



SENCORE TEST EQUIPMENT "WISH BOOK"

1977-78 Edition

Wishing is the first step to having:

Have a good look at these fantastic time-saving, money-making exclusive Sencore instruments, and pick out those that you'll want and need this year. Then set them in your budget to help you keep up with today's and even tomorrow's technology. New knowledge is good only if you have the latest in time-saving technology to apply what you have learned.

Consider the brand-new Sencore instruments shown on this cover, too. We'll have them in stock for you as soon as they roll off the production line.

Your Full Line Sencore Distributor



New Standard in CB Analyzing
page 6

CB42 CB ANALYZER \$975

A new CB standard that has now been approved and used by every CB manufacturer that Sencore has submitted it to. . . E. F. Johnson, HyGain, Delco, Craig, Kris, Midland, Royce, etc.



New Video Analyzer
page 22

VA48 TV-MATV-VTR & VIDEO ANALYZER \$975

A brand-new product to speed up the new, complicated circuit TV repairs, to check out MATV systems, to walk through VTR troubles and knock out those closed circuit video service jobs. A Sencore exclusive with two U.S. Patents. Available Fall 1977.



New

**Super-Accurate
Super-Protected
Digital Multimeter**

page 2

DV37 DIGITAL MULTIMETER \$248

For the first time, super .1% digital accuracy in a portable instrument with unheard-of protection to 2000 Volts on all ranges, at an unheard-of low, low price.

New

**Frequency Counter
through UHF**

**FC45 230MHz
FREQUENCY COUNTER**

A brand-new frequency counter provides direct-reading frequencies to one part per million through 230 MHz VHF, and 600 MHz UHF, too, with Prescaler.

600 MHz UHF PRESCALER \$125
Extends FC45 range to 600 MHz.



\$395

page 9

New

**Automatic Portable
Transistor Tester**

page 15

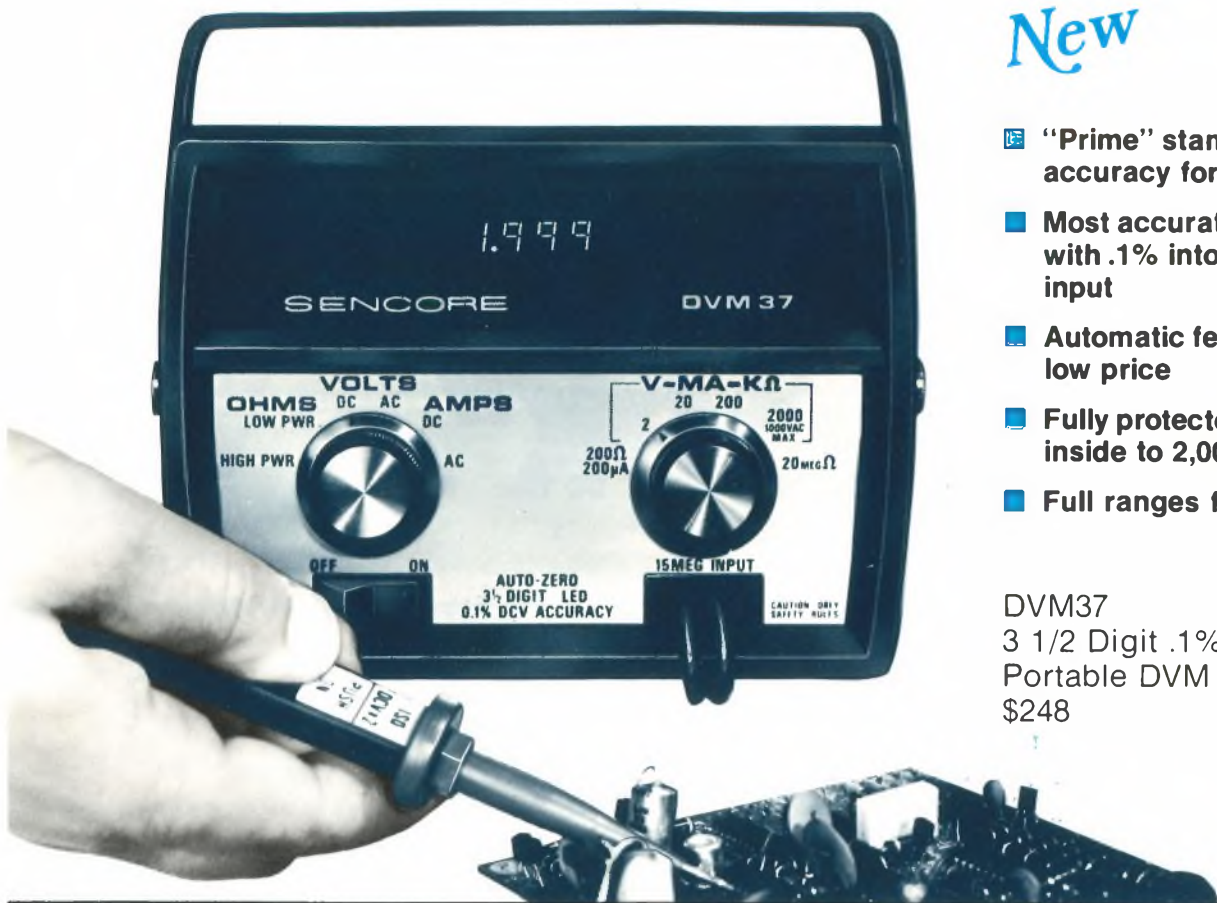
**TF46 PORTABLE
SUPER CRICKET \$195**

The famous Sencore Cricket has become completely portable and automatic, and now check parameters, too. The best of 100,000 transistor testers Sencore's experience has produced to date.



Treat yourself to a Sencore test instrument today

Your greatest weapon for IC circuit tests anywhere



New

- "Prime" standard portable accuracy for less than \$250
- Most accurate portable DVM with .1% into 15 Megohm input
- Automatic features at a low, low price
- Fully protected outside and inside to 2,000 Volts
- Full ranges for every test

DVM37
3 1/2 Digit .1% Accuracy
Portable DVM
\$248

"Prime" standard portable accuracy

Other meters may keep you guessing, but the new DVM37 provides the .1% "prime" standard accuracy you need for tests you can trust in the field or on the bench. It's a virtual necessity if you are operating or troubleshooting voltage-controlled or varactor-tuned circuits.

Most accurate .1% portable DVM you can buy

You may think that all portable .1% meters have the same accuracy specs, but what is the accuracy worth if the circuit voltage is even slightly loaded by the meter. That is why the DVM37 uses Sencore's exclusive 15 Megohm input impedance, rather than the 10 Megohm input other .1% DVMs use. This means 50% greater measuring accuracy with 1/3 less circuit loading for more confidence on every test.

Automatic features at a low price

The DVM37 saves you time on every measurement with special automatic features usually found on bench-model DVMs costing much more. You only need to select the function and range you wish. The DVM37's Automatic Zero, Automatic Polarity, Automatic Decimal, and Automatic Overrange circuits practically do all the "thinking" for you for error-free interpretations every time.

Fully protected outside and inside

The DVM37 is built tough and rugged to take the use and abuse a field meter gets. It's protected outside with an unbreakable Cyclocac® case, the same material automobile bumpers and football helmets use. And it's protected inside, too with special diode protection to 2000 Volts on every range, including ohms, plus has extra fuse and high voltage surge protection. It's virtually burn-out proof.

Full ranges for every test

You can measure 440 Volt AC lines, and test low value resistors in solid state bias circuits with the DVM37. It has full ranges for every test. Measure up to 2000 VDC and 1000 VAC directly. AC and DC current ranges go down to .1 micro-Amp resolution for leakage current safety checks. Six resistance ranges cover your needs from .1 ohm resolution on the 200 ohm scale all the way up to 20 Megohms. The Low Power Ohms function checks resistances in-circuit, too. Flip over to Hi Power Ohms for normal resistance checks and front-to-back testing of diodes.

Accessories

HP200 50KV High Voltage Probe \$25.00
39G90 Power Adapter \$ 9.95

Specifications

DC VOLTAGE: 4 RANGES: 0 to ± 2 , 20, 200, 2000 Volts
ACCURACY: .1% except 2000 VDC range = .2%
RESOLUTION: 2 mV on 2V range. **INPUT IMPEDANCE:** 15 Megohm (30 Megohm using isolation resistor).

AC VOLTAGE: 4 RANGES: 0 to 2, 20, 200, 1000 Volts
ACCURACY: .5% except 1000 VAC range = .75%
RESOLUTION: 1 mV on 2V range. **INPUT IMPEDANCE:** 1.5 Megohm shunted by less than 100 pF.

DC CURRENT: 5 RANGES: 0 to ± 200 μ A, 2, 20, 200, 2000 mA. **ACCURACY:** .3% **RESOLUTION:** .1 μ A on 200 μ A range.

AC CURRENT: 5 RANGES: 0 to 200 μ A, 2, 20, 200, 2000 mA. **ACCURACY:** 1% of reading ± 3 digits. **RESOLUTION:** .1 μ A on 200 μ A range.

RESISTANCE: 6 RANGES: 0 to 200, 2K, 20K, 200K, 2000K ohms (Low Power); 0 to 2K, 20K, 200K, 2000K ohms, 20 Megohms (High Power). **ACCURACY:** .2%. **RESOLUTION:** .1 ohm on 200 ohm range. **MAX. VOLTAGE APPLIED:** Low Power: 200 mV; High Power: 1V.

INPUT PROTECTION: 2000V (DC + peak) on all functions and ranges.

GENERAL: DISPLAY: 3 1/2 digit, 7 segment, 0.3" red L.E.D. INDICATORS: Automatic Negative Sign indicator, Automatic Decimal, Automatic Overrange (indicated by flashing "1" with remaining digits blank). A/D CONVERSION: Dual Slope method. SAMPLE RATE: 3 samples per second. FUSE: 2A fast blow, 3AG type, located in probe tip. 1/16 Amp fast blow, 3AG type, located in battery compartment. MECHANICAL: Drop-proof Cyclocac case, completely insulated. Carrying handle/tilt stand. Test leads attached. SIZE: 7" x 5" x 4" HWD (17.9 x 12.8 x 10.2 cm). WEIGHT: 2 1/2 lb. (1.0 Kg). POWER: Batteries: Four standard "C" cells Rechargeable: 39G90 Power Adapter with four rechargeable "C" cells. AC Line: 115/230 VAC 50/60 Hz when used with 39G90 Power Adapter and batteries installed for filtering.

A "prime" standard at your fingertips for measurements you can trust

- A "prime" standard at your fingertips
- Super-accurate .1% into 15 Megohm input
- Hi-I.o Power Ohms measures from .01 Ohm to 20 Megohms
- Simple to use pushbuttons with automatic operation
- Highly protected inside and shielded from RF interference



DVM38
3 1/2 Digit .1% Accuracy
Auto-Ranging DVM
\$348

A "prime" shop standard

If you're looking for that one meter you can really rely on when the going gets tough, then you want the DVM38 as your "prime" shop standard. When you consider how often you use a bench meter in engineering, QC, production, or service, you deserve a meter you can trust every time. You'll do your job better, faster, and easier with the all push-button action DVM38.

Super-accurate .1% into 15 Megohms

Measurement instruments just don't come any more accurate than the DVM38, particularly for this kind of money. Every test is super accurate to within .1% of the reading. Plus the 15 Megohm input impedance guarantees up to 50% greater measurement accuracy with 1/3 less circuit loading when compared to meters with 10 Megohm input (even 4 1/2 digit DVMs).

Full ranges of Hi-Lo Power Ohms

The DVM38 has the range you need when you need it. Measure down to .01 Ohm resolution and up to 20 Megohms with both Hi and Lo Power Ohms. Solid state circuits use some mighty small resistors and you'll want to check them all. You'll want Lo Power Ohms for measuring resistors in circuit, and you'll want Hi Power Ohms for solid state conductivity tests.



Interference-free testing near RF and magnetic fields

Simple to use with automatic operation

Just push the button and read. The DVM38 does all the work for you automatically. Auto Ranging, Auto Zero, Auto Polarity, Auto Decimal, and the large finger-sized push-buttons make the DVM38 so easy to use and easy to read. In fact, you can test DC voltages from .6V bias to 160 Volt B + in solid state circuits all day without ever having to change a range!

Highly protected and shielded

You can use the DVM38 in more places than any other meter because it is double-shielded from RF and AC line interference. It can sit right on top of a motor or a transmitter, yet it won't jump a number. You can misuse it,

Specifications

DC VOLTAGE: 5 RANGES: 0 to ± 200 mV (lower scale only), 2, 20, 200, 2000 Volts. Each range automatically increases sensitivity ten times for Auto-Range lower scale when reading is less than 1/10 of full scale. **ACCURACY:** 200 mV scale: $\pm 1\% \pm 3$ digits. All upper scale ranges: $\pm 1\% \pm 1$ digit. Auto-Range lower scale range: $\pm 1\% \pm 3$ digits. **RESOLUTION:** .1 mV on 200 mV Auto-Range scale. **INPUT IMPEDANCE:** 15 Megohm. **RESPONSE TIME:** 1 sec. max. **POLARITY:** Automatic. **ISOLATION:** 20K ohm isolation resistor built into probe. **AC REJECTION:** -60 dB at 50-60 Hz on all ranges, except -45 dB on 2000V range. **MAX. INPUT PROTECTION:** 1000V (DC + peak) all ranges. Internal diode protection.

AC VOLTAGE: 5 RANGES: 0 to 200 mV (lower scale only), 2, 20, 200, 1000 Volts. Each range automatically increases sensitivity ten times for Auto-Range lower scale when reading is less than 1/10th of full scale. **ACCURACY:** 200 mV scale: $\pm 5\% \pm 3$ digits. All upper scale ranges: $\pm 5\% \pm 2$ digits. All Auto-Range lower scales: $\pm 5\% \pm 3$ digits. **RESOLUTION:** .1 mV on 200 mV Auto-Range scale. **INPUT IMPEDANCE:** 1.5 Megohm shunted by less than 40 pF. **RESPONSE TIME:** 2 sec. max. **FREQUENCY RESPONSE:** 40 Hz to 5 KHz (-5 dB). **AC CONVERSION:** RMS reading, average detecting. **MAX. INPUT PROTECTION:** 1000 V (peak+DC).

DC CURRENT: 5 RANGES: 0 to ± 200 uA, 2, 20, 200, 2000 mA. **ACCURACY:** $\pm 3\% \pm 2$ digits. **RESOLUTION:** .1 uA on 200 uA range. **VOLTAGE BURDEN:** 200 mV on 200 uA, 2, 20 mA ranges. 300 mV or less on 200 mA ranges. 1V or less on 2000 mA range. **SHUNT RESISTANCE:** 1000, 100, 10, 1, .1 ohm for ranges above. **RESPONSE TIME:** 1 sec. max. **POLARITY:** Automatic. **MAX. INPUT**

too, without the worries of damage or downtime because the DVM38 is highly protected inside to 2000 Volts DC with special diodes and fuses. It will merely blink at you to show overrange, even if you should accidentally apply AC line voltage to the Ohms ranges.

The DVM38 outperforms meters costing \$500 or more, yet there none as complete at this price. It's ideal for the engineer or technician who wants lab accuracy, time-saving features, and unheard-of capability, but who doesn't want to pay a fortune.

Accessories:

HP200 50KV High Voltage Probe \$25.00

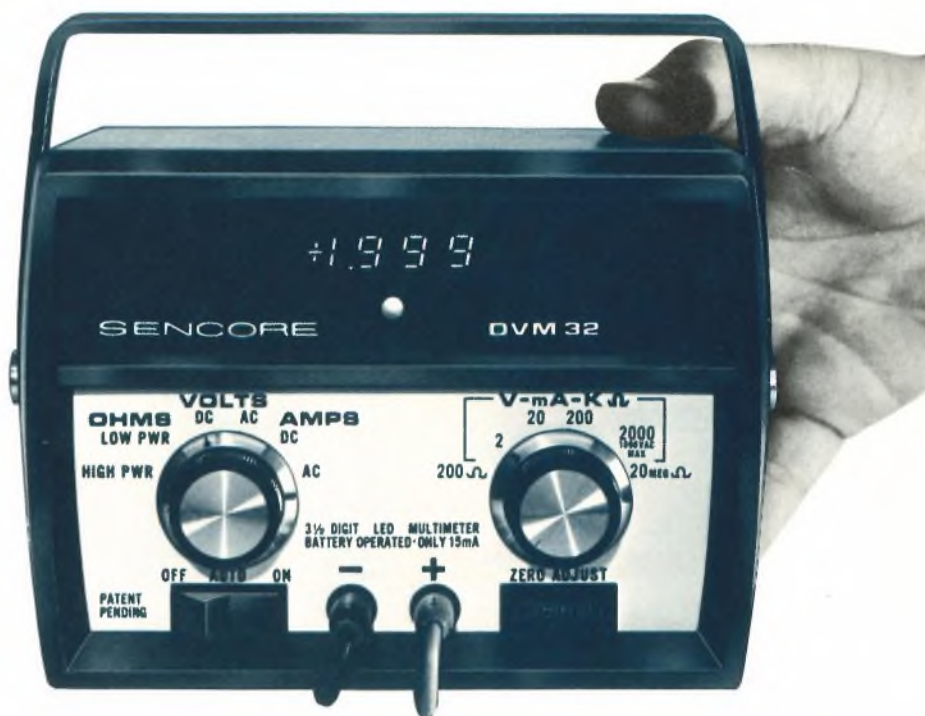
PROTECTION: 2A (fuse protected). **AC CURRENT:** 5 RANGES: 0 to 200 uA, 2, 20, 200, 2000 mA. **ACCURACY:** $\pm 1\% \pm 2$ digits. **RESOLUTION:** .1 uA on 200 uA range. **VOLTAGE BURDEN:** 200 mV on 200 uA, 2, 20 mA ranges. 300 mV or less on 200 mA range. 1V or less on 2000 mA range. **SHUNT RESISTANCE:** 1000, 100, 10, 1, .1 ohm for ranges above. **RESPONSE TIME:** 2 sec. max. **MAX. INPUT PROTECTION:** 2A (fuse protected). **RESISTANCE:** 7 RANGES: 0 to 20, 200 ohms (Lo Power only), 2K, 20K, 200K, 2000K ohm, 20 Megohm (Hi Power only). **ACCURACY:** $\pm 2\% \pm 2$ digits on Hi Power. $\pm 2\% \pm 3$ digits on Lo Power. **RESOLUTION:** .01 ohm on 20 phm range. **MAX. VOLTAGE APPLIED:** 200 mV on Lo Power, 2 V on Hi Power. **MAX. CURRENT THROUGH UNKNOWN R:** 10 mA, 1 mA, 100 uA, 10 uA, 1 uA, 100 nA for ranges above. **RESPONSE TIME:** 1 sec. max. except 3 sec. max. on 20 Megohm range. **MAX. INPUT PROTECTION:** 1000V (DC+peak) Diode and fuse protected. **GENERAL:** Display: 3 1/2 digit, 7-segment, 0.4" red L.E.D. **INDICATORS:** Automatic polarity, Automatic decimal, Automatic V and mV indicators, Automatic overrange (as blinking 999 display). **A/D CONVERSION:** Dual slope method. **SAMPLE RATE:** 3.3 samples per second. **FUSES:** Line: 3AG 2/10A fast blow. Resistance: 3AG 1/16A fast blow. Current: 3AG 2A fast blow. **MECHANICAL:** Vinyl covered steel case construction. Aluminum handle also serves as tilt stand. **SIZE:** 5.5" x 7.83" x 9" HWD (14 x 19.9 x 22.9 cm). **WEIGHT:** 6.5 lb. (3 Kg). **POWER:** 105-130 VAC, 50/60 Hz, .7W. CSA approved. (230 VAC conversion available).

