

# Quickly Test Capacitors & Inductors In-Circuit & Fully Analyze Capacitors & Inductors For All Of The Ways They Fail Out Of Circuit

**ReZolver™**



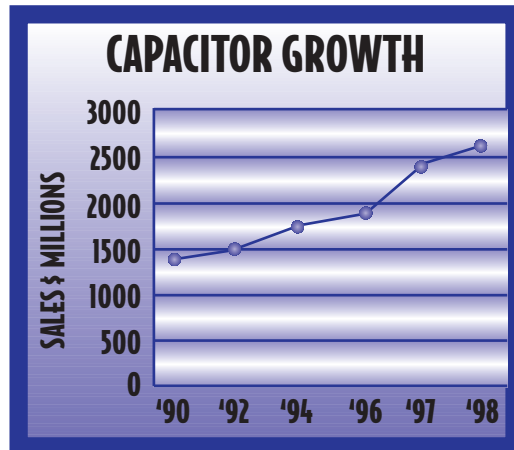
**LC103 ReZolver™  
In-Circuit  
Capacitor  
&  
Inductor  
Analyzer**

**SENCORE**



# 2 Analyzing Capacitors & Inductors Is Good Business

Capacitors and inductors, once thought to be on the verge of extinction with integrated circuits, are thriving. The Electronic Industry Association reports that factor sales of capacitors have increased steadily in the past decade and inductor sales remain strong. Future growth in the sales of these components is predicted.



In today's high performance circuits, capacitor and inductor parameters and tolerances are critical to proper circuit operation. Quickly and accurately finding defective capacitors and inductors is challenging. Numerous capacitor types now exist, each with specific characteristics, applications, and ways they fail. **No longer can you test all capacitors the same and find all failures.**

Capacitors and inductors come in an increasingly wider range of values and tolerances. Capacitor values range from ceramic types less than 1 pF to double layer electrolytic types commonly over 4 Farads. Electrolytic capacitors, once limited to 1 uF, are now available in several values less than 1 uF. Inductor values range from less than 1 uH to over 10 H. Tolerances on these values can range from less than 1% to over 20%. **A capacitor and inductor analyzer must have the needed ranges, resolution, and accuracy.**

Capacitor and inductors are available in numerous packages and lead configurations requiring flexible connections. Delicate surface mount

capacitors and inductors offer a significant testing challenge. No longer can you simply unsolder, test, and reinstall a good component. Removal requires special equipment, stresses the component and risks damage to the circuit board traces. **In-circuit capacitor and inductor analyzing is the only solution.**

Capacitors may change value, equivalent series resistance, dielectric leakage, or dielectric absorption. A change in the performance of any of these characteristics can alter the performance of a critical circuit. Inductors fail from value changes, opens, shorts, or shorted turns. **To confidently identify all defects you need to analyze all these parameters.**

There are many test instruments on the market that claim to test capacitors and inductors. These testers may work well in certain applications; however, they all have two or more of the following shortcomings that leave you guessing if the capacitor or inductor is good or bad.

- 2 They don't test capacitors and inductors for all the ways they fail.
- 2 They can't test some capacitors or inductors because they lack the needed measuring ranges, resolution, and accuracy.
- 2 They require calculations or difficult interpretation, which are prone to errors.
- 2 They don't duplicate circuit voltages so miss some capacitor defects.
- 2 They don't reference component good/bad standards developed by the Electronics Industry Association (EIA)
- 2 They are expensive and/or difficult to use.

**The LC103 ReZolver™ Capacitor and Inductor Analyzer takes the guesswork out of capacitor and inductor testing.** The ReZolver™ is a complete, automatic, microprocessor controlled analyzer ideally suited for service, maintenance, or large volume testing in a lab or incoming inspection.

# 2 Pinpoint Bad Capacitors & Inductors In-Circuit, Or Completely Analyze Them Out-Of-Circuit With Exclusive, Dynamic, Automatic Tests



## LC103 ReZolver™ Capacitor & Inductor Analyzer

Pinpoints bad capacitors and inductors “in-circuit”, and automatically tells you when further out-of-circuit tests are required

The only capacitor tester on the market that dynamically analyzes capacitors out-of-circuit for:

- Value from 1 pF to 20F
- Equivalent series resistance
- Leakage with up to 1,000 volts applied
- Dielectric absorption

Tests SCRs and triacs with optional SCR250 accessory

- 2 Tests SMT components in-circuit and accurately with exclusive, time-saving test accessories
- 2 Makes all tests, compares the results to EIA standards, and tells you “GOOD” or “BAD” – automatically
- 2 Dynamically analyzes inductors with exclusive, patented tests for:
  - Value from 0.1µH to 20 H
  - Opens or shorts
  - Even one shorted turn with our patented “Ringer” test





# **2** In-Circuit Testing Accurately Pinpoints Defective Components!



The ReZolver™ gives you the ability to accurately pinpoint defective capacitors without removing them from the circuit. Using exclusive tests, the ReZolver™ measures the capacitor's value and ESR, checks for parallel components that may otherwise disrupt the measurements, and gives a GOOD/BAD/SUGGEST REMOVAL evaluation.



