

1985 EDITION

# SENCORE

ELECTRONIC TEST EQUIPMENT

# BUYERS GUIDE

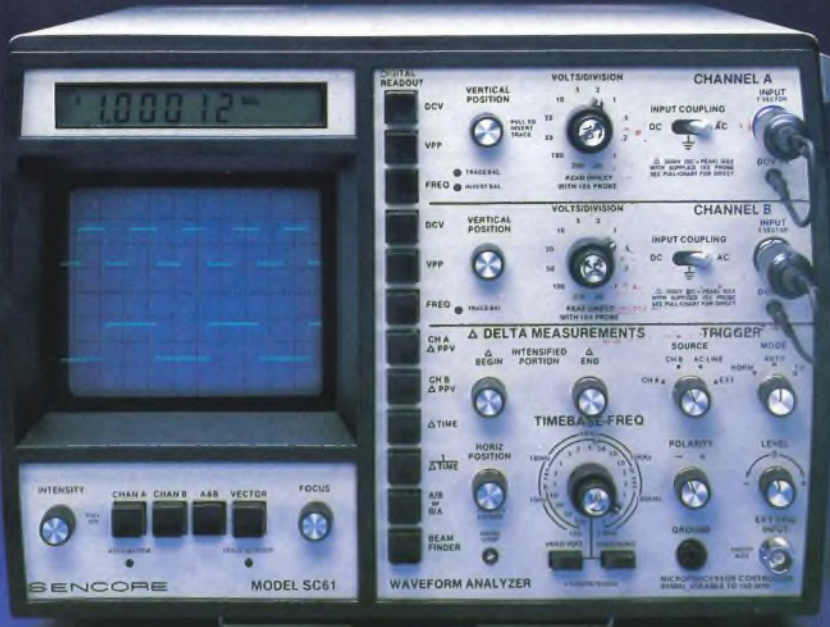
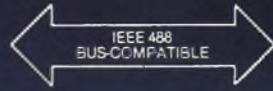


Innovatively Designed  
With Your Time In Mind!

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# SC61 60 MHz Waveform Analyzer



## EXCLUSIVE 2 KV PROTECTION ELIMINATES COSTLY DOWN TIME.

Most general purpose scopes are limited to a 600 V input. The SC61 lets you measure from 5 mV all the way to 2000 V (patent pending) for more versatility and protection.

## PLUS THESE PERFORMANCE EXTRAS.

- Dual delayed signal trace so you see the leading edge of the waveform on both channels.
- Add, subtract, or view both channels separately.
- Post deflection, high intensity blue phosphor 8 x 10 cm CRT provides easy-to-view trace, even under high ambient lighting conditions.
- Push button X-Y vector display with 4 MHz response for accurate phase comparisons.
- Z-Axis input.
- Beam Finder.
- TVV, and TVH video preset positions with sync separators.

**THE ONE AND ONLY.** There are other scopes with digital readout, but none completely eliminate graticule counting like the SC61.

**MONEY BACK GUARANTEE.** The SC61 Waveform Analyzer is a breakthrough in scope technology. It can literally double your troubleshooting and general purpose testing productivity. But, don't take our word for it. Try an SC61 yourself. If it doesn't at least double your productivity during the first 30 days, you may return it for a full refund.

**UPDATE TODAY.** Just like DVMs have replaced analog meters, the SC61 is replacing conventional scopes (under 100 MHz), and for the same reasons: increased speed, accuracy, and reliability. Update today with this new automated scope technology, and begin increasing your productivity. Begin by calling or writing for our free 8 page color SC61 brochure.



## SPECIFICATIONS:

### ANALOG CRT SECTION:

**Vertical Amplifiers:** Frequency Response:  $\pm 3$  dB, DC to 60 MHz, useable to 100 MHz, Risetime: 6 nanoseconds. Sensitivity: 5 mV/div. Maximum Input Voltage: 2000 Volts. VECTOF: Bandwidth:  $\pm 3$  dB from DC to 4 MHz, Phase shift:  $\pm 3^\circ$  from 10 Hz to 4 MHz. Z-Axis Input: BNC input on rear panel.

**Horizontal Sweep:** Timebase: 19 calibrated sweep rates 100 mS/div. to .1  $\mu$ S/div. 10X Expand: Expands horizontal sweep 10 times.

## Double Your Troubleshooting And Testing Productivity Or Your Money Back . . .

**\$2995 Patented**

NSN 6625-01-169-2318 ON GSA CONTRACT.

**THE FIRST SCOPE WITH DIGITAL READOUT.** The SC61 is the first instrument to combine a high performance 60 MHz scope with an autoranging digital display. View any waveform to 100 MHz on the CRT, then simply push a button to read the DCV, PPV, and frequency on the digital display; all with only one probe and no additional set-up.

**IT'S TEN TIMES FASTER—TEN TIMES MORE ACCURATE.** There are no graticules to count or calculations to make. So you end up with measurements ten times more accurate than conventional scopes in one tenth the time.

**EASY TO USE.** The operation is simplicity itself. Just push and read. Makes for fewer operator errors and increased productivity.

**MEASURE PART OF A WAVEFORM, TOO.** Use the exclusive Delta functions to intensify any portion of the waveform you wish. The digital display will read out PPV, time, or frequency for just the intensified section. It's an excellent general purpose scope too.

**60 MHz BANDWIDTH.** 60 MHz ( $-3$  dB) bandwidth lets you see glitches that you'll miss with 10, 20, and 30 MHz scopes.

**SUPER SYNC.** Special sync circuits lock any waveform to 100 MHz faster than any other scope. Our secret is an exclusive ECL (Emitter Coupled Logic) front end with noise cancelling differential amplifiers used throughout the sync circuits to provide better sync than any other scope on the market.

**CRT:** Size: 96.4 × 120 mm. (5 inches) rectangular.

**AUTO-TRACKING™ DIGITAL TESTS:**

**DC Volts:** Ranges: 4, automatically selected; 0 to 2000 VDC, direct reading with low-capacity probes.

**Accuracy:** ± .5%. **Input Impedance:** 15 megohms through low-capacity probes, 1.5 megohms direct.

**Resolution:** 3½ digits (2000 counts).

**Protection:** 2000 Volts (DC + Peak AC).

**Peak-to-Peak Volts:** Ranges: 4, selected by Channel A or B input attenuator, 0 to 2000 volts peak-to-peak, **Accuracy:** ± 2%; ± 0.5 dB of average reading to 30 MHz; - 3 dB at 60 MHz.

