

LC75 CALIBRATION PROCEDURE

WARNING: THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

ACCESS/DISASSEMBLY

Access to the interior of the LC75 for recalibration and/or service may be obtained using the following procedure:

1. Unplug the unit from the AC line.
2. Remove the four screws (two on each side) at the rear of the instrument.
3. Place the unit on end with the handle and front panel pointing upward. Pull gently on the handle while holding the back portion of the case. The case will now slip from the chassis and rear portion exposing the printed circuit boards and all the calibration controls.

EQUIPMENT REQUIRED FOR CALIBRATION

The following equipment is recommended for use in calibrating the "Z METER 2". These are high accuracy standards and will allow the calibration of the meter to the specifications in the front of the manual. Lower accuracy standards will reduce the accuracy of the "Z METER 2". If capacitors and inductors of known values are available, they may be used for calibration.

If known values of capacitors and inductors or the following equipment is not available, the meter may be returned to the Sencore Service Department for check out and recalibration for a small service charge.

GenRad model 1491G Standard Inductor (covers all ranges except the 100 uH range of the LC75.

Hewlett Packard model HP16481A 56uH Standard Inductor

Hewlett Packard model 4440B Standard Capacitor Decade (covers all ranges except the 800uf for the top range of the LC75.

500uF film type capacitor (Can be made up of 20-25 uf Film capacitors and then checked out by a calibration lab.)

Digital Voltmeter

Voltage source capable of output of .18 and 1.8 volts DC

1000 Hertz sine wave signal source variable to 4.0 Volts peak-to-peak

Calibrated Scope to measure the amplitude of the 1000 Hertz signal

.01uf, 600V disc capacitor

1/2W, 1% resistors of the following values; 900, 100, 80 and 8 ohms

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1. Connect the DVM between pin 2 of IC1030 and pin 2 of IC1029.
2. Adjust R1071 for a reading of 1.50V on the DVM.

METER CALIBRATION

The internal meter (readout) calibration should be checked and adjusted if necessary before calibration of any of the ranges of the LC75.

NOTE: Do not depress any of the pushbuttons on the LC75 when adjusting the meter zero on the rear of the meter calibration controls.

1. Turn the LC75 on and allow a 10 to 15 minute warm-up period.
2. If the readout does not show 000 with the negative sign appearing occasionally, adjust the rear panel meter zero control until the negative sign is just off or appears intermittently.
3. With the output control of the DC supply set to minimum, connect the positive lead to the front side of R2146. Connect the negative lead to ground. Connect a DVM to the same points. Adjust the power supply for a reading of 1.8 volts DC.
4. Adjust R2011 on the LC75 for a reading of 900 on the display.
5. Reduce the power supply output to 0.18 volts DC and adjust R2006 for readout of 090 on the display.
6. Repeat steps 3, 4 and 5 two or three times as the controls will have some interaction.

The input protection relay trip point adjustment should be made before calibrating the other ranges of the LC75. The following procedure sets up the trip point at which the relay will open the input to the LC75 when an external voltage is applied to the test leads.

1. Connect a DVM to the sixth pin back on the right side of the cap value switch.
2. Connect a power supply set to 7 volts DC capable of delivering 250MA of current to the test leads. Connect the positive lead to the red test lead, the negative to the black test lead.
3. Adjust R2135 so that the DVM reads plus 7 volts DC. Slowly rotate R2135 until the relay opens and the DVM reads 0 volts.

LEAKAGE VOLTAGE TEST

1. Connect the leads of the LC75 to the .1uf cap.
2. Connect the DVM across the leads.
3. Set the "applied voltage" knob to 3V and depress the leakage button.

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4. Check the following ranges:

LEAKAGE SW	DVM
3	2.5 to 3.3v
6	5.1 to 6v
10	8.5 to 11v
15	12.5 to 16.5v
25	21.1 to 27.5v

Note that the LED on the front of the tester flashes in the following ranges:

50	42.5 to 55v
100	85 to 110v
200	170 to 220v
300	255 to 330v
400	340 to 440v
500	425 to 550v
600	510 to 660v

Return the switch to the 400 position.

INDUCTANCE CALIBRATION

The following procedure requires the use of standard inductors or inductors of known value. The inductors of known value must be close to the values shown in the procedure to insure that the proper range is calibrated. Each time a control is to be adjusted, the VALUE pushbutton must be depressed on the front panel.