Eliminate the time desoldering capacitors you suspect are causing the problem, finding replacements, and installing the new ones only to find you have not solved the problem. The ReZolver™ lets you check the suspect capacitors first, before spending the time desoldering.

Other in-circuit ESR testers can give erroneous readings, especially if a low impedance is in parallel with the capacitor under test, or if the capacitor is shorted. These ESR testers only measure the ESR at a specific frequency. If the capacitor is shorted, an ESR tester will show a good reading of near zero, missing the fact that the capacitor is shorted. If the capacitor is paralleled by a low impedance, the ESR tester will again show a good low reading, even if the capacitor is bad. The ReZolver™ will identify both of these conditions and suggest that the capacitor be removed in order to test it more accurately.

## **In-Circuit Testing Made Easy With An Innovative Adjustable Probe**

Sencore's exclusive **Adjustable In-Circuit Test Probe** makes in-circuit component testing a breeze. Simply adjust the thumb-wheel to the component width, press the points to the leads, and press the Test Activation button mounted on the probe to start the test. The ReZolver™ even lets you know when the test is complete with three short beeps. Once the Test Activation button is released, the readings are held for three seconds. These features allow you to make measurements in-circuit without lifting your head or moving your arm, eliminating the chance of slipping off the component and getting false readings. The adjustable width allows you to test nearly any component, from the smallest surface mount to large leaded components. In many cases, this probe can be used one-handed so you can use the other hand to hold the board.





# 2 Dynamically Analyze Capacitors Out-Of-Circuit For All Four Failure Modes!

## VALUE (to 20 Farads)

When you test a .033 microfarad +/- 5% capacitor with a typical value tester, and get a reading of 31.2 nanofarads, is the capacitor good? The ReZolver™ eliminates all the guesswork typically associated with capacitor testing. **Simply enter the value and tolerance, and the ReZolver™ does all the testing, calculating, and decides if the capacitor is good or bad - automatically.**

## LEAKAGE (up to 1,000 applied volts)

A true, dynamic leakage test requires that you check the capacitor's leakage at its full rated voltage. This type of test is difficult because it requires a complex set-up and the test must be made at the capacitor's working voltage. Plus, the leakage reading



is meaningless unless you reference it to industry standards. The ReZolver™ does this for you. **Simply enter the working voltage of the capacitor, and the ReZolver™ does the test and compares the results to EIA and industry standards.** All you do is wait for a “good” or “bad” display.

## DIELECTRIC ABSORPTION (D/A)

Dielectric absorption prevents a capacitor from completely discharging. Capacitors which store a DC voltage to control other



circuits must have extremely low levels of D/A. All capacitors have some dielectric absorption. Only the ReZolver™ provides an automatic test for D/A. **Simply press the “Dielectric Absorption” button, and the ReZolver™ automatically charges the cap and then measures the DC voltage build-up after being discharged.**

## EQUIVALENT SERIES RESISTANCE (ESR)

As the electrolytic capacitor's physical size shrank and its value skyrocketed, ESR was identified as a leading cause of failure. All capacitors have some ESR – and the amount that allows good performance in any circuit varies with capacitor type, value, and rated voltage. **With the known EIA and industry standard values programmed in, the ReZolver™ can easily test every electrolytic capacitor for ESR.** In addition, the ReZolver™ does the test automatically, without calculations, interpretations, look-up tables, or errors.





# Dynamic Inductor Tests Analyze All Defects - Even Single Shorted Turns!



## INDUCTOR VALUE



Now you can automatically test coils and transformer values from 0.1 microhenry to 20 henrys with a

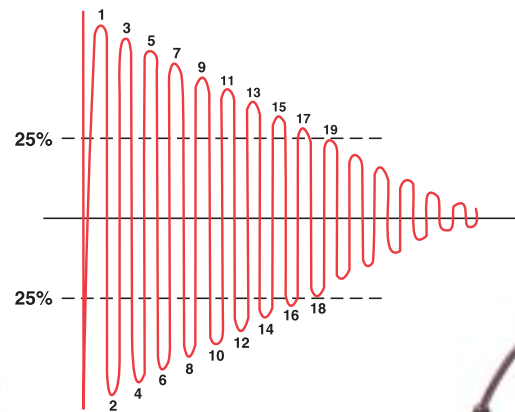
patented inductance test. **The ReZolver™ is truly unique in that it tests for inductance and not inductive reactance, which is frequency dependent.** To make the inductance test just push the Inductance Value button and automatically read any inductance value from 0.1 microhenry to 20 henrys directly with the accuracy you need for modern circuits. Full autoranging speeds up the tests and greatly reduces operator errors.

