

# SENCORE®

*Means Success In Electronic Servicing*



*“Sencore . . . is committed to your success in electronic servicing.”*



1987  
Fall/Winter  
Full Line Catalog

Announcing  
Sencore's Fall  
Specials located  
on the inside  
back cover!



# Sencore Means Success For You In This New Year Of Electronic Servicing

*Are you looking for success in Electronic Servicing? Then welcome to Sencore*



**"With 93% of Sencore's product line holding at least one patent, you're assured of exclusive, time saving, money making features . . ."**



**"Computer aided design and manufacturing put the complex electronics on the inside, to keep your operation simplified on the outside."**



*For over 35 years, Sencore has been dedicated to just one goal — making you more successful in Electronic Servicing. We're proud to say that we plan on sticking to this simple, yet important, mission. You see, as we phase into our second generation of leadership, we realize that your success truly will mean a successful future for Sencore as well.*

*When you say "yes" to Sencore, you're saying "yes" to good old American ingenuity at its finest. With 93% of Sencore's product line holding at least one patent, you're assured of exclusive, time-saving, money-making features not available anywhere else. You see, Sencore instruments are designed by practical troubleshooting pros - for practical troubleshooting pros. That's why you can count on Sencore for test equipment that saves you that all-important analyzing time.*

*Sencore's engineers know from experience that as an Electronic Servicing Professional, your time really is money. Lost or wasted time is money right out of your pocket. Our designers know that every time you have to fiddle with a knob, connect and reconnect leads, or come up with an inconclusive or misleading test result, it costs you dearly. That's why as you review the Sencore product line, you'll notice that each Sencore instrument has a fresh, uncluttered, easy-to-use look. Computer aided design and manufacturing puts the complex electronics on the inside to help keep your operation simplified on the outside.*

*Each unit is 100% Made Right in America's heartland by skilled craftsmen who have your troubleshooting needs in mind. That's why Sencore products are literally world renowned for their toughness, quality, innovation, and outstanding value. Less than 2% are returned for warranty service.*

## **Dealing Direct With The Sencore Factory Adds To Your Success**

*Unlike others, Sencore's commitment to your success just begins at the delivery dock. Consider that one number, **1-800-843-3338**, connects you, 24 hours a day, to a factory full of friendly folks dedicated to making you and your business more successful. You get fast, friendly product delivery; most items are in stock and are shipped within 48 hours of receipt of your order. Our exclusive "Pay As You Grow" Investment Plan will put you in your Dream Shop for just dollars a day. So you literally pay as your Sencore instruments help you grow and prosper. That's why saying "yes" to Sencore is saying "yes" to your future success.*

*Your service after the sale is second to none in any industry. Our standard 72 hour turn-around on service repairs and 48 hours on parts means maximum up-time and productivity from each instrument. Plus, since our Engineering, Service, and Quality Assurance organizations are*

**"Each unit is 100% made in America's heartland by skilled craftsmen who have your troubleshooting needs in mind."**



under one roof, your serviced instrument is renovated to better-than-new performance with the latest engineering updates; is refurbished to like-new appearance; and undergoes final aging and quality checks just like our new units - all at no extra cost. Best of all, you can be sure your serviced instrument is right on specifications, as each unit is calibrated against Sencore's NBS traceable Prime Standards Laboratory.

*Sencore's industry exclusive Sencore News, Application Bulletins, Field Workshops, and helpful Application Engineers guarantee that you'll be getting the most from your investment. Our newly added, state of the art, video production studio will even add a new dimension to your after the sale application support, with both operation and training tapes. Our obligation and support is just beginning, instead of ending, when you say yes to test equipment from Sencore.*

### Your Success Is Guaranteed

*You can't make a wrong buying decision when you say "yes" to investing in Sencore. You're not investing in just an instrument; you're investing in your own piece of an entire organization dedicated to making you more successful.*

*The same WATS Free success number, 1-800-843-3338, that connects you to a fast, friendly Sales Engineer, also connects you to our Application Engineers for technical consultation, Service Technicians for quick field repair tips, and our Telemarketing Engineers for after the sale follow through — all at no added expense to you. You simply need to pick up the phone and ask.*

*Since every Sencore unit has quality built in and not troubleshot out, only Sencore offers you a 100% Lifetime Made Right Guarantee. This exclusive Buyer Protection Plan assures you that your unit was engineered and manufactured right the first time - or we'll make it right - for the lifetime of the instrument, at no cost to you. It even guards your instrument for a lifetime against rusting out - so plan on profiting from your Sencore investment for a long time.*

*Finally, Sencore's no nonsense 30 Day Money Back Guarantee assures you that you've made the right choice. Every Sencore instrument and accessory is covered by the industry exclusive guarantee of satisfaction. Simply stated — if you're not 100% satisfied with your Sencore instrument, return it for a full refund — including freight both ways — and owe nothing. You're always sure that you've "bought right" when you say "yes" to a Sencore investment.*

*Start up the road to success right now, by calling us at 1-800-843-3338 and let us put you in your own Sencore dream shop.*

*Herb Bowden*

Herb Bowden/CEO

### 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!

**"... Every Sencore unit has quality built in and not troubleshot out, only Sencore offers you a 100% Lifetime Made-Right Guarantee."**



**"Your service after the sale is second to none in the industry . . ."**



**"Our obligation and support is just beginning, instead of ending, when you say yes to test equipment from Sencore."**





# SC61 Waveform Analyzer™ 60 MHz (usable to 100 MHz) Dual Trace Waveform Analyzer



## Meet The Triple Patented SC61 Waveform Analyzer

- 60 MHz high performance scope that will put confidence back into your waveform measuring.
- 100% automatic AUTO-TRACKING™ digital read-out of all key waveform parameters at just the push of a button.
- Faster, more accurate, easier than you ever dreamed possible.
- Rock solid sync eliminates frustrating fiddling with complicated controls.
- 4 times the measuring capability of any conventional scope for true peace of mind.
- Plus many extra, exclusive high performance features that will save you time.

SC61 Waveform Analyzer  
\$3295 Patented

At Last With Just One Probe Hook Up You Can Confidently Analyze Any Waveform To 100 MHz, 10 Times Faster, 10 Times More Accurately, Absolutely Error-Free Guaranteed Or Your Money Back.



A real troubleshooting confidence builder. At a first glance the SC61 Waveform Analyzer may look like an ordinary conventional oscilloscope: high performance, dual trace, 60 MHz bandwidth (usable to 100 MHz). But just pick up the probe, connect it to a test point and the exclusively patented, time saving auto-tracking digital readout features of the SC61 Waveform Analyzer are quick to reveal themselves.

There are other scopes with digital readouts, but none completely eliminate graticule counting, extra lead hook ups, and additional impedance loading like the SC61. You see, the SC61 Waveform Analyzer is the first piece of test equipment that integrates a high performance scope with a patented autoranging digital display. You simply

view the waveform on the CRT, then push a button to read DC volts, peak-to-peak volts, and frequency directly on the easy to read auto-ranging digital display; all with one probe connection on both channel A&B, no additional set-up and no graticule counting. It obsoletes conventional scopes like the digital calculator obsoleted the slide rule. Your results will be just as dramatic.

The SC61 Waveform Analyzer also has DELTA function capabilities that make it simple to analyze any portion of a waveform in just seconds. For example, now for the first time ever you can accurately measure peak-to-peak voltage of the ripple on a power supply or the frequency of a small glitch on the leading edge of a square wave. Just lock the waveform on the CRT, adjust

the DELTA BEGIN, and DELTA END (intensified trace) over the desired portion of the waveform and push the button for peak-to-peak volts, frequency, or time of the intensified portion. It's a dream come true. It's super fast. Just hook the probe (to either channel A, B or both) up to the test point, view the waveform to confirm the signal and then simply push a button and read the auto-ranging digital display to completely analyze each waveform's parameters.

It's **digitally accurate**. The SC61 Waveform Analyzer eliminates inaccurate and frustrating graticule counting. The internal microprocessor of the SC61 monitors the signals that are applied to the CRT. So there are no graticules to count or calculations to make. You get measurements that are

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10 times more accurate than conventional scopes. It's easy to use. The push button digital readout makes the SC61 Waveform Analyzer much easier to use than any conventional scope. No more interpolating, graticule counting, or confusing lead hook ups. You'll gain valuable troubleshooting efficiency and confidence with the SC61 Waveform Analyzer.

**It's fiddle free.** The SC61 Waveform Analyzer, with its superb sync circuitry, has the ability to lock quickly onto waveforms all the way to 100 MHz. This has been achieved through exclusive ECL (emitter coupled logic) circuits in the front end and noise cancelling differential amplifiers throughout the sync circuits. The SC61 Waveform Analyzer provides "fiddle free" sync; means you can spend more of your valuable time on testing the circuit and not adjusting the trigger controls of the oscilloscope to lock in a waveform.

**It handles 4 times the signal level of any conventional scope-safely.** Most conventional scopes are limited to 600 volts of input protection but the SC61 provides extra versatility with a voltage range from a sensitive 5 mV to 2000 volts(protected to 3000 V) . . . four times the range of the conventional oscilloscope. Gain troubleshooting confidence without worrying about an expensive front end repair job.

**Plus many extra high performance features.**

- 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 8X10 cm CRT provides easy-to-view trace, even under high ambient lighting conditions.
- IEEE 488 Bus Compatible
- Push button X-Y vector display with 4 MHz response for accurate phase comparisons.
- Z-Axis input.
- Beam finder.
- TV Vertical and TV Horizontal video preset positions with sync separators.

**Try an SC61 Waveform Analyzer for a 10 day Free Self Demo.** The SC61 Waveform Analyzer is a breakthrough in oscilloscope technology. Its operation is

simplistic. Just push the button and read the value. This makes for fewer operator errors which will ultimately lead to increased productivity and success. But, don't take our word for it, put the SC61 through your own tests with Sencore's exclusive 10 day Free Self Demo. Use it on your circuits, compare it to competitive scopes—with or without digital displays, or check its performance in any way you want. If

you don't agree that it will help you more than any other scope, return it and we will cancel the paperwork. If you decide to keep it, we will bill you at the end of the demo period. What's more, if in 30 days you don't agree that the SC61 has doubled your troubleshooting effectiveness — you can return it for a full refund including freight both ways. So call WATS Free **1-800-843-3338** to set up your SC61 Free Self Demo.

### SC61 Specifications

#### Vertical

**Freq Response:** + / - 3 dB, DC to 60 MHz, usable to 100 MHz. **Sensitivity:** 50 mV/div. to 200 V/div. with supplied 10X probes, 5 mV/div. to 20 V/div. direct. **Protection:** 3000 V (DC + peak AC) with supplied probes (U.S. Patent no. 4,473,857). **Dual Trace:** Automatic dual-alternate and dual-chopped. **Vector (X-Y):** A is Y axis, B is X axis. **Z-Axis Input:** BNC input on rear panel.

#### Horizontal

**Sweep Rates:** 100 mS/division to 0.1 uS/division. **Accuracy:** + / - 4%. **Trigger Source:** Channel A, B, AC line, or external.

#### Auto-Tracking™ Digital Tests

**DC Volts Ranges:** 4, autoranged to 2000 VDC, direct reading with supplied probes. **Accuracy:** + / - 0.5%, + / - 2 digit including probes. **Peak-To-Peak Ranges:** 4, selected by channel A or B input attenuator (unaffected by vertical vernier) to 2000 VPP. **Resolution:** 3 4/5 digits. **Accuracy:** + / - 2%, + / - 5 counts. **Freq Response:** + / - 0.5 dB from 30 Hz to 30 MHz, -3 dB at 60 MHz. **Frequency (U.S. Patent no. 4,616,173) Ranges:** 7 automatically selected from 1.00 Hz to 99.999 MHz. **Resolution:** Up to 6 digits. **Accuracy:** + / - 0.001%, + / - 1 digit. **Frequency Ratio:** Ratio of channel A and B.

**Range:** 1 to 999,999. A/B or B/A display. **Accuracy:** + / - 3 digits.

#### Delta Digital Tests

**Measurement Bar:** Intensified area set to any portion of the waveform with Delta Begin and Delta End controls. **Peak-To-Peak Volts:** Amplitude of intensified area. **Delta Time:** Time of intensified area. **1/Delta Time:** Equiv. frequency.

#### General

**Display:** 5" CRT. **Size:** 9.5" x 12" x 17" (21.6 x 30.5 X 43.2 cm) HWD. **Weight:** 31 lbs (14.1 kg). **Power:** 105-130 VAC 50/60. Convertible to 210 to 250 VAC 50/60 Hz.

**Accessories Optional:** DP226 1:1 Direct Probe. PC227 Protective Cover. 39G81 250 MHz Demod Probe. PL207 RF Pickup Loop. HP200 50 kV HV Probe. TP212 10 kV Transient Protector Probe. RM240 19" Rack Mount.





# Video Package

## VA62 Universal Video Analyzer™

Save With FREE Accessories!  
See Inside Back Cover.



Isolate Video Troubles In Half The Time With The Only Universal Video Analyzer.

- Identify tuner problems with all-channel, VHF, UHF and cable RF generator.
- Pinpoint IF troubles with modulated troubleshooting signal and exclusive programmable IF/RF generators.
- Isolate any problem with patented video and standard color-bar patterns.
- Find defectives stages, without disconnecting parts, with exclusive phase-locked drive signals.
- Test yokes and flybacks, plus measure signal levels with autoranged digital meter.
- It's obsolete proof; update for new technology with exclusive phase-locked accessories.

### The Only NTSC Video Servicing System Guaranteed To Cut Your Servicing Time By 54%\* Or Your Money Back.

The VA62 Universal Video Analyzer is the only system that equips you for successful servicing in the expanding video market. It ends expensive parts substitution (especially when working with large-scale ICs) and eliminates embarrassing, costly callbacks by allowing you to quickly, confidently, and dynamically check every repair.

**Eliminate aggravating tuner questions.** The all-channel VA62 gives you the confidence of complete RF testing. The "Standard TV" generator produces every VHF and UHF channel (2 through 83) duplicating all over-the-air channels. The "Standard Cable" generator produces every cable channel (2 through 73) to confirm that "cable-ready" tuners work correctly on all

bands. The "Programmable Cable" function lets you duplicate any cable carrier shift to test lock-in range.

All RF signals pass through an exclusive microprocessor controlled attenuator, which corrects the RF level channel by channel for reliable tests—even on UHF channels.

**Dynamically isolate IF troubles quickly and easily.** The VA62 isolates any IF trouble with a fully modulated, crystal referenced 45.75 MHz IF signal, matched to inject into any IF stage. Both video and audio modulation identify any trouble. It's a real troubleshooting confidence builder. Crystal accuracy insures correct results on synchronous

detectors. The calibrated output tests for correct stage gain.

