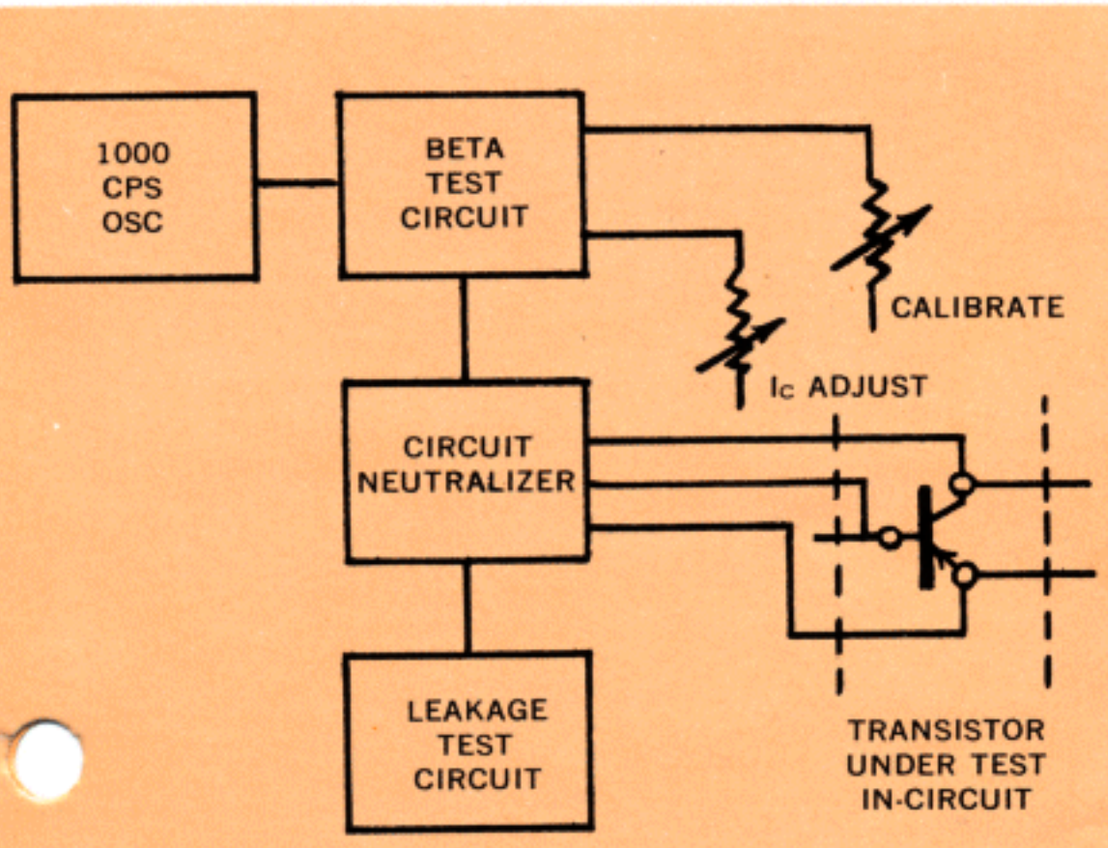
- *Unique circuit (patent applied for) measures AC Beta with* equal accuracy *in or out of circuit*
- *Measures the following in-circuit parameters:*

  AC Beta

  R_{in} (transistor input resistance)

  Z Ohms (base-emitter circuit impedance)

  I_c
- *Measures AC Beta, I_c and I_{cbo} out-of-circuit*
- *In-circuit AC Beta measurement accuracy ±5% (150 ohms minimum circuit impedance)*
- *Portable and completely self-contained*



BLOCK DIAGRAM

I_{cbo} Measurement Range: 0-50 μa

Beta Ranges: 0-50, 0-100, 0-200.

Collector Test Current: Variable from 0-10 MA

Collector Test Voltages: Variable—1.5V, 3.0V, 4.5V

Beta Test Accuracy: ±5% for circuit impedance above 150 ohms

I_c Range: 0-10 MA

AC Test Signal: Variable 1000 cps sine wave—Calibration setting at 5 μa base current

Transistor Input Resistance ("R_{in}, Transistor") **Range:** 50-10,000 ohms

Circuit Input Impedance Range: ("Z Ohms") 100—100,000 ohms

Meter Specifications: Hickok Type 64, Sensitivity: 50 μa, 100 mv, protected against overload.

Battery Power Supply:
One 22.5 volt battery
Four 1.5 volt batteries

Furnished complete with test cable and instruction book.

CASE SPECIFICATIONS:
Furnished in steel portable carrying case.
6½" H, 9" D, 10¾" W. 7¾ lbs. net weight.

PORTABLE TRANSISTOR ANALYZER

MODEL 850P

FEATURES:

- *Ideal for use as a "breadboard" in transistor circuit design and development*
- *Check parameters in any of three configurations—common base, common emitter and common collector*
- *Tests transistors under actual circuit conditions*
- *Six Circuit Configurations—Switch-selected choice of common emitter, common collector and common base—either NPN or PNP*

The Model 850P has been developed as an economical, accurate, easy-to-use transistor analyzer designed to check transistors and determine their ability to function under specific circuit conditions. Featuring a wide range of applied voltages, this instrument will never become obsolete, regardless of new transistor designs. It is ideal as a teaching aid in conveying a full understanding of how a transistor functions.

Technical Specifications

The 850P checks for the following parameters under specific use conditions selected by operator:

- Collector Leakage, Common Base or Common Emitter
- Beta (current) Gain
- Alpha Gain
- Input Resistance
- Output Resistance
- Power Gain

PARAMETERS MEASURED: Measures the following parameters under specific use conditions: Alpha, Beta, R_{in}, R_{out}, I_{co}, I_{ceo}, I_{cbo}, Power gain.

VARIABLE INPUT RESISTANCE: Choice of 10; 27, 100, 150, 470 ohms, 2.7 K, 10 K, 100 K, and 1 meg, plus "short" and "open". Other selected resistance can be added externally through panel terminals.

VARIABLE OUTPUT RESISTANCE: Choice of 10; 100, 470 ohms, 1K, 1.5K, 10K, 15K, 47K, 15K, plus "short" and "open". Other selected resistances may be added externally through panel terminals.

EMITTER BIAS RESISTANCE: Choice of 11; 47, 100, 220, 330, 470 ohms, 1K, 2.2K, 4.7K, 15K, plus "short" and "open". Other selected resistances may be applied externally through panel jacks.

METER RANGES: Input and output meters are identical, have five ranges 0-100 μa 1 MA, 10 MA, 100 MA, 1 AMP.

INPUT CIRCUIT VOLTAGE: Variable 0-2.75 volts with a source resistance of 0.5 ohms. Additional voltage may be applied externally through panel jacks.

OUTPUT CIRCUIT VOLTAGE: 0-12 volts in 1.5 volt steps with a source resistance of 0.5 ohms. Additional voltage may be applied externally through panel jacks.

ACCURACY: Transistor measurements are registered on accurate indicating meters of ±2% full scale accuracy.

CONTROLS: Panel selector permits operator choice of circuit-use conditions to determine transistor suitability.

CASE SPECIFICATIONS:
8" D, 16½" W, 13½" H. 20 lbs. net weight.
Furnished in black leatherette case.

POWER REQUIREMENTS: Battery operated. Furnished with test leads and instruction book.

TRANSISTOR RADIO ANALYZER

MODEL 810

FEATURES:

- *A THREE-IN-ONE TESTER*
- *A Signal Generator—RF, IF and Audio*
- *A Signal Tracer—RF, IF and Audio*
- *A Transistor Tester*

The Hickok Model 810 Transistor-Radio Analyzer has been specifically engineered to fill the need for a time saving instrument necessary to profitable transistor and radio servicing. It has been designed to provide fast, accurate servicing of miniaturized printed circuit, transistorized units. Using the familiar signal tracing method, it quickly checks stage gain and circuit performance, swiftly locates trouble—without slow disconnecting and resoldering—eliminating the chance of damaging "good" transistors in the process. High gain (4 stages) permits probing without the need for actual circuit contact in many cases.

It is ideal for other service jobs, too—servicing small AC-DC portables, audio amplifiers and hard-to-reach automobile radios.

Technical Specifications

TUNED RECEIVER:

- 200-575KC for troubleshooting IF stages
- 550-1600KC for troubleshooting RF stages
- Audio Amplifier for signal tracing audio stages
- Loudspeaker used as signal tracer indicator
- Exclusive cathode follower type signal tracing probe provides minimum loading effect (5 megohms at 5 $\mu\mu$f)

AM SIGNAL GENERATOR

- 200-575KC AM Generator for IF alignment
- 550-1600KC AM Generator for RF alignment
- 600 cycle audio output
- Low Impedance, cathode follower output for effective signal injection into low impedance transistor circuits.

TRANSISTOR TESTER

- Transistor Checking Circuit: Checks leakage and gain

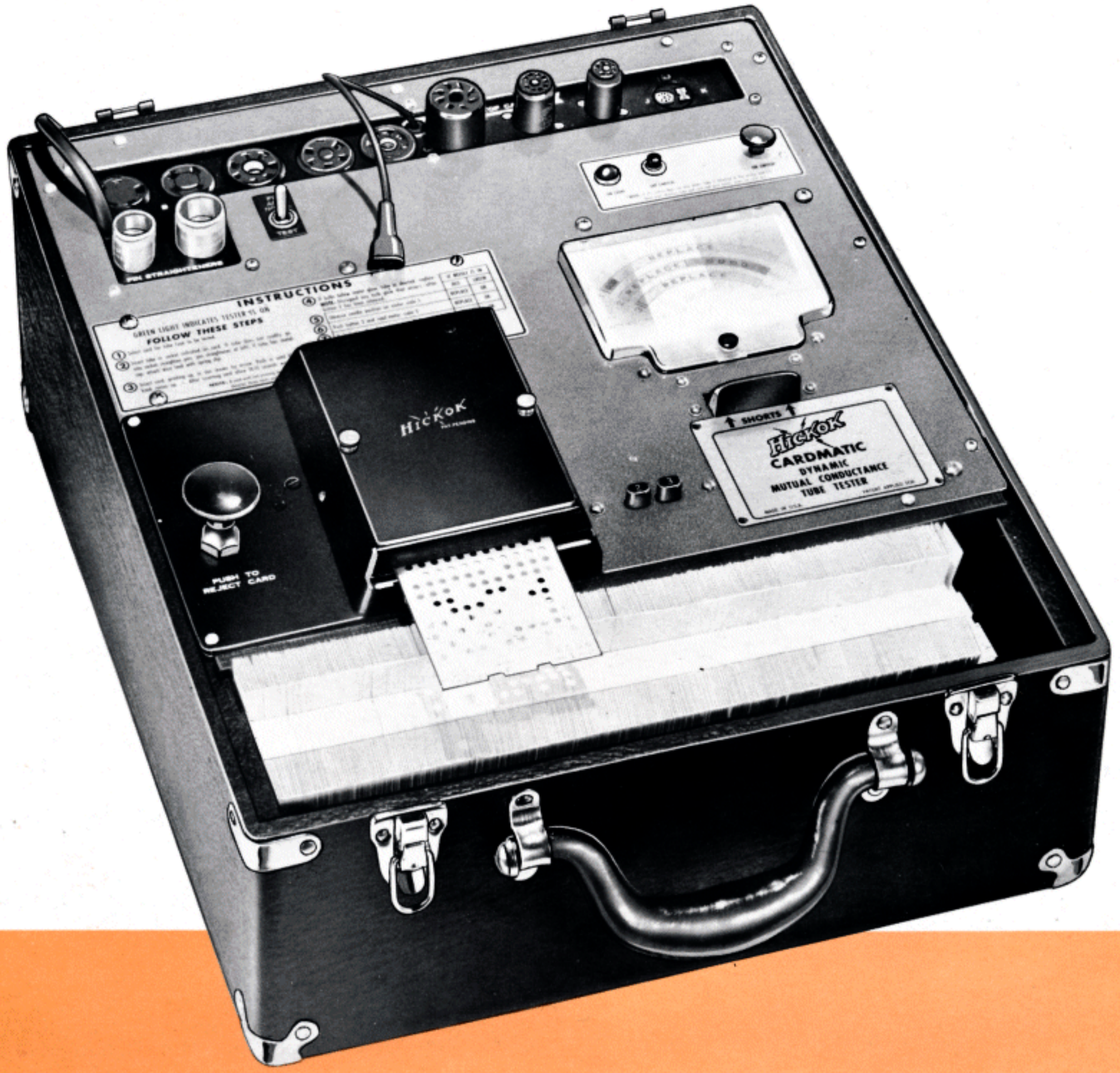
CASE SPECIFICATIONS:

- Furnished in an attractive portable steel case with aluminum panel, 11¼" W, 9" H, 7" D. 11 pounds net.

POWER REQUIREMENTS:

105-125 volts, 50-70 cycles—approximately 20 watts. Furnished complete with instruction book, with simplified schematics and step-by-step instructions for use of the instrument.

INDUSTRIAL and LABORATORY MODEL CARDMATIC AUTOMATIC TUBE TESTER



MODEL 123A—The Model 123A is the first tube tester to use card programming to set up tests required for industrial type tubes. Its patented Card Reader Switch permits over 10 trillion switching combinations. Custom tube tests can be programmed at any point on the characteristic curve—to determine tube performance in special purpose circuits.

A truly modern tube tester, the Model 123A performs complete "fringe" tests and saturation and cut-off tests in addition to the basic G_m measurement. Only saturation and cut-off tests can truly evaluate performance in switching, computer and multi-vibrator applications.

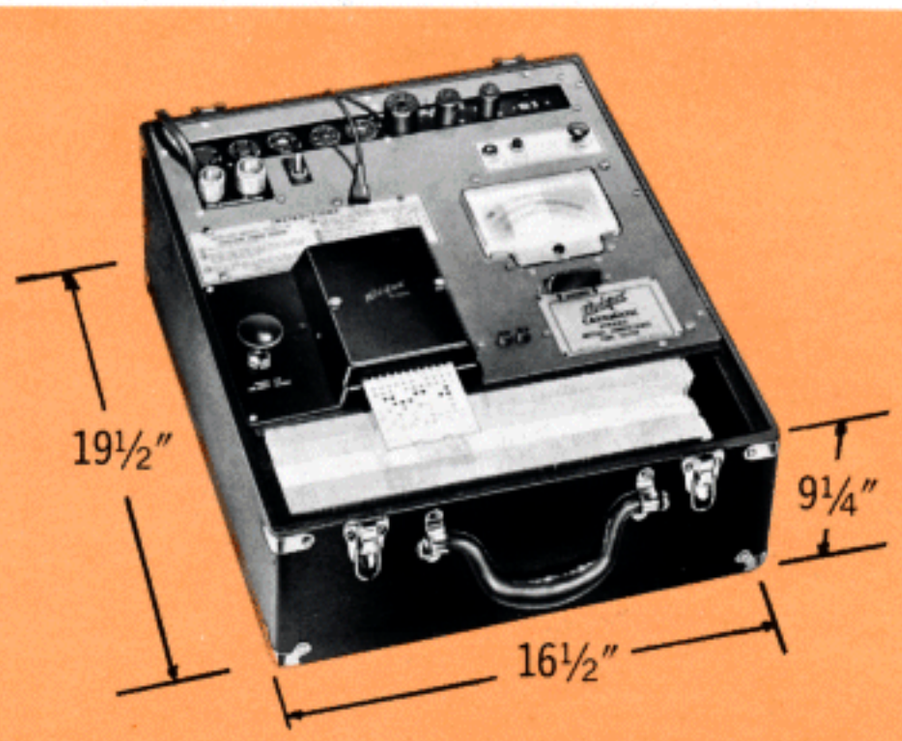
The Model 123A has an unusually low signal voltage of 220 millivolts coupled with a unique G_m measuring circuit and fully regulated power supplies, provides 3-5% accuracy in G_m measurements.

