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Test Equipment and Accessories

- **SERVICING**
Radio
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Color & B&W TV
- **INDUSTRIAL MAINTENANCE**
- **LABORATORY ANALYSIS**
- **SCHOOLS**

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Volt-Ohm-Milliammeters

Types WV-516A, WV-517A, and WV-518A

RCA

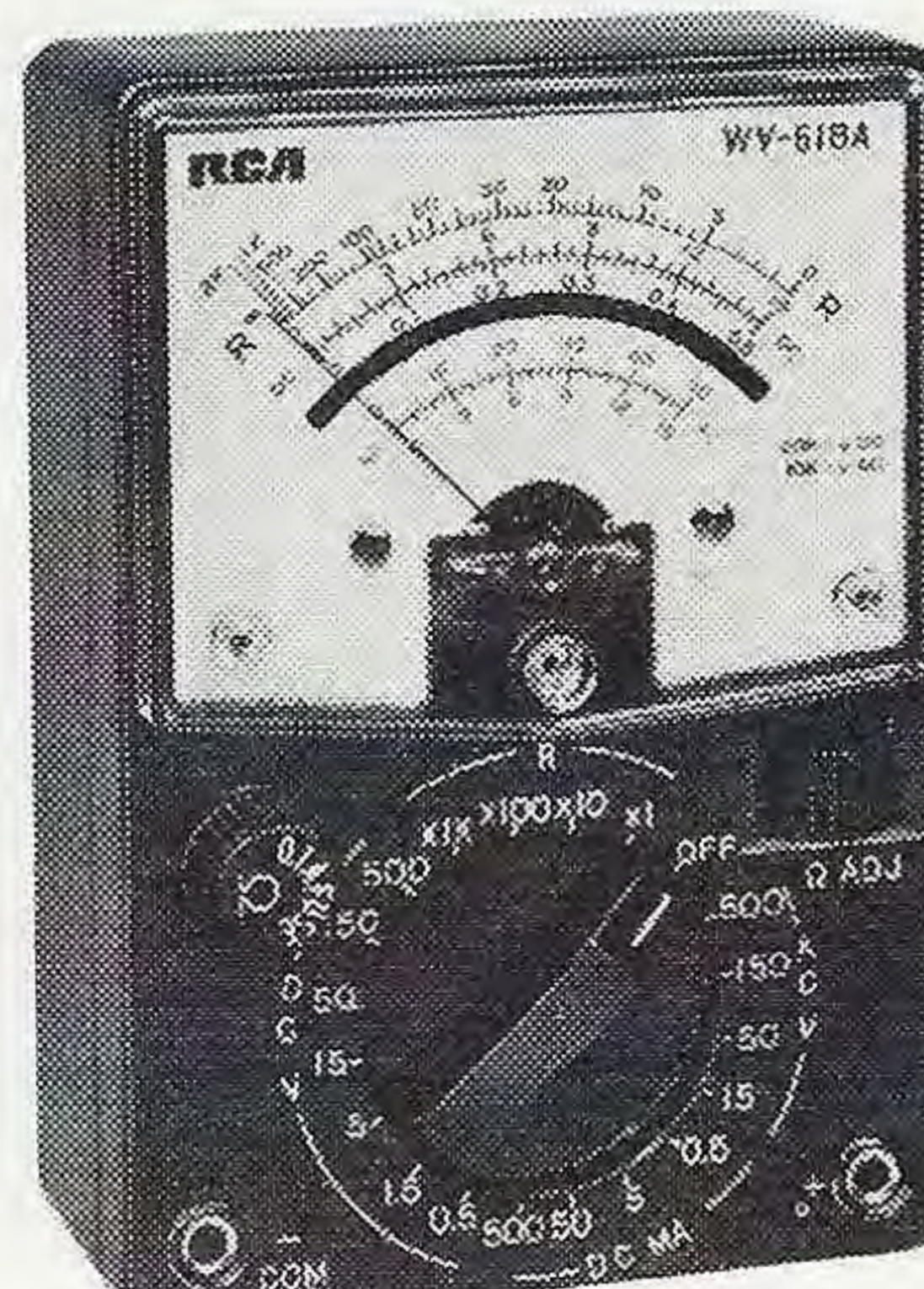
**Test Equipment
and Accessories**



WV-516A



WV-517A



WV-518A

Description

The three versatile volt-ohm-milliammeters illustrated and described here can be used in many servicing and industrial applications and are well suited for use in school workshops and laboratories. Their small size and simplified design make them especially useful in applications where a portable measuring instrument is required.

Protection diodes are included in all three instruments to prevent damage to the meter movement due to accidental overload. Precision resistors are used in all measurement functions to insure accuracy.

The meter scales have been functionally designed and color-coded in green, red, and black to provide quick readability of the ohms, DC, and AC functions. All of these instruments are supplied complete with test leads and batteries.

Available accessories include the WG-297 High Voltage Probe, less resistor, WG-210 900 MΩ Resistor for H.V. Probe (10 x multiplier for 5000 V range), WG-211 495 MΩ Resistor for H.V. Probe (100 x multiplier for 250 V range), and WG-447A vinyl carrying case (includes convenient storage compartment for test leads).

Specifications (WV-516A)

Voltage (DC and AC RMS)

Ranges0 to 5V, 25V, 250V, and 1000V
Sensitivity2000 ohms-per-volt
Accuracy: DC±3% of full-scale reading
AC±4% of full-scale reading
AC Frequency Response (5V range).....10 Hz to 100 kHz, ±1dB

DC Current

Ranges0 to 0.5 mA, 10 mA, 250 mA
Accuracy±3% of full-scale reading

Resistance

RangesR x 1, R x 100
(Measures 1 ohm to 300,000 ohms)
Accuracy±3% of scale length
Batteryone of 1.5V penlite cell
(RCA VS034A, VS334, or equivalent)

Size and Weight (approx.)

Dimensions4 $\frac{5}{16}$ inches x 3 $\frac{1}{8}$ inches x 1 $\frac{5}{8}$ inches
Weight (net)11 oz.

Specifications (WV-517A)

DC Voltage

Ranges0 to 0.3V, 3V, 12V, 60V, 120V and 600V
Sensitivity20,000 ohms-per-volt*
Accuracy±3% of full-scale reading

Features

- Meter movements protected against burnout
- Precision resistors for all ranges
- 3-color meter scales
- The WV-516A combines simplified design and small size with a functional panel utilizing pin-jack connectors for all functions and ranges
- The WV-517A, only slightly larger than the WV-516A, is provided with a panel switch for convenient selection of all functions and ranges
- The WV-518A features a mirror scale and has a convenient panel-mounted fuse to protect the ohms divider resistors from accidental burn-out
- Full 12-month warranty on parts and labor... complete replacement parts availability

AC Voltage

Ranges0 to 12V, 60V, 120V, and 600V
Sensitivity10,000 ohms-per-volt
Accuracy±4% of full-scale reading
Frequency Response (12V range)10 Hz to 100 kHz, ±1 dB

DC Current

Ranges0 to 60 μA, 3 mA, and 300 mA
Accuracy±3% of full-scale reading

Resistance

RangesR x 1, R x 100, R x 1K
(measures 1 ohm to 5 megohms)
Accuracy±3% of scale length
Batterytwo 1.5 volt penlite cells
(RCA VS034A, VS334, or equivalent)

Decibels

Ranges-20 to +23 dB
+20 to +37 dB

Size and Weight (Approx.)

Dimensions4 $\frac{3}{4}$ inches x 3 $\frac{1}{4}$ inches x 1 $\frac{1}{2}$ inches
Weight (net)12 $\frac{1}{2}$ ounces

*Sensitivity on 0.3V range is 16,500 ohms/volt

Specifications (WV-518A)

DC Voltage

Ranges0 to 0.5V, 1.5V, 5V, 15V, 50V, 150V, 500V
Sensitivity20,000 ohms-per-volt
Accuracy±3% of full-scale reading

DC Current

Ranges0 to 0.5 mA, 5 mA, 50 mA, 500 mA
Accuracy±3% of full-scale reading

AC Voltage (RMS)

Ranges0 to 15V, 50V, 150V, 500V
Sensitivity10,000 ohms-per-volt
Accuracy±4% of full-scale reading
Frequency Response (15V range)10 Hz to 100 kHz ±1 dB

Resistance

RangesR x 1, R x 10, R x 100, R x 1K
(measures 1 ohm to 2 megohms)
Accuracy±3% of scale length
Batteriestwo 1.5 volt penlite cells
(RCA VS034A, VS334, or equivalent)

Size and Weight (approx.)

Dimensions5 $\frac{1}{8}$ inches x 3 $\frac{1}{2}$ inches x 1 $\frac{7}{8}$ inches
Weight1 lb.

Volt-Ohm-Milliammeters

Types WV-519A and WV-520A

RCA

**Test Equipment
and Accessories**



WV-519A



WV-520A

Description

The instruments illustrated and described here represent two of the latest additions to RCA's complete line of high-quality, general-purpose volt-ohm-milliammeters.

Both units are attractively styled with a dark blue case, three-color aluminum panel, and three-color meter with mirror scale. The functional color coding is designed to provide quick readability of the ohms, AC, DC, and dB functions.

Protection diodes are included in both instruments to prevent damage to the meter movement due to accidental overload. Precision resistors are used in all measurement

functions to insure accuracy. A convenient polarity switch permits measurement of negative DC voltages without reversing the test lead connections. The instruments come complete with test leads and batteries. A vinyl carrying case, WG-453A, is available as an accessory for the WV-520A.

Additional accessories, for both instruments, include the WG-297 High Voltage Probe, less resistor, WG-210 900 M Ω Resistor for H.V. Probe (10 x multiplier for 5000 V range), WG-211 495 M Ω Resistor for H.V. Probe (100 x multiplier for 250 V range).

Specifications (WV-519A)

DC Voltage	
Ranges	0 to 0.3V, 3V, 12V, 60V, 120V, 300V, 600V, and 1200V
Sensitivity	50,000 ohms-per-volt*
Accuracy	$\pm 3\%$ of full-scale reading
AC Voltage	
Ranges	0 to 6V, 30V, 120V, 300V, 600V, and 1200V
Sensitivity	10,000 ohms-per-volt
Accuracy	$\pm 4\%$ of full-scale reading
Frequency response (6V range)	10 Hz to 100 kHz, ± 1 dB
DC Current	
Ranges	0 to 0.03 mA, 6 mA, 60 mA, 300 mA, and 6A (use the special input jack provided)
Accuracy	$\pm 3\%$ of full-scale reading
Resistance	
Ranges	R x 1, R x 100, R x 1K, R x 10K (measures 1 ohm to 100 megohms)
Accuracy	$\pm 3\%$ of scale length
Batteries	two 1.5V penlite cells (RCA VS034A, VS334A, or equivalent) one 22.5V "photoflash" battery (RCA VS084, or equivalent)
Decibels	
AC Range	
6V	-20 to +17 dB
30V	+15 to +31 dB
120V	+27 to +43 dB
300V	+35 to +51 dB
600V	+41 to +57 dB
Accuracy	$\pm 4\%$ of full-scale reading
Size and Weight (approx.)	
Dimensions	6 $\frac{3}{8}$ inches x 4 $\frac{1}{4}$ inches x 1 $\frac{7}{8}$ inches
Weight (net)	1 lb., 8 oz.

*Sensitivity on 0.3V range is 33,000 ohms/volt.

Features

- Meter movements protected against burnout
- Precision resistors for all ranges
- 3-color meters with mirror scales
- 3-color aluminum panels
- Full 12-month warranty on parts and labor... complete replacement parts availability

Specifications (WV-520A)

DC Voltage	
Ranges	0 to 0.5V*, 1.5V, 5V, 15V, 50V, 150V, 500V, and 1500V*
Sensitivity	100,000 ohms-per-volt
Accuracy	$\pm 3\%$ of full-scale reading
AC Voltage	
Ranges	0 to 5V, 15V, 50V, 150V, 500V, and 1500V*
Sensitivity	10,000 ohms-per-volt
Accuracy	$\pm 4\%$ of full-scale reading
Frequency response (5V range)	10 Hz to 100 kHz, ± 1 dB
DC Current	
Ranges	0 to 15 μ A*, 1.5 mA, 15 mA, 50 mA, 150 mA, 500 mA, and 5 A*
Accuracy	$\pm 3\%$ of full-scale reading
*Use special jack provided.	
Resistance	
Ranges	R x 1, R x 100, R x 1K, R x 10K (measures 1 ohm to 20 megohms)
Accuracy	$\pm 3\%$ of scale length
Batteries	two 1.5V "C" cells (RCA VS0345, VS335A, or equivalent)
Decibels	
AC V Range	
5V	-20 to +16 dB
15V	+15 to +25 dB
50V	+25.5 to +35.5 dB
150V	+35 to 45 dB
500V	+45.5 to 55.5 dB
Accuracy	$\pm 4\%$ of full-scale reading
Size and Weight (approx.)	
Dimensions	7 $\frac{1}{2}$ inches x 5 $\frac{1}{4}$ inches x 2 $\frac{3}{8}$ inches
Weight (net)	3 lbs.

Volt-Ohm-Milliammeter

Type WV-38A

RCA

**Test Equipment
and Accessories**



Description

The RCA WV-38A Volt-Ohm-Milliammeter is a rugged, accurate, and extremely versatile instrument designed for service calls, industrial applications, and all-around shop and lab use. The extra-low 0.25 and 1.0 volt DC ranges are specially useful for servicing all types of low-voltage circuits. The wide range current scales are of value in adjusting color TV receivers, TV cameras, and power-supply drains. The ohms scale can be used for trouble-shooting all types of circuits and electronic parts. The special dB scales are ideal for high fidelity and broadcast-audio tests.

A convenient function switch is provided with AC, +DC, and

Features

- Measures ohms, DC volts, AC volts, direct current, audio signals in dB units
- 39 total ranges of measurement; easy to read 2-color meter scales
- Special 0.25- and 1.0-volt DC ranges
- Meter movement protected against burnout
- Full-scale accuracy $\pm 3\%$ on DC volts and current; $\pm 5\%$ on AC volts
- Fuse protection for ohms divider network
- 2-color markings on front-panel for simplified operation
- Large 5-inch meter with 50 μ A sensitivity
- Polarity Reversal Switch
- 20,000 ohms/volt DC input resistance
- Full 12-month warranty on parts and labor... complete replacement parts availability

—DC positions. The +DC and —DC positions of this switch reverse the polarity of the test leads — a feature that is also helpful in checking the front-to-back resistance ratio of electrolytic capacitors and many types of semiconductor devices.

Two special silicon diodes are used to protect the meter movement against burnout due to accidental overload. A fuse protects the precision multiplier in the ohms network.

The WV-38A is completely portable, requiring no external power source. Five internal batteries (not provided) are used for the ohms function (4 penlight cells and 1 "D" flashlight cell).

Specifications

DC Voltmeter (at full scale):

Ranges 0 to .25, 1.0, 2.5, 10, 50, 250, 1000, 5000 V
Input Resistance 20,000 Ω /V
Accuracy $\pm 3\%$

AC Voltmeter (at full scale):

Ranges 0 to 2.5, 10, 50, 250, 1000, 5000 V
Input Resistance 5000 Ω /V
Accuracy $\pm 5\%$
Frequency response (reference 1000 Hz) flat within 0.5 dB from 10 Hz to 50 kHz on the 2.5, 10, and 50 V ranges.

DC Current (at full scale):

Ranges 0 to 50 μ A, 1 mA, 10 mA, 100 mA, 500 mA, 10 A
Insertion Loss 0.25 V
Accuracy $\pm 3\%$

Ohms:

Ranges RX 1, RX 100, RX 10,000
 ± 3 of pointer position for exact value

AF Output (at full scale):

Ranges 0 to 2.5, 10, 50, 250 V
An internally connected 0.1 μ F DC blocking capacitor permits output measurements in presence of DC voltages.

Decibel Levels (Zero dB is 1 mW in 600 Ω) -20 to +50 dB

Dimensions

Height 5 $\frac{7}{8}$ ", Width 5 $\frac{1}{4}$ ", Depth 3 $\frac{1}{8}$ ", Weight 3 $\frac{1}{2}$ lbs.

Equipment Supplied

Red test lead and probe, Slip-on Alligator Clip and Red Insulating Boot, Black Test Lead with Alligator Clip and Black Insulating Boot, Instruction Book. (Batteries not supplied.)

Accessories Available

WG-297 High Voltage Probe, less resistor, WG-210 900 M Ω Resistor for H.V. Probe (10 x multiplier for 5000 V range), WG-211 495 M Ω Resistor for H.V. Probe (100 x multiplier for 250 V range), WG-270A Vinyl Carrying Case (includes convenient storage compartment for test leads).

VoltOhmyst®

Type WV-77E

RCA

Test Equipment and Accessories



Description

The RCA VoltOhmyst® WV-77E is designed to measure AC rms sine-wave voltages from 0.1 volt to 1500 volts, DC voltages from 0.02 volt to 1500 volts, peak-to-peak voltages from 0.2 volt to 4000 volts, and resistance values from 0.2 ohm to 1000 megohms. The AC voltmeter portion of the WV-77E features an electron tube as a full-wave signal rectifier. The meter reading in AC-voltage measurements is a function of the full peak-to-peak value of the measured waveform. The WV-77E has a high input impedance on all DC- and AC-voltage ranges. This high input impedance allows the use of the WV-77E in circuits where instruments with a lower input impedance would result in loading of the circuit under test, and a resultant error in reading the operating voltage.

Specifications

Performance figures are for line voltage of 120 volts, 60 Hz

DC Voltmeter:

Range 0 to 1.5, 5, 15, 50, 150, 500, 1500 V
Input Resistance with DC Probe (1 mΩ inside probe)
All Ranges 11 mΩ
Accuracy ±3% of full scale

AC Voltmeter:

Ranges
RMS Values of Sine Waves 0 to 1.5 volts on separate scale
0 to 5, 15, 50, 150, 500, 1500 V
Peak-to-Peak Values of
Sine Waves 0 to 4 volts on separate scale
0 to 14, 40, 140, 400, 1400, 4000 V
Accuracy ±5% of full scale
Frequency Response ±5% 40 Hz to 5 MHz
On 1.5, 5, 15 rms, or 4, 14, 40, p-p ranges

Maximum Input Voltages:

When Instrument is set up to measure DC:
DC 1500 V
DC plus AC (peak) 1800 V

Features

- Seven overlapping measurement ranges for:
 - Ohms — 0.2 ohm to 1000 megohms
 - DC volts — 0.02-volt to 1500-volts
 - RMS AC volts — 0.1-volt to 1500-volts
 - Peak-to-peak AC volts — 0.2-volt to 4200-volts measured on separate red scales
- Zero-center DC volts
- Burn-out proof meter circuit
- Precision-ohms-measurement network fused against accidental burnout
- Separate low-voltage AC scale for accuracy
- Color-coded scales, switch settings
- Pilot light
- Full 12-month warranty on parts and labor... complete replacement parts availability

The VoltOhmyst utilizes a push-pull balanced DC-bridge circuit with the meter in the plate circuit. This circuit affords excellent linearity of response, good stability, and very high input impedance.

Additional features of the WV-77E include provision for zero-center indication, useful in discriminator and bias measurements; separate scales for low AC-voltage measurements to assure accurate readings; a circuit design which allows measurement of AC in the presence of DC; a separate DC probe with a 1-megohm resistor which minimizes capacitance-loading effects; and electronic protection against meter burn-out. In addition, the resistors in the resistance divider network are protected by a separate fuse.

When Instrument is set up to measure AC:

Maximum AC (rms) 1500 V
Maximum AC (peak-to-peak) 4000 V

NOTE: When AC is being measured, no more than 400 volts DC shall be present in circuit being tested.

Power Supply

Voltage Rating 105 to 125 V
Frequency Rating 50 to 60 Hz

Battery:

1.5-volt "C" cell RCA-VSO35A or equiv.

Dimensions

Height 7¾", Width 5½", Depth 4¾", Weight 5 lbs.

Equipment Supplied

1 DC Probe and Cable, 1 AC-Ohms Probe and Cable, 1 Ground Cable, 1 Instruction Book.

Accessories Available

WG-297 High Voltage Probe, WG-206 Multiplier Resistor for use with WG-297, WG-351A Demodulator Probe, WG-270A Vinyl Carrying Case (includes convenient storage compartment for test leads).

Senior VoltOhmyst®

Type WV-98C

RCA

**Test Equipment
and Accessories**



Features

- Seven resistance ranges — measures 0.2 ohm to 1000 megohms
- Eight DC-voltage ranges — measures 0.01 volt to 1500 volts
- 0.5 DC-volt scale for transistor circuits
- Seven AC ranges — measures 0.05 to 1500 rms volts
- Measures peak-to-peak sine, complex waveforms to 4200 volts
- Response to 3 MHz
- 200-microampere meter
- Big, readable, 6½" color-coded meter with mirrored scale
- Combination, shielded DC/AC/OHMS probe with switch
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WV-98C incorporates all the time-tested VoltOhmyst features in a deluxe precision instrument with countless uses in audio, radio, TV, and industrial servicing applications. Accurate, dependable, and extremely versatile, it will measure resistance, DC volts, and both rms and peak-to-peak values of sine waves and complex waves.

An input resistance of 11 megohms on all DC-voltage ranges reduces loading of the test circuit.

The WV-98C has convenient mid-scale values of 10, 100, 1000, 10,000 and 100,000 ohms, and 1 and 10 megohms.

All measurements are made with a single-unit probe, the WG-299E DC/AC-OHMS Probe and Cable. The probe is quickly adapted to either DC measurements or AC and resistance measurements by means of a built-in switch.

Included, also, are a zero-center scale, two separate scales for low-voltage AC measurements; a pilot light; and circuit design which permits measurements of the ac component of a DC voltage or the DC component of an AC signal.

Specifications

At line voltage of 120 V, 60 Hz

DC Voltmeter:

Range 0 to .5, 1.5, 15, 50, 150, 500, 1500 V
Input Resistance All Ranges 11 mΩ
Over-all Accuracy ±3% of full scale

AC Voltmeter:

Ranges:

RMS Values of Sine-Waves 0 to 1.5, 5, 15, 50, 150, 500, 1500 V

Peak-to-peak Values of Sine-Waves and

Complex Waves 0 to 4, 14, 42, 140, 420, 1400, 4200 V

Overall Accuracy ±3% of full scale
(Accuracy of rms ranges based on use of sine-wave signals having less than 0.5% total harmonic content)

Frequency Response

(1.5, 5, 0, and 15 V AC Ranges ±1 dB
30 Hz to 3 MHz

Ohmmeter:

Ranges, Seven 0 to 1000 mΩ

Power Supply:

110-130 V, 50-60 Hz

Power Consumption (Approx.) 6 W; Battery 1 RCA VSO36 1½ V "D" cell.

Dimensions

Height 6½", Width 7", Depth 3¾", Weight 6 lbs.

Equipment Supplied

DC/AC-OHMS Probe and Cable (Type WG-299E), 1.5-volt Battery (Type VSO36), Slip-on Alligator Clip, Insulator, Instruction Book.

Accessories Available

WG-301A Crystal-Diode slip-on probe for measuring RF from 50 kHz to 250 MHz; WG-411A High-Voltage slip-on probe for measuring up to 50,000 DC volts; WG-206 Multiplier Resistor.

Solid-State, Battery-Operated VoltOhmyst®

Type WV-500B

RCA

**Test Equipment
and Accessories**



Features

- Excellent stability
- Measures from 2 microamperes to 1.5 Amperes in 8 ranges
- Measures from 0.2 ohm to 1000 megohms in 7 ranges
- Measures from 0.02 volt to 1500 volts in 8 ranges
- Measures from 0.1 to 1500 rms AC volts in 7 ranges plus peak-to-peak voltages of complex waveforms
- 11 megohm resistance on all DC ranges
- Supplied with DC/AC Ohms probe with shielded input cable
- Mirror scale meter—movement electrically protected against burnout
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The WV-500B VoltOhmyst is a solid-state, battery-operated electronic voltmeter. The instrument measures DC voltages from 0.01 to 1500 volts, DC current from 2 microamperes to 1500 milliamperes, AC (rms) voltages from 0.1 to 1500 volts, AC peak-to-peak voltages from 0.5 volts to 4200 volts, and resistance values from 0.2 ohms to 1000 megohms.

Seven overlapping ranges are provided for AC rms and resistance measurements, and eight ranges are provided for DC voltage and current measurement. Accuracy for the DC and AC rms functions is $\pm 3\%$ (of full scale reading).

The WV-500B has an input resistance of 11 megohms on all DC ranges to prevent overloading the circuit under test.

Special solid-state circuitry is used in the WV-500B to assure

stable, drift-free operation with minimum effect due to temperature variation. Advantages of solid-state construction include the elimination of warm-up time and a reduction in zero-shift that can occur in tube-operated voltmeters.

Since the WV-500B is battery-operated, the measuring circuit is completely isolated from the ac power line. The instrument can be used to make measurements on equipment with high ground potentials, an important feature in many industrial and laboratory applications.

Additional features include zero-centering of the meter pointer, and a circuit design that permits measurement of the ac component of an ac signal. The meter movement of the WV-500B is electrically protected against burnout.

Specifications

DC Voltmeter:

Ranges 0 to .5, 1.5, 5, 15, 50, 150, 500, 1500 V
Input Resistance
All Ranges 11 m Ω
Accuracy $\pm 3\%$ of full scale

AC Voltmeter:

Ranges:
rms Values of Sine-Waves 0 to 1.5, 5, 15, 50, 150
500, 1500 V

Peak-to-Peak Values of Sine Waves and
Complex Waves 0 to 14, 42, 140, 420, 1400, 4200 V

Accuracy $\pm 3\%$ of full scale
(Accuracy of rms ranges based on use of sine wave signals having less than $\frac{1}{2}$ of 1.0% total harmonic content.)

