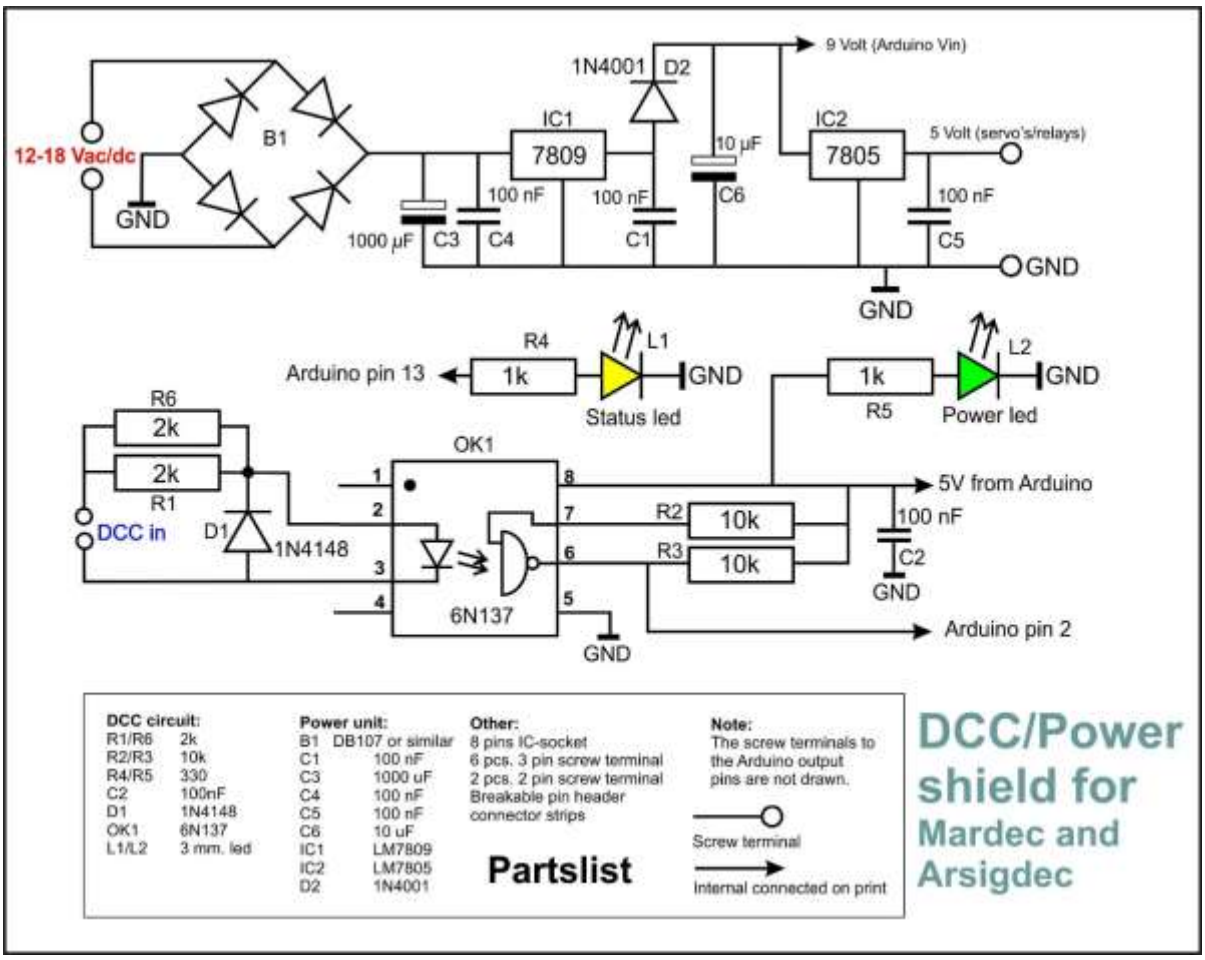
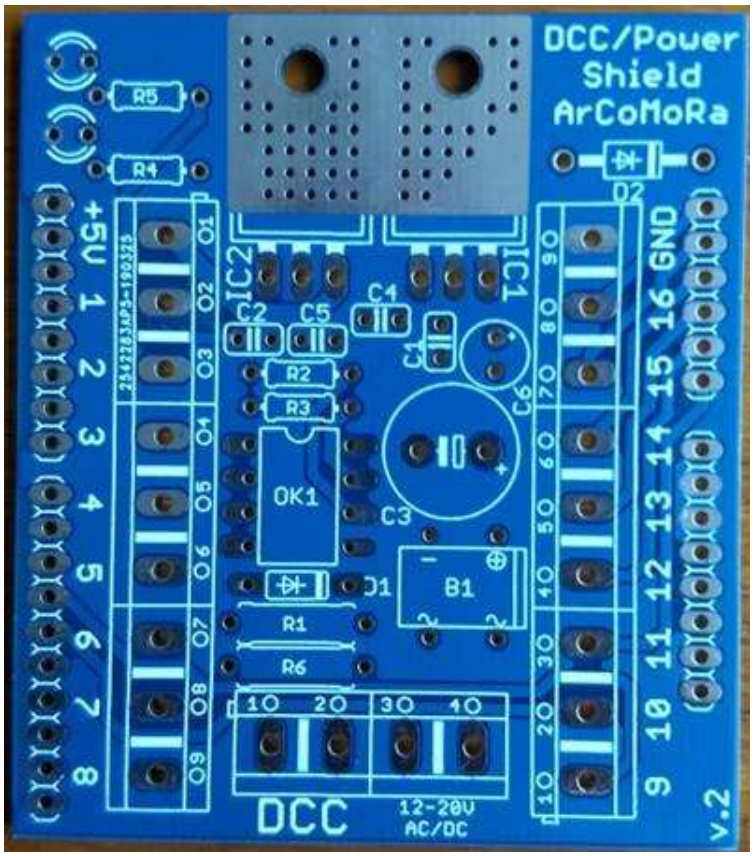
Installation/assembly manual for DCC/Power shield