Patented signals let you set IF traps—a must for cable—by simply looking at the CRT. Plus, the VA62 lets you do full IF alignments without confusing cables or complicated adjustments.

**Improved video patterns simplify your troubleshooting.** Phase-locked video patterns identify problems and simplify alignment in convergence, color and luminance stages. The VA62 provides all the patterns needed to diagnose any video problem.

**Multiburst Bar Sweep.** It's quick and effective; find video smear, reduced resolution, harsh picture edges, and

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ghosting with this exclusive, innovative pattern. Ten frequency bars identify bandwidth problems right on the CRT. Video frequencies all the way to 4.5 MHz let you work on high resolution receivers and projection sets too.

**Ten-Bar Staircase.** Isolate tricky brightness and contrast problems fast using this handy pattern. Ten video levels, equally spaced between pure black and 100% white, make it a snap to find linearity problems or align synchronous detectors.

**Improved Convergence Patterns Too.** Five improved patterns make setting convergence easy. A single white dot or cross, at the electrical center of the CRT, simplifies static convergence, yoke centering, etc. Square boxes on the crosshatch and dots patterns simplify linearity testing and adjustments. A dot-size control lets you adjust the patterns for the line width you like best.

**Improved Color Bars.** The RCA-type, gated-rainbow color pattern is updated for the latest video circuits. Now, for the first time, phase-locking between chroma and sync allow comb filters to operate dynamically. Correct color-burst frequency, amplitude, and color saturation, give better results in VCR service.

**Innovative Patented Chroma Bar Sweep.** The Chroma Bar Sweep is the only color pattern which identifies color bandwidth restrictions. Three equal amplitude bars represent the color subcarrier (3.58 MHz), and the upper and lower 500 kHz sideband limits (4.08 MHz and 3.08 MHz), for a full 1 MHz bandwidth check. The 3.58 MHz bar duplicates the NTSC pattern's cyan bar for correct VCR testing. Pure white edges reference VHS AGC circuits.

**Two Exclusive Signal Adders Modify Any Pattern.** The Interlace Adder selects interlaced or non-interlaced vertical sync to test the popular digital vertical oscillators. The VIR Adder adds a Vertical Interval Reference signal to dynamically test the automatic "station controlled color" circuits.

**Isolates troubles without disconnecting a single component.** Isolate troubles in

any stage from the antenna to the output *without disconnecting a single wire* using signal substitution. Get proof-positive results in any IC, transistorized or tube operated stage. All signals are phase-locked to eliminate costly guess work.

No need to unsolder components because the VA62's output circuits automatically "swamp out" the original signal before injecting the substitute signal. Drive signals are fully adjustable from zero to 3, 30, or 300 volts peak-to-peak, positive or negative polarity, to duplicate any circuit signal. You get versatility unmatched by any other tester.

**The drive signals.** The VA62 drive circuits supply signals for "swamping out" any stage after the detector. These special signals let you troubleshoot any video or sync stage, as well as vertical or horizontal sweep circuits. Separate drive outputs allow simultaneous injection into the tricky closed-loop servo circuits or color oscillators.

**Digital meter adds confidence.** The digital meter makes the VA62 a complete analyzer. Start by testing deflection yokes and flyback transformers, in-or out-of-circuit, with Sencore's reliable (patented) good/bad ringing test. Internal monitoring measures the true peak-to-peak level of any drive signal to prevent overdriving and to show when feeding into a shorted component.

Autoranged external meter includes peak-to-peak and DC to a full 2 kV. Compare peak-to-peak and DC directly to the schematic. Even test the horizontal output transistor voltages. Test high voltage triplers and integrated high voltage flyback transformers (IHVTs) with ease and accuracy.

**DC power supply breaks feedback loops.** The 0 to 35 volt DC power supply blocks confusing feedback loops in AGC, AFT, ACC, or servo circuits or isolates problems in direct-coupled (DC) circuits, such as vertical amplifiers. Current-limiting (to 1 amp) and fuse protection prevents damage when feeding shorted stages or from live circuits.

**Accessory jack prevents obsolescence.** The accessory jack in the lead storage compartment lets you add new technology as you need it. Phase-locking means the accessory signal returns full sync when used with the other VA62 signals.

To cut your servicing time by 54%\* (or your money back), call today at **1-800-843-3338** and put the VA62 on your bench absolutely risk free with our exclusive 10 day Free Self Demo.

\*Based on a nationwide survey of users who reported an average time savings of 54% compared to their previous test equipment.





## VC63 VCR Test Accessory™



The VC63 solves the VCR challenge by providing substitute VCR signals, phase-locked to all the other VA62 signals.

**Substitute for video heads before replacing them:** The signals from the

video heads are tough to measure because they are small (500 microvolts or less) and they are frequency modulated. The VC63's exclusive "Playback Head Sub" signal lets you substitute for this critical signal. If video returns, you can change the heads with confidence.

### Add The Effectiveness Of Signal Substitution To VCR Circuits

- Isolate Problems In VHS, Beta and U-Matic VCR Formats
- Find Defective Heads Without Expensive Substitution
- Pinpoint Defective Stages With Exclusive Substitution Signal
- Troubleshoot Color Problems With Special Reference Signals

**VC63 \$495**

**Isolate FM problems quickly:** Inject the VC63's modulated signal into any FM stage. If the monitor shows the video pattern, you know all the circuits after your injection point are good. Direct peak-to-peak output calibration, from 0.01 to 5.0 VPP, sets the VC63 output for levels shown on schematics.

**Find color problems fast, too:** The VC63 replaces the constantly changing tape signal with a solid reference to simplify signal tracing through the converter, phase-locked oscillators, jitter correction circuits, etc. The VC63 duplicates the 629 kHz VHS and 688 kHz beta/U-Matic VCR signals, including the special phase compensation, so that the circuits respond normally.

**Part of a fully integrated system:** Best of all, the VC63 signals are completely phase-locked to all the other VA62 signals, because it is driven through the special accessory jack on the VA62. You can inject a signal from the VC63 at the same time you use any of the other VA62 signals and have full synchronization. The VC63 becomes part of the total video analyzing system.

## NT64 NTSC Pattern Generator™



The "NTSC" color bar pattern (EIA RS189) has been used to adjust cameras and tape decks in television broadcast stations for decades. Some VCR manufacturers require authorized warranty stations to use these same patterns. The NT64 lets you add them to

your VA62 system at a reasonable price.

**Meets manufacturers' requirements:** The NT64 produces high quality color bars in the two patterns specified by VCR manufacturers. The "full-field"

- Produces EIA RS189 Standard Full-field And Split-field Color Bar Patterns

- Meets All VCR Manufacturer's Requirements For Color Bar Generator

- Fully Phase-locked To All Other VA62 Signals

- One-fifth The Cost Of competitive Stand Alone NTSC Generators

**NT64 \$495**

pattern produces 6 color bars, plus a 75% saturated white bar, which extend from the top to the bottom of the CRT. The "split-field" pattern replaces the bottom one-fourth of the screen with the -I, white, Q, and black test signals needed to fulfill the manufacturer's requirements.

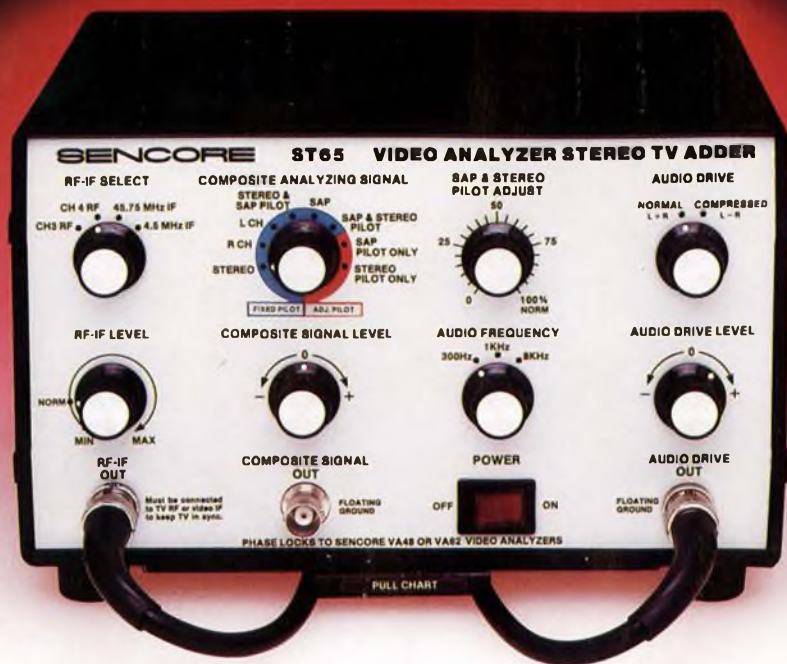
**Phase-locked to all signals:** Sync and references from the VA62 generate and phase-lock the NT64 pattern to the VA62 troubleshooting signals. This makes the NT64 pattern work just like the VA62's built in patterns.

**One-fifth the cost of conventional NTSC Generators:** You get the same quality NTSC patterns as generators selling for \$2000 or more. How is this possible? The precision signals from the VA62 produce the color patterns to give you a quality NTSC at one fifth the cost.



## ST65 Video Analyzer Stereo TV Adder™

# New



- Updates your VA48 or VA62 Video Analyzer to an integrated Multichannel Television Sound (MTS) Stereo TV analyzing system.
- Exclusive Phase-Lock Generator locks the ST65 to your VA48 or VA62 for rock solid analyzing.
- Makes Stereo and Second Audio Program (SAP) performance tests on any MTS Stereo TV system.
- Exclusive adjustable RF/IF, COMPOSITE SIGNAL, and AUDIO levels match and isolate troubles in any stage—including the decoder.
- The only tester guaranteed to tie troubles down to any and all stages.

**ST65 Video Analyzer Stereo TV Adder**  
**\$995 Patent Pending**

**Quickly, Easily, And Accurately Test, Troubleshoot, And Verify Any Mono/Stereo Sound Or SAP Channel Or Your Money Back.**

**Stereo TV repair offers real profit opportunity:** Over 250 stations are transmitting stereo TV right now, and that number will double by the end of this year. More than 75% of the homes now receive at least one "over the air" stereo TV station, and many cable channels routinely carry stereo TV programs. Sales of stereo TVs are climbing. In 1984 more than 750,000 stereo TVs were sold, and the number of stereo TVs sold in 1985 approached 1.5 million with an additional 3 million sales in 1986.

**Add profitable MTS TV analyzing capability to your Sencore video analyzer:** Add stereo TV capability to your VA62 with the ST65. It adds those special signals you need to service stereo TV and Secondary Audio Programming (SAP). You get RF and IF

frequencies plus all the signals needed to perform tests of stereo separation, signal-to-noise, crosstalk, audio, pilot threshold, dbx® and stereo decoders, and more.

**Solve challenging problems:** By testing separation, you'll know that the customer is getting good left and right audio, and that the dbx® and stereo decoders are good. Signal-to-noise tests prove that the TV can produce noise free signals with good separation while crosstalk tests assure that SAP and stereo do not interfere with each other. Audio-to-video and video-to-audio interference tests (more critical in MTS TV) assure proper IF alignment and correctly set traps.

**Phase locked to video analyzer:** Exclusive Gen Lock feature phase locks

the ST65 analyzer to the VA62. Work on stereo TV audio and video problems simultaneously. Use the VA62 drive signals to troubleshoot video problems and the ST65 to troubleshoot stereo sound problems.

**Easy to use:** There are no complicated setups; simply select the signal you want, set the amplitude and test. A handy pull chart guides you through every test. The challenge of stereo TV—new opportunities that spell success. Call your area Sales Engineer at 1-800-843-3338 to discuss this innovative stereo TV generator.

Helpmate/Related Instrument:  
SR68 "Stereo TV Readout"; see page 28.



## ST66 Stereo TV Analyzer™

# New

**\$100 Trade-In Offer!**  
See Inside Back Cover.



- It's a complete MTS Stereo TV and VCR analyzer.

- All the special signals you need to successfully service MTS Stereo TV video and audio.

- Now, completely analyze all MTS Stereo TVs (and VCRs) from the antenna to the speakers, with one simple connection.

- Exclusive Video Patterns For Total Analysis

- Exclusive Pilot Threshold Test

- It's portable, two hours continuous on one battery charge.

- No Complicated Set Up Or Specifications Needed

### Sencore Proudly Brings You The Only Complete Analyzer For MTS Compatible Stereo TV, The ST66 Stereo TV Analyzer.

Get in on the growing stereo TV service market. Leading manufacturers project that the stereo TV market will double by the end of 1986, and reach gigantic proportions by 1990. Over 2,250,000 stereo-TVs were sold in 1984 and 1985. Sales approached 3 million in 1986. Sencore's new ST66 Stereo TV Analyzer gives you every important signal needed to enter this exciting service market.

#### Exclusive phase-locked analyzer.

Connect the ST66 to your television and test any stereo TV. Phase-locked drive signals help you find defects in the stereo decoder or in the tuner or IF stages. Test all stereo circuits including the difficult noise reduction circuits. Interference between audio and video is easily identified and corrected using the ST66's video patterns. In addition, the

exclusive pilot threshold test finds troublesome false triggering and loss of stereo problems.

#### Analyze the entire Stereo TV system.

With the ST66, you'll find challenging MTS Stereo TV and Separate Audio Program (SAP) problems with confidence—right down to the defective stage by simply injecting MTS compatible RF, IF or composite signals into the tuner, IF section, or stereo decoder board, and observing the result on the TV screen, speakers, or scope. Exclusive "normal and compressed" audio drive signals quickly isolate problems in dbx® circuits.

#### Video and audio tests in one package.

Correct convergence problems too with the innovative pattern signals. Check for interference between the color and

### ST66 Stereo TV Analyzer \$1395 Patent Pending

audio circuits with the ST66 Stereo TV Analyzer color bar pattern. The portable ST66 Stereo TV Analyzer maintains NBS traceable accuracy; check stereo TVs anywhere; in the home, field, or shop with complete confidence.

**Solutions to tough challenges — innovatively designed with your time in mind.** Success is enhanced by the ST66's capability, the handy pull chart that guides you through each profitable test, the isolated chassis for error free troubleshooting, automatic shut off to conserve batteries, and Sencore's Exclusive Lifetime Made Right Guarantee. Call **1-800-843-3338** and ask your Sales Engineer for Sencore's exclusive 10 day Free Self Demo on this exciting new profit builder.

Helpmate/Related Instrument:  
SR68 "Stereo TV Readout"; see page 28.