MODEL 123A

MODEL 123A

FEATURES:

- *Card-Programmed Testing to Handbook Standards*
- *Exclusive Saturation and Cut-off Tests, in Addition to Standard G_m Tests*
- *Tests Industrial and Computer Type Tubes, Nuvistors, Low Power Thyratrons and VR Tubes*
- *Sensitive Instantaneous Shorts and Leakage Test*



CASE SPECIFICATIONS: Furnished in strong attractive black-leatherette portable case with detachable lid, 19½″ L, 16½″ W, 9¼″ D. 49 lbs. net weight.

Technical Specifications

TUBE SOCKETS: 4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature, 7-pin in-line and octal subminiature. An adapter is available, Model SA-3, to permit testing of Nuvistors. Socket savers are furnished for 7-pin, 9-pin and octal sockets.

G_m RANGES: From 500 to 26,000 μmhos

CURRENT RANGES: 100 μa to 510 MA full scale.

INTER-ELEMENT LEAKAGE: Shown on 5 neon lamps identifying elements involved. Sensitivity to 10 megohms.

TEST VOLTAGES:
Filament: 0.1 to 119.9 volts in 1/10 volt steps.

Signal: 0.22 volts RMS.

Plate: 12 to 160 volts, fully regulated, standardized at 50, 100 and 150 volts.

Screen: 12 to 160 volts, fully regulated, standardized at 50, 100 and 150 volts.

Grid Bias: 0 to 124 volts, in 7,110 steps

Self-Bias Resistance: 10 ohms to 71,100 ohms in 10-ohm steps. A 1,000 μf capacitor shunts the resistance selected.

Rated Loads on Rectifier Tubes: up to 200 MA.

Relay Overload Protection: Protects the G_m bridge circuit, the filament transformer circuit, the power transformer circuit, power supplies and the meter.

Calibration Cards (Furnished): For calibrating the following:
Shorts test sensitivity
Power supply voltages
Fixed bias voltages
G_m measuring circuit
Overload protection

Cards Furnished: A standard factory pack of 500 selected test cards are furnished with the tester.

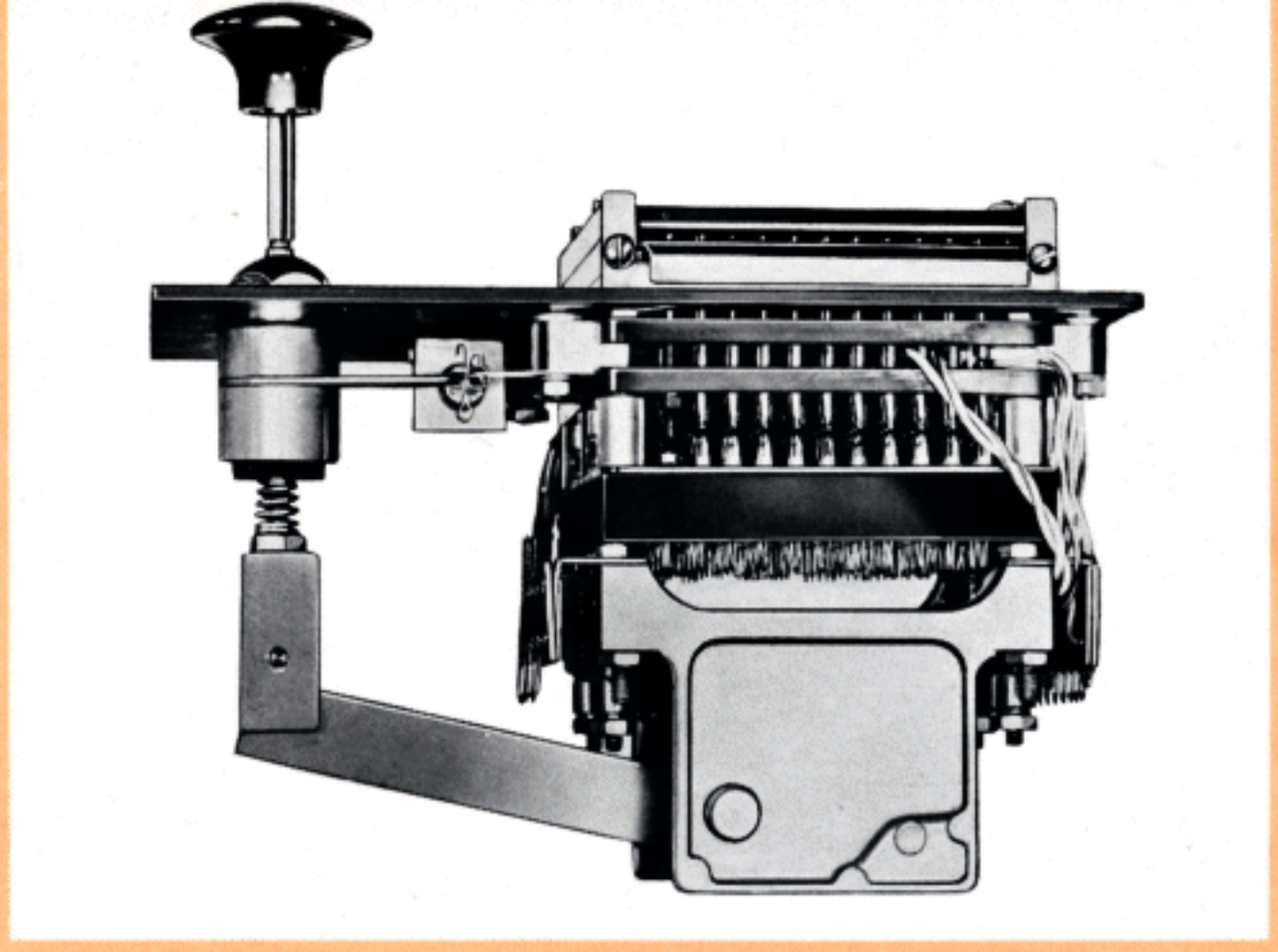
A self mailing order form listing more than 1000 additional test cards is packed with each tester. This makes it possible for you to order test cards for latest tubes and Nuvistors that will be needed. Card orders are processed and shipped directly from the factory within 48 hours after receipt. Supplemental lists covering new test cards available for newly released tubes are issued periodically and mailed automatically to all registered owners of Cardmatic tube testers and to those who have previously ordered test cards.

Card Storage: Integral card storage compartment accommodates up to 600 test cards.

TUBE COMPLEMENT:
6AU8
(triode section) regulator for low current supply
(pentode section) Feedback amplifier for high current supply
6DQ6A Series regulator, B + supply
0A2 Negative voltage regulator
6X4 Bias and reference voltage rectifier
5U4 B + rectifier

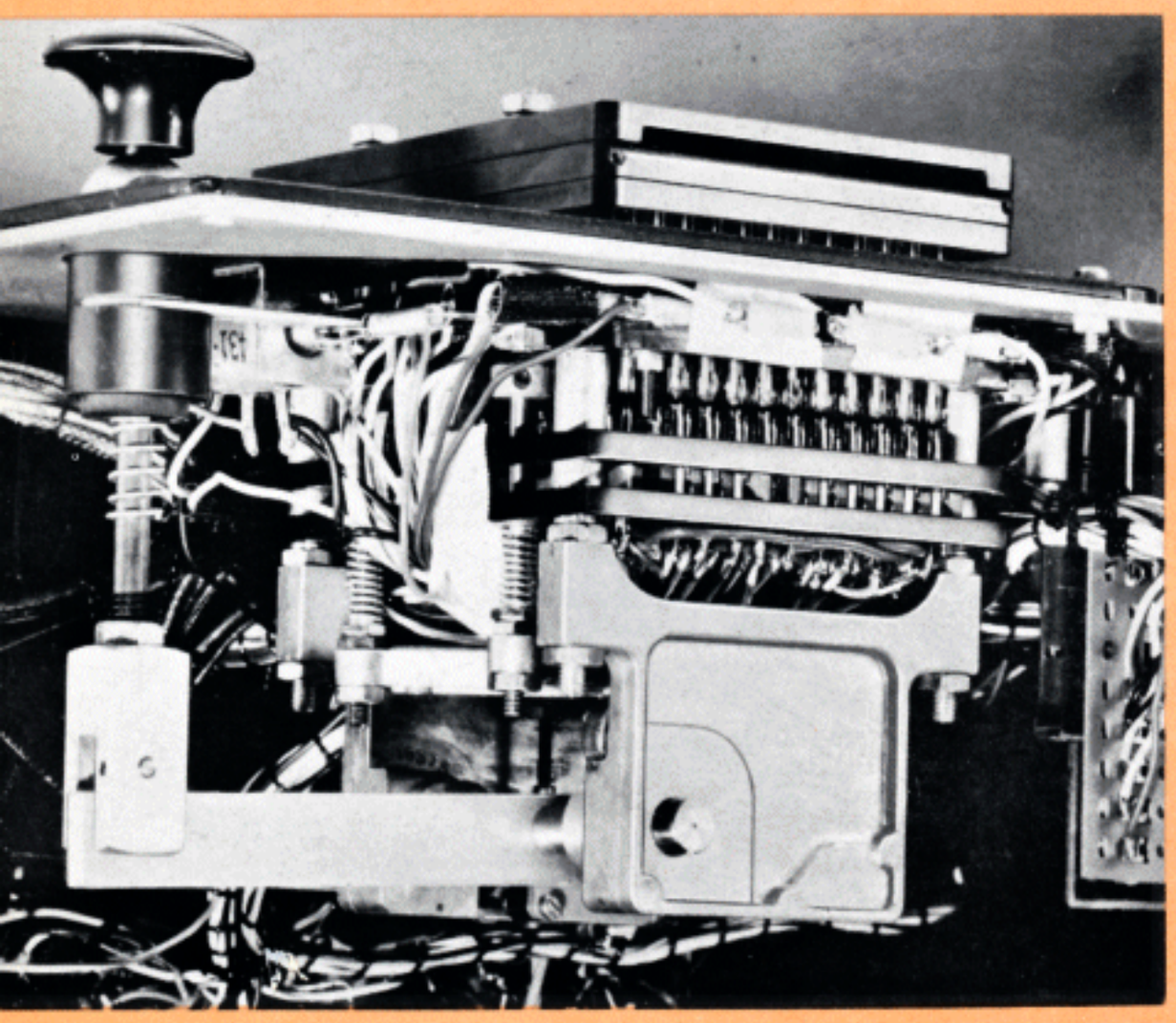
POWER REQUIREMENTS: 105-125V, 50-60 cycles, 55 watts.

Furnished with calibration cards, a selection of most popular cards and instruction book.



CARDMATIC TUBE TESTS ARE PROGRAMMED BY THE HICKOK CARDMATIC CARD READER

The patented Hickok Cardmatic Card Reader contains 186 self-cleaning, wiping-type switches. The actual programming is accomplished with a rubberized vinyl plastic card. The absence of a hole in the card completes a particular circuit; the presence of a hole causes the circuit to remain open. Thus, if the switch is actuated without a card inserted, no circuits will be energized. Also, because the card is mechanically and electrically isolated from the switching circuits the card cannot introduce dirt and foreign material that would affect the switch contacts.



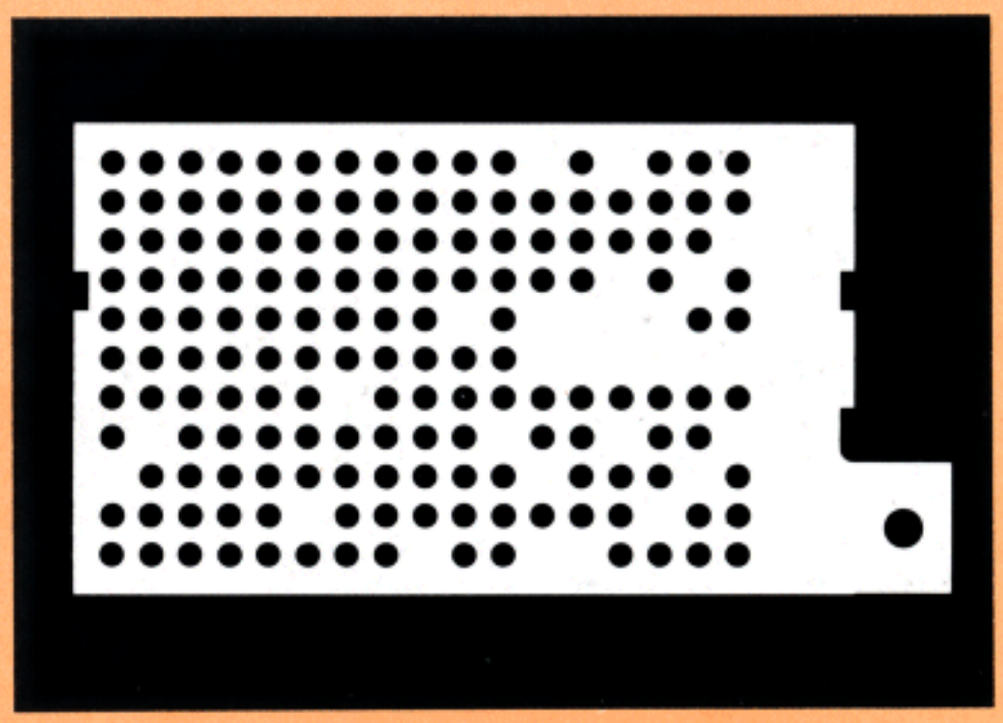
Revolutionary Cardmatic Tube Testers incorporate the Hickok Cardmatic Card reader, pictured above. The Card Reader contains 186 switches and one locating pin. The Card Reader has been life tested in a cycling test of over 100,000 simulated switching actions—without failure.

The Card Reader is a working switch, not a sensing mechanism. It has a contact-to-pin resistance of only 0.0025 ohms, a current carrying capacity of up to 10 amperes.

The flexibility of the Card reader enables card programming of decade and binary test circuits in conjunction with metering, regulating and stabilizing circuits—all automatically. Thus, Cardmatic tube testing offers laboratory evaluation with the insertion of a test card.

Rectifier tubes are subjected to an actual capacitor input filter circuit under full load; fixed-bias or self-bias can be applied to amplifier tubes; the regulating ability of VR tubes is quickly determined. A special knee test instantly determines the ability of pulse amplifiers and switching type tubes to pass peak currents.

In research applications, special cards may be employed to create tailored tube tests at various points on the curve to more closely simulate specific circuit use conditions.



Rubberized vinyl cards provide the programming media. Tough and wear resistant, these cards are ideal for the heavy use they will encounter in tube testing.

THE HICKOK CARDMATIC CARD SUBSCRIPTION PLAN

Hickok, the originator of a continuing program to keep tube testers up-to-date with current roll chart information, has a companion service to users of Cardmatic automatic tube testers.

