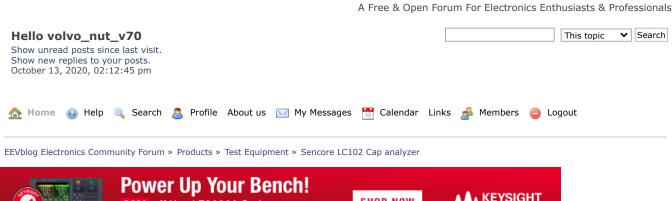
RF Components Part #: Wide variety of ceramic/ferrite type inductors, coaxial Description: Download Datasheet connectors and frequency products

EEVblog Electronics Community Forum





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Topic: Sencore LC102 Cap analyzer (Read 14420 times)

volvo_nut_v70 and 0 Guests are viewing this topic.



Newbie

Author

Posts: 1





Say Thanks

Reply

Quote

« previous next »

Hi Folks,

Just purchased a used Sencore LC102 and it would appear that it is not happy....ummm...pissed-off might be a better term.

It boots fine and passes it's self test. I can zero the leads in 'open' but when I try to connect the leads together to zero 'short' it reads Error4.

When I test any size cap it reads in pF only and it is way way off. I have tested known good leads from another LC77, it is certainly the tester at fault. The lead fuse behind the BNC jack has continuity. The sencore lead that came with the LC102 worked fine on the LC77. I opened it and reseated connectors and did not see any anomalies.

I purchased on EB for a good sum of money, as it was described as 'working and just removed from a closed service center'. Spending more than \$200 (usd) for a repair would exceed it's value. I am looking for options to repair it myself or for a service contact to have it repaired or should I just return

I mostly work on vintage audio and I want a high performance cap tester with leakage,+600wv, ESR and DA, any suggestions?

Thank you for reading,

Brad

Report to moderator



Re: Sencore LC102 Cap analyzer « Reply #1 on: January 18, 2014, 03:56:31 pm »

Say Thanks

Reply

Quote



commongrounder

Frequent Contributor



Posts: 318 Country:



I'd return it if it has warranty.

Report to moderator Logged

There are small lies, big lies and then there is what is on the screen of your oscilloscope.

Re: Sencore LC102 Cap analyzer

« Reply #2 on: January 18, 2014, 04:56:46 pm »

Say Thanks

Reply

Quote

From the Manual:

Error 4... Value Beyond Zeroing Limit

The amount of inductance or capacitance at the TEST LEAD INPUT is beyond the range of the zeroing circuits. An open (greater than 20kohms) or shorted (less than one ohm) test lead will cause the "OPEN" or "SHORT" annunciator to come on, rather than produce an "ERROR 4".

Possible causes:

- 1) The capacitance at the test lead input is greater than 1800pf
- 2) The inductance at the test lead input is greather than 18uH
- 3) The resistance at the test lead input is greater than 1 ohm.

Sounds like something wrong with your test lead that may work with the other unit but is not in range with the auto circuits in the LC102. Good Luck! @





commongrounder

Frequent Contributor



Posts: 318 Country:



Re: Sencore LC102 Cap analyzer

« Reply #3 on: January 18, 2014, 08:09:41 pm »

Say Thanks

Quote

Also wanted to add that it could be one of the relays the LC102 uses to switch functions. They could get corroded if the unit has been stored or not used for a while, causing an increase in the test lead circuit resistance above the one ohm limit. The schematic/service manual would be of great help there. I own a Sencore PA81 I bought as "new old stock". I had to clean every relay in the thing before it would work properly.

Report to moderator Logged



Quote

□ K1JOS

Regular Contributor



Posts: 137 Country:



Re: Sencore LC102 Cap analyzer « Reply #4 on: January 18, 2014, 09:40:24 pm »

Sav Thanks

Reply

I had a NOS LC-102 and sent it to Sencore for calibration and they spontaneously told me that the three relays in the meter were notorious for getting corrosion on the contacts and these would inevitably cause zeroing problems. They replace all three with updated modern stock and I never had any problems. I would contact them to see if you could buy replacements or get the part numbers.