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# Video Package Specifications

## VA62 Specifications

**Video Patterns:** Dot, Cross, Crosshatch, Dots, Color Bars, Chroma Bar Sweep, Multiburst Bar Sweep, Ten-Bar Staircase, External. **Pattern Adder:** Interlace Adder; VIR Adder.

### RF Generator

**Channels:** STD TV, all FCC specified channels, 2-83; STD CABLE, FCC specified VHF channels (2-13) plus midband, superband, and hyperband channels in standard 6 MHz steps; PROG CABLE, same as "STD CABLE" except each channel may be shifted from 0 to  $\pm 9.75$  MHz in 0.25 MHz steps with programming stored in non-volatile memory. **Modulation: Video:** Any video pattern selected by the VIDEO PATTERN switch. **Sound:** 4.5 MHz  $\pm$  kHz sound carrier, 15 kHz FM deviation, modulates RF or IF.

### IF Generator

**Video IF:** 45.75 MHz,  $\pm 10$  kHz, crystal controlled carrier. Modulation same as RF. **Trap Setting Signals:** (U.S. Patent no. 4,562,469) Trap signal mixed with crystal-controlled 45.75 Hz,  $\pm 10$  kHz, video modulated, 1000  $\mu$ V carrier. **Trap Signals:** 39.75, 41.25, or 47.25 MHz,  $\pm 10$  kHz; switch selected. **35-50 MHz Programmable IF:** 35-50 MHz,  $\pm 1$  kHz, programmable in 10 kHz steps. **Sound IF Generator:** 4.5 MHz,  $\pm 1$  kHz FM carrier, crystal controlled. **Output Level:** Maximum 500 mV;  $+ 4$  dB at 500 mV.

### Drive Signals

All drive signals (except audio) are phase-locked to the video signal modulating the RF and IF generators. **Output at full Level:** 3 V range: 3 VPP  $\pm$  .5V into 100 ohms impedance. **30 V range:** 30 VPP,  $\pm 5$  V into 100 ohms impedance. **300 V range:** 300 VPP,  $\pm 50$  V into 10,000 ohm impedance. **Signals Available:** Video Pattern, Audio, V&H Composite Sync, Integrated Vertical Sync, Vertical Drive, Horizontal Transistor Drive, Horizontal Tube Drive, Horizontal SCR Drive, Horizontal Keying Pulse. **3.58 MHz Drive: Output (high end):** 0-30 VPP  $\pm 5$  V. **30 Hz Servo Drive: Output:** 0 to 30 VPP,  $\pm 5$  V, phase locked to vertical sync.

**Digital Meter- Note:** All functions 100% autoranged. **Ring:** Dynamic test of coil Q determined by counting the number of ringing cycles before reaching a preset damping point. (U.S. Patent no. 3,990,002). **Internal or External PPV:** 3 ranges (autoranged): 0.0-19.9 VPP, 20-199 VPP, 200-1999 VPP. **Bandwidth:** 30 Hz to 5 MHz  $\pm 1$  dB to 200 V 30 Hz to 150 kHz  $\pm 1$  dB, 200 to 2000 V. **Accuracy:** (All)  $\pm 1\%$ ,  $\pm 2$  counts. **External DCV:** 3 ranges (autoranged): 00.00-19.99 VDC, 20.0-199.9V DC, 200-1999 VDC. **Accuracy:** (All)  $\pm 0.2\%$ ,  $\pm 2$  counts at 1 kHz. **Input Impedance:** (without probe) 15 Megohm. **Protection:** 2000 V (DC,  $\pm$  peak AC), across the inputs. Maximum voltage between  $+$

lead and ground: 1500 V (DC,  $\pm$  peak AC).

### DC Power Supply

0.00-40.00 VDC; 0.00-1.50 amps DC (meter range),  $\pm 0.2\%$ ,  $\pm 2$  counts. **DC Supply Output:** Typical, 0-35 VDC, current limited to 1 amp. Ripple, less than 1% (RMS AC to DC output), at full load (no current limiting).

### VCR Standard Output

**Level:** 1 VPP  $\pm 1\%$  into a 75 ohm load.

### Audio Generator

**Frequencies:** 333 Hz, 1, 5, and 7 kHz.

### General

**Power:** 105-130 VAC, 60 Hz, 140 W max. **Size:** 11" x 14" x 11" (28.2 x 35.8 x 28.2 cm) HWD. **Weight:** 26 1/4 lbs (12 kg).

## VC63 Specifications

All signals are phase-locked and sync-locked to VA62 signals

### Beta Signals

**Luminance:** 3.6 MHz carrier, frequency-modulated with video pattern. **Luminance & Chroma:** Same as Luminance plus 688 kHz with Chroma standard phase correction, phase-locked to the VA62 30 Hz Servo Drive.

### VHS Signals

**Luminance:** 3.4 MHz carrier, frequency-modulated with video pattern. **Luminance & Chroma:** Same as Luminance plus 629 kHz chroma with VHS standard phase correction, phase-locked to the VA62 30 Hz Servo Drive.

### Signal Levels

Playback Head Sub 0.1-5 mV P-P, X.1:0.01-0.5 VPP, X1:0.1-5 VPP.

**General- Power:** From VA62 (LED power indicator). **Size:** 2 1/2" x 8" x 6 3/4" (6.35 x 20.3 x 17.1 cm) HWD. **Weight:** 2.4 lbs (1.13 kg).

## NT64 Specifications

All signals are phase-locked and sync-locked to VA62 signals.

### Video Patterns (Meet EIA standard RS-189):

Full-field and Split-field.

### Output

One volt peak-to-peak into 75 ohms, negative sync.

### General

Powered from VA62 (LED power indicator) **Size:** 2 1/2" x 8" x 6 3/4" (6.35 x 20.3 x 17.1 cm) HWD. **Weight:** 2.5 lbs (1.13 kg).

## ST65 and ST66 Specifications

**Note:** Specifications identical for both units, except as noted.

### Stereo Multiplexer (MTS standard stereo encoding)

**Separation:** Greater than 33 dB at 1 kHz. **Pilot (1H):** 15,734 Hz  $\pm 2$  Hz phase-locked to the video. Continuously adjustable 0-100%; Distortion less than 2% THD. **L-R Subcarrier (2H):** 31,468 Hz,  $\pm 4$  Hz, phase-locked to pilot. Distortion less than 2%. Zero crossing, coincident with pilot  $\pm 2$  degrees. **L + R Baseband Audio:** Audio distortion less than 2% THD. Deviation 25 kHz for 100% modulation  $\pm 0.1\%$ .

**Simulated "dbx" (Simulated dbx encoding based on BTSC standards)**

**SAP Multiplexer:** SAP pilot (5H),  $\pm 10$  Hz, 0-100% level, distortion less than 3% THD; FM distortion (linearity), 2%; Deviation, 15 kHz at 100% mod.

### Audio

**Audio Tones:** 300, 1000, 8000 Hz, less than 1% THD. **Audio Output:** 0 to 3 VPP, continuously variable ( $\pm$  polarity); impedance less than 100 ohms; Noise level -55 dB minimum with 100% output.

### RF/IF Output

**Modulated RF Output:** Channel 3 and 4, crystal reference. **Accuracy:**  $\pm 25$  kHz. **Level:** 0.5 to 5 mV  $\pm 3$  dB. Modulated 45.75 MHz;  $\pm 0.05\%$  **Level:** 0.5-5 mV,  $\pm 3$  dB. Modulated 4.5 MHz:  $\pm 0.05\%$  **Level:** 50-500 mV  $\pm 3$  dB.

### Video Inputs (ST65 Only)

Locks MTS generators to incoming video and modulates RF and IF signals with incoming video pattern.

### Video Patterns (ST66 Only)

**COLOR BARS:** 10 bar gated-rainbow pattern. **CROSS HATCH:** 20 vertical lines by 15 horizontal lines. **DOTS:** 300 white dots with width adjustment. **BLANK RASTER:** Black. **SYNC LOCK INPUT (ST66 Only):** Locks internal video patterns to an external 1 VPP video input.

### General

**Power:** ST65: 105-130 VAC, 60 Hz, 15 Watts. ST66: 12 VDC from supplied PA241 AC adapter or optional BY234 rechargeable battery; Battery life, 2 hours minimum. **Size:** ST65: 6.5" x 8" x 6.3" (16.5 x 20.3 x 16 cm) HWD. ST66: 6.5" x 11.5" x 11.5" (16.5 x 29.2 x 29.2 cm) HWD. **Weight:** ST65: 5 lbs. (2.3 kg) ST66: 6.8 lbs (3.1 kg) without battery. **Optional:** PC253 Protective Cover.



# Capacitor And Inductor Analyzers

## LC75 Z METER 2™

# New

Add These New Test Features To Your Shop In 1987

- **Capacitor Tests:**
  - Capacitor Value
  - Capacitor Leakage
  - Electrolytic Dielectric Absorption
  - Electrolytic Equivalent Series Resistance (ESR)
- **Inductor Tests:**
  - Inductor Value
  - Inductor Ringing
- **Special Tests:**
  - Transmission Line Distance To Open Or Short

Leakage In Switches, PC Boards, Connectors, Etc.

**LC75 Z METER 2**  
**\$995**  
**Exclusive Triple Patented**  
**Plus One Patent Applied For.**



### The First Tester Designed To Solve New High Tech Cap And Coil Challenges.

**Solve capacitor challenges with speed and confidence.** Make all four industry standard capacitor tests to gain confidence and save troubleshooting time. Check capacitors for value from 1.0 pF to 200,000 uF, leakage to 600 V\*, dielectric absorption, and equivalent series resistance (ESR) with speed and accuracy.

**Test inductors in-or out-of-the circuit with your LC75's 100% reliable ringing test.** The LC75's double patented inductor test checks for value and dynamic, in-or out-of-circuit ringing. Find shorted turns and problems the "value only" testers can't find. Just push the button and read the inductor value from 1 uH to 10 H and inductor quality (ringing)

with 100% reliability. The ringing test detects even one shorted turn.

**Successfully locate faults in transmission lines (even in buried cable).** Locate transmission line faults within a few feet to make repairs quickly and profitably. Simply measure the capacitance of an open transmission line (or the inductance of a shorted one), and calculate the distance to the open or short.

**Check insulation breakdown and find troublesome leakage paths in high tech equipment.** The LC75 is a hi-potential leakage tester for testing switches, PC boards, connectors and contacts. Read leakage as low as one microamp at selected voltages to 600 volts.

**Eliminates embarrassing errors.** The LC75 is fully autoranging. Its large digital display speeds testing and prevents errors. A handy pull chart guides you on every test. Call WATS Free 1-800-843-3338 and make arrangements to test the LC75 on our exclusive 10 day Free Self Demo Program.

\* For your safety, a warning light flashes when 50 volts or higher is selected. The capacitor under test is discharged automatically when the leakage button is released.

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# LC76 PORTA-Z™

# New

Save With FREE Accessories!  
See Inside Back Cover.



- Rugged All Steel Construction
- LCD Display
- Full Day's Operation On Battery; Auto Shut Off After 30 Minutes
- Double Patented Inductor Analyzer
- Patented Capacitor Analyzer With Dynamic Leakage Tests To 1000 Volts
- Tests L/C Components, SCRs, Triacs, Hi-Voltage Diodes, Cables And Transmission Lines
- NBS Traceable Accuracy; Capacitors 1.0%, Inductors 2.0%

## LC76 PORTA Z Portable Capacitor And Inductor Analyzer

**\$1395 Patented**

**The LC76 Brings Portability To Cap And Coil Testing - Get Lab Accuracy Anytime, Anywhere.**

**Guaranteed to increase your troubleshooting confidence—on the bench or in the field.** The LC76 PORTA-Z analyzer brings time tested and proven features to portable cap/coil testing. It's guaranteed to increase your troubleshooting confidence. With the LC76 PORTA-Z you get the know-how and expertise gained from Sencore's years of Z METER experience. Test capacitors from 1 pF to 200,000 uF at voltages to 1000 volts—with NBS traceable accuracy on the bench or in the field!

**Locate capacitor failures other testers can't find.** Measure equivalent series resistance (ESR) to pinpoint this common capacitor problem. Test inductance values from 1 uH to 10 H. Test the quality (Q) of inductors and

check TV yokes and flybacks with Sencore's exclusive Ringing test.

**Exclusive hi-pot test to 1000 volts (previously impossible in a portable) isolates leakage problems fast.** You get 9 continuous hours of battery operation. The LC76 uses a new state-of-the-art power circuit to let you dynamically test leakage at an unheard of portable 1000 volts, guaranteed.

**The most complete and versatile capacitor and inductor analyzer on the market.** Sencore's 'Z METER' is the standard by which inductor/capacitor analyzers are measured. No other equipment performs total dynamic guaranteed L/C tests like the Z METER. Now with the portable LC76, all of the

original Z METER's tests plus improvements like ESR and leakage tests to 1000 volts can be yours anywhere, anytime and anyplace. Call WATS Free 1-800-843-3338 to set up a 10 day Free Self Demo on the LC76.



**in Electronic Servicing**

**WATS Free 1-800-843-3338**



# LC77 AUTO-Z™

**New**

**Automatic Microprocessor Controlled For Accurate Error Free Cap/Coil Analysis**

**All New Portable Automatic Features:**

- Automatic Ranging Of Capacitance And Inductance Value
- Percentage Calculator
- Auto Shutoff & Battery Test
- Lead Zero
- Leakage In Current And Ohms With Up To 1000 Volts Applied
- Dielectric Absorption And Equivalent Series Resistance (ESR)
- Inductor Ringing Test
- Good/Bad Determination

**LC77 AUTO-Z Automatic Capacitor And Inductor Analyzer**  
**\$1895 Patented**



**Portable - use in the field or in the factory.** The full power and potential of the LC77 "AUTO-Z" is packed into a light-weight, portable (battery and AC) package. The "AUTO-Z" is designed with CMOS logic, LCD technology and automatic shut-off feature for low power consumption (the LC77 operates over eight hours on one battery charge). Take the LC77 "AUTO-Z" wherever you check capacitors and inductors - in the field, shop or factory.

To be satisfied that you can meet all the challenges new technology brings, call today 1-800-843-3338 and set up a 10 day Free Self Demo on the "AUTO-Z".



