

# SENCORE NEWS

FEATURING

RC167 "THE SUBSTITUTOR"

3200 SENCORE DRIVE, SIOUX FALLS, SOUTH DAKOTA 57107

HOW TO WITH INSTRUMENTS THRU *PIX FACTS*

*World's Largest Technical Publication — 500,000 Per Month*

WRITTEN BY  
SENCORE FIELD ENGINEERS  
FEBRUARY, 1973

SAVE TIME AND YOUR LEGS WITH

# RC167

# "The Substitutor"

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**\$90.00**

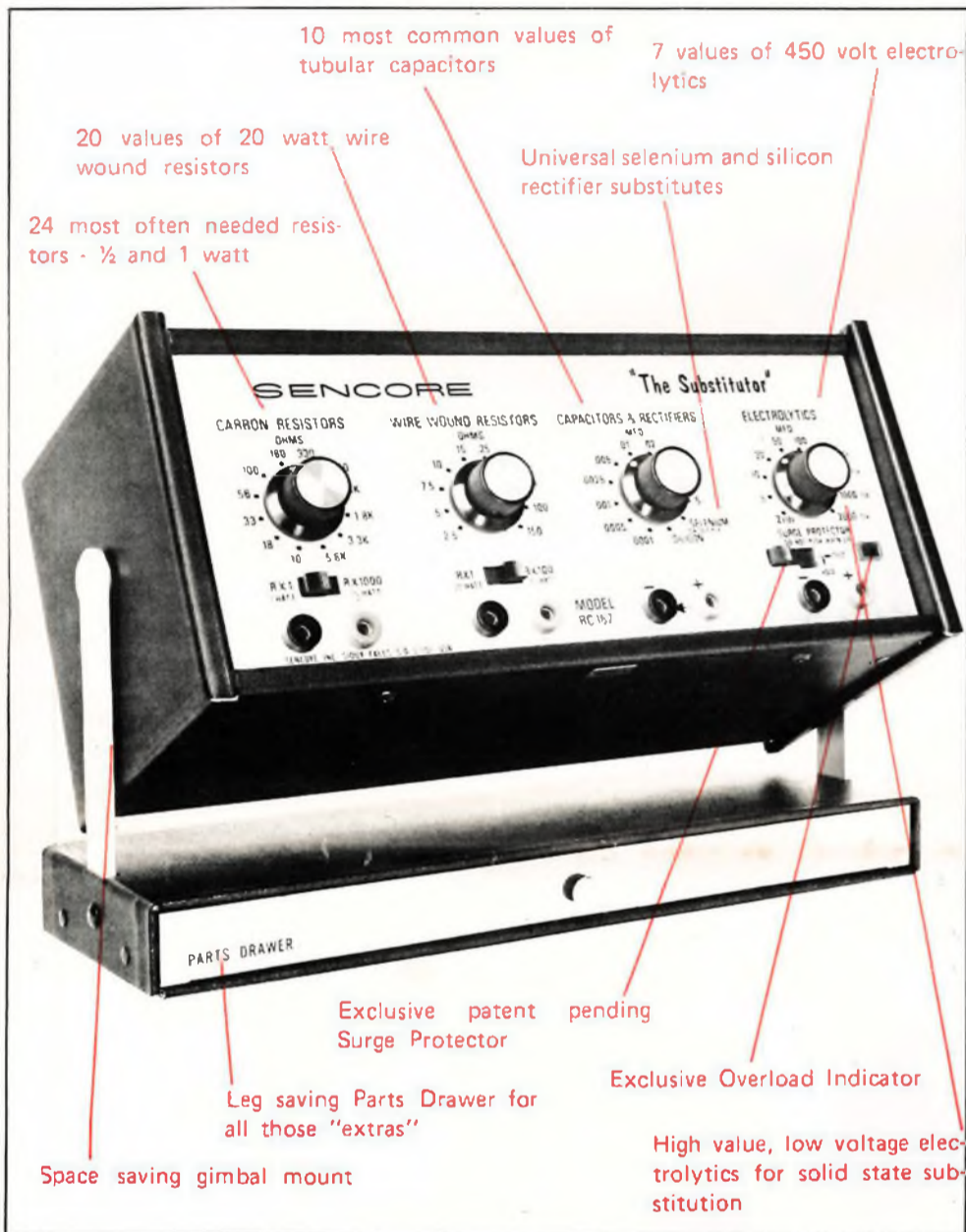
The RC167 "Substitutor" is your leg saver



# RC167 "The Substitutor"

How often we find ourselves in the middle of troubleshooting a television receiver or a stereo, really homing in on the problem, then find it necessary to break up our line of thinking to run to the parts stock to get a part for substitution. This running after parts takes valuable time, and puts us in a position of getting our thinking back in line after getting the part. Think how much easier and faster the job could be done if we were able to eliminate the unnecessary interruption, not to mention the wear and tear we would save ourselves.

The Sencore RC167 "The Substitutor" is your answer. Parts substitution is one of the simplest, most basic forms of troubleshooting and The Substitutor puts all the substitute parts right at your fingertips. No more running back and



forth to the stock room to find the part you need; just twist a dial and you're all set. The RC167 is a real leg saver! It is the type of problem solver that can give you additional troubleshooting time every day, and pay for itself many times over.

The Substitutor is packed with valuable features to make your job a little easier and a lot faster. Sencore's exclusive Surge Protector, with patent applied for, will put an end to the often misleading results you can get when substituting electrolytics. Another Sencore exclusive, the Overload Indicator, makes it possible for the first time to safely substitute those high value, low voltage electrolytics found in solid state equipment. And then there's the Parts Drawer. You can now keep a stock of the most commonly used replacement parts right on your bench, where they belong. The Substitutor won't eat up your valuable bench space either. A space saving gimbal mount is provided so you can use it as a stand-up bench unit, or mount it on the wall or shelf of the bench - always handy when you need it, yet out of the way. Add these all together and you have a real leg-saver, and at a bargain price.

## Specifications

### CARBON RESISTORS

|                        |  |
|------------------------|--|
| 1 Watt, 10% (RX1)      | 10, 18, 33, 56, 100, 180, 330, 560, 1K, 1.8K, 3.3K, 5.6K                 |
| 1/2 Watt, 10% (RX1000) | 10K, 18K, 33K, 56K, 100K, 180K, 330K, 560K, 1Meg, 1.8Meg, 3.3Meg, 5.6Meg |

### WIRE WOUND RESISTORS

20 Watt, 10% (RX1) 2.5, 5, 7.5, 10, 15, 25, 50, 75, 100, 150

20 Watt, 10% (RX100) 250, 500, 750, 1K, 1.5K, 2.5K, 5K, 7.5K, 10K, 15K

### TUBULAR CAPACITORS

600 Volt, 20% .0001, .0005, .001, .005, .0025, .01, .02, .05, .1, .5mfd

### RECTIFIERS

.5a 800PIV Selenium and Silicon

### ELECTROLYTIC CAPACITORS

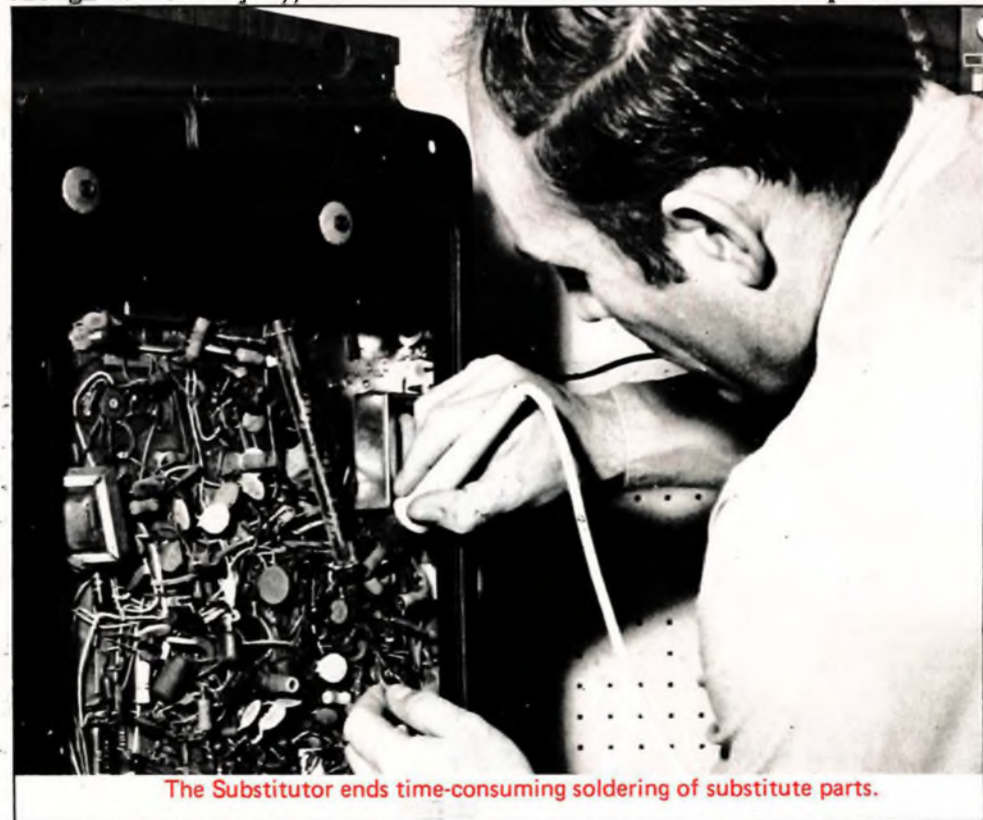
450 Volt (+100 -20%) 2, 5, 10, 20, 50, 100, 200mfd

75 Volt (+80 -20%) 500, 1,000, 2,000 (protected by overvoltage indicator.)

## What Do You Mean - Leg Saver?

"Leg Saver" is our way of pointing out the time and steps the RC167 can save you.

Whether you realize it or not, a good share of your time can be spent in running for parts instead of actual troubleshooting. A look at an example will help point out what we mean. You have a television receiver on the bench with low contrast. The signal input to the video amplifier is normal, but the output is low. The video amplifier tube has been substituted with no result. You decide that the trouble is an open cathode bypass capacitor, a likely culprit for this type of problem. You get up from the bench, walk over to your parts inventory, search out the correct value of capacitor (or one close enough to do the job), and return to the bench. You tack the part into the



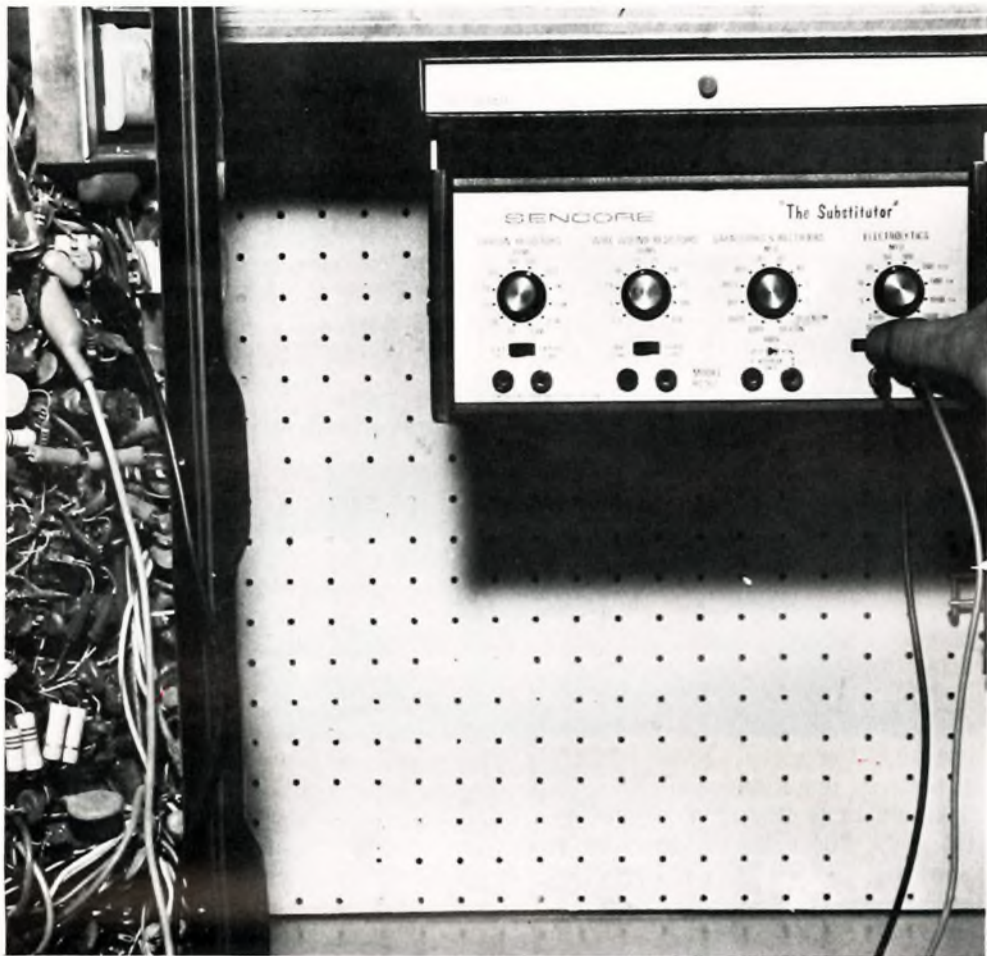
The Substitutor ends time-consuming soldering of substitute parts.