Frequency Response
(1.5 and 5.0 V AC Ranges) ± 1 dB 30 Hz to 3 MHz

DC Current:

Ranges 0 to .5, 1.5, 5, 15, 50, 150, 500 and 1500 mA
Accuracy $\pm 3\%$

Ohmmeter:

Ranges, Seven 0 to 1000 m Ω

Batteries:

Ohms 1 1.5 volt "C" cell RCA VSO35A
or equivalent

Metering Circuit 3 9-volt batteries
(RCA VS323 or equivalent)

Dimensions

Height 6 $\frac{3}{8}$ ", Width 5 $\frac{1}{4}$ ", Depth 3 $\frac{1}{8}$ ", Weight 3 $\frac{1}{2}$ lbs.

Equipment Supplied

DC/AC Ohms Probe and Cable WG-410B, Slip-On Alligator Clip, 2 current leads 1 RCA VSO35A Battery, 3 RCA VS323 Batteries, Instruction Book.

Accessories Available

WG-301A Crystal-Diode slip-on probe for measuring RF from 50 kHz to 250 MHz; WG-411A High-Voltage slip-on probe for measuring up to 50,000 DC volts; WG-206 Multiplier Resistor.

Solid-State, Battery/AC Operated Master VoltOhmyst®

Type WV-510A

RCA

**Test Equipment
and Accessories**



Description

The RCA WV-510A Master VoltOhmyst is a high-quality, solid-state electronic voltmeter especially designed for stable, drift-free operation. The instrument can be operated either from internal batteries (not included) or from a 120-volt AC power line. On battery operation, the power cord can be removed for complete portability. The many features of this VoltOhmyst make it well suited to service, industrial, and laboratory applications.

The WV-510A measures DC voltage from 0.01 to 1500 volts, direct current from 0.01 milliamperes to 1.5 amperes, AC voltage from 0.2 to 1500 volts, AC peak-to-peak voltage of complex waveforms from 0.5 to 4200 volts, and resistance values from 0.2 ohms to 1000 megohms.

Seven overlapping ranges are provided for AC, resistance,

Specifications

DC Voltmeter

Ranges.....0 to .5, 1.5, 5, 15, 50, 150, 500, 1500 V
Input Resistance (With switch on WG-401A set to "DC"):
All Ranges21 M Ω
Accuracy* $\pm 3\%$ of full scale reading

DC Current

Ranges.....0 to .5, 1.5, 5, 15, 50, 150, 500, and 1500 mA
Accuracy* $\pm 3\%$ of full scale reading

AC Voltmeter

Ranges:
RMS.....0 to 1.5, 5, 15, 50, 150, 500, and 1500 V
Peak-to-Peak.....0 to 14, 42, 140, 420, 1400, 4200 V
Accuracy* $\pm 3\%$ of full scale reading
(Accuracy of rms ranges based on use of sine wave signals having less than $\frac{1}{2}$ of 1.0% total harmonic content.)

Input Resistance and Capacitance

(With WG-401A switch set to "AC-OHMS"):
1.5, 5, 50, 150 V Ranges.....0.83 M Ω , shunted by 70 pF
500 V Range.....1.3 M Ω , shunted by 60 pF
1500 V Range.....1.5 M Ω , shunted by 60 pF

Frequency Response

(at 1.5 and 5.0 V AC)..... ± 1 dB 30 Hz to 3 MHz

Maximum Input Voltages

DC Voltages with no ac voltage present:.....1500 V
AC Voltages with no dc voltage present:
RMS for Sine Waves.....1500 V
Peak-to-Peak for Complex Waves.....2000 V
Peak-to-Peak for Sine Waves.....4200 V

Combined AC and DC Voltages:

Sum of DC Voltage and AC Peak Voltage.....2000 V

Features

- Excellent stability
- Battery or AC operation
- Measures from 0.01 milliamperes to 1.5 amperes in 8 ranges
- Measures from 0.2 ohms to 1000 megohms in 7 ranges
- Measures from 0.01 volt to 1500 volts DC in 8 ranges
- Measures from 0.2 to 1500 rms AC volts in 7 ranges
- Measures peak-to-peak voltages of complex waveforms from 0.5 to 4200 volts in 7 ranges
- 21-megohm resistance on all DC ranges
- Supplied with DC/AC Ohms probe with flexible shielded input cable (BNC connector), and current test loads.
- Mirror scale meter—movement electrically protected against burnout
- Full 12-month warranty on parts and labor... complete replacement parts availability

and current measurements, and eight ranges are provided for DC voltage measurement. Accuracy for all voltage and current functions is $\pm 3\%$ of full-scale reading.

The solid-state measuring circuit in the WV-510A features excellent zero stability and linearity. Current drain is very low, assuring long battery life. Accuracy is maintained throughout the usable life of the batteries. A convenient battery test function is provided.

An input resistance of 21 megohms on all DC ranges permits accurate test results on even the most critical low impedance circuits.

The Master VoltOhmyst has a large, easy-to-read, two-color meter. A mirror scale is included to prevent inaccurate readings due to parallax.

Ohmmeter

Ranges, Seven0 to 1000 M Ω
Accuracy* $\pm 3\%$ of center scale reading

Meter Movement

DC Current for Full-Scale Deflection.....200 μ A

Power Required

AC Operation:
Voltage†110-135 V
Frequency50/60 Hz
Power Consumption.....less than 5 W
Battery Operation:.....four 9 volt batteries
RCA VS323 or equiv. (NEDA 1604)
(Not included)

Ohms Circuit.....one 1.5 volt "D" cell
RCA VS036 or equiv.

Dimensions (less handle)

Height 6 $\frac{1}{2}$ " , Width 7" , Depth 3 $\frac{3}{4}$ "
Weight (with batteries) 6 lbs.

Equipment supplied

DC/AC-OHMS Probe and Cable (Type WG-401A) with BNC connector, Slip-On Alligator Clip, 2 Current Leads, 1 RCA VS036 Battery, Instruction Book.

Accessories available

WG-301A Crystal-Diode Slip-On Probe for measuring RF from 50 kHz to 250 MHz; WG-411A High-Voltage Slip-On Probe for measuring up to 50,000 V DC, WG-436A Multiplier Resistor.

*On battery operation, batteries must test good.

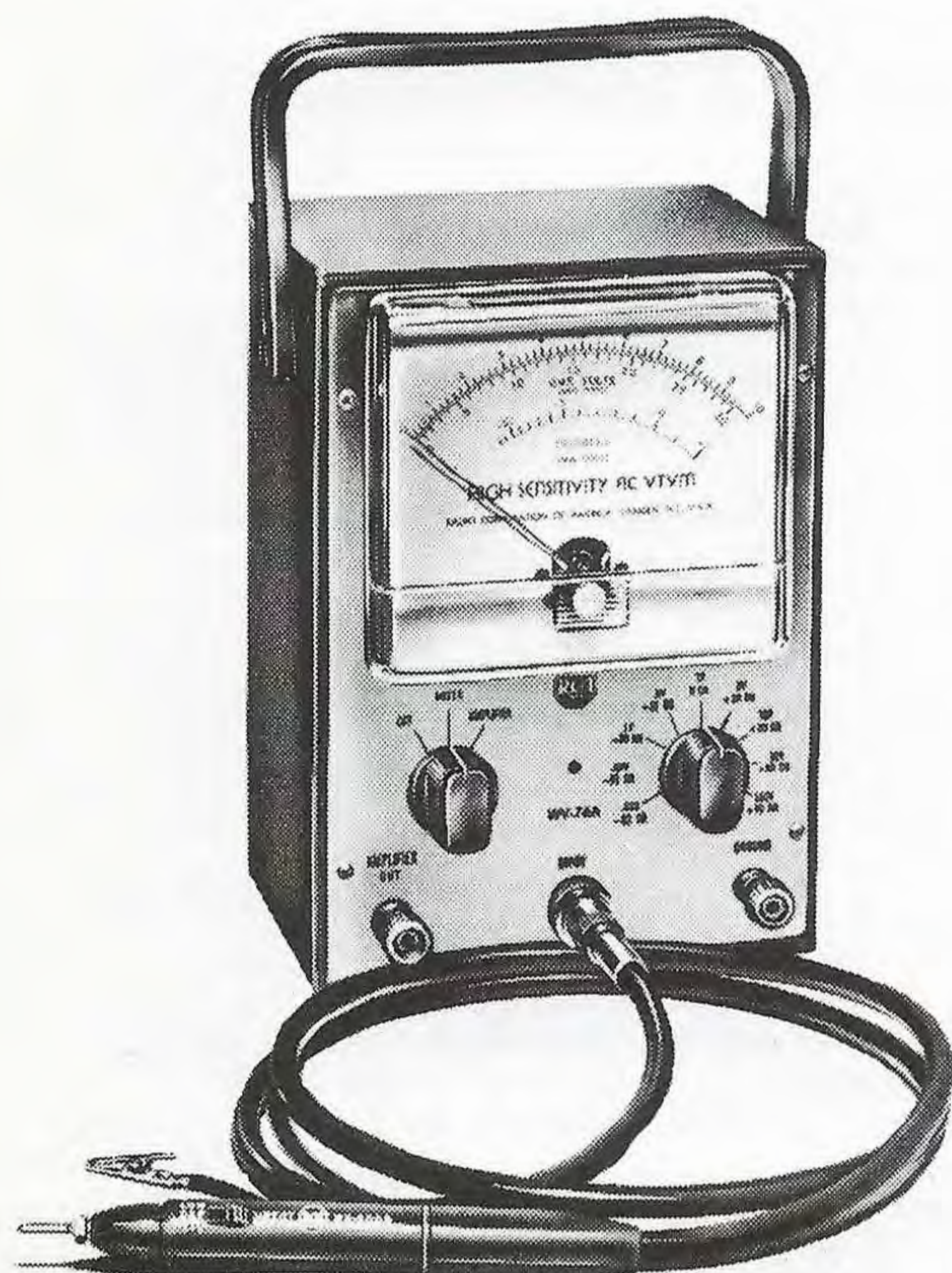
†Instrument can be rewired to operate from 240 V AC. See instruction book.

High Sensitivity AC VTVM

Type WV-76A

RCA

**Test Equipment
and Accessories**



Description

The RCA WV-76A High Sensitivity AC Vacuum-Tube Voltmeter is designed for audio applications in industry, laboratories, and schools. It is also useful in broadcast, design and development, production, and servicing applications. Typical uses include frequency response tests of preamplifiers, power amplifiers, and tone-control circuits; feedback-circuit design, signal tracing, audio-level and power-level measurements, gain measurements, amplifier-balancing applications, and general audio-voltage measurements.

Two different scales are provided for voltage measurements, and a separate scale is provided for decibel measurements. Measurements are made in nine over-lapping ranges. Accuracy

Features

- Nine overlapping AC voltage ranges—permits measurements from 0.0002 volt (lowest scale division) to 100 volts (full scale)
- Separate decibel scale for measurements of levels from -40 to $+40$ dB
- Direct/Low Capacitance input probe permits measurements up to 500 volts or $+56$ dB
- Frequency response is flat from 10 Hz to 500 kHz with "Low Cap" probe, 10 Hz to 1.5 MHz with "Direct" probe
- May be used as a preamplifier — 38 dB maximum gain or 10-millivolt range
- High input impedance — permits measurements in circuits sensitive to loading
- Probe and cable shielded throughout its length — eliminates pick-up from stray fields
- Heavy filtering in power-supply section keeps hum at extremely low level
- Full 12-month warranty on parts and labor... complete replacement parts availability

of the voltage and decibel measurements is 5% of full-scale reading.

The coaxial-type shielded low-capacitance/direct probe, the RCA WG-300B, supplied with the WV-76A has a sliding switch in the probe housing which provides for switches from direct to low-capacitance input. In the Low-Capacitance position, the probe presents an over-all input resistance of 10 megohms and an input capacitance of approximately 13 pF to the test circuit. This feature permits measurements in circuits which are sensitive to loading.

The WV-76A is also useful as a wide-range audio preamplifier, having approximately 36 dB maximum gain.

Specifications

The calibration of the WV-76A is based on pure sine-wave input signal voltage.

(Performance figures are based on a line voltage of 120 volts)

Frequency Range:

With WG-300B in

"Direct" Position ± 1 dB 10 Hz to 1.5 MHz

"Low-Cap" Position $\pm$ dB 10 Hz to 500 kHz

AC-Voltage Measurements (with WG-300B in "Direct" Position):

Ranges 0 to 0.01, 0.03, 0.1, 0.3, 1 V
0 to 3, 10, 30, 100 V†

Accuracy $\pm 5\%$ (full scale)

dB Measurements* (With WG-300B in "Direct" Position):

Ranges (nine) $-40, -30, -20, -10, 0,$
10, 20, 30, 40 dB

Accuracy $\pm 5\%$

Input Characteristics:

At Input Connector 1 meg shunted by 58 pF

With WG-300B in

"Direct" Position 1 mΩ shunted by 95 pF

"Low-Cap" Position 10 mΩ shunted by 13 pF

Preamplifier:

Output Voltage 0.8 output V for 0.01 input V

Output Impedance Less than 400 Ω

Gain 38 dB on 10 mV range

Power Supply:

Frequency 50 to 400 Hz

Voltage 105-125 V

Consumption 35 W

Dimensions

Width 5 $\frac{3}{8}$ ", Height 7 $\frac{3}{8}$ ", Depth 4 $\frac{3}{4}$ ", Weight 5 lbs.

Equipment Supplied

WG-300B Direct/Low-Capacitance Probe, "Slip-On" Alligator Clip, Clip Insulator, Instruction Book.

†When the WG-300B is set to the "Low-Cap" position, up to 500 V or $+56$ dB may be measured.

*Zero dB — 1 mW into 600 Ω.

Power Line Monitor

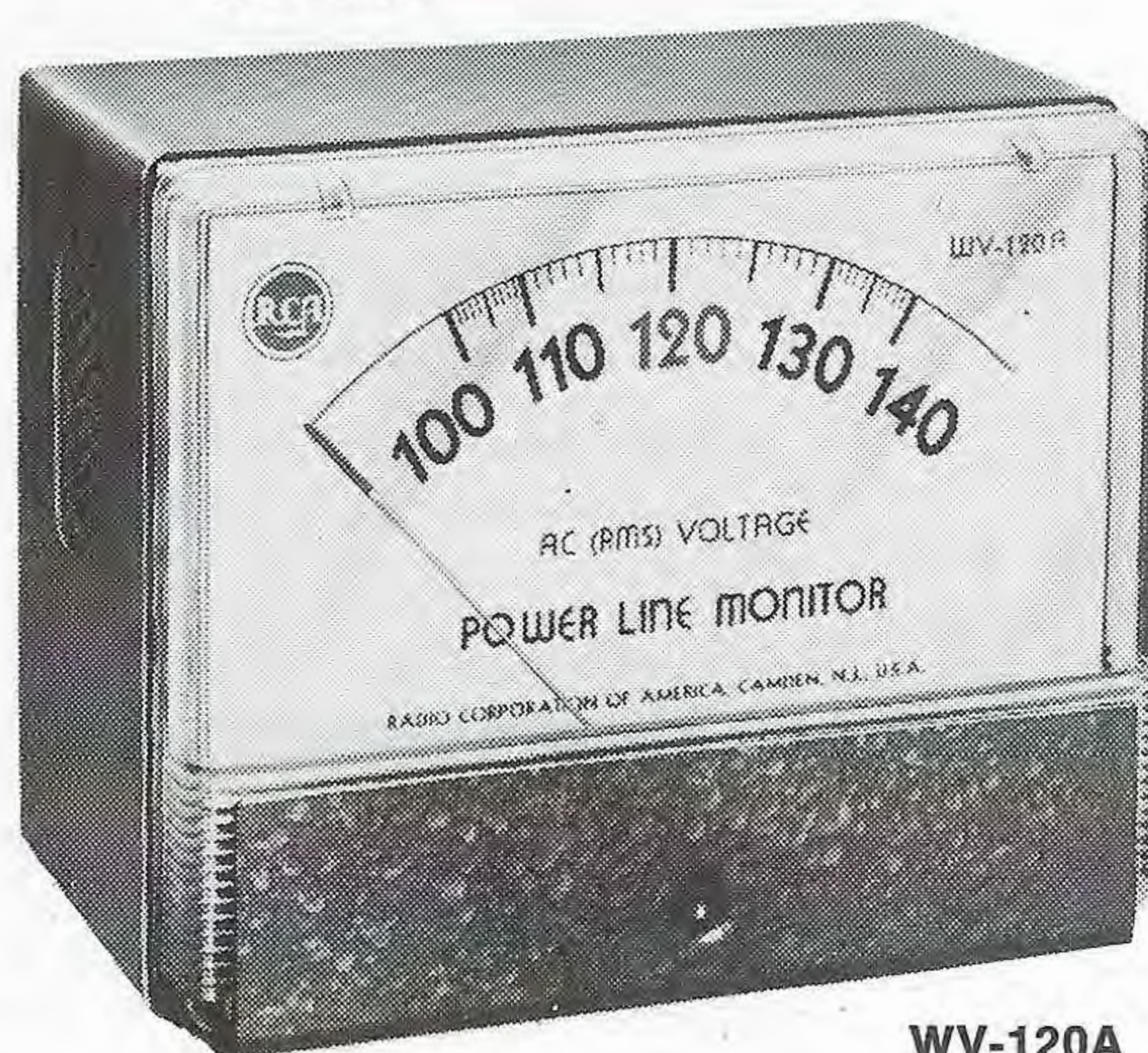
Type WV-120A and WV-503A

RCA

**Test Equipment
and Accessories**



WV-503A



WV-120A

Features

- Expanded 2-color scale — from 100 to 140 volts (WV-120A) and 200 to 280 volts (WV-503A)
- High accuracy — $\pm 2\%$ center scale; $\pm 3\%$ at both ends
- True rms reading — moving vane type meter gives accurate rms readings, even when line voltage is not pure sine wave
- Fast meter action — reveals "bounces" and fluctuations in line voltage
- Wide frequency range — From 25 Hz to 400 Hz
- Large numerals, large pointer, large scale — provides easy readability from distance of 10 feet or more
- Convenient wall mounting — holes are provided in rear of case for easy wall mounting
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WV-120A and WV-503A Power-Line Monitors are designed for use by industries, laboratories, and radio-TV and appliance repair shops where it is important to know the power-line voltage at all times. These instruments provide a continuous, accurate indication of the AC line voltage at a glance, without the inconvenience of handling probes and switches or the necessity of selecting one of several scales to determine the proper meter reading.

Used in conjunction with a variable isolation transformer, an RCA Power Line Monitor is a valuable aid in selecting line voltages for such applications as TV servicing, test instrument calibration, and the operation of electronic equipment that requires a known line-voltage supply.

Both instruments can be used on AC power-line sources with frequencies of 25 Hz to 400 Hz. They feature accuracy of $\pm 2\%$ at 120 and 240 volts, $\pm 3\%$ at scale ends. The meter has a special expanded scale with large, easy-to-read voltage

designations. Also, the tip of the meter pointer is made wide enough to be seen clearly at a considerable distance from the instruments. As a convenient means of reference, the nominal AC line-voltage standard of 120 or 240 volts is printed in red.

The meter movement is a moving-vane type. This type of meter indicates rms values even when the waveform of the power-supply voltage is distorted. (Peak reading and peak-to-peak reading AC voltage measuring circuits, such as used in conventional VTVM's are calibrated on the basis of pure sine-wave voltages, and such meters do NOT indicate the true rms value of distorted waveforms.) The meter movement is only slightly damped and therefore has fast response. This feature is highly desirable because it permits the meter to indicate the presence of line-voltage "bounce" or fluctuations.

Specifications

Frequency Range 25 Hz to 400 Hz
Input Voltage Range 100 to 400 V (WV-120A)
200 to 280 V (WV-503A)

Meter Accuracy $\pm 2\%$ at center scale, $\pm 3\%$ at both ends

Dimensions

Height $3\frac{1}{16}$ ", Width 5", Depth $3\frac{1}{16}$ ", Weight $1\frac{1}{2}$ lbs.

Picoammeter

Type WV-511A

RCA
Test Equipment
and Accessories

Features

- Measures low levels of direct current from 1 picoampere to 30 milliamperes in 18 overlapping ranges
- Measures current levels accurately regardless of their source resistance
- Measures DC voltages from 0 to 10 millivolts with an input impedance of 100 megohms
- Convenient pushbutton switches for all ranges
- AC or battery operation
- Zero center scale
- 1000-volt overload protection
- Low zero drift (less than $\pm 2\%$ over 24 hour period)
- Measures current level with voltage as low as 10 millivolts
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WV-511A Picoammeter is an extremely sensitive, high-quality solid-state instrument designed to measure low levels of direct current. The measurement range extends from 1 picoampere (10^{-12} amperes) which is the lowest division on the most sensitive range, to 30 milliamperes in eighteen overlapping ranges. All ranges are easily selected with convenient pushbutton switches.

The Picoammeter can be operated directly from a 120 or 240-volt, 50-60 Hz power line, or from internal batteries (not supplied). Battery operation permits complete isolation from the AC power line. Rechargeable batteries are recommended, since they can be recharged with the "charge" function when the instrument is used on AC power. Switches are located on the rear panel for convenient battery testing.

Recorder output is provided at 1 volt or 1 milliampere. The 1 mA output can be adjusted to match the recorder input load, up to 1500 ohms. A zero-center reference scale permits monitoring positive and negative variations of current levels, a feature that is especially helpful when using a recorder.

Positive or negative function switches provide a choice of measurement polarity. A "zero" switch is included which shorts the input, permitting accurate zero adjustment without disconnecting the test leads. The measuring circuit can be isolated or "floated" from the chassis ground, so that measurements can be made in circuits up to 1,000 volts above ground.

Specifications

PICOAMMETER

Ranges	Eighteen, from 0.1 nA (10^{-10} A) to 30 mA full scale. Ranges are grouped in convenient functions of nA, μ A, and mA.
Accuracy	$\pm 3\%$ of full-scale reading.
Zero Drift	Less than $\pm 2\%$ per 24-hour period (with input shorted), plus $\pm 0.5\%$ per degree Centigrade after 15 minutes warm-up.
Voltage Drop	10 mV for full-scale reading on any range.
Input Resistance	Varies from 100 megohms (10^8 ohms) on the 0.1 nA range to 0.332 ohms on the 30 mA range. See chart on page 10.
Maximum Rise Time	Approximately 10 milliseconds (all ranges).
Overload (Max.)	1,000 volts, 1 transient.
Recorder Output	1 volt or 1 milliampere. (Switch provided for selection.) Calibration control provided for 1 mA to compensate for variation in load up to 1,500 ohms. Zero center scale is provided.

DC VOLTMETER

Range	0 to 10 mV, resolution to 10Q μ V (lowest scale division).
Input Resistance	100 M Ω (10^8) on 0.1 nA range. Basic accuracy is $\pm 2\%$ of full-scale.
Note: Ranges of 0 to 0.1V, 0 to 10V, 0 to 100V, and 0 to 1000V, with input resistances up to 10,000 Ω (10^4) can be obtained by using external precision resistors (not supplied).	

AMPLIFIER

Input Impedance	As high as 100 megohms (using the 0.1 nA range).
Voltage Gain	150 (using the nA input ranges). At ± 10 mV input the amplifier output is ± 1.5 V non-inverted.
Current Gain	0.033, 0.1, 0.33, 1, etc., to 10 million (in the 0.1/nA range).



The design of the WV-511A permits it to also be used as a high input-resistance voltmeter in many applications that require an electrometer. On the 0.1 nA current range, the instrument measures 10 millivolts (.010 volts) full-scale with an input resistance of 100 megohms. Higher voltages can be measured using external multiplier resistors. The unit can also be used as a megohmmeter to measure resistances up to 10,000 megohms using an external 10 mV voltage source. Also, the WV-511A can be used as an amplifier with a voltage gain of 150.

The circuit of the WV-511A is especially designed to be stable and to have low zero drift characteristics. After about 15 minutes "warm-up" the drift will be less than $\pm 2\%$ over a 24-hour period. Accuracy on all ranges is $\pm 3\%$ of full scale reading. Since the voltage drop on any range is only .010 volts for full-scale deflection, accurate current readings can be obtained at very low voltage levels.

The WV-511A is a practical easy-to-use instrument, and has the highly-sensitive measuring capabilities and other features usually found only in much more costly equipment. The instrument is well suited to many applications in the fields of electronics, chemistry, metallurgy, biology, medicine, radiation, and other sciences. Specific applications include measurement of the minute currents in devices such as vidicon, image orthicon, and photomultiplier tubes. Another common use is the electron-beam current measurements required in mass spectrometry applications.

MEGOHMETER	Measures up to 10,000 megohms using an external 10 mV supply.
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GENERAL

Isolation	Circuit ground isolated from chassis ground. Circuit ground may be floated up to ± 1000 V with respect to chassis ground.
Polarity	Positive or negative selected by push-button switches. Switches do not reverse the recorder output polarity. Meter can be set to zero center.
Connectors; Input	Three binding posts, input (red), input ground (white), chassis ground (black). Removable shorting link provided between input ground and chassis.

POWER REQUIRED

AC	120V or 240V, 50-60 Hz (switch provided for selection). Dissipation — approximately 2 watts.
Batteries	(Not supplied) Two packs, 10 batteries in each pack. Use 1.25 volt nickel cadmium rechargeable batteries. Drain—approximately 8 mA per pack.
Fuse	3AG, $\frac{1}{8}$ Amp.

Equipment Supplied

WG-443A shielded dual banana plug, 4-foot shielded 2-conductor cable, and alligator clips. Plug, for recorder output connector.

Accessory Available

WG-452A Rack Mounting Brackets (standard $5\frac{1}{4}$ " x 19").