**LC77 "AUTO-Z" - The Only Dynamic, Portable, Automatic Capacitor/Inductor Analyzer Guaranteed To Help You Quickly Find Any Defective Capacitor Or Inductor That Other Testers Miss, Anywhere, Without Calculations, Look-up Tables, Or Error.**

Automatic microprocessor controlled for speed and accuracy. The LC77 "AUTO-Z" brings speed, reliability, and extended ranges to cap/coil testing. Its advanced digital technology completely analyzes capacitors to 20 farads and inductors to 20 henrys. Enter the parameters: value, rated voltage and tolerance. The "AUTO-Z" makes the readings, compares them against EIA tables stored in memory, and displays whether the component is good or bad. With the push of a button you obtain the exact readings for value, leakage, dielectric absorption and ESR.

Exclusive capacitor and inductor ranges thoroughly test every cap/coil in the industry automatically — only the LC77

"AUTO-Z" allows you to test today's high tech components. The "AUTO-Z" measures capacitors from 1 pF to 20 farads, with leakage tests to 1000 volts and ESR from 0.10 ohms to 2000 ohms and locates leakage (with .01 microamp resolution) in ceramic and tantalum capacitors that other testers can't find. Automatic ringing test checks inductors, yokes, flybacks, and switching transformers with 100% reliability.

**IEEE488 compatible for automated testing and data collection.** Use Sencore's 1B72 to control the "AUTO-Z" over the IEEE488 Bus for data collecting, incoming inspection, and quality assurance tests.

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## LC75 & 76 Specifications

**Readout:** Function accuracy +/- resolution error.  
**Resolution:** 3 significant digits +/- 2 counts on 3rd digit. **Type:** (LC75) LED. (LC76) LCD.

**Capacitors (Out of Circuit):** +/- 1% of reading + resolution error. 1.0 pF to 199,900 uF in 10 automatic ranges. **Leakage:** +/- 5% + resolution error, 0 to 99.9 uA and 0 to 9.99 uA in two selectable ranges. **Voltages:** (LC75) 12 selectable DC voltages from 3 VDC to 600 VDC. (LC76) 16 selectable DC voltages from 1.5 VDC to 1000 VDC. **Dielectric Absorption:** (U.S. Patent 4,267,503).

**Capacitor ESR:** +/- 5% + resolution error, 0.10 Ohm to 999 Ohms in 3 automatically selected ranges. **Capacitor Range:** 1 uF minimum value.

**Inductance (In or Out of Circuit):** +/- 2% of reading + resolution error, 1.0 uH to 9,990 mH in

6 automatic ranges. **Ringing:** Counts number of cycles inductor rings after pulsed, dynamic quality test (U.S. Patent no. 3,990,002).

## LC 77 Specifications

**Digital Readout:** Accuracy, resolution and autoranging the same as the LC75 and the LC76. **Type:** LCD

**Capacitors (Out of Circuit):** 1.0 pF to 19.99 F in 12 automatically selected ranges, +/- 1% to 2000 uF +/- 5% from 2000 uF to 19.99F. **Leakage:** .01 uA to 19.99 mA fully autoranged, +/- 5%, +/- 1 digit. **Voltages:** same as the LC76. **Dielectric Absorption:** Percentage of stored to total charge, +/- 5% of reading. **ESR:** 0.10 ohms to 1999 ohms fully autoranged, +/- 5%, +/- 1 digit.

**Inductance (In or out of circuit):** 0.10 uH to 19.99 H fully autoranged, +/- 2%, +/- 1 digit. **Ringing Test:** Same as the LC75/LC76.

## General (LC75, LC76, and LC77)

**Power:** (LC75) 105-130 VAC, 60 Hz. (LC76 & LC77) 105-130 VAC, 60 Hz with supplied PA251 or with optional BY234 battery pack. 9 hours on one charge. Shuts off in 16 minutes when the instrument isn't in use. **Protection:** Input fuse. (LC77-voltage greater than 1.5 V ties up the front panel). **Size:** 6" x 9" x 11.5" (15.2 x 22.6 x 29.2 cm) HWD. **Weight** 7.7 lbs (3.6 kg).

**Optional:** 39G85 Touch Test Probe. SCR250 SCR/TRIAC Test Accessory. CH255 Chip Component Test Lead. CH256 Component Holder.

## SCR250 SCR and Triac Test Accessory™

# New

Now you can test SCRs and triacs with any Sencore Z Meter.

- Test All SCRs and Triacs
- Exclusive Dynamic Leakage Test
- New Sensitive Gate Test
- Easy To Use, No Set Up Or Specifications Needed
- Tests Industrial And Protected Gate SCRs And Triacs, Too

**SCR250**  
**SCR And Triac**  
**Test Accessory**  
**\$168**

**Easy to use.** The SCR250 is truly "Innovatively Designed With Your Time In Mind," there's no complicated setup, and no need to look up specifications; just select, push the button and test. Mounts on your Z METER with handy Velcro® strips.



## Dynamically Test All SCRs And Triacs For Leakage And Turn-on With 100% Reliability.

**Tests all SCRs and triacs.** The SCR250 tests all SCRs and triacs in both directions. It's completely isolated and the controlled internal battery supply protects sensitive gates while guaranteeing turn-on of the most demanding high current industrial SCRs and triacs. No more missing those triacs that check good in one direction

but are leaky in the other.

**Exclusive dynamic leakage test.** SCRs and triacs are dynamically tested at their full working voltage. You'll never again get caught guessing whether or not an SCR or triac is good.

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# PR57 'POWERITE'<sup>®</sup> Variable Isolation Transformer And Safety Analyzer

## Five Ways You Can Make Sure Your Power Is Right With A 'POWERITE'<sup>®</sup>

- It's an isolation transformer.
- It's a variable AC supply.
- It's a power line monitor.
- It's an amp/watt meter.
- It's a safety leakage tester.

PR57 'POWERITE'<sup>®</sup>  
\$495 Patented



## Avoid Embarrassment And Risk—Know Beyond A Doubt That Your AC Power (and the equipment you service) Is Right And Safe

The PR57 'POWERITE'<sup>®</sup> lets you know that your AC power is right and includes a variable isolated 470 Watt power transformer to isolate your AC line and vary the output voltage from 0 to 150 volts. You'll monitor voltage, current, and wattage to prove that the equipment under test isn't drawing too much current at any voltage setting.

The PR57's AC line leakage safety test assures that excessive leakage is not present on any exposed part of the equipment being tested. Perform this important safety test on every customer's electronic products for his security and your piece of mind.

**Variable output supply is isolated for your protection.** The 'POWERITE'<sup>®</sup> 470 Watt AC variable output transformer provides a continuously variable output voltage from 0 to 150 volts; a must for troubleshooting shutdown circuits. It protects you and your test equipment from shocking

overloads by isolating you (and the equipment under test) from the AC line.

**Solve challenging shut down problems and eliminate callbacks.** Lower the line voltage to solve tough shut down problems. Raise the line voltage to sweat out intermittents or sensitive parts. Test every set at high and low line voltage to avoid embarrassing callbacks. *Identify AC line related problems* like picture width, sync, and intermittents in the customer's home or test in the shop at their line voltage.

**Build additional profits with safety leakage checks.** Safety checks are easy with the PR57's patented test. Always test every chassis for leakage to add profit (and decrease liability) with the 'POWERITE'<sup>®</sup>. Push a button and touch all the exposed metal parts with the PR57 probe. Any leakage reads on the meter. *All manufacturers require this safety test.* You get security, safety, and profit when you service AC

operated equipment with a 'POWERITE'<sup>®</sup>. Call 1-800-843-3338 and update your service bench today.

### PR57 Specifications

#### Isolated Output

Voltage 0-140 VAC (typical) continuously variable. Current 0-3 Amps continuous, 3-4 Amps intermittent usage (five minutes on, five minutes off).

#### Meter Circuits

Line Voltage: 0-150 VAC  $\pm 3\%$  F.S. Output Voltage: 0-150 VAC,  $\pm 3\%$  F.S. Output Current: ranges 0-1.5, 0-4 A AC. Accuracy: 3 F.S. Output Wattage: ranges 0-175, 0-470 watts. Method: V x amps.

#### Safety Leakage Test (U.S. Patent no. 4,352,058)

Range: 0-800  $\mu$ A,  $\pm 3\%$  F.S.; Includes safety probe with calibration test resistor.

#### General

Meter: 4 1/2", moving coil, 1900 ohm, 100  $\mu$ A F.S. diode protected against overload. Accuracy:  $\pm 2\%$ . Size: 6" x 11 1/2" x 12 3/4" (15.2 x 29.2 x 32.4 cm) HWD. Weight: 18 lbs (8.2 kg).

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# FS73 CHANNELIZER JR.™ TV-RF Performance Tester

# New

Make Difficult Performance Tests  
In Any RF Distribution System  
100% Automatically

Save With FREE Accessories!  
See Inside Back Cover.



- NEW All Channel Digital Tuner
- NEW Exclusive 5 Microvolt Sensitivity And Automatic Attenuator/Ranging
- NEW Automatic Microprocessor Controlled:

Fine tuning with readout of frequency off channel  
HRC and ICC cable system shifts  
On-channel Signal-to-Noise test  
Audio-to-Video carrier ratio test  
Hum test on any in-use channel

**FS73 CHANNELIZER JR.**  
**TV-RF Performance Tester**  
**\$2395 Patented**

**Now You Can Completely Performance Test Every Single TV Channel, In Any RF Distribution System, To FCC Specifications, 100% Automatically And 100% Faster Than Ever Before.**



Finally, automatic readings at the touch of a switch. No more tuning, measuring, and calculating to find audio-to-video ratios, signal-to-noise, and hum. The FS73's microprocessor does these performance tests (and more) on any channel automatically.

**Microprocessor controlled digital tuner covers every channel.** Check any system—UHF, VHF, all cable channels (plus the 5-50 MHz channels), and the FM broadcast band. The FS73's digital tuner uses PLLs throughout for fast accurate results.

**Super 5 microvolt sensitivity and autoranged attenuator leaves hands free to make critical adjustments.** Measure the lowest signal levels at an antenna, to the strongest signals at the output of an amplifier without adjusting the range control.

**Exclusive, automatic fine tuning with LCD readout of off-channel frequency locates shifted channels fast.** Tests non-standard shifted channels, too. AFT circuits lock the FS73 to the carrier and tell you how far the carrier is from its assigned frequency.

**Tune to standard cable shifted channels in seconds without looking up frequencies.** Simply select between HRC, ICC or non-shifted cable systems. The microprocessor automatically offsets the tuner the correct amount for each channel and displays the deviation from the standard frequency on the LCD readout.

**Exclusive signal-to-noise test (even on in-use channels) simplifies testing and saves time.** Compare the signal on any channel to the noise level on that same in-use channel. *The FS73 measures the actual noise within the channel and automatically calculates the S/N ratio.*

**Eliminate tedious pilot and carrier measurements—read audio-to-video ratio and hum on any channel (while it's in use) automatically.** No more calculations, simply tune the channel, select the A/V or Hum test, and the microprocessor does the rest. It's fast, easy, and error free. (Patent Pending)

**IEEE allows all tests to be performed under computer control.** Hands-off performance checks of all channels, and continuous, unattended monitoring for interference, are two of the ways your FS73 and a computer can be used to solve tough problems.

With growing profits in TV-RF and cable service, don't you owe it to yourself to try the FS73 "CHANNELIZER JR."? Call 1-800-843-3338 today to put the FS73 on a 10 day Free Self Demo in your shop or system.

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**WATS Free 1-800-843-3338**



# FS74 CHANNELIZER SR.™ TV-RF Signal Analyzer

# New

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See Inside Back Cover.



- All Channel (Cable, HRC, ICC, VHF, UHF, FM) Digital Tuner And LCD Channel Readout
- Exclusive 5 Microvolt Sensitivity On All Channels With Autoranged Attenuator
- Exclusive, Automatic Or Manual Fine Tuning With Off-channel Frequency Readout
- Exclusive, Automatic Hum And (Patent Pending) Signal-To-Noise Tests On Any In-Use Channel
- Exclusive Picture Quality Check With Integrated Wide Band Monitor
- Exclusive ACV/DCV Measurements Through RF Input Or Special DVM Input

## FS74 CHANNELIZER SR. TV-RF Signal Analyzer \$3495 Patented



Finally You Can Thoroughly Analyze And Pinpoint Any RF Video Trouble In Any RF Video Distribution System - Accurately And Automatically - In 1/2 The Time.

Your success in servicing RF distribution systems depends on locating problems quickly and accurately. Whether the problem involves abnormal signal levels, excessive hum, elusive ghosts, unwanted signal interference or some other system defect, the FS74 is guaranteed to help you pinpoint the trouble fast, accurately, and 100% automatically.

Tune all standard off-air, cable, and FM channels quickly and accurately. The FS74's microprocessor controlled, digital PLL tuner is a field strength meter exclusive. Tune channels quickly and accurately at the turn of a knob. AFT quickly fine tunes the FS74 to the exact carrier frequency. The LCD displays channel number and frequency offset to 10 kHz resolution. Cable shifts are no problem - simply select between HRC, ICC or non-shifted cable system and the microprocessor does the rest.

Best sensitivity available to bring in weak signals. Super sensitive, 5 microvolt (-46 dBmV) sensitivity on all frequencies means you can analyze signals all the way back to the receiving antenna. No more fiddling with attenuator inputs or undependable range switches either. The RF input to the FS74 is fully autoranged. Simply connect a cable to the input and measure signals to a full volt (+60 dBmV) - automatically.

Microprocessor control makes all tests fast and simple. By using state-of-the-art microprocessor technology, time consuming tests are automated and streamlined for fast, dependable results. All tests can be made on an in-use channel without removing or decreasing modulation, or adding special carriers. A patent pending signal-to-noise test automatically compares the signal level to the actual in-channel noise level. No

more tuning to "dead spot" references, or missing narrow band noise. When making an audio-to-video level measurement, the FS74 automatically tunes the video and audio carriers. The ratio is displayed directly on the meter. Hum tests are made directly on any in-use channel without removing modulation - another CHANNELIZER exclusive.

Exclusive built-in wide band monitors make tough picture quality checks in a snap. If you've ever hunted down picture ghosts or interferences you'll appreciate the value of this exclusive FS74 feature. The wideband monitor is an integral part of the FS74. That means no additional cables or cords to connect or TVs to haul around. Just turn on the monitor and view any of the television channels in full detail on the CRT monitor. Its full 4 MHz bandwidth means it will help you isolate problems that affect large screen receivers, but

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## FS73 and FS74 Specifications

All specifications allow for 10 minutes warmup and are guaranteed over the operating range of -13 F to 122 F (-25 to 50 C).