## INDUCTOR RINGER

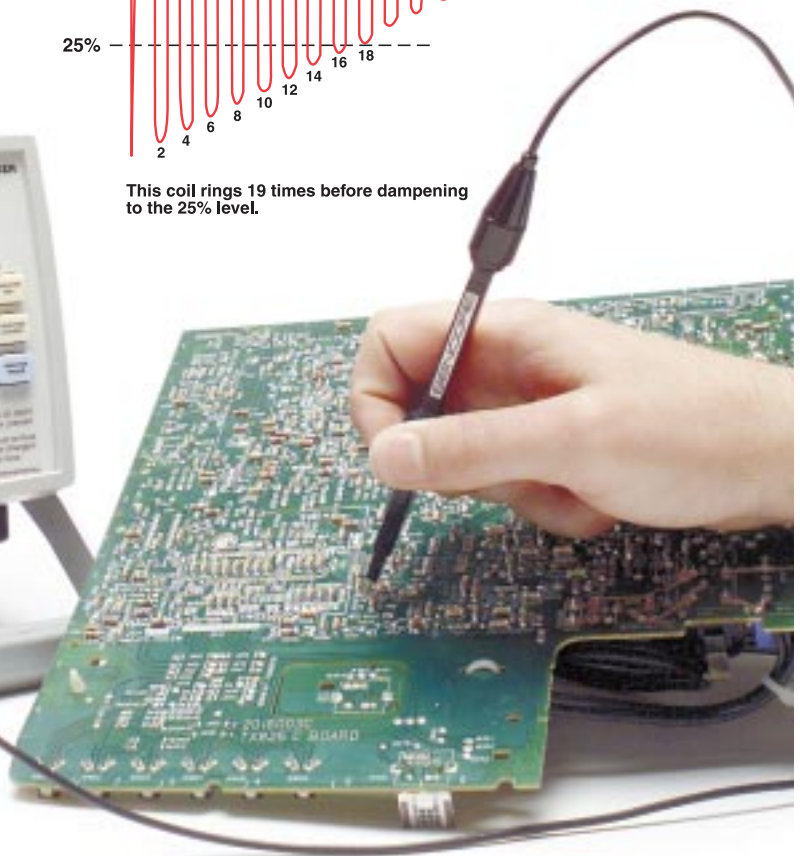


**The automatic ringing test finds even one shorted turn.** This effective Q test strikes the coil under test with a

sharp pulse. The coil is tested to see how many rings it will product until it dampens to the 25% level. Sencore Engineers have empirically determined that any air core or ferrite core coil will ring at least 10 times before decaying to less than 25%, if it is not shorted or open. Any coil that rings 10 or higher is good. This patented test is used in nearly 60,000 Sencore instruments daily and works every time.



This coil rings 19 times before dampening to the 25% level.





# 2 Special Applications Of The ReZolver™

## Resistance Test (1 Gigohm hi-pot tester)

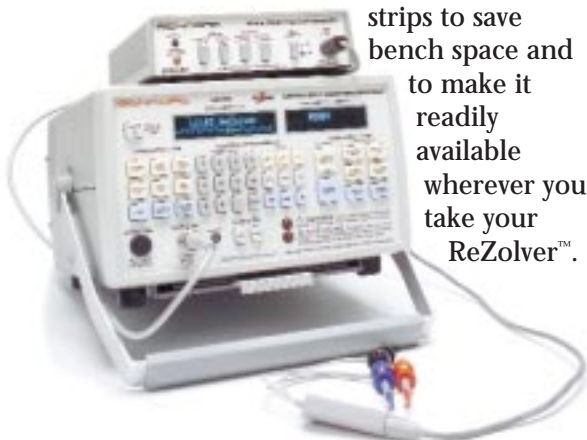
The ReZolver's™ high-voltage power supply and sensitive current meter can be used to measure high resistance to 1 Gigohm. The ReZolver™ is sensitive enough to detect as little as 0.01 microamp of leakage current in connectors, PC boards, and switches. Additionally, the ReZolver™ can be a hi-pot tester that measures resistance up to 1 Gigohm with up to 1,000 volts DC applied.