MECHANICAL

Dimensions	Height $5\frac{1}{4}$ " (approx. 13.3 cm) Width 12" (approx. 30.4 cm) Depth $8\frac{1}{4}$ " (approx. 20.9 cm)
Weight	10 lbs. (approx. 4.5 Kg) (without batteries)

Super-Portable 3-Inch Oscilloscope

Type WO-33A

RCA

**Test Equipment
and Accessories**



Features

- Flat response to 5.5 MHz handles 3.58 MHz color TV signals with ease
- Exceptional sensitivity — .003 rms volt-per-inch for working with extremely low-level input signals
- Built-in calibration circuit and graph screen for direct reading of peak-to-peak voltages — as easily as with a VTVM
- Frequency compensated 3-to-1 vertical attenuators
- Supplied with shielded direct/low capacitance probe and cable
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA Super-Portable 3-Inch Oscilloscope will help you solve virtually any electronics servicing problem you may encounter inside or outside the shop. The low cost and high performance of the RCA WO-33A have made it popular as a monitor and trouble-shooting 'scope in black-and-white and color TV broadcasting studios, and in professional service shops.

High gain and exceptional bandwidth make this instrument ideal for general servicing and alignment work in black-and-white and color TV trouble-shooting, signal tracing, and measurement; for audio high-fidelity and stereo work; for all types of sweep alignment; and in all types of computer and industrial applications.

A novel feature of the WO-33A is the Vertical Input Attenuator which automatically switches the amplifier from Wide Band

to Narrow Band when in the three highest gain positions.

A phase control is provided for varying the phase of the internal sweep voltage when the "LINE" position of the H/SWEEP SEL control is used, enabling the WO-33A to be phased with an external line-frequency sweep oscillator.

The WO-33A is equipped with a specially designed, single-unit Direct/Low-Capacitance probe and cable (WG-349A). When the Low-Capacitance input is used a special high-impedance circuit in the probe is connected in series with the test point and the 'scope, reducing circuit-loading effects and permitting the WO-33A to be used in circuits which would not function properly if loaded down by a conventional oscilloscope.

Specifications

Note: Performance figures are for a line voltage of 117 V, 60 Hz.

Frequency Response:

Vertical Amplifier:

Wide-Band Positions (5.5 Hz to 5.5 MHz) ..flat within —3 dB

High-Sensitivity positions:

20 Hz to 150 kHzflat within —3 dB

3 Hz to 1.5 MHzflat within —6 dB

Horizontal Amplifier (3.5 Hz to 350 kHz)flat within —6 dB

Deflection Sensitivity:	(Wide-Band)		(High-Sensitivity)	
	position		position	
Vertical Amplifier	rms	p-p	rms	p-p
At V INPUT connector	0.10	0.3	.003	0.01 V/in
With WG-349A (Direct)	0.10	0.3	.003	0.01 V/in
With WG-349A (Low-Cap)	1.0	3.0	.03	0.1 V/in
Horizontal Amplifier (at H INPUT terminal)	0.9 rms V/in			
Rise Time (Vertical Amplifier)				
Wide Band MHz Positions	0.1 μ s			

Input Resistance and Capacitance:

Vertical Amplifier:

At V INPUT Connector 1 m Ω shunted by approx. 50 pF
With WG-349A

(Direct) 1 m Ω shunted by approx. 90 pF

(Low-Cap) 10 m Ω shunted by approx. 10 pF

Horizontal Amplifier (at H INPUT terminal) 10 m Ω

EXT SYNC Input Terminal 250 K Ω to 55 K Ω

Sweep Oscillator:

Frequency Range (continuously adjustable) .. 15 Hz to 75 kHz

Sync External, Positive and Negative Internal

Maximum AC Input Voltage (at Lo-Cap Probe):

(In presence of 400 V dc) 600 p-p V

Phase-Control Range 0 to 160 degrees

Power Requirements:

Voltage 105-125 V, 50-60 Hz

Average Power Consumption 50 W

Dimensions

Height 8 $\frac{3}{4}$ ", Width 6 $\frac{1}{2}$ ", Depth 10 $\frac{1}{4}$ ", Weight 14 lbs.

Equipment Supplied

WG-349A Direct/Low Capacitance Probe and Cable

Accessories Available

WG-350A Demodulator Probe for RF application from 500 kHz to 250 MHz; WG-271A Adaptor for using WG-300B Direct/Low-Capacitance Probe; WG-409A Vector Probe and Screen for use with color bar generator.

5-Inch Solid-State Oscilloscope

Type WO-505A

RCA

**Test Equipment
and Accessories**



Description

The WO-505A is a solid-state, inexpensive oscilloscope designed for general purpose use. Features such as a flat-face cathode-ray tube, return-trace blanking, illuminated graph screen, and camera mounting studs make this oscilloscope particularly well suited to industrial, laboratory, and servicing applications.

Frequency response of the vertical amplifier is flat, ± 1 dB, from DC to 5 MHz, and is usable up to 10 MHz. The oscilloscope has exceptionally high gain of 15 millivolts peak-to-peak per inch on the high-sensitivity range.

The sweep frequency is adjustable up to 1 MHz in 6 ranges, permitting lock-in of signals up to 10 MHz. The level of sync signal applied to the sweep oscillator is adjustable, so that synchronization is stable throughout the sweep range. Pre-set TV V and H sweep positions are provided for convenient television servicing. These positions insure automatic lock-in on

Specifications

Note: Performance figures are for a line voltage of 120 V, 60 Hz.

Frequency Response

Vertical Amplifier

DC function	DC to 5 MHz, ± 1 dB useable to 8 MHz
AC function	5 Hz to 5 MHz, ± 1 dB useable 5 Hz to 8 MHz

Horizontal Amplifier	3.5 Hz to 2 MHz
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Deflection Sensitivity

Vertical Amplifier

Direct Probe	15 mV P-P per inch
Lo-Cap Probe	150 mV P-P per inch

Horizontal Amplifier	0.4 V P-P per inch
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Vertical Deflection Plate

Terminals	40 V P-P per inch
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Rise Time

Vertical Amplifier	0.1 μ S
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Input Resistance and Capacitance

Vertical Amplifier

At V INPUT connector	1 M Ω shunted by 25 pF
With probe on "direct"	1 M Ω shunted by 75 pF
With probe on "Lo-Cap"	10 M Ω shunted by 14 pF

Horizontal Amplifier	1 M Ω shunted by 20 pF
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Sync Input Terminal	1 M Ω shunted by 20 pF
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Features

- All solid-state circuitry
- Flat-face 5" CRT
- Return-trace blanking
- Illuminated graph screen calibrated directly in volts
- Provision for connection to vertical deflection plates of CRT
- Regulated power supply prevents trace bounce; excellent stability
- Camera mounting studs
- DC vertical amplifier; DC/AC input
- High-frequency horizontal sweep; solid lock in on 5-MHz
- Useable response to 8 MHz
- Preset TV "V" and "H" frequencies for instant lock in
- Phase control
- Trace polarity reversal switch
- Built in square wave signal for calibrating P-P voltage measurements
- BNC "V" input connector
- High sensitivity (.05 V range)
- Full 12-month warranty on parts and labor... complete replacement parts availability

vertical and horizontal sync and blanking pulses. A separate phase control varies the phase of the sweep voltage when the "LINE" position of the sync or H amplifier switch is used. This control is used in TV alignment for phasing the oscilloscope sweep with the output of a sweep generator.

The vertical input attenuator and the graph screen are calibrated directly in volts so that the WO-505A can be used as a visual voltmeter. An internal calibrated voltage source is provided.

Terminals are located on the back of the case for direct connection through internal capacitors to the vertical deflection plates of the cathode-ray tube. This feature makes it possible to observe rf waveforms with frequencies higher than the bandwidth of the vertical amplifier.

The power supply of the WO-505A is regulated, preventing trace bounce due to line voltage fluctuations.

Sweep Oscillator

Frequency Range	10 Hz to 1 MHz
Preset Positions	30 Hz (TV V) 7875 Hz (TV H)

Maximum AC Input Voltage	600 V P-P (in presence of 400 V DC)
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Phase Control Range	0 to 180°
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Z-Axis Input

Minimum input voltage for blanking	12 V rms
Frequency Response	3 Hz-500 kHz

Power Requirements

Voltage	105-130 V
Frequency	50-60 Hz
Average Power Consumption	30 W

DIMENSIONS:

Height 11 $\frac{3}{8}$ in., Length 15 $\frac{1}{2}$ in., Width 9 in., Weight 25 lbs.

Equipment Supplied:

WG-400A Direct/Low Capacitance Probe and Cable, Alligator Clip, Clip Insulator, Instruction Book.

Accessories Available

WG 302B RF-IF-VF Signal Tracing Probe for RF applications from 500 kHz to 250 MHz.

WG-354A Capacitance-Type Voltage-Divider Slip-On Probe for use with WG-400A to extend the range so that signal pulse amplitudes up to 5,000 volts can be observed; WG-409A Vector Probe and Screen for use with color bar generator.

RF Signal Generator with Sweep Features

Type WR-50B

RCA

**Test Equipment
and Accessories**



Description

The RCA WR-50B RF Signal Generator is a highly versatile, readily portable test instrument designed for use in the shop or in the field for general television and radio servicing and other applications.

The unit is particularly useful in such applications as alignment and signal tracing of AM, FM, High-Fidelity and Citizens' Band receivers, alignment of low-frequency IF amplifiers in television receivers, and signal tracing and troubleshooting in nearly all sections of television receivers.

The 455 kHz and 10.7 MHz sweep positions make the WR-50B particularly useful for sweep alignment of both AM and FM receivers, especially since the introduction of several new AM-FM transistor radios in which sweep alignment of both circuits is recommended.

The variable oscillator covers the fundamental frequencies

Specifications

(Performance figure with line voltage at 120 volts, 60 Hz)

Sweep Output:

455 kHz and 10.1 MHz, center-frequencies
Sweep width approximately 10% of center frequency

Variable Oscillator:

Six Ranges (fundamental frequencies) 85 kHz to 40 MHz

RF Output (all ranges)¹ 0.05 V rms (minimum)

Dial Calibration Accuracy $\pm 2\%$

Internal Modulating Frequency Approx. 400 Hz

Percent Modulation Adjustable up to 30%

Audio Output At least 8 V rms across 15 k Ω load

External Modulation Modulating frequency, 15 kHz max.

Features

- Continuous coverage 85 kHz to 40 MHz in 6 overlapping ranges
- Built-in crystal calibrating oscillator circuit with front panel crystal socket
- Internal 400 Hz audio oscillator
- Sweep output at 10.7 MHz and 455 kHz with return trace blanking for sweep alignment of radio receivers
- Permanently attached shielded RF output cable with built-in DC blocking capacitors
- Modulation level control
- Two-step RF attenuator switch plus a continuously variable attenuator control
- Additional switch for further attenuation of the crystal oscillator output
- Audio output level control
- Easy-to-read dial scale
- Full 12-month warranty on parts and labor... complete replacement parts availability

from 85 kHz to 40 MHz in six ranges. For higher frequencies, harmonics of the high range can be used. A vernier tuning control permits precise setting of the output frequency. The RF output can be modulated with the internal 400 Hz oscillator, or with an external audio signal. The modulation level is adjustable.

A two-position attenuator switch, together with a variable attenuator control provide complete adjustment of the RF output level.

The crystal oscillator circuit in the WR-50B enables the instrument to be used as a crystal calibrator. A convenient crystal socket is provided on the panel. This crystal oscillator can be used as a frequency calibration reference for the variable oscillator, or can be used directly as a crystal-controlled signal source.

Crystal Oscillator²

Maximum Output 0.02 V rms
Internal Mod. Percentage Approx. 20%
Frequency Range 100 kHz to 15 MHz (Fundamental)

Attenuator

VFO and Sweep Output 2-step 10-to-1 attenuator switch with potentiometer for fine adjustment
Crystal Oscillator Output .. Additional 7-to-1 attenuator switch

Power Supply

Voltage Rating 105-130 V 50/60 Hz
Power Consumption 15 W

Dimensions

Height 7 $\frac{3}{4}$ ", Width 5 $\frac{3}{8}$ ", Depth 4 $\frac{3}{4}$ ", Weight 5 lbs.

¹Open-circuit value

²Varies with crystal cut and activity.

Sine/Square-Wave Audio Signal Generator

Type WA-44C

RCA

**Test Equipment
and Accessories**



Features

- Sine-wave or square-wave output from 20 Hz to 200,000 Hz
- High output voltages — 8 volts rms or more with rated load
- Separate 60 Hz output for intermodulation distortion measurements
- 10-to-1 step attenuator and continuously adjustable output control
- Durable, attractive brushed aluminum dial with etched lettering, and sturdy metal cabinet
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

Precision engineered and factory calibrated, the RCA WA-44C Sine/Square-Wave Audio Signal Generator is a high-quality instrument designed for use in audio, high-fidelity and general electronic applications as well as in electronics training, demonstrations, and laboratory work. Covering a range from 20 Hz to 200,000 Hz, the WA-44C is also useful in testing ultrasonic equipment.

Application for this instrument including measuring frequency response of amplifiers determining resonant frequencies of loudspeakers, tuning loud-speaker enclosures, finding input and output impedances, determining values

of unknown inductors and capacitors, and measuring intermodulation distortion.

Operation of the WA-44C is straightforward. The desired frequency is selected by means of the continuous, single-scale frequency dial, together with the appropriate multiplier indicated on the "FREQ RANGE" switch. The type of wave and the amplitude are selected by means of the "SINE-SQUARE" attenuator switch. The output voltages can be adjusted further with the continuously adjustable "OUTPUT" control. A separate output at line frequency is also provided, and output voltage is adjustable up to 6 volts.

Specifications

Note: Performance figures are for a line voltage of 117 V, 60 Hz.

Frequency Range20 Hz to 200 kHz

Amplitude Variation of Output Voltage:
(30 Hz to 100 kHz)±1.5 dB

Frequency Stability:
(105 to 125 volts AC line)±2%

Dial Calibration Accuracy:
(20 Hz to 20 kHz)±5%

Sine Wave:
Output Voltage:
(*100 K Ω and 75 pF load)8 rms V or more

Maximum Total Harmonic Distortion:
(30 Hz to 15 kHz)0.5%

Maximum Hum:
(Percent of rated output voltage).....Less than 0.1%

Square Wave:
Output Voltage:
(*100 K Ω and 75 pF load)10 p-p V or more

Power Supply:
Voltage105-125 V, 50-60 Hz
Power Consumption.....Approx. 40 W

Dimensions:

Height 7", Width 10 $\frac{1}{16}$ ", Depth 6 $\frac{1}{8}$ ", Weight 10 $\frac{1}{2}$ lbs.

*A lower impedance may decrease the output voltage and slightly increase distortion.

Transistorized Sine/Square Wave Audio Signal Generator

Type WA-504A

RCA

**Test Equipment
and Accessories**



Features

- All solid-state — including MOSFET oscillator stage
- Switch selection of sine-wave or square-wave output
- Wide frequency range — 20 Hz to 200,000 Hz
- High output voltages — 10 volts rms or more with rated load
- Low distortion — 0.25% or less over the audio frequency range
- Essentially flat output voltage — ± 1.5 dB from 30 Hz to 100,000 Hz
- Attached, shielded output cable
- 10-to-1 step attenuator and continuously adjustable output control
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

Precision engineered and factory calibrated, the RCA WA-504A Transistorized Sine/Square-Wave Audio Signal Generator is a compact, high-quality instrument designed for use in audio, high-fidelity and general electronic applications as well as in electronic training, demonstrations, and laboratory work. Covering a range from 20 Hz to 200,000 Hz, the WA-504A is also useful in testing ultrasonic equipment.

Applications for this instrument include the measurement of frequency response characteristics of amplifiers, determining resonant frequencies of loudspeakers, tuning loudspeaker enclosures, finding input and output impedances, determining values of unknown inductors and capacitors, and determining the frequency or speed of vibrating or rotating objects. The WA-504A facilitates the testing and

servicing of equipment employing audio or ultrasonic signals.

The RCA WA-504A Sine/Square Wave Audio Generator provides a tunable sine or square wave audio-frequency signal ideally suited for service, industrial, and educational applications. The frequency range extends from 20 Hz to 200,000 Hz.

New solid-state circuit design using six transistors, including an MOS transistor, and two diodes produces a stable signal with an amplitude variation not exceeding ± 1.5 dB from 30 Hz. Total harmonic distortion of the sine wave is less than 0.25% from 30 Hz to 15,000 Hz.

The generator has an attached shielded output cable.

Specifications

Performance figures for line voltage of 120 V, 60 Hz

General

Frequency Range 20 Hz to 200 kHz (four ranges)
Amplitude Variation of Output Voltage
(30 Hz to 100 kHz) ± 1.5 dB
Frequency Stability (105 to 130 volts AC line) $\pm 0.5\%$
Dial Calibration Accuracy (20 Hz to 20 kHz) $\pm 5\%$, or 2 Hz,
whichever is greater

Sine Wave

Output Voltage (100k Ω , 75 pF load) 10 V rms or more
Maximum Total Harmonic Distortion
(30 Hz to 15 kHz) 0.25%

Square Wave

Rise and Fall Time (Maximum output) less than 1.0 μ s
Maximum Tilt less than 5.0%
Output Voltage 10 V p-p or more

Power Supply

Voltage 105-130 V, 50-60 Hz, Average Power Consumption
Approx. 8 watts.

Dimensions

Height 7 $\frac{3}{4}$ ", Width 5 $\frac{3}{8}$ ", Depth 4 $\frac{3}{4}$ ", Weight 3 lbs.

Stereo FM Signal Simulator

Type WR-52A

RCA

**Test Equipment
and Accessories**



Description

The WR-52A Stereo FM Signal Simulator is designed to generate the signals necessary for service, alignment and maintenance of Mono and Stereo FM receivers and multiplex adaptors. In addition to its value as a service instrument, the three low-distortion sine-wave frequencies, the crystal controlled 19 kHz and 38 kHz frequencies, the adjustable 100 MHz carrier make the WR-52A an extremely useful test instrument for FM broadcasters and manufacturers of stereo FM equipment.

A meter is included on the instrument to indicate the RF deviation of the FM signal from 0-75 kHz (75 kHz deviation represents a modulation level of 100%).

Separate color-coded scales are provided for stereo and mono. A calibration mark is also provided on the meter for convenient and accurate adjustments of the 19 kHz subcarrier level.

The RCA WR-52A Stereo FM Signal Simulator provides the following signals:

- Composite stereo output signal for either left or right channel.
- FM stereo output for either left or right channel. The 100 MHz FM carrier is adjustable to permit selection of a quiet point in the FM band. The RF deviation is adjustable from 0 to 75 kHz.

Specifications

RF Signal Output:

Carrier	100 MHz
Center Frequency adjustable	± 800 kHz
Subcarrier	19 kHz*
FM Modulation	Left stereo signal, Right stereo signal, Internal Test (L + R subcarrier modulation), Monaural FM
Deviation	Adjustable 0 to 75 kHz
Sweep Signal	
Center Frequency	100 MHz
Rate	60 Hz
Sweep Width	Adjustable 0 to more than 750 kHz
RF Output Voltage	Adjustable up to 0.1 V, rms (approx.)

Composite Signal:

Output	Left stereo signal, Right stereo signal, Internal Test (L + R subcarrier modulation), 400 Hz, 1 kHz, 5 kHz, 19 kHz*
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Features

- RF output — connects to receiver antenna terminals
- 100 MHz carrier, tuneable
- Choice of FM signals — Left Stereo, Right Stereo, Monaural FM, internal test and 60 Hz FM sweep
- FM stereo deviation adjustable from 0 to 75 kHz
- RF Output attenuator
- RF Deviation Meter
- Composite Stereo Output
- Choice of Left Stereo and Right Stereo signals
- Crystal-Controlled 19 kHz Subcarrier
- 7 Sine Wave Frequencies
- Full 12-month warranty on parts and labor... complete replacement parts availability

- Monaural FM output. A switch is provided to disable the 19 kHz oscillator for low-distortion mono FM output.
- 100 MHz sweep output to check receiver RF/IF alignment. Sweep rate is 60 Hz. Sweep width is adjustable from 0 to more than 750 kHz.
- Audio output signals of 400 Hz, 1000 Hz, and 5 kHz.
- Crystal-controlled 19 kHz and 38 kHz signals for multiplex circuit adjustment.
- 67 kHz and 72 kHz output signals for SCA trap circuit adjustments.
- Special Internal Test output to check phase adjustment of WR-52A stereo signal.

The left and right composite stereo signals, left and right FM stereo signals, and mono FM signals can be modulated with the internal 400 Hz, 1000 Hz, or 5 kHz frequencies. Binding posts are provided so that other AF modulating signals can be applied from an external source. A control is provided for attenuating the level of the RF output.

The WR-52A comes complete with two connecting cables. A direct unterminated cable is for use with the composite stereo signal and audio signal outputs, and a terminated cable for RF output to a 75 ohm or 300 ohm receiver antenna input.

Audio Output	38 kHz*, 67 kHz, 72 kHz
Percent distortion of 400 Hz, 1 kHz, and 5 kHz Frequencies	Less than 2%
Composite Signal/Audio Output Level	Adjustable from 0 to at least 9 V p-p, open circuit; Output source impedance approx. 5000 Ω
Power Supply:	
Voltage	115 to 125 V, 60 Hz
Power Consumption	40 W

Dimensions

Width 13½", Height 10", Depth 8", Weight 12¾ lbs.

Equipment Supplied

Direct Output Cable, RF Output Cable (terminated), Instruction Book.

*19 kHz and 38 kHz signals are crystal-controlled. Accuracy within ± 2 Hz.

Mini Chro-Bar Solid-State Color Bar Generator

Type WR-508A

RCA

**Test Equipment
and Accessories**

Features

- Provides color bar, dot, crosshatch, and blank raster patterns
- All solid-state circuitry, including IC's
- Pattern signals, RF output frequency, and color subcarrier all crystal-controlled
- Compact size — lightweight
- Battery operated. Convenient slide-out battery compartment, AC adapter available
- Solid patterns — no flicker. Three special pattern adjust controls on rear panel for easy reset, if required
- Full 12-month warranty on parts and labor... complete replacement parts availability



Description

The small size and light weight of the RCA WR-508A MINI CHRO-BAR Generator make the unit ideal for portable use. The instrument is battery operated, using a single 4.2 volt mercury battery. A slide-out compartment is located on the rear panel for convenient battery replacement. An accessory AC adapter, the WG-425A, is available separately for operating the generator from a standard 120-volt, 60 Hz power line outlet.

New crystal-controlled solid-state circuitry, including integrated-circuit devices, is especially designed to provide stable patterns with no flicker. Special pattern adjustment controls are provided on the rear panel. If the circuit should require readjustment, these controls can be reset quickly and easily using only a properly operating TV receiver.

Ten color bars are provided simultaneously in the color bar pattern, including R-Y, B-Y, G-Y, I and Q signals, spaced

at 30 degree phase intervals. This pattern is for use in checking color phase and matrixing circuits, and adjusting the automatic frequency phase control (AFPC). Narrow brightness pulses are added at the edges of each color bar to aid in checking the color "fit" or registration of the brightness and color signals.

The dot pattern is used primarily in convergence adjustment. The pre-shoot and over-shoot areas (small black edging preceding and following each dot) can be used to estimate the overall quality of the receiver alignment. The cross hatch pattern is for use in adjusting linearity in both black and white and color receivers, and as an alternate pattern for adjusting convergence. Consisting of a fixed number of vertical and horizontal lines, this pattern can also be used to check receiver overscan adjustment. The blank raster function is useful for both purity and color temperature adjustment.

Specifications

(All signals crystal-controlled)

RF Carrier.....picture carrier 61.25 MHz (ch. 3)

Output Voltage.....10,000 micro-volts approx.

Horizontal Sync.....15804 Hz

Color Subcarrier.....3,563.741 kHz, ± 20 cycles, keyed at 189 kHz

Output Impedance.....approximately 300 ohms

Test Patterns.....color bars (variable chroma level)
dots
cross hatch
blank raster

Battery.....unit powered by one 4.2-volt mercury battery, RCA VS133 or equiv.

Dimensions

Width 6½"; Height 3"; Depth 4"; Weight 19.5 oz.

Master Chro-Bar IC Color Bar Generator/Signalyst

Type WR-515A

RCA

**Test Equipment
and Accessories**

Features

- IC circuitry throughout...provides excellent pattern stability. No counter alignment controls to adjust
- Output at RF, IF, and video on all patterns for TV servicing. The video output is adjustable up to 2 volts across 75 ohms for use in CCTV, CATV, and MATV
- RCA's exclusive Superpulse pattern for simplified gray scale tracking adjustment, testing for picture smear, and troubleshooting by signal tracing and signal injection
- RCA's exclusive color-bar marker identifies the third, sixth, and ninth color bars... aids in AFPC alignment and setting the tint control in overscanned sets
- Pushbuttons provide color bars, dots, lines, crosshatch, and blank (white, no noise) raster patterns with provision for selecting three or ten horizontal and/or vertical lines with middle of pattern electrically centered
- 75-ohm or 300-ohm variable level RF, IF, and video output with + or - video sync polarity
- Stability... 75°F ±70°F; 120-volts AC ±30-volts AC
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The WR-515A Master Chro-Bar Generator is the most advanced "color-bar" generator ever developed by RCA. The many new features and functions of this unique instrument introduce entirely new concepts in color TV set-up and servicing procedures.

Digital IC circuits are used in the WR-515A to provide solid, stable patterns with no flickering or weaving. All signals are derived from crystal-controlled oscillators. There are no counter-alignment controls that require adjustment.

The WR-515A provides the test signals required for adjusting convergence, color-phasing, gray-scale tracking, purity and linearity of color television receivers. Patterns include bars, dots, crosshatch, horizontal and vertical lines, and blank raster. The vertical and horizontal patterns can be selected in groups of three or ten lines. The vertical line and dot brightness are adjustable.

