



Model 1400

IN-CIRCUIT CAPACITOR TESTER

INSTRUCTION MANUAL

MERCURY
ELECTRONICS CORP.

manufacturers of quality electronic products

INTRODUCTION

The Model 1400 is a valuable service aid for in-circuit testing of all types of capacitors, from the smallest ceramic types to large electrolytics. The 1400 will check for open or shorted capacitors without the necessity of removing them from the circuit. Capacity values are measured in-circuit on all popular electrolytic capacitors.

An important feature of the electrolytic test, not found in other instruments sold even at much higher prices, is the low test voltage that protects the low-voltage electrolytics used in transistor radios. Many of these small electrolytic filters are rated as low as 3 working volts D.C. The Model 1400 tests these and all others with perfect accuracy with no chance of damage.

SPECIFICATIONS

Shorts Test – Effective in-circuit with shunt resistance as low as 6 ohms.

Open Test – Effective on all capacitors in-circuit down to capacitors as small as 7 mmfd.

Electrolytic Test – Values of electrolytic capacity found in-circuit over the range of 2 Mfd. to 450 Mfd.

Indicator – EM84 ultra-modern bar indicator tube. Simple instructions printed right on the instrument panel for accurate interpretation of all test results.

Power Supply – Line isolated with special low voltage for electrolytic test.

Case – Smart modern styling in Mercury's exclusive metal case design. Compartment for coaxial cable and cheater line cord ensures convenient, safe storage.

DESCRIPTION

The simplicity of the Model 1400 Panel is indicative of the ease with which a complete in-circuit test of all the capacitors in a radio or TV set can be accomplished.

The knob at the left controls the functions of the instrument, with steps in proper sequence for normal troubleshooting procedure. This knob also turns on the instrument power. The 1400 panel has a power indicator jewel in the lower right.

The large center dial is used for reading capacity values of electrolytics, both in or out-of-circuit.

The indicating eye is at the upper right. Instructions for proper interpretation of eye readings are printed right on the panel, just above the eye window. This saves value troubleshooting time, and can reduce the diagnosis of a difficult intermittent condition to mere seconds.

The co-axial cable test lead, with fully insulated test clips, is permanently connected to the instrument and stores conveniently in the compartment below the chassis along with the cheater line cord. Tests for SHORTS, OPENS, and ELECTROLYTIC VALUES can be made either in-circuit or out-of-circuit without changing test leads or clips.

OPERATING INSTRUCTIONS

Preliminary

1. Always make tests on a receiver which is disconnected from the power line.
2. Make sure capacitors being tested are fully discharged first. Any charge on capacitors can give erroneous test results and may damage the Model 1400.
3. Plug the Model 1400 into 117V. A.C. power line and rotate left hand knob to the position marked SHORTS. Power jewel will glow and eye indicator bars will glow.

TEST FOR SHORTS

1. With the function switch set to test for SHORTS, connect the insulated clips across the capacitor to be tested, and observe the indicator tube on your 1400 panel.
2. If the capacitor is not shorted, the bars will remain open. If the capacitor is shorted, the bars will close.
3. The results shown by your Model 1400 are accurate whether the capacitor under test is in-circuit or out-of-circuit. Circuit shunt resistances and shunt coils with as little as 6 Ohms impedance will not affect the accuracy of the test.

TEST FOR OPENS

1. Rotate the function switch to the position marked OPENS. Connect the insulated clips across the capacitor to be tested, and observe the indicator eye on your 1400 Panel.
2. If the capacitor is not open the bars will remain open. If the capacitor is open, the bars will close.
3. The nature of the high frequency test provided by the Model 1400 takes shunting components into account. Tests for OPENS will be accurate whether made in-circuit or out-of-circuit.

ELECTROLYTIC VALUE TEST:

1. The test clips can be connected directly across any electrolytic capacitor. Polarity is not important since the 1400 provides an AC test signal of sufficiently low voltage so as not to damage any low-rated capacitor.
2. For multiple electrolytics, test each section separately. Connect one test clip to the common negative terminal, and connect the other test clip to each of the positive leads, one at a time.

Common negative terminal is usually the can (or chassis ground) for metal-cased electrolytics, or the black wire in multi-section tubular electrolytics.