Pictured above is a portion of the Hickok inventory of over three and one-half million Cardmatic Test Cards. The large inventory is maintained to assure prompt shipment of card orders within hours after they are received at the factory.

HERE IS HOW THE PLAN WORKS:

A self-mailing Card Order form, listing all test cards currently available for each Cardmatic Model is enclosed with each tester shipped from the factory. The new owner can review this list and supplement the cards furnished with the tester with the particular cards he needs to test the tubes with which he normally works. Industrial users need not load themselves with entertainment tube test cards; service technicians need not buy computer and other tube test cards they will never encounter in their operations.

As with roll chart testers, the Hickok Tube Library is constantly establishing new test cards for newly released tubes. To give users information about new tube test cards as they become available, supplementary self-mailing card order lists are published and users can augment their card supply with the particular cards they will need.

In this way, Cardmatic users are assured that the test cards they need will be available to them—and they need buy only the cards with which they will be working. The effectiveness and efficiency of the Cardmatic Automatic Tube Tester is enhanced because it can be kept up-to-date easily and inexpensively.

LOW COST, HIGH SPEED, CARDMATIC
Automatic Tube Tester, Transistor and Diode Checker

MODEL 121 — The Hickok Model 121 is the new, low-cost companion to the famous Cardmatic Automatic Tube Tester, Model 123A, described on previous page. It brings the advantages of card-programmed tube testing within reach of the smallest radio-television servicing business. Like the Model 123A, it not only measures G_m but also determines pulse performance and makes the critical —and equally important—"fringe tests" for gas, grid emission, shorts and inter-element leakage. It is a truly modern tube tester that eliminates the perplexity of a tube that "tests OK but won't work in the set."

Now, in 8 to 12 seconds, you can make Tube Handbook tests on any tube, including pulse amplifiers and multi-vibrators. Now, for the first time, you can accurately test such types as the 6BQ6 and 6SN7. Damper tubes and rectifiers are subjected to loaded tests under peak inverse voltage conditions.

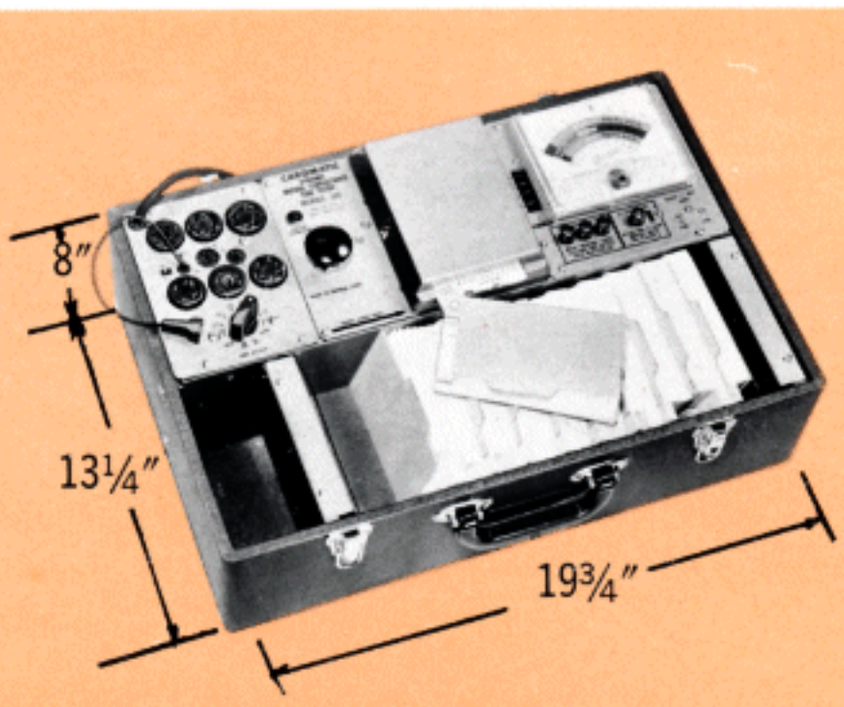
The key to the 121's rapid, automatic tests is card programming through its card-reading operating switch. Employing a unique operating principle, the Hickok Cardmatic Card Reader is patented against duplication. It has been used in thousands of Cardmatic tube testers built to the most exacting standards. Thus, the switch will never become the weak point that has lead to the downfall of many other card type tube testers. The Card Reader has been life tested through 100,000 switching cycles without failure.

MODEL 121

MODEL 121

FEATURES:

- *Correct Testing of Multi-vibrators and Pulse Amplifier Types*
- *Card Programmed Tube Testing*
- *Makes Tube Handbook Tests in 8 to 12 Seconds*
- *Instant Shorts and Leakage Checks*



CASE SPECIFICATIONS:
Furnished in an attractive red-leatherette, portable case with detachable lid, 19¾″ L, 13½″ W, 8″ D. 34 lbs. net weight. Control panel is gold-anodized aluminum.

Technical Specifications

TUBE SOCKETS: 4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature, 3-pin in-line transistor socket. An adapter, Model SA-3, is available for testing Nuvistors.

G_m RANGES: Controlled ranges from 500 to 26,000 μmhos.

INTER-ELEMENT LEAKAGE: Shown by 5 neon lamps identifying elements involved. Sensitivity to 10 megohms.

DUAL SECTION TESTS: Made when indicated by dual-test lamp. Accomplished by depressing a push button on control panel.

ENTERTAINMENT TRANSISTOR TEST: A "good-bad" quality test for emitter-collector conduction. Basic test cards for PNP and NPN transistors are furnished with the tester.

POWER TRANSISTOR TEST: Measures collector-base current leakage.

TEST VOLTAGES:

Filament: 0.1 to 119 volts in 320 steps.
Signal: 0.42 volts RMS.
Plate: 0 to 300 volts in 640 steps.
Screen: 0 to 300 volts in 640 steps.
Grid Bias: 0 to 50 volts in 140 steps.
Self-Bias Resistance Range: 1 to 1000 ohms in 100 ohm steps.
Semiconductor rectifier diodes: Measured in a half-wave circuit under load for conductive efficiency. Load current range: from 100 μa to ½ ampere.

CARD STORAGE: Integral storage compartment will hold up to 600 test cards. Cards can be re-filed automatically.

CARDS FURNISHED: A standard factory pack of 342 test cards selected to cover the most popular entertainment types is furnished with the tester. A self-mailing order form, listing more than 1000 additional test cards is packed with each tester. This makes it possible for the user to order only those cards he actually needs and will use. Card orders are processed and shipped directly from the factory within 48 hours after receipt. Supplemental lists covering new test cards available for newly released tubes are issued periodically and mailed automatically to all registered owners of Cardmatic Tube Testers and to those who have previously ordered test cards.

POWER REQUIREMENTS: 105-125 volts, 60 cycles, 50 watts.

Furnished complete with a selection of test cards, necessary calibration cards and instruction book.

INDUSTRIAL and LABORATORY PORTABLE TUBE TESTER

MODEL 539B — The Model 539B is equally at home in the tube research laboratory or on important maintenance assignments for computers and other industrial electronics equipment. It features a VR tube test for evaluating voltage regulator tubes under actual operating conditions . . . giving instant readings of striking voltages, regulating voltage and current range.

Provision for separate monitoring of plate current (through terminals on panel) makes the Model 539B ideal for matching or balancing tubes. It also features a built-in switch enabling tube measurement under fixed and self-bias condition by merely changing switch position.

A new gas test measures grid current detecting the most minute amount of gas in a tube. Cathode reserve can be determined to indicate the future life of a tube. This is accomplished by a panel switch which reduces heater voltage for evaluation of cathode activity. An extra-low 600 μmho range is especially suited to testing of subminiature tubes.

Non-standard or "tailored" tests are facilitated by the panel terminals providing access to grid, plate, cathode and heater circuits. Thus, direct measurements of voltages and current in those circuits may be made. The measurement of heater current is important in testing tubes on the series-string group where higher resistance in one tube will prevent the remainder from receiving proper operating voltage.

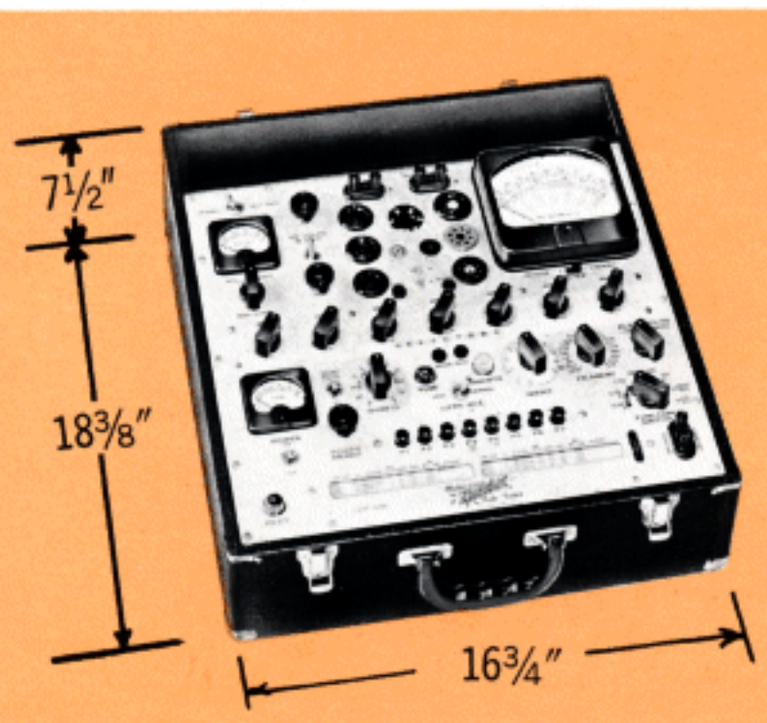
The 539B also makes forward conduction efficiency tests for selenium rectifiers and germanium diodes.

MODEL 539B

MODEL 539B

FEATURES:

- *Hickok-Developed G_m Test Circuit*
- *Six Micromho Ranges*
- *Four AC Signal Voltages*
- *Metered Line Voltage*
- *Metered Grid Voltage*
- *Dual Tube-Leakage Readings—Directly on Meter or by Neon Short Indicator*
- *Provides for Plate Current and Heater Current measurement*
- *Tests VR Tubes, Low-power Thyratrons, "4-digit" types*



CASE SPECIFICATIONS:
Furnished in a black-leatherette, portable case with lead compartment and detachable lid; 16¾" W, 18⅜" L, 7½" D. 28 lbs. net weight. Furnished complete with instruction book and leads.

Technical Specifications

TUBE SOCKETS:
4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature, 7-pin in line and 8-pin round sub-miniature, acorn. Socket savers furnished for 7-pin, 9-pin and octal sockets. Adapters, as listed on page 19, are also available.

G_m RANGES:
60,000, 30,000, 15,000, 6,000, 3,000, 600 μmhos. In addition, rectifier diode and voltage regulator (VR) ranges are provided.

INTER-ELEMENT LEAKAGE:
Indicated directly on meter or on neon lamp; Sensitivity—to 50 megohms.

TEST VOLTAGES:
Filament: 0-117 volts AC (in 20 steps).
Signal: 0.25, 0.5, 1.0 or 2.5 volts RMS.
Plate: 66 and 150 volts DC
Screen: 56 and 130 volts DC.
Fixed Bias: 0 to-40 volts DC, continuously variable.

SELF BIAS:
Applied to the tube by a terminal arrangement on the panel.

BUILT-IN ROLL CHART:
Contains test data for latest industrial and entertainment type tubes.

METERS:
Three Hickok Meters (1% accuracy): G_m meter with ranges listed above and scales reading to 200 volts for VR tube testing and to 50 megohms for leakage testing; An AC voltmeter measuring line voltage and a two-range (0-10, 0-50) DC voltmeter to adjust the negative grid bias.

ROLL CHART SUBSCRIPTION PLAN:
New editions of the roll chart, containing test data for recently released tubes, are published semi-annually and mailed automatically to all subscribers to the Hickok Roll Chart Subscription Plan providing a sure way to keep test data up-to-date.

POWER REQUIREMENTS:
105-125 volts, 50-400 cycles, 40 watts.

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INDUSTRIAL and COMMUNICATIONS PORTABLE TUBE TESTER

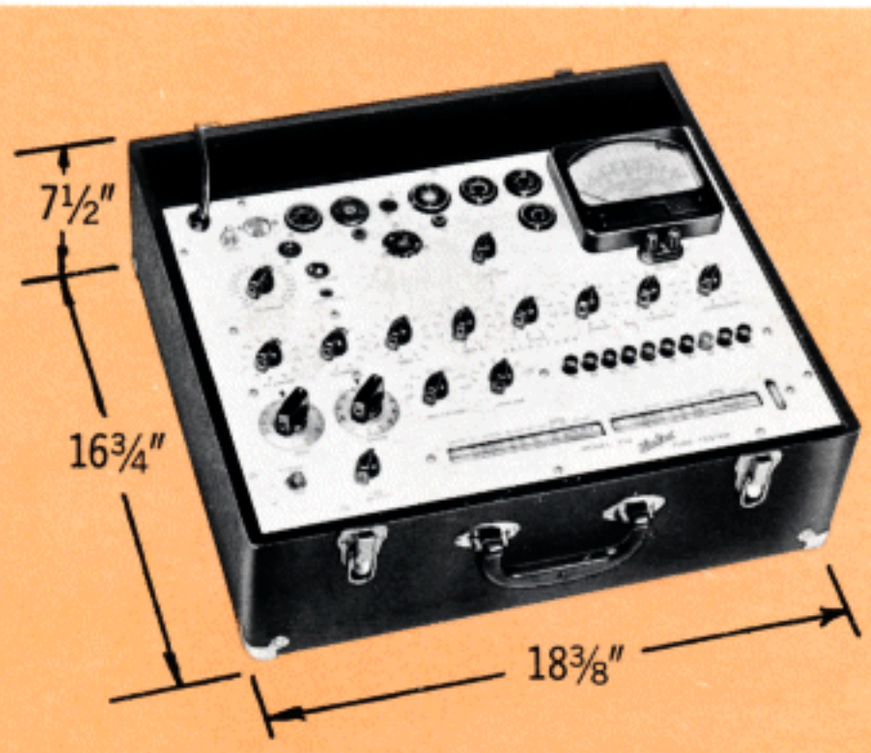
MODEL 752 — Designed for use in maintaining both communications and broadcast equipment and industrial electronic apparatus. The new Voltage Regulator Test Circuit tests VR tubes to manufacturers' specifications including firing point, regulating voltage and current range. Push-button test feature for dual-section tubes permits rapid selection of tubes for balanced or matched characteristics.

MODEL 752

MODEL 752

FEATURES:

- *Hickok-Developed G_m Test Circuit*
- *Dual-section Tubes Tested Without Set-up Change*
- *Speed-engineered Selector Switch Layout*
- *Simplified G_m Scale With Multiplier Ranges*
- *Tests VR Tubes to Handbook Specifications*



CASE SPECIFICATIONS:
Furnished in black leatherette portable case with built-in lead compartment and detachable lid. 18⅜" W, 16¾" H, 7½" D. 25 lbs. net weight.

Technical Specifications

TUBE SOCKETS: 4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature, 7-pin in-line and 8-pin round sub-miniature, acorn.

G_m RANGES: 0-1,500, 3,000, 6,000, 15,000, 30,000 μmhos.

INTER-ELEMENT LEAKAGE: Quantitatively indicated directly in ohms on the meter. Sensitivity to 10 megohms.