Output for all test signals is provided not only at RF (Channel 3*) but also at IF and video. This choice of output frequency provides servicing capabilities not possible with other generators. Now you can use the output signals in stage-by-stage troubleshooting techniques. By applying the signals at various points throughout the receiver, you can localize, or isolate, the defective stage. This technique can be particularly helpful in locating defective stages in the new "modular" TV sets.

The video output is low-impedance and will drive a 75-ohm video amplifier for CCTV, MATV, and CATV applications. The output level of RF, IF, or video signals is adjustable.

An exclusive RCA pattern called "Superpulse" has been included with the WR-515A. This signal provides a white rectangle horizontally centered on the screen.

Specifications

Note: All signals are crystal-controlled.

RF OUTPUT	Picture carrier 61.25 MHz (ch. 3)*
Impedance	75Ω or 300Ω
Level	Adjustable up to 50 millivolts (across 300 ohms)
IF OUTPUT	45.75 MHz
Impedance	75Ω or 300Ω
Level	Adjustable up to 50 millivolts
VIDEO OUTPUT	
Impedance	75Ω or 300Ω
Level	Adjustable up to 2 volts (across 75 ohms)
Sync Polarity	Choice of Positive (+) or Negative (-)
TEST PATTERNS	
Color Bars	(Variable Chroma Level)
Dots	
Crosshatch (H & V)	Select pattern with 3 or 10 H & V lines**
Horizontal Lines	V line and dot brightness are adjustable
Vertical Lines	with panel control.
Blank Raster	(Sync Modulation Only)
Superpulse	White rectangle horizontally centered on screen. Provides pulse-type waveforms for receiver adjustment and troubleshooting.



The Superpulse has many applications, including drive and screen control adjustment (gray-scale tracking), and checking for picture problems, such as smearing, ringing, and video peaking. For troubleshooting, you can inject the Superpulse signal at the RF, IF, or video test points; then with an oscilloscope, trace the waveform through the receiver to locate the defective stage.

The color bar pattern provides ten bars simultaneously, including R-Y, B-Y, G-Y, I and Q signals, spaced at 30 degree phase intervals. This pattern is for use in checking color phase and matrixing circuits, and adjusting automatic frequency phase control (AFPC). Narrow brightness pulses are added at the edges of each color bar to aid in checking the "fit" or registration of the brightness and color signals.

A special color bar "mark" function places a brightness line on the 3rd, 6th, and 9th bars (red, blue and bluish green) for identification of the bars in color bar pattern. This is extremely helpful for servicing overscanned sets, AFPC alignment, and setting tint control.

The WR-515A is operated from a standard 120-volt, 60 Hz power line. Accessories supplied include a shielded output cable, a 300-ohm matching transformer unit for RF output, and a direct output accessory for IF and video applications. Leads are also provided for connection to picture tube control grids for use with the grid-shortening switches. A bracket is located in the rear of the Chro-Bar for convenient storage of the test leads.

The instrument is housed in a metal case with a rugged aluminum panel and carrying handle. Pushbuttons are used for all switch functions. The instrument measures 4 inches by 10 inches by 8 inches, and weighs approximately 6 pounds.

OTHER SIGNALS

Color Bar MarkBrightness line on leading edge of 3rd, 6th, and 9th color bars (red, blue, and bluish-green)

POWER REQUIREMENTS120 V ±30 V, 60 Hz, 5 watts

TEMPERATURE RANGE75°F ±70°F

DIMENSIONS

Width10 inches (25 cm)
Height4 inches (10 cm)
Depth8 inches (20 cm)
WeightApproximately 6 lbs. (2.7 kg)

Accessories supplied:

- Shielded cable, with BNC connectors, WG-427A
- Direct Adapter, WG-430A
- Matching Transformer, (300Ω), WG-451A
- Cable, for gun-killer

Also provided: application booklets on color TV set-up and service with the WR-515A.

* The WR-515A can be operated on channel 4 by replacing a crystal.

** Number of V and H lines generated is actually 3 or 11. The number of V or H lines observed will vary with receiver overscan adjustment.

TV Sweep Chanalyst

Type WR-514A

RCA

**Test Equipment
and Accessories**



Description

The WR-514A TV Sweep Chanalyst has the combined features of a sweep generator, marker generator, and marker adder. RF, IF, video and ChromAlign output sweep signals permit alignment of VHF tuners, IF amplifiers, video amplifiers, and color bandpass amplifiers.

Seven crystal-controlled, IF markers are provided to identify points on the sweep curve. Marker frequencies are 4.5 MHz, 41.25 MHz, 41.67 MHz, 42.17 MHz, 42.67 MHz, 45.75 MHz, and 47.25 MHz. If desired, an external marker generator can be used to provide markers at other frequencies. A "spare" marker function can be used to provide another marker at any frequency from 39 to 50 MHz when a crystal of the desired frequency is inserted. This system of adding the markers prevents distortion of the sweep curve caused by marker overload. The marker signals are also available directly through a panel connector. Audio modulation can be applied to the signals when the signal is used separately for applications such as trap alignment.

RCA's exclusive ChromAlign chroma sweep signal, combining a 45.75 MHz carrier and an IF sweep signal is provided for aligning color bandpass amplifiers. Both the sweep level and carrier level are adjustable, so that the circuit can be aligned

Specifications

(Measured at 120 V, 60 Hz line)

Sweep Output Frequency

TV Channels	2 through 13
IF/Video	approx. 50 kHz-50 MHz
FM	88-108 MHz
ChromAlign Chroma Sweep Signal	45.75 MHz
	crystal-controlled
	carrier with IF
	sweep signal

Marker Frequencies.....4.5 MHz sound IF; 41.25 MHz sound carrier; 41.67 MHz chroma bandpass; 42.17 MHz color subcarrier; 42.67 MHz chroma bandpass; 45.75 MHz picture carrier; 47.25 MHz adjacent sound.
39-50 MHz spare (internal crystal must be added)

External Marker Input Frequenciesfrom 1 MHz to 250 MHz (from separate source)

AF Modulationapprox. 400 Hz

Maximum Output Voltage

TV, IF/Video, FM0.1 V or more

Attenuator Range

RF/IF/Video60 dB

20

Features

- Fundamental sweep output on all VHF TV channels
- Video and IF sweep output for IF amplifiers, video, and chroma circuits
- New ChromAlign chroma sweep signal
- Seven crystal IF markers for checking IF picture, sound, video, and color bandpass
- Built-in solid-state marker-adder for clean displays. Distortion-free sweep/marker displays
- High, flat sweep output voltage at least 10 MHz wide on VHF channels
- On-off blanking control
- Balanced, 300-ohm RF output from low-leakage piston attenuator
- Sweep output on FM band from 88 to 108 MHz
- Full 12-month warranty on parts and labor... complete replacement parts availability

at the signal levels specified in the receiver manufacturer's service data.

RF sweep output is provided for each of the 12 VHF television channels. The sweep width of the RF, IF, and video sweep signal is continuously adjustable.

Output voltage of all sweep signals at the maximum setting of the attenuator is at least 0.1 volt RMS. Maximum variation of output amplitude is 0.1 dB/MHz over any 10 MHz portion of the sweep signal, assuring an accurate display of circuit bandpass characteristics.

The WR-514A also provides FM sweep output from 88 to 108 MHz in two ranges. The sweep width is adjustable up to 20 MHz. A sweep signal in the 10.7 MHz FM IF range is also available. Markers in this frequency range can be applied using an external RF signal generator.

Return-trace blanking is included in the WR-514A to provide a zero-reference line during alignment. A trace reverse switch is provided for selection of horizontal sweep direction so that frequency markers are in proper sequence as illustrated in TV service manuals.

A switch is also provided for bypassing the demodulated signal amplifier, connecting the signal directly to the oscilloscope. This permits the vertical gain of the sweep trace to be calibrated.

Maximum Variation of Output Voltage

All TV Channels0.1 dB/MHz over any 10 MHz portion of sweep range.

Sweep Width (continuously adjustable)

TV Channels }
IF/Video and FM }greater than 10 MHz

Output Cable Terminations

RF Output Cable300 ohms balanced
IF Video-Adapter75 ohms

Equipment Supplied

1 RF Output Cable, type WG-426A; 3 Direct Cables, type WG-427A; 1 Connector Adapter, type WG-428A; 1 VF/IF 75-ohm Adapter, type WG-429A; 2 Direct Cable Adapters, type WG-430A.

Accessories Available

WG-431A General Purpose RF Demodulator Probe, WG-433A Mixer Input Adaptor, WG-434A Video/Chroma Bandpass Detector, WG-435A Link Detector, WG-402A General Purpose Probe Kit, WG-438A Connector Adaptor (male BNC to male microphone connector), WG-440A 39.75 MHz Crystal (for use in spare socket). Provides marker for trap alignment of TV receivers.

Dimensions:

Width 13 $\frac{5}{8}$ " ; Height 10" ; Depth 7"

Weight (approx.)17 lbs. net.

Crystal-Calibrated Marker Generator

Type WR-99A

RCA

**Test Equipment
and Accessories**



Description

The RCA WR-99A Crystal-Calibrated Marker Generator combines in one instrument the functions of a multiple-marker generator, crystal calibrator and a heterodyne frequency meter. Featuring extreme accuracy and stability over a wide frequency range, the WR-99A is ideal for servicing and aligning color and black-and-white TV receivers, communications and other equipment operating in the frequency range of 19 to 260 MHz.

When used as a heterodyne frequency meter, the frequency of an unknown signal can be quickly measured by feeding it into the instrument and reading the frequency directly from the dial.

The WR-99A includes crystal-controlled 10 MHz and 1 MHz oscillators for calibrated accuracy. The VFO frequency as well as the frequency of an external signal may then be checked against internal calibrating beats at 1 or 10 MHz intervals throughout the tuning range.

Specifications

RF-Output Frequencies (fundamentals) ... 19-260 MHz (8 ranges)	
Crystal-Controlled	1 MHz
	4.5 MHz
	10 MHz
Output Voltages:	
VFO Ranges	At least 0.1 V rms
Output Cable Impedance	90 Ω
10-MHz Crystal Calibrator:	
Accuracy	$\pm 0.01\%$
Number of 10-MHz Check Points	242
1-MHz Calibrator:	
Accuracy	$\pm 0.01\%$

Features

- Continuous tuning, 19 to 260 MHz in 8 ranges
- Matched-impedance pad-type attenuator
- Highly stable, fundamental output — no beat frequencies or harmonics used
- Provision for external marker crystals or LC circuits
- Separate crystal check points at 1 MHz or 10 MHz intervals provide accurate calibrating beats throughout entire frequency range
- Internal modulation frequencies — 1 MHz or 10 MHz, 4.5 MHz, a combination of 4.5 MHz and 600 Hz, and 600 Hz
- Most-used television IF and RF frequencies specially marked on dial scale
- Dual sound-and-picture-carrier markers
- Full 12-month warranty on parts and labor ... complete replacement parts availability

A switch-type attenuator in the WR-99A provides attenuation in continuous steps over a range of 60 dB on all frequencies. Double shielding of the oscillator reduces leakage to well below the full attenuated signal; permitting control of marker amplitude right down to the noise level of TV receivers. A special coaxial cable is provided with the unit for coupling into the test circuit.

The VFO signal also may be modulated internally with both 4.5 MHz and 600 Hz, a useful feature for adjustment and alignment of sound-IF amplifiers and detectors. The 4.5 MHz signal produces dual sound and picture markers; the 600 Hz modulation will produce a horizontal-bar pattern when the output signal is set to the frequency of the picture carrier or picture intermediate frequency. The 4.5 MHz output signal may be modulated with 600 Hz for visual alignment of the detector.

Number of 1-MHz Check Points	24
4.5 MHz Crystal Oscillator:	
Accuracy	$\pm 0.02\%$
Internal Modulation	1, 10, 4.5 MHz and 600 Hz

Power Supply

Voltage 105-125 V, Frequency 50-60 Hz, Power Consumption 45 W.

Dimensions

Height 10", Width 13½", Depth 7", Weight 17 lbs.

Equipment Supplied

1 Output cable, 1 red and 1 black phone tip, instruction book.

RF/IF/VF Marker Adder

Type WR-70A

RCA

**Test Equipment
and Accessories**



Features

- Reduces distortion of marker or sweep curve due to overloading or clipping
- Permits trap circuit alignment without marker "suckout"
- Complete front panel control of marker shapes, marker amplitude, marker polarity, sweep amplitude, and sweep trace polarity
- Built-in attenuator for use during IF and video alignment
- Power supply voltage stabilized for rock-steady trace display
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WR-70A RF/IF/VF Marker Adder is designed for use in RF, IF and video-sweep frequency alignment of both color and black-and-white TV receivers. Designed for use with conventional markers and sweep generators such as the RCA WR-39, WR-89 and WR-99 series calibrators and the WR-59 and WR-69 series Sweep Generators, the WR-70A produces clean, narrow markers on the sweep-response curve displayed on an oscilloscope.

A choice of four different marker shapes is available with the WR-70A; (1) positive peak, (2) negative peak, (3) positive and negative peaks (wide band), (4) positive and negative peak (narrow band). Sweep-trace polarity and amplitude may also be adjusted.

During alignment, the marker signal is added to the sweep-response curve in the WR-70A after the demodulated sweep

signal is taken out of the receiver under test. The WR-70A system of adding markers to the response curve eliminates distortion due to overloading or clipping.

Included in the WR-70A is a built-in attenuator for use during if and video alignment. The attenuator provides for continuous adjustment of the sweep signal over a range of approximately 60 dB.

The WR-70A utilizes a special electron-tube regulator circuit to stabilize the B+ voltage and thus insure exceptional trace stability and freedom from trace jitter and bounce.

Four coaxial cables are provided with the Marker Adder for connection to the sweep and marker generators, the oscilloscope, and to the input and output circuits of the TV receiver under test.

Specifications

Input Frequencies:

IF/VF SWEEP IN connectors	50 kHz to 50 MHz
RF-input connectors	50 MHz to 250 MHz

Minimum input voltages*

IF/VF SWEEP IN connector	0.1 V rms
RF SWEEP SAMPLE IN connector	0.005 V rms
MARKER IN connector	0.1 V rms

Maximum output voltage (Measured at SCOPE VERT connector):

Marker signal	2.5 V rms
Demodulated sweep signal	10 V p-p

Power supply characteristics:

Input voltage	105-125 V
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Power supply characteristics:

Input voltage	105-125 V
Frequency	50-60 Hz
Power Consumption	25 W

Dimensions: 7½" high, 10½" wide, 6¼" deep, Weight 8 lbs.

Equipment supplied:

3 Jumper Cables, Pick-up Cable, Instruction Book.

*These are minimum values required to produce a useable output marker.

In-Circuit/Out-of-Circuit Transistor Tester

Type WT-501A

RCA

**Test Equipment
and Accessories**



Features

- Battery operated — completely portable
- Tests both high-power and low-power transistors
- Measures NPN and PNP transistors (I_{cbo}), (I_{ceo}), and DC beta
- Adjustable collector current permits most transistors to be tested at their rated current level
- Front panel NPN and PNP sockets for convenient matching in complementary symmetry applications
- Reliable in-circuit testing of transistor current gain
- Includes zero control to cancel the effect of leakage on in-circuit current gain reading
- Tests relative front-to-back ratio of diodes at appropriate current levels
- Mirrored scale
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

Completely portable and requiring no external power source, RCA's WT-501A tests transistors both in-circuit and out-of-circuit, tests both low and high-power transistors, and has both NPN and PNP sockets to allow convenient transistor matching for complementary symmetry applications. Three color-coded test leads are provided for in-circuit testing. Special low-impedance circuitry assures reliable in-circuit testing.

The instrument is designed to test transistors for DC beta from 1 to 1000, collector-to-base leakage (I_{cbo}) as low as two microamperes, and collector-to-emitter leakage (I_{ceo}) from 20 microamperes to one-ampere. Collector current is adjustable from 20 microamperes to one-ampere in four ranges, permitting most transistors to be tested at their rated current level.

Power transistors can be tested with I_c up to one-ampere. A DC forward current transfer ratio curve can be plotted. The instrument can also test the relative in-circuit DC current gain of a transistor.

A 100 microampere meter movement is used in the measuring circuits for the various test functions, and precision resistors are used to insure accurate test results. Normal maintenance includes only replacing the batteries as necessary.

The WT-501A is also a convenient instrument for making a check of the relative front-to-back ratio of diodes. An important feature is the ability to check the diode at an appropriate current level.

Specifications

DC Beta (h_{FE})
 Range 1 to 1000
 Accuracy $\pm 5\%$
 Collector Current (I_c) 100 μA to 1 Amp. in four ranges
 Collector-to-Base Leakage (I_{cbo}) 0 to 100 μA

Collector-to-Emitter (I_{ceo}) 0 to 1 Amp.
 Battery Voltage two $1\frac{1}{2}$ V "D" cells, RCA VSO36 or equiv.

Dimensions

Height $6\frac{7}{8}$ ", Width $5\frac{1}{4}$ ", Depth $3\frac{1}{8}$ ", Weight $2\frac{3}{4}$ lbs.

Color/Black-and-White Picture Tube Tester

Type WT-509A

RCA

**Test Equipment
and Accessories**



Features

- Tests over 1,000 color and B&W picture tubes for emission quality, interelectrode leakage, and shorted elements
- Includes "activate" function to improve performance of some low-emission tubes
- Supplied with five test sockets including unique "universal" test adaptor which can be used with any type of tube or socket arrangement
- Includes sensitive adjustment to establish proper cut-off point for each tube
- All solid-state — triac device controls internal voltage for accurate testing regardless of variations of line voltage
- Input jack for high voltage probe — measures picture tube anode voltage up to 50,000 volts
- Includes 1500 volt input to measure picture tube grid and cathode voltages
- Comes complete with sturdy, luggage type carrying case with convenient storage compartment
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The WT-509A is a precision instrument that tests both color and black-and-white picture tubes for emission quality, inter-electrode leakage, and shorted elements. Complete solid-state circuitry is used, including a triac device for controlling internal voltages. Test data is provided for testing more than 1000 picture tube types.

Five socket adaptors are supplied, including a versatile "universal" adaptor that can be connected to the base of any picture tube.

Socket Adaptors

Five socket adaptors are provided with the WT-509A, permitting most tubes commonly found in both black and white and color TV receivers to be tested. The socket to use for a particular tube is noted in the Test Data Booklet. The sockets are identified by a number, Sockets 1, 2, 3, 4, and 7 are provided with the Tester. Sockets 5 and 6 are available as accessories, and can be ordered from your local RCA Test Equipment Distributor, using the stock numbers listed at right (use socket specified in test data chart E1 255, supplied with instrument).

A sensitive cut-off adjustment establishes the proper cut-off point for testing each tube. The internal B+ and bias voltages of the Tester are regulated to assure an accurate and reliable test of picture tube performance.

A special "activate" function is provided to improve the performance of some low-emission tubes. Additional features of the WT-509A include a 50,000 DC volt range for use with an RCA WG-297 High-Voltage Probe to measure picture tube anode voltage. A 1500 volt input is also provided for measuring picture tube electrode voltages.

Socket	Stock No.
1.....	WG-421 V1
2.....	WG-421 V2
3.....	WG-421 V2
4.....	WG-421 V4
5.....	WG-421 V5
6.....	WG-421 V6
7	WG-421 V7 (Universal Socket Adaptor)

Solid-State Regulated DC Power Supplies

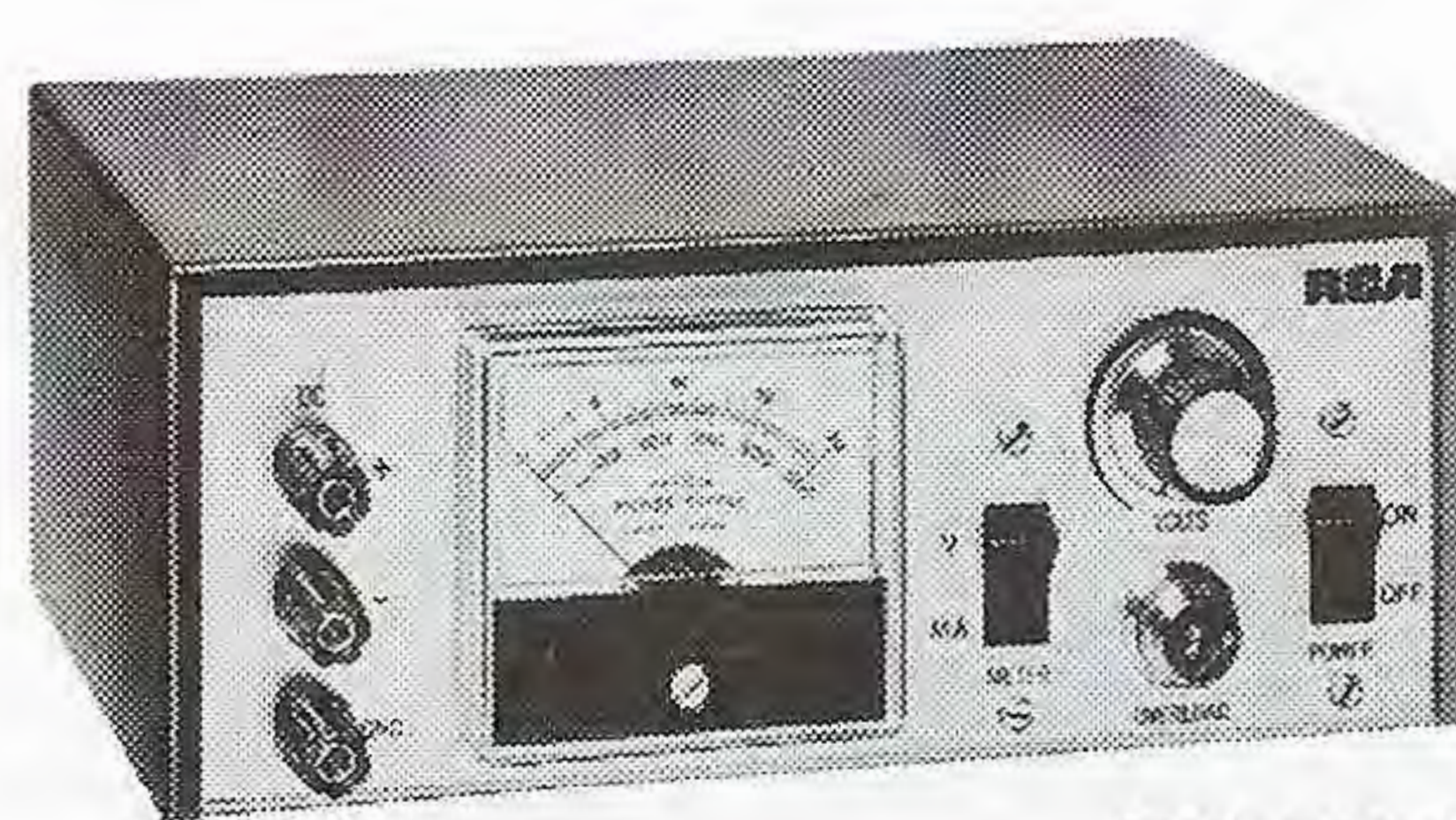
Types WP-700A, WP-702A, WP-703A, WP-704A

RCA

**Test Equipment
and Accessories**



WP-700A



WP-703A
WP-704A



WP-702A

Features

- All solid-state circuitry
- Continuously adjustable voltage output down to 0 volts
- Electronic short-circuit protection — short across the output terminals won't harm the supplies
- Front-panel overload-indicator lamp signals when maximum current condition is approached
- Negative feedback regulator circuit maintains constant output voltage with low ripple
- Compact and lightweight
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The WP-700A, 702A, 703A, and 704A are solid-state, constant voltage dc power supplies. These versatile bench-type supplies are ideally suited for use in circuit design, servicing, industrial, and educational applications. Typical applications include developmental transistor or integrated circuit projects, production line testing of dc operated equipment, industrial maintenance, life testing of devices that require a dc supply, and classroom use.

The WP-700A and WP-702A circuits are identical, except that the WP-702A is a dual unit, with separate controls, output terminals, and meters for each section. The two sections of the WP-702A are electrically isolated from each other.

Output voltage of the WP-700A and WP-702A is continuously adjustable from 0 to 20 volts, at current levels up to 200 milliamperes.

Output voltage of the WP-703A is continuously adjustable from 0 to 20 volts at current levels up to 500 milliamperes.

Specifications

	WP-700A WP-702A	WP-703A	WP-704A
Output	0 to 20V 0 to 200 mA	0 to 20V 0 to 500 mA	0 to 40V 0 to 250 mA
Input	105V-135V 50-60 Hz	110V-135V 50-60 Hz	110V-135V 50-60 Hz
Line Regulation	30 mV (Max. change in output with power-line variation of 110 to 135 V ac)	7 mV	15 mV
Load Regulation	less than 50 mV (Max. change at rated load)	less than 10 mV	less than 20 mV
Ripple	less than 500 uV rms	less than 200 uV rms	less than 200 uV rms
Meter Functions	0 to 20V 0 to 200 mA	0 to 20V 0 to 500 mA	0 to 40V 0 to 250 mA
(Function selected with panel switch)			

The output voltage of the WP-704A is adjustable from 0 to 40 volts at current levels up to 250 mA.

Overload current is limited to prevent damage to the power supplies. No damage will occur even if connected to an external short circuit. A special overload indicator panel lamp will begin to glow when the current approaches the maximum rated level.

A meter is provided to indicate either output voltage or current level. The meter function is selected by a convenient panel switch.

All silicon transistors and diodes are used in the four supplies. Circuit design features include a negative feedback circuit to maintain constant output voltage with low ripple regardless of varying line.