Bench and field master for digital accuracy measurements . . . anywhere

- Tough, portable DVM for today's circuits
- .5% lab accuracy anywhere
- Protected inside and outside
- Battery-saving automatic display
- Hi-Lo Ohms checks resistances in-circuit

DVM32
3 1/2 Digit .5% Accuracy
Portable DVM
\$198

PATENTED



Tough, portable DVM for today's circuits

Tomorrow's circuits are here today, and that "old reliable" VTVM or VOM just won't tell you what you need to know in solid state and IC circuits. The DVM32 can . . . anywhere in the field or the shop.

.5% lab accuracy anywhere

The DVM32 is tough, but accurate, too. Use it anywhere with battery operation, or plug it into the optional 39G90 Power Adapter for AC line operation. Either way, you get reliable readings every time with .5% DCV accuracy and 3½ digit resolution. The DVM32 is even more accurate than other .5% meters, too, because it is backed with 15 Megohm input impedance for 50% greater measuring accuracy with less circuit loading.



Tough portable keeps on working after 10 foot drop

Protected inside and outside

You can forget about broken meters and burned-out range resistors with the DVM32. It's protected outside with a rugged and durable Cyclocac[®] case—the same material that football helmets are made of. Plus it is both diode and fuse protected inside to 2000 Volts DC and 1000 Volts on every other function and range.

Battery-saving automatic display

A patented auto-off feature automatically turns off the 100 mA current used to light the display during the times that you are not making voltage tests. Only 15 mA is drawn to make the batteries last and last. The display turns on the instant you apply a voltage, though.

Hi-Lo Power Ohms in-circuit tests

Resistance measurements in solid state circuits are fast and error-free when you switch to Lo Power Ohms to prevent the semiconductors from conducting and upsetting your reading. Then you can switch over to Hi Power Ohms for front-to-back ratio testing or standard resistance checks.

Want to update for solid state with just one DVM for any bench or field job? Then put the DVM32 to work for you.

Accessories

HP200 50KV High Voltage Probe \$25.00
39G90 Power Adapter \$ 9.95

Specifications

DC VOLTAGE: 4 RANGES: 0 to ±2, 20, 200, 2000 Volts. ACCURACY: .5% RESOLUTION: 1 mV on 2V range. INPUT IMPEDANCE: 15 Megohm. RESPONSE TIME: 2 sec. max. POLARITY: Automatic. ISOLATION: 200K ohm resistor in probe. AC REJECTION: 40 dB at 60 Hz. MAX. INPUT PROTECTION: 2000 Volts (DC+peak) on any range. Internal diode plus back-up fuse protection. (Fuse in battery compartment).

AC VOLTAGE: 4 RANGES: 0 to 2, 20, 200, 1000 Volts rms. ACCURACY: ±1.5% at 50–60 Hz. RESOLUTION: 1mV on 2V range. INPUT IMPEDANCE: 1.8 Megohm shunted by less than 18 pF.

DC CURRENT: 4 RANGES: 0 to ±2, 20, 200, 2000 mA. ACCURACY: 1% RESOLUTION: 1 uA on 2 mA range.

AC CURRENT: 4 RANGES: 0 to 2, 20, 200, 2000 mA. ACCURACY: 1.5%. RESOLUTION: 1 uA on 2 mA range.

RESISTANCE: 6 RANGES: 0 to 200, 2K, 20K, 200K, 2000K ohms (Lo Power); 2K, 20K, 200K, 2000K, 20 Megohm (Hi Power). ACCURACY: 1% except 5% on 20 Megohm range. RESOLUTION: .1 ohm on 200 ohm range. MAX. VOLTAGE APPLIED: Lo Power: 80 mV max.; Hi Power: 800 mV max.

GENERAL: DISPLAY: 3½ digit, 7-segment 0.3" L.E.D. INDICATORS: Automatic polarity, Automatic decimal, L.E.D. pilot light, Automatic overrange (as blinking "1" with "000" readout). A/D CONVERSION: Single slope method. SAMPLE RATE: 2 samples per second. FUSES: 2A Fast blow, 3AG-type for current and voltage functions. 1/16A Fast blow, 3AG-type for ohms functions. Fuses located in battery compartment. MECHANICAL: Drop-proof Cyclocac case, completely insulated. Handle/tilt stand. SIZE: 7" x 5" x 4" HWD (17.8 x 12.8 x 10.2 cm). WEIGHT: 2¼ lbs. (1.0 Kg) with batteries. POWER: Battery-saving Auto-Off Display (Patented), turns display off when reading is 010 or less. Batteries: Four standard 1½V "C" cells. Rechargeable: Uses optional 39G90 Power Adapter with four rechargeable 1½V "C" cells. AC line: Uses optional 39G90 Power Adapter into 120/230 VAC, 50/60 Hz with batteries installed for filtering.

Pocket portable lab-accurate performance that fits every budget

- Lab accuracy in a portable meter
- Tough protection inside and outside
- Battery-saving PushOn probe
- Tests resistances in-circuit



DVM36
3 1/2 Digit .5% Accuracy
Pocket Portable DVM
\$158

Lab accuracy in a portable meter

The DVM36 has the same .5% accuracy and 3½ digit resolution that is normally found in the large, expensive digital multimeters. Yet it goes anywhere in the lightweight, pocket-sized case that fits your pocket or tool case. It's AC operated for the bench, too, with the accessory PA202 Power Adapter.

Tough protection inside and outside

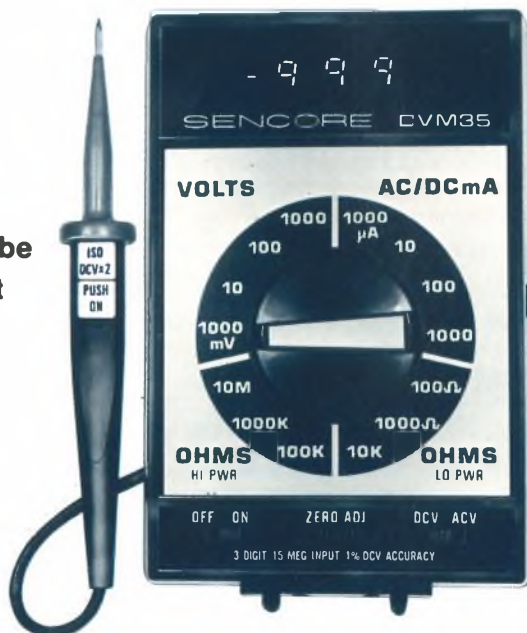
You might imagine that you would have to treat the DVM36 like a delicate China doll, but you can drop it, overload it with 2000 Volts DC, apply AC voltage to the Ohms scale, and it keeps on working. Why? The DVM36 is built tough inside with 2000 Volt DC protection and a back-up fuse in the probe, and it's built tough outside with an unbreakable Cylolac® case.

Battery-saving Push-On probe

Battery life is extended to unbelievable hours because you use the battery power only when you need it. Simply push the thumb-sized "Push On" button in the probe, and only then do you draw current. Release the button when you're finished to keep the power in reserve for your next job.

Fast, direct reading digital accuracy for the man on the go

- Fast, direct-reading portable digital accuracy
- 1%, 3 digit accuracy
- Tough protection inside and outside
- Battery-saving PushOn probe
- Tests resistances in-circuit



DVM35
3 Digit 1% Accuracy
Pocket Portable DVM
\$134

Now you can enjoy easier, faster and error-free readings with a rugged portable digital multimeter — at less price than many analogs. The DVM35 puts portable 1% digital accuracy in the palm of your hand for ten times more accurate measurements than you're getting now with pointer-type meters. This 3-digit 1% accuracy is backed by Sencore's 15 Megohm input impedance for minimum circuit loading.

Tough protection inside and outside

You won't need to handle the DVM35 with "kid gloves". The rugged Cylolac® case is built so strong and tough that it will last and last without the need for the protective accessory cases other portable meters require. Plus, you'll save money on instrument repairs with the DVM35's tough protection against measurement errors. Built-in overload protection goes to 1000 Volts on all ranges (including Ohms), and the probe tip holds back-up fuse protection.

Battery-saving Push-On probe

The DVM35's standard "AA" batteries won't let you down because battery life is extended with the exclusive "Push On" switch in the probe. Snap the button with your finger to apply the power only when you make a test.

Specifications

DVM36
DC VOLTAGE: 4 RANGES: 0 to ±2, 20, 200, 1000 Volts. ACCURACY: ±0.5%. RESOLUTION: 1 mV on 2V range. INPUT IMPEDANCE: 15 Megohm. (30 Megohm using isolation resistor).
AC VOLTAGE: 4 RANGES: 0 to 2, 20, 200, 1000 Volts. ACCURACY: ±1% of reading ±2 digits at 50–60 Hz. RESOLUTION: 1 mV on 2V range. INPUT IMPEDANCE: 15 Megohm shunted by less than 60 pF.
AC/DC CURRENT: (Total average sum of AC and DC current is indicated). 4 RANGES: 0 to ±2, 20, 200, 2000 mA. ACCURACY: DC: 1%; AC: 1.5%.
RESISTANCE: 6 RANGES: 0 to 200, 2K, 20K ohms (Lo Power); 200K, 2000K, 20 Megohm (Hi Power). ACCURACY: ±1%±2 digits. MAX VOLTAGE APPLIED: Lo Power: 200 mV max; Hi Power: 2V max.

DVM35
DC VOLTAGE: 4 RANGES: 0 to ±1000 mV, 10, 100, 1000 Volts. ACCURACY: ±1%. RESOLUTION: 1 mV on 1000 mV range. INPUT IMPEDANCE: 15 Megohm (30 Megohm) using isolation resistor.
AC VOLTAGE: 4 RANGES: 0 to 1000 mV, 10, 100, 1000 Volts. ACCURACY: ±1.5% at 50/60 Hz. RESOLUTION: 1 mV on 1000 mV range. INPUT IMPEDANCE: 15 Megohm shunted by less than 60 pF.
AC/DC CURRENT: (Total average sum of AC and DC current is indicated). 4 RANGES: 0 to 1000 uA, 10, 100, 1000 mA. ACCURACY: ±2%.
RESISTANCE: 6 RANGES: 0 to 100, 1000, 10K ohms (Lo Power); 100K, 1000K, 10 Megohms (Hi Power). ACCURACY: ±2%±2 digits. MAX VOLTAGE APPLIED: Lo Power: 200 mV max.; Hi Power: 1V max.

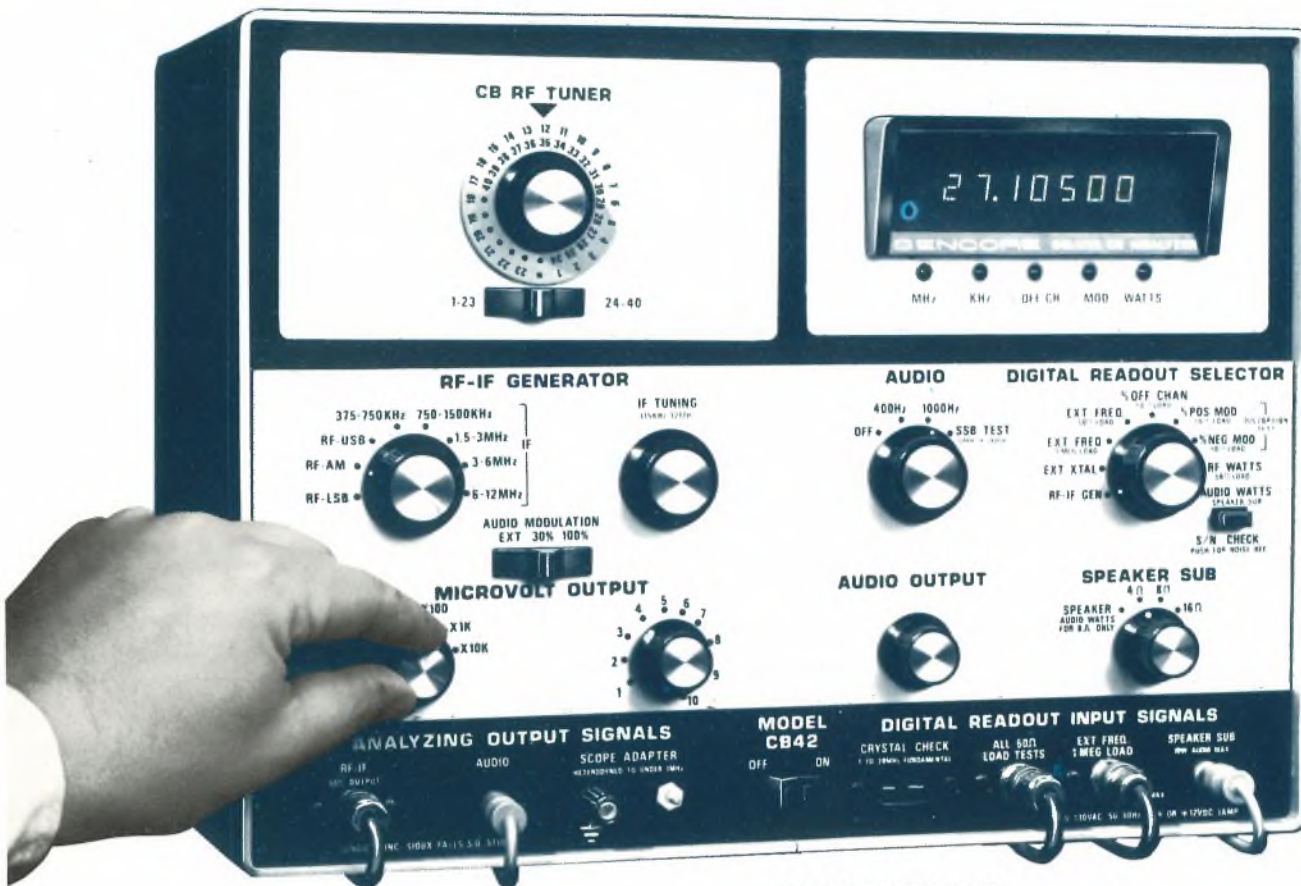
BOTH DVM36 & DVM35

GENERAL: DISPLAY: 3½ digit on DVM36, 3 digit on DVM35. 7-segment, 0.3" red L.E.D. INDICATORS: Automatic negative sign, Automatic decimal, Automatic over-range (as blinking display). **MECHANICAL:** Drop-proof Cylolac case, completely insulated. **SIZE:** 6" x 4" x 1½" HWD (15.2 x 10.2 x 3.2 cm). **WEIGHT:** 1.1 lb. (.5 Kg) including batteries. **POWER:** Batteries: Six 1½ Volt "AA" cells. Rechargeable: PA202 Power Adapter used with six 1½ Volt "AA" NiCad rechargeable cells. AC line: 105-130 VAC, 50/60 Hz when used with PA 202 Power Adapter and batteries installed for filtering.

Accessories

HP200 50KV High Voltage Probe \$25.00
PA202 Power Adapter \$ 9.95

Walk the troubles out of all 40 CB channels in seconds



PATENT PENDING

You may be thinking of breaking into CB service, just as many other technicians have done who are increasing their business profits in the growing CB market. These techs have found that CB fits in well with their radio, TV, and other electronic experience. Yet you may have checked and found that other CB equipment costs thousands of dollars, or required connections between separate units with a tangle of cables and many controls to fiddle with.

Everything you need in one instrument

The CB42 has everything that you need for testing and troubleshooting any CB transceiver from the antenna through the speaker, and from the mike back to the antenna again. It's a total CB service bench for any AM or SSB rig in one compact, easy-to-use instrument, and costs hundreds of dollars less than any competitive system.