### Tuner:

**Channels:** All FCC specified and cable channels including VHF 2-13, UHF 14-83, sub-band cable T-7 to T-13, mid band cable 14-22, super band cable 23-36, hyperband cable 37-65. FM band 88.1 to 107.9 MHz. **Display:** (FS73) Numeric readout of channel number (FS74) Numeric readout of VHF, UHF, and FM channels; Selectable numeric or alpha-numeric readout of cable channels. **Cable Shift:** FCC non-shifted, HRC, or ICC cable shifts selectable via front panel control. **Fine Tuning:** Tuner may be manually offset +/- 1.25 MHz from any TV channel or FM frequency in 50 kHz steps. Automatically or manually tuned.

### RF Input

**Sensitivity:** 5  $\mu$ V (-46 dBmV on VHF, UHF, cable channels and FM frequencies). **Attenuator:** 5 autoranged steps with manual override, range hold, and range indicators. **Maximum Input:** 500 V (DC + Peak) for frequencies less than 1 kHz. +65 dBmV (1.7 V) on x.01, x.1, attenuator ranges; +85 dBmV (17V) on x10 and x100 attenuator ranges **Accuracy:** +/-1dB at channel 2 + 0.02 dB/degree C from 25 degrees C. All other channels +/- 1 dB from channel 2. **Input Impedance:** 75 ohm, unbalanced. SWR less than

2:1 for all VHF and cable channels, increasing to not more than 3:1 for UHF channels.

### RF Signal Tests:

**RF Video/FM:** Measures RF signal level of selected carrier. **RF Audio:** Measures audio carrier; automatically tuned. **A/V Ratio:** Measures dB difference between TV video and audio carriers. Accuracy is +/- 2 dB. **Hum:** Measures level of 60 and 120 Hz variation on peak RF level; with or without modulation (patent pending). **Accuracy:** +/-5, + 2 degree of arc. **Range:** 0-10%. **Signal/Noise:** Automatically computes ratio of peak video level to selected noise reference (Patent pending). Accuracy is +/- 2 dB. **Range:** 20-47 dB.

### Digital Multimeter (FS74 Only)

**DC Voltage:** Autoranged, 0-19.99, 199.9 V; +/-0.5% **Impedance:** 1.5 megohms. **AC Voltage:** Autoranged, 0-19.99, 199.9 V; +/-1%. **Ohms:** 0-199.9 ohms; +/-1%; 0.1 ohm resolution. **Input:** AC & DC through RF Input and External DVM input; Ohms through external DVM input only.

### CRT Monitor (FS74 Only)

**CRT:** 3", magnetic deflection; high intensity; mechanical shock protected. Recessed for high ambient light viewing. **Bandwidth:** 4 MHz with correct roll-off to prevent ringing or overshoot. **Sync:** Digitally derived; fully automatic.

**General: Audio Output:** Internal speaker and headphone jack with adjustable volume. **Meter:** 3.5", 2%; 1000  $\mu$ A, 50 ohm; Shock protected jeweled movement. **Computer Control:** IEEE 488 GPIB interface through use of optional IB72 Bus Interface Accessory (add .1 dB to all accuracy specs over the IEEE). **Power Requirements:** 12 VDC, 1.8 amp. Powered from optional PA241 Power Adapter or 39G187 automotive accessory cable. Battery operation with 2 optional BY242 batteries. **Auto Off:** Removes power during battery operation if unit remains idle for approximately 15 minutes.

**Temperature:** (Operating range) -13°F +122°F (-25°C to 50°C). **Size:** (FS74) 6" x 12" x 10" (15.3 x 30.5 x 25.4 cm) HWD (FS73) 6" x 9 1/2" x 10" (15.3 x 24 x 25.4 cm) HWD **Weight:** (FS74) 13.5 lbs. (6.12 kg) without batteries; 17.5 lbs. (7.94 kg) with batteries. (FS73) 10.2 lbs. (4.63 kg) without batteries; 14.2 lbs. (6.44 kg) with batteries.

which go unnoticed on portable televisions.

**Built-in autoranging AC/DC Voltmeter and Ohmmeter means you'll never be caught short.** Your troubleshooting capabilities are rounded out with AC and DC voltage measurements and a special low resistance ohmmeter right at your finger tips. Measure to 200 volts, right through the RF input. The durable, all-weather design of the FS74 is field tested tough to hold better than FCC specifications in all kinds of weather and rough conditions. The FS74 is totally portable, easy to use, and ready to go when and where you go. Completely automated, computer controlled tests are made possible through the IEEE interface available for the FS74.

Guaranteed more successful RF Distribution System servicing or your money back. Now is the time to pick up your phone and dial **1-800-843-3338**. Put the FS74 to work in your system for 10 days absolutely risk free. Call us today. You'll locate problems more quickly and accurately than ever before—guaranteed!

## FS73 & FS74 Accessories:

### Optional:

PA241 AC Power Adapter  
BY242 Rechargeable Battery (2 required)  
CC243 Carrying Case (FS73 only)  
CC244 Carrying Case (FS74 only)  
PL246 External Panel Light

HF247 Headphones  
RE248 Range Extender Probe (FS74 Only)  
SS249 Standard Reference Signal  
IB72 IEEE 488 Bus Interface



**in Electronic Servicing**

**WATS Free 1-800-843-3338**



# FC71 Portable 10 Hz to 1 GHz Frequency Counter™

Save With FREE Accessories!  
See Inside Back Cover.



- 10 Hz - 1 GHz Portable Frequency Counter
- Five Times More Accurate Than FCC Requirements Even On The Toughest Job; .5 Parts Per Million
- Exclusive Microprocessor Time Base For Super Stability From -12°F to 122°F
- Measures All Signals, Even complex And Noisy Signals, With Exclusive Sensitivity Control
- Super 5 mV Average Sensitivity Over Full Range
- Automatic Crystal Check Tests The Fundamental Frequency Of Any Crystal
- Frequency Ratio Compares Two Frequencies And Displays The Ratio Directly
- Double Shielded For Interference Free Frequency Measurements Anywhere
- Automatic Readings With IEEE 488 Computer Interface. IEEE 488 Bus Compatible

**FC71 Frequency Counter—The Only Portable Counter Especially Designed With An Exclusive Microprocessor Controlled Timebase To Measure 10 Hz To 1 GHz To .5 PPM Accuracy In High RF Environments**

**FC71 Portable 10 Hz to 1 GHz Frequency Counter  
\$1295 Patented**



The only truly portable 1 GHz counter that makes every reading better than FCC requirements. The FC71 uses a unique, new, microprocessor-controlled timebase. This patented counter provides (0.5 ppm/y aging) from 10 Hz to 1 GHz. With the 8 1/2 digit LCD display, you get superior accuracy on the high end while allowing .01 Hz resolution for low end audio work.

The most sensitive frequency counter available—counts signals other counters miss. The FC71's 5 mV input sensitivity lets you count signals in more circuits than with any other counter - without external amplifiers. It will even measure the output of RF generators and communications monitors that can't be tested with other counters.

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.

Since there is no power robbing oven, the FC71 gives nine hours of continuous operation. Take it wherever it's needed: broadcast towers for FCC documentation, repeater sites, for troubleshooting or airplane cockpits for avionics tests.

The highest stability available to count signals that drive other counters crazy. The FC71 is guaranteed to be the most stable counter you can buy. It counts signals others can't, like AM or FM signals, digital signals with ringing, or

The best RF shielding of any counter gives interference free measurements—even in high RF fields. With most counters, you cannot make measurements near a broadcast or 2-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.

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Extra tests make the FC71 more than just a counter, it's an analyzer for troubleshooting tough RF problems. The frequency-ratio test simplifies troubleshooting in digital and RF multiply and divide stages. The FC71 helps you solve modern digital and 2-way radio circuit problems quickly and confidently. Measure the input, measure the output, press a button,

and read the exact ratio. Checks any crystal at its fundamental operating frequency to take the doubt out of oscillator repairs.

**IEEE488 Instrument Bus interfaces the FC71 to your computer for new service opportunities.** Sencore's universal interface, the IB72, lets you use the FC71 with any computer for automated

testing, monitoring, and data collecting. The IB72 includes switch selectable addressing, power/data on indicators, and reset. To learn how the FC71 adds capability, satisfaction, and profit to your applications, call **1-800-843-3338**; ask for the IEEE488 Applications Bulletin and talk to your Sales Engineer about Sencore's exclusive 10 day Free Self Demo.



Field calibrate to full specifications (NBS traceable) with a simple module and ROM change.

### FC71 Specifications

**Display:** 8 1/2 digit LCD. **Freq Range:** 10.00 Hz to 1 GHz. **Sensitivity:** 5 mV ave., 14 mV typical at 1 GHz (adjustable). **Accuracy:** 0.5 ppm (0-40 degrees C), 0.5 ppm/year aging, ± 1 digit (± 2 digits on frequencies under 100 kHz) U.S. Patent No. 4,616,173. **Frequency Ratio:** 1.0000 to 99,999,999; automatically calculated (stored input/measured input). **Crystal Check:** Test crystal for approx. fundamental freq.

**Input Frequency-**  
1 Megohm Input, 10 Hz to 100 MHz, 50 Ohm Input, 10 MHz to 1 GHz, 50 Ohm VSWR 2:1 to 1 GHz. **Crystal Check** 1-20 MHz.

**Update Time-**  
Selectable. Approximately 0.1 and 1 second

**Sensitivity-**  
1 megohm 5 mV RMS sinewave avg. 50 ohm 5 VRMS sinewave avg, typically 14 mV RMS at 1 GHz.

**Input Protection-**  
1 Megohm 400 VPP to 100 Hz, 250 VPP to 10 kHz 50 VPP to 30 MHz, 8 VPP to 100 MHz, 250 V

max. DC; diode protected. 50 ohm 5 VRMS, 0.5 watt; 100 V max. DC, fuse protected.

**Ratio-**  
**Single Input Range:** 1.0000 to 99,999,999 with proper '+' or 'X' indication.

**General-**  
RFI Emission Meets or exceeds FCC code 47 CRF 15.840 **Display:** 8 1/2 digit LCD, leading zero suppression, auto decimal placement, "Hz" "kHz", "MHz", "X", "+", "FC" (full charge), "LO" (low battery), "fuse bad" (50 ohm input) indications. **Power:** 105-130 VAC with PA235 (supplied); 12 VDC car battery with 39G176 (supplied); battery with BY234 battery pack (optional). **Auto Off:** After 30 to 45 minutes of battery use. **Size:** 4" x 8" x 11.5" (10.2 x 20.3 x 29 cm) HWD. **Weight:** 5 lbs. (2.3 kg) without battery, 6.6 lbs. with battery.

**Accessories-**  
**Optional:** AN210 Telescoping Antenna, BY234 Lead Acid battery pack, IB72 IEEE 488 Bus Accessory, PA239 220 AC Power Adapter, CC238 Carrying Case.



# CR70 'BEAM BUILDER'<sup>TM</sup> Universal CRT Analyzer and Restorer

**\$200 Trade-In Offer!**  
See Inside Back Cover.



**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.**

- Guaranteed To Test Every CRT (Old Or New)
- Guaranteed Dynamic Tests You Can Trust
- Guaranteed To Safely Restore 9 Out Of 10 Weak Or Shorted CRTs
- Guaranteed To Be Totally Protected From Damage From Charged CRTs

**CR70 'BEAM BUILDER'<sup>TM</sup>**  
Universal CRT Analyzer and Restorer  
**\$1295 Patented**

**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.)**

**Are You Wasting Valuable Time And Profit Replacing CRTs?** Let's face it, the CRT is the only modern electronic component guaranteed to wear out. But, did you know most worn CRTs can be successfully 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 gives you the know how and confidence to 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
- Camera pickup tubes - broadcast, industrial and surveillance
- Even scope, radar, and other industrial CRTs.

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**Means Success**



### Finally - You'll 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. Remember all those socket adapters you need for your CRT tester? No matter how many you've got, it seems like you're always one short. It takes 78 different adapters (at a cost of over \$9.95 each) for a conventional CRT tester to test all the CRTs tested with the adapters (five double-sided and one universal) supplied with the CR70. And the supplied 39G170 Universal Adapter connects to any "non-standard" CRT that might be announced in the future.

**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, its exclusive cutoff test accurately identifies CRT problems related to bad contrast that other testers miss. 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. The CR70 also tests for shorted elements.

### Restore CRTs Safely And Effectively.

The CR70 is guaranteed to extend the life of 9 out of 10 weak or shorted CRTs in industry, broadcast, and surveillance. This saves thousands of dollars per year as you stretch the life of computer display tubes, camera tubes, or high-priced scope tubes (or salvage that instrument you can't get a CRT for). 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 and safer than any other CRT restoring instrument because it's the only one with the 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 restoring level until you improve the tube or run out of steps (If you've ever destroyed a CRT with a CRT restorer, you'll really appreciate progressive restoration). 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 current limited power supply to prevent costly damage.

**Exclusive 4-Way Money Back Guarantee.** The CR70 is so unique and different from any other CRT tester 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 CRTs.
- Be totally protected from damage from charged CRTs.

Prove to yourself that the CR70 meets all of these claims, with our exclusive 10 day Free Self Demo. Call us today. WATS Free **1-800-843-3338** and put your CR70 "BEAM BUILDER"™ to work.

### CR70 Specifications

#### CRT Tests

**Short Tests: H-K Shorts:** 2 megohm good/bad calibration,  $\pm 10\%$  **G1 Shorts:** 20 megohm good/bad calibration,  $+10\%$  **Cutoff Test: G1 Bias:** Switch selectable: -20, -36, -52, or -68 VDC. **Emission Test: G1 Bias:** Zero V. **Emission Levels:** Video CRTs, 300  $\mu$ A; Projection CRTs, 800  $\mu$ A; Scope CRTs, 10  $\mu$ A; all  $\pm\%$ . **Tracking:** Stored emission current levels compared between highest and lowest guns with ratio indicated on meter.