The DCC circuit consists of the following components:

R1/R6 2 kΩ resistor ½ Watt *(color code Red/Black/Black/Brown/Brown)*

R2/R3 10 kΩ resistor *(color code Brown/Black/Black/Red/Brown)*

R4/R5 1 kΩ resistor *(color code Brown/Black/Black / Brown /Brown)*

D1 1N4148 diode

C2 100nF ceramic capacitor

OK1 6N137 optocoupler *(also white version)*

L1 3 mm LED yellow or red

L2 3 mm LED green

IC-socket (DIP8 for 6N137}

The power part consists of the following components:

B1 DB107 1 Amp Bridge rectifier.


C3 1000 µF electrolytic capacitor

C1/C4/C5 100 nF ceramic capacitor

C6 10 µF electrolytic capacitor

IC1 Power IC 7809 (9 Volt)
IC2 Power IC 7805 (5 Volt)
*(Please note that these are two different !C's!)*

D2 diode 1N400x

Other parts:

6 x 3 pin terminal block (TB}

2 x 2 pin terminal block (TB}, (or 1 with 4}

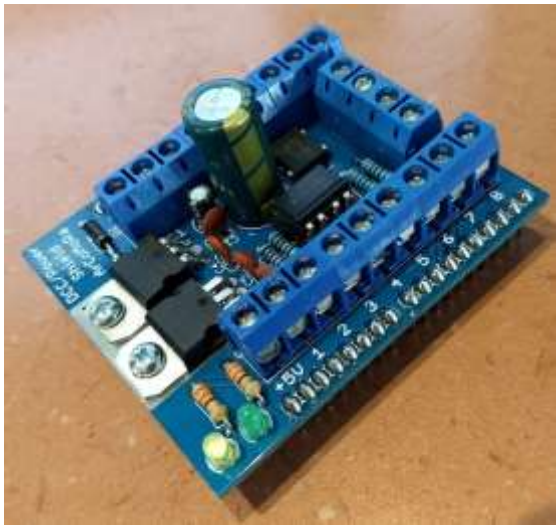
1 x DuPont male headers, strip of 40 pins.