Direct readout of transmitter tests

Read the CB's RF power, channel frequency, percent modulation, and modulation distortion directly on the digital meter for fast, calibration-free readings. The results of these automatic performance tests will often lead you directly to the problem before you remove the CB's case when you start the job, and assure you and your customer of maximum FCC performance when the job is finished.

Uses only three connecting cables

You need only three cable connections to the CB42 for every testing job: one for the receiver input, one for the transmitter output, and one for the audio output. It's the only CB analyzer on the market that makes connecting to the CB this simple to save your time, and the only one that includes the cables with the instrument to save your dollars.

Simplified channel checking

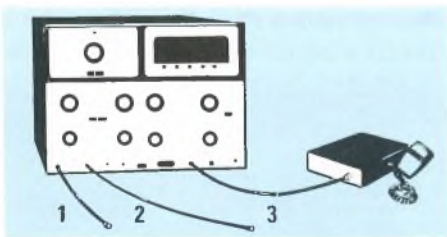
The exclusive CB42 Percent Off-Channel test (patent pending) allows you to check all 40 channels in seconds. Simply rotate the CB and CB42 channel selector knobs to the same channel and read the percentage error directly on the meter to be sure the error is less than .005%, as required by the FCC. The accuracy is up to 50 times better than the FCC specs.

Troubleshoots every receiver stage

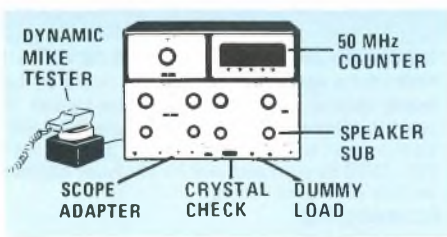
Every RF, IF, audio, and alignment signal is at your fingertips to walk through receiver troubles on any AM or SSB CB. The crystal-controlled 40 channel PLL RF tuner and the full range IF generator for both 1st and 2nd IF frequencies save your service time as you step through each RF and IF stage without changing cables. All the audio signals are at hand, too, for injecting through the audio and squelch circuits, all the way to the speaker itself.

Makes receiver sensitivity test a snap

You'll want to be sure that your customer can hear as far as he can talk on his CB, so you'll want to make a check of the total receiver's sensitivity. The built-in generator output attenuator is directly calibrated in microVolts down to .1 microVolt to make the sensitivity test the way the CB manufacturers recommended.



Time-saving hook-up to CB



Complete CB service center

- at FCC specs

- Everything you need to service CB in one instrument
- Uses only three connecting cables to CB
- Troubleshoots every receiver stage
- Direct digital readout of all transmitter tests
- Simplifies channel checking for .005% FCC frequency limits

CB42
Automatic CB Analyzer
\$975



Check all single sideband CBs, too

The CB42 checks all SSB transceivers as well as the standard AM sets, and just as easily, too. Now you can really make your service charges stick on these higher-priced units.

It's a complete service center with extra features

The CB42 has additional features, too, that make it a complete service center for CB so you don't get stopped by the equipment half-way through the job. A 12 Watt Dummy Load and a Speaker Substitute are built in to keep your bench clean from additional cables. You can troubleshoot through the circuits using the built-in 50 MHz frequency counter, and even check the crystal frequencies on the Crystal Check. And a dynamic microphone tester is included, too.

CB manufacturer approved

As recommended by many major CB manufacturers, the CB42 is the one instrument you need to get out more CBs in less time than any other way. It is approved and used by every CB manufacturer. Sencore has submitted it to, including E.F. Johnson, HyGain, Craig, Kris, Midland, Royce, and many others.

Specifications

RF/IF GENERATOR: METHOD: Crystal-controlled, digitally programmed phase lock loop. RANGE: CB AM: 40 standard FCC Class D channels, switch selected. CB SSB: EIA standard 1000 Hz (± 100 Hz) above (USB) or below (LSB) main channel. IF: 375 KHz-12 MHz in 5 bands. Continuously variable. CRYSTAL ACCURACY: $\pm 0.001\%$ (1 ppm) 25°C. $\pm 0.01\%$ (10 ppm) 15°-35°C. MODULATION: Internal: AM modulation at 0, 30, or 100% (400, 1000 Hz, or SSB Tone 500 + 2400 Hz). External: Input on rear of case. DISPLAY: 7 digits, 10 Hz resolution. OUTPUT RANGE: .1 μ V-1V in 6 steps, continuously variable. IMPEDANCE: 50 Ohm.

SIGNAL-TO-NOISE CHECK: METHOD: Standard EIA test. Audio Power Wattmeter sensitivity is increased 10 dB for Noise Reference. RF sensitivity is indicated when same audio watts readout is obtained with S + N signal.

AUDIO POWER WATTMETER: METHOD: Peak detecting. RMS-reading power of sine wave across fixed load. RANGE: 0-200 Watts RMS. ACCURACY: $\pm 5\%$. LOADS: INTERNAL 4, 8, or 16 Ohms. EXTERNAL: Connect in parallel with speaker. Calibrated for 8 Ohms. DISPLAY: 3 1/2 digit 0.01 Watt resolution.

PERCENT OFF-CHANNEL TEST: METHOD: Display percent frequency deviation of transmitter compared to FCC CB AM channel switch frequency. RANGE: 0.0-100.000% transmitter error. ACCURACY: $\pm 0.002\%$ (25°C). $\pm 0.02\%$ (15°-35°C). DISPLAY: 6 digits. 0.0001% resolution.

PERCENT MODULATION AND DISTORTION TEST: METHOD: Indicates percentage continuous tone AM modulation, positive or negative. Compares peak audio to average RF carrier. RANGE: 0 to over 100%. ACCURACY: $\pm 5\%$ of reading (30-100%). DISPLAY: 3 1/2 digit, 1% resolution. **DISTORTION TEST:** Presence of audio modulator distortion is indicated by comparison of pos and neg levels (80% to 95% pos mod typical limits at 90% neg mod).

RF POWER WATTMETER: RANGE: 0-20 Watts Peak Envelope Power (PEP). 20-30 MHz. ACCURACY: $\pm 5\%$ of reading, (2-20 WPEP). IMPEDANCE: 50 Ohm. DISPLAY: 3 1/2 digits, 0.01 Watt resolution.

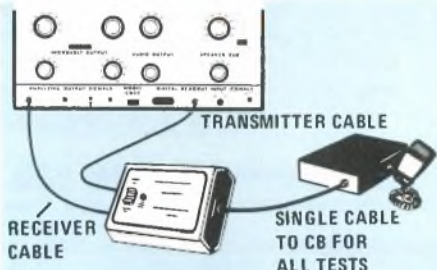
AUDIO GENERATOR: FREQUENCY: 400, 1000 Hz, and EIA SSB tone (500 + 2400 Hz). OUTPUT: 0.4 V P P 8 Ohm load. **FREQUENCY COUNTER:** DISPLAY: 7 digit, Auto-Ranging with KHz, MHz indicators. RANGE: 50Hz-50MHz (guaranteed) 55 MHz (typical). ACCURACY: $\pm 0.001\%$ (1 ppm) 25°C. $\pm 0.01\%$ (10 ppm) 15°-35°C. INPUT IMPEDANCE: 1 Megohm. RESOLUTION: 10 Hz. SENSITIVITY: 300 mW (50 Ohm input, 20 Watts PEP max), 25 mV (1 Megohm input, 50 Hz-30 MHz).

CRYSTAL CHECK: METHOD: Parallel resonant circuit for fundamental crystal frequency. RANGE: 1 to 20 MHz. ACCURACY: $\pm 0.001\%$ (25°C) $\pm 0.01\%$ (15°-35°C). DISPLAY: 7 digit, 10 Hz resolution.

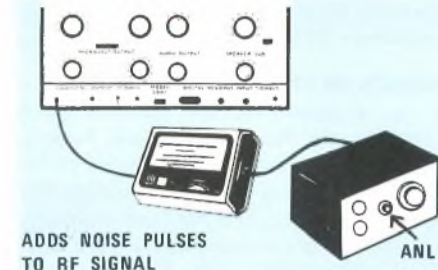
SCOPE ADAPTER: OUTPUT METHOD: Heterodynes RF signal for input to 1 MHz oscilloscope. RF RANGE: CB channels 1 to 40 (26.965-27.255 MHz). LOCAL OSCILLATOR: 26.940 MHz. OUTPUT VOLTAGE: .5V P P per 1 Watt RF. FREQUENCY: 25-315 KHz.

GENERAL: DISPLAY: 7 digit, 7 segment, red L.E.D., 0.3", INDICATORS: Automatic decimal position. L.E.D. function indicators. MHz, KHz, % Off Channel, % Modulation, Watts. FUSE: 2A fast blow, 3AG type. ELECTRICAL: All solid state circuitry, including CMOS LSI. MECHANICAL: Vinyl-covered steel and aluminum trim construction. Carrying handle. Lead storage compartment in back. SIZE: 11" x 14" x 11" (HWD). (28 cm x 35.5 cm x 28 cm). WEIGHT: 24 lb. (10.9 Kg). POWER: 120 VAC, 50/60 Hz, 15 Watts or 12 VDC, 1 A. CSA approved. (230 VAC conversion available). ACCESSORIES: Cables included. 39G102 Dynamic Mike Tester included.

Accessories:

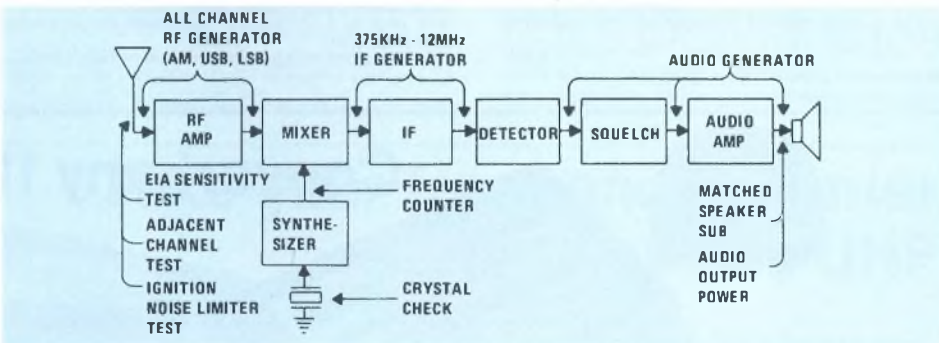


RFS205 RF CHANGEOVER SWITCH for simplified CB tests without cable changeover \$25.00

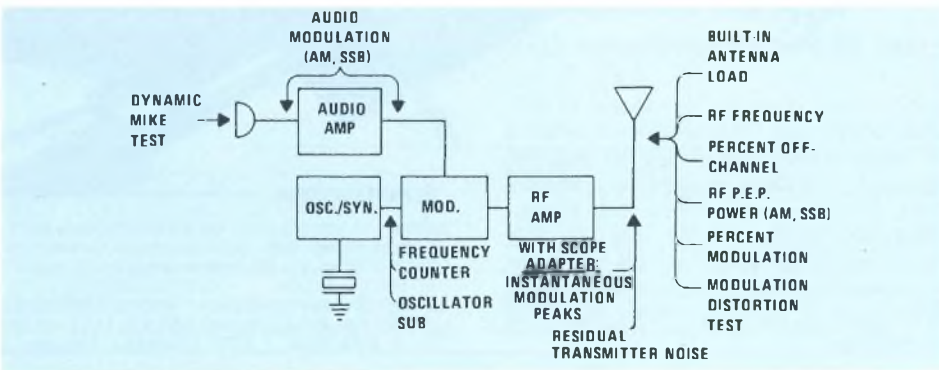


NL204 EIA NOISE PULSE SIMULATOR simulates ignition noise for testing \$35.00

Walk through all Receiver troubles



Walk through all Transmitter troubles





Test right at the antenna - Sensor connects between antenna cable and the CB.



Get your CB customers out 3 miles further in 1/3 the time with 3 simple pushbuttons

- Automatically tests CB Power, SWR, and Percent Modulation
- Self-calibrating pushbutton operation
- Adjusts SWR with meter at antenna

CB41 Automatic CB Performance Tester
\$148

Are you standing on your head and running around the car for each antenna adjustment with your present CB tester? You can avoid all that back-breaking, time-wasting work with the automatic CB41.

Automatic 40 channel CB tests

You can automatically test standing wave ratio (SWR), RF Power output, and Percent Modulation at the push of a button on all 40 CB channels. Testing takes only seconds because you simply connect the built-in Sensor unit between the CB and antenna cable, and punch the buttons. That's all.

Self-calibrating pushbutton operation

The CB41 is so fast to use because it has none of the adjustments to fiddle with that other testers have. The automatic, self-calibrating circuits do all the "thinking" for you. You simply switch the CB through all CB channels and read the meter directly. The tests are all the same for either AM or SSB.

Test with meter at the antenna

Only the CB41 lets you make final antenna SWR adjustments with the meter right at the antenna, even on a station wagon or 18 wheeler. The accessory EX203 12 foot Extension Cable lets you move all the way back to the antenna for error-free tests with the car doors closed, as open doors can upset your readings.

Customer-convincing Good-Bad scale

The color-coded meter scale helps you show

the customer that the SWR is in the good area, that the CB is putting out near the four Watt range, and that the mike is modulating the signal. There is nothing like a happy customer who has been shown peak performance on his CB to bring in more business through your door.

Accessories:

- EX203 12 FOOT EXTENSION CABLE for measuring SWR at the antenna \$9.95
- PA202 POWER ADAPTER for AC operation \$9.95

Specifications:

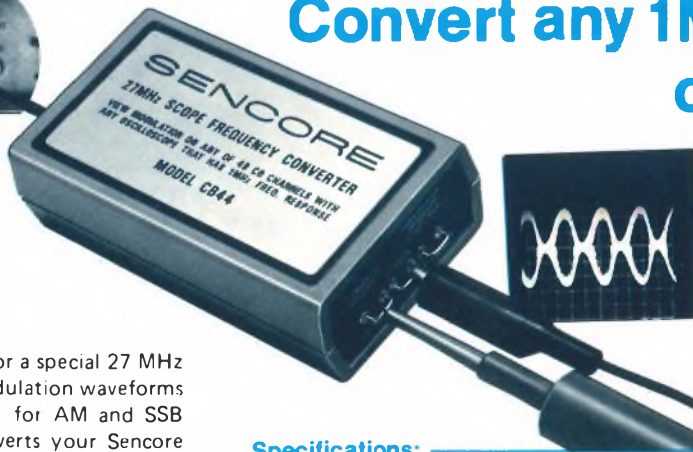
RF WATTS TEST: FREQUENCY RESPONSE: Flat for 20-30 MHz. RANGE: 0-25 Watts PEP. ACCURACY: $\pm 3^\circ$ arc. **SWR TEST:** RANGE: 1 to infinity (∞). TEST METHOD: Self-calibrating compares forward and reverse power ratio. ACCURACY: $\pm 5^\circ$ arc from SWR=1.0:3.0. INPUT: 1-15 Watts PEP for rated accuracy. **PERCENT MODULATION TEST:** RANGE: 0 to 100%. TEST METHOD: (AM only) Self-calibrating. Refers P-P detected audio to average RF power. ACCURACY: $\pm 5\%$ FS with input of 1-12 Watts PEP. Calibrated for continuous tone modulation. **39G101 SENSOR HEAD: ANTENNA:** Internal non-inductive dummy load or loop-through to external antenna. IMPE-

DANCE 50 Ohm, unbalanced. **POWER CAPABILITY:** 25 Watts PEP intermittent duty. 6 Watts average RF power continuous. **CONNECTIONS:** PL259 Female output PL259 Male input on 16" coax stub. 4 conductor connector to unit. **GENERAL:** POWER: 7.2-10 VDC, 8 mA Batteries: Two 9 V radio batteries (Eveready No. 216 or equivalent) Rechargeable: PA202 Power Adapter used with two 9 V rechargeable cells. AC Line: 105-130 VAC, 50/60 Hz when used with PA202 Power Adapter and batteries installed for filtering. **METER:** 4 1/2" moving coil. 100 uA 1900 Ohm $\pm 2\%$ FS. Spring protected jeweled pivots. SIZE: 10" x 5 1/2" x 3 1/2" HWD (25.6 x 14.1 x 9.0 cm). WEIGHT: 4 1/2 lb. (2.0 Kg).



Convert any 1MHz scope to a 40 channel CB scope

New



- No conversions necessary
- Much-needed built-in 12 Watt Dummy Load

CB44 27MHz CB Scope Frequency Converter
\$75

Save hundreds of dollars for a special 27 MHz scope to view your CB modulation waveforms for checking distortion or for AM and SSB alignment. The CB44 converts your Sencore scope, or other service scope with at least 1 MHz bandwidth, to a CB scope for only \$75. It puts your scope into the CB action by automatically converting the 27 MHz CB signal down to less than 1 MHz for all 40 CB channels.

Specifications:

INPUT: 50 Ohm Dummy Load. **POWER:** 12 Watts (PEP) at 4 Watts average. **SWR:** 1.3:1 maximum. **CONNECTOR:** PL259 UHF plug to CB antenna output jack through 22" RG-58C/U coax cable. **OUTPUTS:** Converted frequency to scope: **FREQUENCY:** 200-800 KHz (for CB channels 1-40) **VOLTAGE:** 0.8 VP-P for 4 Watts input $\pm 10\%$. Transmitted Frequency to

Counter: **FREQUENCY:** 26.965-27.405 MHz (for CB channels 1-40). **VOLTAGE:** 2.4 VP-P maximum. **CONVERTER OSCILLATOR FREQUENCY:** 26.865 MHz $\pm 1\%$. **POWER:** Derived from RF input signal. 1 Watt minimum required for operation. **SIZE:** 1 3/8" x 2 3/4" x 4 1/2" HWD (3.5 x 7 x 11.4 cm). **WEIGHT:** 9 1/2 oz. (.27 Kg).