TEST VOLTAGES:
Filament: 0-117 volts AC (in 18 steps)
Signal: 0.25, 0.5, 1.25, 4.5 volts 60~ AC
Plate: 75 and 150 volts DC
Screen: 56 and 130 volts DC
Grid Bias: 0 to –40 volts DC, continuously variable.
Extra Negative Supply: –40 volts DC
Diode Test: 20 volts RMS
0Z4 Test: 287 volts RMS

VR TUBE TEST: According to handbook specifications on two meter scales; 0-200 volts and 0-100 milliamperes.

CATHODE ACTIVITY/LIFE TEST: Push button switch reduces filament voltage by approximately 10% of its normal value in order to permit evaluation of cathode condition and estimate of future life.

METER: Hickok Model 68. Single G_m Scale with multipliers simplifies interpretation of tube condition. Additional scales are provided for leakage and VR tests.

ADDITIONAL FEATURES: Bias and line fusing . . . Safety-interlocked selector switches prevent damage due to improper setting . . . Self bias test jacks on the panel . . . Illuminated meter and roll chart . . . Filament selectors expressed in numbers instead of letters simplifies set-up, minimizes error.

BUILT-IN ROLL CHART: Contains test data for over 1200 tubes, including VR tubes, low power thyratrons and 4-digit industrial types.

ROLL CHART SUBSCRIPTION PLAN: New editions of the roll chart, containing test data on recently released tubes, are published semi-annually and automatically mailed to subscribers to the Hickok Roll Chart Subscription Plan, providing a sure way of keeping test data up-to-date.

AVAILABLE ADAPTERS:

Hickok Code No.	For
1050-114	Cathode-ray tubes (kinescopes only)
1050-53	2C39A
1050-107	829B
1050-109	4X150A/4X150B (leakage test only)
1050-118	991
1050-119	2036
1050-120	2-10C
1050-121	6263, 6173, 5675 (pencil types)
SA-3	Nuvistors

POWER REQUIREMENTS: 105-125 volts 50-60 cycles, 40-70 watts.
Furnished complete with leads and instruction books.

SERVICE TECHNICIANS'
HIGH SPEED DELUXE PORTABLE TUBE TESTER

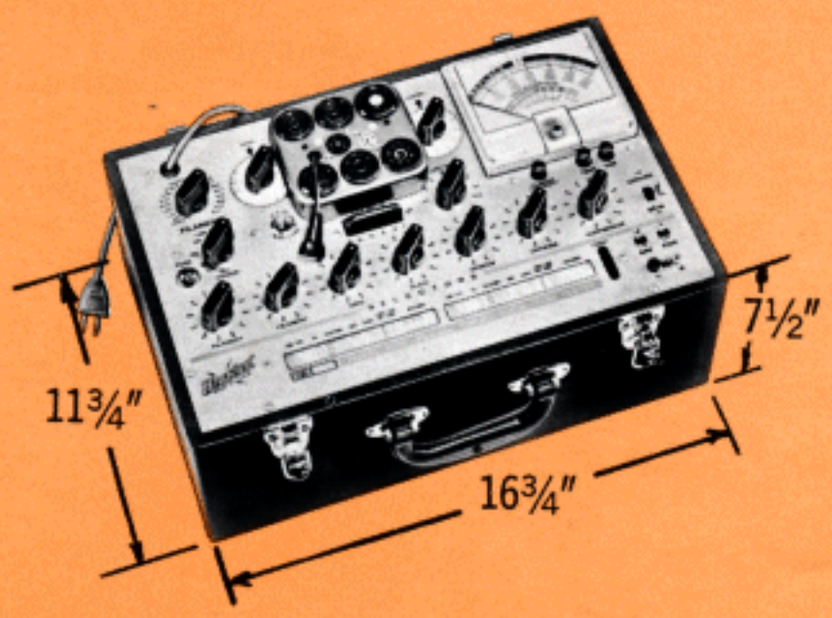
MODEL 6000 — Combining time saving operating features with economical price, the Model 6000 is the choice of both industrial maintenance and service technicians. It tests more tubes—faster and without sacrificing accuracy. It features a plug-in master socket panel, replaceable to guard against obsolescence. The new, *instantaneous* inter-element shorts and leakage test provides greatly increased leakage sensitivity.

MODEL 6000

MODEL 6000

FEATURES:

- *Hickok-Developed G_m Test Circuit*
- *Replaceable socket plate for obsolescence protection*
- *Sensitive, Instantaneous Inter-element Leakage and Shorts Test*
- *Constant Indication of Line Voltage*
- *Filament Continuity Test*
- *Checks Transistors, Diodes and Nuvistors*



CASE SPECIFICATIONS:
Furnished in an attractive, red leatherette covered portable case with detachable lid. 16¾" W, 11¾" L, 7½" D. 16 lbs. net weight.

Technical Specifications

TUBE SOCKETS: Furnished complete with Type RSP-4, 8-socket removable plate that accommodates 4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature tubes. Worn tube sockets may be replaced easily. Adapters available: Type SA-1, accommodating 7-pin inline and 8-pin round sub-miniature types; Type SA-3 accommodates Nuvistors.

G_m RANGES: 0-3,000, 6,000, 15,000 μmhos, read directly on 3-scale meter.

INTER ELEMENT LEAKAGE: Registered instantly on 5 neon lamps, identifying elements involved. Sensitivity: in excess of 3 megohms.

FILAMENT VOLTAGES: 0.6—117 volts in 18 steps.

GRID CURRENT (GAS) TEST: Measured in terms of μamps of grid current on meter when button is pressed. The test circuit employs the tube's amplification factor to disclose the slightest amount of gas.

FILAMENT CONTINUITY TEST: Open filaments can be discovered immediately after tube is inserted in its socket —by pressing a control button.

TRANSISTOR AND DIODE CHECKS: Provides "Good-Bad" quality test for NPN and PNP transistors and forward conduction efficiency test on semi-conductor diodes.

METER: Hickok 5-inch model with large, easy-to-read, multi-colored scales.

LINE VOLTAGE INDICATION: Constantly shown, permits correction at any time during test.

BUILT IN ROLL CHART: Contains test data for more than a thousand tubes. Most frequently used entertainment tube types are grouped in a separate section of the chart.

ROLL CHART SUBSCRIPTION PLAN: New editions of the roll chart, containing latest tube additions, are published semi-annually and automatically mailed to subscribers to the Hickok Roll Chart Subscription Plan, providing a sure way to keep test data up-to-date.

POWER REQUIREMENTS: 105-125 volts 50-70 cycles, 40 watts. Furnished complete with instruction book and test leads.

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SERVICE TECHNICIANS' PORTABLE TUBE TESTER, TRANSISTOR and DIODE CHECKER

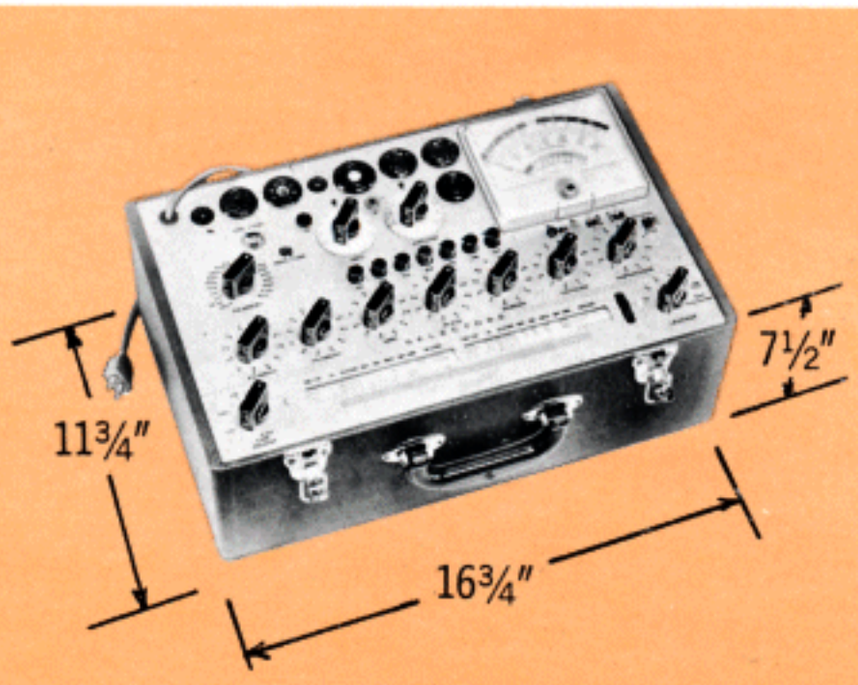
MODEL 800—The Model 800, incorporating the Hickok-developed G_m test circuit, brings the advantages of quality Hickok tube testers to the smallest service shop. Results of the new inter-element leakage and shorts test are read directly on the meter. The new grid current (gas) test will detect even the slightest amount of gas. Manual control of heater voltage permits measurement of cathode reserve by reduction of heater voltage.

MODEL 800

MODEL 800

FEATURES:

- *Hickok-Developed G_m Test Circuit*
- *Direct Meter Reading of Inter-element Leakage and Shorts.*
- *New Filament-Continuity Test—Speeds Tests of Series-string Tubes.*
- *New Grid Current (Gas) Test.*
- *Checks Transistors and Nuvistors.*



CASE SPECIFICATIONS:
Furnished in attractive red-leatherette covered portable case with detachable lid. The aluminum panel is gold-anodized with red and black lettering. 16¾" W, 11¾" L, 7½" D. 16 lbs. net weight.

Technical Specifications

TUBE SOCKETS: 4, 5, 6, 7-pin, octal, loctal, 7 and 9-pin miniature. Adapters available: Type SA-2 for 7-pin inline and 8-pin round sub-miniature types, SA-3 for Nuvistors and No. 1050-9 which accommodates Acorn-type tubes. In addition, the Model 800 will accommodate the Hickok CRT adapter.

G_m RANGES: 0-3,000, 6,000, 15,000 μmhos indicated directly upon the meter dial.

INTER-ELEMENT LEAKAGE: Read on Meter. Maximum sensitivity, 10 megohms.

TRANSISTOR AND DIODE CHECK: Provides "Good-Bad" quality test for NPN and PNP transistors and forward conduction efficiency test on semiconductor diodes.

SPECIAL METER REVERSE: Push button control reverses the meter for testing special tubes such as the 117N7 types.

BUILT-IN ROLL CHART: A time-saving tube test data reference chart is provided on the control panel.

ROLL CHART SUBSCRIPTION SERVICE: New editions of roll charts are published semi-annually and automatically mailed to subscribers to the Hickok Roll Chart Subscription Plan, providing a sure method of keeping test data up-to-date.

POWER REQUIREMENTS: 105-125V, 50-70 cycles, AC, 40 watts. Furnished complete with instruction manual and grid and plate lead.

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TUBE CADDY-PAL

MODEL 820

FEATURES:

- *A Sensitive Grid-Circuit Tube Checker*
- *A True Bridge-Type VTVM—Ohmmeter*
- *A CRT Tester*
- *A Transistor Tester*

The Model 820 Caddy-Pal is a versatile TV trouble-shooting instrument developed primarily to detect minute shorts, gas, grid emission and leakage in vacuum tubes. Designed to fit in a service technicians's caddy, this valuable time-saver has been tailored to check tubes used in those circuits where gas, grid emission and leakage are most critical, such as RF, IF and sweep circuits — the areas where most time-consuming service problems occur.

Besides its value as a tube checker, this handy helper is also a true bridge-type VTVM—Ohmmeter with high (10 megohm) input resistance. This circuit is far superior to ordinary multimeter type VOM testers. The VTVM eliminates loading in checking AGC circuits and permits quick, accurate detection of leaky capacitors. Ranges are chosen to fit voltages most often encountered in radio and TV service. It also checks the important parameters that determine the quality of a transistor (current gain and Collector—emitter leakage.) Checks PNP and NPN types and features an individual test under high collector current conditions for power types as well as check on low signal types.

Technical Specifications

HEATER-CATHODE LEAKAGE: 1 megohm center scale—Readable leakage to 50 megohms.

GRID CURRENT: 0-5 microamps, full scale (standard) 0-1 microamp, full scale (super test) for IF, RF and Audio tubes to accurately indicate gas, grid emission and leakage.

GRID QUALITY (Contact Potential): Evaluates grid condition for emission and contact potential . . . a test specifically designed to evaluate today's tubes in their demanding circuit applications.

HUM DETECTION: Hum problems in series-string sets, due to heater-cathode leakage are resolved easily with the 820. Heater-cathode leakage up to 50 megohms is read directly in ohms on the expanded meter scale.

SHORT TEST: Shorts and leakage from grid to screen or plate are read with a sensitivity of 100 megohms (full scale deflection on the meter). Grid to cathode leakage or shorts are read with a sensitivity of 30 megohms (full scale on the meter).

CONTACT POTENTIAL: Range 0-1.5 volts across 4.7 megohms. Voltage produced between grid and cathode of a tube is due to thermal-electric effect which acts as an artificial bias. To get optium results from high gain amplifiers or limiter stages, a tube with low contact potential should be chosen. This test is particularly useful in selecting low-noise "front-end" tubes such as the 6BZ7, 6BQ7, etc.

HEATER VOLTAGE: 2-19 volts, includes provision for 150, 300, 450 and 600 mil tubes plus horizontal and vertical deflection types and picture tubes.

TUBE CHECKER: Socket panel is removable and replaceable to guard against obsolescence. Accommodates most popular radio, hi-fi and TV types in an 11-socket panel. Picture tubes tested with accessory adapter, Model CRT.

TRANSISTOR GAIN: Front panel push button. Gain read directly on the meter. D.C. current gain (Beta) 0-140 (full scale).

TRANSISTOR LEAKAGE: Scale calibrated as "Good," "Fair," and "Bad" quality.

TEST JACKS: 4 jacks — "Emitter," "Base," "Low Power Collector," and "Power Collector."

VTVM-OHMMETER: Vacuum tube bridge circuit type with built-in power supply.

INPUT RESISTANCE: 10 megohms.

DC VOLTS (4 ranges): 0-1.5, 15, 150, 750 volts. Readable to 0.02 volts. Designed to place most commonly used voltages at center of each scale.

OHMS (3 ranges): 100 ohms center scale; X1, X100, X10K. Readable down to 1 ohm.

ZERO ADJUST: Front panel control adjusts the meter to zero for all test functions.

OHMS ADJUST: A dual-purpose, front panel control. In the ohms section it is used for setting the meter pointer to full scale for resistance measurement. In transistor testing, it is turned fully counter-clockwise for power types and fully clockwise for checking signal transistors.

METER: Hickok-built super sensitive Model 64 with large, multi-colored, multi-scale dial.

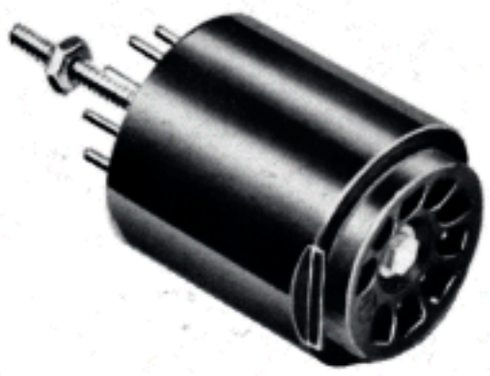
ACCESSORIES INCLUDED: 4 ft. ground lead, 4 ft. test lead, 4 ft. test probe and tube test data chart, self contained in the back of the instrument.