1. Set all inductance cal pots to midrange (R2106, R2042, R2048, R2035, R2029 R2023 and R2014).
2. Connect the test leads to a standard 80 mH coil. Adjust R2035 for a readout of 80.0.
3. Connect the test leads to a standard 10 mH coil. Adjust R2106 for a readout of 10.0.
4. Repeat steps 2 and 3 at least two to three times as the controls will interact with each other. This sets the linearity of all the inductance ranges of the "Z METER" and calibrate the 10-1000 mH range.
5. Short the test leads together, depress the VALUE button and adjust the front panel LEAD ZERO control for a readout of 000 with the negative sign appearing occasionally.
6. Connect the test leads to a standard 80uH coil. Adjust C2014 for a readout of 80.0uH.
7. Connect the test leads to a standard 800uH coil. Adjust R2023 for a readout of 800uh.
8. Connect the test leads to a standard 8mH coil. Adjust R2029 for a readout of 8.00mH.
9. Connect the test leads to a standard 800mH coil. Adjust R2042 for a readout of 800mH.

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10. Connect the test leads to a standard 8 Henry coil. Adjust R2048 for a readout of 8000mH.

RINGER TEST CALIBRATION

The calibration of the Ringing test is dependent upon the accuracy of the scope used to measure the 1000 Hertz sine wave input on the second half of the procedure.

1. Short the test leads together and set the IMPEDANCE MATCH switch to any one of the BLUE positions.
2. Connect a DVM to the collector of TR2023.
3. Depress the RINGING TEST button and adjust R2088 for a 6.0 to 6.5 VDC reading.
4. Unshort the test leads. Set the IMPEDANCE MATCH switch to any one of the RED (Yoke and flyback) positions. Connect the vertical input from a scope and the output of an audio generator to the input of the "Z METER". The input of the scope and the hot lead of the generator are connected to the red test clip and the ground leads to the black test clip.
5. Set the audio generator to sine wave and the frequency to 1000 Hertz.
6. Depress the RINGING TEST button and adjust the output of the audio generator for a 3.6 volts peak-to-peak reading.
7. Adjust R2083 with the RINGING TEST button depressed so the front panel display on the "Z METER" is counting. Slowly back off until the counting appears to be intermittent or the readout shows some number. The actual number is meaningless and only shows that you have reached the proper trip point in the ringing circuit. Carefully check that the point is the correct one by adjusting the control above and below the point to see that the counting starts and stops.

CAPACITOR CALIBRATION

Use of the standards listed in the beginning of the procedure are recommended. If Calibration must be done with known value capacitors, be sure that the three capacitors are close in value to the ones recommended. Calibrate the meter to read the value of the capacitor used regardless of the value listed for the most accurate readings.

1. Short the test leads together and depress the VALUE button under INDUCTANCE. Check to see that the meter is zeroed. If not, reset the front panel LEAD ZERO control until the readout shows 000 with the negative sign appearing occasionally. Do not touch the front panel LEAD ZERO again until after the next step.
2. Open the test leads and depress the VALUE button under CAPACITORS and adjust the LC zero balance pot on the back of the unit until the readout shows 000 with the negative sign appearing occasionally. This puts the inductance and capacitance lead zero at the same point on the front panel LEAD ZERO control.
3. Connect a standard 8000pf capacitor to the test leads and depress the VALUE button under Capacitors.
4. Adjust R2122 for a readout of 8000pF.

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5. Connect a standard 100pf cap to the test leads and depress the VALUE button under capacitors.
6. Adjust R1069 to 100pf. Rezero and recheck calibration.
7. Connect a standard .800uf capacitor to the test leads and depress the capacitor VALUE button.
8. Adjust R2125 for a reading of .800uf.
9. Connect a standard 800uf cap to the test leads and depress the VALUE button under capacitors.
10. Adjust R2129 for a reading of 800uf.

ESR CALIBRATION

1. Short the test leads on the LC75 and adjust the ESR zero control on the back of the unit for a reading of zero.
2. Connect the leads to a 900ohm resistor, depress the ESR button and adjust R2068 for 900 ohms on the LC75.
3. Connect the leads to a 100 ohm resistor, depress the ESR button and adjust R2077 for 100 ohms on the LC75.
4. Repeat steps 2 and 3 until the readings are accurate, as the controls will interact with each other.
5. Connect the leads to an 80 ohm resistor, depress the ESR button and adjust R2062 for 80 ohms on the LC75.
6. Short the leads and re-zero the LC75 using the front panel control.
7. Connect the leads to an 8 ohm resistor. Depress the ESR button and adjust R2056 for 8 ohms on the LC75.
8. Recheck ESR zero.
9. Repeat steps 7 and 8 until both agree.