A frequency counter you can really count on from audio through 230 MHz VHF

- Covers audio through VHF (and UHF, with PR47 Prescaler)
- Better than FCC accuracy
- High sensitivity for circuit testing
- Easy-to-use pushbuttons and direct readout



FC45
230MHz Frequency Counter
\$395

If maintaining high accuracy frequency tolerances is critical to keeping your FCC license and your business, or essential to your design or service job, you can't afford to use a frequency counter that counts you out when you need sensitive high frequency tests at FCC specs.

Covers audio through VHF

The FC45 has an extremely wide frequency range coverage for every use from audio through 230 MHz VHF. It will even go to 600 MHz UHF with the PR47 Prescaler, equipping you for any frequency test you may encounter.

Better than FCC accuracy

Every reading is at least five times better than FCC standards with the FC45's .0001% (1 ppm) accuracy. A high accuracy reference crystal enclosed in a temperature-controlled oven insures this accuracy through the entire frequency range and under 0-40° C temperatures.

High sensitivity for circuit testing

High 25 millivolt sensitivity all the way through 230 MHz means that you can use a pick-up loop in low level circuits without loading. Now you can trace frequencies all the way through oscillators, amplifiers, and high power stages with full confidence that your reading is 100% accurate.

Specifications

INPUTS: 50 Ohm impedance, 12 Watt load, BNC Connector. 1 Megohm impedance, BNC Connector. Crystal Check, Universal plug-in socket.
METHOD: 30 Hz to 30 MHz Direct frequency counting. 30 MHz to 230 MHz frequency divided by ten through built-in prescaler. Crystal Check circuit for fundamental crystal frequency.
FREQUENCY RANGE: 1 MEGOHM INPUT: 30 Hz to 230 MHz. 50 OHM INPUT: 100 KHz to 230 MHz. CRYSTAL CHECK: 1 to 20 MHz fundamental frequency.
ACCURACY: ± 1 ppm (.0001%) ± 1 count. (0° to 40° C ambient temperature after ten minute warmup.)
SETABILITY: ± 0.1 ppm (.00001%)
REFERENCE CRYSTAL: 10 MHz (± 1 ppm) within temperature-controlled oven.
AVERAGE AGING RATE: 1 ppm/6 mo. after 1st 30 days.
RESOLUTION: 30 Hz-30 MHz: 1 Hz (1 sec read rate), 10 Hz (1 sec read rate), 30 MHz-230 MHz: 10 Hz (1 sec read rate), 100 Hz (1 sec read rate).
SENSITIVITY: 50 OHM INPUT: 10 mWatt avg. 1 MEG-

Accessories:

PL207 PICK-UP LOOP for probing in low-level or high-power circuits without loading or connections . . . \$9.95
 NE206 RF Noise Eliminator (for removal of RF riding on lower frequency waveforms) . . . \$25.00

OHM INPUT: 20 mV (30 Hz-30 MHz), 25 mV (30 MHz-100 MHz), 25 mV @ 100 MHz-400 mV @ 230 MHz.
INPUT PROTECTION: 50 OHM INPUT: Diode protected to 12 Watts, Fuse protected over 12 Watts (3AG .5A fast blow). 1 MEGOHM INPUT: Diode protected, 250 VP-P (30 Hz-10 KHz), 50 VP-P (10 KHz-30 MHz), 8.48 VP-P (30 MHz-230 MHz).
GENERAL: DISPLAY: 8 digit, 7 segment red 0.5" LED automatic decimal, Hz and MHz indicators. CONSTRUCTION: Vinyl-covered steel case with aluminum panel and trim. Adjustable tilt stand/carrying handle. POWER: 105-130 VAC, 50/60 Hz, 30 Watts or 12 VDC 2.2 A max. (220 VAC conversion available) +9 VDC output jack on front panel for use with PR47 UHF Prescaler. SIZE: 5 1/2" x 7 7/8" x 9" (HWD) (14 x 19.9 x 22.9 cm). WEIGHT: 6.5 lb (3 Kg).
SUPPLIED ACCESSORIES: 39G111: 12 VDC Power leads with in-line fuse. 39G112: Direct/Isolation test probe.



PR47 600 MHz
UHF Prescaler \$125

Extends counter range to 600 MHz

The PR47 Prescaler extends the 230 MHz frequency range of the FC45 counter all the way to 600 MHz UHF. It quickly connects between the test lead and the counter to fully equip you for UHF band testing on land mobile transmitters, scanners, aircraft radio and navigation, amateur equipment, and many other uses.

Accessories:

PA202 POWER ADAPTER for AC operation (Not required when PR47 is used with FC45) . . . \$9.95



Take your frequency counter all the way into UHF

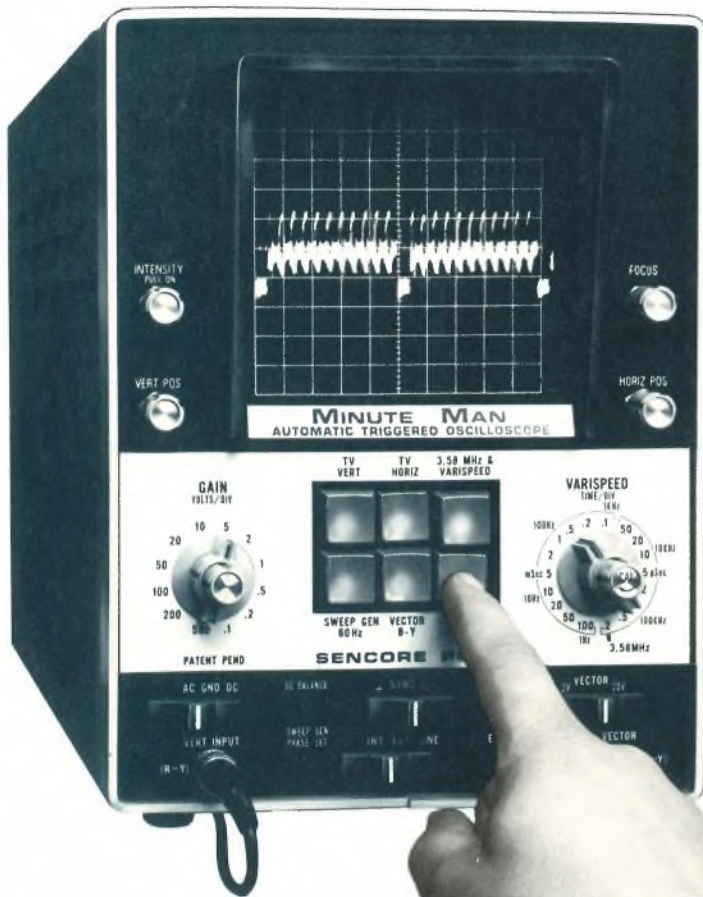
- Extend any 60 MHz frequency counter range to 600 MHz
- FCC accurate with FC45
- High sensitivity for circuit tests

Specifications:

FREQUENCY: 1-600 MHz input frequency is divided by ten for 100 KHz-60 MHz output.
INPUT SENSITIVITY (for typical input counting range): 1 mW-1 W (250 mV-7 V) for 1-200 MHz, 1-200 mW (250 mV-3 V) for 200-400 MHz, .8-12 mW (200-800 mV) for 400-500 MHz, .5-5 mW (150-500 mV) for 500-600 MHz.
INPUT IMPEDANCE: 50 Ohm.
INPUT PROTECTION: 1 W (7 Vrms) from 1 to 400 MHz, 5W (5 Vrms) from 400 to 500 MHz, 25 W (3.5 Vrms)

from 500 to 600 MHz.
OUTPUT: 1 V P-P, TTL compatible. Direct plug-in to FC45 1 Megohm input jack.
GENERAL: POWER REQUIREMENTS: 7-12 VDC at 100-150 mA. Uses supplied cable to +9 VDC jack on FC45, or PA202 Power Adapter for AC line operation. SIZE: 1 3/8" x 2 3/4" x 4 1/2" HWD (3.5 x 7 x 11.4 cm). WEIGHT: 9 1/2 oz. (.27 Kg). SUPPLIED CABLES: PL207 RF Pick-Up Loop, 39G116 DC Power Cable.

It's a pushbutton automatic triggered video oscilloscope



- The only pushbutton automatic scope for any color TV & video service
- Just push a button for pre-set, pre-"synced" video waveforms
- It's a wideband general purpose 10 MHz scope, too
- Exclusive burnout-proof 5000 VAC input protection



PS29 MINUTE MAN Automatic Triggered Oscilloscope \$595

PATENTED

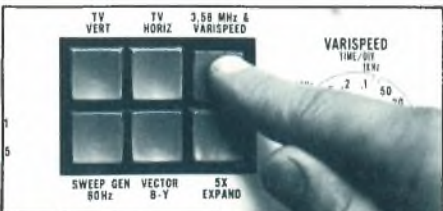
Are you still fiddling and twisting the knobs on your scope for TV and video servicing? Now enjoy the PS29—the pushbutton video troubleshooter that frees you from all that time-consuming scope set-up.

It's a pushbutton automatic triggered video oscilloscope

The PS29 is called the Minute Man because it is especially designed for fast, fiddle-free troubleshooting for all color TV, VTR, and video servicing. It is the only completely automatic pushbutton triggered scope you can buy, backed with actual TV sync separator circuits and automatic triggering to guarantee solid, jitter-free sync on even the hardest-to-hold video waveforms.

Just push a button

Just push a button to select the waveform you want. Everything is automatically pre-set and pre-"synced" for each of these six video displays: (1) Vertical rate, (2) Horizontal rate, (3) 3.58 MHz Color, (4) 60 Hz Sweep Generator, (5) Vector input, and (6) Five times expand. What you push is what you get. It's that simple to use.



Just push the pre-programmed buttons

It's a wide band general purpose scope, too

The PS29's speed and ease of operation don't stop with video waveforms. It can be used for any general purpose work that a single trace scope normally performs up to 10 Megahertz. Simply push the "Varispeed" button, and use the Varispeed control for horizontal sweep time or frequency settings, the same as you would on any other scope. Automatic triggering backs you here, too, for rock-solid displays.

Specifications

PUSHBUTTON DISPLAY SELECTORS (Patented): Automatically selects preset display mode, sweep range, and trigger level for: TV Vertical (30 Hz sweep), TV Horizontal (7875 Hz sweep), 3.58 MHz Color; 60 Hz Sweep Generator (line sweep); Vector; 5X Expand.

VERTICAL AMPLIFIER: SENSITIVITY: 10 mV/cm to 50 V/cm in 12 calibrated ranges. 1, 2, 5 sequence. Continuously variable between ranges. AC, DC coupled. Front panel calibrated from 100 mV/cm to 500 V/cm for direct reading with lo-cap probe. ACCURACY: ± 5%. BANDWIDTH: DC to 8 MHz (3 dB), 10 MHz (4 dB). Useable to 15 MHz. RISE TIME: 45 nanoseconds. OVERSHOOT: 1% or less. INPUT IMPEDANCE: 10 Megohms shunted by 11 pF using lo-cap probe. 1 Megohm shunted by 40 pF at input terminals. MAX. INPUT VOLTAGE: 5 KV ACP-P or 1 KVDC using lo-cap probe. 1000 V (DC + peak) at input terminal.

HORIZONTAL AMPLIFIER (Varispeed Mode): RANGE: 0.1 sec/cm to 0.2 usec/cm in 18 calibrated ranges: 1, 2, 5 sequence. Continuously variable between ranges. Front panel also marked in sweep frequency (1 Hz to 100 KHz). Special TVV (30 Hz) and TVH (7875 Hz) sweep ranges, 60 Hz line sweep (phase adjustable), and External (Vector B-Y). ACCURACY: ± 5%. MAGNIFICATION: 5X Expand for maximum sweep speed of .04 usec/cm. ACCURACY: 5%. HORIZONTAL INPUT (Vector): Variable or calibrated.

5,000 VAC input protection

You won't ever knock out the front end if you own the PS29, even if you accidentally touch the probe to the horizontal output tube plate. Built-in probe protection to 5000 Volts AC saves your repair costs, while other scopes go only to 600 Volts. This exclusive protection on the PS29 offers you complete freedom to measure any sync or sweep signals without damage to the scope.

Accessories

39G80 10:1 LO-CAP PROBE (supplied)

39G81 DEMODULATOR PROBE. \$20.00

SENSITIVITY: 2 or 20 V/cm (.4 or 4 V/cm using 5X Expand). BANDWIDTH: 1 MHz (3 dB). INPUT IMPEDANCE: 1 Megohm shunted by 40 pF.

TRIGGERING: MODE: Automatic (Baseline displayed in absence of input signal). SOURCE: Internal, Line, External. Positive or negative slope polarity. SENSITIVITY: 5 cm deflection (Internal), 400 mV (External). INPUT IMPEDANCE: 500 KOhm shunted by 40 pF. MAX. INPUT VOLTAGE: 10 VPP. TVV, TVH: Uses sync separator for stable display of video waveforms.

VECTOR (X, Y) MODE: DISPLAY: Front panel inputs Normal input vertical (R-Y), Vector input horizontal (B-Y). PHASE SHIFT: 1% or less.

GENERAL: REAR PANEL OUTPUTS: 15 VP-P horizontal sweep sawtooth (AC coupled), Ground. CRT: 5UP1 Round 5" flat face. P1 phosphor. Shielded. POWER SUPPLY: 2 KV, regulated RF, DC blanking. GRATICULE: 10 x 10 cm grid or 30° vector, illuminated. Z-AXIS: Rear panel input. SENSITIVITY: 5 VP-P (AC coupled). INPUT IMPEDANCE: 10 K Ohm. MECHANICAL: Vinyl-covered steel and brushed aluminum case construction. Front and rear tilt stands. Carrying handle. SIZE: 10 1/2" x 8" x 16" HWD (26.7 x 20.3 x 40.6 cm). WEIGHT: 25 lb. (11.4 Kg). POWER: 105-130 VAC, 50/60 Hz, 60W. CSA approved. (220 VAC conversion available.)

True lab performance with 1% phase-locked waveforms

- Simultaneous waveform comparisons with 1% lab accuracy
- Easy to use sweep settings with both time & frequency calibration
- Positive sync locking on video waveforms
- Exclusive burn-out proof 5000 VAC input protection

PS163
Dual Trace Triggered
Sweep Oscilloscope
\$895

Compares simultaneous waveforms accurately.

The PS163's 1% phase-locked matched channels, backed with a flat 8 MHz bandwidth, won't distort your comparisons as other scopes available can even with 15 MHz bandwidth. The PS163 maintains this high accuracy matching regardless of where you set the waveform position, brightness, or amplitude controls.

Horizontal speed setting made easy

There are many times when you only know the frequency of your signal, and you don't

Specifications

DISPLAY MODES: Channel A; Channel B; Dual Alternate (A and B displayed alternately on successive sweeps); Dual Chopped (A and B displayed by switching between channels at approximately 100 KHz rate); Vector (Channel A vertical, Channel B horizontal).

VERTICAL AMPLIFIER: (2 identical channels): SENSITIVITY: 5 mV/cm to 50 V/cm in 13 calibrated ranges. 1, 2, 5 sequence. Continuously variable between ranges. AC, DC coupled. Front panel calibrated from 50 mV/cm to 500 V/cm for direct reading with lo-cap probe. ACCURACY: $\pm 2\%$. BANDWIDTH: DC to 8 MHz (3 dB), 10 MHz (4 dB). Useable to 15 MHz. RISE TIME: 40 nanoseconds. OVERSHOOT: 1% or less. INPUT IMPEDANCE: 10 Megohms shunted by 11 pF using lo-cap probe. 1 Megohm shunted by 35 pF at input. MAX. INPUT VOLTAGE: 5 KV ACP-P or 1 KVDC using lo-cap probe. 1000 V (DC + peak) at input terminals.

HORIZONTAL AMPLIFIER: RANGE: .1 sec/cm to .1 usec/cm in 19 calibrated ranges. 1, 2, 5 sequence. Continuously variable between ranges. Front panel also marked in corresponding sweep frequency (.1 Hz to 1 MHz). Special TVV (50 Hz) and TVH (12.5 KHz) sweep ranges, 60 Hz line sweep (phase adjustable), and External positions. ACCURACY: $\pm 2\%$ (Triggered mode only). MAGNIFICATION: 5 times for maximum sweep speed of .02 usec. HORIZONTAL INPUT: Variable uncalibrated.

TRIGGERING: MODE: Manual (Triggered by adjustable

want to take the time to figure the time setting on your horizontal speed control. So the PS163 has the horizontal sweep calibrated directly in frequency for quicker set-up. (Other triggered scopes are calibrated in time only.) The control is also time-calibrated to speed your measurements in pulsed or clock digital circuits.

Provides positive sync locking

The PS163's Automatic Triggering will lock on any signal of 1 cm deflection down to 5 mV/cm sensitivity. The built-in Automatic Sync Separators lock in those hard-to-hold

sync level); Automatic (Baseline displayed in absence of input signal); Free Run (Conventional sync-sweep operation). SOURCE: Internal (A or B), Line, External. Positive or negative slope polarity. Adjustable level. SENSITIVITY: 1 cm deflection (Internal), 15 mV (External). PHASE SHIFT: Less than 3% at 5 MHz. INPUT IMPEDANCE: 1 Megohm shunted by 40 pF. TVV, TVH: Uses sync separator for stable display of video waveforms.