3. Set the function switch to the proper range, either 2-40 Mfd. or 40-450 Mfd. depending on the value of the electrolytic to be tested.

If the value is unknown, try the higher range first, as the larger values are more commonly found in TV sets and radios.

No harm can be done if an electrolytic capacitor is tested on the wrong range.

4. After the test clips are connected, rotate the main dial until the indicator bars are at a minimum opening (barely touching). The pointer will then read the value (in microfarads) of the electrolytic capacitor.

Note that a test for SHORTS or for OPENS may be made on an electrolytic as well as on any other capacitor. However, if an electrolytic capacitor shows a definite value in microfarads, it is neither open nor shorted, so no further test is required.

5. If you cannot get the bars to touch, switch to the other electrolytic range and test for value in exactly the same manner as described in Step 4.

The ranges provided by the Model 1400 cover over 99% of all electrolytics in use today.

6. Shunt resistances found in most electrolytic radio and TV circuits are normally high enough to cause no difficulty during in-circuit testing.

Where no test can be obtained on either range, check the schematic diagram to see if extremely low shunt resistance is in parallel with the electrolytic capacitor. Only on small capacitors (less than 10 Mfd.) is this condition to be expected. In such cases, an out-of-circuit test can readily be made by disconnecting one of the capacitor leads.

TROUBLE SHOOTING WITH THE MODEL 1400

GENERAL

The Model 1400 provides a fast means of troubleshooting open, shorted, or intermitten capacitors. To make a quick in-circuit check of any small capacitor, proceed as follows:

1. With test clips connected across the capacitor, switch to SHORTS. If eye remains open, capacitor is good.
2. Without moving the test clips, switch to OPENS. If eye remains open, capacitor is good.
3. If an intermittent condition exists, wiggle the capacitor during each of the above tests; also try applying heat or cold, or tapping on it, while watching the indicator bars. Any momentary closing of the bars means the capacitor is defective.

TV TROUBLESHOOTING

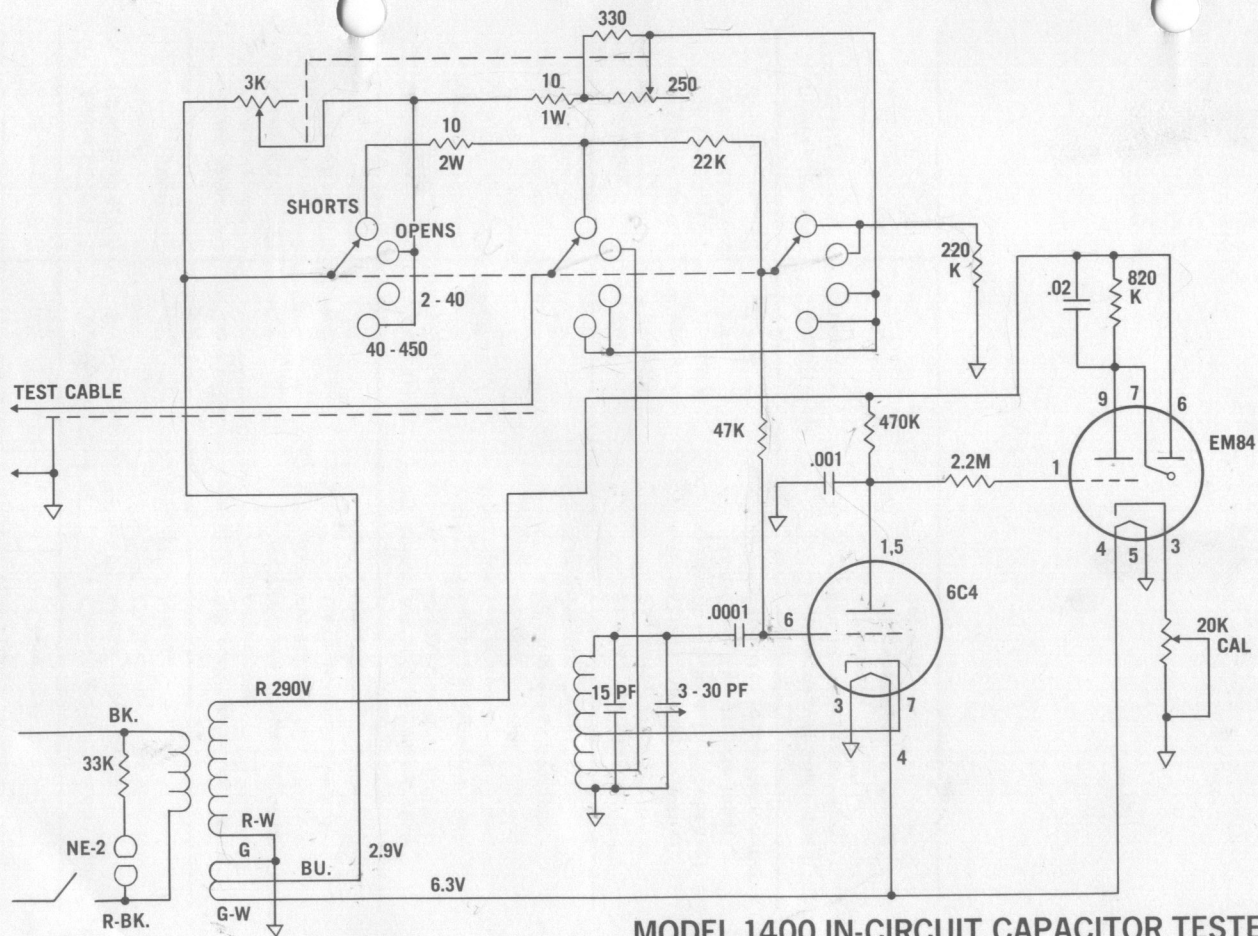
Refer to TV Schematic to locate the following capacitors for quick check with the Model 1400:

