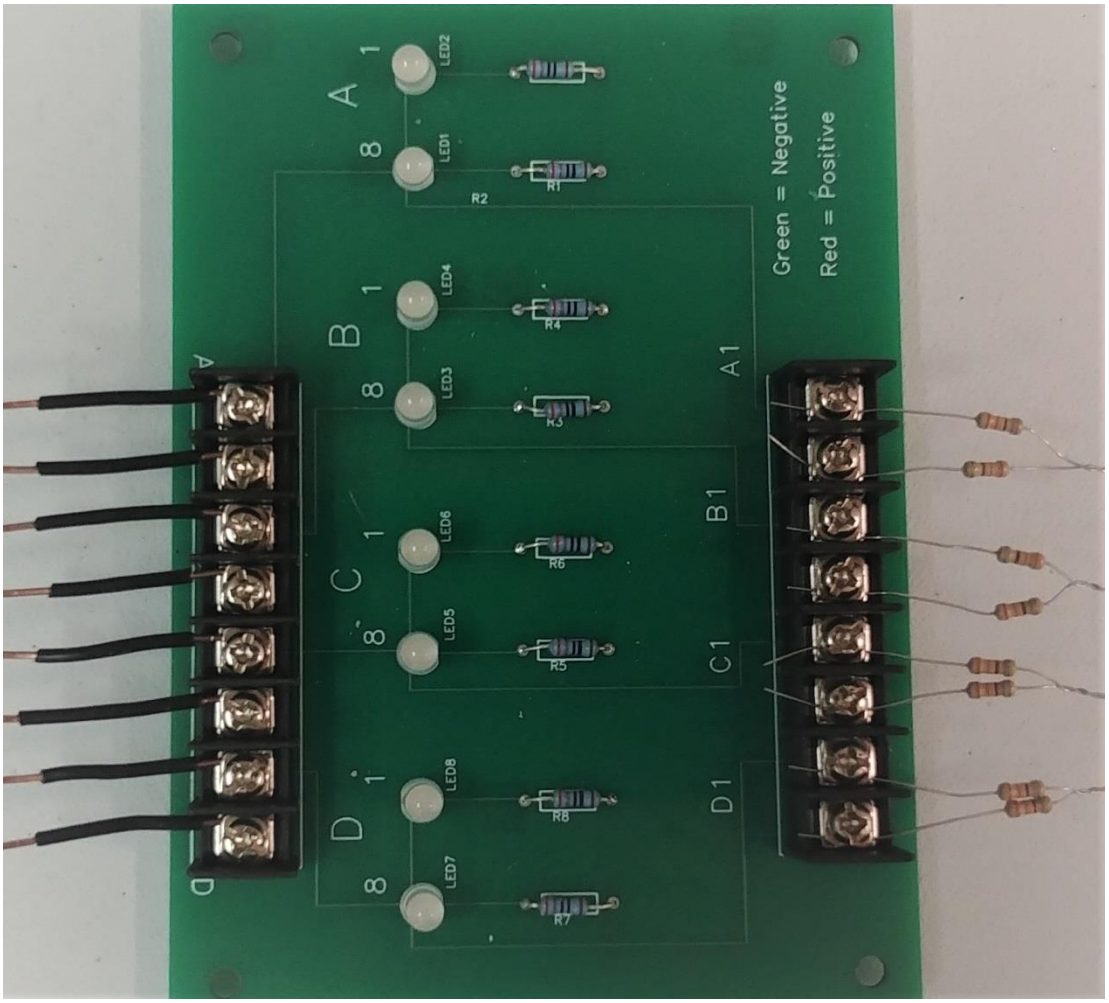
C/MRI Tortoise Matrix Setup Card

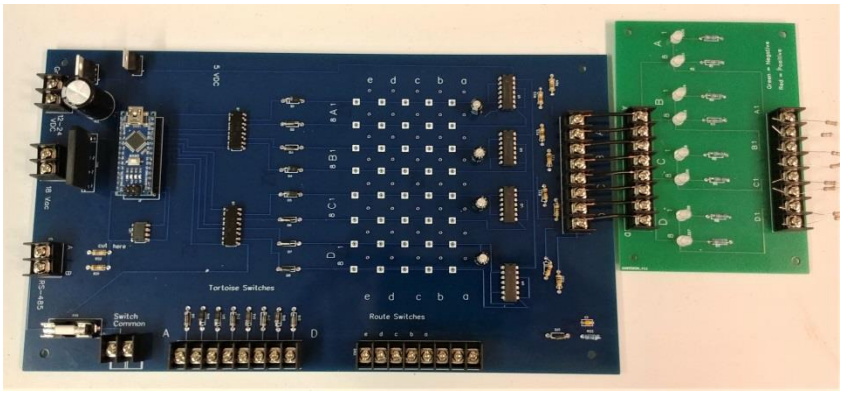
This card is designed to be used in conjunction with the Tortoise with Matrix Routing Card. Its purpose is to help the user to determine the negative control line going out to the stall motor.