circuit across the original part and turn the set on. Same problem. That leaves only one other possibility, since the voltages were correct, the screen bypass capacitor. It's a much different value. Get up again, walk over to the parts stock, select the part needed, return to the bench and install it for test. Problem corrected. Now you can install permanently the correct value capacitor and wrap the set up. Before you are finished with the job, however, you must return to stock the part not used. Get up again, return the part to the correct place in your stock, and walk back to the bench. If you are part of a larger organization that requires requisitions from the stockroom to get the parts you need the problem of time and steps is compounded many times. Repeat this several times a day and you have chalked up a pretty good amount of travel and time lost.

The RC167 "The Substitutor" ends this running for parts. You have every common part available right on your bench for any substitution check. Just reach for "The Substitutor", dial the value needed and you're all set. It even makes the substitution easier than individual parts because you can make the connection without a soldering iron. Just connect the clip leads to the circuit and your test is made. The Substitutor will save you many miles on your legs and help you get more done too.



A run through the problem just mentioned, using the substitutor rather than individual parts, will show the steps saved. After tying the problem down to a component in the video amplifier, you simply dial the value of the capacitor needed for the cathode bypass. Clip the leads to the circuit, turn the set on, and the results are in! If it doesn't correct the situation, remove the leads, dial the value needed for the screen bypass and check again. Now the trouble has been isolated in much less time, and you haven't even moved from the



Troubleshooting by substitution is fast and simple with the RC167.

bench. Doing it the old-fashioned way we have two trips to the stockroom invested in the set by this time. We don't have any unused parts to take back either when we use the Substitutor. The only trip you have is the one to obtain the correct part for replacement purposes and you have the set repaired. This is certainly a lot easier on the legs than jumping up and running across the room everytime you need a substitute part. The RC167 "The Substitutor" is the greatest leg saver you can own.

### How Can The Leg Saver Pay For Itself?

The Leg Saver will pay for itself in time saved and the increased service efficiency it provides.

Let's look at the example we just used to show how it can really pay, far more than you would expect at first glance. We will first relate the trips to the stockroom on the basis of time, and the total time involved in the troubleshooting from the point of isolating the problem. If you must get up and find a substitute part each time you need one, you will find that you spend quite a bit of time away from the bench, essentially accomplishing nothing.

We will say, for the sake of some basis for discussion, that the parts stock is 15 feet from the bench. Each time you make the trip, search through even well marked parts inventory, return to the bench and make the part connections to the circuit, you have spent at least a couple of minutes to make each trip. In the case of our example, three trips to the stock room were made, two for parts and one to take an unused part back. This adds up to six minutes for just one job. Multiply this by the number of sets worked on during a day, lets say just 8--one an hour, and you have spent 48 minutes just going after parts in one day! In a week you have wasted over 4 hours time. Equating this to actual dollars and cents, based on a technicians wage of only 4.00 per hour, running after parts has cost you \$16.00 for that week. You can pay for the RC167 "The Substitutor" in less than six weeks. That's right, in less than six weeks you will save enough time to pay for the substitutor. Doesn't it make good profit sense to have a stock of substitute parts on every bench to end this costly parts chasing? We think it does, and the Sencore RC167 Leg Saver is your dollar saver the minute you put it to use in your shop.

### What's That Parts Drawer For?

The Parts Drawer allows you to keep additional replacement or substitution parts handy at all times.

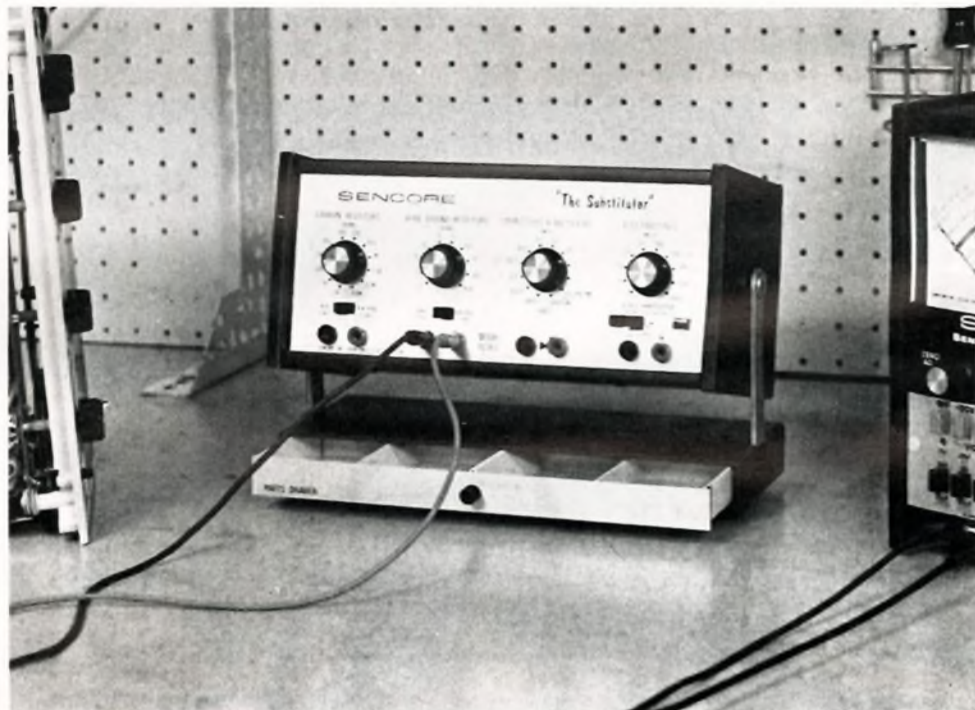
The RC167 contains 66 of the most often needed substitution items. Each of us has the need from time to time for some other part for substitution. The parts drawer gives you a convenient, out of the way place to keep these parts so you have them at arms reach whenever you need them. You may also want to keep a small stock of some common failure items in the drawer to save that

trip to the stockroom to get it. To be a complete leg saver, the Parts Drawer has been included to house these other handy items that we all seem to need. Just another Sencore feature to help save your legs.

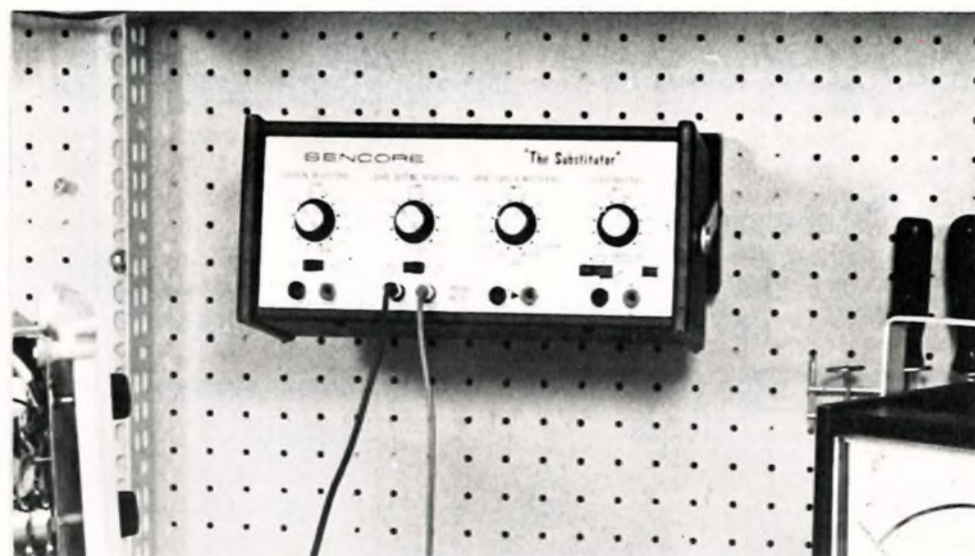
### Why The Gimbal Mount?

The gimbal mount is the space saving feature of The Substitutor, permitting you to use it sitting on the bench or mounted on the wall or shelf out of the way. The typical shop workbench can end up looking like a national disaster area when you are working on a set. You have the set, your meter, scope, tools, soldering iron and other items on the bench so they are handy to you. This leaves very little room on the bench for anything else. If you wish to add another item of equipment to that which you already have on the bench, you have to move something aside to make room. If you keep adding equipment, before long you don't have any room left for the set.

The gimbal mount of the RC167 gives you a full choice of placement of the RC167 so it is always handy to use. It can sit on the bench as a bench unit if you desire.



It can be mounted on the wall beside the bench so it is nearby if needed, yet not taking up any of that valuable bench space.



You can mount it under the equipment shelf on the bench, and still make use of the handy parts drawer.





The RC167 is completely versatile; you can put it wherever it is handy, either free-standing or mounted. Features like the space-saving gimbal mount are just a part of the quality you expect from Sencore, the All American Line of quality test equipment.

## Why The Surge Protector?

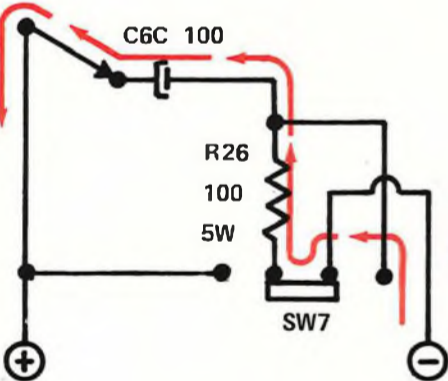
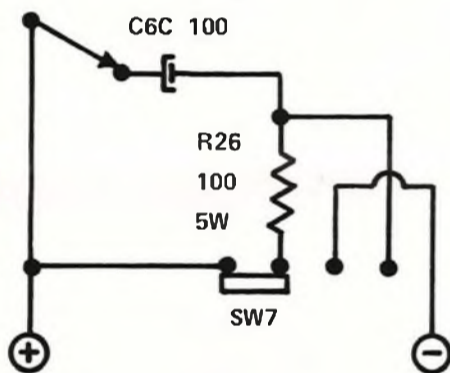
The Surge Protector is included to prevent the arcing or heating of electrolytics which so often occurs when making substitutions with these parts.

The RC167, like its caddy counterpart, the RC24, includes electrolytics for in-circuit substitution during troubleshooting. The only real problem that you can encounter when substituting electrolytics is caused by the large current surge which occurs when the substitute electrolytic charges. This surge current is large enough to cause a large arc when the electrolytic is connected to a 'live' circuit.

