

Modifying the Con-Cor Air-car to use the TCS M4T decoder!

by Charles Long

BACKGROUND:

Out of the box the Con-Cor car has the following deficiencies when compared to both the prototype and current NMRA standards. The headlight operates in both forward and reverse by bridging the white and yellow function wires with a diode rather than setting the white function to be operative both forward and reverse using the appropriate CV available in most good decoders. Con-Cor developed a circuit so the taillights operate automatically when the car is completely stopped, not the more realistic as the car is preparing and coming to a stop as provided by the Train Control Systems M4T decoder using the yellow function wire. Also, the interior lights are always on as long as the car is on a powered track. On the prototype cars, the interior lights are under operator control with toggle switches on the “gang switch” panel at the operator’s fingertips. On an operating model this can be duplicated with a DCC function.

To plug a TCS M4T decoder into the NMRA socket installed on the Con-Cor PCC circuit board and fully utilize all the provided functions the following changes need to be made:

Note 1. These modifications could void your Con-Cor warranty so proceed at your own risk.

Note 2. It is also assumed that anyone attempting this procedure has the knowledge and ability to perform soldering of microelectronics components. We do not assume any total or partial responsibility for any damage done to the car or the individual.

Note 3. Please read the entire procedure twice before proceeding to understand all the requirements

CONVERSION PROCEDURE:

1. Remove the surface mounted components labeled D5, D6, D7 and D8 from the rear of the circuit board and remove the surface mounted component labeled D2 from the middle of the circuit board. Figure 1 shows the top of the original circuit board before any modifications.

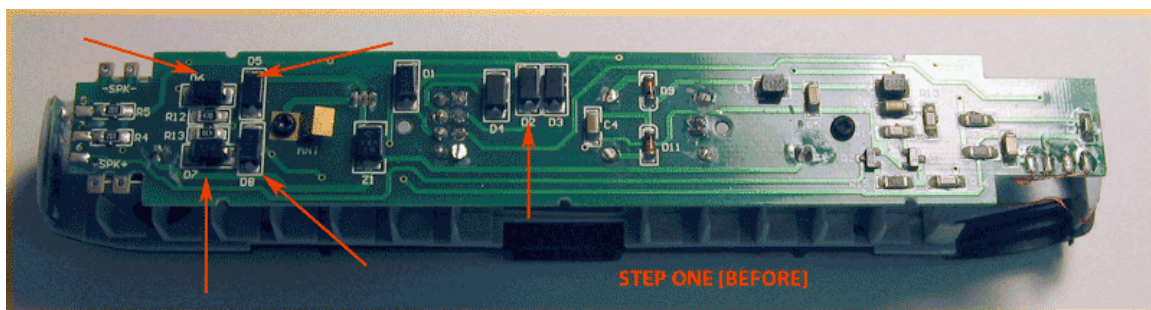


Figure 1 – Top of Circuit Board

Figure 2 shows a close up of the board after components D5, D6, D7, D8 and D2 after they were removed.

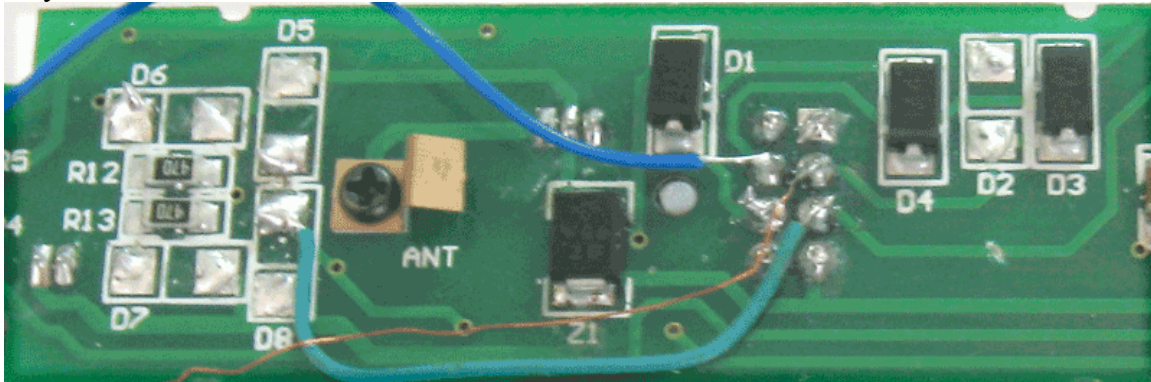


Figure 2 – Top Circuit Board after Modifications

2. On the underside of the circuit board remove surface mounted components D10 and D12 in the middle and also U1 at the rear.

Note 4: I was able to unsolder the various surface mounted diodes but I crushed U1 with diagonal pliers and unsoldered the remains. These components are removed to isolate the lighting circuits from the motor and power circuits to avoid decoder short circuits.