Three convenient output terminals (+DC, —DC, and GND) are provided. The units are equipped with a three-wire ac power cord to permit connecting the external circuit to the power line ground, using the "GND" terminal.

Controls	Continuously variable voltage Power on/off Meter selector V/mA
Output Terminals	DC+, DC—, GND, (Pos. or neg. output)
Short Circuit Protection	Protected from damage due to external short circuit
Overload Indicator	Panel lamp glows when current approaches max. level
Power Cord	Three-wire type
Dimensions	
WP-700A	4 in. x 6½ in. x 3 in., weight 2 lbs., 11 oz.
WP-702A	6 in. x 12 in. x 3 in., weight 4 lbs., 13 oz.
WP-703A and WP-704A	5¼ in. x 8¼ in. x 3¼ in., weight 5 lbs., 13 oz.

TV Isotap

Isolation and Autotransformers

Types WP-26A and WP-25A

RCA

Test Equipment and Accessories



WP-26A



WP-25A

Features

- Provides instant high-low-medium line-voltage testing
- Speeds up servicing . . . cuts down costly returns
- Minimizes shock hazards . . . prevents damage to test equipment
- Primary-to-secondary leakage factory-tested to be less than 0.1 mA—five times less than most electrical equipment limits
- Delivers 500 volt-amperes from autotransformer winding; 400-volt amperes from isolated secondary winding. (A less expensive model, WP-25A, is also available. It delivers 275 volt-amperes max. from isolated secondary winding)
- Heavy duty rotary switch adjusts primary to match line voltage over range of 105 to 130 volts in 5-volt steps
- Full 12-month warranty on parts and labor . . . complete replacement parts availability

Description

The RCA WP-26A and WP-25A Isotaps are designed for use as either an adjustable isolation transformer or as an adjustable autotransformer to facilitate testing and trouble-shooting of radio and television receivers, and other electronic equipment. A seven-position selector switch permits adjustment of the Isotap in five-volt steps to operate from any 50 to 60 Hz supply-line voltage from 105 to 130 volts. Output voltages of approximately 105, 115 and 130 volts are provided throughout

the supply-line voltage range.

Three outlets, marked DIRECT, are connected to the autotransformer or primary winding, and three outlets, marked ISOLATED, are connected to the secondary winding.

The three receptacles marked ISOLATED provide isolation from the supply-line for any connected equipment, minimizing shock hazard usually associated with the chassis, and other exposed parts of transformerless equipment.

Specifications

(All voltages within $\pm 5\%$)

Supply Line:

Voltage range 105-130 V
Frequency 50-60 Hz

Output Voltages

DIRECT receptacles (with 500 max. VA load and selector set to value of supply-line voltage):

LOW 105 V
MED 115 V
HIGH 130 V

ISOLATED receptacle (with resistive load of 400 max. VA and selector set to value of supply-line voltage):

LOW 105 V

MED 115 V
HIGH 130 V

Load Rating:

	WP-26A	WP-25A
Continuous operation:		
DIRECT receptacles	500 VA max.	500 VA max.
ISOLATED receptacles	400 VA max.	275 VA max.

Intermittent operation:		
DIRECT receptacles	750 VA max.	750 VA max.
ISOLATED receptacles	450 VA max.	450 VA max.

Dimensions

Height 5 $\frac{3}{4}$ ", Width 5", Depth 4 $\frac{3}{8}$ ".

Weight	15 lbs.	12 lbs.
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Transistor/Diode Checkers & Resistance-Capacitance Circuit Box

Types WC-506A, WC-528A, and WG-412A

RCA

Test Equipment and Accessories



WC-506A

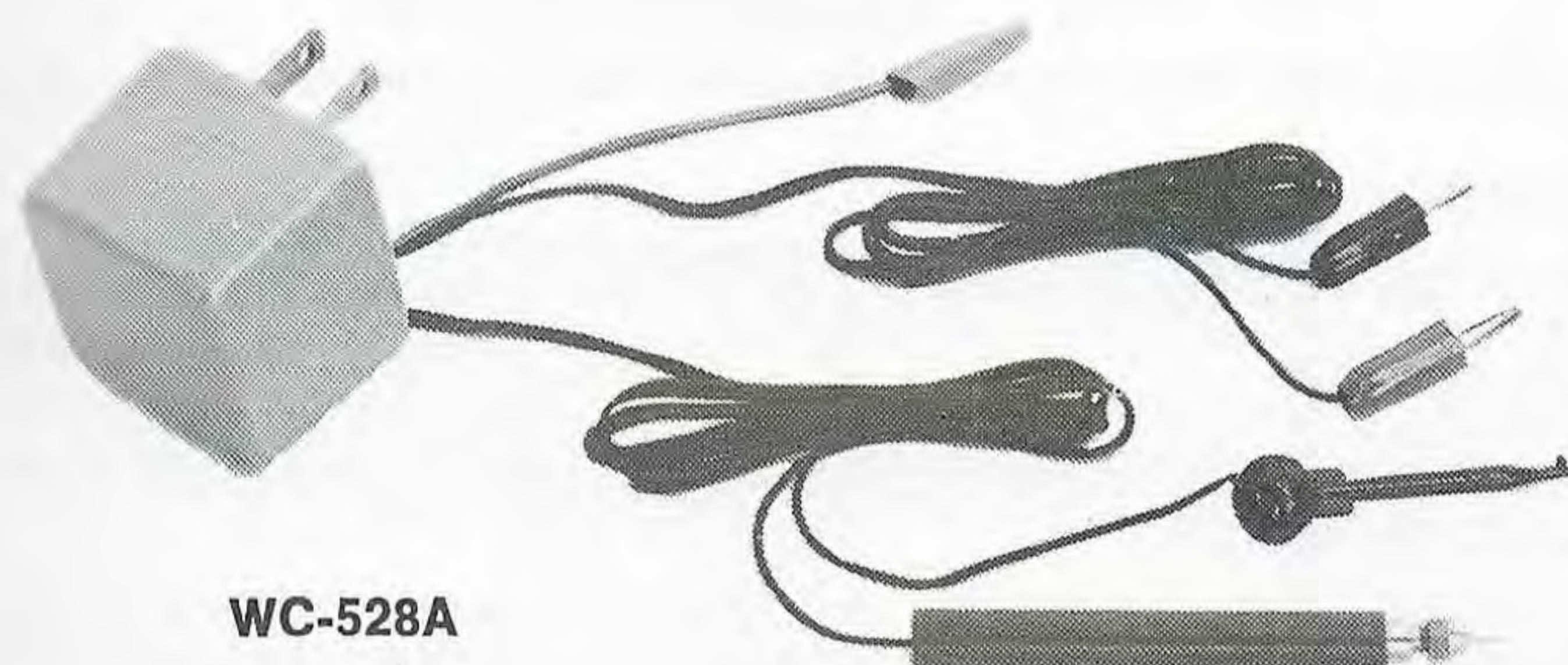
Features

- Fast relative gain and leakage measurements of out-of-circuit NPN and PNP transistors
- "Square-Law" meter gives extended current range on one scale. All measurements indicated on easy-to-read red/green scale
- Forward and reverse diode-current checks
- Panel socket and test leads for out-of-circuit measurements
- Small, compact, inexpensive
- Panel switch for high and normal leakage transistors
- Quick-connect diode test terminals
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WC-506A is designed to provide a quick, simple check of relative gain and leakage levels of out-of-circuit transistors.

This unit weighs 14 ounces and measures 3 3/4 inches by 6 1/4 inches by 2 inches. Power is supplied by two 1.5-volt penlite batteries (not included). The WC-506A is contained in a sturdy bakelite case.



WC-528A

Features

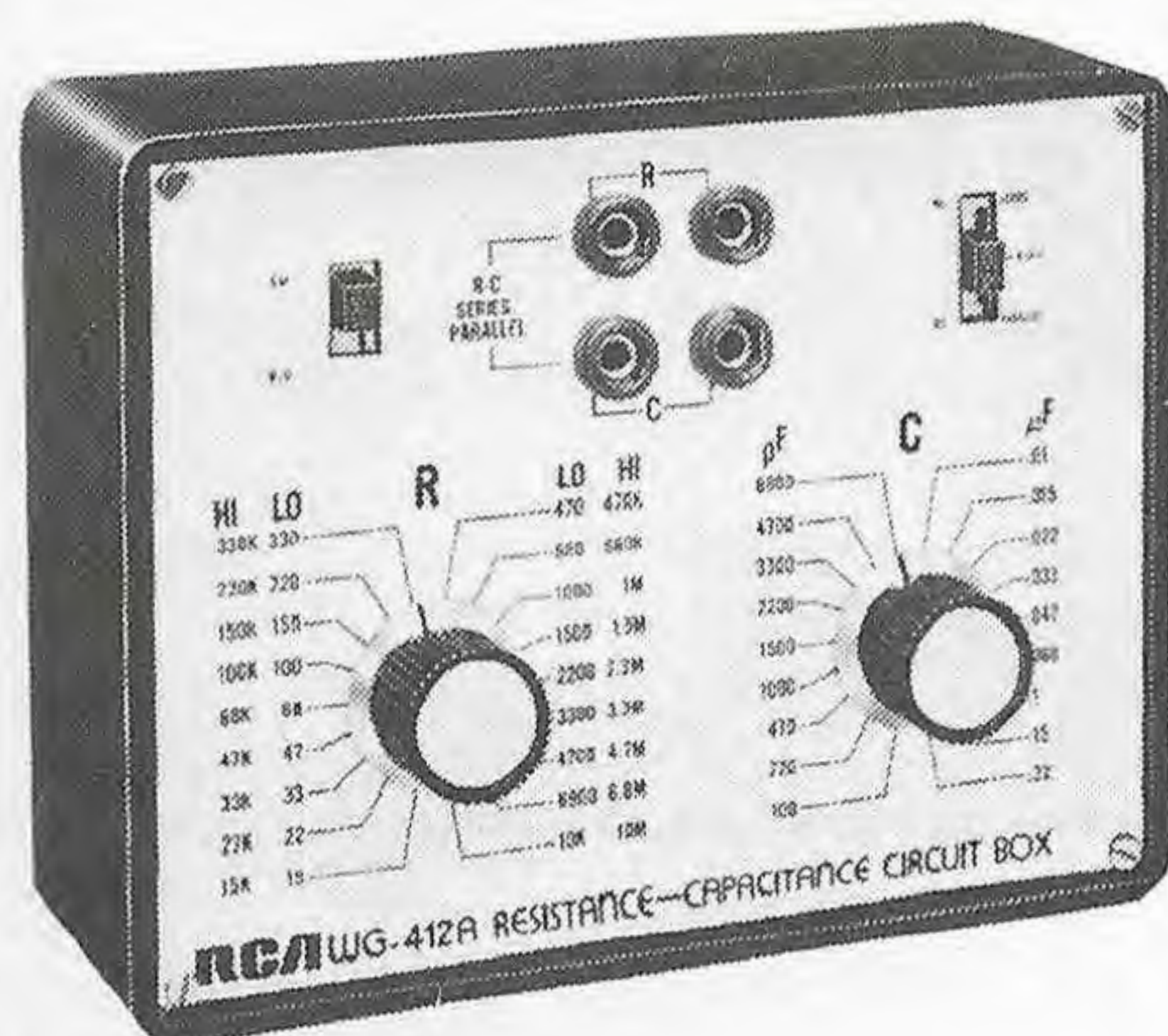
- Facilitates rapid checking of: in-circuit and out-of-circuit transistors (except FETs); diodes, including zener diodes; resistors, and capacitors
- Can be used with any general-purpose oscilloscope—such as RCA's WO-33A or WO-505A—to obtain unique Quicktrace waveforms (with waveforms of defective and good components considerably different)
- Power-limiting circuit prevents damage to semiconductors under test
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

The RCA WC-528A Quicktracer may be used with any general purpose oscilloscope to make rapid point-to-point checks of transistors (excluding FETs), zener diodes and other diodes, capacitors, and resistors. Distinctive Quicktrace

waveforms indicate at a glance whether the component under test is functioning properly.

Supplied with the Quicktracer is a special applications manual that contains extensive information about employing the WC-528A in testing transistors, diodes, resistors, and capacitors. Numerous waveforms are illustrated.



WG-412A

Features

- Simplified switching to provide:

Resistance values	Capacitance values
RC series network	RC parallel network
- 36 resistors in standard values from 15 ohms to 10 megohms (1 watt power rating, tolerance $\pm 10\%$)
- 18 capacitors from 100 pF to 0.22 μ F (600 V rating, tolerance $\pm 10\%$)
- Complete with plug-in test leads and alligator-clip connectors
- Full 12-month warranty on parts and labor... complete replacement parts availability

Description

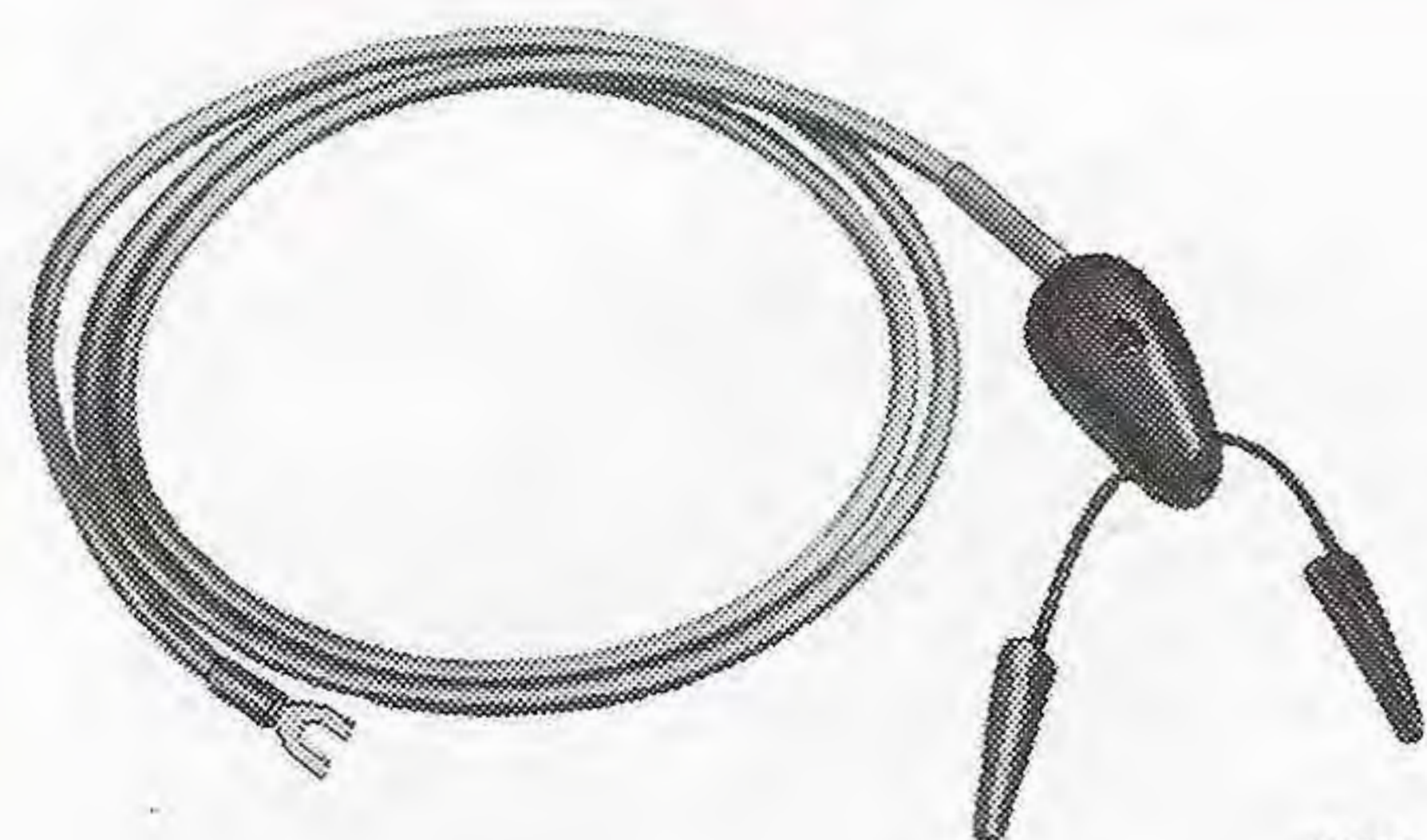
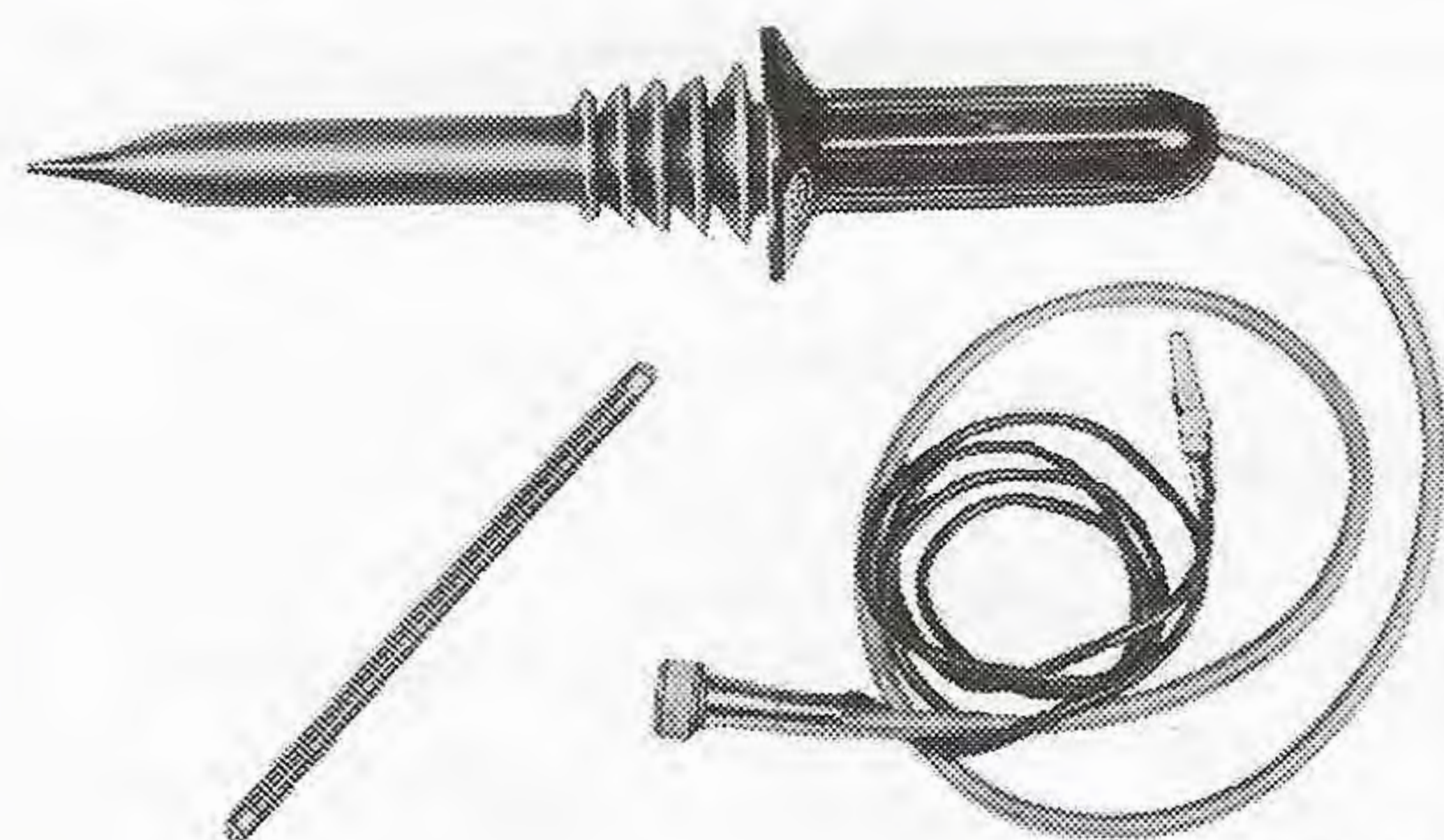
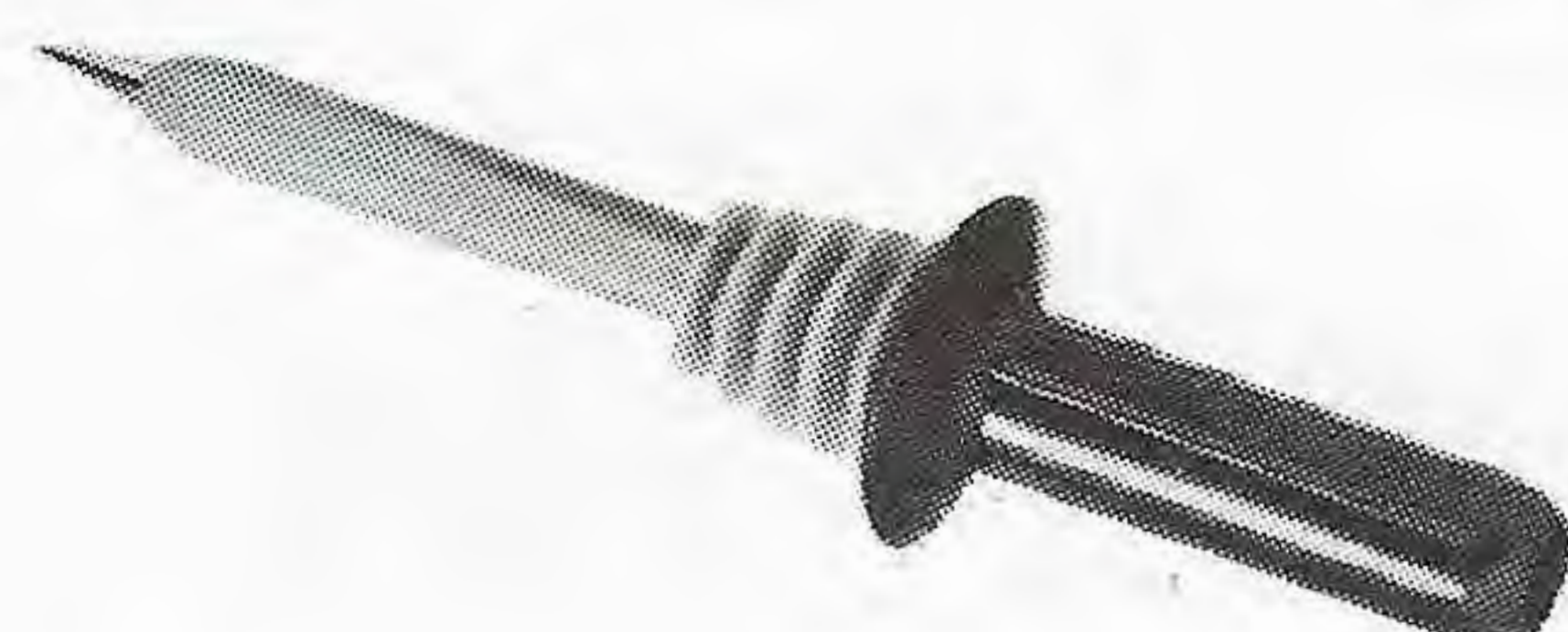
The RCA WG-412A provides a convenient selection of standard resistors and capacitor values available either separately or in series or parallel RC combinations.

This instrument measures 6 7/8 inches by 5 3/8 inches by 2 3/8 inches and weighs approximately 1 pound, 12 ounces.

Probes and Accessories

RCA

Test Equipment and Accessories

**WG-409A****WG-295C****WG-304B****WG-289,
WG-297****WG-411A**

Vectorprobe

WG-409A—The RCA Vectorprobe enables a general-purpose oscilloscope to be used as a vectorscope for AFPC alignment of color TV receivers. A special screen is provided with the Vectorprobe which can be attached to the oscilloscope for convenient reference during AFPC alignment.

Video Multimarker

WG-295C—The WG-295C provides seven simultaneous absorption-type markers at accurately preset frequencies for marking video response curves in color receivers. Markers 0.5 MHz, 1.5 MHz, 2.5 MHz, 3 MHz, 3.58 MHz, 4.1 MHz, and 4.5 MHz. Each marker is identified simply by touching a corresponding contact on the WG-295C case. This reduces the amplitude of that particular marker. The WG-295C connects between the IF/VF output on the sweep generator and the video output cable.

RF Modulator

WG-304B—An accessory used to check the over-all frequency response of TV receivers from antenna to picture tube grid. The unit permits modulation of an rf marker signal from a marker generator (such as WR-89A or WR-99A) by a signal from a video sweep generator (such as WR-59C or WR-69A).

High-Voltage Probes

WG-289, WG-297—The WG-289 extends the dc-voltage range of the WV-77A, WV-77B, WV-77C, WV-87A, WV-87B, WV-97A, WV-98A, WV-98B and WV-98C VoltOhmysts to 50,000 volts.

The WG-297 extends the range of the WV-77E VoltOhmyst® and WV-38A volt-ohm-milliammeter to 50,000 volts dc.

The WG-289 is provided with a microphone-type connector, and the WG-297 is provided with banana-plugs for use with appropriate voltOhmysts and other VTVM's, VOM's.

A choice of six multiplier resistors is available, enabling these probes to be used with many popular electronic and non-electronic volt-ohm-meters!

WG-206—1090-megohm multiplier resistor for VTVM's having 11-megohm input (multiplying factor 100). Use WG-206 for the WV-77, WV-87, and WV-98 series VoltOhmysts®.

WG-210—900-megohm resistor multiplies 5000-volt dc range of 20,000-ohms-per-volt VOM's by a factor of 10.

WG-211—495-megohm resistor multiplies 250-volt dc range of 20,000-ohms-per-volt VOM's by a factor of 100.

WG-408A—4950-megohm resistor for use with the WG-297 High-Voltage Probe to extend the DC voltage measuring capability of the WV-520A V.O.M. to 50,000-volts.