This arc presents a hazard to the technician, not because he will experience an electrical shock, but because of the startling effect of the arc and loud snap. The leads may be shifted to another point of low potential by the reaction, causing circuit damage and greater problems than you started with. In addition, the sudden surge of current can temporarily heal a defective electrolytic in circuit. This you have probably experienced before. You make the connection across an electrolytic trying to chase down a hum problem. As soon as you make your connection, the hum disappears. You decide that the capacitor you were substituting is the bad one. You remove the leads of the substitute and no hum. Now what has happened? The problem seems to have cured itself. What has taken place is that the high current surge caused by the charge of the substitute capacitor has temporarily healed, or welded, the defective electrolytic. The big question now is which one was healed. It could be any electrolytic affected by the current surge, including the one you were connected across. You are to a point of guessing which part is bad or waiting for the trouble to reoccur, which may take days. Again you have a greater problem after making the substitution than when you started.

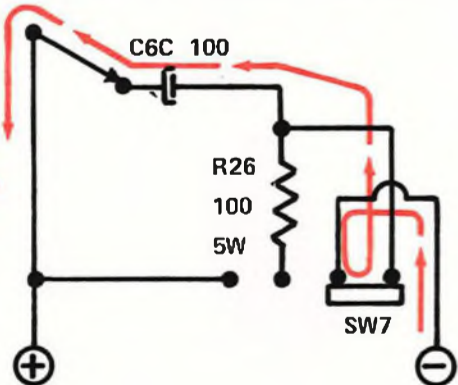
The Surge Protector prevents these situations from happening. The patent pending Surge Protector employed in Sencore substitutors places a surge limiting resistor in series with the electrolytic being used as a substitute to eliminate the damaging surge of current. After the capacitor has been charged, the resistor is removed from the circuit to prevent interference with the test. The Surge Protector functions as follows:

First, lead connections are made to the circuit after the substitute value of electrolytic has been selected. The substitute part is not connected at this time since the Surge Protector is holding the circuit open.

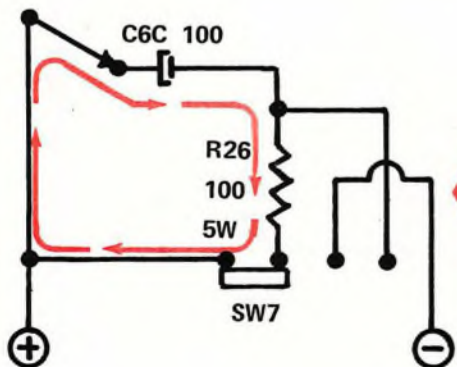


Second, the Surge Protector switch is moved toward the Test position. This connects the electrolytic to the circuit with a surge limiting resistor value in series with it. This holds the charging current to a level safe for the circuit, preventing heating of any defective electrolytics.

Next, the resistor is removed from the circuit when the Surge Protector switch is moved fully to the TEST position. The removal of the series resistor prevents its presence from altering the results of the test.



Finally, as a safety measure for for both you and the equipment you are working with, the electrolytic is automatically discharged when the Surge Protector is returned to its normal position. Return to the normal position is aided by a spring returned switch assuring full discharge of the electrolytic.



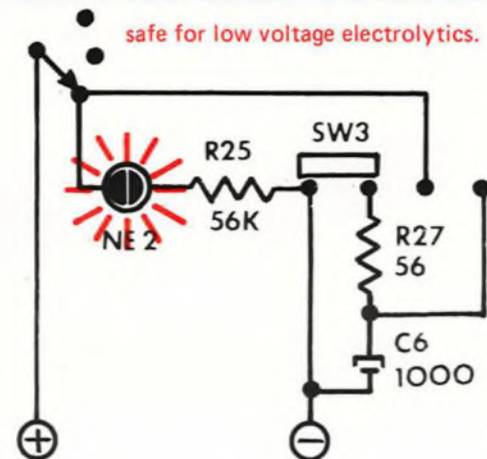
## What's The Overload Indicator For?

The Overload Indicator is an exclusive Sencore feature to help prevent accidental overload of the low voltage electrolytics.

High value, low voltage electrolytics have never been included in a substitution unit before because of the possibility of component and circuit damage resulting from accidental overloads. If the low voltage electrolytics are connected directly to a point of high B+ voltage, they can possibly explode, causing serious injury to the technician. Further, the overload can cause circuit damage even if the electrolytic is not destroyed. Excessive currents can be caused by the low voltage electrolytic failing, giving rise to more serious damage to the circuit it is connected to.

The Overload Indicator is used to warn you if the voltage present, at the point to which you have the leads connected, exceeds the voltage rating of the capacitor. The red light tells you to "Stop, recheck your connections before you push the Surge Protector switch." This safety feature greatly reduces the possibility of damage to the low voltage electrolytics and to the circuit by giving you a red alert signal.

The Overload Indicator is connected directly across the test leads for each of the three low voltage electrolytic positions of the ELECTROLYTICS selector switch. The circuit is set to fire the neon lamp anytime the voltage present across the leads exceeds the 75 volt rating of the capacitor. (We might note that we have included an additional safety factor by using 100 volt electrolytics in The Substitutor). Safety First is an important consideration when working with electronics and Sencore builds in the safety features needed to keep you and your equipment safe.

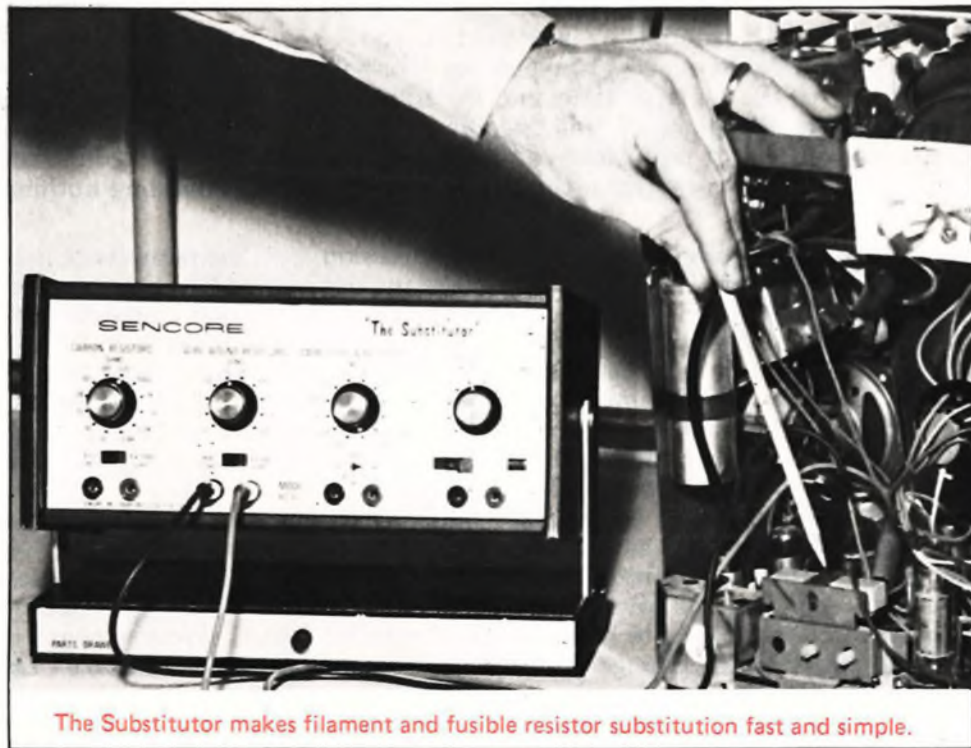


## Why The Power Resistors?

The power resistors make the RC167 complete for any substitution need you may have.

You can probably think of hundreds of different applications for carbon resistors, capacitors and electrolytics which are common in every type of circuit. The power resistors are used less, but are still an important part of the substitutor. Think along with us for a moment and let's see where we might be able to use these parts.

The first thing that comes to mind is the fusible resistors and filament dropping resistors in sets. These things have a habit of failing, often for no good reason. If resistance checks show no shorts, and none of the tubes are shorted, just connect one of the power resistors from the RC167 and power up. This gives you a quick check on performance before installing that new part. If a trou-

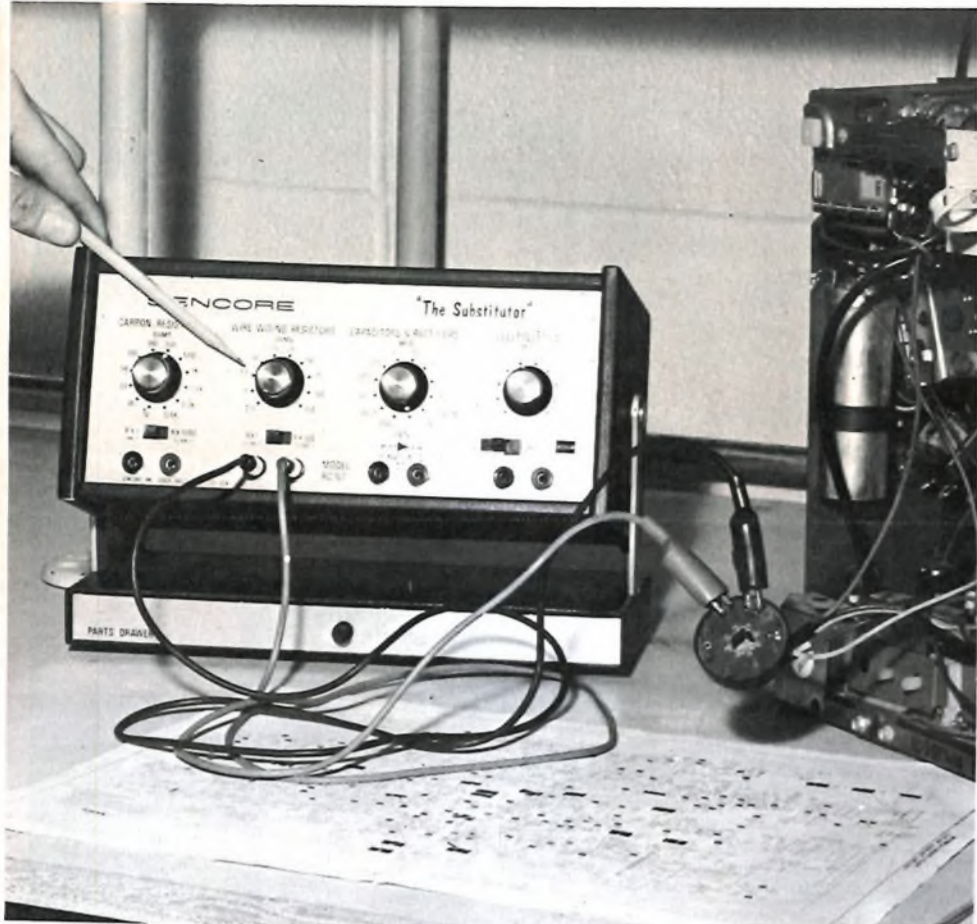


The Substitutor makes filament and fusible resistor substitution fast and simple.

ble still exists, you need not worry about damaging the substitute resistor. The resistors are rated at 20 watts continuous, and will withstand overloads up to 40 watts for a short period of time. This high rating can really come in handy if you have overlooked something.