**Frequency:** Ranges: 7 automatically selected; 1.00 Hz to 99.9999 MHz.

**Resolution:** 6 digits. **Accuracy:** ± .001% (10 ppm).

**Frequency Ratio:** Range: 1 to 999,999.

**Digital Display:** Liquid crystal.

**ACCESSORIES:**

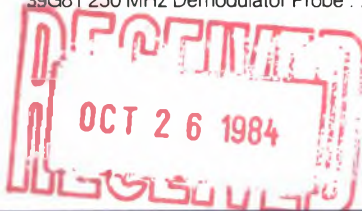
HP200 50 KV High Voltage Probe . . . . . \$49.00

DP226 1:1 Direct Probe . . . . . \$60.00

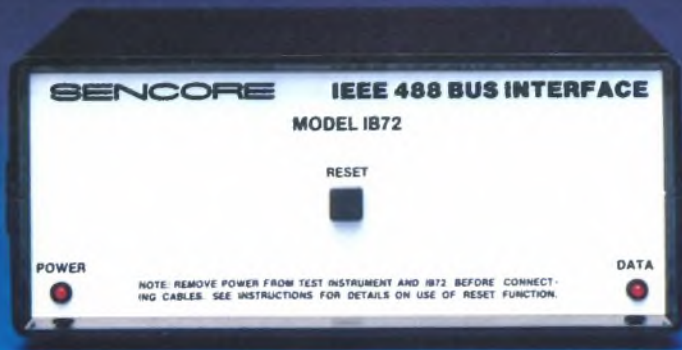
PC227 Protective Cover . . . . . \$29.00

TP212 10 KV Probe . . . . . \$19.50

39G81 250 MHz Demodulator Probe . . . . . \$29.95



## IB72 IEEE 488 Bus Interface Accessory



### Automate The SC61 Waveform Analyzer And FC71 1 GHz Frequency Counter

**ADD BUS MEASUREMENTS**

**EASILY.** Connect the IB72 to the special connector on the back of the SC61 Waveform Analyzer (page 2) or to the FC71, 1 GHz Frequency Counter, (page 5) to interface it to a computer or automated system. The IB72 translates between the instrument's microprocessor and the industry-standard IEEE 488 General Purpose Interface Bus (GPIB). The unique IB72 design means your cost of updating to IEEE bus capability is kept, low, as you can share one IB72 between the SC61 and the FC71 unless both must be connected to the bus at the same time.

**SC61 WAVEFORM ANALYZER**

**APPLICATIONS.** Use the IB72 with the SC61 60 MHz Waveform Analyzer and you convert this digital readout scope into a completely automated (talker and listener). This means a computer/controller can select any of the SC61's digital

readout functions and then take the readings from the SC61 as needed. This brings tests to the IEEE bus never before available, like peak-to-peak volts to 60 MHz, DC voltage measurements to 2000 volts, and fully autoranged frequency measurements from 10 Hz to 100 MHz. The SC61 replaces up to 6 separate instruments in many bus applications. It's often the only measuring instrument needed for many complex tests.

**FC71 FREQUENCY COUNTER**

**APPLICATIONS.** Plug the IB72 into the FC71 (see page 5) and you have a (talk only) IEEE bus compatible 1 GHz frequency counter. Simply select the function you want with the FC71's front panel switch, and it will send its frequency readings to the computer/controller whenever needed by your program.

**ACCESSORY.** IE233 1 meter (39.4 inches) IEEE bus cable . . . . . \$79.95

**IB72 . . . . . \$625.00**

# TF46 Portable Super Cricket Transistor/FET Tester



**Test Any Transistor Or FET With 99% Reliability In Less Than 15 Seconds—In Or Out Of Circuit**

**\$395 Patented**

NSN 6625-01-058-9564 ON GSA CONTRACT.

**PATENTED IN CIRCUIT TEST.** The "Cricket" has a patented "go/no-go" in or out of circuit test for all transistors and FETs. It's proven 99% reliable in circuit—99.9% reliable out of circuit. Simply connect the leads in any order and rotate the test switch. There's no setup needed. If the device is good, you'll hear a chirp. That's the total test.

**LEAKAGE TEST.** Out of circuit leakage check finds those transistors that show good gain, but are still leaky.

**GAIN TEST.** Push a button for gain. Helpful in troubleshooting as well as matching transistors and FETs.

**MORE PRACTICAL THAN CURVE TRACERS.** If your job is troubleshooting, you'll want to use the Cricket rather than a curve tracer. It's faster, just as reliable, and requires no interpretation. At \$348 you can't make a better investment.

**ACCESSORIES.** 39G85 Touch Test Probe for testing on PC boards . . . . . \$17.00

# Catch Defective Caps And Coils That All Other Testers And Bridges Miss With The Triple Patented "Z Meter"

**\$895 Patented**

NSN 6625-01-118-8016 ON GSA CONTRACT.

**DYNAMIC CAP TESTING.** The "Z METER" is the most reliable capacitor tester on the market at any price. That's because it is the only tester that dynamically tests capacitors for capacity value, leakage (at full rated voltage up to 600 V) and dielectric absorption (a patented test). According to thousands of tests made by Sencore Field Engineers, less than 25% of all capacitor defects cause a value change. Only the "Z METER" steps in to find the remaining 75% of the caps that give so much trouble loading circuits causing excess hum, upsetting biases, or who knows what. Value only testers, and bridges will mislead you. You need all three "Z METER" tests to be sure.

**RELIABLE COIL TESTING.** The "Z METER" is the most reliable coil tester on the market, as well. That's because the "Z METER" measures inductance, not inductive reactance as bridge type testers read. Test results often vary from one bridge to another because different test frequencies or amplitudes are used. The "Z METER" uses a patented true inductance test, not related to frequency, to provide consistent, accurate results every time.

Second, only the "Z METER" provides you with a patented Ringing Test that is sensitive enough to detect one single shorted turn in air or powdered iron coils. One shorted turn will seldom change the inductance value of these high-Q coils, yet the coil won't work in circuit. This is why value only testers will mislead you. The patented Ringing Test tells you positively, at the push of a button, whether a coil is good or bad.

## PLUS YOU GET THESE SPECIAL TESTS

- Test SCRs, TRIACs, hi-voltage rectifiers and diodes with up to 600 V applied.
- Pinpoint distance to a short or open in a transmission line or coaxial cable. (Great for broadcast and avionics work.)
- Test for dielectric leakage (hi pot) to 600 volts.

It's like getting a special tester free.

**"Z METER" GUARANTEE.** We feel the "Z METER" is the most reliable cap/coil tester on the market. We'd like you to decide for yourself. Here's our offer. Try a "Z METER" for thirty days. If at the end of that time you don't agree, you may return your "Z METER" for a full refund, including freight both ways.