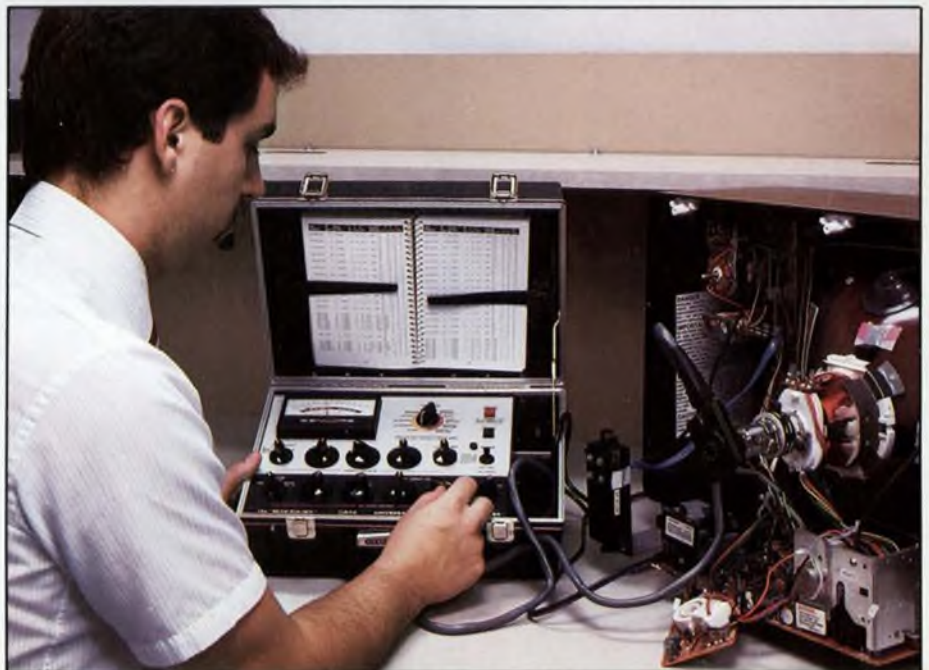
#### Cathode Recovery Methods

**Remove G1 Shorts:** R/C discharge with zero filament power. **Rejuvenation:** R/C discharge with

current limiting; time automatically determined by CRT cathode. **Restoration:** Cathode super-heating using elevated filament voltage and increased beam current. Current limited to 100 mA in "Auto" and "Manual 1" and 150 mA in "Manual 2". **Filament Voltage:** Variable from 1-14 V.

#### General

**Meter:** 4" x 100  $\mu$ A, 2%, 4000 ohms. **Size:** 7.5" x 14" x 9.7" (19 x 35.6 x 24.8 cm). **Weight:** 12 lbs (5.4 kg). **Power:** 105-130 VAC, 50/60 Hz: 60 Watts. **Accessories:** Optional: 39G170 Universal Test Clip Adapter.





# Digital Meters

## DVM37 3 1/2 Digit, 0.1% Bench/Portable Digital Multimeter™



- Automatic .1% accurate DVM for bench or field for measurements you can count on.
- 15 Megohm input impedance for least loading and error, especially in high impedance circuits.
- Protected inside, too, better than any other DVM on the market, to 2 kV DC with 8 kV transient protection and to 10 kV with TP212 probe.
- An Indestructible DVM For Both Bench And Field

**DVM37**  
**3 1/2 Digit, 0.1%**  
**Bench/Portable Digital**  
**Voltmeter**  
**\$395**

**For Confidence And Success In Troubleshooting, You Need A DVM That Holds Lab Accuracy Under The Most Rugged Conditions.**

**One super rugged digital voltmeter for every use.** If you like to use 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.

### DVM37 Specifications

**DCV:** 1 mV to 1999 V, +/- 0.1% to 200 V, 0.2% to 1999 V. **Input Z:** 15 M. **ACV:** 1 mV to 1000 V, +/- 0.5% to 200 V, 0.75% to 1000 V. **Input Z:** 1.5 M. shunted by less than 100 pF. **BW:** 40 Hz to 5 kHz .5 dB. **AC RMS:** average detecting. **DC Current:** 0.1 uA to 1999 mA, +/- 0.3%. **AC Current:** 0.1 uA to 1999 mA, +/- 1% of reading +/- 3 digits. **Resistance:** 0.1 to 1999 kilohm (low pwr), 0.001 to 19.99 M. (high pwr), +/- 0.2% to 200 kilohm, 0.5% to 20 M.; +/- 3 digits. **Protection:** 2000 V (peak + DC) or 1400 V rms.

**Size:** 7" x 5" x 4" HWD (17.9 x 12.8 x 10.2 cm). **Weight:** 2 1/4 lbs. (1.0 kg), w/batteries. **Power:** 4 "C" cells or PA208 Power Adapter w/ rechargeable "C" cells.

### DVM56A Specifications

**100% Autoranging**  
**DC V:** 0.1 mV to 1.9999 kV, +/- 0.075% +/- 5 digits. **Z:** 15 M..

**ACV Ave. or true RMS:** 1 mV to 999.9 V, +/- 0.5% +/- 4 digits at 60 Hz. **Response:** 30 Hz to 20 kHz, +/- 1dB. **ACV PP:** 1 mV to 1.9999 kV, +/- 1.0%, +/- 4 digits at 60 Hz. **Input Z:** 10 M. shunted by less than 40 pF. **Response:** 30 Hz to 100 kHz +/- 1 dB, -3 dB to 200 kHz. **True RMS in dB:** -43 to +62.2 dBm. **dB Reference:** 1 mW into 600 ohm or programmable in dBp, +/- 1 dB +/- accuracy of True RMS. **Current, AC and DC:** 0.001 mA to 1.9999 amps, +/- 0.3%, +/- 4 digits on DC and 1.0%, +/- 4 digits on AC. **Low pwr ohm:** 0.01 ohm to 1.9999 M., +/- 0.3%,

+/- 4 digits on all ranges. **Hi pwr ohm:** 0.1 ohm to 99.99 M., +/- 0.3%, +/- 4 digits to 19.999 M.; 1% +/- 4 digits to 99.99 M..

**Protection:** 2000 V (DC + peak AC) or 1400 VRMS all ranges except 1000 V (DC + peak AC) on current. **Display:** 0.5", 7 segment red LED, 4 1/2, 4, or 3 digits. **Size:** 4" x 8" x 11.5" (10.2 x 20.3 x 29.1 cm) HWD. **Weight:** 7.7 lbs (3.6 kg) **Power:** 105-130 VAC, 50/60 Hz, 35 Watts. **Optional:** DBA220 X10 AC Amplifier. HP200, 50 kV HV Probe. DP213 Demod. Probe. CS223, 20 amp shunt.

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## DVM56A "MICRORANGER"® Digital Voltmeter



**DVM56A: The most versatile time saving bench DVM you will ever own.**

- 100% Automatic, designed to save you time, simply touch and test and MICRORANGER® does the rest.
- Lab Accuracy - .075% 4 1/2 digit with 15 Megohm Input Impedance
- Versatile-16 Microprocessor Controlled Measuring Ranges
- Tough - Fully protected to 7.5 kV overload and RF interference free.
- Super Easy To Use

**DVM56A  
"MICRORANGER"®  
Digital Voltmeter  
\$995 Patented**

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

The DVM56A is what you want. Of all the instruments a technician uses on the job, his multimeter has got to be the one he uses most often. Yet many multimeters don't meet the service technician's needs. The DVM56A puts a microprocessor to work for you, and makes one meter with everything in it that you would ever want for your troubleshooting and testing needs.

**The most versatile meter on the market.** The DVM56A measures all the voltages, currents, and resistances found on schematics without need for interpretation of ranges or units. It also measures stage gain in decibels referenced to 1 milliwatt in 600 ohms. For easy troubleshooting, simply set the dB reference to any value you choose, at any point in the circuit, to measure dB gain or loss relative to the selected point.

**You'll troubleshoot faster with the DVM56A.** The MICRORANGER® is totally autoranging. You simply select the function you want, touch and test, let the MICRORANGER® do the rest. Its microprocessor selects the range, places the decimal point, and displays the units automatically to eliminate interpretation errors.

**You'll get accurate error free readings every time.** 4 1/2 digit readout with a .075% DCV microprocessor accuracy. A high 15 megohm input impedance minimizes circuit loading by 50% over other meters.

**You'll solve new high tech challenges with these new meter ranges.** The MICRORANGER® has more functions and ranges than any other meter, including dB, ACV peak-to-peak, true RMS, average RMS, peak and null, low power and high power ohms.

**It's built tough — for years of dependable measurements.** Your investment in the DVM56A is fully protected to 7.5 kV. Measure to 10 kV with confidence and safety with supplied probe, and to 50 kV with the optional High Voltage Probe (HP200).

The MICRORANGER® is truly a technician's meter. It's guaranteed to get the job done faster and more accurately than ever before. It holds rock solid in the most severe electromagnetic interference (EMI) to make successful measurements where other meters can't. Enjoy troubleshooting success and more free time when you put this time saving meter to work on your bench. Call 1-800-843-3338 and ask your Sales Engineer how the DVM56A can help you meet routine and special troubleshooting challenges (profitably).



# TF46 Portable Super Cricket Portable Transistor/FET Tester



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

- Needs No Set-up Book Or Instructions
- Patented In-Circuit "go/no-go" Transistor/FET Test
- Now More Automatic Than Ever, Identifies Transistor Leads
- Portable Operation With Auto Shut Off To Save Your Batteries.
- Tests All Possible Leakage Paths
- Dynamic Gain Test

## TF46 Portable Super Cricket Portable Transistor/FET Tester \$495 Patented

**Be Confident In Your Transistor/FET Analyzing.** If you've pulled your hair out over transistor, diode, and FET "substitution" problems, you're ready for a fast guaranteed tester that will take the guess work out of solid-state servicing. And when you want the confidence that comes from knowing which parts are good, and the satisfaction of quickly fixing complex circuits, what you really want is the TF46.

**Patented In-Circuit Tests Save You Time.** The "Cricket" has a patented "go/no-go" in or out of circuit test for all transistors and FETs to allow you to quickly identify bad components. 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 — guaranteed! That's all you'll have to do to find good-bad semiconductors; we made it easy to save you time. Fool-proof leakage and state-of-the-art gain

tests answer those critical parameter questions.

**New Test Checks Every Leakage Path To Locate Troublesome Semi-conductors.** Out-of-circuit leakage check finds those transistors that show good gain, but are still leaky from collector-to-base or collector-to-emitter. Simply press the leakage button and rotate the permutator switch to check every possible leakage path.

**New Gain Test Matches Transistors.** Push a button and read the transistor's gain to speed troubleshooting as well as match transistors and FETs for critical circuits.

**Solves More Semiconductor Circuit Problems Than Any Other Instrument.** If your job includes troubleshooting direct coupled transistor stages, you'll want to use the Cricket before any other instrument. Troubles in early direct coupled circuits usually cause all the DC voltages to be off. To save valuable

time, simply test the transistors *in the circuit* with the TF46. It's faster than interpreting voltage readings, and it's reliable. Can you afford to be without the ability to make these important tests? Give your Sales Engineer a call.

### TF46 Specifications

**Cricket Good/Bad:** Detects ability of transistor to invert a square wave (U.S. Patent no. 3,898,559). **Bi-Polar Transistor Beta:** Dynamic Beta (U.S. Patent no. 3,832,633) **Bi-Polar Leakage:** Tests six paths with rotation of permutator switch (Icbo, Iebo, Iceo, Ieco, Ibc, Ibc). **Field Effect Transistor Gm:** Dynamic mutual conductance. **FET Leakage (I<sub>gss</sub>):** 0-2500 microamperes **Zero Bias Drain Current (I<sub>dss</sub>):** 0-50 milliamps.

#### General

**Test Leads:** Color-coded E-Z Hook® connectors. **Batteries:** Six alkaline, carbon zinc, or rechargeable "AA" cells used with PA208 AC adapter. **Meter:** 4 1/2", 100 uA, 5%, mechanical shock protected. **Size:** 10" x 5 1/2" x 3 1/2" (25.4 cm x 13.8 cm x 8.9 cm) HWD. **Weight:** 4 1/2 lbs (2.0 kg).

**Accessories:** 39G85 Touch-Test Probe (Optional).

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# SG165 AM/FM Stereo Analyzer™

## Designed To Boost Your Audio Troubleshooting Efficiency

- Provides Every AM/FM Stereo Signal Needed For Efficient Analyzing Of Audio Equipment Problems
- It's five generators in one - RF/IF, audio, stereo MPX, sweep/marker, SCA.
- It's a dual channel audio wattmeter to 100 watts with built-in dummy loads.
- It's a stereo separation meter with independent metering.
- Stereo Subcarrier At Better Than FCC Tolerance

## SG165 AM/FM Stereo Analyzer \$1495 Patented



Everything you need to completely analyze AM-FM Stereo. Would you like the security of having all five pieces of necessary audio test equipment (with meters that show the effects of every adjustment and test)? With the SG165, these troubleshooting confidence builders are yours in one compact unit.

**Signal Injection.** Successful stereo troubleshooting is signal injection using "divide and conquer." The concept is simple; divide any stereo into major blocks and inject known good signals into each block, starting about half way through the circuits. If the circuits respond, continue to divide the remaining circuits with signal injection until you've identified the bad stage. You'll pinpoint stereo/audio troubles in minutes.

**Replaces five major pieces of test equipment.** With the SG165, you get every important signal needed to inject into any stage of the receiver—including:

1. An FM-RF/IF generator covering 2 MHz above and below the band limits to meet manufacturers' alignment requirements and variable frequency IF output to match ceramic filter IF stages.
2. An audio generator with sine wave output for troubleshooting and power testing and square wave output for frequency response evaluation.
3. A sweep/marker generator for IF bandpass and detector "S" curve alignment.
4. A stereo multiplex generator to find decoder problems fast.
5. An SCA generator to accurately set 67 kHz traps.

**Special meters guide you all the way.** Calibrated meters, with dummy loads, monitor every test as you troubleshoot the circuits. The meters show at a glance, separation in dB or audio in watts. With the SG165, audio servicing is efficient and profitable. Call today

WATS Free 1-800-843-3338 for full details on this stereo servicing profit center.

### SG165 Specifications

**FM RF:** 86 MHz to 110 MHz, 30 or 100% modulation; 0-10 mV. **AM RF:** 525 kHz to 1625 kHz at 0 or 30% modulation; 0-100 mV. **10.7 MHz FM IF:** 30 or 100% modulation, variable  $\pm 250$  kHz; 0-100 mV. **10.7 MHz Crystal FM IF:** 0% modulation; 0-100 mV. **262 kHz and 455 kHz AM IF:** 0 or 30% modulation, variable  $\pm 25$  kHz; 0-100 mV. **400 Hz SINE WAVE,**  $\pm 20\%$ ; 0-1 Vrms. **400 Hz SQUARE WAVE;** 0-2.8 V P-P. **10.7 SWEEP AND MARKER** with post injected crystal-controlled markers at 10.6, 10.7, and 10.8 MHz. **STEREO MPX SIGNAL** with 19 kHz pilot at 0%, 5%, or 10% level; phase-locked (U.S. Patent no. 3,896,268). **67 kHz SCA:** 0% modulation. **Speaker Loads:** 20 watts continuous, 100 watts intermittent; 4, 8, 16, or 32 ohms. **Meters:** separation: 0 to -40 dB; **Audio Power:** 0-20 and 0-100 watts RMS at 400 Hz.