Figure 3 shows the underside of the circuit board in its original condition:

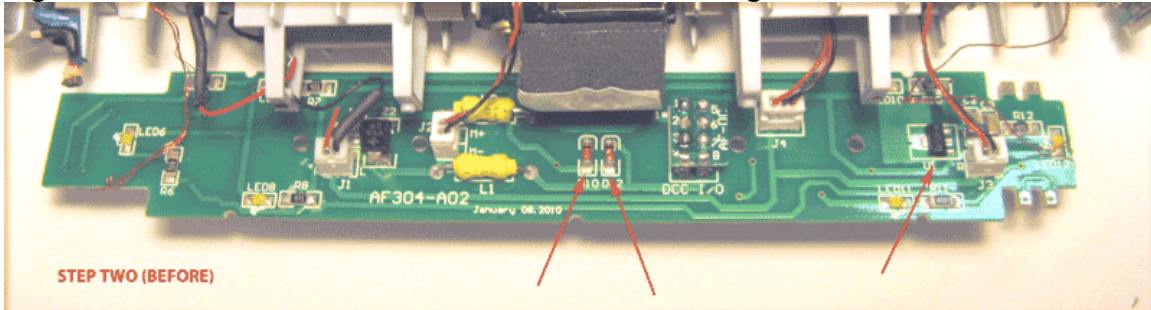
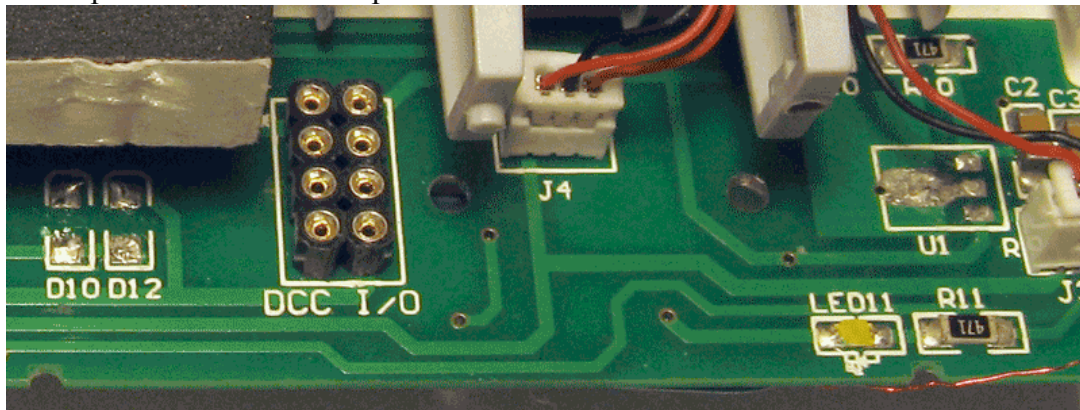


Figure 3 – Bottom of Circuit Board Before Modifications

The next photo shows a close up of the underside of the board after the modifications.



3. Unsolder the enameled taillight wire from tab 6 at the rear of the circuit board and resolder to the top circuit board side of the NMRA socket pin No. 2. Be careful when soldering to the circuit board side of the NMRA socket that you do not create any “solder bridges” between the closely spaced pins.

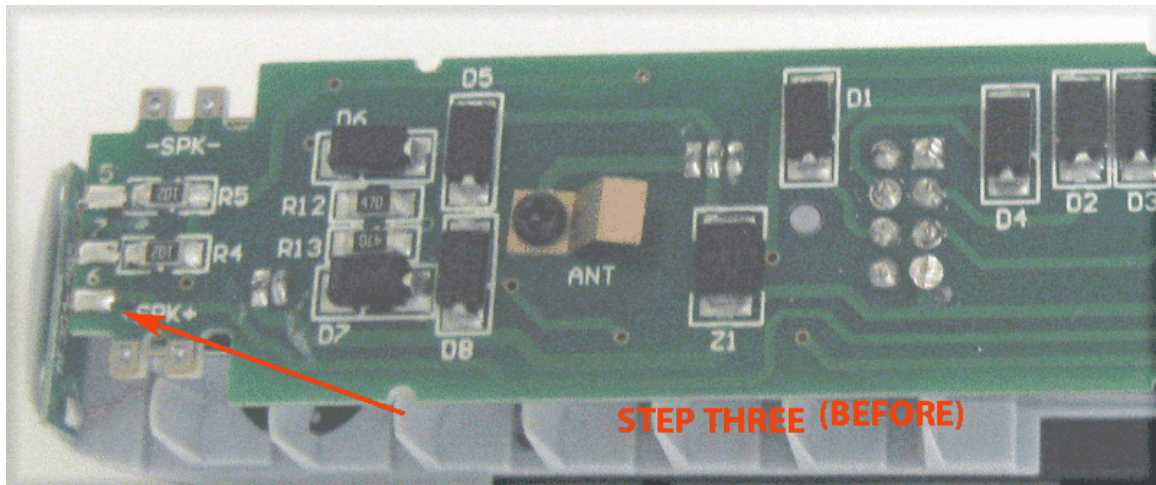


Figure 4 – Rear of Top Circuit Board prior to modifications.

