

Model I service guidelines for the do it yourself person

There are 4-5 versions of the electronics that were made over the 10 years the Model I. Dot clock was in production. The following applies to all of them.

The part that you will replace the most is the transistors that drive the lamps. Even a careful owner will occasionally forget to unplug the clock and try to change a burned out lamp. If the bronze lamp clip touches the aluminum sheet with the power on and the transistor is trying, at that moment, to turn on that lamp -pop goes the transistor. There are 12 of these transistors. They are all in a row near the PC board connector. Just trace the wire from the lamp/s that don't light back to the circuit board. The transistor you find is the one that is dead. The **2N4401** is usually the easiest to find as a replacement. The collector goes towards the connector.

If the clock is skipping over the high times 10-11-12 o'clock, then check the large 1000mfd, 16V power supply filter capacitor on the left end of the PC board. It should have 13-16VDC on it and less than 1.5VAC of ripple. If the ripple voltage is more or the DC voltage lower change the cap with a **2200mfd, 16V** one. Of course watch the polarity. The + end of the cap is towards the power diodes.

If the clock seems to keep time for 2-3 hours then either stops or skips to a totally new time, the big power darlington regulator transistor has gotten intermittent on you. This is the transistor that is glued to a scrap of the frame, used as a heat sink, on the left side of the clock (not any part on the circuit board). A **TIP31A** works fine as a replacement. Use clear silicon adhesive. Make sure to push the transistor down and get all the glue squeezed out from under so the transistor is in intimate contact with the **anodized** aluminum heat sink. I do not try to remove the old bad transistor, but just glue the new one just above the old one. Wait 24 hours for the silicone to dry then unsolder and move the wires to the new transistor. The reason I put anodized in bold print above is to emphasize that anodized aluminum is an insulator (not electrically conductive). You don't want the underside, collector, of the power transistor to be touching a sharp edge (not anodized) of the heat sink. This would short out the regulator and put too much voltage on aluminum sheet and thus to all the lamps, drastically shortening their life.

The DC voltage on the aluminum sheet depends on the amount of light going to the photo resistor facing out on the front of the clock under the minute lights. With minimum light the voltage is set to approximately 8.5 VDC. The pot on the board adjusts this voltage. Too high and the lamps will burn out too fast, too low and the 5VDC to the TTL counting IC's will cause trouble.

Not much else fails with any regularity - the fuse on rare occasions. It is a 5/8 amp slow blow.

Occasionally I have seen the printed circuit board edge connector make poor contact to the traces going out to the big power darlington regulator. When this happens several parts usually fail - the 2N3053 that is closest to the corner of the board (there is another one with a heat sink nearer the center of the PC board), the 6V zener diode and the 2N3643. After replacing the bad parts try using a x-acto knife to bend the PC edge connector pins to increase the tension on the board traces.

Another rare occurrence is the 4030 IC will fail to drive and turn on the 1,2 or 20 minute light transistors. You can replace the 4030 with a 4071, which is usually easier to find.

On other rare occasions the 4020 counter has failed.

The lamps are #330.

That's about it. 28 years of trouble shooting this clock in a nutshell. Good luck. Barry Gamble