**General:** Size: 12.25" x 10" x 9" (32.2 x 25.4 x 22.9 cm) HWD.  
**Weight:** 18 lbs (8.2 kg). **Power:** 105-130 VAC; 50/60 Hz; 7 Watts.

**in Electronic Servicing**

**WATS Free 1-800-843-3338**



## CG25 Little Huey™ Portable, Digital Color Bar Generator

### Rock-Solid Patterns In A Pocket Size Generator

- Push Button Ease—Caddy Size
- Jitter Free Patterns
- Battery Saving Shutoff
- Test Leads Built In

CG25 Little Huey \$198

**Built rugged for field use:** Lasts and lasts on the road with tough acrylic case.

#### CG25 Specifications

**TV Channels:** 2 thru 6 (55.25—83.25 MHz). **Patterns:** Color Bars, Horizontal Lines, Vertical Lines, Cross Hatch, Dots, and Blank Raster. **Power:** One 5.6 V Battery. **Size:** 2" x 4" x 6" (5.08 x 10.2 x 15.2 cm). **Weight:** 2 lbs (0.91 kg).

**Big generator features:** Dot size, color level, and RF channel controls just like the deluxe generators.

**Rock-solid digital patterns:** Just push the buttons for jitter-free standard color bars, horizontal and vertical lines, crosshatch, and white dot patterns.

# New

## SR68 Stereo TV Readout™

### Dual Meters And Loads To 100 Watts Solve Stereo TV Servicing Challenges

- Analyze Stereo TV Audio Line Or Speakers In dB Or Watts
- Loads To 100 Watts For Dynamic Tests And Speaker Substitution
- Measure Channel Separation To -40 dB Without Calculations
- Battery Operated — Use In The Shop Or In The Field

SR68 Stereo TV Readout \$595

#### SR68 Specifications

**Input Impedances:** 10 k ohm +/- 10% paralleled by 500 pF. 4, 8, 16, and 32 ohm. **Power Ranges:** 0-10 watt and 0-100 watt. **Power Accuracy:** +/- 3% of full scale. **Separation Range:** 0 to -40 dB. **Separation Accuracy:** +/- 5% of reading. **Frequency Response:** +/- 1 dB from 50 Hz to 15 kHz. **Power:** 105 to 130 VAC with supplied PA235 AC adapter/charger. Battery operation with optional BY234 battery. **Auto Off:** shuts off after 30 minutes on battery. Auto off disabled when using external power. **Supplied Accessories:** 2 BNC to phono cables. 2 BNC to alligator clip cables. **Optional Accessories:** BY234 Battery Pack. PC253 Protective Cover/lead storage.

**Weight:** 7.7 lbs. with battery (3.5 Kg.), 6.1 lbs. without battery (2.8 Kg.). **Size:** 6.5" x 11.5" x 11.5 HWD. (16.5 cm x 29.2 cm x 29.2 cm).

**Solve stereo TV audio challenges without blaring speaker noise.** Dummy loads let you troubleshoot audio circuits at full power to 100 watts. No need to listen to speakers or tie up your scope or DVM to monitor outputs. No more calculations to determine separation.

**Portable dummy loads, level meters, and separation tests save troubleshooting time.** Connect the TV's audio (line or speaker outputs) to the SR68's input, match the impedance (10 kilohm, 4, 8, 16 or 32 ohms) and wattage (10 or 100 watts), turn up the

volume and start troubleshooting. You'll get simultaneous readings of the audio output of both channels in watts or dB to show performance and separation instantly.

**Helpmate/Related Instrument:** ST65 "Video Analyzer Stereo TV Adder", ST66 "Stereo TV Analyzer"; see pages 9 and 10.

# SENCORE

# Means Success



## IB72 IEEE 488 Bus Interface Accessory™



Automated testing is ideal when challenges include repeated testing, data collection, or fault analysis.

### Add Automation To Reduce Costs In Repeated Measurements

- Lets You Interface Sencore Instruments To The IEEE 488 Data Bus
- Uses Any Software Language . . . No Special Programming Skills Needed
- Selectable Address, External Reset, And Data Indicator LED Aid Program Development And Debugging

The IEEE488 bus lets you automate test equipment with a personal computer or instrument controller.

### IB72 Specifications

**IEEE Standards:** Meets IEEE Standards 488-1978 (Electrical) and 728-1982 (Data). **Instruments Interface:** Connects to 7-pin port on SC61, FC71, FS73, FS74, or LC77.

**Power Required:** PA235 110 VAC Power Adapter (included). **Accessories:** PA239 220 VAC Power Adapter. IE233 Standard 1 meter IEEE 488 bus cable.

#### General

**Size:** 2.7" x 6.1" x 6.5" (6.9 x 15.5 x 16.5 cm) HWD. **Weight:** 1.8 lbs. (830 grams).

### IB72 \$625

The IB72 adds IEEE488 to the SC61, FC71, FS73, FS74, and LC77. Connects between the bus cable and the instrument.

# New

## RG67 NTSC Video Monitor Adaptor



Updates your VA48 or VA62 Video Analyzer -- helps you expand into analog/digital monitor service.

- Phase-locked R,G,B,I signals drive any NTSC analog/digital monitor.
- Selectable signal and sync polarity with adjustable amplitude to 5 VPP; matches any input.
- E-Z HOOK™ leads for fast hookup to separate R,G,B,I inputs.

### RG67 \$890

Expand your video business, increase your "video store" image and get a jump on your competition, by servicing the analog and digital video monitors. Update your VA48 or VA62 Video Analyzer with the RG67 NTSC VIDEO MONITOR ADAPTOR. Monitor circuits are similar to TV, but many use separate red, green, and blue (RGB) video drive signals, sync, and intensity.

The RG67 gives you the important signals you need to successfully service video monitors.

E-Z HOOK leads let you connect to any monitor (typical hookups shown in handy pull-chart). Selectable polarity and adjustable levels to 5 VPP match the input of any monitor. Plus, a special lead (provided) lets you wire a

### RG67 Specifications

**Video Input:** 1 VPP into 75 ohms, negative sync, horizontal frequency 15,734 Hz.

**Digital/Analog Outputs:** 0-5 VPP ±10% into 100 ohms, freq. response 3 dB at 4.5 MHz. **Power:** 105-130 VAC, 50-60 Hz.

**Size:** 5.25" x 8" x 6.25" (13.3 x 20.3 x 15.9 cm) HWD. **Weight:** 4.9 lbs. (2.2 kg).

**Supplied:** 39G199 test lead, 8-pin male DIN to 8 EZ Hooks. 13A64 cable, 8-pin male DIN to 8 color-coded blank wires.

**Optional:** 39G205 test lead, 8-pin male DIN to 8 RCA male phono jacks. 39G206 test lead, 8-pin male DIN to D 9-pin male. 39G207 test lead, 8-pin male DIN to EIAJ 8-pin male connector.

connector for monitors you service often. Color-coded and labeled leads ensure fast error free hookup.

The RG67 keeps the good circuits in sync while you use your VA48 or VA62 Video Analyzer's drive signals to divide and conquer circuit problems.



# Accessories



39G81



39G85



39G170



HP200



PL207



TP212



DP213



TP222



TP225

## Test Probes

### 39G81: RF Demodulating Scope Probe

This demodulator scope probe shows the amplitude modulation envelope of RF carriers up to 250 MHz. It works with oscilloscopes that have BNC input connectors.  
\$29.95

### 39G85: Touch-Test Test Probe

This probe accessory is guaranteed to save you time with "in-circuit" transistor or inductor checking. No need to unsolder leads, just touch the three needle tip points to the transistor pads on the PC board or connect to a "Z Meter" for in-circuit inductor testing.  
\$17.00

### 39G170: Universal Test Clip Adapter

The universal adapter makes your CR70 "BEAM BUILDER"™ obsolete proof by allowing you to hook directly to the pins on any CRT. Perform tests and restoration on any CRT by identifying the proper pins (from the schematic) and using the universal adapter.  
\$30.00

### HP200: 50,000 VDC High Voltage Probe

Protect your test instruments and yourself with this DC high voltage probe. Just slip the probe over the standard Sencore meter probe and measure DC voltages to 50,000 volts. Use with any Sencore 15 megohm input digital meter only. This probe increases your meter's range 100 times and increases the meter's input impedance to 1500 megohms. The probe provides the safety and protection you need.  
\$59.95

### PL207: RF "SNOOP LOOP"

Test RF circuits without making a single probe hook up. This broadband RF pickup loop functions as a miniature directional antenna that allows you to inductively pick up a signal and measure it on a frequency counter or a scope. Use the SNOOP LOOP to avoid loading critical circuits and to protect the input of the meter from excessive voltages.  
\$19.95

### TP212: 10 KV, 1%, Transient Protector Probe

Extend the input protection and measuring capabilities of your Sencore meter to 10,000 volts. This durable probe saves many times its cost each time it protects your instrument from high voltage surges. The TP212 increases the input impedance of the meter from 15 megohms to 150 megohms. Use the TP212 for DC measurements only.  
\$24.95

### DP213: Universal Meter RF Detector Probe

Use this low cost RF detector probe to trace RF signals. The DP213 converts the RF signal to DC for measurement by any Sencore or competitive DC meter. The supplied RF to DC conversion chart helps to determine the RF level applied. Usable to 250 MHz.  
\$20.00

### TP222: 10 KV, 0.5% Accuracy Transient Protector Probe

Attach the transient protector probe to your standard meter probe to extend both input protection and measuring capabilities to 10,000 volts. Also decreases loading of critical circuits by increasing the meter's input impedance from 15 megohms to 150 megohms.  
\$40.00

### TP225: 'Sure-Hold' Alligator Clip Adapter Probe

Convert any standard alligator clip into a 'Sure Hold' test clip. This durable probe lets you make measurements in "tight fit" circuits because the nose of the probe is narrow enough to clip onto the leg of a transistor or a pin of an IC. Purchase a "Sure-Hold" alligator clip adapter probe for each instrument you own.  
\$14.95





DP226

### DP226 1:1 Scope Probe

Take full advantage of your scope's sensitivity. This direct (1:1) probe works with any brand of scope that uses a BNC input connector. The special design limits the frequency response to 15 MHz with a standard 1 megohm input.

\$60.00



NP229

### NP229: Scope Needle Point Adapter

Extend the reach of Sencore oscilloscope probes with this needle point tip. The added reach lets you make measurements in tight, hard to access areas. The two-inch adapter, screws onto the probe in place of the spring loaded hook. The hardened steel point pierces oxide on connectors or the coating on PC boards for secure connections.

\$9.95



RE248

### RE248: External DVM Range Extender

Increase the measurement range of your FS74 CHANNELIZER SR. to 2000 volts with this special extender. This low cost investment protects your Channelizer from line surges. It also decreases loading because the probe increases the input impedance to 15 megohms.

\$19.95



PA208

### Power Supplies And Batteries

#### PA208: Universal AC Adapter/Charger

This adapter has been specially designed to operate Sencore portable instruments equipped with an AC adapter jack. 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. The PA208 also serves as a battery charger.

\$19.95



PA235

#### PA235: AC Power Adapter

Use this specially designed adapter to operate the portable SR68 Stereo TV Readout, FC71 Frequency Counter and the IB72 Interface Bus. The PA235 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. The PA235 is also used to charge the FC71's internal battery.

\$30.00



PA241

#### PA241: AC Power Adapter

The PA241 was specially designed to operate Sencore's field strength meters: the FS74, FS73, and the ST66 MTS Stereo Analyzer. It 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. The PA241 also serves as a battery charger for the rechargeable battery packs in these units.

\$48.00

#### PA239: AC Power Adapter (for 220 volt systems)

The PA239 Power Adapter has the same specs as the PA235 except that it has been designed for operation on 220 volt AC systems.

\$60.00



PA251

#### PA251: AC/Adapter Charger

Use this special power adapter to operate Sencore's LC76 or LC77. It 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. These Sencore instruments can be equipped with rechargeable batteries, in which case the PA251 also serves as a battery charger.

\$48.00



BY234

#### BY234: 12 Volt Rechargeable Battery

For use with the FC71, ST66, LC76, LC77 and SR68. These heavy duty rechargeable, lead acid batteries are guaranteed to provide hours of continuous operation.

\$59.95



BY242

#### BY242: 6 Volt Rechargeable Battery For The FS73 And The FS74 CHANNELIZER

For use with the Sencore Channelizers: The FS73 and FS74. These are heavy duty, rechargeable, lead acid batteries for long life.

\$44.00





AN210

### AN210: Frequency Counter Pick-up Antenna

The pick-up antenna lets you measure the output frequency of a transmitter by simply counting the RF transmitted through the air. Just connect this adjustable antenna to the 50 ohm or 1 megohm input of the FC71 and measure off the air frequencies of commercial AM, FM, and TV, hand-held transmitters, and mobile radios; all without any time consuming disconnections.

\$25.00



AT218

### 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 much 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.

\$25.00



TR219

### TR219: Horizontal Isolation Transformer

The TR219 provides isolation between the VA48 ground lead and the H.O.T. transistor emitter in chassis using split flybacks (flybacks with two primary windings) or in chassis using isolated hot-ground/cold-ground power supplies. Note: The TR219 does not eliminate the need for an AC line isolation transformer (such as the Sencore PR57 AC POWERITE®) when working with a hot chassis. It is not necessary to use the TR219 with the VA62.

\$35.00

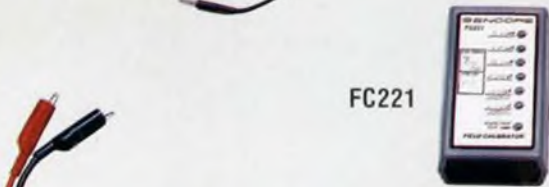


DBA220

### DBA220: 20dB(10X) Audio Amplifier

This special amplifier allows you to make low-level audio measurements (to .1mV) with your DVM56 or DVM56A MICRORANGER® Digital Meters. The DBA220 extends the DVM range by 20 dB for super sensitivity. The DBA220 is powered directly from the MICRORANGER.

\$50.00



FC221

### FC221: Capacitor/Inductor Field Calibrator

This handy calibration tester lets you confirm your CA55, LC53, LC76, LC75 or LC77 is within its published specification. 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 our line of "Z METERS". We suggest that you return your FC221 to the Factory Service Department whenever you return your unit for service or calibration so the calibration of the FC221 can be rechecked against our standards.

\$65.00



CS223

### CS223: 20 AMP Current Shunt

Use the CS223 with any voltmeter to make AC or DC current measurements. 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. The CS223 will prevent loading errors which are common to meters with built in high current ranges. There are no switch contacts, jacks or flimsy meter leads to increase the voltage drop.