MEASUREMENTS: 3½" H, 8½" W, 6" D. Enameled steel case. Panel is grey and gold with black inscriptions. 4¾ lbs. net weight.; 3 test leads furnished.

POWER SPECIFICATIONS: 115 volts AC, 50-60 cycles, 15 watts.

TUBE TESTER ACCESSORIES

7-PIN



8-PIN

9-PIN

TUBE TESTER SOCKET SAVERS

- *Permits easy-to-make permanent installation*
- *Add years of life to your tester*
- *Eliminate wear on tube sockets in your HICKOK tube testers*

SW-1 (7-pin) SW-2 (8-pin), SW-3 (9-pin)—For Models 121, 123, 123A, 539B, 752 and 800.

SOCKET ADAPTERS

SA-1—Subminiature socket adapter, 7-pin inline and 8 pin round for use with late models 6000, 6005, 6000C, and 121.

SA-2—Subminiature socket adapter, 7-pin inline and 8-pin round for use with Model 800.

SA-3 NUVISTOR adapter for all current HICKOK tube testers. Also, for any HICKOK tube tester covered by currently supplied roll charts.

CA-4—Adapter for 10-pin tubes, Nuvistors, 9-pin jumbos and compactrons.

TUBE TESTER ROLL CHARTS

Revised tube test charts published twice yearly by Hickok Tube Laboratory include data on all tubes available at time of each printing. Available singly or as a two-year subscription.

TRUE VACUUM TUBE VOLT-OHM-MILLIAMETER and CAPACITANCE METER

MODEL 209A

FEATURES:

- *Large 9-inch Meter*
- *Low Capacity—High Frequency Probe*
- *AC Peak-to-Peak or RMS, Range to 200 Megacycles*

This multi-purpose instrument accurately measures a wide range of inductance, capacitance, resistance, current and voltage. AC voltages are measured in terms of either RMS or Peak-to-Peak values.

The large nine-inch indicating meter has a clearly marked multi-color, multi-range scale—to minimize reading errors and facilitate use of the instrument from almost any position on the work bench. The meter circuit has been designed to be completely protected against damage from accidental overload (milliameter circuit excepted).

The capacity range of the 209A permits measurements to as low as 1 $\mu\mu$f and as high as 1000 μf.

Voltages, either positive or negative with respect to ground, may be measured by merely switching to the proper DC position. A DC volt, zero-center position is included for measuring potential in null balance circuits.

In capacitance and inductance measurements, the unknown is placed in series with an internal source of AC voltage and a portion of the divider network. The AC voltage drop across the unknown is applied to a cathode follower, the output of which is rectified electronically, and then impressed on the grid of the vacuum tube bridge.

A built-in power supply system provides all DC plate voltages and AC heater voltages.

The 209A is furnished with a low capacity, high frequency probe for peak-to-peak or RMS AC measurements to 200 megacycles.

The input capacity of the Model 209A is approximately 7 $\mu\mu$f as compared to 200 $\mu\mu$f in a similar electronic voltmeter.

The extended frequency range of the 209A True VTVM, 200 megacycles, compares with a top range of only 2 or 3 megacycles in ordinary electronic voltmeters.

Technical Specifications

SCALES:
Volts, MA; 0-3, 12
0-3 volts (AC only)
Ohms; 0-100,000, Inf.
Capacity; 0-1,000, Inf. MMF
0-10, Inf. MF
Decibels; —20 to +5, —8 to +17, 0 to +25 db
DC Zero-Center; 0 to ±6, 0 to ±1.5 volts

RANGES:
Volts AC; 0 to 3, 12, 30, 120, 300, 1200.
Volts DC; 0 to 3, 12, 30, 120, 300, 1200.
MA DC; 0 to 3, 12, 30, 120, 300, 1200.
Capacitance: 0 to 10,000 $\mu\mu$f in two ranges.
0 to 1,000 μf in five ranges.
Inductance; 50 mh to 100 henries (through use of conversion chart.)
Ohms; 0.1 ohm to 10,000 megohms in 8 ranges.
Volts AC Peak-to-Peak; 0 to 3, 12, 30, 120, 300.

FREQUENCY:
AC response substantially flat to 200 MC.

INPUT IMPEDANCE:
Volts DC; 12 meghohms.
Volts AC; 12 megohms (shunted by 7 $\mu\mu$f).
Volts AC; 13 megohms on 1200 volt scale.

ACCURACY: ±3% DC, ±5% AC, ±3° of arc on resistance scales.

POWER SUPPLY:
105-125 volts, 50-70 cycles. 20 watts at 115 volts.
Attractive enameled steel portable case with non-glare black meter scale and panel and chrome meter case. 13¼" H., 16¼" W., 7" D. 18 lbs.

Furnished complete with AC and DC probe assemblies, test leads, low capacity, high frequency probe, instruction book and guarantee.

A high voltage DC probe to extend range to 30,000 volts DC is available as an accessory.

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ELECTRONIC VOLT-OHMMETER

MODEL 470

FEATURES:

- *Lightweight Portable With High-Impact Phenolic Case*
- *Large, Easy-to-read 7" Meter*
- *AC—DC—OHMS, Single Unit Probe*

The Model 470 is a modern, high quality, engineer's portable electronic volt-ohmmeter incorporating the latest design features to provide useful, versatile operation. Its unique High Sensitivity Range (0.5 volt DC) is especially suited for measuring transistor bias and similar potentials in the millivolt range.

To provide greater operating convenience, a new AC—DC Ohms, single unit probe eliminates the need for multiple leads. This and other time saving operating features make this instrument adaptable to both field service and laboratory applications.

Technical Specifications

DC VOLTMETER:
Ranges: 0-1.5, 5, 15, 50, 150, 500,1500 volts, plus 0-0.5 volt range selected by panel switch

OHMMETER:
Design Center: 10 ohms
Ohms: x1, x10, x100, x100K, x1 megohms
Readability: 0.2 ohms to 100 megohms

AC VOLTMETER:
AC voltages are based on peak-to-peak detection and are calibrated in both RMS and peak-to-peak values.

Ranges: AC RMS: 0-1.5, 5, 15, 50, 150, 500, 1500 volts
Ranges: Peak-to-peak 0-4, 14, 40, 140, 400, 1400, 4000 volts
Frequency Response: 30 cps to 2.5 MC
Input Capacity: 10 megohms, shunted by approximately 150 mmf.
Accuracy: ±3% DC, ±5% AC, ±3° of arc on resistance scale.

CASE SPECIFICATIONS: Furnished in attractive high-impact phenolic case, 6¼" H, 4" D, 7" W. Panel is gold-anodized with black and red scales and numerals. 6 pounds net.

Power Requirements: 105-125 volts, 50-400 cycles, AC, 10 watts. Complete with single-unit probe, test leads and instruction book.

VOLT-OHM-MILLIAMETERS

BURNOUT–PROOF VOLT-OHMMETER

MODEL 455A

FEATURES:

- *Exclusive Burnout-Proof Protection for Meter and all Components*
- *Single Function Range Selector Switch*
- *Batteries Instantly Accessible—Snapped In or Out*
- *Attractive, Streamlined, High-Impact Phenolic Case*

MODEL 457

This attractive, versatile, compact portable volt-ohm-milliammeter provides automatic overload protection. YOU CAN'T BURN IT OUT! Any high voltage or current may be applied across any function, including ohms, without endangering the meter or any other component.

A unique, patented protection circuit incorporates an interlocked combination of relay, fuse and neon lamp to protect against any conceivable overload situation.

The new, streamlined, high-impact phenolic case has a curved face. The meter is also slanted, permitting the instrument to lie flat while in use. The wide-vision, non-breakable lucite face admits more light for easier reading.

The Model 457 incorporates the features of the Model 455A—except for the automatic overload protection feature and AC sensitivity. An accuracy of ±3% DC, ±5% AC, and ±3° of arc on resistance scale is provided in both models.

Technical Specifications

MODEL 455A

Sensitivity: 20,000 ohms per volt DC
20,000 ohms per volt AC

Volts: 3, 15, 60, 150, 600, 1200 volts AC
3, 15, 60, 150, 600, 1200 volts DC

Resistance: 0 to 100 megohms in 4 ranges

Center Scale Ranges: 5, 500, 5000, 500,000 ohms

Current Ranges: 50 μa, 1, 10, 100, 1000 MA, 10 amperes

DB Ranges: —18 to + 57 db in 5 ranges, frequency compensated over the audio range

Size: 8½" L, 5⅞" W, 3" H, tapering to 1¾" H. 3¾ lbs.

MODEL 457

Sensitivity: 20,000 ohms per volt DC
1,000 ohms per volt AC

Volts: 3, 15, 60, 150, 600, 1200 volts AC
3, 15, 60, 150, 600, 1200 volts DC

Resistance: 0 to 100 megohms in 4 ranges

Center Scale Ranges: 5, 500, 5000, 500,000 ohms

Current Ranges: 50 μa, 1, 10, 100, 1000 MA, 10 amperes

DB Ranges: —18 to + 57 db in 5 ranges, frequency compensated over the audio range

Size: 8½" L, 5⅞" W, 3" H, tapering to 1¾" H. 3¾ lbs.

High Quality Electronic Volt-Ohmmeter IN A DO-IT-YOURSELF KIT

MODEL 225K

FEATURES:

- *Large 9-inch Meter*
- *Accurate Peak-To-Peak Scales*
- *Fast Continuity Tests*
- *Single Unit AC—DC Probe*

With this easy-to-assemble kit, you can build a professional quality, multi-range volt-ohmmeter, providing measurement over a wide range of AC or DC voltages and resistance.

The large, nine-inch indicating meter has a highly visible, accurately calibrated, multi-scale dial. A mechanical adjustment for zero setting is provided on the front of the meter.

Accurate peak-to-peak scales are ideal for measuring complex waveforms. Extra-long scales minimize reading errors and permit placing the equipment at the most convenient working distance.

The meter circuit has been designed to provide full protection against overload damage to the meter. The basic circuit is a bridge, similar to the common Wheatstone Bridge in operation.

The new single-unit cable and probe assembly for voltage measurement has an integral slide-switch to permit instant switching to either AC or DC.

A built-in audio buzzer permits rapid indication of continuity of circuit under test. This buzzer facilitates continuity checks by eliminating the need for observing the meter during this operation.

A built-in power supply system furnishes all DC and AC heater and buzzer voltages. A self-contained dry cell supplies the necessary DC voltage for resistance measurements.

The zero-adjust control permits accurate DC Zero-center voltage measurements for galvanometer applications of the meter.

Technical Specifications

DC VOLTMETER:

Ranges: 0 to 1.5, 3, 12, 30, 120, 300 and 1200

Input: 10.5 megohms

AC VOLTMETER:

AC Rms: 0 to 1.5, 3, 12, 30, 120, 300 and 1200

AC Peak-to-Peak: 0 to 4, 8, 32, 80, 320, 800 and 3200

Input Impedance: 10.5 megohms shunted by 150 $\mu\mu$f

Frequency Characteristics: flat from 40 cps to 3.5 MC

OHMMETER

Design Center: 10 ohms

Ranges: x1, x10, x100, x1000, x10,000, x100,000, megohms

Readability: 0.2 ohms to 1,000 megohms

ACCURACY: ±3% DC, ±5% AC, ±3° of arc on resistance scale.

CASE SPECIFICATIONS: Furnished in an attractive portable steel case in blue, hammertex finish with etched aluminum panel. 13¼″ H, 16¼″ W, 7″ D, 16 pounds net.

Power Requirements: 105-125 volts, 50-800 cycles, approximately 20 watts Furnished complete with test leads, dual purpose AC-DC probe, full 60 page step-by-step instruction book with large fold-out circuit diagrams, and informative theory section.

ENGINEER'S LABORATORY FIVE INCH OSCILLOSCOPE

MODEL 770

The Model 770 is a versatile oscilloscope developed to provide complete visual analysis of electrical and electronic circuits.

Features like the wide response amplifier (DC to 5 Mc), Built-in Voltage Calibrator, Choice of Recurrent or Driven Sweep, excellent locking, high gain, hum free, clear stable trace, make the 770 adaptable for use in all phases of electronic research. This equipment provides the requisite range, stability and accuracy for precise measurement in the visual study and interpretation of electrical phenomena such as modulation, phase relations, voltage amplitudes and distortion. The 770 has been specifically engineered to provide accurate response to voltages in wide ranges of frequencies and amplitudes. The flat face tube provides a more linear reading and facilitates signal photography as required.

FEATURES:

- *Illuminated, calibrated screen*
- *DC to 5 MC Response*
- *10 mv RMS/Inch Sensitivity*
- *Flat Face Tube—For Increased Linearity*

Technical Specifications

VERTICAL AMPLIFIER: Frequency Response; Wide Band: DC to 5 MC (within 3 db). Narrow Band: DC to 2.5 MC (within 3 db). Pulse Response: Excellent pulse response with a Rise Time of 0.07 microseconds. Sensitivity: Wide Band; 35 MV RMS per inch. Narrow Band: 10 MV RMS per inch. Vertical Attenuator: Frequency-compensated decade steps of 1 to 1, 10 to 1, 100 to 1 and 1000 to 1. Self contained voltage calibrator provides peak-to-peak calibrating voltages of 100, 10, 1 and 0.1 volts. Gain Control: Non frequency discriminating 10 to 1 attenuation ratio. Input Impedance: 2.2 megohm, 50 $\mu\mu$f. Deflection: Full screen vertical deflection without low or high frequency distortion. Shock Mounted Amplifiers. Direct Connection Sensitivity: 25 volts RMS per inch. Input Impedance; 2.2 megohms, 20 $\mu\mu$f.

HORIZONTAL AMPLIFIER: Frequency Response: DC to 500 KC (within 3 db). Sensitivity: 75 MV RMS per inch. Horizontal Attenuator: Frequency compensated decade steps of 1 to 1, 10 to 1. Line Sweep: Phaseable (Approximately 180°) line frequency is available. Input Impedance: 2.2 megohm, 50 $\mu\mu$f. Deflection: 3 times full screen horizontal deflection without low or high frequency distortion. Shock Mounted Amplifiers. Direct Connection Sensitivity: 35 volts RMS per inch. Input Impedance; 2.2 megohms, 20 $\mu\mu$f.

TIME BASE GENERATOR: Sweep Functions: Recurrent and driven. Frequency: Frequency coverage from 2 CPS to 30 KC in 7 ranges. Provisions for external capacities for slower frequency sweeps. Fixed Sweep Frequencies: 30 and 7875 cycles. Synchronization at line or 2 times line frequency. Time Base Expansion: Time Base expansion of six times full screen (30 inches) with complete positioning of expanded trace.

DISPLAY INFORMATION: The trace is displayed on a type 5ADP1 or 5ABP1 flat-faced Cathode Ray Tube with high accelerating and post accelerating voltages, providing sharp trace detail with greater brilliance and better definition. Flat faced tube provides a linear reading and permits photography of the display information. Intensity Modulation: Input provided for Intensity (Z-Axis) Modulation.

SPECIAL FEATURES: Both B+ and line are fused for extra protection. Test Signals: Line Frequency; 3 volts RMS per inch. Sawtooth; available from front panel. Shielded; Mu Metal magnetic shield gives maximum protection to cathode ray tube against effect of external magnetic fields.