The left edge terminal strip connects to Tortoise Matrix Board right edge terminals labeled D, C, B and A (see below) The card receives its power through this connection.

The right terminal strip is where the stall motors are attached.

There are no other external connections to this board.

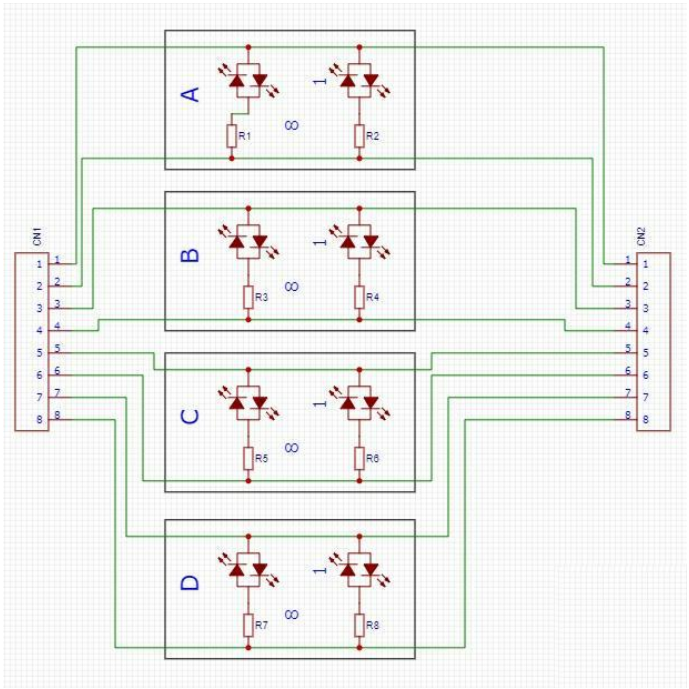


Here the Setup Card is shown attached to the Tortoise with Matrix Routing Card. NOTE: The resistors on the far right simulate where the tortoise motors would connect.

Schematic Overview:

Please don't be alarmed by the following schematic, mastery is not necessary to use the Matrix Setup card. It is included for a more in-depth understanding of how the card works and will allow advanced users to adapt the card for other purposes.

Each circuit is identical so we'll describe stall motor "D"



Blow up the PDF page for more clarity

Power sources:

The left edge terminal strip connects to Tortoise Matrix Board right edge terminals labeled D, C, B and A (see below) The card receives its power through this connection.

Card Labeling:

Stall motor D is labeled with a large D, 1 and 8 and this is an extension of the control line labels found on the Tortoise Matrix Card. (Each stall motor is labeled this way.)

There is also silk screen labeling showing what each color represents. Red = positive while Green = Negative control line.

CN1 and CN2:

The card acts as a power pass-through board with a few components in between. Follow CN1 terminal (7) and (8) and you can see that there is a direct connect to CN2 terminal (7) and (8).