\$45.00

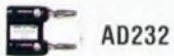


EX231

### 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. Use with the VC63 VCR Test Accessory and the NT64 NTSC Pattern Generator. The EX231 lets you add to your VA62 video analyzing system as they are introduced.

\$148.00



AD232

### AD232: Banana/Scope Adapter

Double banana jacks provide a special hookup for oscilloscope probes to eliminate lead connector problems. Can be used to hook an oscilloscope to the DRIVE SIGNAL output of the VA62.

\$12.75



IE233

### IE233: IEEE 488 Bus Interface Cable

This cable connects the IEEE488 Bus to the Sencore IB72 Interface Bus. Male and female connectors for series, chain, or daisy chain connections. The cable is 39.94 inches long.

\$79.95



RM240



**RM240: Rack Mount Accessory**

Mount the IB72 Interface Bus and the SC61 Waveform Analyzer for handy rack mounting. This standard 19" rack holds the units firmly in place yet allows for full access to all the front controls.  
\$148.00

SS249



**SS249: Cable-izer Channel 13 Modulated Signal Source**

Technicians that work on television RF distribution systems often need a reliable portable signal source to use with their field strength meter to troubleshoot these systems. The SS249 provides a modulated RF signal to check the performance and to troubleshoot television RF distribution systems. Its adjustable output (1000 micro-volt to 1 volt RF) permits the signal to be inserted anywhere in the RF distribution system to aid in locating defective components. In addition, the video pattern provided by the SS249 is used with the Sencore FS74 CHANNELIZER SR, as visual check of the quality of the RF distribution system. Small hand sized, weighs less than a pound. Saves carrying a full sized RF generator on the job.  
\$395.00

PL246



**PL246: External Panel Light**

You never know when you are going to have to operate in dim light or even the dark. A backlighted meter may enable you to read the meter but not the front panel. This simple but effective battery operated light, snaps on, and lights up the front panel as though a flashlight were shining on it.  
\$9.95

HF247



**HF247: Earphones For The FS73 and FS74**

Get clear TV sound when working in noisy environments. Lets you defeat the field strength meter's built in speaker.  
\$9.95

SCR250



**SCR250: SCR And Triac Test Accessory**

Dynamically test SCRs and triacs using your CA55, LC53, LC76, LC75, or LC77. The SCR250 results in the most reliable test available for SCRs with sensitive gates and for those requiring higher latching currents.  
\$168.00

PC227



**Sencore's Line Of Cases And Covers**

**PC227: Protective Scope Cover**

Snap this plastic cover on the front of your SC60, SC60A, or SC61 every time you move or store the unit. This cover will keep your front panel and CRT looking like new. It's easy to install because it snaps into place with one simple latch.  
\$29.00

PC230



**PC230: Protective VA62 Cover**

Use this snap on plastic cover to protect the controls when your unit is not in use. It will keep your VA62's front panel looking like new. It's easy to install because it snaps into place with one simple latch.  
\$29.95

CC237



**CC237: Black Plastic Lead Pouch**

This "kangaroo" pouch fits any Sencore or (competitive) instruments larger than 8 by 11 inches. it uses super tough Velcro® strips that you can apply in the field. No special glues or applicators are needed.  
\$24.95

CC238



**CC238: FC71 Carrying Case**

A specially designed nylon pouch for the FC71 Frequency Counter. Waterproof and padded for extra protection. One of the neatest, most professional instrument carrying cases you've ever seen. Includes 3 handy pockets: 1 for test leads, and 2 for spare batteries, tools, etc. Machine washable.  
\$49.95





CC243



CC244



PC253



CC254



Say Yes  
Form 3454



Form 3611



Form 3580



CH255



CH256

### CC243: Custom Built Carrying Case For The FS73 CHANNELIZER JR.

A stylish, tight fitting, custom made carrying case for the FS73. This carrying case has special padding for extra protection. Built in lead, tool and equipment pouches for convenience on every job. Washable.

\$148.00

### CC244: Custom Built Carrying Case For The FS74 CHANNELIZER SR.

A custom fit, handsome, grey vinyl carrying case for the FS74. This case is waterproof and padded for extra protection. Includes two handy pockets for tools and equipment. Carry your FS74 in this stylish case on every one of your field calls. Washable.

\$148.00

### PC253: ST66 & SR68 Dust Cover And Lead Storage Compartment

This optional snap on plastic cover fits on the front of your ST66 and SR68 to keep the front panel looking like brand new. Holds leads during transit. Fits on the back when not in use.

\$49.50

### CC254: 'Z METER' Carrying Case

This handy carrying case is recommended for the protection of the LC76 and LC77. The stylish case is waterproof and padded to prevent damage caused by Mother Nature. Featured are three pouches, one for application manuals and two for extra batteries or leads, allowing you to take everything you need in one case. Washable.

\$99.00

## Business Building Reference

### Ten Ways To Get Your Customer To Say Yes by Herb Bowden (Form 3454)

Have you found yourself in a position to sell? Need to know more about marketing and advertising? Are you just a little weak on running a sales organization or motivating people? If you say "yes" to any of these questions, then you will profit from "Say Yes", a practical (how to) sales book for technical personnel. *Written by a technical engineer for technicians in terms they understand.* Written and edited personally by Herb Bowden, the founder and President of Sencore. See how Sencore was built from an \$800 start, to a leader in the industry. Worth twice what you pay, or your money back.

\$9.95

## Servicing Guides

Sencore's simplified guides help you gain "Know How" and enjoy success in the expanding video service market. Shows how to troubleshoot and locate defective circuits, quickly, without error and without disconnecting components.

### Simplified Guide For The VA62 Universal Video Analyzer (Form 3580)

\$20.00

### Guide To Stereo TV Theory, Troubleshooting And Test Equipment (Form 3611)

\$20.00

### CH255: Component Holder

A time saving test fixture for the Z-Meters. This holder allows you to test axial and radial lead components without hooking up test leads each time. Fully adjustable to test any size component.

\$195.00

### CH256: Chip Component Test Lead

A specially designed test lead for the Z-Meters. The special prongs on the end allow you to test chip type or surface mount components. Gives you the satisfaction of testing these tiny components with confidence.

\$49.00

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Trademarks of Sencore, Inc.: Little Huey, Z-Meter, MICRORANGER®, POWERITE®, Waveform Analyzer, AUTOTRACKING, "BEAM BUILDER", CHANNELIZER JR., CHANNELIZER SR., Z METER 2, PORTA-Z, AUTO-Z, Snoop Loop, Sure-Hold, Needle Probe, Kangaroo Pouch, Touch Test Probe.

Pricing Note: All prices shown are U.S. dollars. Canada must add applicable Duty, Freight, and F.S.T. Prices and specifications subject to change without notice.



**Totally Update Your Test Bench For Tomorrow's Technology With The Added Versatility To Update Your Present And Future Troubleshooting Needs.**



Buy the SC61 Waveform Analyzer for ..... \$3295  
 And the VA62 Universal Video Analyzer for ..... \$3495  
 Total Investment ..... \$6790

You get FREE any 2 of these 3  
 VC63 VCR Test Accessory (\$495 Value)  
 NT64 NTSC Pattern Generator Accessory (\$495 Value)  
 PR57 "POWERITE" (\$495 Value) OR

Choose any 1 of these FREE  
 DVM56A "MICRORANGER" (\$995 Value)  
 ST65 Video Analyzer Stereo TV Adder (\$995 Value)  
 LC75 Z METER 2 Cap/Coil Analyzer (\$995 Value) OR  
 Choose one of these for \$395  
 ST66 Stereo TV Analyzer (\$1395 Value)  
 LC76 PORTA-Z (\$1395 Value) OR  
 Choose the LC77 AUTO-Z Meter for \$895 (\$1895 Value)  
 Yours for only \$46 per week.

**Discover The VA62's Function Analyzing Secret in TV, VCRs Or In Today's New MTS Stereo TVs!**

**Update Your Troubleshooting Ability At The Push Of A Button With Our All New Automated Test Bench!**



Buy the VA62 Universal Video Analyzer for ..... \$3495

Choose one of these FREE  
 VC63 VCR Test Accessory (\$495 Value)  
 NT64 NTSC Pattern Generator Accessory (\$495 Value)  
 PR57 "POWERITE" (\$495 Value) OR  
 Choose the ST65 for half price \$497.50 OR  
 Choose the ST66 for only \$895 (\$1395 Value)  
 Yours for only \$24 per week.



Buy the SC61 Waveform Analyzer for ..... \$3295  
 And the LC77 AUTO-Z for ..... \$1895  
 Total Investment ..... \$5190

Receive A DVM56A "MICRORANGER" FREE (\$995 Value)  
 Yours for only \$36 per week.

Call 1-800-843-3338 To Reserve Your Special Package Deal!



**For The First Time Ever . . . Test To Full  
FCC Specifications In Half The Time Plus  
Test Your Signal Quality As Well!  
Dynamic 4 MHz Monitor Isolates System  
Troubles Instantly With No Interpretation!**



Buy the FS74 CHANNELIZER SR. for . . . . . \$3495

Receive FREE  
(2) BY242 Batteries (\$88 Value)  
CC244 Deluxe Carrying Case (\$148 Value)  
HF247 Headphone Accessory (\$9.95 Value)  
Yours for only \$24 per week.

**Discover The First Fully Automatic Signal  
Level Analyzer Guaranteed To Cut Your  
System Analyzing Time In Half!**



Buy the FS73 CHANNELIZER JR. for . . . . . \$2395

Receive FREE  
(2) BY242 Batteries (\$88 Value)  
CC243 Deluxe Carrying Case (\$148 Value)  
Yours for only \$20 per week.

**Save Even More Cash On These Super  
Trade-In Offers!**

Cut Your Scope Time In Half, Plus Trade-In Any Scope Or  
Equivalent Piece Of Test Equipment And Save Up To \$300!

Buy the SC61 Waveform Analyzer for \$3295.00  
Receive up to \$300 credit for your old equipment!

Carry In Your New MTS Stereo TV Analyzing Capabilities To Cash  
In On Today's Fastest Growing Service Market! Plus, Trade-In  
Your Old Color-Bar Generator And Save Up To \$100!

Buy the ST66 Portable MTS TV Analyzer for \$1395.00  
Receive up to \$100 credit for your old color-bar generator!

Restore Your Confidence In CRT Testing And Restoration With The  
Only True Dynamic Tester On The Market That's Guaranteed To  
Restore Your Profits In TV Servicing! Plus, Trade-In Your Old CRT  
Tester And Save Up To \$200!

Buy the CR70 "BEAM BUILDER" for \$1295.00  
Receive up to \$200 credit for your old CRT tester!

**Plus Save Even More On These Packages!**

Cash In On Today's Expanding Communications Field With The  
First Truly Portable FCC Accurate 1 GHz Counter With Instant  
.5 ppm Accuracy And 9 Hour Portability That You Just Have To  
See To Believe!

Buy the FC71 Frequency Counter for \$1295.00  
Receive FREE: AN210 Antenna (\$25.00 Value)  
BY234 Battery Pack (\$59.95 Value)  
CC238 Carrying Case (\$49.95 Value)

Possess The Power Of Portability To Troubleshoot In Those Hard-  
To-Get Places With The All New LC76 PORTA-Z!

Buy the LC76 PORTA-Z for only \$1395.00  
Receive FREE: CC254 Carrying Case (\$99 Value)

**Discover The Ultimate In Automatic LCR  
Testing! The LC77 Dynamically And  
Instantly Tests To EIA Standards To Get  
You Out Of Trouble Fast!**



Buy the LC77 AUTO-Z Meter . . . . . \$1895

Receive FREE  
SCR250 SCR & Triac Tester (\$168 Value)  
BY234 Power Pack (\$59.95 Value)  
Yours for only \$19 per week.



# Announcing Sencore's Ultimate Success Servicing Center . . . It's The Standard By Which Other Shops Are Judged.

Open Up To Save  
Big On Our Fall Specials



Sencore's Ultimate Success Servicing Center - \$16,340

For those who demand excellence, Sencore is proud to unveil to you this all new Success Servicing Center. It caters to the discriminating few who have come to expect excellence and demand just a bit more from their investments. It is the latest in video servicing technology that will allow you to master the possibilities and capture the market with unlimited servicing potential.

- Here's The Ultimate Success Servicing Center:**
- SC61 Waveform Analyzer
  - VA62 Video Analyzer
  - VC63 VCR Test Accessory
  - NT64 NTSC Pattern Generator
  - LC77 AUTO-Z Meter
  - CR70 "BEAM BUILDER"
  - ST66 Stereo TV Analyzer
  - SR68 Stereo TV Readout
  - DVM56A "MICRORANGER" Bench DVM
  - DVM37 Portable 3 1/2 digital DVM
  - PR57 "POWERITE"
  - TF46 Super Cricket

**Accessories Round Out This Magnificent Package:**

- HP200 50 kV High Voltage Probe for your DVM56A
- DBA220 100 Microvolt Low Level Audio Amplifier
- FC221 Field Calibrator for your LC77
- CS233 20 Amp AC/DC Current Shunt
- TP225 Two "Sure Hold" Adapters
- DP226 Direct 1:1 Probe for your SC61 Waveform Analyzer
- PC227 Protective Cover for your SC61
- NP229 Two Needle Point Adapters for your SC61
- PC230 Protective Cover for your VA62
- EX231 Expander Jack for your VA62 Video Analyzer
- BY234 (3) Battery Packs for your ST66, SR68 & LC77
- SCR250 Dynamic SCR/Triac Test Accessory for your LC77
- CC254 Custom Carrying Case for your LC77
- 39G85 In-Circuit Test Accessory for your TF46

When you invest in your future with this package, you'll receive a FREE \$3495 FS74 CHANNELIZER SR.! That's right! When you invest in the Ultimate Success Servicing Center, you get the ultimate field service tester that instantly locates any antenna cable or RF distribution problem in one-half the time! It's a customer convincer!

Best of all, this amazing package can be yours for only \$99 a week! That's right! Only \$2.50 an hour to at least double the productivity of your technicians! If you're contemplating hiring another technician this year, consider this: For a qualified, top technician, you pay at least \$12-\$15 per hour, that's without benefits! Wouldn't it be smarter to double your present

technician's efficiency to clear up that "back log" and to continue to produce at that level to maximize your profits?

Well, the Ultimate Success Servicing Center is guaranteed to do just that, without coffee breaks or vacations. And if this tried and proven system doesn't at least cut your technician's servicing time in half, we'll take it back, no questions asked.

We stand behind this Success Center with Sencore's exclusive 30 Day money back guarantee. You can't lose! So, call us today at 1-800-843-3338 and reserve a successful future for you and your business.

Call WATS Free 1-800-843-3338