ILLUMINATED, CALIBRATED SCREEN: The illuminated, calibrated screen is backed with a green filter which reduces reflections caused by incidental illumination thereby permitting accurate qualitative and quantitative measurements. Astigmatic focus control creates a new standard in undistorted sharpness.

FOR SPECIAL APPLICATIONS: Some users may prefer a 5ADP11 tube for short persistence, or 5ADP7 tube for long persistence observations. Either is available in the Models 770HA (with High Actinic Tube) or 770LP (with Long Persistence Tube) at a slightly higher cost.

DIMENSIONS: 14" H., 12"W., 18" D., 50 lbs.

POWER SUPPLY REQUIRED: 105-125 Volts, 50-400 Cycles.

POWER CONSUMPTION: Approximately 125 watts. Furnished complete with shielded input cable and ground lead.

WIDE BAND, HIGH SENSITIVITY OSCILLOSCOPE

MODEL 675A

FEATURES:

- *Illuminated, Calibrated Screen*
- *Wide Band Response*
- *Ideal for Servicing Color TV Equipment*
- *Complete with Low-Capacity Probe*

This new 5-inch 'scope has been developed for servicing latest model industrial and entertainment type equipment, including color television receivers. It contains design features formerly found only in much higher priced equipment.

The illuminated, calibrated screen, with astigmatic focus, provides clear, undistorted trace detail. Stable operation, and latest circuit refinements, make this an ideal 'scope for service technicians. Wide range response and ease of operation have been provided without sacrificing sensitivity.

Technical Specifications

VERTICAL AMPLIFIER: Frequency Response: DC to 4.5 MC (within 3 db). Flat through the Color Burst Frequency (3.58 MC). Pulse Response: rise time, 0.08 μsec. Sensitivity: 20 MV RMS per inch. Amplifiers are shock-mounted. Self-contained voltage calibrator.

VERTICAL ATTENUATOR: Fully Frequency-compensated. 10 to 1 vernier gain control plus decade step attenuator providing decade steps of 1, 10, 100 and 1000 to 1.

TRACE REVERSAL: A switch is provided to reverse the polarity of the vertical trace.
Amplifiers are shock-mounted. Self-contained voltage calibrator.

HORIZONTAL AMPLIFIER: Frequency Response: 1 CPS to 450 KC (within 3 db). Sensitivity: 250 MV RMS per inch. Horizontal Attenuator: 10 to 1 vernier gain control and frequency compensated, decade steps of 1 to 1 and 10 to 1.

LINE SWEEP: Variable phase (through approximately 180°) line frequency signal is available.

TIME BASE GENERATOR: Coverage from 10 to 100,000 cycles per second in four calibrated decade ranges with 10 to 1 vernier control: 10 CPS—100 CPS, 100 CPS— 1 KC, 1 KC — 10 KC, 10 KC — 100 KC.

WRITING SPEED: Variable from 25,000 μsec per inch (based on 4 inches) or 10,000 μsec per CM (based on 10 CM) to 0.1 μsec per CM based on 100 CM.

TIME BASE EXPANSION: Time base expansion of ten times full screen around center line (40 inches) with complete positioning of expanded trace.

ILLUMINATED, CALIBRATED SCREEN: The illuminated calibrated screen is backed with a green filter to reduce reflections caused by incidental illumination. This permits accurate qualitative and quantitative measurements to be made. Astigmatic focus control provides a new standard in trace sharpness.

DISPLAY INFORMATION: The trace is displayed on a type 5UP1 Cathode-Ray tube with 1500 volts accelerating potential, providing sharp trace detail.

INTENSITY MODULATION: Input provided for Intensity (Z-Axis) Modulation.

SPECIAL TUBES AVAILABLE: Some engineers may prefer a 5UP1 tube for short persistence or 5UP7 tube for long persistence observations. Either is available in Models 675HA (with High Actinic Tube) or 675 LP (with Long Persistence Tube) at a slightly higher cost.

DIMENSIONS: 13″ H, 10″ W, 16″ D, 35 pounds net weight.

POWER REQUIREMENTS: 105-125 volts, 50-400 cycles 125 watts (@ 115 v). Furnished complete with low capacity probe, ground lead and instruction book.

MICROVOLT and CRYSTAL CONTROLLED GENERATOR

MODEL 295X

- *Continuous Frequency Coverage From 125 KC to 175 MC*
- *Metered Output From 0.1 to 100,000 Microvolts*
- *1% Dial Calibration Accuracy/Built-In 1MC Crystal Standard*
- *Precision Step Attenuator*
- *Direct Reading—Vernier Tuning*

MODEL 295X — This instrument is ideal for use in the maintenance of communications receivers in other applications requiring an accurate, versatile instrument with wide frequency coverage and a calibrated RF output.

The Model 295X covers the range of frequencies from 125 KC to 175 MC in 8 fundamental calibrated bands both modulated and unmodulated. RF circuits are silver-plated and double-shielded permitting accurate RF output level monitoring to as low as 0.1 microvolt.

The instrument has four separate oscillators and the necessary controls to permit independent, coordinated action. The basic generator consists of a shunt-fed Colpitts-type oscillator with calibrated output. Heising modulation of a buffer amplifier provides exceptional stability and minimized incidental FM. The Model 295X also has a fixed frequency 400 cycle audio oscillator with variable output and a crystal-controlled RF oscillator, providing frequencies up to 250 MC (on harmonics) through the use of accessory crystals.

MODEL 295X

Technical Specifications

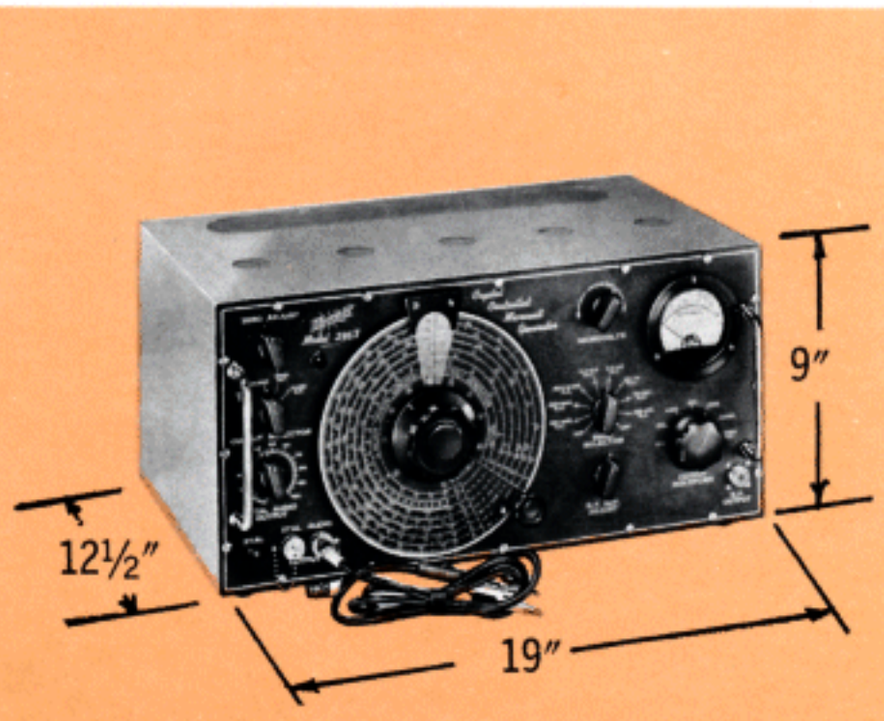
FUNCTIONS:

Unmodulated RF: Continuous from 125 KC to 175 MC in 8 calibrated bands with monitored output from 0.1 to 100,000 microvolts.

Amplitude Modulated RF: Modulated at 400 cycles, from 125 KC to 175 MC in 8 calibrated bands with monitored output from 0.1 to 100,000 microvolts.

Crystal-Controlled RF: At any frequency from 400 KC to 20 MC on fundamentals (by choice of accessory crystal). High harmonic output—up to 250 MC through selection of crystals. 1000 KC crystal is supplied. Output is continuously variable and may be unmodulated or amplitude modulated at 400 cycles.

Audio at 400 cycles: Continuously variable to a maximum of one volt, RMS.



CASE SPECIFICATIONS:

Portable, steel, gray finish enamel case. 19″ W., 12½″ D., 9″ H. 40 lbs. net weight.

PRECISION STEP-ATTENUATOR

Has low VSWR characteristics throughout all frequencies. Six positions in decade steps with multiplying factors from 1 to 100,000. The step-attenuator and microvolt meter are calibrated for proper indication when the generator is terminated with a 50 ohm load (Receiver). This attenuator, used in conjunction with the "microvolt meter", provides an accurate measurement of the RF output. RF connector is approved A/N type SO-239.

VARIABLE OSCILLATOR

Eight Bands from 125 KC to 175 MC.

A Band: 125 KC to 325 KC
B Band: 325 KC to 890 KC
C Band: 890 KC to 2,400 KC
D Band: 2.4 MC to 6.9 MC
E Band: 6.9 MC to 20 MC
F Band: 20 MC to 70 MC
G Band: 70 MC to 120 MC
H Band: 120 MC to 175 MC

Accuracy of Frequency Calibration, 1%.

Output Impedance: 50 Ohms.

Modulation: 400 Cycles, 30%.

CRYSTAL-CONTROLLED RF OSCILLATOR

Frequency Determined by Choice of External Crystal:
1,000 KC crystal, accuracy 0.05%, supplied with instrument. Possible crystal frequency range, 400 KC to 20 MC on fundamentals. Crystals can also be supplied to generate any desired harmonic frequency from 20 MC up through 250 MC, accuracy 0.05%.

AUDIO OSCILLATOR

Frequency 400 Cycles, Accuracy 10%
Output level Variable to a Maximum of Approximately 1 Volt
Output Impedance Variable, 0 to 50,000 Ohms

METER:

Hickok-built, Model 46, 3½″ ruggedized and sealed, with an accuracy of 1% of full scale, 50 μa sensitivity.

TUBE COMPLEMENT:

6J6 Variable RF oscillator, H band
6J6 Variable RF oscillator, A through G bands
12AU7 Xtal oscillator-amplifier
12AT7 RF amplifier
12AT7 RF cathode follower
6SN7 Audio oscillator-amplifier
12AU7 VT voltmeter
5Y3 Rectifier
OB2 Voltage regulator
OB2 Voltage regulator
7H-10 Ballast

ACCESSORIES FURNISHED:

1,000 KC crystal
48-inch output cable with two connectors
Instruction book

POWER REQUIREMENTS:

105 to 125 volts, 50 to 400 cycles, 90 watts at 115 volts, 60 cycles.

FM-AM ALIGNMENT GENERATOR

CRYSTAL CONTROLLED, HIGH OUTPUT AM-FM SWEEP and MARKER GENERATOR

MODEL 288X

FEATURES:

- *A complete alignment instrument*
- *Built-in Decibel Meter*
- *Crystal-Controlled frequency standard*
- *7 bands from 100 KC-160 MC*

The Model 288X provides the necessary signal voltages for servicing AM and FM receivers as well as television receivers. In addition, a crystal-controlled 100 KC and 1000 KC oscillator provides an accurate frequency standard. The wide choice of frequency ranges, sweep widths and methods of modulation make this a uniquely versatile generator.

The high output voltage of the Model 288X permits visual stage-by-stage alignment of IF stages, limiter and discriminator or both AM and FM receivers. Power and voltage measurements, as well as determination of resonance in alignment work is materially aided by a self-contained decibel meter with a range of —10 to +39 db.

Technical Specifications

Amplitude Modulated Ranges: 100 KC—110 MC in 7 bands. Choice of unmodulated, 400~ modulation, or external modulation.

Frequency Modulated Ranges:
100 KC—110 MC in 7 bands (0-30 KC sweep)
1 MC—160 MC (0-150 & 0-450 KC sweep)
1 MC—Fixed (0-30 KC sweep)
50 MC—Fixed (0-150 KC & 0-450 KC sweep)

Modulation: Choice of External or internal modulation on both AM and FM ranges. Internal FM sweep width continuously variable to maximum of 450 KC. Choice of 60~ or 400 ~ sweep rate. Sweep synchronizing voltage brought out to front panel.

Audio Frequency Output: 20-15,000~ variable or 400~ fixed

Crystal Output: Choice of 100 KC or 1000 KC, unmodulated or modulated at 400~.100 KC output provides useful harmonics to 15 MC; 1000 KC output useful to 125 MC.

Output Control: Vernier Control with decade steps of 1, 10, and 100.

Db Meter: Ranges of —10 to +6, +6 to +22, +22 to +38 decibels.

Dimensions: 16" Long x 13" High x 7" Deep—33 pounds net weight.

Power Requirements: AC —110 volt 50-70 cycles. Complete with crystals, cable assembly, meter leads and instruction book.

VIDEO SCANNER

MODEL 760

An instrument with a multitude of uses in industrial and service applications, both black and white and color, the Model 760 can be used to produce slide pictures and announcements in closed circuit TV systems in schools, rail, bus and air terminals, industrial plants or retail stores.

In service applications, this complete, cable-connected transmitting station can be used to trouble-shoot the synchronizing section or to analyze the frequency response or definition capabilities or any TV receiver. By inserting a slide to produce a white dot pattern on the raster, it is possible to make a quick, accurate convergence adjustment of color TV receivers. A test pattern slide, furnished, can be inserted to check all the properties of picture production. The ratio of video information to sync is adjustable and, thus, can be varied to evaluate the sync performance of a television receiver.

FEATURES:

- *Generates and scans at the 525 line, 60 field 30 Frame System*
- *Produces slide pictures for closed-circuit television systems*
- *Uses high definition flying spot scanning method*
- *Choice of video or RF output*
- *Crystal-controlled Sync Generator*

Technical Specifications

Patterns Furnished: Bar, Dot, Standard Test Pattern and transparent blanks for use with a grease pencil.

Crystal Controlled: 315 KC Crystal provides stable sync standard.

Horizontal Snyc: Contains both front and back porch.

Vertical Pulse: Serrated to maintain horizontal sync.

Video Output: 2 volts peak-to-peak with an impedance of 100 ohms. Output is either positive or negative.

Resolution: Minimum 450 lines, band-width in excess of 5 MC.

Variable Sync Level: Permitting any combination of sync to video information, preset at factory to RETMA Standards.

RF Channel Selector: Covers channels 2 through 6 (fixed).

RF Output: Variable to 100,000 μvolts.

Tube Complement: 17 tubes including type 5HIX CRT, photo-multiplier and rectifier.

Case Specifications: Furnished in an attractive black-leatherette portable case with detachable cover: 17″ W., 18¾″ L., 8½″ D., 43 lbs. net weight.

Power Requirements: 105-125 volts AC 60 cycles, 120 watts approximately.

Furnished complete with output cable, pattern slides listed above, and instruction book.