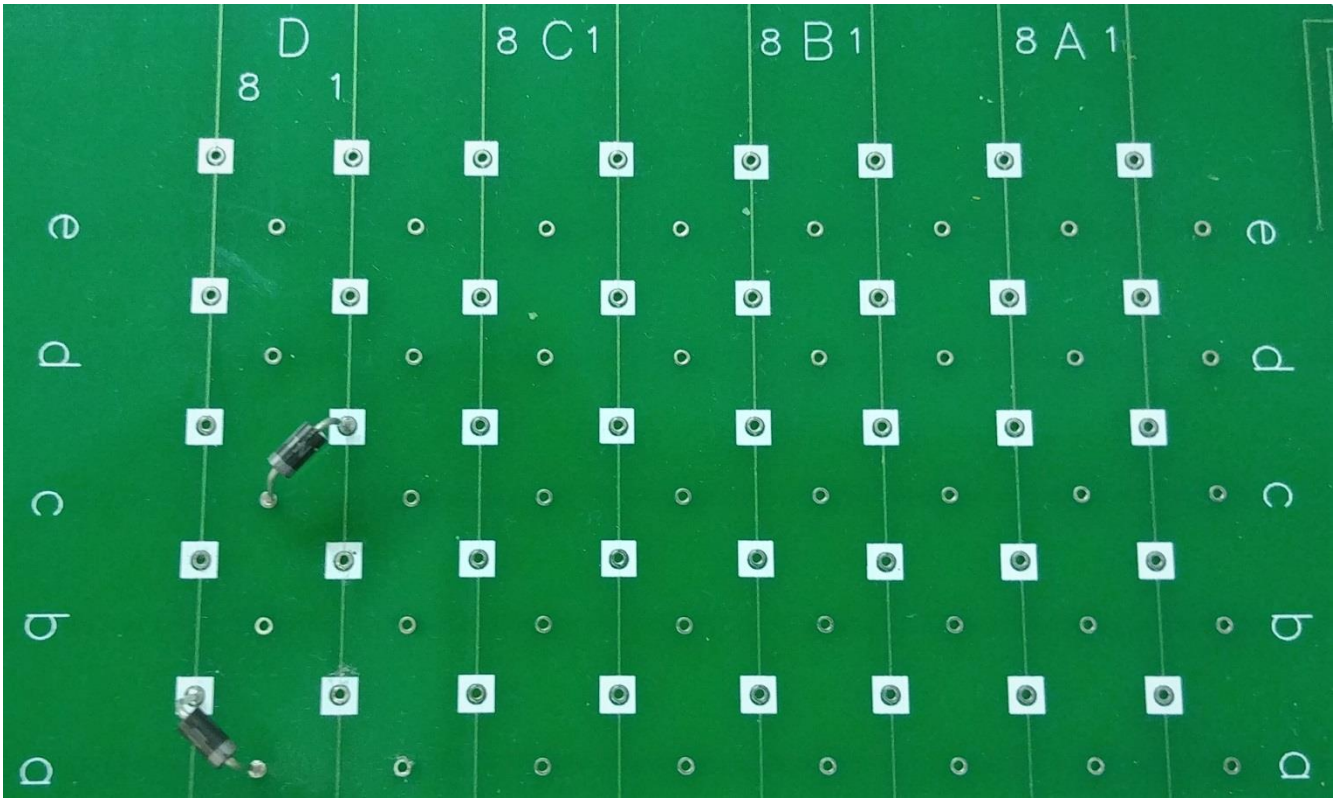
The Magic Box:

The schematic shows two LEDs with dropping resistors surround by a box outline. Each stall motor has an identical box. These LEDs are referred to as Red/Green LEDs and they display both colors depending on how the power polarity is assigned. Each LED is installed so that the leads are reversed (this reverses the cathode polarities for each internal LED) One LED is labeled as (1) and the other as (8).

How to use this board:

We'll use stall motor D to illustrate how to use this board as each motor is identical.

- Attach the left terminal strip to the Tortoise Matrix Card
- Attach all stall motors to the right hand terminal strip honoring the pin 1 and pin 8 connections from the motors,
- Using the Tortoise Matrix Card local controls (Tortoise Switches) set each turnout to the position you want for that route (Closed / Thrown.) We'll be starting with route "c"
- Observe the color of the two LEDs one will be red and one will be green. We'll assume that LED "D-1" is green.
- The labeling on the Matrix Setup Card reminds us that a GREEN LED indicates the negative control line.
- The negative control line is the one we need to work with



Tortoise with Matrix Routing Card -- Matrix

Now shift your attention to the Tortoise Matrix Card

- Find the capital “D” and the two vertical control lines labeled 8 and 1. This is the stall motor we wish to control.
- Now find the lower case “c” which is route c. It has eight small dots running horizontally across the board. This is the route we want to connect to stall motor D.
- **Observe the diode polarity** Diodes usually have the negative side identified with a white or silver stripe.
- Place the positive side of the diode into the square on the D-1 control line.
- Place the negative side of the diode into the circle on the route “c” line.
- Repeat the diode placement for the remaining 3 stall motors to complete route “c”
- Once the diodes are in place you can now test route “c” using the Diode Matrix Board local control switches labeled “Route Switches.”
    - Frist use the Diode Matrix Board local control switches labeled “Tortoise Switches” to move the stall motors to positions opposition of route “c”
- Toggle the “Route Switch” for “c” and all four motors should move to form the desired route.

Also pictured is stall motor “D” with control line 8 set to negative and connected to route “a”

Each stall motor has five squares on each control line; this allows the stall motor to be connected to each route as needed.

Configuring JMRI to use the board as C/MRI hardware:
There is no JMRI configuration associated with this board

Arduino Code:
There is no Arduino code associated this board.