Jerry

Report to moderator Logged



□ ruairi

Frequent Contributor



Posts: 298 Country:



Re: Sencore LC102 Cap analyzer

« Reply #5 on: November 23, 2015, 06:59:08 pm »

Sav Thanks

Reply

Quote

Bumping this old topic. I have an LC77 (almost identical to LC102) that I bought used recently and it is a really nice machine but has the intermittent sticky relay / Error 4 issue. I'd like to replace all of the relays so I sent Sencore an email looking for replacements for the below.

Schematic Designation	Part No.	Part type	Info on
actual component			
L1, L9	41G13	Relay, SPST	MBZ, FRL-
648D05/1AK, 5VDC			
L2, L3	41G6	Relay, SPDT	Cornell Dubilier
Electronics, 603-3V			
L4	41G15	Relay, SPST	MBZ, FRL-
648D05/1BK, 5VDC			
L5, L6, L7, L8, L10	41G12	Relay, SPST	MBZ, FRL-
648D05/1AS, 5VDC			

Their reply;

41G13 - no longer available

41G6 - \$27.00 each and in stock

41G15 - \$14.50 each and in stock

41G12 - no longer available

Commongrounder mentioned cleaning relays but the relays on the LC102 are sealed. Any ideas on

□ ruairi

Posts: 298 Country:

Contributor Posts: 18

Country:

<u>₽</u> 🖂 🗘

□ ruairi

Posts: 298 Country:

Contributor Posts: 18

Country:

<u></u> Q

Frequent Contributor

Sencoretech

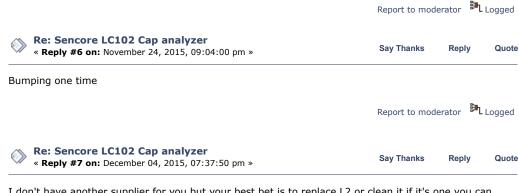
<u>_</u> Q

Frequent Contributor

□ Sencoretech

alternative sources for the above parts?

Thanks! Ruairi



I don't have another supplier for you but your best bet is to replace L2 or clean it if it's one you can open. They used a few different brands on it and if you have an older one you should be able to get the case off of it.

Also cleaning the contacts on the fuse holder, and P2 and P3 on the main board will help. These units can only zero about 3 ohms so it doesn't take much corrosion to cause issues. I'd also check the fuse to make sure it doesn't have any resistance on it as well, I've seen a few that have had more then they should and that causes issues.



■ **Johnny10**Frequent Contributor





Posts: 714
Country:

I have the LC102 and I find I get "short" displayed while trying to zero probe on the OPEN switch. Looking for a solution.

Report to moderator Logged

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

glicos

Regular Contributor



Posts: 66



Re: Sencore LC102 Cap analyzer

« Reply #11 on: January 20, 2016, 01:51:51 am »

Sav Thanks

Renly

Quote

Quote from: bfreemannh on January 18, 2014, 03:12:04 pm

Just purchased a used Sencore LC102 and it would appear that it is not happy....ummm...pissed-off might be a better term.

It boots fine and passes it's self test. I can zero the leads in 'open' but when I try to connect the leads together to zero 'short' it reads Error4.

When I test any size cap it reads in pF only and it is way way off. I have tested known good leads from another LC77, it is certainly the tester at fault. The lead fuse behind the BNC jack has continuity. The sencore lead that came with the LC102 worked fine on the LC77. I opened it and reseated connectors and did not see any anomalies.

I purchased on EB for a good sum of money, as it was described as 'working and just removed from a closed service center'. Spending more than \$200 (usd) for a repair would exceed it's value. I am looking for options to repair it myself or for a service contact to have it repaired or should I just return it and keep looking?

I mostly work on vintage audio and I want a high performance cap tester with leakage, +600wv, ESR and DA, any suggestions?

Thank you for reading,

Brad

Try to manually short the output terminal together and check if ok. If yes, you have a problem on your cable otherwise there's a problem with your input section. I have a good working one and will change notes together to repair the problem..

Report to moderator Logged

commongrounder

Frequent Contributor



Posts: 318 Country:





Re: Sencore LC102 Cap analyzer

« Reply #12 on: January 21, 2016, 06:23:32 pm »

Say Thanks

Quote

Quote from: Johnny10 on January 19, 2016, 06:36:17 pm

How did this repair progress?

I have the LC102 and I find I get "short" displayed while trying to zero probe on the OPEN switch. Looking for a solution.