Another area where a substitute power resistor can often come in handy is when working on a series receiver. Often it is easiest to get to if the chassis is removed from the cabinet. This leaves the filament string open because the picture tube is still in the cabinet. No problem if you have the RC167, just dial the correct value resistor, connect the leads and the set is going. If you

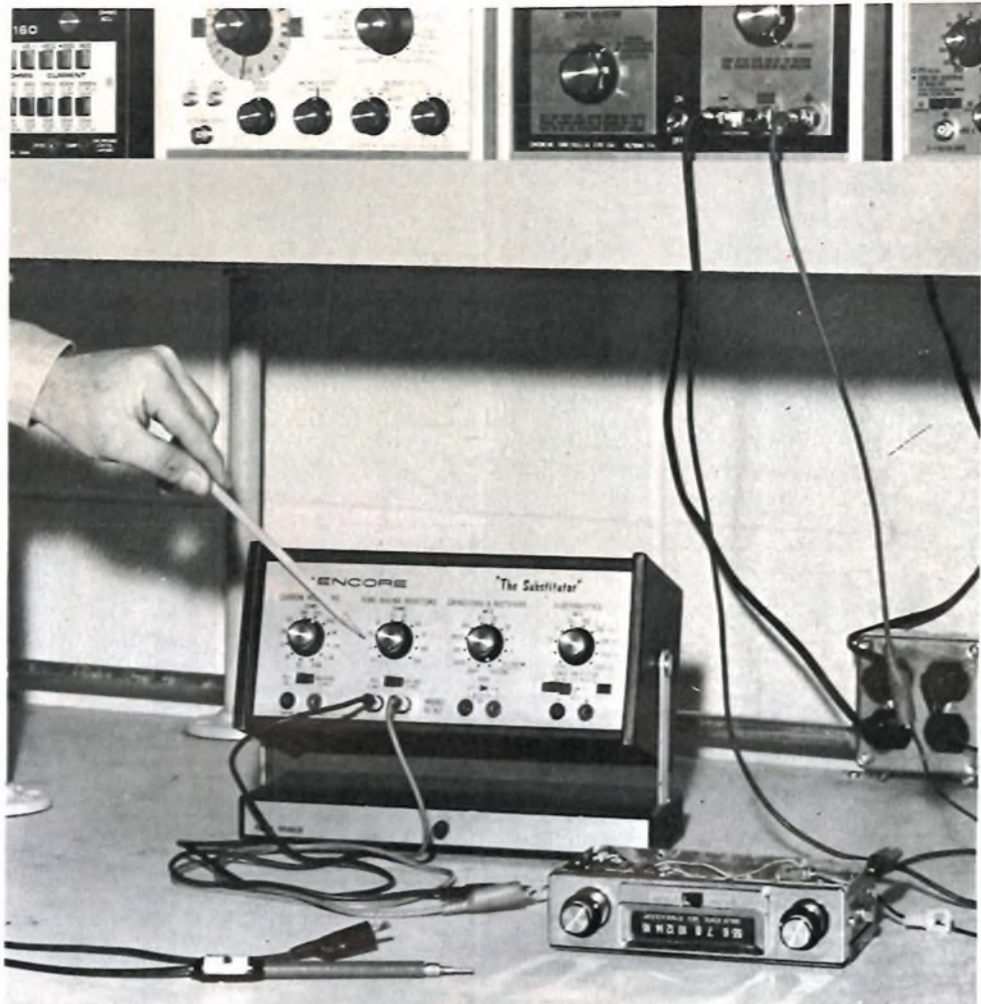




Power resistors replace filaments in series receivers.

are concerned about the value you need, a fast way of determining this is to multiply the filament voltage of the tube by two and use the value of resistor that is the closest.

How about amplifiers? They are always howling and squawking while you are trying to troubleshoot them. Get rid of that obnoxious and unnecessary noise with the RC167. Simply connect the power resistor equal to the impedance of the speaker to the output and the noise is gone. You can be more relaxed, work faster, and not worry about the amplifier "heading south" because there is no load.



Speaker replacement with the RC167 quiets the shop.

There are many, many other ways you can put the power resistor section of the RC167 to work to make your job easier. Just like all the other components of the RC167, they are sure handy to have around. The RC167 "The Substitutor" can really help you save your legs and keep up with your work. It is a mighty big item for you at a mighty small price. Your favorite distributor has them in stock now, so why not pick one up the next time you're there. We think you'll be glad you did.

# COMMENTS FROM OUR READERS

## Wilkes-Barre Area Vocational-Technical School

P. O. BOX 1699 NORTH END STATION  
JUMPER ROAD, R. D. 2, PLAINS TOWNSHIP  
WILKES-BARRE, PENNSYLVANIA 18702

PHONE 717 822-4131



1723 West 7th St., Des Moines, Iowa 50302

SENCORE  
3200 SENCORE DRIVE,  
SIOUX FALLS, SOUTH DAKOTA.....57107

Dec/6/72

RECEIVED  
DEC 11  
SENCORE, INC.

Gentlemen:

Would you please send us the "Set-up" for the following tubes:

We have a TC 162 Mighty Mite VII.

And speaking of this Mighty Mite, it may be of interest to you that we have compared it to a rather expensive set costing several times as much.....and believe it or not, the Mighty Mite showed up defective tubes that the big expensive job didn't ferret out. This performance is invaluable when working with transmitters & receivers that operate in the 200 -300 Mega Herz range; for as you know, if a tube is just a wee bit "hay-wire" in those ranges, the performance of the set is "kaput".

Thanks for building a portable tester that can be used in the field and is reliable.

Yours truly,  
*Robert A. Simons*  
Robert A. Simons  
Allied Door Co.

RECEIVED  
DEC 8 1972  
SENCORE, INC.

5 December 1972

The President  
Sencore Manufacturing Company  
3200 Sencore Drive  
Sioux Falls, S. Dakota 57101

Dear Sir:

I would like to congratulate you on the quality of your instruments. More power to you for having the ZERO DEFECTS program.

We have just opened up our new Vocational School and have purchased \$80,000 worth of electronic equipment. The number of defective pieces from other companies was appalling. Every Sencore piece was flawless. Thanks.

We will undoubtedly be ordering more and would appreciate two copies of your complete catalog.

Sincerely,  
*Asa N. Casterlin*  
Asa N. Casterlin, Electronics Instructor  
Wilkes-Barre Area Vocational-Technical School  
P.O. Box 1699 North End Station  
Wilkes-Barre, Pa. 18702

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Norm Pedersen, Editor



## Sencore Product News

Sencore News is a technical publication. We seldom run news items. Every word is devoted to that technical understanding that makes your job easier. But, once in awhile, we like to tell you what is new at Sencore and how we are working so hard to make Sencore products better, more timely and more reliable. We will tell you the story as it is. You decide.

All manufacturing is done in one large modern air conditioned, dust proof factory on the northwest corner of Sioux Falls, South Dakota. If you are looking at a map, or want to stop in and see us this summer as you are visiting the new Earth Resources Observation Satellite Space Center, or going to the

Black Hills for vacation, we are at the intersection of Interstate 90 and Interstate 29. Now, don't get mixed up, we are much closer to Omaha Nebraska than we are to Fargo, North Dakota. Come see us this summer and we will give you the cooks tour of our brand new factory and show you how all these new things happened and where they happened. Just ask for Norm Pedersen. That's me. If you are a hunter, pheasants are good and I love to hunt them. You have an invitation.

Now let's see what's new.

### Sencore Receives Patent On CRT Tester Main Feature

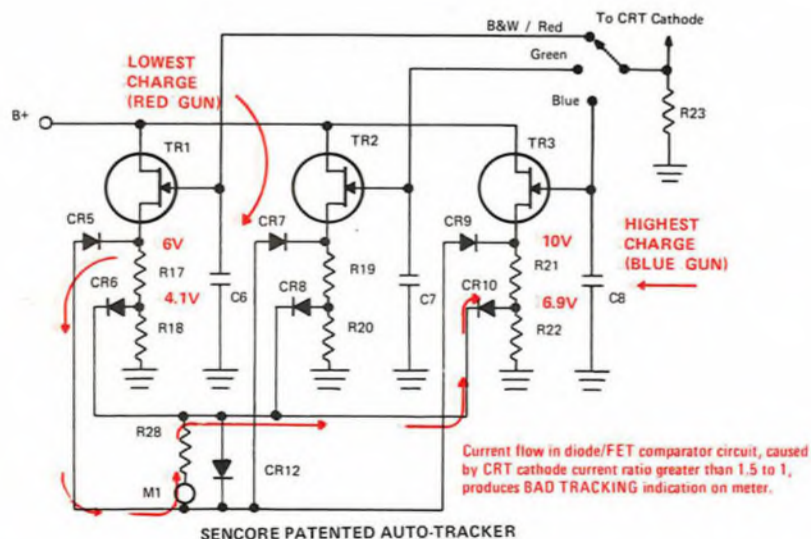
Sencore's CR161 Auto Tracker has had the words "patent applied for" on it since inception. The patent has come through and been issued by the U.S. Patent Office; number 3,688,184. Mr. Bowden, company president said, "This is the kind of basic patent that Sencore is seeking, to be sure that Sencore is the only company that has an automatic gun tracking test. Not only that, but this enables Sencore to own the patent rights to the basic circuitry that permits the service technician to check black and white, tri-color tubes and the single gun trinitron with the same basic test."

This is a real first as color tracking is now being emphasized over every other CRT test. It is the test that serves as a criteria to determine whether an expensive color CRT is accepted or rejected by the color TV tube manufacturers. That is important, as no one wants to get a hundred fifty dollar color CRT back that they thought was bad, when it wasn't.

Mr. Bowden further explained the color gun tracking to us. He said that tracking is really the ability for a color CRT to stay white from the bottom of

the brightness control to the top. The cathode currents must stay within a 1.5 ratio of each other, after setting up the G2 controls in the TV set (or in the Sencore CRT testers). This can be tested by setting the G2 controls and then checking current while logging it on a paper to be sure that this 1.5 to 1 ratio stays. This is very time consuming, does not make you look very professional to the customer, and often results in error from a simple math mistake.

Other forms of comparison methods, as used by competition and older Sencore CRT testers, are to readjust the meters so they compensate and then compare on the meter. Once again, there is a chance of error and it is time consuming. The patented circuit shown here is rather unique to say the least.



It is a computer type memory bank that reads out the ratio between charged capacitors through a diode comparison circuit and automatically reads on the meter if the difference is great enough to overcome the 1.5 threshold. The meter will simply read good or bad. The user just pushes the button.

This exclusive feature compares a tri-color tube and a trinitron in the same manner. Therefore, it makes these tubes look alike, as they test like three guns each. The black and white tube is simply tested as a single red tube. This means that one simple procedure works for all tubes. Competitive CRT testers and Sencore's older testers use different procedures for different tubes. The new patented feature means that only Sencore will have the simplest and most accurate test method on the market. Sencore's Big Mack CRT Tester that is being announced next month will have these patented circuits too. Be sure to see Big Mack; it is really something.



Bob Baum, Senior Engineer and Herb Bowden, President exhibit their satisfaction over latest Sencore patent.



# SENCORE

THE ONLY COMPLETE TEST EQUIPMENT LINE THAT IS  
**ALL AMERICAN MADE**

CHOOSE FROM SENCORE'S 21 MOST POPULAR INSTRUMENTS

## POWER SUPPLY



### Universal Power Supply

A SINGLE INSTRUMENT TO EQUIP YOU FOR MODULE SERVICING

**UPS164 \$240.00**

- 0 - 15 and 0 - 30 VOLT VARIABLE OUTPUT to power any experimental circuit or operate TV modules for service.
- HIGH FILTERING ASSURES VIRTUALLY DC OUTPUT. A must when powering solid state and integrated circuit units.
- FULLY ADJUSTABLE CURRENT LIMITING up to 2 amps to protect the circuit being powered and the supply.
- DUAL D'ARSONVAL OUTPUT METERS constantly monitor load current and output voltage. Gives you load condition at a glance.
- FILTERED 6 and 12 VOLT HIGH CURRENT OUTPUTS give you hum-free operation of car radios, tape players and other units requiring high power.

## STEREO ANALYZER

### AM-FM-Stereo Analyzer

**SG165 \$400.00**

THE ONLY INSTRUMENT THAT PRODUCES ALL 12 SIGNALS YOU NEED FOR COMPLETE STEREO SERVICING



- AM and FM RF OUTPUT variable over full range of both FM and AM broadcast frequencies for complete RF troubleshooting.
- AM and FM IF OUTPUT, modulated or unmodulated for any alignment or troubleshooting need.
- FM IF SWEEP and MARKER GENERATOR to do the complete job.
- COMPLETE STEREO GENERATOR with MPX output available on both FM RF and IF, plus composite stereo output without carrier for direct injection. High level outputs provided for IHF tests.
- AUDIO GENERATOR producing 400Hz sine and square wave signals for amplifier troubleshooting.
- SEPARATION METERS and SPEAKER SUBSTITUTE — Meters tell at a glance the operation of the MPX decoder. High wattage dummy speaker loads eliminate that annoying howl in the shop.