COLOR BAR WHITE DOT-BAR TV GENERATOR

MODEL 656XC

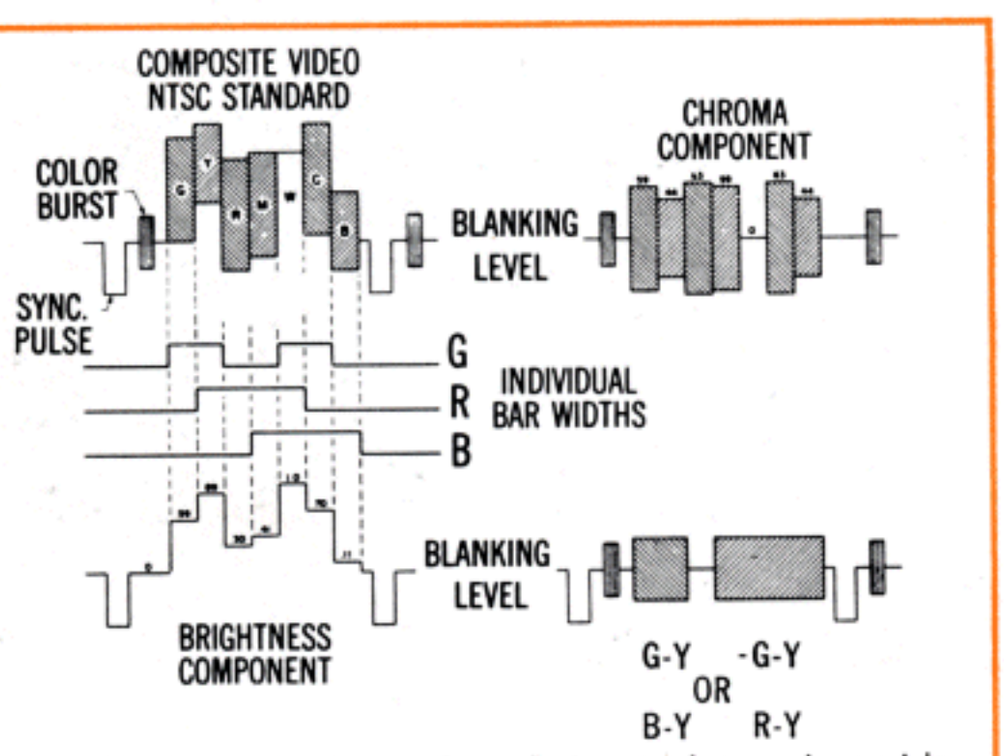
FEATURES:

- *100% Fully-saturated NTSC Approved Standard*
- *Provides Complete Range of Signals for Chroma Alignment*
- *Combines Color Bar Generator with White Dot-Bar Generator*

This versatile generator produces the standard fully-saturated NTSC color bar pattern. Because its design is based on NTSC standards, obsolescence protection is assured. The Model 656XC provides signals for complete chroma alignment including I, Q, R-Y, B-Y, G-Y, and G-Y demodulator systems. Color phase is accurately set with precision delay lines and referenced to a crystal oscillator; the amplitude of the subcarrier and of the brightness component is accurately set with precision resistive networks, assuring the high stability required for correct alignment. Proper colors are generated within 30 seconds after warm-up.

In addition to color bar patterns, this versatile instrument produces a choice of: crosshatch (20 vertical and 15 horizontal), vertical lines only, horizontal lines only, and small size white dots, locked to assure stability. This "locking" is obtained through the self-generated 60 cycle and 15,750 cycle sync pulses referenced to a 315 KC crystal oscillator. The white dots are of optimum size (approximately 2 lines thick) to permit accurate convergence adjustments. Approximately 300 dots are present in each frame.

The Model 656XC was designed in cooperation with leading color TV manufacturers and is specified by them for their field service groups because of its accuracy, stability and long, troublefree operating life.



This NTSC standard waveform is to precise scale and is accurately produced in detail by the 656XC when viewed on a high quality wide-band scope (At least 4.5 MC).

Technical Specifications

NTSC Standard Color and Brightness: Designed for use with NTSC-standard color television systems

Color Generation: 3 primaries, 3 complementaries, plus black and white; I, Q, R-Y, B-Y, G-Y, and -G-Y

Dot/Crosshatch Generation: Crystal-controlled by 315 KC crystal oscillator. 300 dots per frame less those in blanking region. Minimum size—2 lines.

Crosshatch: Choice of vertical or horizontal bars or both; 20 vertical bars, 15 horizontal bars—less those in blanking region

Crystal-Controlled Sub-Carrier and Horizontal Framing: Produces stable, clearly defined waveforms to permit easy alignment and reduce possibility of error

Video Output: 0-2 volts peak-to-peak, open circuit, across 100 ohms with positive or negative output

RF Output: Channels 2 through 6, modulated with choice of color signals. Equivalent vestigial sideband modulator avoids overloading of chroma channel. Separate output provided from 3.58 MC burst oscillator

Sound Carrier: Provided to permit correct setting of local oscillator in TV receivers

Advanced Integrated Design: Generator is self-contained, requiring no external synchronization connections. All generated voltages are stable and independent of line voltage changes

Case Specifications: Furnished in an attractive black leatherette case with detachable cover, 16¾" W, 18⅜" L, 7½" D. 34 lbs. net weight

Power Requirements: 105-125 volts, 60 cycle, 40 watts. Furnished complete with cable and instruction book

WHITE DOT—BAR COLOR DISPLAY TELEVISION GENERATOR

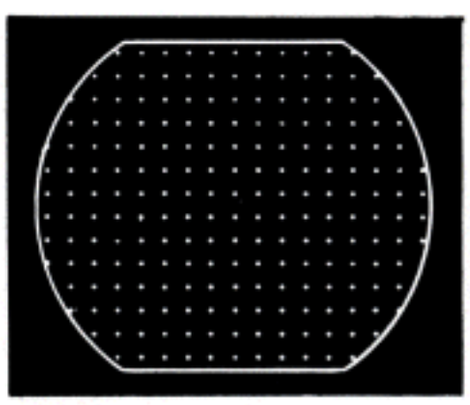
MODEL 660

This generator was designed for use in fast, in-the-home servicing of color TV receivers or on-site servicing of industrial color TV closed circuit installations. It features a high order of stability not provided by externally synchronized white-dot generators. In the Model 660, all frequencies generated are crystal-controlled and locked together for maximum stability. In addition, the frequency of the chrominance (color) signal is crystal-controlled to insure reliable evaluation of chroma circuit performance. This feature assures an accurate standard of reference not found in color display generators employing a free-running oscillator.

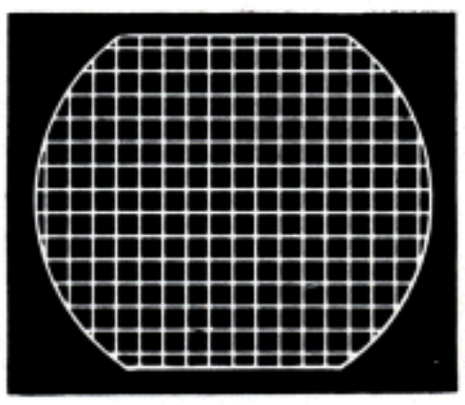
RF output frequency is in pre-set channels 2 through 6, permitting easy selection by means of a built-in switching arrangement. The circuit of the Model 660 has been developed to be completely compatible with future color TV receiver designs. The precise timer circuit will hold synchronization over the wide range of line voltages that may be encountered in "on-location" servicing.

FEATURES:

- *All Frequencies Crystal-Controlled and Locked Together*
- *Circuitry Completely Compatible with New Design Receivers*
- *Lightweight, Portable for In-The-Home Servicing*



Small size white dot pattern. 300 white dots, less those in blanking.



White line cross-hatch pattern. 20 vertical and 15 horizontal, less those in blanking.

Technical Specifications

COLOR DISPLAY PATTERN: In the following sequence; orange, red, magenta, blue, cyan and green—all crystal controlled.

SIDELOCK COLOR FREQUENCY CRYSTAL: 3.563795 MC output, 1 volt peak-to-peak

DOT AND CROSSHATCH SIZE: As small as 2 lines in both horizontal and vertical planes. Approximately 300 dots total.

CROSSHATCH WHITE LINES: 20 vertical and 15 horizontal, less those in blanking

RATIO OF SYNC TO VIDEO: Variable from 10 to 90%

VIDEO OUTPUT: 0-4 volts, peak-to-peak; across 300 ohms, black positive or negative

RF OUTPUT VOLTAGE: 0.05 volts maximum, 0.001 volts minimum RF modulated by all video outputs (60% modulation)

CASE SPECIFICATIONS: Furnished in sturdy black leatherette portable case with detachable cover, 10½" W, 10½" H, 5¼" D. 15 pounds net weight

POWER SPECIFICATIONS: 105-125 volts, 50-60 cycles, 40 watts Furnished complete with instructions book, with color channel alignment waveforms, 2 crystals and output cable.

SWEEP AND MARKER ALIGNMENT GENERATOR

MODEL 615

FEATURES:

- *Provides Complete TV IF and RF Alignment*
- *Also Provides Harmonic Output on UHF*
- *All-Electronic Sweep With No Moving Parts*

The Model 615 is a complete, single-unit TV sweep and marker generator providing all the necessary features and ranges for visual alignment of television receivers. It permits complete television IF and RF alignment as well as harmonic output on UHF. Both the marker and the sweep have the required attenuation range for accurate results in servicing modern, sensitive TV receivers. Designed around HICKOK's unique *barium titanate* sweep capacitor, the all-electronic sweep has no moving parts to wear out or become inoperative. Since amplitude modulation distorts the final curve, as viewed on a 'scope, its elimination is mandatory in any sweep generator—amplitude modulation in the Model 615 is less than 0.1 db/MC. Marker frequency is 0.5% or better at any dial setting. Non-parallax, knife-edge pointers simplify readings, reduce chance of error.

Technical Specifications

MARKER FREQUENCY: 2.5-5.5 MC, 19-50 MC, 54-108 MC and 108-216 MC harmonic

MARKER AMPLITUDE: 0.25 RMS, attenuation to 0.3 microvolts

MARKER MIXING: Built-in switching arrangement and panel connector permit use of a heterodyne marker adder such as the HICKOK Model 691

SWEEP FREQUENCY: 0-50 MC, 50-100 MC, 175-225 MC

SWEEP WIDTH: Variable; 0-15 MC, linear within 0.1 db/MC

RETRACE BLANKING: Built-in and controllable from front panel to provide zero-reference base line

EXTERNAL SWEEP PHASING CONTROL: External sweep variable phasing (170°) is controllable from the front panel for use with 'scopes that do not have variable sweep phasing control

BUILT-IN CRYSTAL: 4.5 MC crystal provides dual markers for IF or RF alignment and accurate 4.5 MC signal for inter-carrier sound alignment

AMPLITUDE MODULATION: Both marker and crystal oscillators may be amplitude modulated approximately 30% by self-contained 900 cycle internal modulator

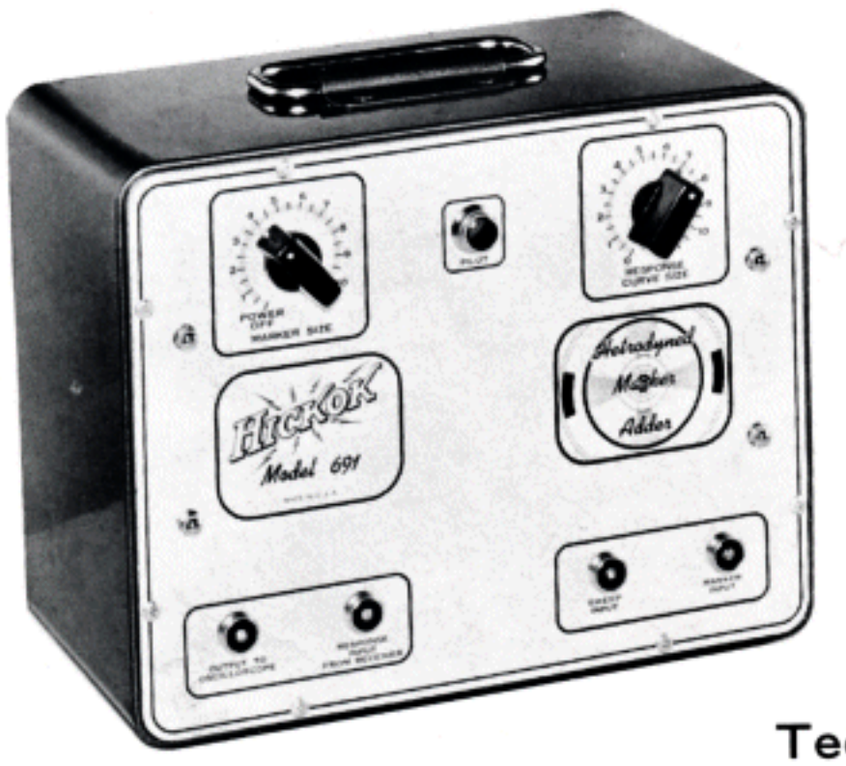
CIRCUIT PROTECTION: Dual-fused to protect power transformer and other components

CASE SPECIFICATIONS: Furnished in an attractive portable steel case, 13¼" H, 16¼" W, 8" D. 31 lbs. net weight

POWER REQUIREMENTS: 110-120 volts, 60 cycles, 40 watts Furnished complete with leads and instruction book

HETERODYNE MARKER ADDER

MODEL 691



This instrument, when used with the Model 695 sweep-alignment generator and Model 690 marker, provides the ultimate in TV alignment technique, takes the guesswork out of alignment jobs and eliminates errors otherwise encountered because of marker overload. The Model 691 provides a continuously visible marker (including trap points) that will not alter or distort the receiver's response curve. This important feature, in addition to the inherent accuracy and low leakage of the other instruments (690-695) materially simplifies and speeds up any alignment job. The outputs of the sweep and marker generators are heterodyned and applied to a 'scope in such a manner that the marker signal does not pass through the receiver itself and therefore cannot cause overloading. This unit will function with any associated marker and sweep equipment that has an output capability of 0.05 volts or more.

Technical Features

- Input RF voltage required; 50,000 microvolts
- Output marker voltage; maximum 3 volts
- Attenuation of marker; variable 0 to 60 db
- Attenuation of response curve; variable 0 to 20 db
- Input impedance; 90 ohms
- Attractive steel portable case. 11¼" W, 8¼" H, 7" D. 10 lbs. net weight
- Power supply required: 105-125 volts AC, 50-60 cycles, 25 watts

VHF-UHF MARKER GENERATOR

MODEL 690

The Model 690 is a crystal standard generator with high (0.25 volts) output permitting dual markers with any TV sweep generator. It features another HICKOK first—a non-parallax, shadow-type dial. Conventional dials introduce error, unless viewed at an exact right angle, because the hairline indicator is always a slight distance from the scale. The HICKOK non-parallax dial can be viewed from any angle without introducing error. The 45 inches of dial can be self-calibrated to within 0.05% accuracy with integral crystal calibrator. The Model 690 gives complete RF coverage on channels 2 through 83—A 3.58 MC crystal (color burst frequency) is available as an accessory. Additional accessory crystals permit alignment of chroma pass-band circuits. The 690 has been evaluated for its frequency, stability, simplified, timesaving operation and is recommended by service engineers of leading TV manufacturers.