VECTOR (X, Y) MODE: (Front panel inputs): DISPLAY: Channel A vertical, Channel B horizontal. SENSITIVITY: 5 mV/cm to 50 V/cm direct. 50 mV/cm to 500 V/cm using lo-cap probe. BANDWIDTH: DC to 8 MHz vertical, DC to 7 MHz horizontal. PHASE SHIFT: Less than 3% at 5 MHz. GENERAL: REAR PANEL OUTPUTS: 15 VP-P horizontal sweep sawtooth (AC coupled); Ground; Vertical Deflection Plates. CALIBRATOR: 2 VP-P square wave, approx. 1 KHz. Front panel output pin. CRT: 5U1P round 5" flat face. P1 phosphor. Double shielded. POWER SUPPLY: 2 KV, 30 KHz regulated RF, DC unblanking. GRATITUDE: 10 x 10 cm grid or 30" vector, illuminated. Z-AXIS: Rear panel input (AC coupled). MECHANICAL: Vinyl-covered steel and brushed aluminum case construction. Front and rear tilt stands. Carrying handle. SIZE: 12" x 10" x 15 1/2" HWD (30.5 x 25.4 x 39.4 cm). WEIGHT: 30 lb. (13.4 Kg). POWER: 105-130 VAC, 60 Hz, 60W. CSA approved. (220 VAC, 50/60 Hz conversion available.)

horizontal and vertical video waveforms, too, without any trace jitter. Plus, both the sweep speed and the triggering are automatically set for video waveforms when you select the TVV and TVH positions. Even your newest technician can operate the PS163 easily.

5,000 Volt input protection

You never know what signal level you may find in a defective circuit, as accidental high voltages may appear in unlikely places. These overloads can put your scope out of commission with a blown front end. You won't have this worry if you own the PS163, as it is the only dual trace scope that has 5000 Volt AC protection built into the probes to cut your scope repair and replacement costs. Other scopes only go as far as 600 Volts.

Designed with your scope needs in mind, the PS163 offers protected laboratory performance at a fraction of lab price for today's school, lab, or shop.

Accessories

- 39G80 10:1 LO CAP PROBE (two supplied).
- 39G81 DEMODULATOR PROBE. \$20.00



Exclusive burn-out proof protection

The most versatile & protected supply you can buy for hundreds of uses

- Two supplies in one - high filtered variable outputs, plus 6 & 12 Volt battery eliminator
- Goof-proof direct short protection
- Goof-proof circuit protection
- Goof-proof dual meters

UPS164
Universal Power Supply
\$325



The UPS164 is a dream supply for CB, mobile communications, auto radio, cassette, and 8-track servicing. It's also ideal for electronic design or production testing where extremely low voltage ripple is required, plus allows servicing of the module boards in television, stereo, and automation equipment.

Two supplies in one

The UPS164 is a universal power supply because it is actually two highly filtered, current and voltage regulated supplies in one. One section is a highly filtered, low ripple supply with full regulation and control of voltage up to 30 Volts and current up to 2 Amps. The second supply provides 12 Volts at 10 Amps or 6 Volts at 20 Amps for high power applications. The UPS164 handles all your power needs from low current circuit breadboarding to land mobile transceiver servicing. It will also power special aircraft, marine, and military systems, and even recharge storage batteries.

Goof-proof direct short protection

You can short the UPS164 outputs directly with a screwdriver, even for minutes, and it keeps right on working. No more smoke in the air, blown fuses to replace, or buttons to constantly reset. You would pay hundreds of

dollars more to get this tough protection in other lab supplies. This feature alone makes the UPS164 the ideal supply for school experiments for savings on your power supply budget year after year.

Goof-proof circuit protection with current set

You can set the current to the maximum level you want on the variable 30 Volt section, all the way up to 2 Amps. The UPS164 won't deliver a milliAmp more than you select--even

with a direct short--because it has full current limiting. It saves burning up parts during design or repair.

Goof-proof meter readings

Two sensitive meters monitor every change in current and voltage to prevent damage to the circuit, you, or the power supply itself. You know the current and voltage that you are providing at all times with just a glance.

Accessories

39G42 MODULE MASTER. \$35.00

Specifications

VARIABLE HIGH FILTERED SECTION: VOLTAGE: .5 to 15 VDC or .5 to 30 VDC (35V available at less than 1A load), regulated and continuously variable. CURRENT: 0 to 2A variable. CURRENT LIMITING: Continuously adjustable in 4 ranges to 2A max., no overshoot above set limit. RIPPLE: 5.4 mV P-P or less (.018%). REGULATION: 100 uV (.3%) for line voltage change 105-130 VAC; .15 V/A changing load with constant 115 VAC line. DC OUTPUT IMPEDANCE: .15 Ohm at full load.
STANDARD 6V REGULATED SUPPLY: VOLTAGE: 7.5V (no load) to 4.5V (full load). CURRENT: 20A maximum continuous at 4.5V, 28A maximum surge. CURRENT LIMITING: Ferro-resonant constant voltage transformer with 30 Amp fuse. RIPPLE: .10 VP-P (no load), 4.0 VP-P (20A load). REGULATION: .3V at no load, .5V at 20A load for line voltage change from 105-130 VAC. .15 V/A changing load with constant 115 VAC line. DC OUTPUT IMPEDANCE: .15 Ohm at full load.
STANDARD 12V REGULATED SUPPLY: VOLTAGE:

15.0V (no load) to 11.5V (full load). CURRENT: 10 Amp maximum at 11.5V, 14 Amp max. surge. CURRENT LIMITING: Ferro-resonant constant voltage transformer with 30 Amp fuse. RIPPLE: 2 VP-P (no load), 4.0 VP-P (10A load). REGULATION: .1V at no load, .6V at 10 A load for line voltage change from 105-130 VAC; .35V/A changing load with constant 115 VAC line. DC OUTPUT IMPEDANCE: .35 Ohm at full load.
GENERAL: METERS: Monitor output voltage and current. 3", moving coil, 3% accuracy. OUTPUT TERMINALS: 5-way high current binding posts. Chassis ground terminal isolated from positive and negative outputs. SUPPLIED TEST LEADS: Two banana plug to alligator clip leads for general use. Two lug terminal to heavy-duty clip leads for battery charging. SIZE: 13 1/2" x 10" x 9 1/2" HWD (34.3 x 25.5 x 24.1 cm). WEIGHT: 23 lb. (10.5 Kg). POWER: 105-130 VAC, 60 Hz, 30W idle, 350W max. load. (230 VAC conversion available).

It's a real leg & time saver

RC167
THE SUBSTITUTOR
R-C Component Substitutor
\$140

- Saves your legs and your time
- Electrolytic surge protection

Make quick substitution checks in filter, power, or bias circuits before you tire your legs and waste your time installing replacement parts that may not be needed. The RC167 puts the 46 most-used resistors and capacitors at your fingertips to speed service and design work, or for school experiments.



The only supply especially designed for solid state design & servicing

- Universal solid state supply
- Adjustable taps all the way to 14.4 Volts
- Battery eliminator for 6 & 12 Volt supplies
- Only portable supply for field use



PS43 PORTA-PAK
Universal Rechargeable Battery Power Supply
\$125

Here's the one low cost supply that powers up virtually all solid state equipment. Highly regulated and filtered voltages with virtually pure DC and no hum make the PS43 an ideal designer's and servicer's supply. A happy marriage of a ripple-free battery supply with the high current and automatic recharging provided by AC power gives the best of both at a very low price in the PS43.

A universal regulated solid state supply

The PS43 is a voltage-regulated universal power supply for a hundred and one uses. It equips you to power virtually any solid state equipment, from auto radios, tape players, and CBs requiring up to 5 Amps peak current to applications where pure DC is required, such as circuit modules, breadboards, ICs, business machines, and biasing.

Provides two 15 Volt variable supplies

The two variable outputs deliver up to 14.4 Volts in adjustable 0.6 Volt steps all the way. This wide range makes the PS43 excellent for

design applications, module testing, IC testing and "burn in," biasing, and other uses that require B+ voltages in small steps. Each output is independently adjustable. The PS43 may be connected to provide positive and negative potentials at the same time, too.

Replaces 6 and 12 Volt batteries

Use the two fixed 6 and 12 Volt outputs during your repair or testing as a direct battery replacement source in place of those messy storage cells. You get highly filtered 200 milliAmp continuous output or up to

5 Amp peak loads for highly regulated outputs that only batteries can insure.

Works at remote jobs without AC

Now you can take your power source with you for field service. Unplug the PS43 Porta-Pak for a handy supply that delivers up to 4 Amp-Hours (1 Amp for four hours) anywhere you want to take it. Or unplug it on the bench when you want to be sure that the power is absolutely hum-free. Recharging begins automatically as soon as you plug in the AC cord.

Specifications

VARIABLE OUTPUTS: Two independently adjustable supplies from 0.6 to 14.4 VDC in 0.6 Volt steps. 15.8V max. at full charge. 200 mA continuous, 5 Amp peak current using 4AH cells. 80 mA continuous, 1.5 Amp peak (5 Amp instantaneous) current using 1.2AH cells.
FIXED OUTPUTS: 12 VDC SUPPLY: 13.5 VDC max. at full charge. 200 mA continuous, 5 Amp peak current. 6 VDC SUPPLY: 6.75 VDC max. at full charge. 200 mA continuous, 5 Amp peak current.
REGULATION: LOAD: Flat to limits of batteries. LINE: Independent of line fluctuation. (\pm 9% at low battery limit). AC RIPPLE: 0 mV without AC line connected.

50 mVPP with AC line connected
PROTECTION: Each output independently protected with 5 Amp fast blow fuse in test lead.
GENERAL: BATTERIES: 12 D-type Ni-Cad cells (1.2 or 4AH). BATTERY DRAIN: 3 mA with no load. CHARGE CURRENT: 80-120 mA with 1.2AH cells; 230-290 mA with 4AH cells. INDICATORS: Battery Charging Light. Batteries Low Light (less than 13.2V total charge). SIZE: 5 1/2" x 8" x 10 1/4" HWD (14.0 x 20.3 x 26.0 cm). WEIGHT: 9 lb. (4.1 Kg) with batteries. POWER: 105-125 VAC, 50/60 Hz, 5W. Four test leads supplied.

Seven bias supplies in one for fast servicing of tube & solid state

- Seven bias supplies in one
- All bias voltages for tube & solid state
- Provides special tube blocking voltage
- The king of AGC troubleshooting.



BE156 ALIGN-O-PAK
7-in-1 DC Bias Supply \$49.50

The world's most popular DC bias supply is actually seven different supplies in one for fast alignment and troubleshooting in any stage of any set-tube or solid state. It has three positive and three negative variable voltage supplies to 25 Volts, plus one variable 75 Volt negative supply for alignment and the hundred and one other places where biasing is recommended.

Specifications

OUTPUT: Three independently-controlled voltage sources. VOLTAGE: 0 to 25 Volts variable, calibrated, positive or negative. "C" section also selectable for 0 to -75 Volts variable. RIPPLE: Less than .1% at no load.
GENERAL: Three output test leads with alligator clips. Common ground lead (Isolated from chassis). SIZE: 3 1/2" x 6 1/2" x 2" HWD (8.9 x 7.1 x 5.1 cm). WEIGHT: 2 lb (.9 Kg). POWER: 105-130 VAC, 50/60 Hz, 2W.

Test transistors anywhere in or out of circuit in seconds with 99.9% reliability



- Tried and proven
99.9% reliability
good-bad test in seconds
- Automatically identifies type,
polarity, and lead connections
- Battery operated and built
rugged for portable use

TF40 POCKET CRICKET
Portable Transistor
and FET Tester
\$98

Widespread use of solid state devices in consumer, industrial, business, and communications products is placing an increasing load on you to service this equipment on location, rather than in the shop.

Test transistors in or out of circuit . . . anywhere

The TF40 Pocket Cricket equips you for speedy field service at any job site with the reliable Cricket test. The Cricket test indicates Good or Bad either in or out of circuit. The Pocket Cricket has a metered leakage scale, too, so you're not fooled by leaky transistors.

Automatically identifies transistor type, polarity, and lead connections

There is no need to look up set-up or schematic information when you use the TF40. Simply connect the test leads in any order and rotate the knob through all twelve basing combinations. The Pocket Cricket will "chirp" on one

or two positions if the device is good, and also indicates the correct polarity. The exclusive Lead I.D. control automatically indicates the test lead color coding for the correct transistor basing connection.

Built rugged for portable use

The TF40 rides along with its shock-proof meter movement and rugged Cyclac[®] case

(the same tough material that automobile bumpers and football helmets use). It's battery operated so you don't have to carry a line cord for your tester in the field, or AC powered from the PA202 Power Adapter for bench use.

Accessories

PA202 POWER ADAPTER for AC operation . . . \$9.95
39G85 TOUCH-TEST PROBE for in-circuit testing on foil side of circuit boards . . . \$10.00

Specifications

DEVICES TESTED: Transistors, Darlingtons, single gate FETs, diodes, rectifiers.

GAIN TEST: (In or out of circuit) Phase inversion detector for indication of gain (Patent 3898559). Meter and tone indication. **VOLTAGE:** $V_{be} = 7$ VP-P centered on zero reference. $V_{ce} = +4.5$ V. **CURRENT:** $I_b = 10$ mA max. (5 mA avg. continuous.) **FREQUENCY:** 1.2 KHz (nominal). **LEAKAGE TEST:** (Out of circuit) Measures reverse collector-base leakage, (Icbo), plus all the interelement leakages with rotation of Permutator switch. **VOLTAGE:** $V_{cb} = +4.5$ V depending on polarity used. **RANGE:** 0-2500 μ A. **IN-CIRCUIT SHUNT LIMITS:** Resistance greater than 25 Ohms, capacitance less than 5 mF.

LEAD IDENTIFICATION TEST: Adjustment of LEAD ID control indicates Good gain test on only one permutator

position for normal transistor. Front panel coding identifies all three leads.

GENERAL: METER: $2\frac{1}{2}$ ", 200 μ A moving magnet, 5% accuracy. **PERMUTATOR:** Twelve position switch for selection of all possible lead and polarity connections. **CONNECTORS:** Three color-coded and spring loaded E-Z Mini-Hook[®] on attached cable assembly. **ELECTRICAL:** All solid state and IC circuitry. **MECHANICAL:** Rugged Cyclac[®] case construction Tilt stand. **SIZE:** 6" x 4" x 1 $\frac{1}{4}$ " HWD (15 x 10 x 3 cm.) **WEIGHT:** 14 oz. (4 Kg) with battery. **POWER:** 1 $\frac{1}{2}$ mA idle, 20 mA during test. **BATTERY:** One 9-Volt radio battery (not supplied), or AC line operation using PA202 Power Adapter with 9 Volt battery installed for filtering.

AC POWERED CRICKET TESTERS - A FEW STILL AVAILABLE



- 99.9% in or out of circuit reliability
- Pushbutton - fast test in seconds
- Hook up the leads in any order

TF26 CRICKET
Transistor/FET Tester \$150



- Patented Cricket in-circuit "Good-Bad" test
- Automatic out-of-circuit Parameter analyzing test
- No set-up info required
- Identifies all three leads

TF30 SUPER CRICKET
Transistor/FET Analyzer \$240

Completely analyze any transistor or FET . . . anywhere in seconds

- The famous Super Cricket has gone portable
- Now more automatic than ever before
- Needs no set-up book or instructions
- Automatic power shut-off after ten minutes

TF46
PORTABLE SUPER CRICKET
Transistor and FET Tester
\$195

PATENTED



Test In-Circuit
Anywhere

New



Now you can test any place where complete solid state testing is essential, such as in aircraft, boats, mobile and remote communications equipment, computers, switchboards, plus a thousand and one other places where you couldn't test before. The TF46 is especially made for portable, solid state testing to expand your capability in these locations that are hard to get at with a dragging line cord.

Now more automatic than ever

In the field or on the bench, the TF46 is two testers in one to make your transistor and FET analyzing more automatic than ever. It's a famous Cricket tester for "Go-No Go" checking in-circuit, plus a Super Cricket analyzer for complete parameter testing out-of-circuit. Just connect the test leads in any order and rotate the Cricket switch through all twelve positions for fast "Good/Bad" testing. The TF46 "chirps" and reads Good on the meter when you find the correct position on a good transistor. Then simply push the parameter test buttons for gain, leakage, and FET I_{DSS} without any time-consuming calibrations. "What you set is what you get." It's so fast and easy to use, you can hop through circuits in minutes because everything is automatic.

No set-up information is needed

There is no need to know anything about those "little monsters" before you start your test. The TF46 will tell you everything needed for replacing transistors or for determining a substitute. It identifies all three leads with 100 percent accuracy, tells the polarity, and even determines whether the device is a transistor or an FET. You can test diodes and rectifiers quickly for front-to-back ratios, too.

Turns the power off automatically, too

You may forget and leave the power on after making your field tests, so an automatic power shut-off circuit always remembers to turn off the power for you. But when you're back on the bench and operating from the AC line with the PA202 Power Adapter, the shut-off circuit is automatically disabled so you

don't have to bother turning the power on every ten minutes. The TF46 is truly your solid state servicer for circuit testing anywhere.

Accessories

PA202 POWER ADAPTER for AC operation . . . \$9.95
39G85 TOUCH-TEST PROBE for in-circuit testing on foil side of circuit boards . . . \$10.00

Specifications

DEVICES TESTED: Transistors, Darlingtons, single and dual gate FETs, diodes, rectifiers.

GAIN TEST: (In or out of circuit) Phase Inversion detector for indication of gain (Patent 3898559). Meter and tone indication. VOLTAGE: $V_{be} = 7$ VP-P centered on zero reference. $V_{ce} = \pm 4.0$ VDC. CURRENT: $I_b = 7$ mA max. (3 mA average continuous). $I_c = 12$ mA max. (3 mA average continuous).