4. Using a blue wire to be consistent with NMRA standard coding, run a jumper from the top circuit board side of the NMRA socket pin No. 7 to R5 at the rear of the car. Solder to the R5 terminal closest to the middle of the car, not the terminal that connects to taillight tab 5.

5. Using a green wire, again to be consistent with NMRA standard coding, run a jumper from the top circuit board side of the NMRA socket pin No. 3 to where D8 was removed just behind the trolley pole terminal. Solder to the D8 pad between the trolley pole terminal and R13.

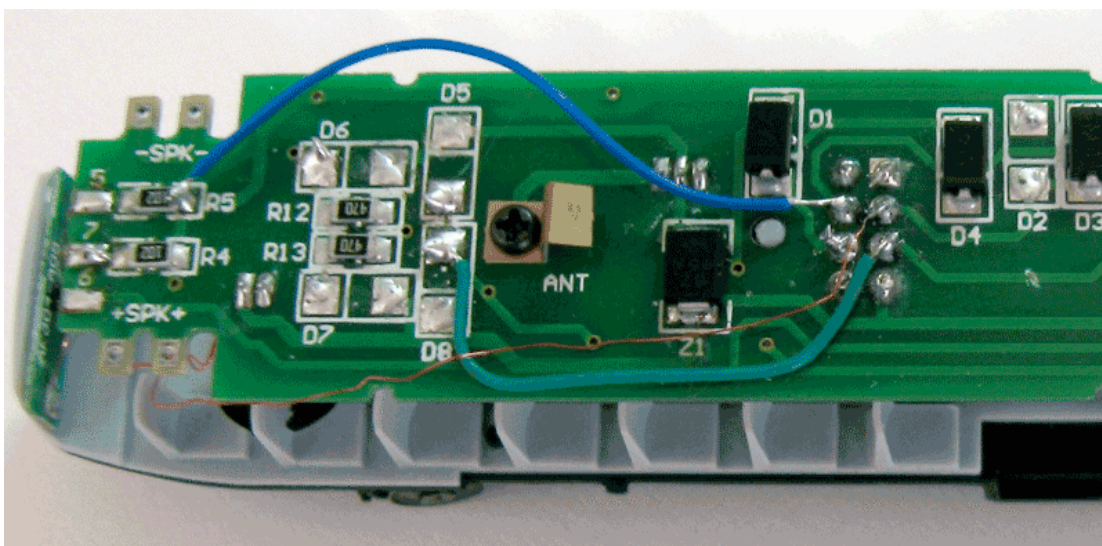


Figure 5 – Rear of Top Circuit Board after modifications were completed

6. Con-Cor wires a red LED for the Next Car light to Pin 3 of the NMRA plug. *(Only Brooklyn and Boston 3001 actually had them so it is unneeded on all other cars.)* Since we are connecting the interior body lights to Pin 3 we also need to cut the circuit board trace between Pin 3 and the Next Car LED to keep the Next Car LED from coming on when the interior lights are turned on. This trace can be cut just opposite where D2 was removed. If you are modeling a prototype with the Next Car light and want to keep Pin 3 connected to the Next Car LED the purple wire of the decoder can be hardwired to the D8 pad in place of the green wire jumper from Pin 3 of the NMRA socket. Figure 6 shows where the trace was cut to eliminate the next car light.