Circuit	Trouble	Capacitors to Test
Vertical	Unstable sync.	<ul style="list-style-type: none">. Integrator network. Timing network. Wave-shaping circuit. Feed back network
Sound	Poor quality	Ratio detector electrolytic
Horizontal	Poor sync. or no raster (weak high voltage)	<ul style="list-style-type: none">. All capacitors in duo-diode Hor. AFC circuit. Coupling capacitors to horiz. output tube. Horiz. drive (wave-shaping) capacitor. Horiz. Lin. Coil by-pass capacitors

Circuit	Trouble	Capacitors to Test
Power Supply	Narrow raster	<ul style="list-style-type: none"> . All power supply electrolytics . Boost filter capacitor
Tuner	Blank raster, no sound	<ul style="list-style-type: none"> . All ceramic oscillator capacitors . Tuner B + by-pass capacitors . Tuner AGC capacitors
Sync.	No sync, weak sync	<ul style="list-style-type: none"> . Sync clipper input capacitor . Sync separator screen by-pass and plate coupling capacitors
Color Killer (Color TV)	No color (Black-and-White O.K.)	<ul style="list-style-type: none"> . Blocking capacitor in blanker circuit . Capacitors in killer detector network or phase detector network. . Capacitors in burst oscillator or reactance stages
Color Matrix (Color TV)	Cannot achieve black-and-white picture (discoloration)	<ul style="list-style-type: none"> . Input coupling capacitors to color difference amps. . Input capacitors to color CRT grids . By-pass capacitors in "X" or "Z" demodulators

HI-FI STEREO, UHF, FM, AND FM MULTIPLEX TROUBLESHOOTING

Circuit	Trouble	Capacitors to Test
Audio Output (Monaural or Stereo)	Distortion (one or both channels)	<ul style="list-style-type: none"> . Coupling capacitors to output stage grids . Cathode by-pass electrolytics.
Audio Amp. (Monaural or Stereo)	Low volume	<ul style="list-style-type: none"> . All audio coupling capacitors . Volume control network capacitors . Bass or treble network capacitors
Multiplex (FM)	Poor L-R Separation	<ul style="list-style-type: none"> . All caps. in tuned filter network . Coupling capacitors in L + R and L - R mixer stages . Inverter stage network capacitors
Multiplex (FM)	Only one channel operative	<ul style="list-style-type: none"> . Shorted deemphasis capacitor . Open coupling capacitor in L + R or L - R channel . Open electrolytic input capacitor to Lo-Pass network
Converter (U.H.F.)	No UHF reception	<ul style="list-style-type: none"> . Heater decoupling capacitors . B + decoupling network capacitors . All capacitors in tuning network



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