## TRANSISTOR TESTER



### Automatic Transistor Analyzer

**TF166 \$190.00**

TESTS OVER 20,000 TRANSISTORS - IN CIRCUIT, AUTOMATICALLY, IN SECONDS WITHOUT A REFERENCE BOOK.

- DYNAMIC IN-CIRCUIT AC TESTS for both transistors and FET's. No need to waste time removing components or risking transistor damage from soldering iron heat.
- AUTOMATIC OPERATION — The push of a button sets all test conditions automatically. Ends guesswork and the need for reference books or transistor data sheets.
- FULL PUSHBUTTON OPERATION for the fastest, easiest transistor testing ever.
- EASY TO INTERPRET GOOD - ? - BAD SCALE — Tells you transistor condition at a glance. Calibrated Beta and Gm scales too.
- DC OUT OF CIRCUIT TEST for 100% testing capability. Only the Sencore TF166 gives you both AC and DC tests for fast problem solving.
- LEAKAGE TESTS for transistors (Icbo) and FET's (Icss) with direct read-out in microamps of leakage current.
- ZERO BIAS Idss TEST FOR FET's — A must for matching FET's in cascode circuits and industrial applications.
- SAFE, LOW LEVEL TESTS — Patent pending circuits give sensitive, accurate test without any chance for transistor or circuit damage.

## SUBSTITUTORS

### Parts Pak

KEEP YOUR CADDY CLEAN AND HAVE ALL THE 'ON CALL' SUBSTITUTION PARTS YOU NEED

- 24 VALUES OF RESISTORS from 10 ohms to 5.6 megohms in 1/2 and 1 watt.
- 9 VALUES OF CAPACITORS from 100pf to .5mfd at 500 volts.
- 3 ELECTROLYTICS: 10 & 100mfd at 450 volts, 1000mfd at 50 volts.
- LEAD STORAGE COMPARTMENT to prevent lost or tangled leads.



SMALL AND LIGHTWEIGHT

**RC24 \$38.00**

### "The Substitutor"



**RC167 \$90.00**

SAVE TIME AND YOUR LEGS — PUT A FULL RANGE OF SUBSTITUTION PARTS AT YOUR FINGERTIPS

- 24 VALUES OF RESISTORS from 10 ohms to 5.6 megohms in 1/2 and 1 watt.
- 10 CAPACITORS- 100pf to .5mfd-600V
- 7 ELECTROLYTICS from 2 to 200mfd at 450 volts
- 3 LOW VOLTAGE ELECTROLYTICS: 500, 1000 and 2000mfd at 75 volts.
- POWER RESISTORS from 2.5 ohms to 150K at 20 watts.
- UNIVERSAL selenium and silicon rectifier substitutes.
- NEW OVERLOAD INDICATOR to prevent accidental overload of low voltage electrolytics PLUS surge protection.
- SPACE-SAVING GIMBAL MOUNT Set on the bench or hang on the wall.
- EXCLUSIVE PARTS DRAWER to keep those little extras handy and save legs.



FAST REPLACING OLD FASHIONED VTVMs AND VOMs



## SENCORE FE METERS

Sencore pioneered the idea of using Field Effect Transistors to provide a high impedance, stable and reliable replacement for the troublesome and easily damaged VOMs and VTVMs. Many changes and improvements have been added since the first Sencore FE Multimeter was introduced. The newest FE meters are shown here. Each of these instruments has the same, high 15 megohm input impedance on DC which provides minimum circuit loading. The stability and accuracy of these instruments makes troubleshooting a pleasure rather than a task.

### FE23 *Little Henry*



FIELD EFFECT  
MULTIMETER  
\$85.00



THE TOUGHEST LITTLE METER IN THE WHOLE WIDE WORLD . . . WITH 1.5% FET ACCURACY AND PUSHBUTTON EASE OF OPERATION.

FULLY PROTECTED to 500 times overload

MINIMUM CIRCUIT LOADING with 15 megohm DC input impedance

AUTOMATIC SHUTOFF to prevent battery run-down

COMPARTMENT FOR STORING LEADS has snap action cover to prevent loss of leads

ILLUMINATED meter is fully protected with exclusive sliding cover

SIMPLE PUSHBUTTON OPERATION

1.5% DC ACCURACY - 3% AC



FE16  
\$95.00

Lab Accuracy  
1.5% DC  
3% AC

ACCURATE  
RUGGED

LESS CIRCUIT LOADING THAN VTVM. 15 megohms on DC, 10 megohms on AC.

INSTANT STABILITY. Zero warmup time . . . ready with the flip of a switch.

FULL METER PROTECTION to 100 times AC overload. No more damaged meters.

SPECIAL SHIELDED INPUT LEADS prevent stray pick-up and erroneous readings.

#### SPECIFICATIONS

14 DC Voltage ranges from 1 volt to 1000 volts full scale, 7 negative and 7 positive.

7 Zero Center ranges from .5 to 500 volts.

7 AC Voltage ranges from 1 to 1000 volts full scale.

5 DC current ranges from 100 microamps to 1 ampere full scale.

5 Resistance ranges from 1000 ohms to 100 megohms. 10 ohms center scale.

## TUBE TESTERS



TC162 \$115.00

**MIGHTY MITE - THE WORLD'S MOST POPULAR TUBE TESTER.**

NEW PIN ELIMINATION SWITCHES eliminate normal shorts caused by internal connections.

CHECKS MORE TUBES THAN EVER BEFORE. Pin elimination allows tubes to be tested which could not be checked before.

FULL RATED CATHODE EMISSION TEST.

100 MEGOHM GRID LEAKAGE TEST.

SENSITIVE STETHOSCOPIC SHORTS TEST.



MU150 \$270.00

**WORLD'S ONLY TUBE ANALYZER**

TRUE MUTUAL CONDUCTANCE TEST using a 500 Hertz square wave for true tube test.

TWO TESTERS IN ONE. The MU150 can be used to make the Mighty Mite tests as well as mutual conductance.

FULL RATED CATHODE EMISSION TEST.

100 MEGOHM GRID LEAKAGE TEST.

SENSITIVE STETHOSCOPIC SHORTS TEST.



CR161 \$150.00

**NEW CRT AUTO-TRACKER WITH COMPUTER MEMORY CIRCUITS.**

PATENTED PUSHBUTTON AUTOMATIC TRACKING TEST. Simply push a button to make the previously complicated tracking test.

COMPUTER MEMORY CIRCUITS store CRT information for the tracking test.

CHECKS BLACK AND WHITE TUBES using the same procedure as color.

TESTS TRINITRON TUBES the same as domestic tri-gun tubes. Only one procedure for all tubes, all made possible through computer memory.

FILAMENT VOLTAGE now precisely set on meter.



# MULTIMETERS

## HI-LO FIELD EFFECT MULTIMETERS — A New Concept in FE Meters

**NOW . . . MEASURE RESISTANCES IN CIRCUIT IN SOLID STATE DEVICES WITH THESE HI-LO FIELD EFFECT MULTIMETERS.**



**FE21**  
**\$115.00**

4½ INCH  
METER  
LAB OR  
BENCH



**FE20** **\$150.00**

with 30KV hi voltage probe

A  
SERVICEMAN'S  
DREAM



**FE160**  
**\$195.00**

PUSHBUTTON  
OPERATION  
with 7 inch meter  
112 RANGES  
AT YOUR  
FINGERTIPS

- **LOW POWER OHMS** using .08 volts to make in-circuit resistance measurements accurately. Allows you to use latest Howard Sams service information. Sams specifies it, only Sencore has it.
- **HIGH POWER OHMS** for routine resistance measurements and to check front-to-back ratios of diodes. Meters would not be complete with low power ohms only.
- **ONE-TENTH VOLT FULL SCALE** sensitivity on both AC and DC voltage. A must when servicing in solid state circuit with critical low voltage biases.
- **PROTECTED TO 1000 TIMES OVERLOAD.** A truly burnout proof multimeter. Tested in production with 1,000 volts on .1 volt range. Multimeter resistors protected by .6 amp fuse to save these valuable and expensive components. No more trips to factory when you accidentally measure volts on ohms range.

### SPECIFICATIONS FE20 and FE21

- 9 DC Voltage ranges from .1 to 1000 volts full scale
- 3 High Voltage ranges of 3, 10 and 30KV
- 9 DC Zero Center ranges from .05 to 500 volts
- 9 AC Voltage ranges from .1 to 1000 volts full scale
- 9 AC Peak-to-Peak ranges from .28 to 2800 volts
- 9 DC Current ranges from 100 microamps to 1 amp full scale
- 7 Hi Power ohms ranges from 1000 ohms to 1000 megohms
- 6 Lo Power ohms ranges from 1000 ohms to 100 megohms

### SPECIFICATIONS for FE160

- 10 DC Voltage ranges from .1 to 3000 volts full scale
- 10 DC Zero Center ranges from .05 to 1500 volts
- 9 AC Voltage ranges from .1 to 1000 volts
- 9 AC Peak-to-Peak ranges from .28 to 2800 volts
- 10 DC current ranges from 30 microamps to 30 amps full scale
- 10 DC current ranges from 30 microamps to 3 amps full scale
- 8 Hi Power ohms ranges from 600 ohms to 6000 megohms
- 7 Lo Power ohms ranges from 600 ohms to 600 megohms

# OSCILLOSCOPES

## Dual Purpose Oscilloscope Vectorscope

THE FIRST REALLY COMPLETE SERVICE SCOPE

- **WIDE BAND 10Hz** 5.2MHz  $\pm$  1DB
- **HIGH SENSITIVITY** 17mv rms per inch.
- **HIGH INPUT IMPEDANCE** — 27 megohms shunted by 11 pf low cap
- **SEVEN THOUSAND VOLT** input rating with low cap probe, not 600 volts like other scopes.
- **DIRECT VERTICAL PEAK TO PEAK VOLTAGE READING** with input controls calibrated directly in volts p-p.
- **CONVERTS TO PROFESSIONAL VECTORSCOPE** with the flip of a switch. A truly complete scope with this feature.
- **FULL RANGE HORIZONTAL SWEEP** frequencies from 5Hz to 500Hz in five overlapping ranges.
- **POSITIVE SYNC** with variable control locks complex waveforms with triggered ease.
- **EXTERNAL INPUTS** for sync, sweep, Z axis and direct connections to deflection plates.



**PS148** **\$275.00**



## All New Dual-Trace Triggered or Free Running Oscilloscope

DC OR AC  
COUPLED

**PS163** **\$650.00**  
WITH PROBES

**YOUR PRESTIGE BUILDER** — Your customers know you can service everything when you have the PS163. Simple to operate, too . . . just push the button and view the screen.

- **A SERVICE SCOPE:** AC coupled, free running, wide band scope to 8 MHz at 3 DB with direct peak to peak readout enables you to service fast with no interpretations.
- **A SERVICING WAVEFORM ANALYZER** for complex circuits. Dual trace and triggering action enables you to determine right on the nose whether or not two waveforms are appearing at the same time, and their amplitudes, in gated AGC, gated sync separators, burst amplifiers, color killers, etc.
- **A DESIGN SCOPE COSTING ONE FOURTH OF COMPETITORS!** 5 millivolt sensitivity, calibrated sweep speed, dual chopped and alternate displays, and other such specs means performance personified for the lab.
- **A VECTORSCOPE:** Right from the front with sensitivity to spare.



# SWEEP-MARKER GENERATORS

Speed Aligner **SM158** \$275.00

Deluxe Generator **SM152**



Sencore all solid-state sweep marker generators are constructed to provide the necessary signals for sweep alignment and troubleshooting. The SM158 and SM152 have these common specifications:

- **CRYSTAL CONTROLLED MARKERS** for alignment accuracy.
- **15 MEGAHERTZ SWEEP WIDTH** to cover the entire IF band.
- **SIMPLE HOOKUP** with just four cables, 2 to TV, 2 to scope.
- **ZERO BASE LINE** for reference when adjusting traps and positioning carrier markers.
- **POST INJECTION MARKERS** for distortion free response curves.