TRANSISTOR PARAMETER TEST: (Out of circuit) Self-zeroing and self-calibrating dynamic AC beta. VOLTAGE: $V_{ce} = \pm 4.0$ VDC. $V_{be} = 1$ VP-P centered on zero reference. MAXIMUM CURRENTS: Signal Transistor button: $I_c = 25$ mA; $I_b = 50$ uA. Output Transistor button: $I_c = 150$ mA; $I_b = 300$ uA. BETA RANGE: 0 to 500. FREQUENCY: 2 KHz nominal.

FET PARAMETER TEST: (Out of circuit) Measures dynamic mutual conductance (Gm). VOLTAGE: $V_{ds} = \pm 4.0$ VDC. $V_{gs} = 4$ VP-P centered on zero reference. RANGE: 0 to 25,000 micromhos. FREQUENCY: 2 KHz nominal.

LEAKAGE TESTS: (Out of circuit) Measures transistor

I_{cbo} or FET I_{gso} , plus all other interelement leakages with rotation of permutator test switch. VOLTAGE: V_{cb} or $V_{gd} = \pm 3.5$ VDC with emitter or source open. RANGE: 0 to 2500 uA.

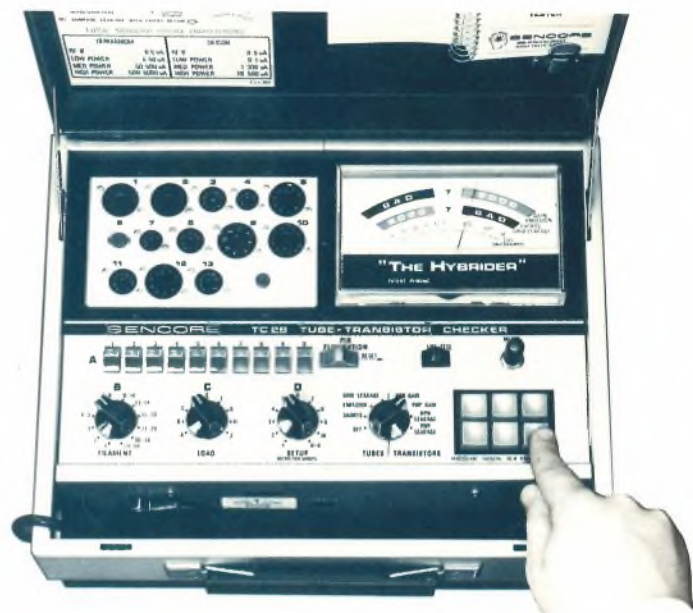
I_{DSS} TEST: Measures FET zero bias drain current. VOLTAGE: $V_{ds} = \pm 4.0$ VDC. RANGE: 0 to 50 mA. GENERAL: METER: 4 1/2", 100 mA moving coil, 5% accuracy, shock-protected. "CRICKET" PERMUTATOR: Switch selects all six possible lead connections for both positive and negative polarities. Coding on knob corresponds to test lead color for full identification of device connections. CONNECTORS: Three color-coded E-Z Hook[®] connectors on permanently attached cable. MECHANICAL: Durable, vinyl-covered steel and ABS plastic case. Carrying handle/tilt stand. Lead storage compartment. SIZE: 1" x 5 1/2" x 3 3/8" HWD (25.4 x 13.8 x 8.9 cm). WEIGHT: 4 lb. (1.8 Kg). POWER: 11 mA idle, 120 mA maximum. BATTERIES: Six, 1 1/2 Volt AA size batteries, or PA202 Power Adapter for 120 VAC operation with batteries installed for filtering.

The only tester for tubes, transistors, and hybrid circuits

- Unrestricted "Good-Bad" tests through any circuit
- Two tried and proven testers in one
- Rapid Mighty Mite for tubes
- Reliable Cricket for transistors
- Saves money over separate testers, too

TC28 HYBRIDER
 Tube/Transistor/FET Tester
 \$275

PATENTED



When you go on a call to the customer's home, business, or plant, it often happens that you don't know what type of circuit you'll encounter—tube, transistor, or hybrid. Instead of breaking your back by carrying separate tube and transistor testers, carry along the new TC28 Hybrider—the only amplifier tester on the market today to fully equip you for any testing job.

Only tester for both tubes & transistors

You'll have unrestricted amplifier testing freedom as you move from tubes to transistors in today's modern electronics. You won't be stopped by your tester when you encounter tubes, transistors, and FETs in the same circuit. The TC28 will quickly check them all

for Good or Bad with a simple click of the function switch.

Two tried and proven testers in one

The TC28 is two tried and proven testers in one. The tubes are tested with the famous Mighty Mite circuit, while transistors and FETs are tested with the patented Cricket circuit.

All tests are shown on the big color-coded "Good/Bad" meter to make it easy for you to convince your customer that a new component is needed.

Accessories

39G85 TOUCH-TEST PROBE for in-circuit testing on foil side of circuit boards \$10.00

Specifications

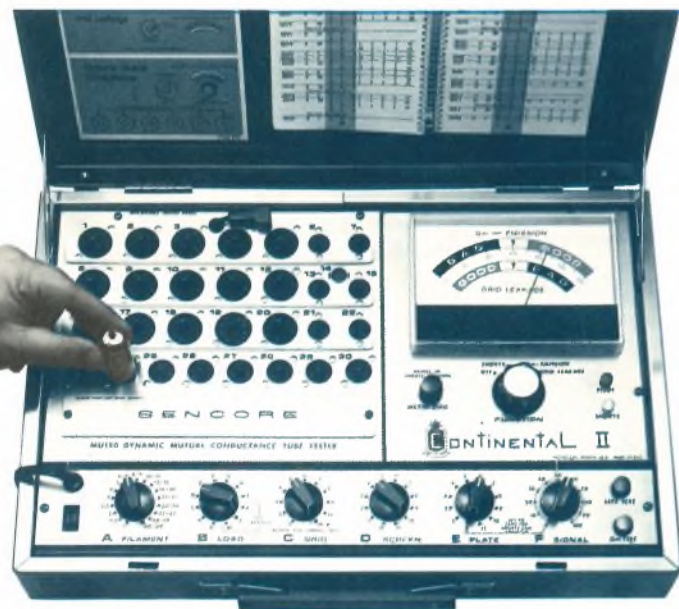
DEVICES TESTED: Tubes, transistors, Darlingtons, single gate FETs, diodes, rectifiers.

See TC162 specifications for tube test. (Shorts indication shown directly on meter.)

See TF40 specifications for transistor/FET test.

GENERAL: METER: 6", 100 uA moving coil. **PIN ELIMINATION:** 10 switches open circuit to internally connected pins in tube. Special Reset button clears all

switches simultaneously. **SOCKETS:** 13 standard sockets with phosphor bronze contacts for long life. T0-5 type transistor socket. **ELECTRICAL:** All solid state and IC circuitry. **MECHANICAL:** Durable vinyl-covered steel case with aluminum panel and trim. Carrying handle. **SIZE:** 12" x 14 1/2" x 4 1/4" HWD (30.5 x 37.5 x 11.5 cm). **WEIGHT:** 13 1/2 lb (6.25 Kg). **POWER:** 105-130 VAC, 50/60 Hz, 30 W. CSA approved. 230 VAC conversion available.



A true tube analyzer with exclusive 5000 Hz square wave amplifier test

- Tests tube under actual amplifier operating conditions
- Rapid Mighty Mite tester, too.
- Only mutual conductance tester left on the market

MUI50 CONTINENTAL II
 Mutual Conductance Tube Analyzer
 \$395

The MU150 is the only complete tube analyzer on the market because it uses a special 5000 Hertz square wave test that harnesses the tube into an amplifier circuit, just like the tube's actual operation. Plus, it checks it for actual frequency conditions that may not show up on other testers using 60 Hz sine waves, especially in audio, control, and television tubes.

Specifications

MUTUAL CONDUCTANCE TEST: Measures true Gm (relative amplification) using 5 KHz square wave input, with Automatic Bias Control.

EMISSION TEST: Good/Bad indication of full rated cathode load current up to 120 mA. Each section of multi-section tube is tested independently. **VOLTAGE:** 40 VAC RMS maximum. **LIFE TEST:** Filament voltage is reduced to detect intermittent and temperature sensitive tubes.

GRID LEAKAGE TEST: Meter indicates grid contamination or gassy condition. **SENSITIVITY:** Bad area = 100 Megohms or less (0.5 uA).

GENERAL: METER: 6", moving coil. **SOCKETS:** 30 standard sockets with phosphor bronze contacts for long life. Removable panel for installation of six additional sockets for future use. **MECHANICAL:** Durable vinyl-covered steel attache case with chrome plated panel and trim. Carrying handle. Accessory AC outlet. **SIZE:** 14" x 18" x 5" HWD (36 x 46 x 13 cm). **WEIGHT:** 18 lb. (8.1 Kg). **POWER:** 105-130 VAC, 50/60 Hz, 50 W max. (230 VAC conversion available).



Finds over 95% of all tube troubles in the home

- Tried and proven by over 70,000 service people
- Checks them all-over 3,000 types foreign or domestic
- Finds "tough dog" troubles with grid leakage test
- Checks emission under full load

TC162 MIGHTY MITE VII
Tube Tester
\$175

The Mighty Mite VII saves your time on every service job because it finds those tough dog problems that other testers miss. This master of field service finds over 95% of all tube troubles in the home with the famous Mighty Mite circuit. It has been tried and proven by over 70,000 service people for home and field service work. It's your tube salesman, too, with a simplified Good/Bad scale that shows your customer exactly what is wrong with the tube.

Checks them all - large and small

Over 3000 types of tubes, large and small, foreign and domestic, can be tested for television, audio, industrial, ham radio, and many other uses. The ten Pin Elimination buttons cut out internal connections within the tube for positive testing of the latest types—hundreds more than ever before.

Super-sensitive grid leakage test

Leaky grid conditions can upset the circuit operation, and usually show up only after

being used for an hour or so, often when you have already left the home. The Mighty Mite's highly sensitive grid leakage test of 100 Megohms, (or .5 microAmps) finds these leaky grid conditions that wouldn't be found with other testers.

Checks emission under full load

You'll want to check the tube under the full rated cathode current up to 120 mA. Each section of multi-section tube is tested independently. VOLTAGE: 40 VAC RMS maximum. LIFE TEST: Filament voltage is reduced by 15% to detect intermittent and temperature sensitive tubes.

Specifications

DEVICES TESTED: Receiving, Industrial, European, and special tubes, including Miniature, Octal, Loctal, Nuvistor, Compactron, Magnoval, and Novar types.

CATHODE EMISSION TEST: Good/Bad indication of full rated cathode load current up to 120 mA. Each section of multi-section tube is tested independently. VOLTAGE: 40 VAC RMS maximum. LIFE TEST: Filament voltage is reduced by 15% to detect intermittent and temperature sensitive tubes.

GRID LEAKAGE TEST: Meter indicates grid contamination or gassy condition. SENSITIVITY: Bad area = 100 Megohms or less (0.5 uA).

SHORTS TEST: Checks each element for shorts against all

other elements by rotation of Set-Up switch. SENSITIVITY: 300 K Ohms or less causes light to indicate. VOLTAGE: 40 VAC RMS maximum.

Makes stethoscopic shorts test

Each and every element is checked against all the other tube elements as you rotate the "D" switch through all the positions. Other testers check only the most active elements, and let hidden problems get by. So don't accept a substitute for proven reliability—ask for the famous Mighty Mite.

GENERAL: METER: 3", 1 mA moving coil. PIN ELIMINATION: 10 switches open circuit to internally connected pins in tube. Convenient Reset button clears all switches simultaneously. SOCKETS: 13 standard sockets with phosphor bronze contacts for long life. MECHANICAL: Durable vinyl-covered steel case with aluminum trim. Carrying handle. SIZE: 9" x 10" x 4" HWD (23 x 25 x 10 cm)

WEIGHT: 9 lb. (4.1 Kg). POWER: 105-130 VAC, 50/60 Hz, 32 W max. CSA approved. 230 VAC conversion available.

Handy time-saver for tube filament checks

FC147 Filament Checker
\$12.95

A real time-saver for those series-string sets. Checks the continuity of all tube filaments, including Compactrons, Novars, duodecals, and Nuvistors. Checks the CRT filament, too. Powered by the TV cheater cord to insure that 115 VAC power is going to the TV.

- Quick test of filament continuity without set-ups
- Checks all the latest tube types
- Compact for the caddy

PATENTED

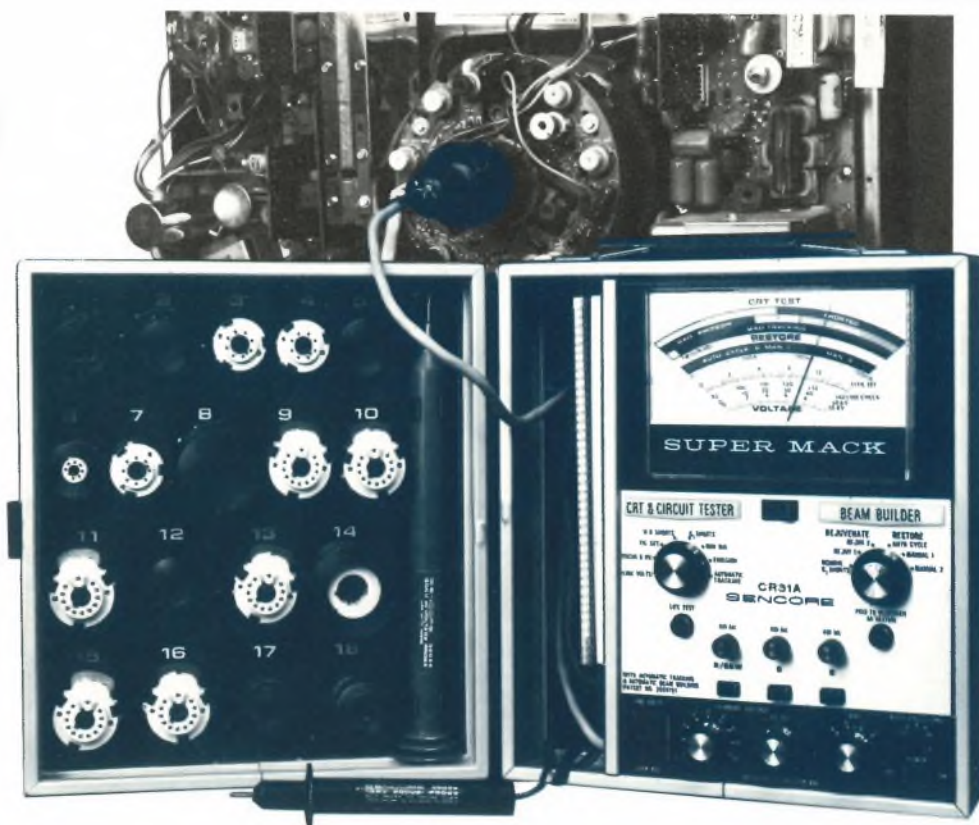


Be completely equipped for any CRT testing or restoring job

- Tried and proven patented CRT tester
- Silent CRT salesman color-coded meter
- Automatic CRT restorer
- It's a circuit tester, too
- All the sockets you'll need

CR31A SUPER MACK
Automatic CRT
Tester & Restorer
\$495

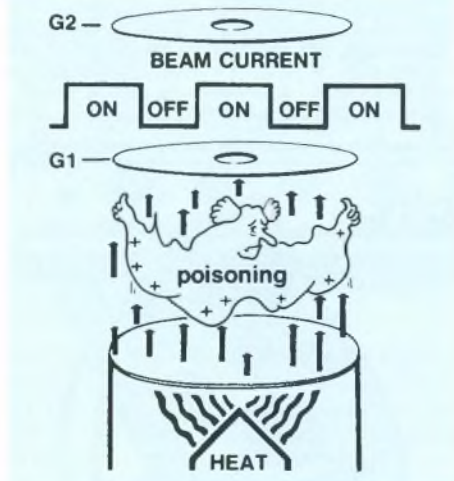
PATENTED



Be completely equipped, not just half-equipped, for any CRT testing or restoring job with the automatic CR31A Super Mack CRT Tester and Restorer.

Tried and proven patented CRT tester

You begin with the CRT tests and the CR31A is a tried and proven tester using the automatic CR168 Big Mack CRT testing circuits. Each test is performed under the actual operating conditions as used in the TV set. Only the Sencore testers do it this way—the way the CRT manufacturers specify the tests should be done. The Super Mack also has the patented automatic color gun tracking test to catch those troublesome tracking problems that other testers miss.



Automatically-cycled restoration safely removes cathode "poisoning" to expose fresh cathode surface

Silent salesman color-coded meter

Every test result is shown directly on the color-coded meter and every scale is shown simply as Good or Bad. You can show your customer the condition of the CRT, right down to one "wobbly" red gun that causes the raster to turn green at the high setting of the brightness control. Your customer can see exactly what needs to be done, so they can decide if they want you to try restoration.

Automatic CRT restorer

When you decide to go ahead with CRT restoration, you want to apply just the right amount needed. Only the CR31A Super Mack has three positions of automatically timed restoration, plus two manual positions, so you can step up to the minimum amount needed to do the job without worry about damage to the CRT.

It's a circuit tester, too

You may have repaired or replaced a CRT only to find that the set still wouldn't focus because the line voltage, high voltage, or focus voltage was off. The CR31A has built-in circuits and probes to make these circuit tests on the spot without running out to get a special meter.