WG-441A—1485-megohm resistor for use with the WG-297 High-Voltage Probe to extend the DC voltage measuring capability of the WV-519A V.O.M. to 30,000-volts.

WG-442A—990-megohm resistor for use with the WG-297 High-Voltage Probe to extend the DC voltage measuring capability of the WV-518A V.O.M. to 50,000-volts.

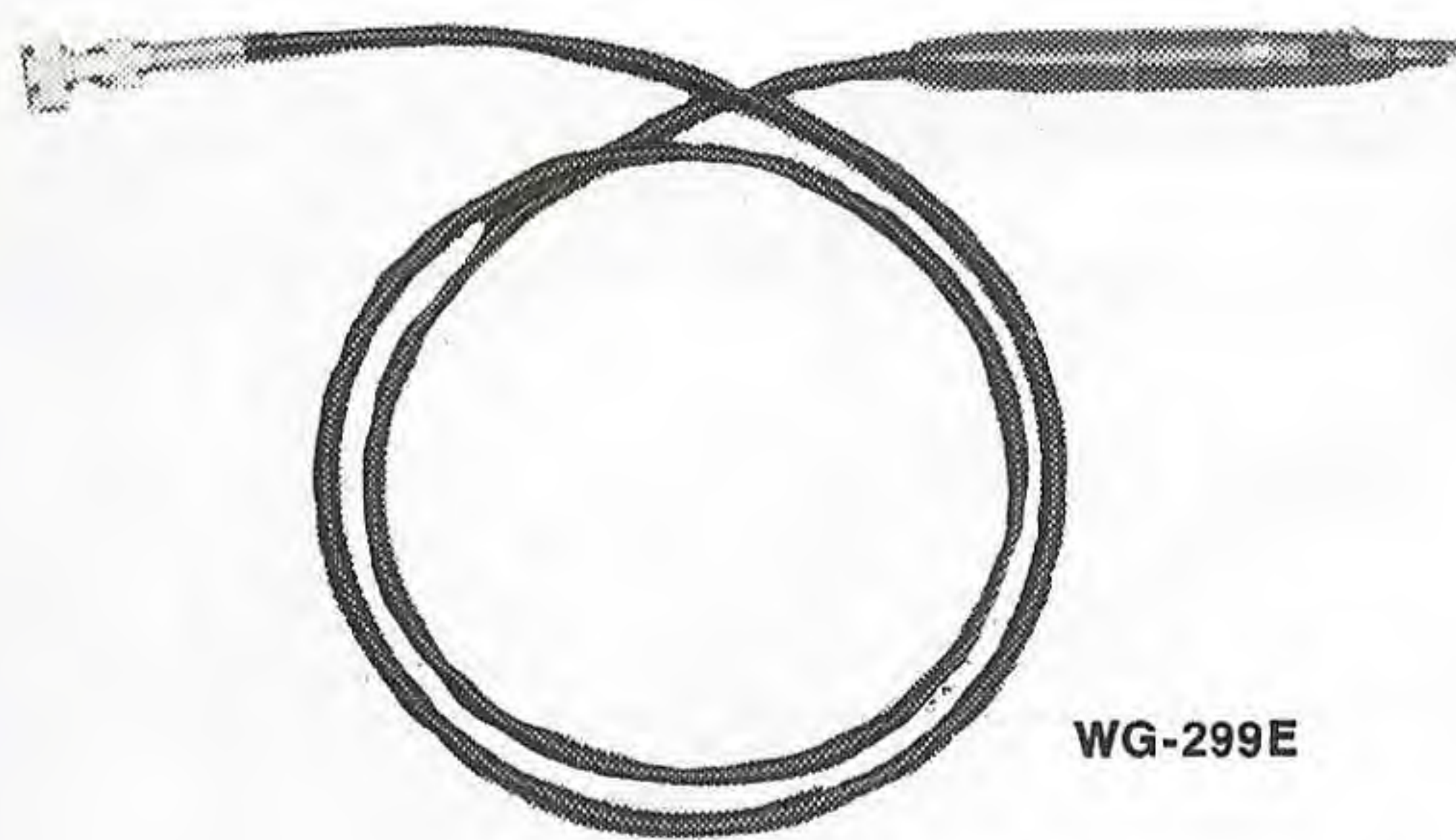
Slip-On High Voltage Probe

WG-411A—The WG-411A high-voltage slip-on probe was designed for use with either the WG-410A or WG-299D ac/dc ohms probes. It extends the dc voltage range of VoltOhmysts to 50,000 volts when used with WG-206 multiple-resistor. The extremely high impedance of the WG-411A is especially desirable when it is necessary to measure voltages found in geiger-counter tubes, television, and other high-impedance circuits which would not function properly if loaded down with a low-impedance voltmeter.

Probes and Accessories

RCA

Test Equipment and Accessories



WG-299E



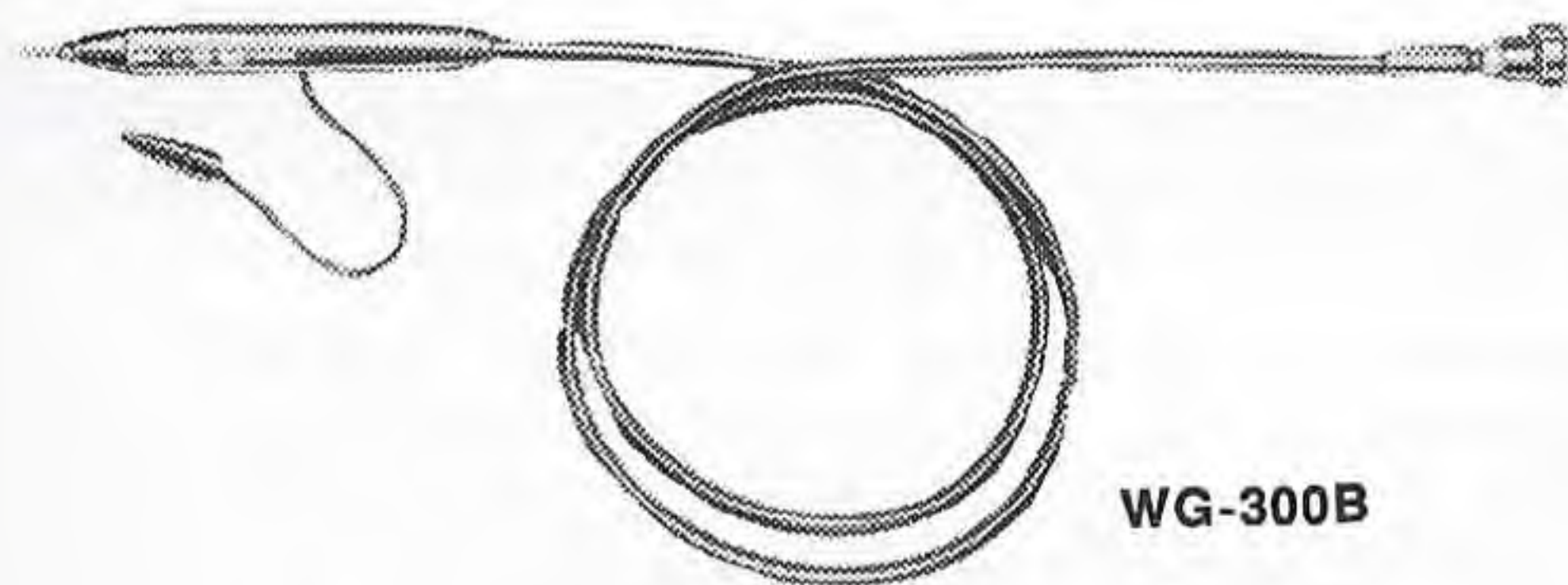
WG-354A



WG-301A



WG-302B



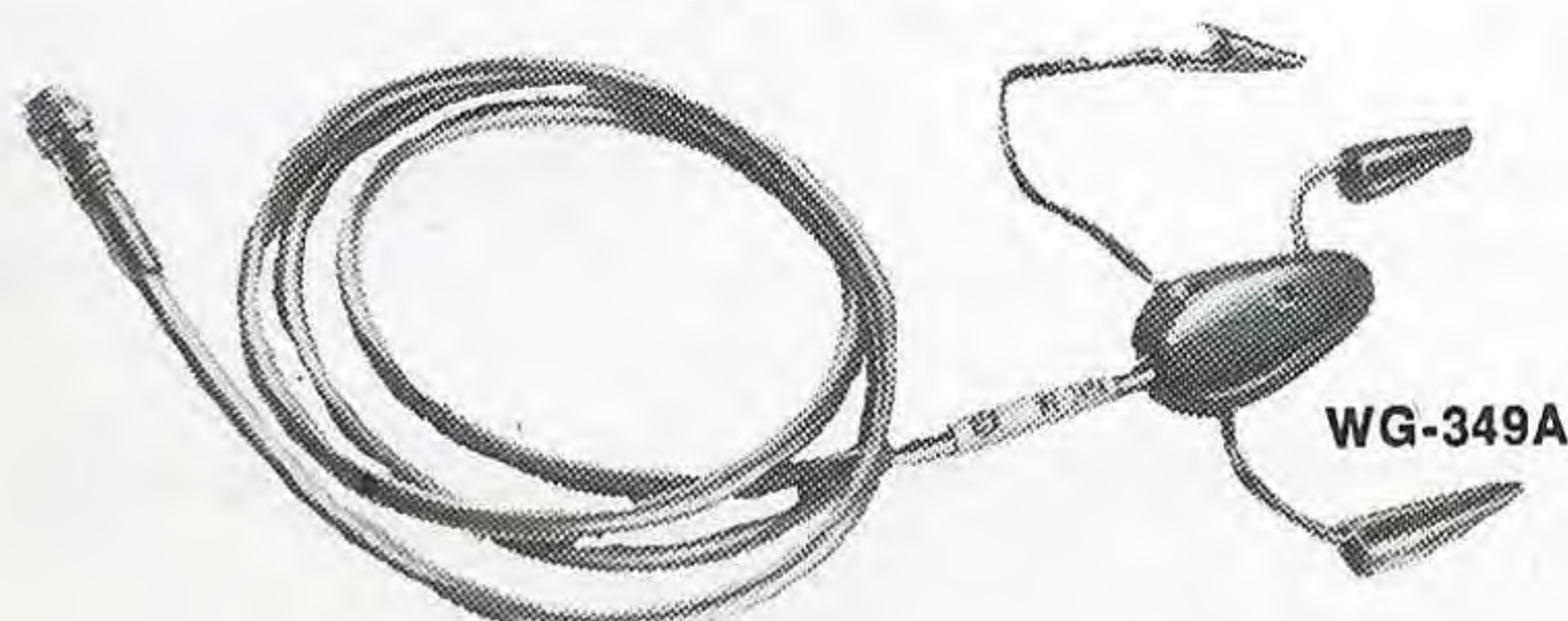
WG-300B



WG-350A



WG-351A



WG-349A

DC/AC Ohms Probes and Cables

WG-229E, WG-401A, WG-410A, and WG-410B—All four items are single-unit probes designed for use with RCA VoltOhmysts. They come complete with a sliding switch to permit changing the probe characteristics to suit the type of measurement being made.

The WG-299E cable is terminated with a microphone type connector for use with VoltOhmysts except WV-77E, WV-500B, and WV-510A.

The WG-401A cable is terminated with a BNC connector for use with the WV-510A Master VoltOhmyst.

The WG-410A is identical to the WG-229E without connector.

Capacitance-Type Voltage Divider Probe

WG-354A—The RCA WG-354A Capacitance-Type Voltage Divider Probe is a slip-on accessory for use with the WG-300B Direct/Low Capacitance Oscilloscope Probe. The WG-354A used with the WG-300B Probe and Cable extends the range of oscilloscopes such as the RCA WO-33A† and WO-91B so that signal pulse amplitudes up to 5000 volts can be observed.

†The WG-300B and WG-354A can be used with the WO-33A if the WG-271A Connector Adaptor is employed.

Crystal-Diode Probe

WG-301A—“Slip-on” type for use with the WG-299A, B, C, or D DC/AC Ohms Probe and Cable extending the frequency range of VoltOhmyst® to 250 MHz.

RF/IF/VF Signal Tracing Probe

WG-302B—“Slip-on” type high-frequency probe designed for use with the WG-300A and B probe and cable to permit visual signal tracing for rapid isolation of trouble in radio receivers and in television if and video stages.

The WG-302B uses a new voltage doubler circuit which results in higher output permitting signal tracing of low level signals.

Direct/Low Capacitance Probe and Cable

WG-300B and WG-400A—Designed for use with the RCA Scopes. Cable is 48" long, completely shielded from connector to probe tip to minimize hum and stray field pick-up. Built-in switch provides instant selection of direct or low-capacitance operation. Input characteristics: 10 megohms resistance, less than 12.5 uuf capacitance in low capacitance position. Includes ground lead and clip. WG-300B has microphone connector. WG-400A has BNC connector.

Demodulator Probe

WG-350A—For use with the WO-33A Super-Portable Oscilloscope for demodulation and signal tracing of radio/TV rf and if signals.

Crystal Diode Probe

WG-351A—For extending the rf measuring capability of the WV-77C, WV-77E VoltOhmyst, and WV-77E(K) VoltOhmyst Kit, to over 100 Mc.

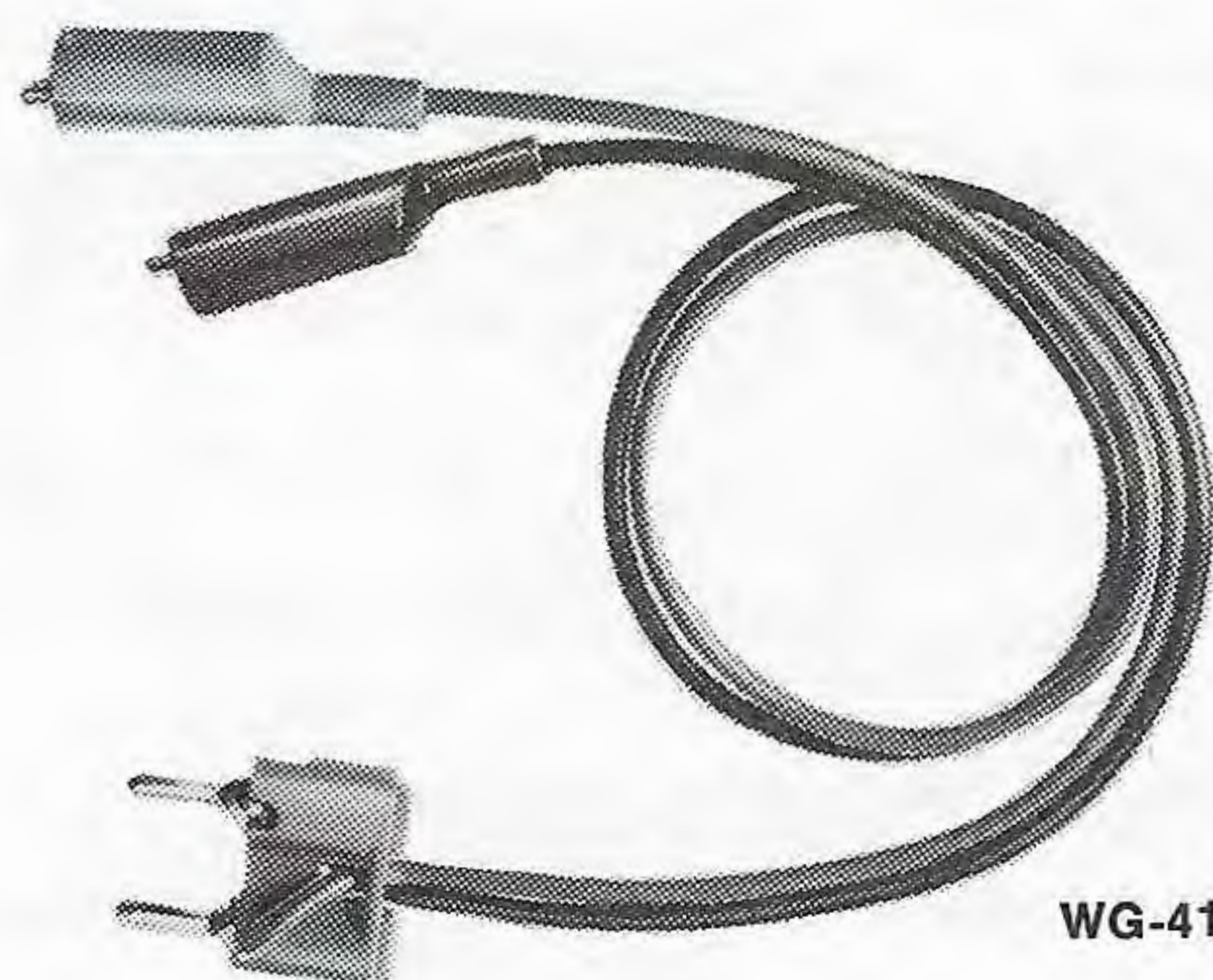
Direct/Low Capacitance Probe

WG-349A—A 48 inch, small diameter, extremely flexible shielded cable designed for use with the WO-33A Oscilloscope. The probe consists of three short leads with alligator clips for ground, direct, and low-capacitance connections. For convenient use, the WG-349A eliminates the need for switching. It connects to the oscilloscope by means of a miniature-type microphone connector. Increases input impedance to 10 megohms, 12 uuf capacitance, when used with the WO-33A and WO-33A(K).

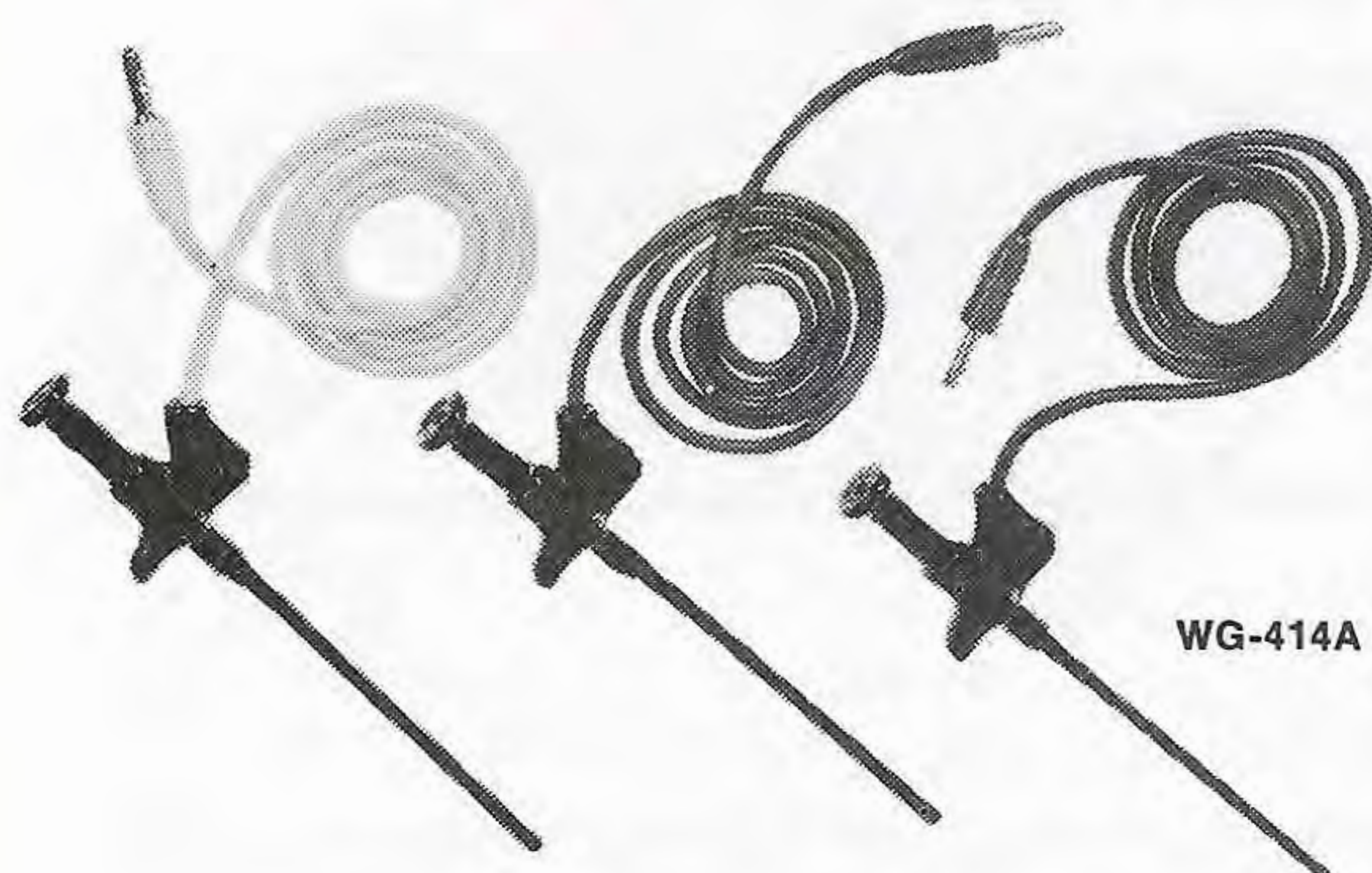
Probes and Accessories

RCA

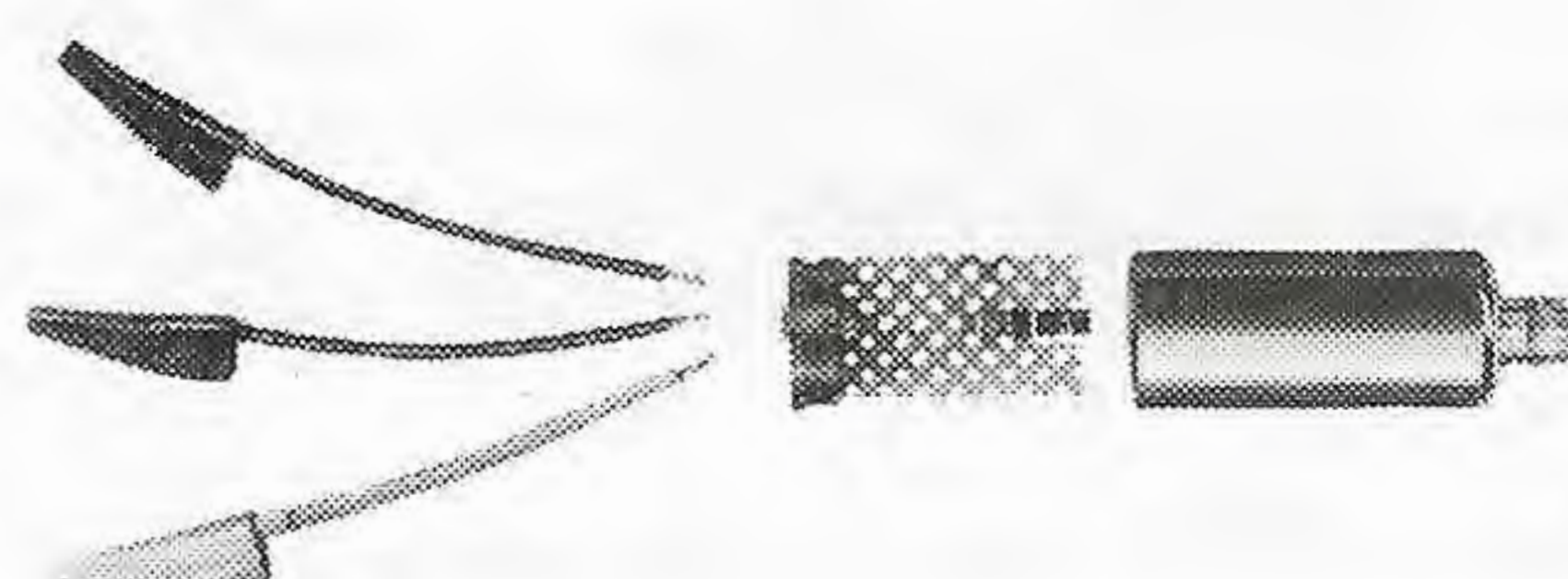
Test Equipment and Accessories



WG-413A



WG-414A



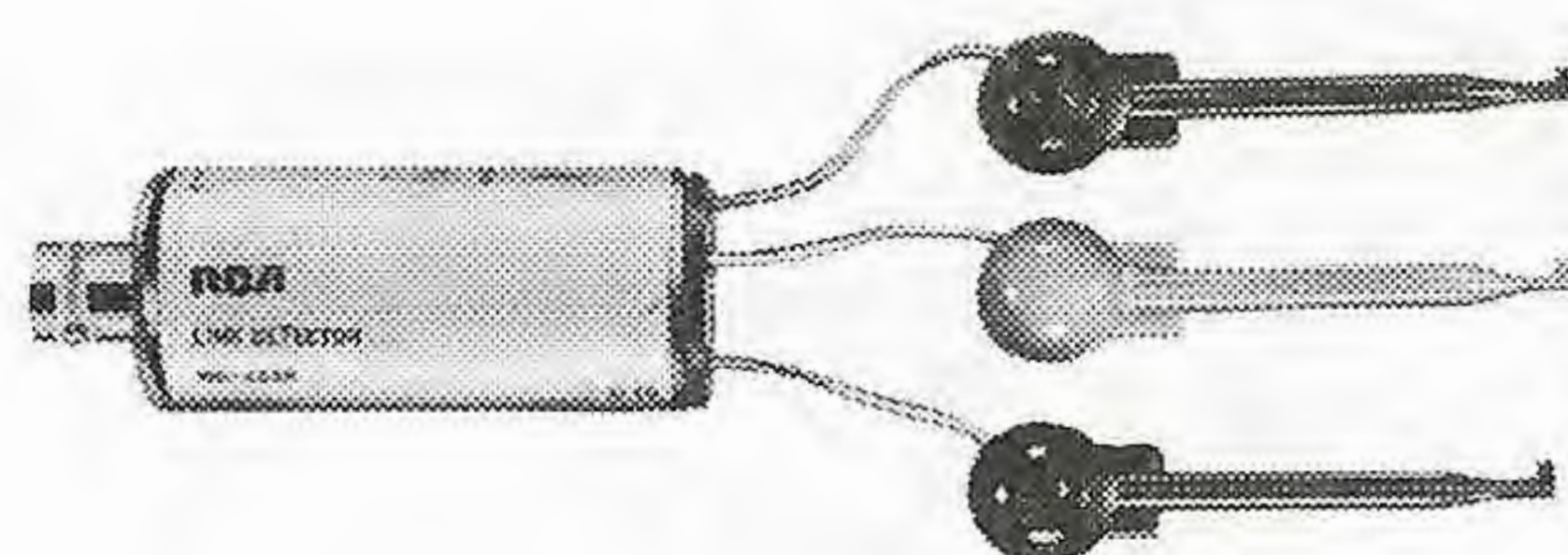
WG-402A



WG-431A

WG-433A

WG-434A



WG-435A



WG-438A

Test Leads

WG-413A — Test leads with alligator clips and dual banana plug connector. Replacement for leads included with WG-412A RC Circuit Box. May also be used with RCA Power Supplies.