**\$450.00**

If it is speed and simplicity that you want, the all crystal controlled SM158 is your answer and at \$120.00 savings over competition.

- **PUSHBUTTON MARKERS** for the eight most often used IF frequencies: 39.75, 41.25, 41.67, 42.17, 42.67, 44.25, 45.75, and 47.25. Trap and carrier markers listed right on front panel for fast identification.
- **2 EXTRA RF CHANNELS** to assure interference-free response curves on RF - 4 RF channels in all.
- **HORIZONTAL MARKERS** available at the flip of a switch.

If it is completeness that you want, the SM152 is the most complete on the market.

- **RF SWEEP FOR ALL BANDS**, VHF, UHF, FM, IF, and Chroma.
- **CALIBRATED RF OUTPUT AND CALIBRATED SWEEP WIDTH.**
- **IF SPOT ALIGN BAND** for pre-alignment adjustments.
- **RF MARKERS** for channels 4, 5, 10 and 13.
- **FM SWEEP** with markers for FM Alignment.

# COLOR GENERATORS

Sencore Color Generators offer these all new outstanding features:

- **SMALLER LINES AND DOTS** for the most precise convergence ever.
- **PERMA-LOCK CIRCUITS** which match or out-perform the digitals.
- **"PAINTED PATTERNS"** so rock solid you'll think they are painted on the screen.
- **STANDARD PATTERNS** including RCA licensed color bars for every convergence need.

## Caddy Bar Jr.

- **"POCKET SIZED"** measuring a mere 2 x 4 x 6. (Size of two 5U4's)
- **PUSHBUTTON OPERATION** for ease of operation.
- **BUILT-IN PREHEATER** for cold days.
- **RETRACTABLE CORD.** No messy cords to untangle.
- **AUTOMATIC SHUTOFF** after 15 minutes if you forget. All electronic using computer memory circuit. No more run down batteries.

WORLD'S SMALLEST... BUT PERFORMS LIKE A GIANT!



**CG22** \$89.00

## Deluxe Color Bar Generator

COLOR KING III - THE BEST GENERATOR YOU CAN BUY.

- **SENCORE EXCLUSIVES.** Single dot and single cross, movable so they can be positioned anywhere on screen to simplify dynamic convergence.
- **SENCORE EXCLUSIVE.** Thermostatic temperature control to warm unit on cold days or to dry out moisture in humid areas.
- **GREATER LINE VOLTAGE** range means stable operation regardless of line potential.
- **HIGH STYLE** in two-toned vinyl clad steel attached case with mirror in cover.



**CG159** \$169.50

# TIME SAVING INSTRUMENTS

**FS134**  
\$250.00

## Field Strength Meter

LOWEST PRICED FIELD STRENGTH METER ON THE MARKET TODAY.

- **HIGHLY SENSITIVE** all the way down to 30 micro-volts.
- **STANDARD REFERENCE** of zero DBJ. 1000 microvolts into 75 ohms for CATV and MATV work.
- **COMPLETE COVERAGE** of all VHF, UHF, and FM bands.
- **ACCURATELY CALIBRATED** in microvolts for direct signal strength reading, 3 DB VHF and FM, 6 DB UHF.
- **COMPLETELY PORTABLE** to go where you need it without extension cords.
- **BOTH 75 AND 300 ohm** inputs.



## Power Monitor

THE MOST PRACTICAL SERVICE TOOL EVER DEvised.

- **AC VOLTMETER** from 65 to 135 volts. Calibrated at 115 volts for more accuracy than VOM.
- **AC AMMETER** up to 10 Amps. Check fuse and circuit breaker currents in a flash.
- **AC WATTMETER** up to 1150 watts. A real trouble shooter.
- **DC AMMETER** up to 10 Amps.
- **FUSE RESISTOR CHECKER** with special scales for each resistor.
- **MAKE ALL TESTS** with interrupted line cord or test leads.
- **FULLY PROTECTED** against shock hazard to appliance, instrument and operator.

**PM157**  
\$75.00





## Sencore Packaging Going Red White And Blue

Sencore is the only all American full line of test equipment and we push Yankee Know How. We work with domestic as well as foreign TV manufacturers and see them all. We believe that this is an advantage as we ship no TV receivers to Japan and they do not know the problems that we run into in this country with our domestic TV receivers. We think Sencore has the advantage in knowledge and refer to this as the old Yankee Know How.

Our design department has decided that the best way to tell all that Sencore is 100 percent American is to add red to the regular white and blue fields, on our display cartons. This is being done in a sophisticated manner by Tom Mitchell. Tom is the artist in the Sencore News department. Therefore,



Tom Mitchell, Sencore artist, putting finishing touches on new carton design.

he was selected to depict this American Heritage story to you in the best way that his brush can tell it. Tom, we hope that you come across just right. He is putting the finishing touches to the first red, white, and blue box on the all new SG165 AM-FM Stereo Analyzer.

## Sencore Announces Five Year Rust Proof Guarantee

Production Manager Jim Ahrendt holds up the first instrument that is being shipped with Sencore's new five year guarantee against any and all rust.



Jim Ahrendt, Production Manager, shows case design using rust-proof materials.

This is just one more step in Sencore's Zero Defects program to insure the best quality in the test equipment business. Sure, we don't get rust here in South Dakota because we have such low humidity, Jim explained. But, they do get rust on some instruments in Florida and the two coasts. We have added humidity tests to be sure. In addition, we are now using all prefinished materials or rust proof materials so that we can see any rust before it happens. We can stand behind each and every Sencore metal product because we now manufacture all metal parts right here in our Sioux Falls factory with full quality control. That's why Jim is 100 percent behind the new five year rust proof guarantee. Jim knows that he will replace very few pieces in those five years but feels that it is worth it to get the feed back and make our products even better. What does it cost our customer if we have to replace a metal part in those five years? "What do you think," Jim said. "It is free of charge for both parts and labor of course; it wouldn't be a real guarantee otherwise, would it?"

SENCORE NEWS

## Sencore Goes All American In Meters Too

We want reliability. That is what Paul Wollmuth, Sencore electronic production manager said. We want reliability in meters more than any other component because that is the heart of most of our equipment. Special testing and tough negotiating set up an agreement with Dixson Instrument Company of Grand Junction, Colorado to manufacture all of Sencore's meters.



Paul and Marlin closely inspect the latest shipment of all American made meters for Sencore instruments.

"We must have delivery and we must have sensitivity," said the Sencore meter man, Marlin Westra. We want them to move at the slightest effort. That's what we got and Marlin called them "penny pivot" because they move with the same ease as the big expensive types tested, but only a fraction of the cost. Marlin went on to say that we can now rely on delivery, repairs, and field replacements, should we ever need them. It's all American penny pivot from now on in all Sencore equipment.

## Tug Proof Cable Test Added For More Reliability

What will Quality people think of next? We thought that a 24 hour heat run and retest was tough. We thought that pounding the table with the instrument was a tough test. We thought that raising and lowering line voltages was about as rough as we wanted. "But, guess what our new quality control director wants now?" said QA director, John Moneke. "They want us to drop the tester off a bench and grab the cables. They tell us in field engineering that service people and even engineers do this occasionally. They set the tester near the end of a bench and then accidentally knock it off. They grab for it and they get the leads instead. The leads break and the instrument won't work."

Our service department tells us that nearly 20 percent of all failures have to do with cables and leads. So, here we go again with another test. We have to knock the instrument off the table and grab it just like "they say" you do.



John Moneke makes life tough for Sencore instruments to make sure they perform for you.

We thought the drop tests were tough. Oh well, better that we wreck it here than to have you out of business in the middle of a job out there. We will keep on trying to make the best quality merchandise in this business, and I know that we are doing it. But, "keep telling us", says John, "we want to hear some more so that we can get better, and better, and better. . . . ."



## Sencore Opens Sales And Service Office In San Francisco

"We are going all out to insure top quality and top service," said Herb Bowden, Sencore President, as he prepared to cut the ribbon to the latest Sencore sales and service office. The San Francisco office is actually located at 833 Mahler Rd., Burlingame, California 94010 (which is really right beside the San Francisco Airport). This office is set up for a maximum of three days instrument repair for any customer on the West coast. United Parcel service delivers to the door, providing a turn around service of less than a week.

"We want our customers satisfied, even on the smallest part." said Bill Hefner, West coast supervisor. "We are TWX connected to the main factory division in Sioux Falls and can get any part on Western Airlines within hours, as the Sencore plant is also located next to the Sioux Falls Airport."

833 Mahler Road  
Burlingame, California 94010  
697 - 692 - 5854  
TWX 910 - 375 - 3307

The new sales office also has all literature, set-up books, pricing lists, and invoicing capability the same as the home office. "This is a decision making office," said Bill. "We are ready when our customers are."

## Sencore Opens Sales And Service Office In Atlanta

Herb Bowden, President, and Don Multerer, Sales Manager, point to map showing Atlanta as the sixth sales and service office to be opened by the company. Don said, "There is one more to go and that is in Albany New York. Then, we are within a day's delivery from anyone in the good old USA." Don points with pride to the fact that these are factory owned sales and



Herb Bowden, Sencore President, and Don Multerer, Regional Sales Manager for Atlanta region look over the growing network of regional offices for improved customer service.

service offices and every instrument that is processed is made exactly as new with engineering changes too. He also pointed out that new cartons and packing is used so that a distributor can place the re-checked instrument back in his stock, allowing instrument replacement from his shelf for fastest service ever. Don also boasts of "no finger prints." Every instrument is cleaned carefully when it is returned. This station, like all others is fully equipped with a field engineer, a customer service gal, and full primary standards for full checking or repair. "We want to stay number one," said Don. "That's why we are going all out." The address of the Atlanta Office is:

2459 Roosevelt Hwy Suite B-9  
College Park, Georgia 30337  
404 - 768 - 0606

It too is right by the Atlanta Airport for fastest possible service.

## Motorola Helps Design SG165 AM-FM Stereo Analyzer

The SG165 AM-FM Stereo analyzer is going on the line this month! It has been delayed for a very good reason. Motorola engineers wanted to help get the last little goodies into this one-of-a-kind analyzer. They indicated that there is no other low cost analyzer on the market, and there are thousands of stereo units that need repair. In other words, they wanted to make the SG165 "just right." Ramer Streed worked with their every need and came up with three changes.

1. The RF bands were extended so that tests can now be made below and above the bands. The reason; quite simple. Their instructions, and those of other manufacturers, call for it. This new concept must be dealt with and this we did.

2. The new AM-FM units are coming on the market with fixed IF's. Imagine that—you can no longer diddle. So, we had to add an IF rocker, for both AM and FM, so that we could vary our frequency for peaking when we came to the new sets. Sure, it is a lot of work, but only Sencore has it. That's why Motorola is taking the first run of SG165's for their own distributor use. That's what we call cooperation with manufacturers for the betterment of the user. Hats off to the Motorola boys and thanks.

3. Motorola wanted the output calibrated in microvolts. You might imagine how this hit Ramer Streed when he came into an engineering meeting with this demand. He said, "They are talking another \$600.00; that's what you get



Ramer Streed proudly displays the SG165 AM-FM Stereo Analyzer designed with assistance of Motorola.

for microvolt calibration." But we settled Ramer down and negotiated with Motorola to include only the frequencies that require close calibration, and not across bands that did not cover AM or FM. We both won, and you, the customer, benefit.

The price is not going to be increased. It is still only \$400.00 and it is the the only generator in it's class that has the IHF (Institute of High Fidelity) modulation on it. Better get yours on order though, as the first thousand are completely sold by distributors from coast to coast. You will have to wait a little but it is worth it. Stack it up against a competitive model at \$2500.00 and I'll bet you'll still take the SG165.