## GET THE "Z METER" STORY.

Write or call toll-free today and ask for our free 8 page color brochure on the "Z METER" to see just how amazing this instrument really is.



## ACCESSORIES.

SCR224 SCR and TRIAC Test accessory. Use with LC53 to dynamically check for turn-on and turn-off capability of SCRs and TRIACs. . . . . \$49.00  
 FC221 Field Calibrator. Contains three low-drift inductors and capacitors for field calibration checks. . . . . \$65.00

# LC53 "Z Meter" Cap/Coil Analyzer



# FC71 Portable 1 GHz Frequency Counter



**Now Measure With FCC Accuracy To 1 GHz—All Day Long On One Charge—For One-Third Less Than The Nearest Competitive Counter**

**\$995 Patent Pending**

ON GSA CONTRACT

## ANNOUNCING THE FIRST TRULY UNIVERSAL 1 GHZ FREQUENCY COUNTER.

Yesterday's counters, with their 80, 100, or 520 MHz top ends, just won't meet today's 1 GHz demands in avionics, broadcast, two-way communications or video disk service; not to mention future applications. 1 GHz is the frequency you need, but 1 GHz counters have always meant trade-offs of some sort—until now. Thanks to several innovations, the FC71 is the first 1 GHz counter that provides totally uncompromising, portable performance.

**THE FIRST TRULY PORTABLE 1 GHZ COUNTER THAT'S FCC ACCURATE.** The FC71 uses a unique, new, microprocessor-controlled timebase. This patent pending circuit provides .5 ppm accuracy (0.5 ppm/year aging) from 10 Hz to 1 GHz. The 8½ digit LCD display provides superior accuracy

on the high end while allowing .01 Hz resolution for low end audio work.

Since there is no power robbing oven, the FC71 is the first battery operated 1 GHz counter to give nine hours of continuous operation. Take it wherever it's needed: broadcast towers for FCC documentation, repeater shacks for troubleshooting or airplane cockpits for avionics tests. You now have accurate high frequency measurements all day long.

**THE MOST SENSITIVE 1 GHZ COUNTER—COUNTS SIGNALS IN MORE CIRCUITS.** The FC71's front end almost sounds like magic; an average sensitivity of 5 mV from 10 Hz to 1 GHz—a typical 1 GHz sensitivity of 14 mV. Counts signals in more circuits than with any other counter—without external amplifiers. Even measure the output of RF generators and communications monitors that can't be tested with other counters.

**THE HIGHEST STABILITY AVAILABLE—COUNT SIGNALS THAT DRIVE OTHER COUNTERS CRAZY.** The FC71 is guaranteed to be the most stable counter you can buy due to a specially designed input circuit. The FC71 counts signals others can't, like AM or FM signals, digital signals with ringing, or audio signals with noise. There's such a striking difference between the FC71's stability, and that of a conventional counter, you have to try it to believe it.

**THE BEST RF SHIELDING OF ANY COUNTER—IT'S INTERFERENCE FREE.** With most counters, you cannot make measurements near a broadcast or two-way transmitter because the counter picks up the transmitter signal through the case. The FC71's double shielding lets you measure signals in RF fields that are just plain impossible to measure with other counters.

## EXTRA TESTS FOR ADDED VERSATILITY.

- Frequency-ratio function walks right through the ever-present multiply and divide stages in today's digital and 2-way circuits. Measure the input, measure the output, press a button, and read the exact ratio.
- Crystal check tests the fundamental operating frequency of any crystal.

**IEEE 488 BUS OPTION TOO.** Add the IEEE 488 bus controller IB72 at any time (without modifying the unit) for automatic readings. (See page 3 for IB72 Accessory Description.)

**PRICE.** The FC71 is a price for performance breakthrough, unmatched by counters costing half again as much—we guarantee it.

## MONEY BACK GUARANTEE

Try our FC71 for 30 days. If you do not find it to be the best 1 GHz frequency counter buy on the market, you may return it for a full refund including freight both ways.

Call or write today for full details.

## SPECIFICATIONS

**Display:** 8½ digit liquid crystal with battery test.

**Frequency Range:** 10.00 Hz to 1 GHz.

**Sensitivity:** 5 mV ave., 14 mV typical at 1 GHz; adjustable for special signals.

**Accuracy:** 0.5 ppm (0-40 degrees C), microprocessor compensated; 0.5 ppm/year aging.

**Frequency Ratio:** 1.0000 to 99,999,999; automatically calculated from stored input and measured input.

**Crystal Check:** Test any crystal for operation.

# DVM37 3½ Digit, 0.1% Bench/Portable DVM



## When The Going Gets Tough, You Need A Tough DVM To Keep Going

**\$395**

ON GSA CONTRACT.

**ONE SUPER RUGGED DIGITAL VOLTMETER FOR EVERY USE.** If you are the kind of person who likes to get used to one meter and use it everywhere and anywhere, you'll want the super reliable DVM37. You can drop it, kick it, carry it by the test leads, and it will keep right on operating at lab accuracy.

**FULLY PROTECTED INSIDE.** Unheard of 8 KV transient protection with 2 KV DC protection on every function and range, including ohms, spells unmatched internal protection.

**0.1% DCV ACCURACY INTO 15 MEGOHM INPUT.** 15 megohm input impedance means 50% less loading and thus, 50% greater accuracy than other 0.1% DVMs.

**AUTOMATIC FEATURES AT AN AFFORDABLE PRICE.** Auto Zero, Auto Polarity, Auto Decimal, and Auto Overrange, plus Hi-Lo Ohms.

**28 FULL RANGES.** 4 DC voltage ranges to 2000 volts at 0.1% accuracy, 4 AC voltage ranges to 1000 volts at 0.5% accuracy, 5 DC current ranges to 2000 mA at 0.3% accuracy, 5 AC current ranges to 2000 mA at 1% accuracy, 5 Lo Power resistance ranges to 2 megohms and 5 Hi Power resistance ranges to 20 megohms at 0.2% accuracy. Optional CS223 20 amp current shunt extends AC or DC current to 20 amps.

**ACCESSORIES.** See DVM56A on next page for accessories.

## Troubleshoot Startup And Shutdown Problems Fast

**\$395 Patented**

NSN 6625-01-124-6269 ON GSA CONTRACT.

**IT'S A VARIABLE OUTPUT SUPPLY FOR SHUTDOWN CIRCUITS.** The Powerite® 400 Watt AC variable output transformer provides a continuously variable output voltage from 0 to 140 Volts; a necessity for troubleshooting the new shutdown circuits.

**IT'S ISOLATED FOR YOUR PROTECTION.** The PR57 Powerite® protects you and your test equipment from those shocking overloads by isolating you (and your equipment) from the AC line.

