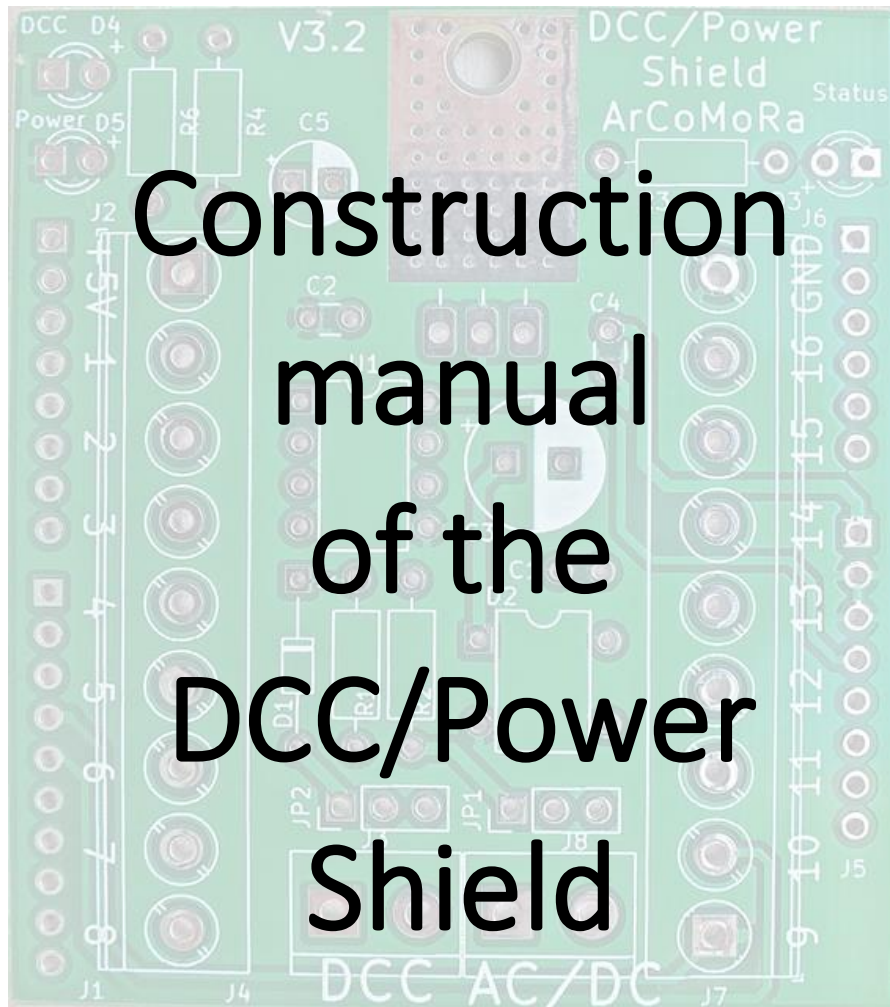


# ARCOMORA

## ARDUINO CONTROLLED MODEL RAILWAY

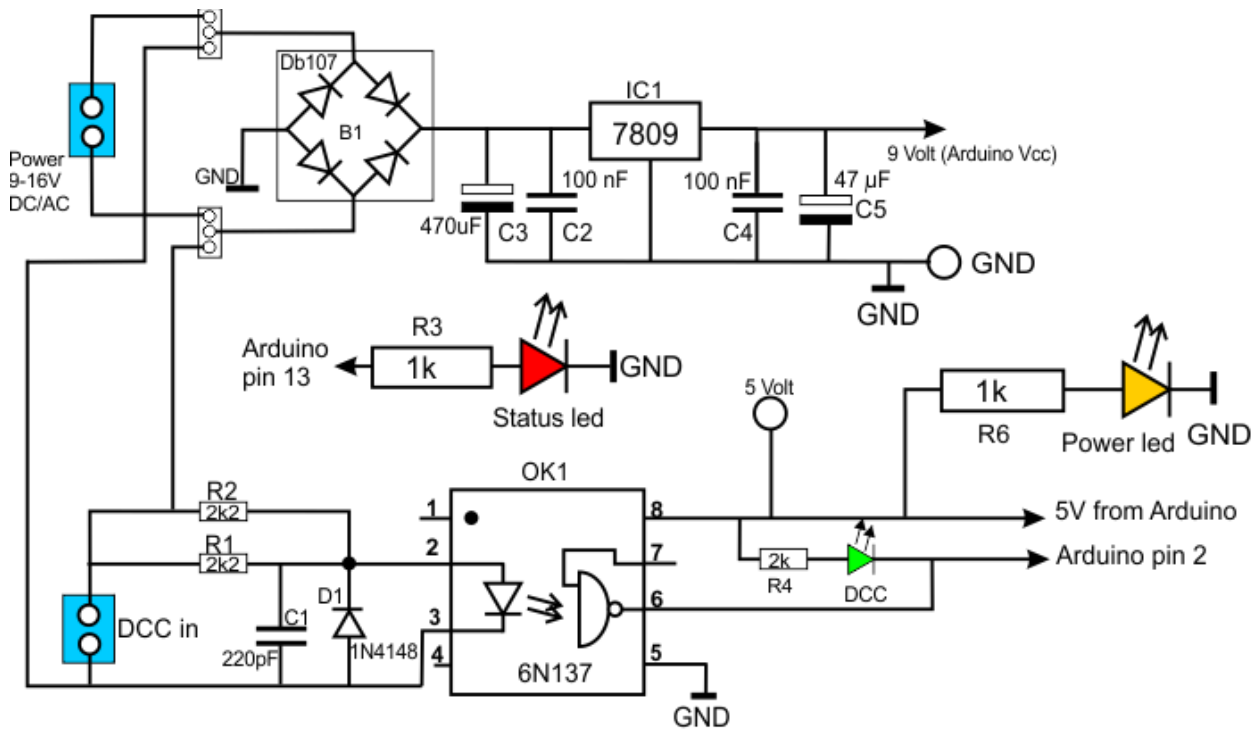


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Version of DCC/Power Shield: 3.2

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## Schema:



**DCC circuit:**  
R1/R2 2k2 1/2 Wat  
R3/R5 1k  
R4 2K  
C1 220pF  
D1 1N4148  
OK1 6N137

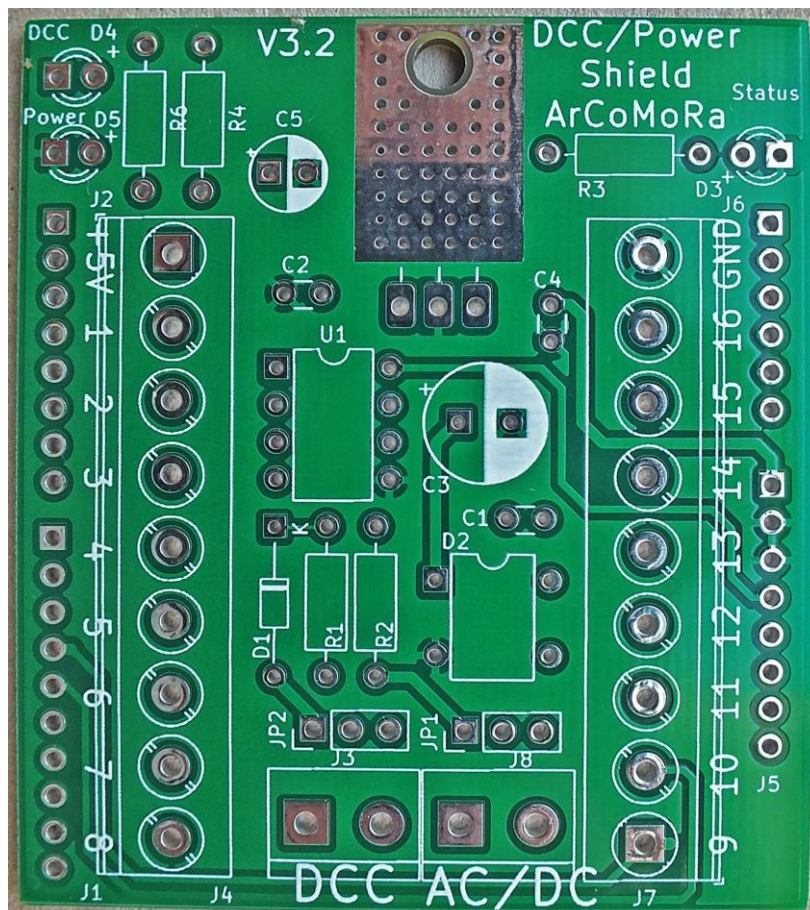
**Power unit:**  
B1 DB107 or similar  
C1 220 pF  
C2 100nF  
C3 470 uF  
C4 100 nF  
C5 47 uF  
C6 10 uF  
IC1 LM7809