Clip-On Probes (Set of Three)

WG-414A — Handy probes with special clip-on connectors and long, thin, flexible shafts for "reaching around corners". Ideal for testing transistors and other components in hard to reach places. Each lead is color coded and terminates in a banana plug. Especially useful with WT-501A Transistor Tester.

General Purpose Probe Kit

WG-402A — Provides all the basic parts (except circuit components) to construct a high-quality shielded "probe" for servicing, industrial, and laboratory applications. The unit includes a BNC connector, and is designed to attach to the RCA WG-427A Direct Cable to form a flexible, shielded probe/cable assembly. This kit includes an insulated metal probe case with BNC connector, a perforated circuit board, and three insulated phosphor-bronze test leads with insulated miniature alligator clips.

General Purpose RF Demodulator

WG-431A — Designed for use as a demodulator in general purpose RF applications. The WG-431A demodulates amplitude-modulated RF wave-forms with frequencies from 100 kHz to 250 MHz in TV receiver sweep alignment applications, the WG-431A can be used with an oscilloscope and sweep generator system to display the response curves of IF amplifiers, video-amplifiers, and tuners.

Mixer Input Adaptor

WG-433A — Designed for use in TV alignment procedures to couple an IF signal into the mixer input of most solid-state-type tuners, including the tuners on such RCA chassis as the CTC 32, CTC 38, CTC 40, CTC 47, etc.

This adaptor has a 75-ohm termination to match the output systems of the WR-514A and similar sweep generators. The unit has a BNC type connector so that it can be attached to the WG-427A cable. The WG-433A/WG-427A assembly can be connected directly to the WR-514A Sweep Generator, or other equipment with BNC type connectors.

Video/Chroma Band-pass Detector

WG-434A — Designed for use in chroma band-pass alignment and chroma circuit troubleshooting. This detector can also be used in servicing TV sound stages to adjust the take-off transformers, IF stages, sound detector, and 4.5 MHz trap.

The WG-434A has a BNC-type connector so that it can be attached to the RCA WG-427A cable. The WG-434A/WG-427A assembly can be connected directly to the RCA WO-505A oscilloscope, WR-514A TV Chanalyst, or other equipment with BNC connectors.

Link Detector

WG-435A — Designed for use in checking and aligning overcoupled IF link circuits. The unit includes both a detector circuit for connection to the 1st IF plate, and a load circuit for connection to the 2nd IF plate (in solid state sets, make connections to appropriate transistor element). Special "E-Z Hook" connectors attach easily to circuit test points.

The WG-435A has a BNC-type connector so that it can be attached to the RCA WG-427A cable. The WG-435A/WG-427A assembly can be connected directly to the RCA WO-505A oscilloscope, WR-514A TV Chanalyst, or other equipment with BNC connectors.

Connector Adaptor

WG-438A — Male BNC to male microphone connector for connecting cables with female microphone connectors (WG-299E, WG-300B, etc.) to equipment having female BNC panel connectors (WO-505A, WR-514A, WV-510A, etc.)

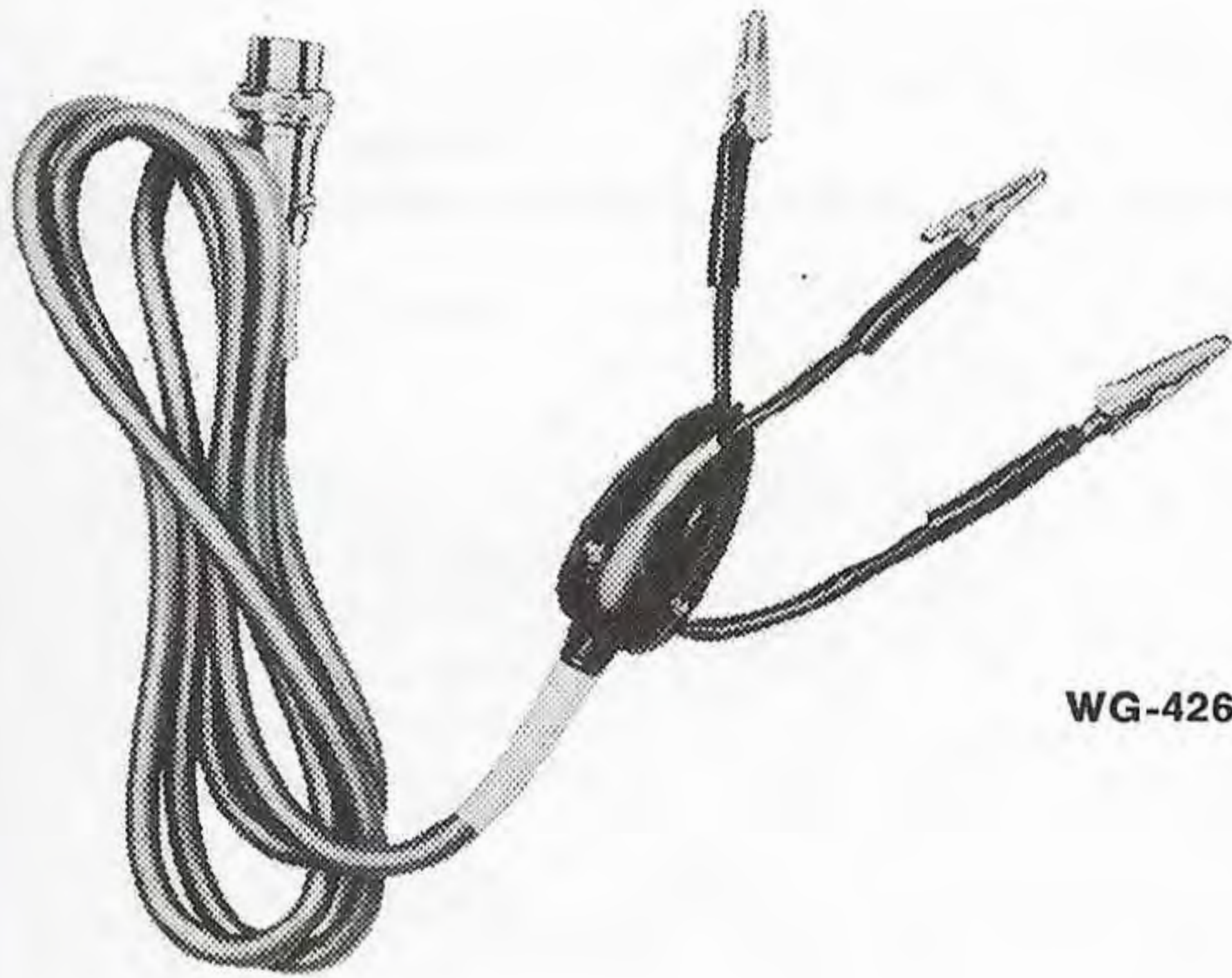
39.75 MHz Crystal

WG-440A — For use in spare socket of WR-514A. Provides marker for trap alignment of TV receivers.

Probes and Accessories

RCA

Test Equipment and Accessories



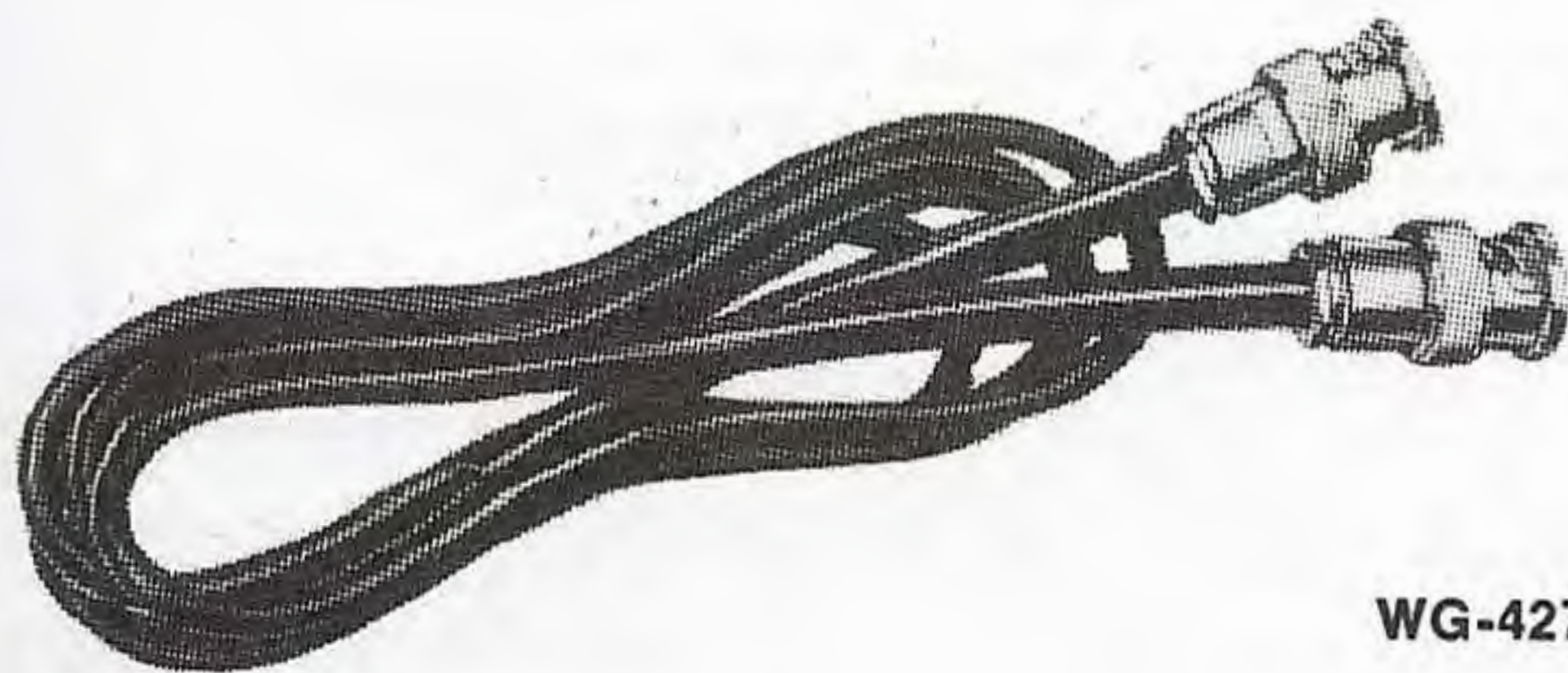
WG-426A

Cables and Accessories Supplied with the WR-514A

The cables and accessories supplied with the Chanalyst are specially designed to provide a complete, versatile system of shielded connections for alignment applications.

RF Output Cable (WG-426A)

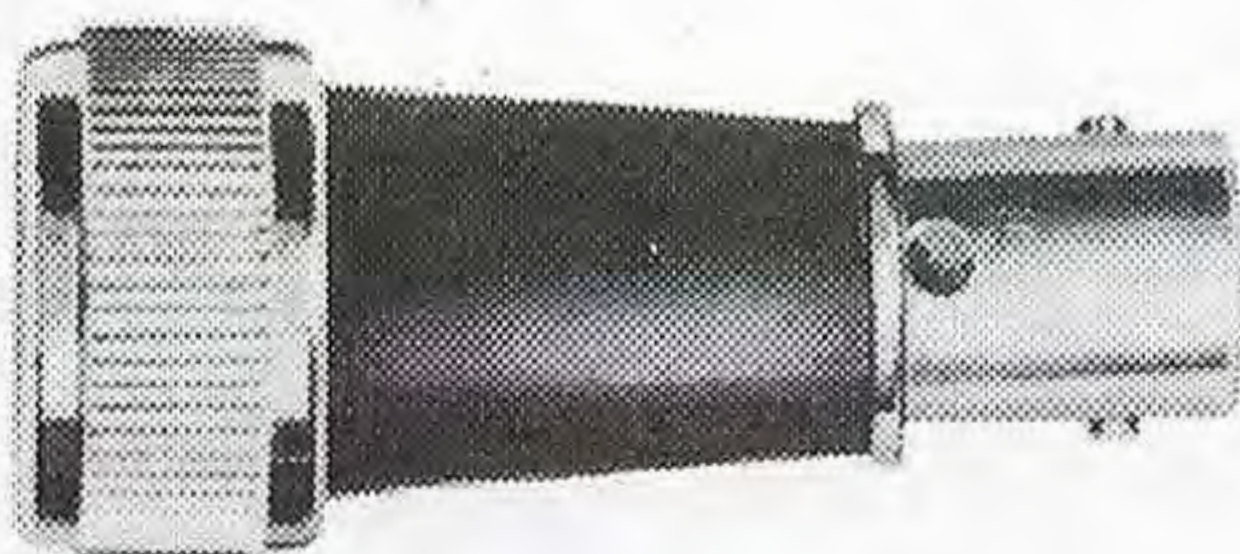
Balanced 300 ohm termination. Connects from piston-type RF attenuator to tuner 300 ohm antenna terminals. Provides RF sweep signal for tuner alignment or overall tuner-IF alignment.



WG-427A

Direct Cable (WG-427A) (Three supplied)

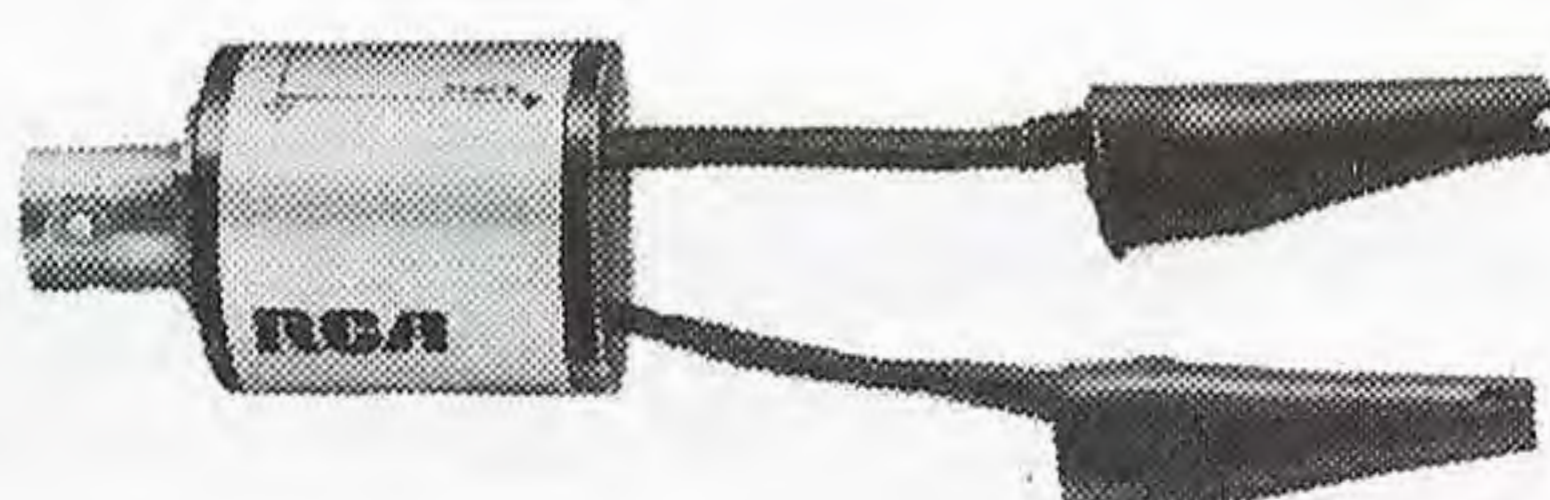
Shielded cables with BNC-type connectors. Use directly or with WG-429A, WG-430A Term. Unit, or special alignment probe as required. Except for RF output, these cables provide all necessary connections in most alignment procedures.



WG-428A

Connector Adaptor (WG-428A)

Permits connection of WG-427A Cable to equipment having microphone-type connectors. Applications include connection from Chanalyst to oscilloscope vertical input, and connection from an RF marker generator to the Chanalyst.



WG-430A
WG-429A

Direct Termination Unit (WG-430A) (Two supplied)

Attaches to WG-427A Cable for use in alignment applications requiring a direct, shielded connection. Applications include connection of sweep signal to mixer input pad, connecting demodulated signal to the Chanalyst, and as an output cable for marker signals.

VF/IF 75-Ohm Termination Unit (WG-429A)

This unit attaches to the WG-427A cable, and can be used for signal injection where a 75-ohm termination is required, such as the grids of IF amplifier stages. The WG-429A can also be used for mixer-grid signal injection on receivers requiring a 75 or 100 ohm termination and a 1500 pF isolating capacitor. The capacitor must be connected in series with the WG-429A red output lead for this application.

Rack Mounting Brackets (WG-452A)

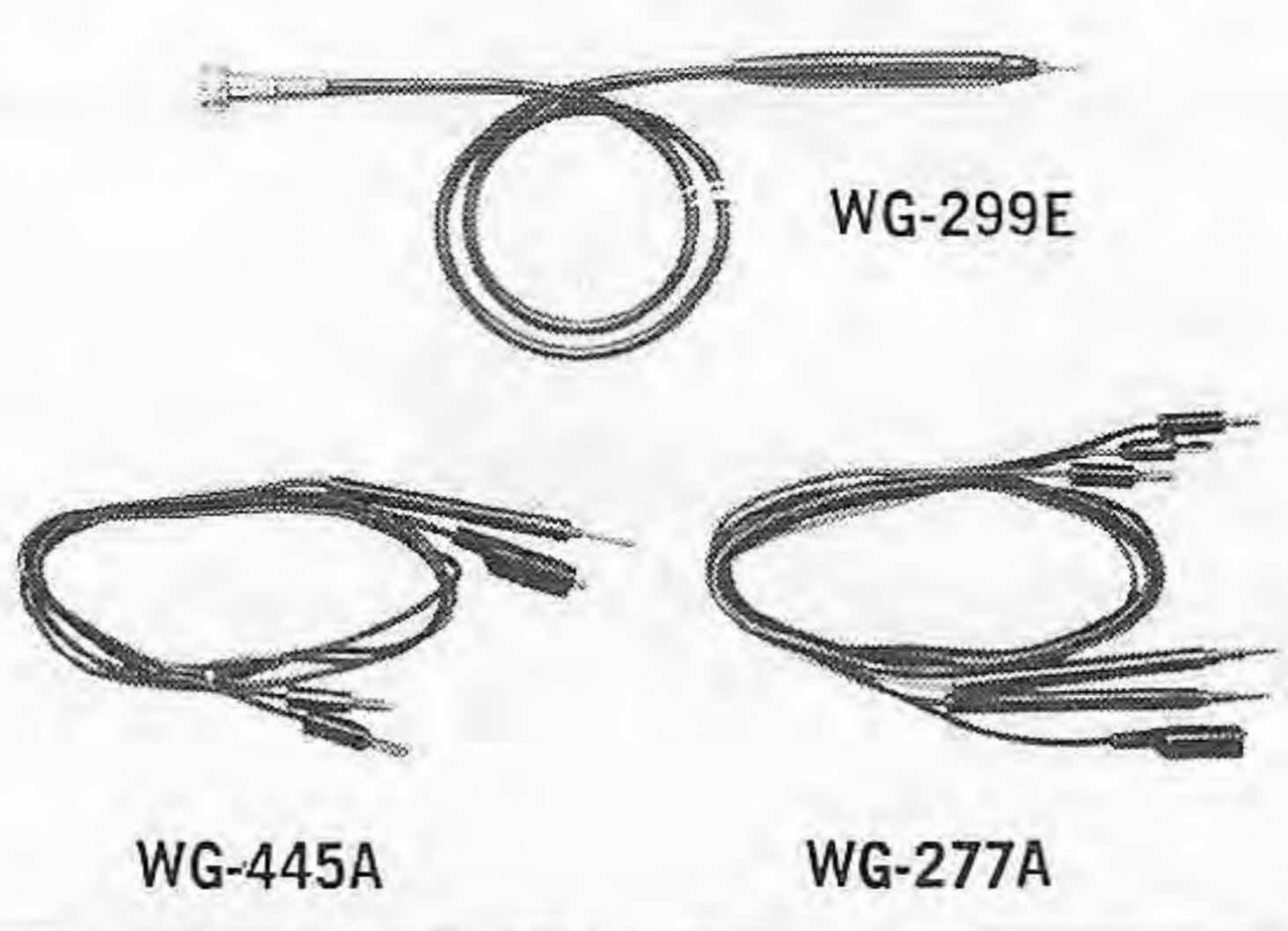
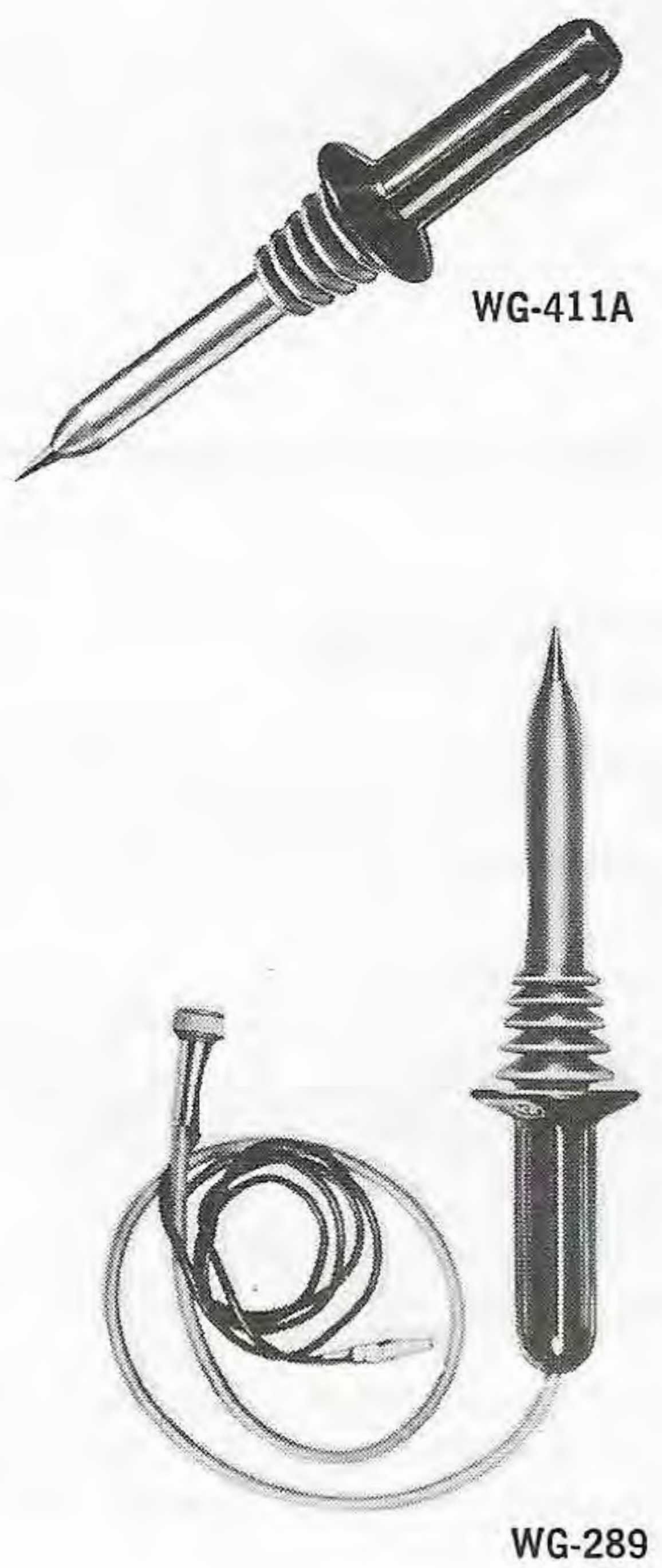
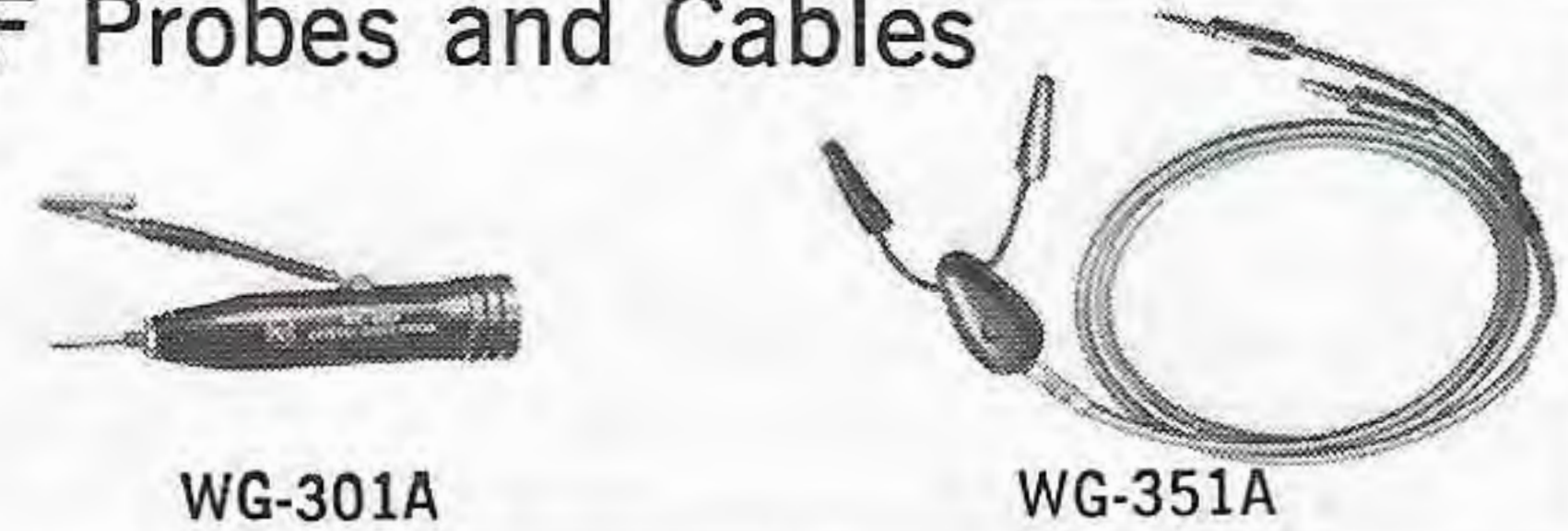
Standard (5 1/4" x 19") mounting brackets for such instruments as the RCA WV-511A Picoammeter.