**PROTECTS YOU AND BUILDS YOUR PROFITS WITH SAFETY LEAKAGE CHECKS.** Safety leakage checks are now a snap with the patented Powerite® test. All manufacturers require this safety test, yet few techs perform it because it's too time consuming. But not any longer. Simply push a button and touch all the exposed metal parts with the PR57 probe. Any leakage reads on the meter. You can charge for this special test too. An extra \$2, \$3, or \$4 a set adds up to several thousand dollars a year. If you're servicing AC operated equipment, you should be using a Powerite®

Powerite® is a registered trademark of Sencore, Inc.

## PR57 Powerite® Variable Isolation Transformer and Safety Tester



# Guaranteed To Be Everything You Ever Wanted In A Bench Meter—Or Your Money Back

**\$995 Patented**

ON GSA CONTRACT.

**THE MOST VERSATILE METER ON THE MARKET.** Of all the instruments a tech uses on the job, his meter has got to be the one he uses most often. Yet, many meters just don't meet the needs of today's techs. That's why we designed the DVM56A Microranger®. We surveyed literally thousands of techs and engineers to see what they liked and didn't like about their present meters. We then put the microprocessor to work to make one meter with everything in it that you would ever want for your testing and troubleshooting. Our claim is simple; try a DVM56A Microranger® and if you don't feel it is everything you ever wanted in a bench meter, you may return it for a full refund, including freight. That claim may sound a little bold, but once you see just what you can do with the Microranger®, you'll know why.

**IT'S FAST.** The Microranger® is totally autoranging. You simply select the function you want. The Microranger® does everything else.

**IT'S ACCURATE.** 4½ digit readout with a .075% DCV accuracy means reliable readings every time. A high 15 megohm input impedance minimizes circuit loading for readings you can trust in any circuit.

**IT'S VERSATILE.** The Microranger® has more functions and ranges than any other meter out, including dB, ACV peak-to-peak, true RMS, peak and null, and more.

**RF INTERFERENCE FREE.** The DVM56A holds rock solid under the largest broadcast transmitting tower.

The DVM56A is a one of a kind meter. If you use a meter for most or all of your troubleshooting, you should be using the DVM56A Microranger®.

## SPECIFICATIONS

**DCV:** 4 ranges to 2 KV, 0.075%; to 10 KV with supplied probe, 0.5%.

**ACV True and Ave. RMS:** 3 ranges to 1000 volts, 0.5%. **ACV-PP:** 3 ranges to 2 KV, 1%. **dB:** -42 to +62.2 dBm (0 dB = .7746 V) **dBp:** programmable reference.

**Ohms:** 5 Low-Power ranges to 2 megohm, 5 Hi-Power ranges to 100 megohm, 0.3%.

**AC/DC Current:** 2 ranges to 2A, 0.3% DC, 1% AC.

**ACCESSORIES (Used with all Sencore meters and DVMs except as indicated.)**

DP213 Universal Voltage Quadrupler Detector Probe	\$20.00
TP212 Universal 10 KV Probe (Not needed with DVM56A)	\$19.50
HP200 Universal 50 KV High Voltage Probe	\$49.00
PA208 115 Volt AC Power Adaptor for DVM37	\$15.00
DBA220 Low Level X10 Audio Amplifier. Use with DVM56A, for increased resolution on low level signals in the .5 to 200 mV (RMS) range by 10 times (20 dB)	\$50.00
CS223 20 Amp Current Shunt	\$45.00

Microranger® is a registered trademark of Sencore, Inc.

## DVM56A Microranger®



# CR70 "Beam Builder" Universal CRT Analyzer and Restorer



**DYNAMIC TESTS YOU CAN TRUST.** The CR70 tests the CRT over its entire operating range, from black (cutoff) to white. It's the only tester that does. The CR70 tests emission as true beam current (current that passes through the control grid to the screen grid) plus it accurately identifies CRT problems related to bad contrast that other testers miss. The CR70 also tests for shorted elements, plus, a patented color-tracking test gives a direct good/bad comparison of all three guns of a color CRT or all three CRTs of a projection system to confirm they will balance properly for any color or B&W picture.

**RESTORE CRTS, SAFELY AND EFFECTIVELY.** The CR70 is guaranteed to extend the life of 9 out of 10 weak or shorted CRTs. In industry, this saves thousands of dollars per year as you stretch the life of computer display tubes or high-priced scope tubes. In TV service, this is a real profit generator as you charge \$25 to \$35 for restoration and keep your customer from throwing away an otherwise good TV.

The CR70 is more effective than any other CRT restoring instrument because it's the only one with five different restoration levels for each CRT type. We call it "progressive restoration". Progressive restoration means you start with the lowest (safest) level of restoring current. If the CRT responds to the lower level, you stop. If it doesn't, you step up the energy level until you improve the tube or run out of steps. There is nothing on the market that is safer or more effective.

**PREVENTS COSTLY OVERLOAD DAMAGE.** CRT testers are often damaged by high voltage left on the CRT, or by shorted filaments. The CR70 is fully protected with special MOVs (metal oxide varistors) and a fast-acting magnetic circuit breaker to prevent costly damage.

**EXCLUSIVE 4-WAY MONEY BACK GUARANTEE.** The CR70 is so unique and different from other CRT testers that it has a money back guarantee that protects you four ways. The CR70 is guaranteed to:

- Test every CRT you encounter.
- Provide the most reliable tests available.
- Restore 9 out of 10 weak or shorted CRTs.
- Be totally protected from damage from charged CRTs.

If the CR70 fails to meet any of these claims during the first 30 days, you can return it for a full refund.

Call or write for 8 page color brochure.

**For The First Time Ever . . . Test Every CRT On The Market—Now And In The Future—Plus Restore 90% Of All Weak Or Shorted CRTs . . . Or Your Money Back. (Includes Color—B&W TVs, Scopes, Computer Displays, Camera Tubes And More.)**

**\$995 Patented**

NSN 6625-01-187-4395 ON GSA CONTRACT.

**ARE YOU WASTING MONEY REPLACING CRTS?** The CRT is the only modern electronic component guaranteed to wear out. Did you know most worn CRTs can be restored with a reliable restoring system? The CR70 is the best available anywhere. Here's why.

**TEST EVERY CRT ON THE MARKET.** The CR70 is the only CRT tester that lets you test every type of CRT in use today—and we mean every!

- All B&W and Color Video CRTs
- Projection CRTs
- Computer Display CRTs
- Closed circuit video CRTs

- Even scope, radar, and other industrial CRTs.