## Sencore Care-A-Vans Coming Your Way

It is a new idea in selling but a good idea to you, the user, I am sure. Sencore has just purchased ten full sized service vans, that we call Care-A-Vans (because we do care,) for distributor and dealers calls.

These vans will be used by technical men from coast to coast to bring you more prepared technical meetings and to carry manuals, service literature, accessories and all those things that hold up your jobs. These sports model vans are all air conditioned, sound proofed and ride like a Lincoln Continental with a 1500 pound load of goodies. You can bank on better service, better Tech-A-Ramas and more equipment at your meetings than ever before. This is Sencore's way of bringing Quality Assurance to the distributors door as over 50 percent of all service problems are really cock-pit problems.

There are no foolish questions to the Sencore Tech Rep who will be piloting these little angels. He is there to make everything crystal clear and to see that you, Sencore's best advertisement, is satisfied. Over 50 percent of all Sencore sales are made by satisfied Sencore users, according to Sencore's warranty cards. "We want to keep it that way," says Barbara Heilman, Customer Service Director.

## Sencore Adds Quality Assurance Department

How far can you go to insure quality? Sencore really doesn't know, but has added one more department to insure you, the user, that you are getting the best in the West. A new department, called Quality Assurance, has been added between the end of the production lines and the input to the stock room. There, we see John Moneke, QA director, remove 10 percent of all goods manufactured and give them those extra tests. He simulates the various conditions that you run into in the field. John has a TV antenna and various inputs. He has a Whirlpool freezer to load up to 10 instruments at a time to check for temperatures down to well below zero.



John has a sweat box that he uses to run temperatures up to 140 degrees for extended periods of time and with increased line voltage. John also has a freight simulator that gives his equipment a ride to the West coast and back to South Dakota in two hours. He has a duplicate of a truck loading dock so that he can drop a package, just as the freight lines aren't supposed to, and then

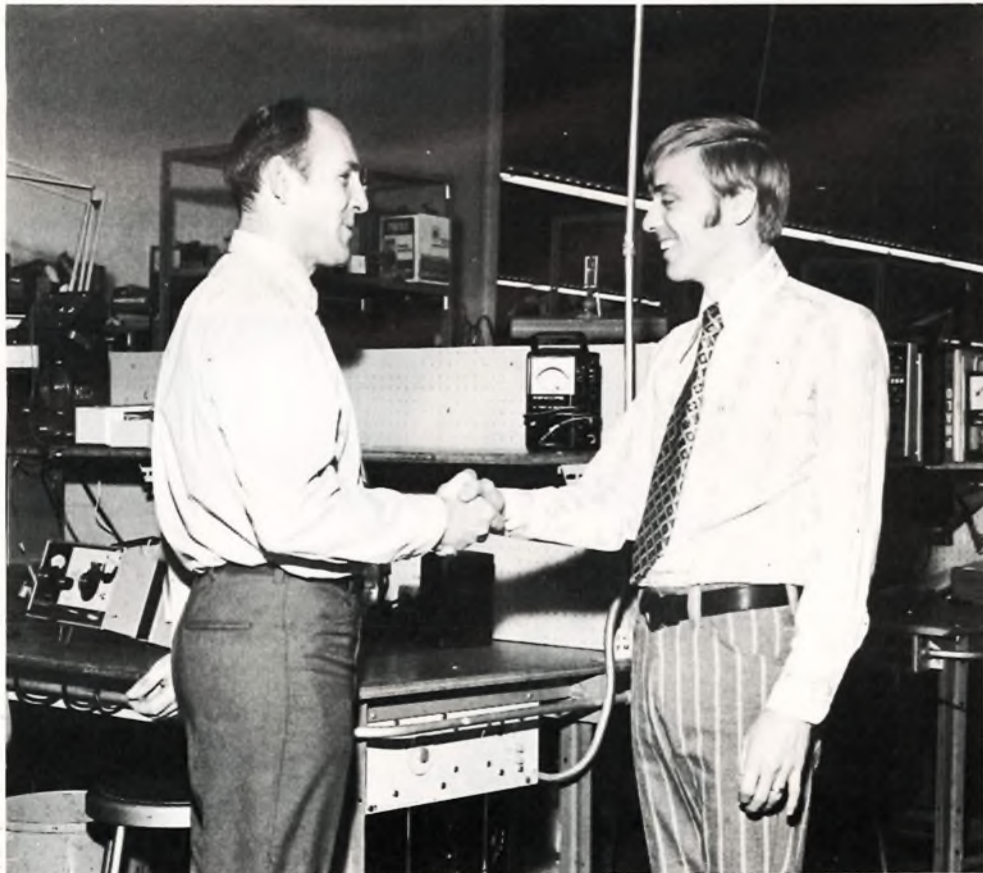


John subjects Sencore instruments to both freezing cold and extreme heat to assure you they will work anywhere, anytime you need them.

have a look and see what happened. In addition, John directs 100 percent retest of all products at the end of the production lines on actual operating circuits. Is this the only quality check? Lord no. We have a full quality control department, a full service department with added tests and 100 percent incoming inspection too. This is an added check to be sure that you buy the best when you buy the Sencore All American line.

## Sencore Appoints Quality Co-Ordinator

In an all out drive to raise quality to the highest level ever, and to insure the full responsibility by one individual, Terry Satrang has been appointed Sencore Quality Coordinator. Terry, who has advanced from National Service Manager accepts this new appointment with delight as he has always worked for top reliability in the Sencore line.



Norm Pedersen congratulates Terry Satrang, recently named Sencore Quality Co-ordinator. Terry was Quality Control director with Sencore until 1971. He started with Sencore from Minneapolis, Minn. where he had worked in electronic manufacturing and service. Terry graduated from the highly respected Brown Institute in that city, with an associate degree.

New responsibilities include coordination of service, quality control, incoming inspection and quality assurance. Terry also directs and is responsible for the work of the field engineers in the Sencore service centers throughout the

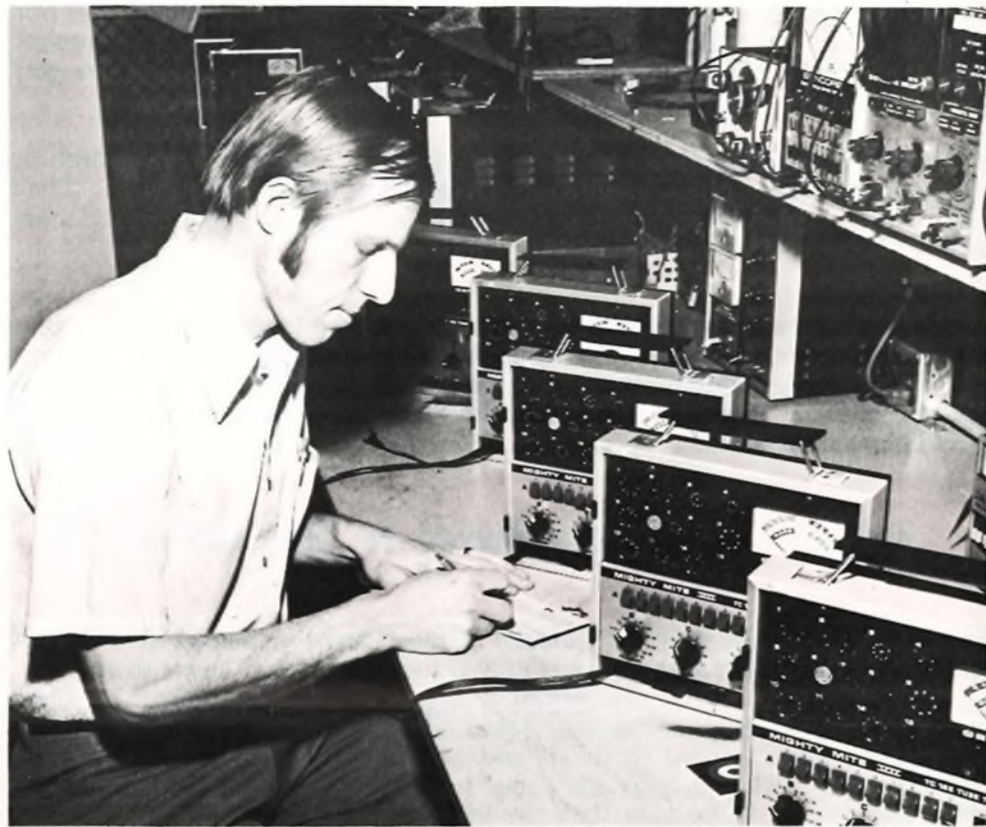
country. So, if you want to talk to the man who can do something about any service or quality problem, and one who carries the big hammer, call Terry Satrang. He is your man.

## Sencore Adds Quality Personified Tag

Here is a brand new tag with a brand new twist. We hope that it will bring you, our customer, closer to the understanding that Sencore people really try to give you the best.

Sencore instruments are twice tested, heat run, and tested again in actual operating conditions. If all standards are met, the Quality Assurance technician passes the test instrument on to final packing. It is there that we at Sencore want to be absolutely sure that we would go out and buy that instrument over any other on the market, foreign or domestic.

This is the point of commitment. So, someone must commit. This is just what the QA technician does. He signs his full name and his phone number to that instrument. If he is a field engineer from one of our stations working in that department, he signs his name and that number.

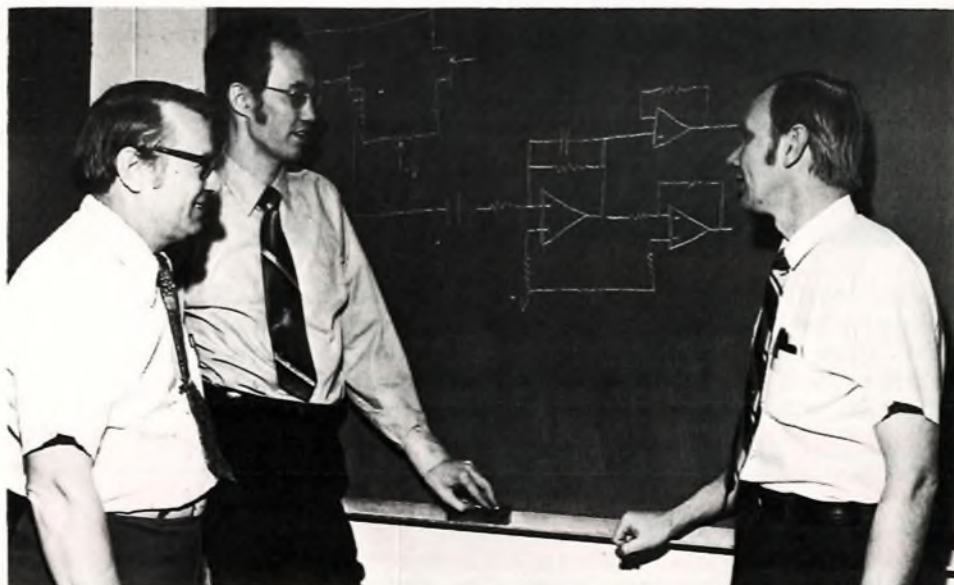


Each Quality Assurance technician personally signs the Quality Assurance Tag to signify that the instrument tested meets the standards of performance.

The story is simple. If you should ever have trouble, you know that you have a friend at the factory who is technical and who has tested and passed that instrument to you. He will want to help you if you will but call him. That is what we call Quality Personified. We recognize any quality problems that we have; that's why we keep getting better, and better, and better. . .

## Sencore Now Introduces A Brand New Product Each Month

Sencore labs are humming. We have finally done it. There is a new and different instrument introduced each and every month. Look at the smiling faces of our three product managers as they see that they finally have the six Sencore labs cycling to keep up with this fast moving technology. They know that you look to Sencore for the latest and they hope to give it to you.



Sencore Product Managers Bob Baum, Ramer Streed, and Marlin Westra combine talents for the next Sencore instrument.