**Other:**  
8 pins IC-socket  
6 pcs. 3 pin screw terminal  
2 pcs. 2 pin screw terminal  
Breakable pin header  
connector strips

**Note:**  
The screw terminals to the Arduino output pins are not drawn.

—○—  
Screw terminal  
—→—  
Internal connected on print

## Partslist







### Assembly order:

- 1) Place and solder resistors R1 to R6. (Note the correct colour code, there is no R5).
- 2) Insert and solder diode D1. Please note the correct orientation!
- 3) Place and solder the IC socket for 6N137.
- 4) Place and solder capacitor C1 (text: 221 or nothing)
- 5) Place and solder the LEDs. 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 next steps depends on how you want to power the shield.

#### Option 1: External power supply on the Jack plug of the Arduino

Connect a DC power supply of 7-12V to the jack plug of the Arduino. The DCC circuit is powered by the 5 Volt output from the Arduino. There is also 5V available on the 5V terminal.

Continue to point 11.

#### Option 2:

Use the power components on the board.

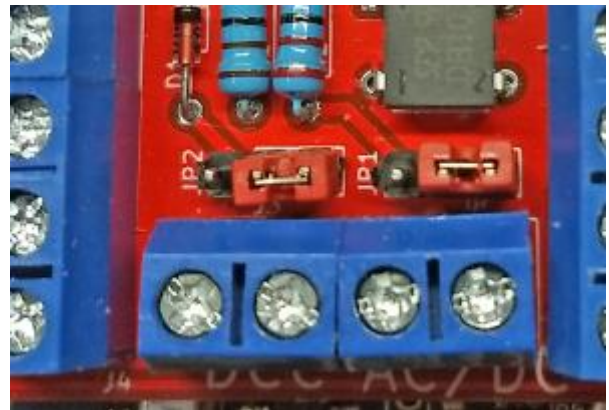
You can apply power in two ways:

- A) with the DCC signal from the DCC terminals
- B) with an external power from ac/dc terminals

For both ways place and solder 2 x 3 Dupont pins.

For ac/dc power place the jumpers over the middle and right Dupont pins (as in picture)

For DCC power place the jumpers over the middle and left pins.



- 7) Place and solder the bridge rectifier B1. Please note the correct orientation!
- 8) Place and solder the capacitors C2 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 capacitors C5 (47  $\mu$ F) 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 (-).

### For all options:

11) 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.

12) 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.

13) 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.

14) 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:***

16) Place capacitor C3 (470  $\mu$ F). 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 screw connectors marked DCC.

**Option 1:**

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

**Option 2:**

If you are using power supplied by the board:

- A) Connect a power supply of 12-16V AC or DC. The polarity is not important as the bridge rectifier will handle the polarity and place the jumpers over the middle and right pin.
- OR
- B) Connect the DCC signal to the DCC terminals and set the jumpers over the middle and left pin

**Note:** On the 5V screw terminal you can connect a single servo or relay for testing. Make sure you do not draw more than 0.5A from this 5 V power supply. If you have a lots of servos and relays, then you must use a separate power supply.