**FINALLY—WIN THE SOCKET WAR.** Using a totally new approach, the CR70 solves an age-old CRT tester problem; the adapter sockets. Conventional CRT testers need a separate, expensive adapter socket for each mechanical or electrical CRT variation. It takes 64 different adapters (at a cost of over \$700) for a conventional CRT tester to test all the CRTs tested with the 6 adapters supplied with the CR70. And the optional 39G170 Universal Adapter connects to any "non-standard" CRT that might be announced in the future.



# Walk The Troubles Out Of Any Stereo System In Half The Time

\$1,295 Patented

ON GSA CONTRACT.

**THE SG165—DESIGNED FOR TROUBLESHOOTING.** The SG165 Stereo Analyzer is the only instrument designed for complete troubleshooting of any AM/FM stereo system. There are numerous pieces of test equipment presently on the market designed for testing the operating specs of stereo/audio

equipment. Yet, none of these products are truly designed for cost effective troubleshooting of these same systems. The SG165 is.

**SIGNAL INJECTION.** The key to the SG165 troubleshooting capability is what we call signal injection. The concept is simple, and yet effective. You divide any stereo system into its

major blocks, including the RF, IF multiplex, audio, and output. You then inject known good signals from the SG165 into each block, starting from the output and moving towards the input. As soon as the problem appears, you know you are injecting into the defective stage. This simple approach to troubleshooting lets you literally walk through any stereo/audio troubleshooting in minutes.

The SG165 gives you every signal you need, at better than FCC tolerance, to inject into any of the basic blocks. Here is a rundown of those signals.

FM RF, 88 to 108 MHz; FM IF, 10.7 MHz adjustable 250 KHz either side of center. 10.7 MHz crystal CW signal and 10.7 MHz sweep signal. The AM band consists of RF from 550 to 1600 KHz with both 262 and 455 KHz IF signals, amplitude modulated. A composite multiplex signal and 400 Hertz sine wave and square wave signals as well as the special 67 KHz SCA trap signal are also provided.

A sweep and marker generator is also placed at your fingertips, plus an innovative vector alignment procedure lets you peak stereo separation in just minutes.

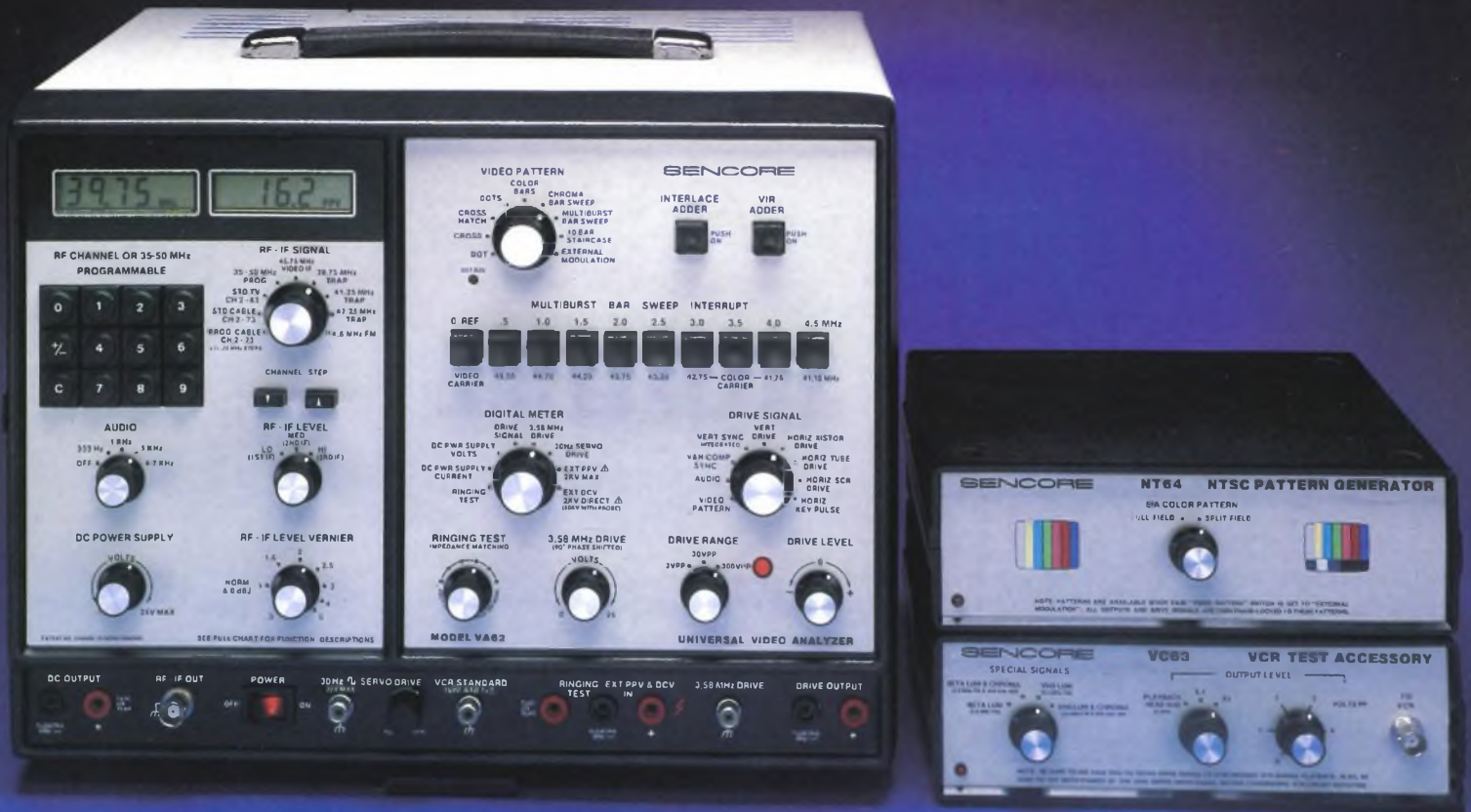
**SPECIAL METERS GUIDE YOU ALL THE WAY.** Two built-in meters, with dummy loads up to 100 watts, monitor your every action as you walk through the circuits. Each dummy load is connected directly in place of the speakers to avoid that annoying howl in your shop. The meters are calibrated in decibels (to -40 dB) plus they show as good or bad. Two audio wattage scales to 10 and 100 watts are also included.

Call today for full details on this stereo servicing profit center.

## SG165 AM/FM Stereo Analyzer



# VA62 Universal NTSC Video Analyzing System



**The Only All-Channel, NTSC Video Service System . . .  
Guaranteed To Cut Your Service Time In Half Or Your  
Money Back.**

**\$3,295 Patented**

ON GSA CONTRACT.