All the sockets you'll need

Super Mack carries 18 sockets in all for nearly every CRT ever made. Some competitive models supply only six sockets. You can run short on the job and long on the price when you have to order the additional sockets you'll need at marked-up accessory prices. Only Super Mack saves those "optional socket" headaches

Specifications

SET-UP: FILAMENT VOLTAGE: 1 to 14 VAC, continuously variable. Meter voltage scale. Accuracy 5% G1 BIAS: Sets manufacturer recommended CRT bias for gun balance test. A - 20V, B - 35V, C - 50V, D - 70V. **SOCKETS:** 18 individually mounted sockets supplied, including B & W, Delta and In-Line color types. Each plugs into heavy-duty universal 11-pin connector on attached cable. **CIRCUIT TESTS:** LINE VOLTAGE: 90-140 VAC. Accuracy: 2% of reading. FOCUS & HIGH VOLTAGE: 0 to 10 KV with 39G88 Focus Voltage Probe. 0 to 50 KV with 39G89 High Voltage Probed added to 39G88. Accuracy: 3% FS. **SHORTS TEST:** "Good Bad" meter reading of inter element shorts of each gun. Indicates H-K, K-G2, G1-K, G1-G2 shorts. SENSITIVITY: 2 Megohm for H-K position. 20 Megohm for G1 position. **EMISSION TEST:** Measures zero bias beam current of gun selected, after G2 level is set for cutoff with bias applied. SENSITIVITY: Max "BAD" = 200 uA. Min "GOOD" = 300 uA. Meter reading suppressed above 500 uA. **LIFE TEST:** Reduces filament voltage 15% to check temperature sensitive guns. **TRACKING:** Automatically compares beam current ratio of highest emission gun to lowest emission gun. Ratio of 1.55 to 1 or greater indicates BAD tracking, as specified by CRT manufacturers. **REJUVENATE:** Safety pushbutton applies voltages to selected CRT gun only when depressed, to prevent damage to CRT. REMOVE G1

SHORTS: 450V capacitive RC-time discharge between G1 and G2/K removes leakage path between elements. No filament voltage applied. **REJUV 1, 2:** 450V capacitive RC-time discharge between K and G2 exposes new cathode material and enlarges G1 grid aperture. **RESTORE:** Applies restoring beam current between K and G2 to remove contamination of oxide coating. Filament voltage increased 50%. Cycling periods provide current ON period, plus current OFF cooling period to prevent G1 overheating. Direct meter readout of 0 to 150 mA cathode current. Safety pushbutton applies voltage to selected CRT gun only when depressed. **AUTO-CYCLE:** CURRENT: 0-100 mA max limited. CYCLE: 3 periods automatically timed for 4 sec ON, 2 sec OFF. Auto-Cycle ON time adjustable from 2-6 sec with front panel control. **MANUAL 1, 2:** CURRENT: 0-100 mA max limited for Man 1, 0-150 mA max limited for Man 2. CYCLE: Manual cycling periods by depressing and releasing Restore Button. **GENERAL:** METER: 6" moving coil, 500 uA, 2%. MECHANICAL: Durable ABS plastic case with brushed aluminum trim. Carrying handle. Cable storage compartment. Socket storage in cover. 18 sockets supplied. SIZE: 12 1/4" x 11" x 7" HWD (30.6 x 27.5 x 17.5 cm). WEIGHT: 13 1/4 lb (5.9 kg). POWER: 105-130 VAC, 50/60 Hz, 25 W. CSA approved. (230 VAC conversion available)

Your number 1 CRT customer-convincer

- Customer convincer Good/Bad scale
- Patented automatic color gun tracking
- Includes all sockets you'll need
- Safe CRT gun rejuvenation

CR168 BIG MACK
Automatic CRT Tester
\$275



Customer convincer Good/Bad scale

Big Mack helps you sell more CRTs and gets that customer off your back in a hurry with all the tests shown on the big six-inch meter. The scales are all color coded as Good or Bad, too, to show him that you have done the testing correctly. Every CRT test is performed exactly the way the CRT manufacturers specify so you get reliable, accurate tests every time.

Patented automatic color gun tracking

Convincing your customer that the color tracking is off is easy if you own the Big Mack with the simplified Automatic Tracking test. Simply flip the switch to Tracking and read the meter directly with none of the set-ups or interpretations three meter testers use.

Includes all sockets you need

You may have been caught short before with your tester when you needed a socket for the set you were working on but the tester

didn't have it. Big Mack saves you the embarrassment and the extra costs of buying extra sockets as all the sockets you need are right there in the cover.

Safe CRT gun rejuvenation

There are times when one color gun shows

weaker than the other two. Big Mack's safe RC-timed rejuvenation gets the emission back into the good tracking area automatically and safely. It helps to extend the life of the CRT, and locks in your satisfied customer for a future sale later.

Specifications

SET-UP: FILAMENT VOLTAGE: 1 to 14 VAC, continuously variable. Meter voltage scale. Accuracy: 5%. **GI BIAS:** Sets manufacturer-recommended CRT bias for gun balance test. A - 20V, B - 35V, C - 50V, D - 70V. **SOCKETS:** 16 individually mounted sockets supplied, including B & W, Delta and In-Line color types. Each plugs into heavy-duty universal 11-pin connector on attached cable. **SHORTS TEST:** "Good-Bad" meter reading of inter-element shorts of each gun. Indicates H-K, K-G2, G1-K, G1-G2 shorts. **SENSITIVITY:** 2 Megohm for H-K position, 20 Megohm for G1 position. **EMISSION TEST:** Measures zero bias beam current of gun selected, after G2 level is set for cutoff with bias applied. **SENSITIVITY:** Max "Bad" - 200 uA. Min "Good" - 300 uA. Meter reading suppressed above 500 uA. **LIFE TEST:** Reduces filament voltage 15% to check temperature-sensitive guns. **TRACKING:** Automatically compares beam current ratio of highest-emission gun to lowest-emission gun. Ratio of 1.55 to 1 or greater indicates Bad tracking, as specified by CRT manufac-

turers (Patent 3688184).

REJUVENATE: Safety pushbutton applies voltages to CRT gun selected only when depressed, to prevent damage to CRT. **REMOVE GI SHORTS:** 450V capacitive RC-time discharge between G1 and G2/K removes leakage path between elements. No filament voltage applied. **REJ 1, 2, 3:** 450V capacitive RC-time discharge between K and G2 exposes new cathode material and enlarges G1 aperture. **FILAMENT VOLTAGES:** REJ 1 - Normal; REJ 2 - increased 15%; REJ 3 - increased 30%.

GENERAL: METER: 6", moving coil, 500 uA, 2%. **MECHANICAL:** Durable vinyl covered steel case with brushed aluminum trim. Carrying handle. Cable storage compartment. Socket storage in cover. 16 sockets supplied. **SIZE:** 10 3/4" x 11 1/2" x 7" HWD (27.3 x 29.2 x 17.7 cm). **WEIGHT:** 14 lb. (6.4 Kg). **POWER:** 105-130 VAC, 50/60 Hz, 25 W max. CSA approved. (230 VAC conversion available).

The only continuous-tuning VHF, UHF, FM field strength meter on the market

- Ideal for MATV and CATV with all connections and matching impedances
- Uses standard microVolt and dB scales for easy reference
- High 30uV sensitivity for both VHF and UHF fringe tests
- Built-in speaker eliminates need for messy headphones

FS134
Portable Field Strength Meter
\$395



Specifications

FREQUENCY INPUT: Continuously variable tuning through VHF and UHF TV, FM in three bands. **RANGES:** 53-109 MHz, 173-218 MHz, 465-895 MHz. Direct reading VHF and UHF channels with sound and picture carrier frequencies indicated. **SENSITIVITY:** 30 uV ±3 dB. **SELECTIVITY:** 500 KHz @3 dB. **IMAGE REJECTION:** 40 dB (53-109 MHz, 173-218 MHz); 30 dB (465-895 MHz). **INPUTS:** 75 ohm with standard "F" connectors. 300 ohm matching transformer with thumb-screw terminals. **ATTENUATOR:** 0, 20, 40 dB (X1, X10, X100).

OUTPUTS: METER SCALES: Calibrated in micro Volts and dB (0 dB = 1000 uV into 75 ohm). **METER RANGE:** 30- 30,000 uV (-30 to +30 dB). **AUDIO OUTPUT:** Detected signal of 5 uV minimum can be heard on built-in speaker. Adjustable volume. 150 mW max. power. **DETECTOR OUTPUT:** Detected signal at pin jac for scope or meter reading.

GENERAL: METER: 4", moving coil, 3%. **MECHANICAL:** Durable vinyl-covered steel with brushed aluminum trim. Carrying handle. Internal double shielding to prevent pick-up. **SIZE:** 9 1/2" x 10" x 5" HWD (24.1 x 25.4 x 12.7 cm). **WEIGHT:** 9 lbs. (4.1 Kg). **POWER:** 12V, 35 mA max. plus -1.5 V bias. Uses nine 1 1/2 "C" batteries. Optional 39G15 AC battery charger may be used with Burgess CD24 rechargeable cell.

39G15 AC Battery Charger \$15.00

The only all-channel, all-weather color generator

- Every VHF channel, plus UHF, too
- Especially equipped for MATV and CATV
- Temperature and humidity protected
- Calibrated RF output for fringe tests

CG169 COLOR KING IV
Deluxe Digital Color Generator
\$225

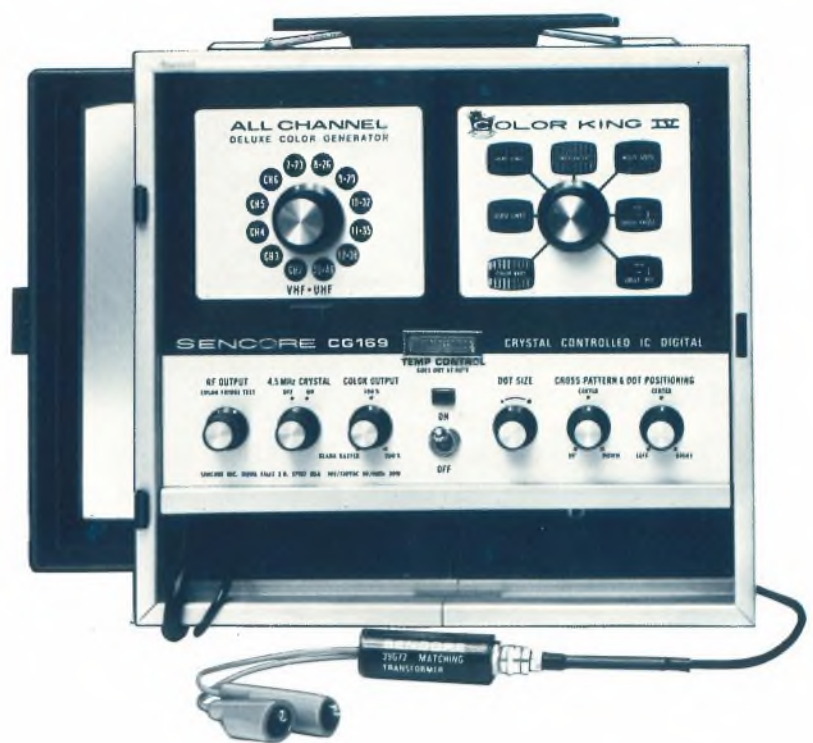
Now make your color convergence set-up and distribution system check-out a snap. The Color King puts all your standard RCA patterns at your fingertips for direct comparison with the manufacturer's service literature.

Every VHF channel, plus UHF, too

The CG169 is the only color generator that operates on every single VHF channel, and selected UHF channels, too. Now you can check out every channel plus the UHF tuner in the home, or in the shop before the set goes back.

Especially equipped for MATV and CATV

Standard MATV and CATV connectors are provided for both 75 ohm and 300 ohm matching impedances. Connect the CG169 directly into a cable distribution system, and dial the VHF or UHF channel you want to check the system from the rooftop to basement.



Temperature and humidity protected

The Color King uses crystal-controlled digital logic circuits for jitter free, rock-solid patterns as soon as you turn it on, plus it contains a built-in heater for temperature and humidity control, even under the most extreme hot or cold conditions.

Calibrated RF output for fringe tests

You can check the snow level of a receiver being returned to a fringe area, going on rabbit ears, or at the end of a distribution system with the calibrated output control on the front panel. Only the CG169 has it. It tells you if the TV receiver is sensitive enough before your customer tells you.

Specifications

PATTERNS: Seven crystal-controlled and digital-locked patterns. (1) Color bars: standard RCA 10-bar 30° rainbow with color level adjustable 0-200%. (2) Horizontal lines: 14 lines. (3) Vertical lines: 10 lines. (4) Crosshatch. (5) Dots: adjustable dot size control. (6) Single Vertical and Horizontal line: adjustable off-screen, controls detented for precise screen centering. (7) Single Dot: adjustable off screen.

OUTPUT: CHANNELS: VHF channels 2-13 individually selected, with ± 500 KHz FCC-assigned video carrier frequency for each channel. UHF channels 23, 26, 29, 32, 35, 38, 41 with ± 2 MHz of FCC-assigned video carrier frequency for each channel. **LEVELS:** VHF 1000 μ V ± 5 dB into 300 ohm, adjustable to -10

dB. **CONNECTORS:** 75 ohm impedance line, terminated with standard Jerrold "F" fitting connector. 300 ohm balun 39G72 Matching Transformer with universal alligator clip leads.

TEMPERATURE: Internal thermostat-controlled heater maintains 80° F ambient temperature after 15 min. warm-up. **OPERATING RANGE:** 50 to 100° F (10 to 40°C). **USEABLE RANGE:** -20 to 120° F (-30 to 50° C).

GENERAL: MECHANICAL: Durable vinyl-covered steel case with aluminum trim. Mirror in detachable cover. Lead storage compartment. **SIZE:** 10 1/2" x 10 1/2" x 4 1/8" HWD (27.7 x 27.7 x 10.5 cm). **WEIGHT:** 8 lb. (3.6 kg). **POWER:** 70-135 VAC, 50/60 Hz, 25 W max. CSA approved. (230 VAC conversion available.)

Rock-solid patterns in a caddy-size generator

- Rock solid digital patterns
- Built rugged for field use
- Big generator features, too
- Automatically shuts itself off

CG25
LITTLE HUEY
Portable Digital
Color Generator
\$99



Little Huey packs big generator performance in a handy caddy-size case. He has the same rock-solid digital-locked patterns as the big color generators. Just push the buttons for standard RCA patterns that look exactly as shown in your service literature.

Little Huey is rugged and built to last on the road with a tough, unbreakable case and protected computer-type circuit boards. Yet he's lightweight and takes less space in the

Specifications

PATTERNS: Five crystal-controlled and digital-locked patterns. (1) Color bars: standard RCA-licensed 10-bar 30° rainbow with color level adjustable 0-200%; (2) Horizontal Lines: 14 lines; (3) Vertical lines: 10 lines; (4) Crosshatch; (5) Dots: adjustable dot size control; plus Blank Raster for purity test with all selector buttons out.

OUTPUT: CHANNELS: VHF channels 2 thru 6, fully adjustable. Factory set to Channel 4. **CONNECTORS:** Universal alligator clip leads attached. 300 ohm matched.

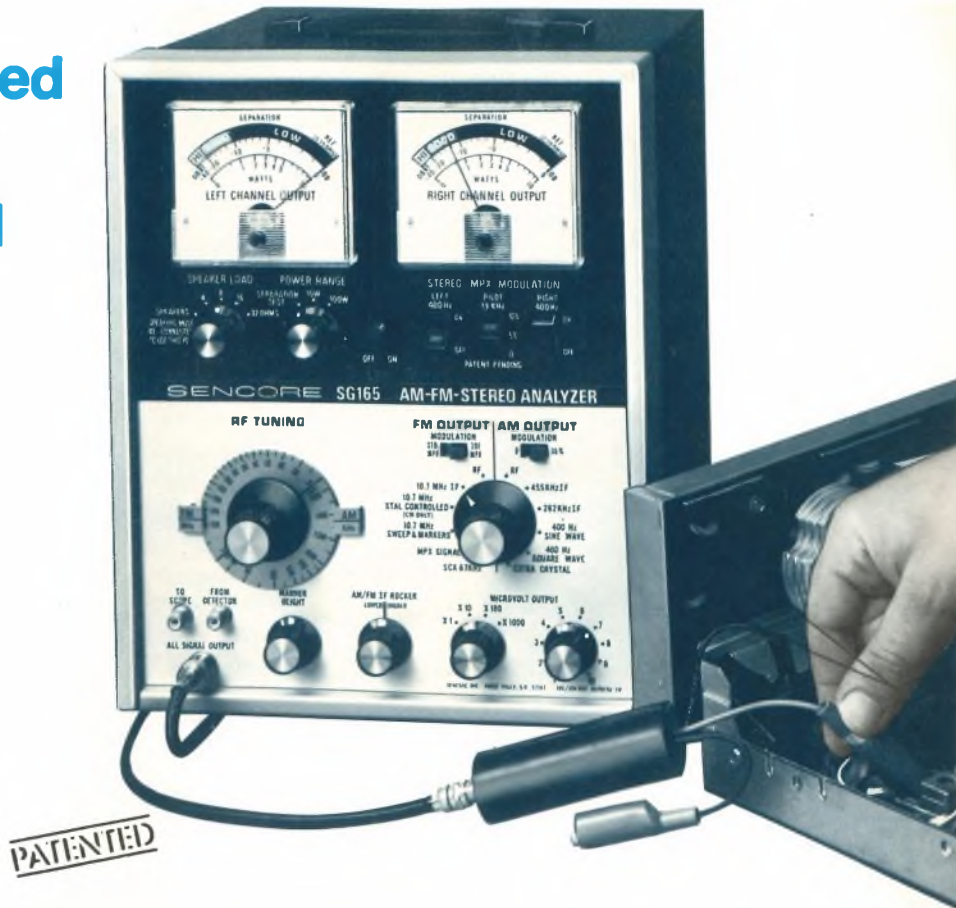
GENERAL: AUTOMATIC SHUT-OFF: 20 min typical. **MECHANICAL:** Durable ABS acrylic plastic case with vinyl-covered steel. Scratch-proof rubber feet. Lead storage compartment. **SIZE:** 2" x 4" x 6" HWD (5.1 x 10.2 x 15.2 cm). **WEIGHT:** 2 lb. (.91 kg). **POWER:** 5.6V, 6.6 mA max. Uses one 5.6V mercury cell (Eveready E164 or equiv.).

caddy than two large tubes, so he's always handy. You have controls to adjust the dots to the size you like, big or small, plus tuning for any channel from 2 through 6. An adjustable color level control lets you simulate a weak signal or check the color sync action, just as you would with a deluxe generator. Little Huey automatically turns the power off after 20 minutes—even if you forget. Battery life is extended to near the battery shelf life.