Probes and Accessories

RCA

**Test Equipment
and Accessories**

PROBES FOR VOMs, TVOMs, VTVMs

	RCA Probe	Description	For Use With
AC/DC Ohms Probes and Cables 	WG-277A	Set of 3 with banana plugs. DC probe and cable, AC—Ohms probe and cable, ground cable with alligator clip.	VOMs, TVOMs, VTVMs manufactured by RCA, Simpson, Triplett, Eico, Heath and other Foreign and Domestic suppliers.
	WG-299E	Shielded AC/DC—Ohms probe and cable with microphone type connector.	
	WG-401A	Shielded AC/DC—Ohms probe and cable with Male BNC connector.	
	WG-410B	Shielded AC/DC—Ohms probe and cable with tinned end-leads.	
	WG-445A	AC/DC/Ohms—Current probes and cables with banana plugs.	
High-Voltage Probes and Resistors 	WG-297	High-Voltage probe and cable with banana plug (less resistor).	For use with DC Voltmeters having banana jacks.
	WG-289	High-Voltage probe and cable with microphone type connector (less resistor).	For use with DC Voltmeters having microphone connectors.
	WG-411A	Slip-On type High-Voltage probe for use with AC/DC—Ohms probes.	Use ONLY with WG-299E, WG-401A, WG-410B.
	WG-206	WG-206—1090 megohm multiplier resistor for VTVM's having 11-megohm input (multiplying factor 100). Use WG-206 for the WV-77, WV-87, and WV-98 series VoltOhmysts and appropriate Simpson, Triplett units.	Use in conjunction with WG-289, WG-297, WG-411A.
	WG-436A	WG-436A — 2079-megohm resistor for use with WG-411A High-Voltage probe to extend the DC voltage measuring capability of the WV-510A VoltOhmyst to 50,000 volts.	Use with RCA WG-411A High-Voltage probe.
	WG-210	WG-210—900-megohm resistor multiplies 5000-volt DC range of 20,000-ohms-per-volt VOM's by a factor of 10.	Use with RCA WG-297 High-Voltage probe.
	WG-211	WG-211—495-megohm resistor multiplies 250-volt DC range of 20,000-ohms-per-volt VOM's by a factor of 100.	
	WG-408A	WG-408A—4950-megohm resistor for use with the WG-297 High-Voltage probe to extend the DC voltage measuring capability of the WV-520A VOM to 50,000 volts.	
	WG-441A	WG-441A—1485-megohm resistor for use with the WG-297 High-Voltage probe to extend the DC voltage measuring capability of the WV-519A VOM to 30,000 volts.	
	WG-442A	WG-442A—990-megohm resistor for use with the WG-297 High-Voltage probe to extend the DC voltage measuring capability of the WV-518A VOM to 50,000 volts.	
RF Probes and Cables 	WG-301A	Slip-On type High-Frequency probe for use with AC/DC—Ohms probes.	Use with RCA WG-299E/401A/410B AC/DC ohms probes.
	WG-351A	High-Frequency probe and cable with banana plug.	Use with WV-77E VoltOhmysts

PROBES FOR OSCILLOSCOPES

	WG-349A	Direct/Lo-cap probe and cable with miniature microphone connector.	Use with RCA WO-33A Oscilloscope.
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Probes and Accessories

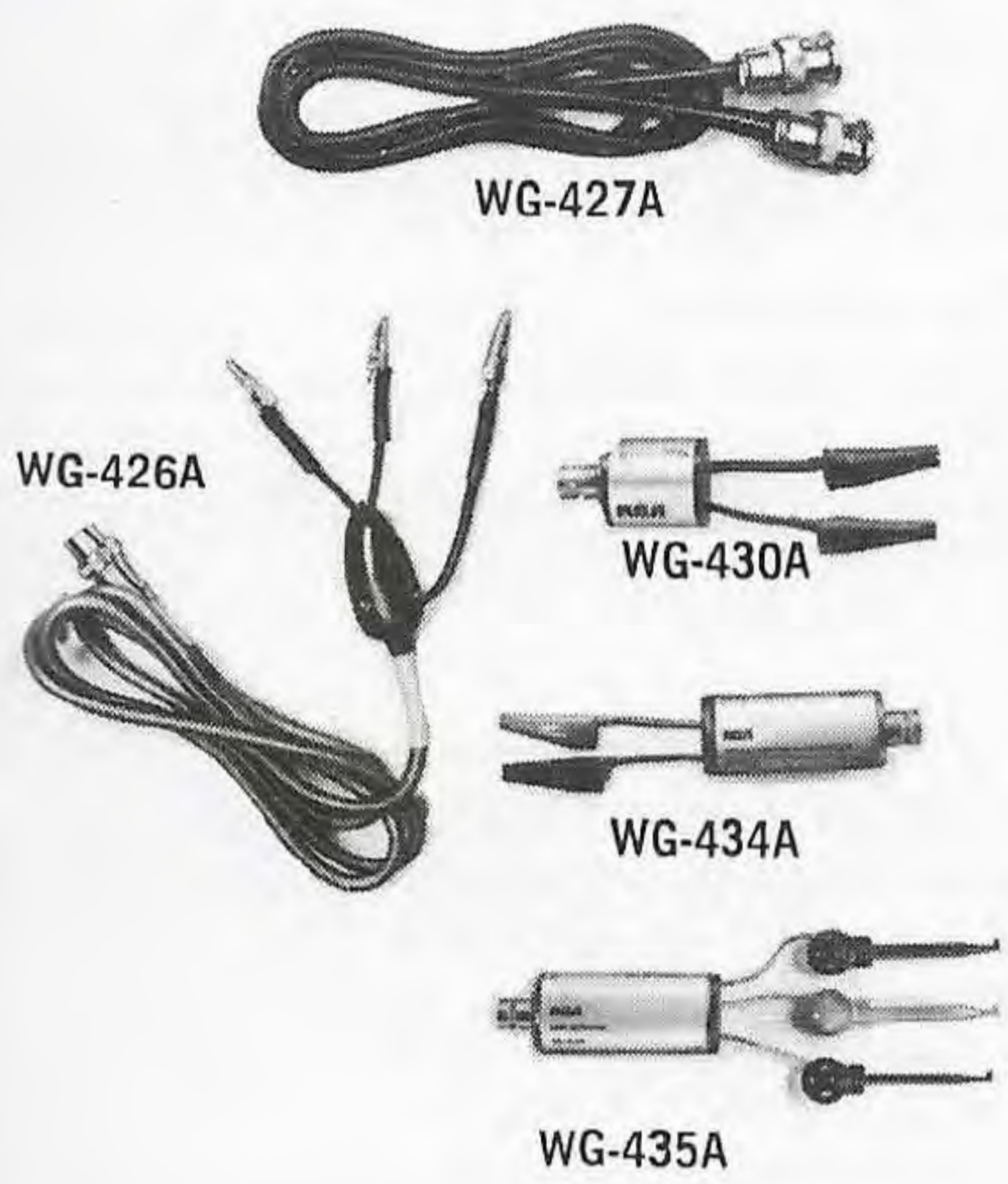
RCA

**Test Equipment
and Accessories**

PROBES FOR OSCILLOSCOPES (Continued)

	RCA Probe	Description	For Use With
	WG-400A	Direct/Lo-cap probe and cable with BNC Male connector.	Use with oscilloscopes having Female BNC connector.
	WG-300B	Direct/Lo-cap probe and cable with microphone connector.	Use with oscilloscopes having microphone connector.
	WG-350A	RF Demodulator probe and cable with miniature microphone connector.	Use with RCA WO-33A Oscilloscope.
	WG-354A	Slip-On type Voltage Divider probe.	Use with WG-300B probe and cable to extend oscilloscope range to 5000 V.
	WG-302B	Slip-On type RF/IF/VF Signal Tracing probe.	Use with WG-300B/WG-400A probe and cable.
	WG-409A	Vectorprobe and screen.	Use with oscilloscopes.
	WG-271A	Adaptor for using WG-300B probe and cable with WO-33A oscilloscope.	Use with WO-33A Oscilloscope.

PROBES FOR SWEEP AND ALIGNMENT

	WG-426A	RF output cable (balanced 300Ω) with special connector.	Use with WR-69A/WR-514A.
	WG-427A	4-foot 75Ω coaxial cable with two Male BNC connectors.	General RF applications.
	WG-429A	VF/IF 75Ω probe with Female BNC connector (use with WG-427A cable).	For use with instrument such as RCA WR-514A Chanalyst.
	WG-430A	VF/IF Direct probe with Female BNC connector (use with WG-427A cable).	
	WG-431A	General purpose RF Demodulator probe with Female BNC connector (use with WG-427A cable).	
	WG-433A	Mixer Input Adaptor with Female BNC connector (use with WG-427A cable).	
	WG-434A	Video/Chroma Bandpass Detector with Female BNC connector (use with WG-427A cable).	
	WG-435A	Link Detector with "E-Z Hook" connectors and Female BNC termination (use with WG-427A cable).	

SPECIAL PURPOSE PROBES AND CABLES

	WG-413A	22" General Purpose test leads with Std. 3/4" dual banana plugs.	For general use.
	WG-414A	Set of three special clip probes with banana plugs, long flexible shafts (yellow, blue, green cables).	
	WG-438A	Special Adaptor. Male BNC to Male microphone connector.	
	WG-428A	Special Adaptor. Female BNC to Female microphone connector.	
	WG-402A	General Purpose Probe kit. All parts for constructing high-quality shielded probe with Female BNC connector (use with WG-427A cable).	

AUTHORIZED RCA TEST EQUIPMENT SERVICE DEPOTS

California

Electronic Service Co.
7732-A Densmore Ave.
Van Nuys, Calif. 91406
Attn: Stuart Oleskar
213-780-3071

Guaranteed Electronics, Inc.
5822 Mission Street
San Francisco, Calif. 94112
Attn: Mr. Bruce
415-334-5900

Otto's Instrument Service
Ontario International Airport
Ontario, Calif. 91761
Attn: Wm. Otto
714-986-6624

Colorado

Insko Company
841 Champa Street
Denver, Colo. 80204
303-255-7665

Clyde N. Still
2630 W. Kiowa
Colorado Springs, Colo. 80904
Attn: Clyde Still
303-633-8404

District of Columbia

Electronic Maintenance
308 Carroll Street
Washington, D.C. 20012
202-882-2333

Georgia

Powell Electronic Service Co.
1250 Virginia Avenue
Atlanta, Georgia 30306
Attn: Arthur Powell
404-872-9688

Idaho

TV Tuner Service
410 Elm Street, No.
Twin Falls, Idaho 83301
Attn: Neils Haslam
208-733-5636

Illinois

B & S Electronics
6326 W. Roosevelt Road
Oak Park, Illinois 60304
Attn: O. J. Staks
313-383-2363

Kansas

Main Electronics Inc.
353 Pattie
Wichita, Kansas 67211
Attn: Dennis Main
316-267-3581

Louisiana

Audio & Instrument Associates
5511 Sussex Street
Shreveport, Louisiana 71108
Attn: E. Nuttall
318-868-9577

Ted Drell Electronics
3341 Ole Miss Drive
Kenner, Louisiana 70062
Attn: Ted Drell III
504-721-3740

Massachusetts

Douglas Instrument Labs.
176 Norfolk Avenue
Boston, Mass. 02119
Attn: Harold Millen
617-445-4836

Michigan

Main Electronics Company
5558 S. Pennsylvania Ave.
Lansing, Mich. 48910
Attn: Gordon D. Main
517-882-5035

Missouri

Kansas City Calibration Lab.
2607 Holmes
Kansas City, Missouri 64108
816-471-2080

Scherrer Instruments
7170 Manchester Avenue
St. Louis, Missouri 63143
314-644-5362

Kermit Shetley Repair
2613 Marvin
Cape Girardeau, Missouri 63701

Nebraska

Electrometrics Company
412 South 11th Street
Lincoln, Nebraska 68508
Attn: Larry Merriman
402-477-3434

New Jersey

Blackwood Electronics
104 E. Hillcrest Avenue
Blackwood, New Jersey 08012

Brownell-Electro Inc.
207 Columbus Avenue
Roselle, New Jersey 07203
Attn: Jack Marsh

New York

A to Z Service Co.
1067 Harlem Road
Buffalo, New York 14225
Attn: Carl Mayer
716-825-6666

Electrical Instrument Service
25 Dock Street
Mount Vernon, N.Y. 10550
Attn: Gerry Frank
914-699-9717

Brownell-Electro Inc.
85 Tenth Avenue
New York, N.Y. 10011
Attn: Joe Grant
212-675-2400

Radio & Electronic Service Co.
401 N. Townsend Street
Syracuse, N.Y. 13203
Attn: Larry De Martino
313-422-5707

North Carolina

Speed Instrument Company
3028 E. Rothgeb Drive
Raleigh, N.C. 27609
Attn: Wm. Speed
919-782-1468

Oregon

Progress Electronics Co. of Oregon
5160 N. Lagoon Avenue
Portland, Oregon 97217
503-285-0581

Pennsylvania

Certified Calibration Labs
2709 N. Broad St.
Phila., Pa. 19132
Attn: Dave Krantz
215-229-7557

Sanders Electronics
6236 Jerome Blvd.
Harrisburg, Pa. 17112
Attn: Irv. Sanders
717-545-3260

Sunshine Scientific Instruments
1810 Grant Avenue
Philadelphia, Pa.
Attn: E. Lansdowne
215-673-5600

Tennessee

Edwin Bohr Electronics
5880 Dayton Blvd.
Chattanooga, Tenn. 37415
Attn: Edwin Bohr
615-877-8207

Texas

Ultra Instrument Laboratory
9995 Monroe Drive
Dallas, Texas 75220
Attn: Steve Huszar
214-357-0297

Whitlock Instrument Repair
1314 North Texas
Odessa, Texas 79760
Attn: Larry L. Ritchie
915-337-3412

Washington

Eicher-Richards Company
2727 N.E. Blakeley Street
Seattle, Washington 98105
Attn: Dick Richards
206-523-7888

Sutherlands Inc.
South Annex—Boeing Field
Seattle, Washington 98108
Attn: Alex McCallum
206-763-2491

Test Equipment

Optional Distributor Resale Price Schedule

**Instruments,
Power Supplies
and Accessories**

INSTRUMENTS

Type	Description	Optional Distributor Resale Price
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Meters (VOM)

WV-38A	Volt/Ohm/Milliammeter	\$66.00
WV-516A	Volt/Ohm/Milliammeter	9.95
WV-517A	Volt/Ohm/Milliammeter	18.00
WV-518A	Volt/Ohm/Milliammeter	28.50
WV-519A	Volt/Ohm/Milliammeter	36.00
WV-520A	Volt/Ohm/Milliammeter	48.00

Meters (Electronic)

WV-76A	High-Sensitivity AC VTVM	99.00
WV-77E	VoltOhmyst	66.00
WV-98C	Senior VoltOhmyst	99.00
WV-500B	Solid-State VoltOhmyst	95.00
WV-510A	S/S/ Master VoltOhmyst	128.00

Picoammeter

WV-511A	DC Picoammeter	250.00
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Power Line Monitors

WV-120A	120-Volt Power-Line Monitor	20.00
WV-503A	240-Volt Power-Line Monitor	20.00

Oscilloscopes

WO-33A	3" Oscilloscope	180.00
WO-505A	5" Solid-State DC Oscilloscope	299.00

Generators (AF)

WA-44C	Audio Sine/ Square Wave Generator	99.00
WA-504A	S/S Audio Sine/ Square Wave Generator	95.00

Generators (RF)

WR-50B	RF Signal Generator	75.00
WR-52A	FM Stereo Signal Simulator	250.00
WR-70A (L)	RF/ IF/ VF Marker Adder	96.00
WR-99A	Crystal-Calibrated Marker Generator	275.00
WR-514A	Sweep Chanalyst	380.00

Generators (Color)

WR-508A	Mini Chro-Bar Generator	75.00
WR-515A	Master Chro-Bar Generator/ Signalyst	179.00

Testers

WT-501A	Transistor Tester	68.00
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INSTRUMENTS (Cont'd)

Type	Description	Optional Distributor Resale Price
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Testers (Cont'd)

WC-506A	Transistor Checker	18.00
WT-509A	B&W Color Picture Tube Tester with 5 Socket Adapters	110.00
WT-509AV1	Same as WT-509A except for 240 V	110.00
WC-528A	Transistor Quicktracer (for use with CRO)	14.75

R-C Substitution Box

WG-412A	R-C Substitution Box	30.00
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POWER SUPPLIES

WP-25A	TV Isotap	30.00
WP-26A	TV Isotap	42.00
WP-700A	DC Power Supply	48.00
WP-702A	Dual DC Power Supply	87.00
WP-703A	DC Power Supply	60.00
WP-704A	DC Power Supply	60.00

ACCESSORIES

WG-206	1090-Megohm Resistor for H.V. Probe	3.75
WG-210	900-Megohm Resistor for H.V. Probe	3.75
WG-211	495-Megohm Resistor for H.V. Probe	3.75
WG-270A	Carrying Case for WV-38A	5.25
WG-271A	Adapter for using WG-300B Cable and Probe on WO-33A, WO-33A-K	2.50
WG-277A	Test Leads for WV-77E, WV-77E-K	7.50
WG-289	High Voltage Probe (Less Resistor) with Microphone-Type Connector	15.00
WG-297	High Voltage Probe (Less Resistor) with Banana Plugs	15.00
WG-299E	AC/ DC-Ohms Probe and Cable for WV-98A, WV-98B, WV-98C	9.75
WG-300B	Direct/ Low-Capacitance Probe for WO-91A, WO-91B, WO-91C, WV-74A, WV-76A	12.00
WG-301A	Crystal-Diode Probe for WV-98A, WV-98B, WV-98C, WV-500B	8.25

(L) Sales limited to extent of inventory.

Prices shown do not include state or local taxes and are subject to change or withdrawal without notice.

Test Equipment

Optional Distributor Resale Price Schedule

RCA
Instruments,
Power Supplies
and Accessories

ACCESSORIES (Cont'd)

Type	Description	Optional Distributor Resale Price
WG-302B	Slip on Tracing Probe for WO-505A	12.00
WG-304B	RF Modulator	18.00
WG-325A	Unpunched Cards for WT-110A	3.75
WG-326A (L)	Accessory Card Punch for WT-110A	5.95
WG-349A	Direct-Low Cap. Probe for WO-33A, WO-33AK	6.75
WG-350A	Demodulator Probe for WO-33A, WO-33AK	5.25
WG-351A	RF Probe for WV-77E, WV-77E-K	5.25
WG-354A	Capacitance-Type Voltage Divider Probe for WG-300B	11.00
WG-357A (L)	IF Diode Probe	4.50
WG-361A (L)	Current Measuring Adapter	5.25
WG-374A	Balanced RF Output Cable for WR-64A, WR-64B	4.50
WG-400A	Direct/Low Cap. Probe and Cable for WO-505A (with BNC Connector)	10.50
WG-401A	AC/DC Probe and Cable for the WV-510A	9.00
WG-402A	General Purpose Probe Kit for the WR-514A	9.00
WG-408A	Resistor for High Voltage Probe Used with WV-520A	3.75
WG-409A	Vector Probe	5.25
WG-410B	AC/DC Ohms Probe with .150" Dia. Cable (No Connector)	9.00
WG-411A	Slip on High Voltage Probe (less resistor)	15.00
WG-413A	Clip Leads with Dual Banana Plug for WG-412A, Power Supplies	3.75
WG-414A	3 Clip Probes with Banana Plugs	13.50
WG-421-V1	Diheptar Socket Adapter for WT-509A	6.00
WG-421-V2	Neodiheptar Socket Adapter for WT-509A	6.00
WG-421-V3	Duodecal Socket Adapter for WT-509A	6.00
WG-421-V4	Eightar Socket Adapter for WT-509A	6.00
WG-421-V5	Eightar Adapter for WT-509A	6.00
WG-421-V6	7-Pin Min. Adapter for WT-509A	6.00
WG-421-V7	Universal Socket Adapter for WT-509A	6.00
WG-421-V8	13-Pin Adapter for WT-509A	7.50
WG-422A	RF Output Cable for WR-502A	8.25
WG-423A (L)	Carrying Case for WR-502A, WV-98C	7.50
WG-425A	AC Line Adapter for WR-502A	9.00

(L) Sales limited to extent of inventory.

ACCESSORIES (Cont'd)

Type	Description	Optional Distributor Resale Price
WG-426A	RF Output Cable for WR-514A	11.25
WG-427A	Direct Cable for WR-514A (with 2 BNC Connectors)	6.00
WG-428A	BNC to Microphone (Female) Adapter	3.75
WG-429A	VF/IF 75-Ohm Terminated Adapter for WR-514A	4.50
WG-430A	Direct Cable Adapter for WR-514A (BNC to 2 Alligator Clips)	4.50
WG-431A	General-Purpose Demodulator	12.75
WG-433A	Mixer Input Adapter	11.25
WG-434A	Video/Chroma Band-Pass Detector	15.00
WG-435A	Link Detector	16.00
WG-436A	2079-Megohm Resistor for HV Probe Used with WV-510A	3.75
WG-438A	BNC to Microphone (Male) Adapter	4.50
WG-440A	39.75 MHz Crystal for WR-514A	5.25
WG-441A	Resistor for WV-519A HV Probe	3.75
WG-442A	Resistor for WV-518A HV Probe	3.75
WG-443A	Test-Lead Parts for WV-511A	12.00
WG-445A	Test Leads for WV-38A, 517A, 518A, 519A, 520A	3.75
WG-446A	Channel 4 Crystal for WR-502A, WR-508A, WR-515A	6.75
WG-447A	Carrying Case for WV-516A, WV-517A, WV-518A	5.75
WG-449A	4.5 MHz Trap Probe	10.50
WG-450A	3.58 MHz Chroma Probe	15.00
WG-452A	Rack Mounting Brackets for WV-511A	14.00
WG-453A	Carrying Case for WV-520A	7.50

COLOR TEST JIGS, TUBES

10J102	19" Test Jig — Mark II	*
10J103	19" Portable Jig — Mark III	*
10J104	19" CTC40 Series Jig	*
10J105	19" Portable CTC40 Series Jig	*
1830P22	19" 90° Rectangular Laminated Test Tube	*

* Price and delivery on request.

Prices shown do not include state or local taxes and are subject to change or withdrawal without notice.

RCA TEST EQUIPMENT WARRANTY

All factory-wired instruments, accessories, except for batteries which may be contained therein, are warranted by RCA against defects in workmanship, materials and construction, and under normal operating conditions should give satisfactory service.

RCA will repair or, at its option, replace any defective factory-wired instrument or accessory provided it is returned no later than one year after date of sale to the original user and RCA's inspection discloses that the defect was warranted hereunder. Claimants must return defective product transportation prepaid, along with a service report, to an Authorized RCA Test Equipment Service Depot (lists of such depots are available from distributors or directly from RCA). The repaired or replacement product will be shipped prepaid to the claimant without charge by RCA and will carry forward the original warranty for the balance of the one-year period. All adjustments for factory-wired instruments purchased by users are contingent upon warranty registration of the instrument with RCA at the time of purchase.

RCA is not responsible for labor other than for the RCA repairs specifically provided above, and RCA is not responsible for products which have been subjected to misuse, alteration (including the removal, defacing or alteration of identification numbers), accident, non-RCA repairs, or for products which are lost or damaged in transit.

The foregoing warranty constitutes RCA's sole liability hereunder and is in lieu of any other warranty expressed, implied, or statutory.

Free Application Notes Available

RCA will send, upon request, application notes describing the use of RCA Test Instruments in a variety of applications. The following notes are currently available and may be obtained by writing RCA, Test Equipment Headquarters, 415 S. 5th St., Harrison, N.J. 07029.

1. "Setting the 4.5 MHz Trap"
2. "Servicing Video and Chroma Amplifiers"
3. "Setting Vidicon Dark Current"
4. "Ringing Test for Yokes, Flyback Transformers and Coils"
5. "Vectorprobe AFPC Alignment"
6. "Miscellaneous Applications for the WR-514A"

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