## Testing SCRs and TRIACs

Test SCRs and TRIACs with the ReZolver™. Simply connect to the SCR250 SCR & TRIAC Test Accessory and you can test these components for turn-on and turn-off capability and leakage. Check SCRs with either sensitive or normal gets with a push of an SCR250 button. Check TRIACs with either positive or negative gate bias. Reverse junction leakage, such as between the anode and cathode, is checked directly in microamps.

The SCR250 is designed to mount on top of the ReZolver™ with supplied Velcro® strips to save bench space and to make it readily available wherever you take your ReZolver™.



## Testing Transmission Lines

It's easy to find the distance to an open or short in any transmission line or to determine whether the transmission lines need to be replaced. You'll be amazed when you dig down to the transmission line to find you are within feet, saving an unbelievable amount of time and expense in digging up large sections of the transmission line for testing purposes only. The ReZolver™ will detect a break in either the shield or the center conductor of coaxial transmission line. To determine whether a transmission line has deteriorated and needs replacing, measure the capacity and compare to standard capacity per foot for that type of line and length. Capacity will increase if the dielectric has moisture. A leakage test can also be made to determine insulation leakage with up to 1,000 volts applied.



## Portability

The ReZolver™ operates on 120VAC or optional battery pack so you can take it wherever you do capacitor and inductor testing. Take the ReZolver™ along with you to service large main frame computers, industrial machines, or remote antenna networks.



## SPECIFICATIONS

<b>IN-CIRCUIT TESTS</b>	Dynamic in-circuit tests to determine whether the component is good or bad. INDUCTOR RANGE: 3.18 uH to 3.18 H CAPACITOR RANGE: 0.002 uF to 20,000 uF
<b>CAPACITOR VALUE</b>	RANGE: 1 pF to 20 F ACCURACY: $\pm 1\%$ ; $\pm 1$ pF, $\pm 1$ digit for values to 1990 uF; $\pm 5\%$ , $\pm 0.1\%$ of range full scale for values from 2000 uF to 20 F
<b>EQUIVALENT SERIES RESISTANCE (ESR)</b>	ACCURACY: $\pm 5\%$ , $\pm 1$ digit CAPACITOR RANGE: 0.01 uF to 20 F
<b>DIELECTRIC ABSORPTION</b>	ACCURACY: $\pm 5\%$ , $\pm 1$ count CAPACITOR RANGE: 0.01 uF to 20 F
<b>CAPACITOR LEAKAGE</b>	ACCURACY: $\pm 5\%$ , $\pm 1$ digit. APPLIED VOLTAGE: 1.0 to 1000 volts
<b>INDUCTOR VALUE</b>	RANGE: 0.1 uH to 20 H ACCURACY: $\pm 2\%$ , $\pm 1$ digit, $\pm 0.1$ uH
<b>INDUCTOR RINGING</b>	ACCURACY: $\pm 1$ count on readings between 8 and 13 rings INDUCTOR RANGE: 10 uH and larger, non-iron core
<b>GENERAL</b>	AC POWER: 105 to 130 VAC, 60Hz SIZE (HWD): 6" x 9" x 11.5" (15.2 cm x 22.9 cm x 29.1 cm) WEIGHT: 6.0 lbs. (2.7 kg) without battery 7.6 lbs. (3.4 kg) with battery.

All specifications subject to change without notice

## SUPPLIED ACCESSORIES

39G219	Out-of-Circuit Test Leads
64G37	Test Lead Mounting Clip
AP291	Adjustable In-Circuit Test Probe
PA251	110 VAC Power Adapter/Charger

## OPTIONAL ACCESSORIES

39G144	Test Lead Adapter
BY289	Rechargeable Lead Acid Battery
CC254	Carrying Case
CH255	Component Holder
PA252	220 VAC Power Adapter/Charger
SCR250	SCR/Triac Test Accessory
CH256	Chip Component Test Lead

## SENCORE OFFERS YOU

### 30 Day Money Back Guarantee

Sencore's 30 Day Money Back Guarantee assures that you've made the right choice in instrumentation. Every Sencore instrument and accessory is covered by this guarantee of satisfaction.

*"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."*

### Toll Free Support 1-800-SENCORE

One number connects you to a factory full of people dedicated to making your job easier and more successful. We will answer any questions you may have concerning a new product, application of a Sencore instrument, ordering information, or technical service.

### Made Right Guarantee

We guarantee your Sencore Instrument was "Made Right" or we will make it right without charge for parts and labor for as long as you own the instrument. Call for details.

### Flexible Investment Options

Sencore gives you easy purchasing terms at low rates. Your options include:

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- 2 to 5 month split payment plan
- 6-48 month "Pay As You Grow" Investment plans
- MasterCard or Visa
- COD or cash with free freight

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