Everything you need to completely service an AM-FM stereo receiver

- Everything in one instrument for complete stereo servicing
- Uses only one output cable
- Dual dB & Watt meters backed with 100W speaker loads
- It's an FM sweep and marker generator, too

SG165
AM-FM-Stereo Analyzer
\$695



Why should you spend thousands of dollars for separate audio and stereo test instruments, only to get yourself tangled up in a mess of interconnecting cables that wastes your troubleshooting time? Now you can simplify your testing with all 12 AM and FM stereo troubleshooting signals in one clean, compact instrument—the SG165 AM-FM Stereo Analyzer.

Only instrument you'll need for stereo servicing

Every signal and test you'll need is at your fingertips for troubleshooting any receiver, portable radio, or auto radio, from the antenna terminals to the speaker loads. You'll need nothing else. Simply switch the output knob step by step to walk the troubles out of RF, IF, audio or stereo multiplex stages. A patented phase-locked multiplex subcarrier circuit assures that each standard FM stereo signal has specs better than FCC requirements for stations. The SG165 also works on AM and monaural FM, plus it can be used to check quadraphonic systems.

Uses only one output cable

You'll save time like never before with only one output cable for every signal. Individual instruments can require up to 15 cables and accessories to do the same job. So why get yourself wrapped up with cables when the SG165 cable keeps your bench tangle-free to speed your work.

Dual dB/Watt meters with 100 Watt dummy loads

Two 100 Watt maximum speaker substitute dummy loads are built into the SG165 to save more bench space. Simply connect the left meter in place of the left speaker and the right meter in place of the right speaker. Then read the dual meters to monitor each channel for audio RMS watts power output and dB channel separation. The direct-reading color-coded scales on the meters make excellent customer-convincers when the job is done.

Specifications

ALL OUTPUTS: OUTPUT CABLE: Single cable output for all functions. 39G43 Matching Pad for 300 ohm balanced and 75 ohm unbalanced termination. 300 V isolation. Alligator clip test leads. **ATTENUATOR:** 4 calibrated 20 dB ranges, continuously variable between ranges. Controls all output signal levels. 1 uV to 10,000 uV for RF signals. **FM MODULATION FREQUENCY:** 400 Hz left channel, right channel selectable, 19 KHz pilot (± 2 Hz), selectable for 0%, 5%, or 10% level. Pilot phase-locked to 38 KHz subcarrier (patent 3,896,268). **FM MODULATION LEVEL:** Standard MPX = 30% deviation (± 22.5 KHz), IHF MPX = 100% deviation (± 75 KHz).

FM RF GENERATOR: 86 to 110 MHz continuously variable. Unmodulated or modulated. Direct reading selector dial. Tracking ± 300 KHz at any mark.

FM IF GENERATOR: Crystal-controlled 10.7 MHz ($\pm 10\%$). Modulated or unmodulated CW only. Rocker adjustable ± 250 KHz from center detent position.

FM IF SWEEP GENERATOR: 10.7 MHz ± 140 KHz sweep with post-injected markers at 10.7, 10.6, and 10.8 MHz. Adjustable marker height control. Adjustable center frequency rocker control. Two lead hook up: (1) from receiver detector, (2) to scope vertical. Phase-locked line sweep jack provided for connection to scope external horizontal jack.

FM MPX GENERATOR: Modulated signals only, with 19 KHz pilot phase-locked to 39 MHz subcarrier.

SCA 67 KHz GENERATOR: 67 KHz ($\pm 3\%$) carrier for setting SCA subscription signal traps.

It's an FM sweep and marker generator

Stereo alignment can be very crucial but you won't need a separate sweep and marker generator to "dead set" the alignment, because it's already built in. Yet the total SG165 analyzing system sells for no more than your cost of just a separate sweep and marker. You'll be completely equipped for stereo service without making a mess of your bench or your budget with the SG165.

AM RF GENERATOR: 525 to 1625 KHz, continuously variable. Unmodulated or 400 Hz sine wave modulated at 30%. Direct-reading selector dial.

AM IF GENERATOR: 262 and 455 KHz ($\pm 2\%$). Unmodulated or 400 Hz sine wave modulated at 30%. Rocker adjustable ± 25 KHz from center detent position.

AUDIO GENERATOR: 400 Hz ($\pm 20\%$) sine or square wave for signal tracing. 5% max sine wave distortion. 2 usec max square wave rise time.

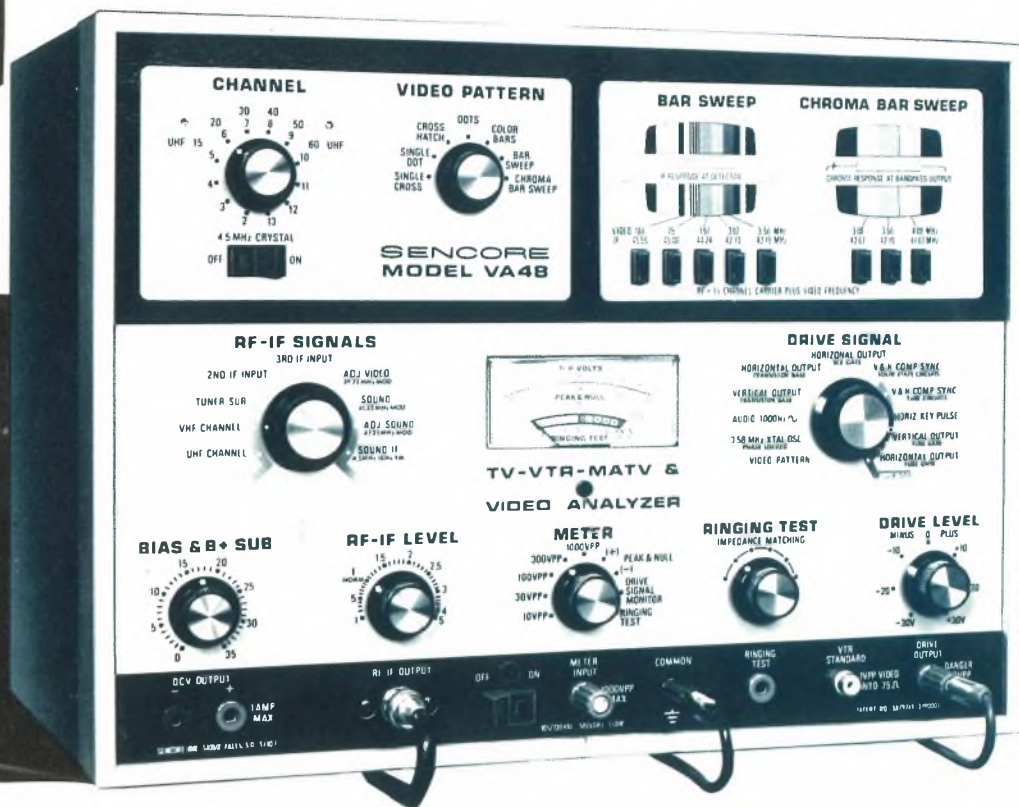
EXTRA CRYSTAL: 3-12 MHz crystal oscillator available for use with non-FCC standard frequencies. HCGU crystal socket. 15 pf loading.

DUAL MONITORING METERS: Measure left and right channel outputs. **RANGES:** 0 to 40 dB separation between channels (0 dB = 2.1 V RMS). 0 to 10 W RMS, and 0 to 100 W RMS output power.

SPEAKER SUBSTITUTE LOAD: Direct connection to amplifier outputs. **LOAD IMPEDANCES:** Speaker direct, 4, 8, and 16 ohm for each channel. **RANGES:** 10 W, 100 W RMS. **POWER DISSIPATION RATING:** 20 W RMS continuous, 100 W RMS max for 5 min.

GENERAL: All necessary cables and accessories supplied, including Auto Radio Adaptor. **METERS:** 3 1/2", moving coil, 3%. **MECHANICAL:** Durable vinyl-covered steel with brushed aluminum trim and panel. Carrying handle. Lead storage compartment. **SIZE:** 12 1/2" x 10" x 9" **HWD** (32.2 x 25.4 x 22.9 cm). **WEIGHT:** 18 lb (8.2 Kg). **POWER:** 105-130 VAC, 50/60 Hz, 7W. CSA approved (230 VAC conversion available)

The one complete instrument for faster, easier video troubleshooting



PATENTED

New

How often have you dreamed of owning one complete and easy-to-use instrument that would take you all the way through any TV or video system, from the antenna terminals through to the CRT grids? Now your dreams are answered in the all-new VA48 TV-VTR-MATV and Video Analyzer.

Uses standard color bars and patterns

What could be simpler to start with than the patterns you are already used to in your Sams and manufacturer's service literature. The standard rainbow color bars, dots, crosshatch, and single fixed dot and single fixed cross patterns are all right there at your fingertips. The patterns are rock solid and trouble-free because they are developed with all-electronic digital circuits, and phase locked to every test signal in the VA48.

New patented Bar Sweep patterns speed alignment

For the first time you can align any chassis by watching the response pattern on the screen itself. The VA48's Bar Sweep allows the TV to follow the signal in a dynamic fashion, eliminating the need for special hook-up and AGC clamping. This patented system produces the standard video response pattern used by cable TV companies, but also componentates the bar amplitudes for the IF response curve. Simply connect the VA48 Bar Sweep into the antenna terminals and look at the response bars on the screen. Or you can connect a scope into the video detector and

adjust the IFs for even amplitude on each bar, if you wish.

The Chroma Bar Sweep pattern works just as easily into the antenna terminals for chroma bandpass alignment. Those critical trap adjustments are made easier, too, as each crystal-controlled trap frequency is 1000 Hz modulated, so you merely adjust for minimum modulation on the screen.

All RF and IF signals from one cable

Every RF and IF signal is controlled by the calibrated MicroVolt Output control through a single time-saving cable. All twelve VHF channels, plus six UHF channels, are at your command to check every station channel in your area. Special preset outputs for the 1st, 2nd, and 3rd IFs equip you to walk through the stages in minutes.

All drive signals for tube and solid state

Flip the Drive Signal control to select the video pattern for injecting through the video circuits to the CRT grid, the phase-locked 3.58 MHz crystal-controlled oscillator to substitute for the color oscillator, and the audio signal to complete your injection tests when the sound is dead. Then all the vertical and horizontal sweep drive substitute signals are there to inject into the oscillators and outputs on transistor and SCR-controlled sets, plus provide the higher drive levels for tube-operated sweep circuits. Substitute NTSC sync signals are built in, too, for both solid state and tube AGC and sync tests.

Famous 100% accurate Ringer test

How do you check the yoke and flyback? Simply connect the reliable, patented Ringer built into the VA48 to the coil, in or out of circuit, and check for good or bad on the meter. It works 100 times out of 100 to eliminate needless replacement of these expensive components.

Drive signal monitoring

You won't need to guess at your drive signal level since each signal is monitored accurately on the built-in meter. It's also a Peak-to-Peak reading meter for signal tracing.

Video sweep generator

You'll want a good video sweep generator to service VTRs, MATV systems, and video games in a hurry. The VA48 Bar Sweep pattern provides a full video sweep system that shows the standard cable TV response pattern right on the screen. A special 1 Vp-p video signal into 75 ohms is provided on the front panel to make manufacturer's recommended tests on VTR's, too.

Bias and B+ substitute power supply

If you wish to substitute the B+ supply on the newest sets that develop B+ from the flyback, or power modules for testing, then simply couple in the VA48 B+ Sub power supply. You can quickly isolate troubles in any AGC, AFC, ACC, or other automatic control circuits when you clamp the DC voltage and note whether the circuit operation returns to

- Uses familiar standard color bars and patterns
- New patented Bar Sweep patterns for simplified speed alignment
- All RF & IF signals for injection before the detector from one cable
- All drive signals for every stage after the detector - tube and solid state
- Famous 100% accurate Ringer yoke and flyback test
- Accurate drive signal monitoring and peak-to-peak meter
- Video sweep generator for standard video, MATV and VTR tests
- Bias and B+ substitute power supply

VA48
TV-VTR-MATV &
VIDEO ANALYZER
\$975

(Available Fall 1977)

normal. Finally, this handy supply provides the tube blocking voltages you'll need for horizontal output and color killer operation checks.

The VA48 directly replaces up to ten separate instruments on your bench costing nearly \$3000. It's the only instrument that updates you for faster TV and video system troubleshooting like never before.

The Old Way—sweep/marker response curve required interpretation and time-consuming connections

Scope connected to video detector shows even amplitude bars for proper response

Patented Bar Sweep Pattern on TV screen simplifies alignment with a dynamic test just like the station

Save hours of frustrating guesswork on TV sweep circuits

- Guaranteed 100% reliable Ringer yoke and flyback test
- Operates with pushbutton ease and Good/Bad scale
- Works in-circuit or out-of-circuit
- It's a sweep circuit analyzer, too

YF33 RINGER
Yoke & Flyback Tester
\$195



PATENTED

100% reliable Ringing test

The Ringer uses a 100% reliable test for yokes and flybacks in any TV set, foreign or domestic, tube or solid state. The standard ringing test accurately counts the number of rings before decay to the preset 25% level. Ten rings separates the good from the bad every time. It's so reliable that it's patented.

Pushbutton ease and Good/Bad scale

Simply connect the Ringer to the winding you wish to test and push the six big king-sized pushbuttons for correct yoke or flyback impedance matching. The color-coded Good/Bad scale tells you and your customer whether a new part is needed or not.

Use in or out of circuit

The Ringer works in circuit on all tube operated sets, and on solid state when the

dampener diode or other components are disconnected from across the winding. Even then, it will never lie to you by calling a transformer good when it isn't. The out-of-circuit test backs you up for 100% reliable testing, too.

It's a sweep circuit analyzer, too

Special Peak-to-Peak voltage scales allow you to test the horizontal circuit drive levels all the way back to the oscillator. Plus you can check the focus and high voltage outputs, too, with the 10KV Focus and 50KV High Voltage optional probes.

Accessories

10KV Focus Voltage and 50KV High Voltage Probe Set \$35.00

Specifications

DEVICES TESTED: Horizontal and vertical yoke windings, horizontal output transformers, horizontal linearity coils, horizontal efficiency coils, and numerous general applications coils operating at frequencies between 1 KHz and 15 MHz.

RINGING TEST: Dynamic ringing test counts number of cycles coil rings before reaching a preset damping level after exciting pulse has been applied. Meter calibrated to show number of cycles detected with "Good" reading for 10 or more cycles. RANGE: 1 to 60 cycles. ACCURACY: ± 1 cycle, at midscale. EXCITING PULSE: ± 15 Vp-p at 120 cycles per second. Sync'd to AC line frequency.

SENSITIVITY CONTROL: Selects level of ringing signal at which detector stops counting. RANGE: Typically 50% to 10% of exciting pulse amplitude. Calibrated at mid-position for normal 25% cutoff level.

DRIVE VOLTAGE METER: Measures peak-to-peak AC voltage. RANGES: 0 to 30 VAC p-p; 0 to 30 VAC a-p. ACCURACY: $\pm 3\%$ FS. FREQUENCY RESPONSE: 3 MHz (3 dB).

HIGH VOLTAGE METER: Measures DC Voltage when used with optional FP201 10 KV Focus Voltage Probe and 39G89 50KV High Voltage Probe. RANGES: 0 to 10 KVDC (with FP201 probe); 0 to 50 KVDC (with 39G89 and FP201). ACCURACY: $\pm 3\%$ FS.

GENERAL: METER: 4 1/2" moving coil. 100 uA, $\pm 2\%$. Illuminated scale. Shock-protected movement. MECHANICAL: Molded ABS acrylic and vinyl covered steel case. Aluminum handle/tilt stand. Lead Storage Compartment. TEST LEADS: Two alligator-clip leads attached. SIZE: 10" x 5 1/2" x 3 1/2" HWD (25.4 x 13.8 x 8.9 cm) WEIGHT: 4 3/4 lb. (2.2 kg). POWER: 105-130 VAC, 50/60 Hz, 10 W. CSA approved.

SENCORE

3200 SENCORE DRIVE, SIOUX FALLS, SD 57107 (605) 339-0100

TIME-SAVING INSTRUMENTS

In stock at your local Sencore
Full Line Promotional Distributor

Prices and specifications subject to change without notice.

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Each Sencore instrument is backed by
these exclusive benefits:



10 Day Free Trial

to let the product prove itself to you in your shop.
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returned.



100% Made Right Lifetime Guarantee

— your assurance of quality that lasts and lasts.



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to your local Sencore Full Line Promotional
Distributor backs your instrument purchase.



Technical Seminars with Video Tapes

where you learn simplified techniques from a
Sencore Test Equipment Specialist.

SENCORE

25 years as value leaders in Radio & TV, 2-Way
& MRO Test Equipment