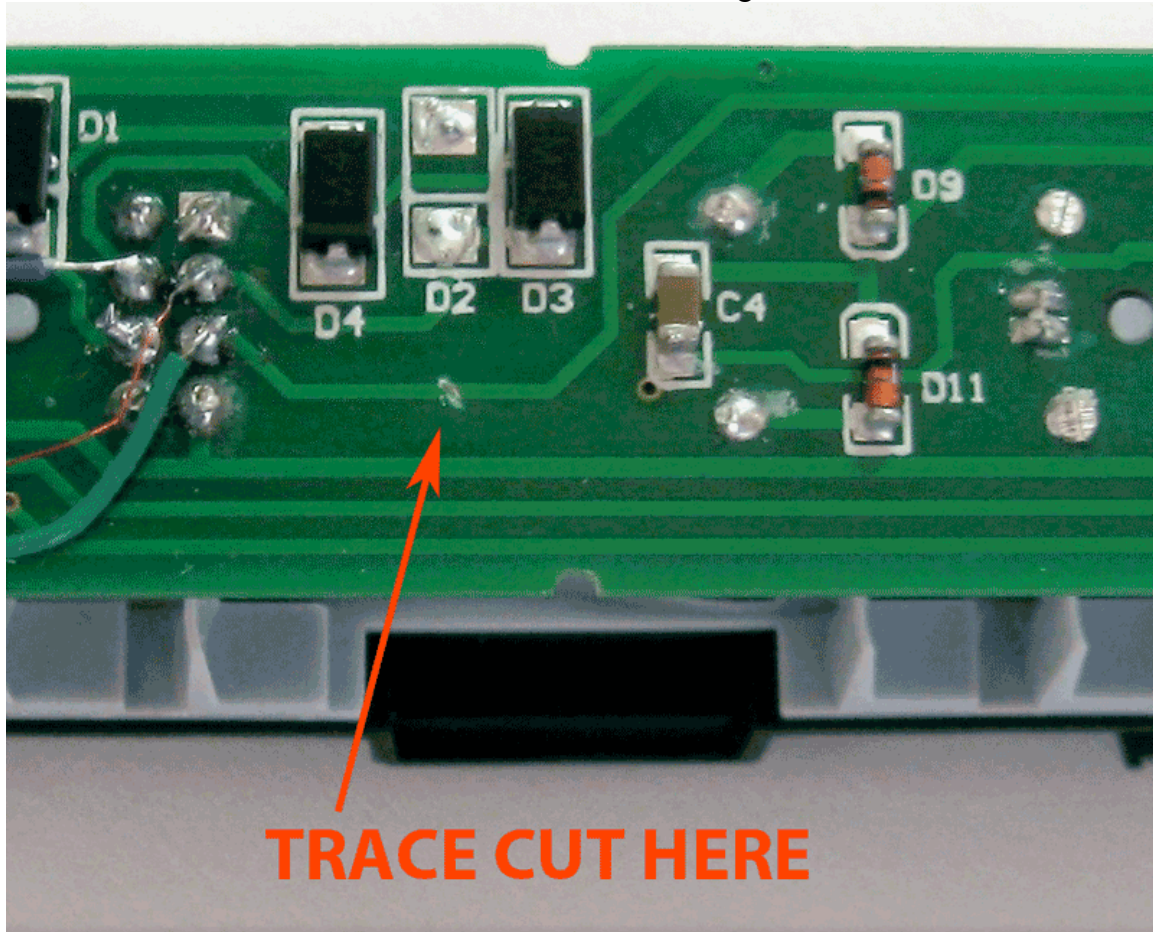


Figure 6 – Indicating where the trace for the unneeded next car light was cut.

7. The LED for the destination sign is wired to the headlight circuit and this is probably sufficient for most modelers. However, most prototype PCC cars have the destination sign lights as part of the interior light circuits. Advanced modelers could cut a trace and run a jumper to make this change but probably not worth the extra effort.

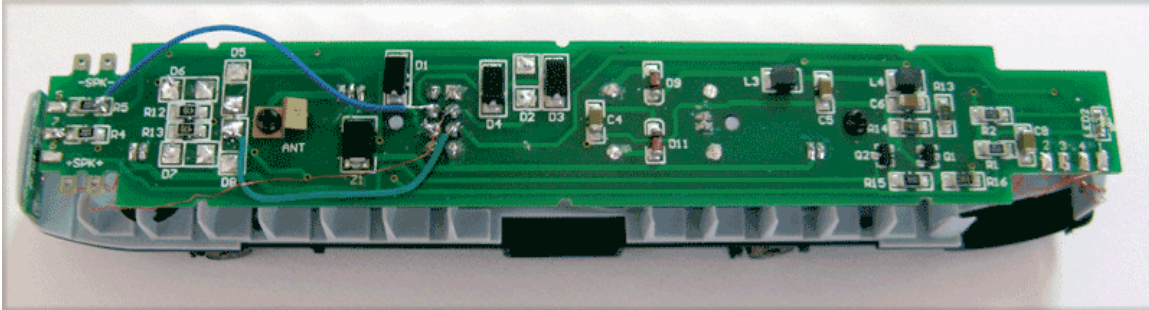


Figure 7 – Completely modified top circuit board.

The specific chassis modified by Charlie Long and shown in this article was sent to the Southern California Traction Club for testing in mid-September 2010. It was placed in a Con-Cor Philadelphia 2013 shell, which had been modified to PRT 2013 by George Huckaby. It was operated on the club test track and some of the modules as shown below in Figure 8.

F0 now operates the headlight and destination sign illumination.

F1 now operates the interior lights.

F3 now allows the brake lights to illuminate.

F6, when running, activates the brake light and slows the car to a stop. It requires another activation of F6 to get the brake lights to go off and return the car to the previous speed.



Figure 8 – Con-Cor PRT car 2013 with “What-If” PTC 1930 Brill Peter Witt 9169.