Have you done an OPEN zero with no test lead attached? If it completes with no error message, then check your test lead with an ohmmeter for a short between the shield and center conductor (or just the red and black mini-grabbers). If the tester still reads "short" then there is a fault inside the unit that will need to be traced down.

Report to moderator



Johnny10

Frequent Contributor





Posts: 714 Country:





Re: Sencore LC102 Cap analyzer

« Reply #13 on: January 24, 2016, 05:26:50 am »

Say Thanks

Reply Quote

OK

My unit shows the "SHORT" designator during the Zero Calibration "OPEN" switch.

When the probe is disconnected.

Where would I find the probe calibration circuit in the Sencore LC102?

I am not at all familiar with this type circuit.

« Last Edit: January 26, 2016, 08:53:24 pm by Johnny10 »

Report to moderator Logged

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

Johnny10

Frequent Contributor



Posts: 714 Country:



Re: Sencore LC102 Cap analyzer

« Reply #14 on: January 24, 2016, 06:35:45 am »

Say Thanks

Reply

Quote

Mucking around the mainboard now the unit just shuts down whenever I press either "Short" or "Open"

And I don't hear the relay! Maybe one of the relays malfunctioning?

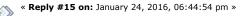
« Last Edit: January 26, 2016, 08:53:43 pm by Johnny10 »

Report to moderator Logged

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

□ commongrounder Re: Sencore LC102 Cap analyzer





Say Thanks

Quote

The LC-102 uses the ESR and capacitance measurement circuits to determine the residual lead capacitance and resistance, then digitally subtracts the result from actual component readings. There is no "calibration circuit", just a microprocessor routine. The shutdown issue may be a clue to the real problem you are having. The main board has +12, +18 (with a +15 volt on board regulator), +5 and -5 volts, all of which come across from the power supply board to P6. You should be able to probe that connector and check that those voltages are stable. If any of those are out by a significant amount, or collapse when you use the cal switch, you need to go over to the power supply board and check things, especially capacitors. There are switching circuits there. If you have an oscilloscope you can also check for pulse noise on the DC rails that might point to capacitor degradation, or other issues. Do you have the schematics? You should get your hands on a set if you plan to keep this unit for a while.

Report to moderator



Johnny10

Frequent Contributor





Country: <u>_</u> Q

Re: Sencore LC102 Cap analyzer « Reply #16 on: January 24, 2016, 07:38:28 pm »

Say Thanks

Quote

Thanks,

Oops, you caught the shut down problem very quickly for me!

If you have seen my other post about display problems with this unit I am getting quite good at working on the power supply.

I was using too low a power supply voltage and as soon as I brought it back up .. no more shutdown. Forgot the voltage setting from the last time on the bench!

Still getting the SHORT on Open result .

I do have a set of schematics that I printed out from the online manual.

Problem is the mainboard schematic is quite hard to read unlike the power supply and display board schematics.

I will have to enlarge it and then print again.

« Last Edit: February 07, 2016, 11:02:36 pm by Johnny10 »

Report to moderator Logged

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

commongrounder

Frequent Contributor



Posts: 318 Country: <u>&</u> ⊠ Q





Say Thanks

Reply

Quote

Ah. Good that the shutdown problem had a simple solution. Too bad it still leaves you with the short issue.

When the unit is at rest, the relays have the 50 ohm (two 100 ohm 22 watt resistors in parallel) discharge load across the leads. If the relay switching is faulty, this load might possibly remain in circuit and cause the short reading when running the cal. Do you read around 50 ohms across the test jack (If it is lower, then there is an additional short on the circuit)? You should hear some relay clicking when running cal. Do you have solid supply voltage (either +5 or +12v) at all of the relay coils? L2 and L3 have high side switching through their transistors, TR10 and TR9, so their coils have no voltage unless energized. The others have low side switching and have +5v on the coil high side. Finally, there is always the possibility of a welded relay contact if the unit was abused by a previous user (like hooking onto a capacitor charged to 5kv or something).

By the way, do you get an error code when you run a capacitance test?

Sorry I can't check the forum very often right now due to being so busy, but will try to check in on your progress. 📵

Report to moderator Logged



Johnny10

Frequent Contributor



Posts: 714



Re: Sencore LC102 Cap analyzer « Reply #18 on: January 27, 2016, 04:29:38 pm »

Say Thanks

Reply

Quote

Thanks! commongrounder for taking time to go over this problem with me.