Technical Features

RF Ranges: 4.25MC – 11MC
19MC – 50MC
54MC – 108MC
155MC – 225MC
UHF CHANNELS 14-83 (harmonics) may be unmodulated or internally modulated at 1000~

Double RF shielding for minimum leakage

All frequencies generated at fundamental – eliminates confusing beats and spurious responses

Crystal Oscillator: 2.5MC, ± 0.05% accuracy. Provides calibration check points at minimum intervals of 2.5MC throughout RF range. Provisions for two additional crystals in the range 250KC to 20MC. Accessory crystals are available for specified channels 2 thru 13 (specify audio or video carrier) and for chroma band pass alignment

Provisions for simultaneous viewing of two markers – speeds alignment

Visual and audible zero beat indications

RF output voltage 0.25 volts. Vernier and step attenuator provides 100 db attenuation range

Output impedance 90 ohms, unbalanced; 300 ohms balanced with Model 75 accessory pad

Case Specifications: 13¼" H, 16½" W, 8" D. 25 lbs. net weight

Power Requirements: 105-125 volts, 50-1000 cycles AC

VHF SWEEP-ALIGNMENT GENERATOR

MODEL 695

ALL-ELECTRONIC SWEEP

The Model 695 is a completely new generator with all-electronic sweep. It will meet the exacting requirements of the professional TV service technician or laboratory engineer. Designed around HICKOK's unique *barium titanate* sweep capacitor, moving parts in the sweep system are eliminated. Economically priced, this generator features linear sweep, free of amplitude modulation, high output (0.3 volt), triple shielding to eliminate leakage problems. The signal can be attenuated from 300,000 to 0.3 microvolts—down into the "snow" level of most television receivers. The built-in bias supply eliminates batteries, is variable from 0-12 volts to permit sensitive set alignment for fringe areas or less sensitive for prime areas to prevent overloading. Continuous tuning and detailed, easy-to-read scales simplify alignment. Three RF oscillators provide complete VHF coverage on fundamentals and heterodyned IF output (0-50 MC). This assures the high signal level required for aligning front ends.

Technical Features

- Fundamental output on all VHF channels (0.3 volt output)
- Frequency Coverage continuously variable in 3 bands: 0-50 MC, 50-90 MC, 170-220 MC
- Sweep width of 0-15 mc., ±3 mc. depending on frequency
- Linear sweep—Amplitude variation less than 0.1 db/mc
- Triple shielded, very low leakage. Provides attenuation down into "snow" region to check IF's for osciliation
- 100 db. attenuation, 0.3 volt to 3 microvolts
- Blanking of oscillator provides reference base line
- Variable phase time base, 170° range
- Metered, variable DC bias supply, 0-12 volts. Eliminates use of batteries for fixed bias
- Output impedance 90 ohms, unbalanced, 300 ohms balanced with accessory adapter
- Attractive steel portable case. 16¼" W., 13¼" H., 8" D., 30 pounds net weight
- Power Requirements: 105-125 volts, 50-800 cycles AC, 30 watts
- Furnished complete with leads and instruction book

TRUE WATTMETER

MODEL 900C

FEATURES:

- *Wattmeter/Load Tester*
- *Also Tests for Shorts, High Resistance, Circuit Continuity*
- *Can Be Used To Calculate Power Factor*

The Model 900C is basically a wattmeter and a load tester which also tests for shorts, leakage and circuit continuity. It can also be used for accurate calculation of power factor.

Comparison of reading on the meter with the rating of the appliance permits quick troubleshooting. Three wattage ranges permit servicing of all major appliances, including electric ranges.

Complete, detailed operating instructions with schematic drawings are permanently mounted on the back of the instrument for ready reference. Accessory leads are available for working with 3-wire circuits.

Technical Specifications

WATTAGE RANGES: 0-500, 0-1,000, 0-2,000
VOLTAGE RANGES: 0-130, 0-260
AMPERAGE RANGES: 0-6.5, 0-13, 0-26
SIZE: 9½" H, 6¼" W, 4½" D, 6½ lbs. net weight
POWER REQUIREMENTS: 105-117 volts, 50-400 cycles

NEW LINE LOADING VOLTMETER

MODEL 101

Electricians and appliance installation technicians are indeed receptive to this time-saver. A built-in front panel switching arrangement permits 1000 watt or 2000 watt line load and reads resulting AC line voltage change due to load.

Field service and electrical unit installers effectively use this equipment to quickly determine circuit capacity and adequacy of existing wiring to handle air conditioning units, freezers, etc., in homes or institutions.

Instrument plugs into any 115 volt AC outlet and continuously reads line voltage, from 50 to 140 volts.

Entirely self-contained. Housed in attractive steel portable case. 9¼" W, 6¼" H, 3¼" D. 5 lbs. net weight. Moderately priced for every electrician or appliance installation service company.

TV PICTURE TUBE TESTER

MODEL CR5

This tester checks the electron gun of cathode-ray tubes, testing for both shorts and open elements through use of a sensitive neon lamp in conjunction with the cathode-ray tube in a bridge circuit. The beam current (peak) principle of the test, essentially equivalent in light output, is used for electron guns of tetrode design (electro-magnetically focused types). For triode-type electron guns (electrostatically focused) a peak emission check is used to determine the condition of the cathode.

The tube socket furnished accommodates tubes having 6.3 volt heaters utilizing duodecal basing. An accessory adaptor is available to accommodate 110° tube types. It is housed in a distinctive metal case with built-in lead compartment, 6" H, 8½" W, 3" D. 117 volts, 50-60 cycles, 20 watts. Complete with leads. 5 lbs. net weight.

PROBES AND ACCESSORIES

HICKOK PROBES AND ACCESSORIES INCREASE THE RANGE AND USEFULNESS OF YOUR TEST EQUIPMENT

TVP-1 TELEVISION PROBE—Reduces capacitive loading effects. Provides net input capacity of 25 $\mu\mu$f. Made of black phenolic with chrome probe tip and four-foot heavy duty cord with spade connectors.

PR 30—HIGH VOLTAGE DC PROBE—Extends the range of your VTVM to 30,000 volts DC. Doubles the use of any voltmeter. Designed for use with the Hickok Model 203 or 209. Made of heavy duty black phenolic, with a 4-foot cord and cable type connector.

PR 30A—HIGH VOLTAGE DC PROBE—Same technical advantages and specs as the PR-30 described above but specifically designed for use with the Hickok Model 209A.

PR 25—HIGH VOLTAGE DC PROBE—Specifically designed to extend the range of the Hickok Models 450 and 435A to 25,000 volts DC. This probe is also ideal for use with any 20,000 ohm per volt DC multimeter with a 250 volt scale. Same weight and specifications as the PR-30.

PR 4-6KV—HIGH VOLTAGE DC PROBE—Specifically designed to extend the range of the Model 455A to 6000 volts.

PR 4-30KV—HIGH VOLTAGE DC PROBE—Specifically designed to extend the range of the Model 455A to 30,000 volts.

PR 50-KV—HIGH VOLTAGE DC PROBE—Specifically designed to extend the range of the Model 470 to 30,000 volts.

TYPE 34—CRYSTAL DEMODULATOR PROBE—Ideal for use with any scope to trace a modulated RF signal through a radio or TV receiver from the antenna post to the detector or discriminator. Phenolic probe and heavy four foot cord with spade-type connectors. Provides a quick and accurate aid to trouble-shooting with your scope.

TYPE 35—CRYSTAL DEMODULATOR PROBE—Same technical advantages and specifications as the type 34 described above but it is specifically designed for use with the Hickok Model 675 Oscilloscope and has Microphone-type connector.

TYPE 75—TERMINATION PAD—Available for use with any TV-FM alignment generator having unbalanced output of 75-90 ohms. Provides match to 300 ohms, balanced and eliminates standing waves on the output cable to insure accurate match between generator and TV receiver.

CRYSTALS

For Model 295X:

100 KC to 20 MC, Specify accuracy

For Models 615 or 695:

IF Crystals, 4.5 MC through 50 MC

RF Crystals, specified channel, 2 through 6.

TVP-1

PR-30

TYPE 34

TYPE 75

A HICKOK EXCLUSIVE

Only Hickok Offers The Roll Chart Subscription Plan

We believe the Hickok Roll Chart Subscription plan is unique in the industry. Hickok maintains an up-to-date Tube Library which evaluates all newly released tubes and determines test data for all Hickok tube testers.

New test data are added to the roll charts as they occur and new editions of the charts are published semi-annually. Subscribers receive two charts per year. Because of savings in handling and ordering, roll chart subscribers are able to assure themselves of up-to-date charts at a saving over the individual chart price. Your Hickok distributor has the full details about the unique Hickok Roll Chart Subscription Plan.

HICKOK POLICIES

DISTRIBUTOR SALES POLICY

Hickok instruments are sold by over 1,000 leading electronics distributors throughout the country. We are proud of our relationship with these local businessmen. They stand ready to demonstrate Hickok equipment, answer your questions, recommend the best instrument for your needs. You can depend on your experienced Hickok Distributor.

TERMS

Since Hickok instruments are sold to the ultimate user by distributors, terms and payment arrangements are established by them.

WARRANTY

Hickok instruments are warranted to be free from defects in materials and workmanship. Any parts that fail within a period of 90 days from date of purchase by the user will be replaced without charge, provided the instrument has been used in accordance with operating instructions and within its specifications limit and provided the instrument has been registered with us. A defective instrument should be returned, whenever possible, to the designated repair station or to the factory or Branch office from which it was originally shipped.

PARTS

The company maintains an inventory of parts for instruments currently offered for sale, and for most older models at its Cleveland Service and Parts Department, 1643 Eddy Road, Cleveland 12, Ohio. Every effort is made to ship parts promptly upon receipt of order. When ordering parts, please describe completely the parts desired. Give the model number and serial number of the instrument for which the parts are ordered.

SPECIFICATIONS

Hickok is constantly engaged in research and development of new test instruments and the improvement of present instruments to keep pace with the dynamic progress of the electronics industry. Therefore, specifications in this catalog are subject to change without notice. The company is not liable for incorporating specification changes into completed instruments. We also reserve the right to discontinue manufacture of any instrument without notice.

EXPORT REPRESENTATIVES

Export sales are handled by The Hickok Electrical Instrument Company, Export Department, 333 East 46th Street, New York 17, New York, with established export distribution points throughout the world. All quotations and other sales agreements are made by that office for export sales. Canadian distribution is handled by Stark Electronic Sales, Ltd., P. O. 670, Ajax, Ontario. All Canadian sales and service questions are handled by that company.

SERVICE

Factory Service and repair facilities are maintained in Cleveland, Ohio; Berkeley, California, and Greenwood, Mississippi. In addition, authorized repair stations are located at convenient points throughout the United States and Canada. To expedite repairs, contact your local Hickok distributor for the location of the nearest repair facility. All returns to factory repair facilities must be preceded by written authorization (Contact C. E. Lenke, Service Manager, 1643 Eddy Rd., Cleveland 12, Ohio). Returns should be accompanied by a detailed description of the fault or defect.

Instruments returned to Cleveland for servicing should be addressed to:

The Hickok Electrical Instrument Company
Service and Parts Department
1643 Eddy Road
Cleveland 12, Ohio

Instruments returned to Berkeley for servicing should be addressed to:

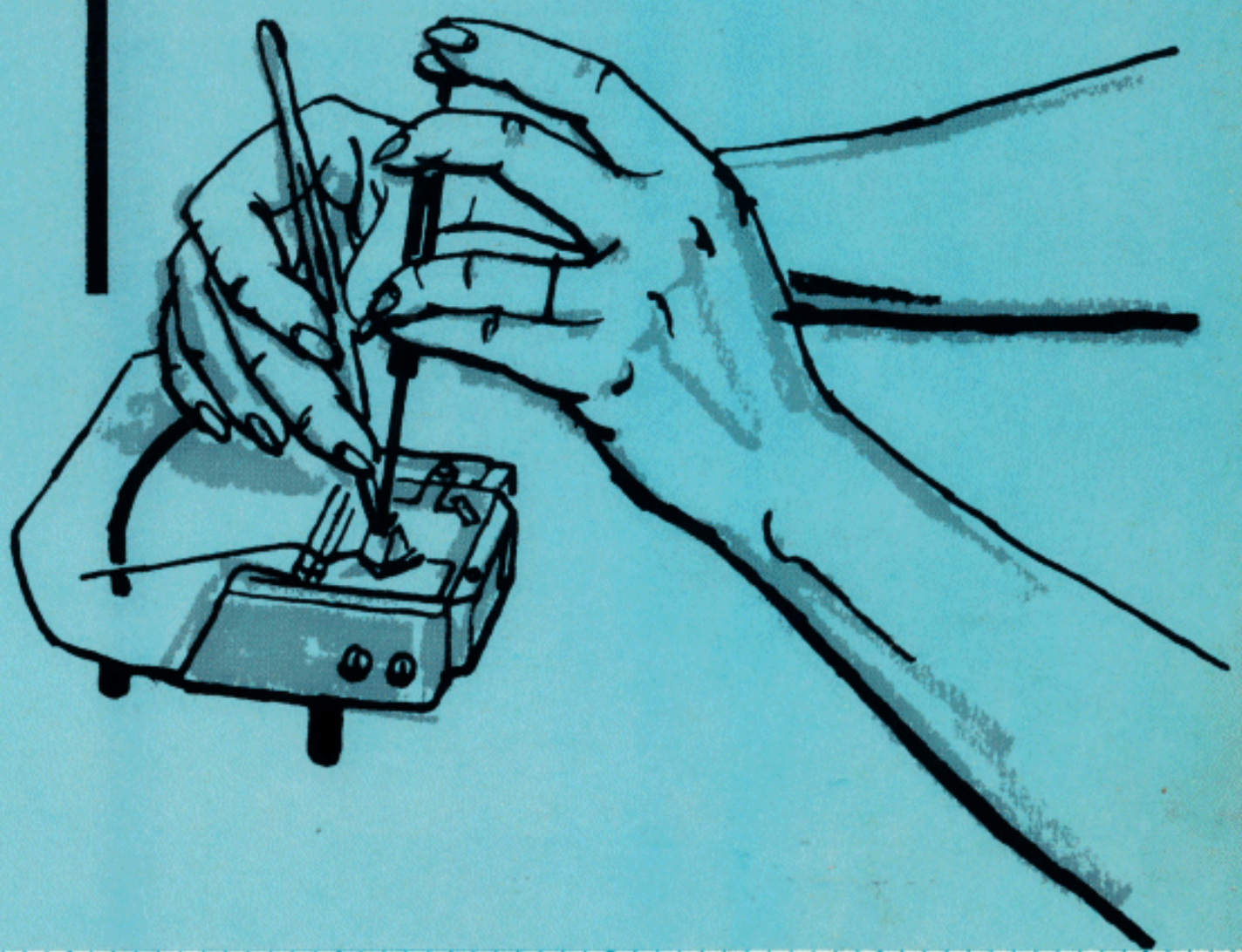
The Hickok Electrical Instrument Company
Service Department
2585 Shattuck Avenue
Berkeley 4, California

Instruments returned to Greenwood for servicing should be addressed to:

The Hickok Electrical Instrument Company
Supreme Electronics Division
Service Department
Greenwood, Mississippi

In areas not conveniently located to these points, contact the local Hickok distributor for the name of the nearest authorized repair station.

All meters for HICKOK Test Instruments are built by HICKOK meter craftsmen. HICKOK offers a full line of panel and switchboard type meters for the original equipment manufacturer. For full information, write for Catalog 39.



RD INSTRUMENTS

FOR RESEARCH AND DEVELOPMENT

HICKOK also manufactures a broad line of more sophisticated test equipment for industrial and laboratory applications under the trade name, "RD Instruments." For more information, write for the HICKOK-RD Short Form Catalog, Form SFC.

HICKOK

THE HICKOK ELECTRICAL
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