**CUT YOUR SERVICE TIME BY 54%.** Six years ago, Sencore revolutionized the video service industry by introducing the VA48 video analyzer. Since its introduction, the VA48 has become the industry standard for TV & VCR service. Over 22,000 service techs are increasing their service productivity with the VA48. In fact, a recent survey of VA48 users nationwide showed an average time savings of 54% with the VA48 compared to their previous test equipment. The key to this tremendous time savings is what we call signal substitution.

**SIGNAL SUBSTITUTION IS THE KEY.** There are two basic methods of troubleshooting a circuit: signal tracing and signal substitution. Signal tracing means you take a scope (or meter) and measure the signal at various points.

Signal substitution, on the other hand, lets you inject known good signals from a video analyzer into any stage of a TV. If you get a good picture on the screen, you know everything is working from that injection point forward. You then back up, stage by stage, until the defect appears on the screen. You then know you are injecting into the

defective stage. It's just that simple. Until now, the VA48 has been the only analyzer to provide all the signals necessary to inject into any TV stage from antenna to CRT.

**BUT TIMES CHANGE.** The VA48 was introduced six years ago. Since then, we have seen quite a few changes in TV circuits, video signals and VCR formats including synchronous detectors, SAW filters, high resolution video monitors, comb filters, integrated flybacks, 4 head VCRs, microprocessor controlled digital tuners, cable-ready channels and much, much more. To meet these changes, we designed the all

new VA62 video analyzing system. The VA62 totally equips you for all of today's new TVs and new video circuits, as well as providing complete analyzing capabilities for VCRs. Here are just a few of the exclusive features.

**IT'S A SIGNAL SUBSTITUTER.**

The VA62 is a totally updated design in video analyzers that now lets you use the tried and proven method of signal substitution in all the latest TV and VCR formats.

**COMPLETELY UPDATED FOR ALL NEW TV'S.** The VA62 drive circuits have been updated so you can now signal inject into any stage of even the newest TV chassis, including comb filters, SAW filters, synchronous detectors and more.

**EXCLUSIVE "ALL CHANNEL CABLE-READY" TUNING.** Now, for the first time, check absolutely every channel in use today; including all VHF, UHF and cable channels. There's no other generator on the market like it.

**NEW IMPROVED TEST PATTERNS.** Speed your video troubleshooting with all new, improved test patterns including our all new 10 step Multiburst Bar Sweep, an improved Chroma Bar Sweep, a special 10 bar staircase plus, the industry standard NTSC (EIA) color bars for VCR service. These new patterns will tell you

things about VCR and TV operation that you just can't determine any other way, speeding your troubleshooting tremendously. (See waveform photos for full details.)

**IT'S A COMPLETE VCR ANALYZER, TOO!** Until now, you've serviced VCRs using a scope and a pattern generator. The most popular pattern generator on the market costs \$2000, and all you get is a basic pattern generator. You still have to scope test points and interpret waveforms. But, not any longer.

For the first time, the VA62 brings tried and proven signal substitution to VCRs. Isolate tricky servo problems by signal substituting the VA62 30 Hz Servo Drive. Then, simply plug in the VC63 VCR Test Accessory for the special signals needed to signal substitute into every VHS, Beta, or U-Matic circuit.

**SUBSTITUTE FOR HEADS DIRECTLY.** The VA62/VC63 system even lets you use signal substitution to substitute directly for the video playback heads! Why guess when it comes to these expensive parts? Now you have a proof-positive test before you replace.

**OBSOLETE PROOF.** All this, and the VA62 is obsolete proof. That's right. We'll provide new accessories as the manufacturers announce new formats, test patterns, etc. This makes your VA62 a protected investment.

**CUT YOUR SERVICE TIME IN HALF—OR YOUR MONEY BACK.** The VA62 will cut your overall video service time in half on even the latest chassis. But don't take our word for it. Here's our offer:

**MONEY BACK GUARANTEE**  
If you are not convinced the VA62 will double your productivity, you may return it during the first 30 days and we'll cheerfully give you a full refund, including freight!

**YOU CAN'T LOSE.** If you service TVs only, the VA62 is the only way to update for all new TVs including the cable-ready channels.

If you're thinking about VCR servicing, the VA62 is the easiest, fastest, most cost effective way to get started. (And it does meet all VCR manufacturers' equipment requirements.)

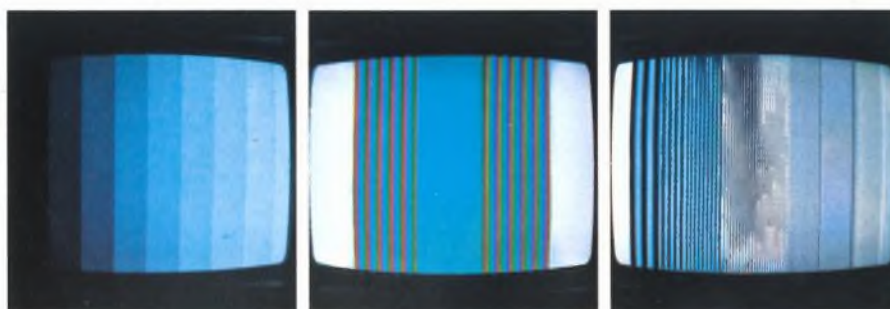
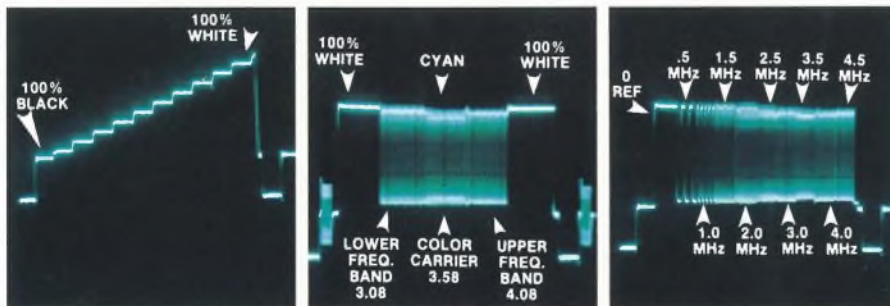
If you're already in VCR service, we guarantee that this system will cut your service time to a minimum. (Just having a proof positive check of the heads has been enough to convince many VCR techs that the VA62 is for them.)

Write or call for the VA62 brochure for complete details.