2 x M2.5x5 mm bolts & nuts

All components are placed on the printed side of the board.
The location of each component is indicated by the component code.

Assembly order

1. Place and solder resistors R1 to R6. (Note the correct colour code}.
2. Insert and solder diode D1. Please note the correct orientation! The stripe (cathode} is toward the rectifier bridge (DB107}.
3. Place and solder the IC socket for 6N137. Place the notch toward R2 and R3.
4. Place and solder capacitor C2 of 100 nF
5. Place and solder the LEDs L1 and L2. Please note the correct orientation!
   The short leg (cathode} is near the edge of the board!
6. Insert the 6N137 into the IC socket. Please note the correct orientation! The spot (pin 1) is near the terminal block.



The next steps depend on how you want to use the power supply on the board.

Option 1: External power supply
No further components are required.
Connect a DC power supply of 7-12V to the jack plug of the Arduino. There will not be any 5V feed at the terminal block. The DCC circuit is powered by the 5 Volt output from the Arduino.
Continue to point 14.

Option 2: Power supply using the power components on the board.
Connect an AC or DC power supply to the power terminals. You will then have 5V available at 5V connector.

7. Place and solder the bridge rectifier B1. Please note the correct orientation!
8. Place and solder the capacitors C1 and C4, each 100 nF
9. Place IC1 (7809}. First bend all three pins, with suitable pliers or tweezers, to 90 degrees, so that, when the pins are inserted into their relevant holes, the mounting hole lines up with the mounting hole on the PCB. Solder the connections and fix the IC with the M2.5 bolt and nut.
10. Place and solder capacitor CS of 100 nF.
11. Place and solder capacitors C6 (10 µF} Please note the correct orientation. The positive (+} of the capacitor in the little hole goes to the (+} on the PCB. The capacitors are marked with negative (-}.
12. Place and solder IC2 (780S} in the same way as IC1 (Point 9}.
13. Place and solder diode D2. Note the orientation: the band to the outer edge of the PCB.

For both options:

14. Connect 3 x 3 pin TBs together (now a 9 pin TB}. Each TB has a slot on one side and a vertical lug on the other, allowing them to slide together.
    Do the same with the other three.
    Do the same with 2 x 2 pin TBs. If you are just using Option 1, then you only need 1 x 2 pin TB in the place marked DCC.
15. Insert the 2 x 9 pin TBs in the board, ensuring the cable entry holes face outwards and turn the board over. Because none of the components are higher than the top of the TBs then the board should be flat lying on the top of the TBs.
16. Solder the TBs.
    Tip: first solder the outermost pins of the three blocks. They are then fixed and can no longer fall out.
    Check whether they are nice and straight. Correct if necessary, and solder the other pins.
17. With snips or cable cutters, cut 4 pieces from the 40 pin male headers strip, with lengths of 6, 8, 8 and 10 pins. Fit the header pieces to the Arduino (long pin} and place the PCB on the pins (short pin}. Now solder just two end pins of each header strip. Ensure that the connectors are tight against the board. To prevent excess heat to the Arduino, remove the board with the headers from the Arduino. Check the header strips are tight against the board, and correct as necessary. Then solder the rest of the header pins.
    After that you can fit the board on the Arduino.

*Only for option 2:*

18. Place capacitor C3 (1000 µF}. Please note the correct orientation. The positive (+) of the capacitor in the little hole goes to the (+) on the PCB. The capacitors are marked with negative (-).

The board is now finished. Connect the DCC signal to the scre connectors marked DCC.

If you use an external power supply for the Arduino (7-12 volts DC) then connect it to the jack plug of the Arduino.

If you are using power supplied by the board, connect a supply of 12-18V AC or 12-20V DC. The polarity is not important as the bridge rectifier will handle the polarity.

The power supply for servos and relays can now be connected to the + SV and GND screw connectors on the board.

Note: Make sure you do not draw more than 0.5A from the on-board S V power supply. More than 0.5A cannot be delivered! If you have a lots of servos and relays, then use a separate power supply.

Make sure that any external power supply is also grounded using the GND connection on the bo