Output jack reads 51.9 ohms.

Open switch reads Short

Short switch starts the blinking dash for probe cal without leads attached.

Voltages are at 12V, 5V at relays.

When running Cap Value Test display reads Short

Relays are clicking at Cap Value Test but displays Short with no lead attached.

Leakage test sends entered voltage spike to BNC .

« Last Edit: February 01, 2016, 05:18:23 am by Johnny10 »

Report to moderator Logged



Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B



Frequent Contributor





Country: <u>a</u> 😱

Re: Sencore LC102 Cap analyzer

« Reply #19 on: February 02, 2016, 03:51:00 pm »

Sav Thanks

Reply

Quote

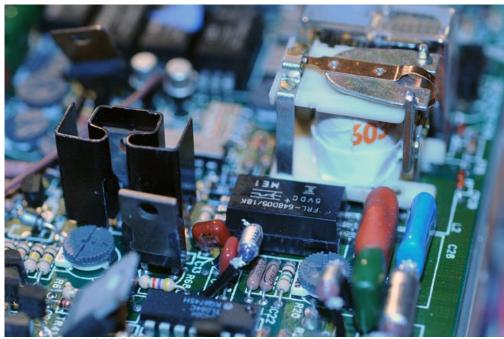
Re-reading this thread I see commongrounder cleaned all the relays in his unit.

Fujitsu FRL-648D05/1AK relays

I cleaned the contacts in the Cornell Dubilier 603-3v relay. Found a Fujitsu relay L8 that is always open and wouldn't close.

After disconnecting this relay I can get the ESR to work (shows accurate result of resistor in test port but still comes up "Short" on Cap Value Test and Zero Cal.

Maybe I am getting closer to solving this problem?



Sencore Relays.jpg (185.95 kB, 772x513 - viewed 690 times.)

« Last Edit: February 09, 2016, 02:44:09 pm by Johnny10 »

Report to moderator Logged



Quote

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

Newbie

Posts: 1 Country: [19]

<u>...</u> Q

Re: Sencore LC102 Cap analyzer « Reply #20 on: October 27, 2016, 08:31:38 pm »

Sav Thanks

Reply

Quote from: ruairi on November 23, 2015, 06:59:08 pm

Bumping this old topic. I have an LC77 (almost identical to LC102) that I bought used recently and it is a really nice machine but has the intermittent sticky relay / Error 4 issue. I'd like to replace all of the relays so I sent Sencore an email looking for replacements for the below.

Schematic Designation	Part No.	Part type	Info on actual component
L1, L9	41G13	Relay, SPST	MBZ, FRL-648D05/1AK, 5VDC
L2, L3	41G6	Relay, SPDT	Cornell Dubilier Electronics, 603-3V
L4	41G15	Relay, SPST	MBZ, FRL-648D05/1BK, 5VDC
L5, L6, L7, L8, L10	41G12	Relay, SPST	MBZ, FRL-648D05/1AS, 5VDC

Also bumping this old topic... working on my LC102 with same intermittent issue when zeroing the cable.

603-3V is still available; it has a contact rating of 2A. It is in series with L3, which in my unit is an Omron G2R-1-E-DC12: this E part has a 16A contact rating, so I'm wondering if L2 might also benefit from a higher contact rating (now that 3V relays are much more commonly used, there are many more options).

I searched for data on the FRL-648 relays and came up with nothing, so I wrote to Fujitsu who kindly and quickly replied with the attached (which they say is all they have on these relays discontinued 20 years ago).

My summary of the FRL-648 parts:

D05 is 5VDC coil, 550 ohms, 45 mw (ie. 9mA), 3.8V pickup

and for /1AK, /1AS, /1BK

1 = SPST

A = form A (normally open)

B = form B (normally closed)

S = 10VA, 500mA, 100V contact rating

K = 50VA, 1A, 100V contact rating

There is a note about magnetic shield inside the mold, but I'm guessing that isn't relevant in this application.

Summarizing the various recommendations from Sencoretech et al, my plan is to replace L1,L2,L9 (possibly with higher contact rating parts), as well as clean the fuse holder and P2&P3 connectors on the main board.

m frl-640.pdf (220.72 kB - downloaded 898 times.)