**ACCESSORIES**

- VC63 VCR Test Accessory. . . . . \$495.00**  
Supplies video-modulated, FM luminance signals, plus phase-corrected, down-converted chroma signals for VHS, Beta, or U-Matic VCRs. Special "head-sub" signal and signals to inject in any stage up to detectors.
- NT64 "NTSC" Pattern Generator . . . . \$395.00**  
Supplies the two EIA color-bar patterns required by some VCR manufacturers; the full-field and the split-field pattern. The NT64 patterns are phase-locked and sync-locked to all other VA62 drive signals so it can be used for signal substitution.

**Exclusive VA62 Test Patterns—They Tell You Things About TV And VCR Operation You Just Can't Determine Any Other Way.**



10 Bar Staircase

Improved Chroma Bar Sweep

Improved Multiburst Bar Sweep

**CG25 Little Huey Portable Digital Color Bar Generator**

*Rock-Solid Patterns In A Caddy-Size Generator*

**\$198**

**ROCK-SOLID DIGITAL PATTERNS.** Just push the buttons for jitter-free standard color bars, horizontal and vertical lines, crosshatch, and white dot patterns.

**BUILT RUGGED FOR FIELD USE.** Lasts and lasts on the road with tough acrylic case.

**BIG GENERATOR FEATURES.** Dot size, color level, and RF channel controls just like the deluxe generators.

**BATTERY SAVING POWER SHUTOFF.** Automatically shuts itself off after 20 minutes, saves batteries.

### HP200 50,000 VDC HIGH VOLTAGE PROBE

Slip this range multiplier probe over the standard meter probe of any Sencore 15 megohm input analog or digital meter to measure DC voltages to 50 KV. (NOTE: Do not use with the Sencore SM112 VTVM or competitive meters with a 10 megohm input impedance.) The HP200 divides the DC level by 100 before applying it to the meter, so you simply move the decimal two places to the right to determine the measured voltage. It also increases the input impedance by 100 times (to 1500 megohms) for minimum loading of the high impedance circuits often used to produce high voltage.

**\$59.95**

### PL207 RF "SNOOP LOOP"

Use this untuned RF pickup loop with any frequency counter or scope to inductively couple high level signals to the instrument's input. Inductive coupling keeps the loading of high frequency circuits to the absolute minimum while preventing damage to your scope or counter input that often occurs with a direct signal connection.

**\$19.95**

### PA208 UNIVERSAL AC ADAPTER/CHARGER

Use this specially designed adapter to operate Sencore portable instruments equipped with an AC adapter jack (see the chart for details). Unlike low-cost tape recorder adapters, the PA208 is protected to 1500 volts (DC plus peak AC) to protect your instrument when it is necessary to float the common lead above earth ground. Most Sencore instruments can be equipped with ni-cad batteries, in which case the PA208 also serves as a battery charger.

**\$19.95**

### PA211 HEAVY DUTY AC POWER ADAPTER

This is the heavy duty version of the PA208. It should only be used to power the CB49 or the WBA52. Use the PA208 for all other Sencore instruments.

**\$19.95**

### TP212 10,000 VOLT TRANSIENT PROTECTOR PROBE

This probe saves many times its cost every time it prevents damage to one of your Sencore meters caused by a high voltage overload onto the DC voltage range. The TP212 absorbs overloads and transient spikes as large as 10 KV before they get anywhere near your meter's front end. Leave it connected any time you are working near high voltage to protect your meter in case your probe slips into a high voltage test point. Many customers buy one for every Sencore meter they own for complete protection.

The TP212 allows continuous measurements to 10 KV DC and also reduces meter loading in high impedance circuits as the input impedance increases to 150 megohms; almost as good as an electrostatic voltmeter. (NOTE: The TP212 only works with 15 megohm inputs. It will not work with the Sencore SM112 or competitive 10 megohm input meters.)

**\$24.95**

### DP213 UNIVERSAL METER RF DETECTOR PROBE

This low cost accessory lets you use any meter (even competitive meters) to trace RF signals through circuits. The DP213 converts the RF signal to DC, quadruples the DC level for added sensitivity, and feeds it to the DC range of your meter. Use the supplied RF to DC conversion chart to determine the approximate RF level applied. The DP213 is usable to 250 MHz, and works almost as well as an expensive RF voltmeter through its 2 mV to 30 volt RF measuring range.

**\$20.00**

### AT218 VA48 IF TRAP SETTING ACCESSORY

This low cost accessory is a must if you use your VA48 to set IF traps in a variety of TV chassis. Without the AT218, many traps do not have a solid null, making them difficult to set. This is caused by the action of the AGC. The AT218 lowers the test signal to a point less than the sensitivity of the AGC circuits.

The AT218 has both a male and female output connector so you can use either end of the tuner cable for IF input connections. A switch allows you to leave the AT218 connected as you move from trap setting, which requires attenuation, to other alignment or troubleshooting jobs, which do not require attenuation.

**\$25.00** (Not needed with VA62.)



HP200



PL207



PA208



TP212



DP213



AT218

## TR219 1:1 HORIZONTAL ISOLATION TRANSFORMER

Which VA48 signal do you use to drive the horizontal output transistor if the schematic shows a 160 VP-P base signal? You still use the 30 volt transistor base drive, but it must be isolated from the chassis ground through the TR219. The TR219 provides isolation in chassis using split flybacks (flybacks with two primary windings) or in chassis using isolated hot-ground/cold-ground power supplies. If you want, you can use it for all horizontal troubleshooting as it never hurts to isolate the signal even when isolation is not needed.

NOTE: The TR219 does not eliminate the need for an AC line isolation transformer (such as the Sencore PR57 AC Powerite®) when working on hot chassis.

**\$35.00** (Not needed with VA62.)



TR219

## DBA220 20 dB (10X) AUDIO AMPLIFIER

This special amplifier allows you to make low-level audio measurements (to .1 mV) with your DVM56 or DVM56A Micro-ranger® Digital Meters. Keeping the low level signals outside the main case allows better accuracy when measuring low level audio signals as the input circuits are triple-shielded from the microprocessor and other digital meter circuitry. Simply divide the readings by 10 and move the decimal one place to the left with the DBA220. The DBA220 is powered directly from the Microranger®

**\$50.00**



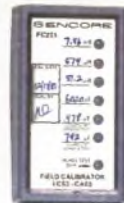
DBA220

## FC221 CAPACITOR/ INDUCTOR FIELD CALIBRATOR

This handy calibration tester lets you confirm your LC53 "Z METER" or CA55 Capacitor Analyzer is within its published specifications. Low drift capacitors and inductors are individually compared to Sencore's NBS traceable standards, and their exact value written on the FC221 front panel.

NOTE: These standards are NOT for calibration of bridge-type testers. They are only accurate on the dynamic DC tests used by the LC53 and CA55. We suggest that you return your FC221 to the Factory Service Department whenever you return your LC53 or CA55 for service or calibration so the calibration of your FC221 can be rechecked against our standards.