"Sencore labs are really a think tank." says Bob Baum on the left. Ramer Streed, says, "It is fun to design at Sencore. You know that you are serving a purpose and keeping up with the fast pace of electronics." Marlin Westra, on the right, says "this is sure different than being a professor of physics as I have been so far in my career. This is doing and living in an exciting way."

This three man troika team now directs and heads up all design at Sencore. Bob has a BS degree in Engineering from American Television Labs and has over 15 years experience designing Sencore instruments. Ramer has a BS degree in Engineering from the University of Minnesota and Marlin has a Masters in Physics and has been working on his doctorate at Texas A & M. "We believe that we now have the greatest development team in this industry," says Herb Bowden, President, "as these men direct the action of 41 technical people throughout the plant at Sencore."

## Sencore Setting Up Full Line Distributors

You have asked for it. You have complained that your distributors don't always have the Sencore instrument that you want. You are in the middle of a color TV problem, or half way through a design and you need an instrument. You call your favorite distributor and guess what--"we are out of that but can substitute something else," you are told. Then, you get the instrument home and discover that it doesn't have those little extras that Sencore gets those patents on. Tricked again.

We hope to provide you with the instruments that we show every month in the Sencore News by signing up Full Line Promotional Distributors. They will carry the full line and in turn, we will list their names in the Sencore News.

We think that this new exciting program will serve you better and will enable Sencore to serve our good, loyal distributors better. It is working together in this electronic industry that pays off for all of us. So, why not direct your business on Sencore to these distributors who are good enough to carry the full line at all times?

## Bob And Norm's Shop Moved To New Address

Bob and Norm's TV shop, as featured in most issues of Sencore News, was out of business this month as it was moved lock, stock, and barrel to the Sencore plant. That's right, we moved it right into the last vacant lab right between the TV design lab of Bob Baum, and the Sencore News lab. Why? Because everyone wanted to use it and had to run to and fro. "Enough," said the boss. "If you guys are going to be fixing sets all the time to get those stories and to be sure that the test equipment is just right, move it right inside and fix employees sets. We will kill two birds with one stone. We will give employees benefits and you can fix all you want." So, here we



see Norm Pedersen stooped over setting up the last bench. Nothing like having things within reach and handy now is there Norm? Who brings you coffee? Lunch? Does your wife pick you up. . . Oh, well, just a little jealous because I can't have it so handy. How about you? But, it will mean more checking and more accurate information each month in the Sencore News.

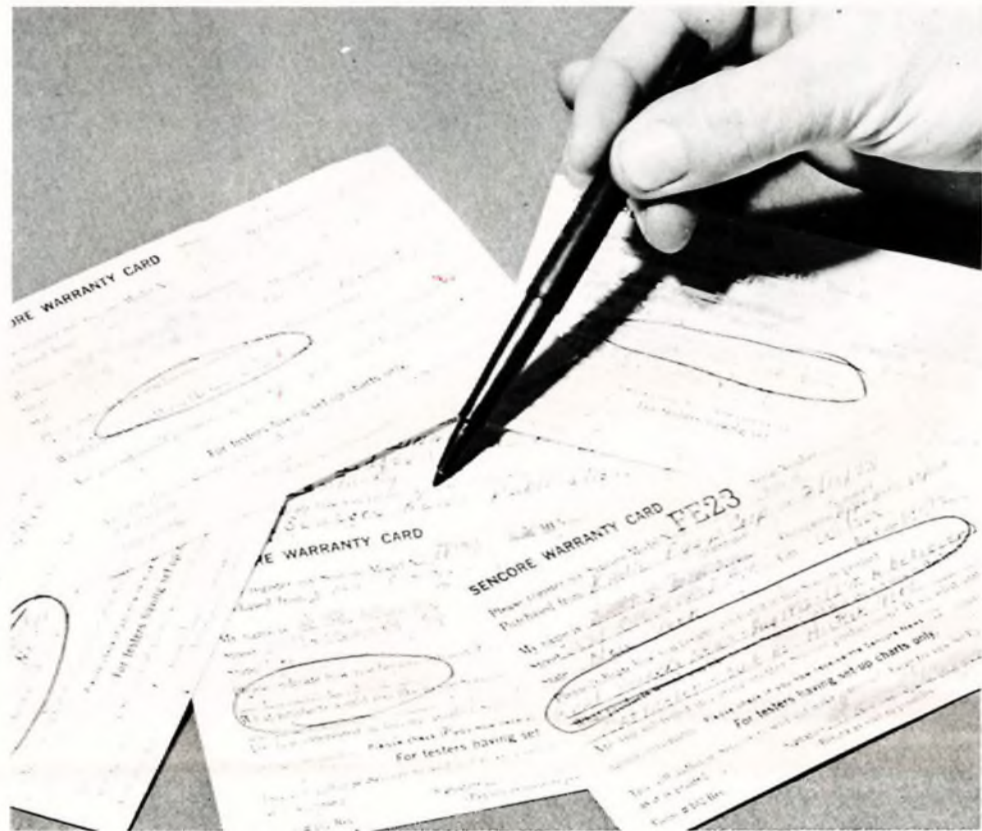
## Sencore Taking Ten Booths At Las Vegas Show To Exhibit Program

Your distributor will see Sencore as either the largest or one of two largest exhibitors at the annual parts and equipment show in Las Vegas on May 1. We want to tell each distributor the full line of cooperation story that Sencore has announced in their full line promotional program. We want to show

each distributor salesman how we have developed a new instrument each month to get your attention, and how we make his presentation to you worth while to listen to in an exclusive Sencore Pitch Pak. Then, we want to show each distributor how he can bring you up to date with his annual Sencore Tech-A-Rama and how the Sencore News brings you closer in knowledge and understanding. Last, we want to show him an actual working model of the Sencore Care-A-Van that will call on him monthly to help his customers, you, with your understanding of the Sencore equipment and how we can meet your needs. That's why we are going all out. Sencore wants your business because we want to earn it by meeting your needs and requirements.

## Sencore News Readership Doubles In One Year

We are proud to announce the interest in Sencore News has doubled in just one year. There is not a day that goes by that we don't hear the acclaim "keep it coming even if you have to charge for it." Well, we will never charge you for it as long as you keep buying Sencore. That is just what you have done as we have watched the check-offs on Sencore warranty cards where we



ask you "why you bought Sencore." I bought Sencore because "of Sencore News" comments have increased from an average of 35 call outs a week, one year ago, to over 70 at the present time. We are grateful. Keep buying Sencore and we will keep sending you Sencore News.

## Double Sealed Humidity Proof Boards Now Used On All Sencore Equipment

Sencore quality is high because we manufacture all equipment right in Sioux Falls, South Dakota, where we have complete control. Sure we have some quality problems. Anyone who says they don't just isn't listening and you



High quality, double sealed circuit boards used on all Sencore equipment to improve reliability.

can't get higher quality without listening. We just think that we have the best quality, but we are not satisfied to stand still. The latest addition to our quality features is a double coated, high quality, sealed printed circuit board throughout. Sure, it costs a little more but test instruments aren't exactly cheap and you should get your moneys worth. You'll get it with Sencore. Our challenges of today are your product improvements of tomorrow.



## Sencore Instruments Are Now All Care Packaged

How many times do you want to try an instrument before you buy, but you are afraid that you will take it home and it won't look like new if you have to bring it back? Many times, we know. You'll never have to worry about that with a Sencore instrument as all instruments in the line are now CARE packaged. We do care about your problems and we want to make it as easy for you to find your answer as possible. Each Sencore instrument is fully prepared and then slipped into a protective plastic cover. It is slid into two styrofoam shipping shock protectors so that you don't have to figure out some odd



Care Packaging for shipment insures delivery of full performance to you.

cardboard fold if you wish to return the instrument; you simply slide it back. Last, no seal is placed on the carton but rather, a flip top box. You simply

find the key and pop the top out and slide out the instrument. More, if you should scratch the instrument, Sencore's policy to all full line distributors is "no refurbishing charges at all." Most full line distributors know about this exclusive Sencore feature and will let you try the instrument for 10 days, free of charge, before you buy. Why not take advantage of this offer to see why Sencore offers more and then try competition too. We know that you'll choose Sencore. Most do.

## Photo Labs Developed At Sencore For Full Control

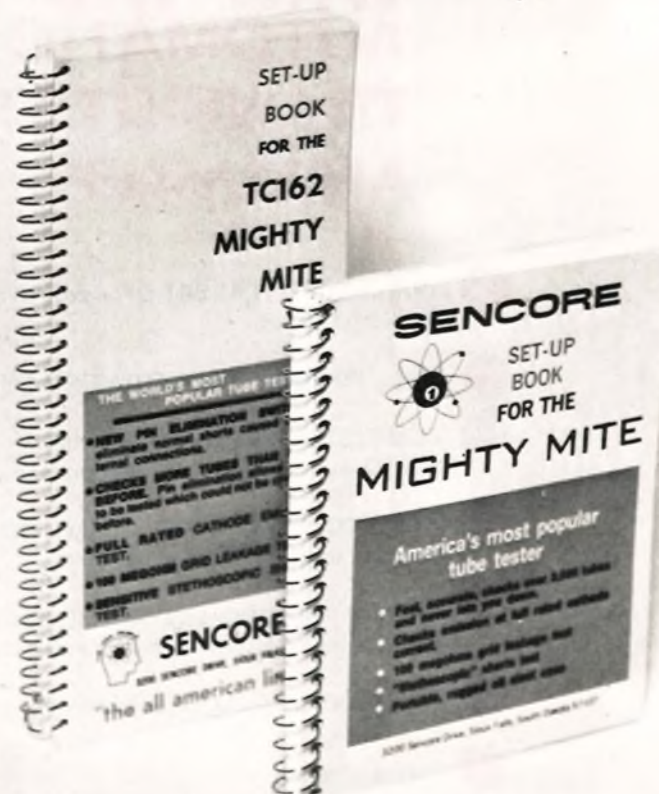
Dick Ingalls smiles. You know why? He has just found the answer to his dreams. He has always dreamed of working for a company who would say "Dick go out and get the best, we want full photo facilities, printed circuit board facilities, and silk screening facilities." \$6,000 later, Dick showed up with this smile on his face. Well, it paid off because this is the first Sencore News where we took full advantage of Dicks new lab as every picture here



was taken by Dick right on location. They were developed by his automatic equipment in just 24 hours. That's how you got your Sencore News quicker this time, too. We thought that Dick should get into the act somewhere because he is as proud as the RCA peacock. Sorry Dick, it was the last act today, but then, maybe we saved the best till last.

## AVAILABLE NOW!

The Sencore News is written, edited, and published by the Field Engineering Department of Sencore, Inc., 3200 Sencore Drive, Sioux Falls, South Dakota, 57107. The Sencore News is distributed without charge to all individuals or companies who have registered the purchase of any Sencore instrument by means of the warranty card packed with that instrument. The information herein has been taken from one or more sources which we consider reliable. Although such information has been carefully prepared, we make no representations as to its accuracy or completeness. Prices and specifications are subject to change without notice.



## NEW UPDATED SETUP BOOKS FOR YOUR MIGHTY MITE

New set up books for your Sencore Mighty Mite tube testers have just been received. The new books list over 200 new tubes and updated information compared to the previous book. Be right up to the minute with set up information for your Mighty Mite by ordering yours today. Just select the correct form for your model of the Mighty Mite from the chart below, enclose \$3.00 to cover cost of book, postage and handling, and send your order to: Sencore Service Department, 3200 Sencore Drive, Sioux Falls, South Dakota.

Your new set up book will be sent to you by return mail. Don't be caught short with a lack of information, be up-to-date!

|       |                 |          |
|-------|-----------------|----------|
| TC114 | Mighty Mite II  | Form 674 |
| TC130 | Mighty Mite III |          |
| TC136 | Mighty Mite IV  |          |
| TC142 | Mighty Mite V   |          |
| TC154 | Mighty Mite VI  |          |
| TC162 | Mighty Mite VII | Form 683 |



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LAST ISSUE**



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**PARTS PAK**

*"the tube caddy janitor"*

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