Report to moderator Logged





Frequent Contributor





Posts: 714 Country: **=**





Say Thanks

Reply

Quote

I don't know if I would change all the relays.

That seems to be the consensus but I found it wasn't a cure all for the problem.

I have a lot of experience with the LC102.

You could say I cut my teeth on this baby.

I took the Omron relays apart, don't and I mean don't cut the top off the relay.

It actually comes apart very easily. Small hidden tab at bottom and lifts off in one piece. No need to cut or slice top. (Sencoretech noted changes in BOM at different serial numbers.

I followed an old thread on different site and they were very wrong for my unit.

Actually there was a lot of incomplete information available.

Really think before you go messing around with the main board as it is very easy to damage.

Most of my problem with error 4 was in the BNC/inline fuse connector, It is very sensitive to movement. (tightening the fuse holder had an effect on my error 4 issue) I cleaned it and still didn't work. It took the intermittent behavior to suggest the Fuse Holder was partial to blame. The LC77 and LC102 are very similar I believe it is just the Leakage voltage that is different. I purchased a LCD Screen from the LC77 and it was identical except for one indicator lamp. Never used it! I did test it in the LC102 and worked fine.

- 1. Check the resistance through the fuse holder first, try tightening while calibrating leads. Check Short Open test while fiddling with BNC connection.
- 2. Be very careful of all wire connectors.... just moving the inter-board connectors will sever the connection on those old thin wires and you won't even see the break. These connectors worked by slicing the insulation during insertion.
- 3. Change all the caps in the power supply. They did not hold up well. Mine leaked under can.
- 4. These are fantastic easy to use Capacitor checkers with lots of great functions.

I also bought 5- 5V Fujitsu relays. NOS FRP645

I will look up the seller. Fairly Expensive.

These old boards are quite easy to damage. ie. lift pads. I lifted a pad removing one of the smoothing caps. Easy to Short them out! Blow them up! Yikes!

Mucking around with those old reed relays may not a good idea.

Maybe that is where all the information came about relay problems?

I shorted one on my board just checking voltages and it was a pain to get it out and find another.

My unit works great now no complaints.

Great addition to the bench.

« Last Edit: October 30, 2016, 08:57:09 pm by Johnny10 »

Report to moderator Logged

Quote

Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

Johnny10

Frequent Contributor





Country: <u>_</u> Q

Re: Sencore LC102 Cap analyzer

« Reply #22 on: October 28, 2016, 12:48:05 pm »

Sav Thanks

Reply

Reply

Reply

Found the supplier of those relays.

http://www.ebay.com/itm/FUJITSU-FRL-648D05-1AS-1-FORM-A-Relay-New-Lot-Quantity-5-/161929708311?hash=item25b3c34317:g:IDkAAOSwnLdWs5uy

As I said I bought 5 of these. Not as expensive as I remembered.

« Last Edit: October 28, 2016, 01:15:20 pm by Johnny10 »

Re: Sencore LC102 Cap analyzer

« Reply #23 on: October 31, 2016, 12:43:15 am »

Once fixed its the best to send it to Sencore for calibration...

Report to moderator Logged

Say Thanks

Say Thanks

Report to moderator



Tektronix TDS7104, DMM4050, HP 3561A, HP 35665, Tek 2465A, HP8903B, DSA602A, Tek 7854, 7834, HP3457A, Tek 575, 576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

Replacing relays, test leads, BNC and fuse holder fix most of the problems. I used different relays, glued them and used wires to connect to PCB. Those two are NLA from Sencore for a long time.

zaoka

Frequent Contributor





Posts: 373 Country:



Re: Sencore LC102 Cap analyzer

« Reply #24 on: October 31, 2016, 01:25:03 am »

Rubidium, Sencore LC102, Tek TG506, TG501, SG503, HP 8568B

Did you see the calibration instructions given by Sencoretech?



Quote

Quote

Johnny10

Frequent Contributor



Posts: 714 Country:



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576, 577 Curve Tracers, Datron 4000, Datron 4000A, uTracer, HP5335A, EIP534B 20GHz Frequency Counter, TrueTime

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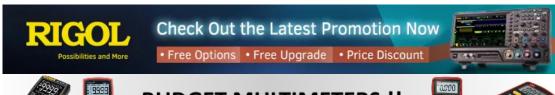


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