**\$65.00** NSN 6625-01-122-4883



FC221

## CS223 20 AMP CURRENT SHUNT

The CS223 prevents loading errors common to meters with built in high current ranges. The CS223 keeps the voltage burden on the circuit under test to a minimum. There are no switch contacts, jacks, or flimsy meter leads to increase the voltage drop. This is especially critical when testing high current, digital power supplies, where a one volt drop across a conventional series-connected shunt creates a 20 percent error in the voltage.

Use the CS223 with any voltmeter to make AC or DC current measurements. You measure the amount of current by connecting the CS223 in series with the circuit and connecting your analog or digital meter to the CS223 output jacks. Set your voltmeter to AC to read AC current and to DC to read DC current.

**\$45.00**

CS223



## SCR224 SCR AND TRIAC TEST ACCESSORY

Dynamically test SCRs and TRIACs using your LC53 "Z METER" or your CA55 Capacitor Analyzer. The SCR224 results in more reliable tests on SCRs with sensitive gates and those with higher latching currents that can be tested with the LC53 directly.

**\$49.00**



SCR224

## TP225 "SURE-HOLD" ALLIGATOR CLIP ADAPTER PROBE

You've probably needed one of these every day since you saw your first transistor. The TP225 lets you convert any standard alligator clip into a tiny "sure-hold" test clip. The nose of the test probe is narrow enough to grab a tiny signal transistor leg or fit between the legs of an IC, yet it's big enough to grab a power resistor lead. The clip converts to a probing tip with a simple twist of the probe tip.

The TP225 is so handy, you'll probably find that one is not enough, so order one for each instrument you own that has an alligator clip connection.

**\$14.95**

TP225



### DP226 1:1 SCOPE PROBE

Take full advantage of your scope's front-end sensitivity. This direct scope probe works with any brand of scope that uses a BNC input connector. The special design of the DP226 provides the highest frequency response possible (15 MHz) with a standard 1 megohm input. Competitive probes roll off at 10 MHz or less. Special resistance-type wire is the secret. The DP226 comes complete with three ground connectors (a 3'' lead, a 6'' lead, and a special IC clip) for minimum ringing and distortion. Unscrew the locking probe tip to expose a needle-sharp contact for P.C. board probing. The Sencore NP229 (needle point adapter) may be used to extend the reach of the needle point tip.

**\$60.00**

DP226



### PC227 PROTECTIVE SCOPE COVER

Keep the front panel and CRT of your Sencore SC60A or SC61 like new at all times. This custom-molded cover snaps firmly in place with one simple latch. (NOTE: The original SC60 case does not have the needed hardware. You can order a new A-model case from the Service Department for \$48.00 if you want to use the PC227 with a plain SC60.)

**\$29.00**

PC227



### NP229 SCOPE NEEDLE POINT ADAPTER

The NP229 extends the reach of the needle point tip on your SC60, SC60A, or SC61 low-capacity probe, or of the DP226 Direct Probe to reach test points in tight areas. The two-inch adapter screws onto the probe in place of the spring-loaded hook. The hardened steel point pierces oxide on connectors for secure connections. The NP229 is insulated (except for the needle point) to prevent accidental shorting of adjacent test points.

**\$9.95**

NP229



### PC230 PROTECTIVE COVER

Protect your VA62 front panel from the bumps and scratches of everyday use. Simply snap the cover into place with one simple latch.

**\$29.95**

PC230



### EX231 EXPANDER JACK

Make your VA62 capable of driving up to four separate accessory packages without unnecessary hooking and unhooking. One single hookup to the VA62 accessory jack is all that is required.

**\$148.00**

EX231



### AD232 BANANA/SCOPE ADAPTER

Add the capability of your oscilloscope to monitor the drive signal output of your VA62 without trying to hook directly to the lead connections. This double banana plug adapter offers you that special hookup capability.

**\$12.75**

AD232



### IE233 IEEE 488 BUS INTERFACE CABLE

This standard 1 meter (39.4 inch) cable lets you interconnect the IB72 to standard IEEE 488 General Purpose Interface Bus (GPIB) systems. Each end has both a male and a female connector, allowing cables to be "daisy-chained" in series (for extra length) or connected as a star for central signal distribution. Meets all IEEE 488 standards. (Not pictured)

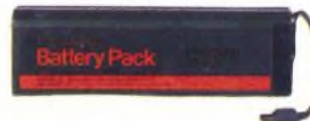
**\$79.95**

### BY234 2-AH RECHARGEABLE BATTERY

Heavy duty 2 amp-hour battery powers the FC71 frequency counter. Guaranteed to provide at least 9 hours of continuous operation. Heaviest duty battery commercially available today. This is the one we recommend for the FC71.

**\$59.95**

BY234



### CC237 BLACK PLASTIC LEAD POUCH

This "Kangaroo" pouch fits any Sencore or (competitive) instruments larger than the DVM56A case. It uses super tough Velcro® strips that you can apply in the field. No special glues or applicators are needed.

**\$24.95**

CC237



\* Velcro is a registered trademark of Velcro USA, Inc.



# Have Questions? Ready to Order?

In U.S.A. Phone Toll Free  
1-800-843-3338

In Canada Phone Toll Free  
1-800-665-4871

South Dakota, Alaska, and Hawaii  
call collect at 605-339-0100

## SENCORE PRODUCTS ARE:

**Exclusive:** 9 out of the 13 Sencore instruments in this brochure are patented or patent pending. You can only get this innovation from Sencore.

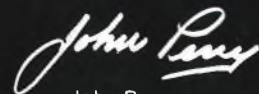
**High Quality:** Every Sencore product is made in the U.S.A. to the highest quality standards possible, including intensive 100 hour heat runs that assure you of tried and proven quality you can rely on for years to come.

**Lifetime Workmanship Guarantee:** Our one year limited warranty is backed by our industry-exclusive lifetime workmanship guarantee. We call it our 100% Made Right Guarantee. Simply stated, any defect due to a workmanship error is repaired parts and labor free of charge, for the lifetime of the product.

**Satisfaction Guaranteed:** Your satisfaction is guaranteed on every Sencore product with our no-nonsense money back guarantee.

### MONEY BACK GUARANTEE

If you are not completely satisfied with any Sencore instrument, you may return it during the first 30 days and we'll give you a full refund, including freight, no questions asked!



John Perry  
Phone Sales  
Manager

#### PRICING NOTE:

ALL PRICES SHOWN ARE U.S. DOLLARS.  
CANADA MUST ADD APPLICABLE  
DUTY, FREIGHT AND F.S.T.  
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