Construction Manual

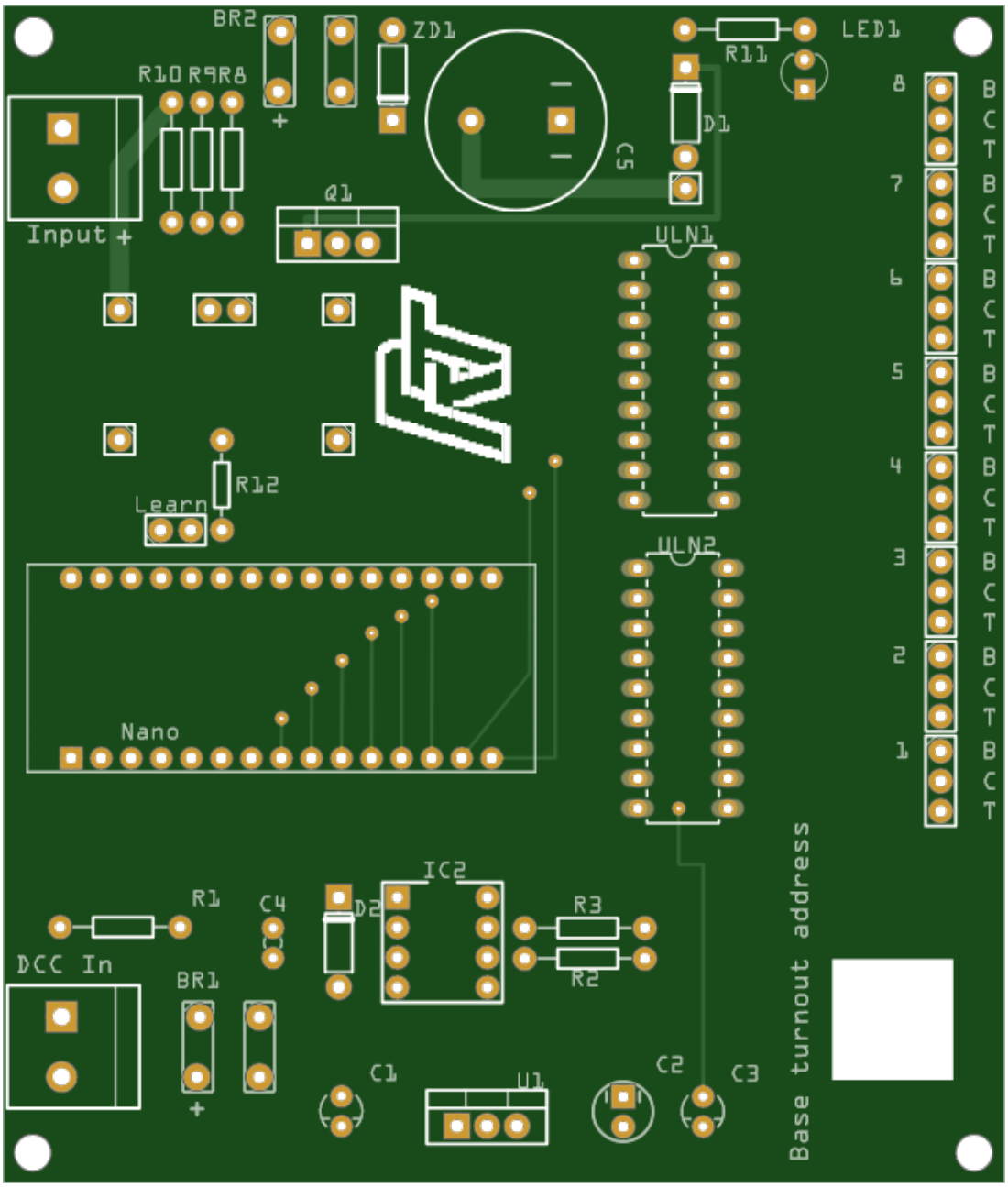
Model Railroad DCC stationary decoder.

RT DCC TD8 2

This is a DCC stationary decoder for use on model railroads at all scales with any DCC command station.

It is was developed to control eight (8) dual solenoid turnouts. However it can be used to control any solenoid device eg, signals, uncouplers, level crossings.

This document describes the construction of the kit version of the stationary decoder.



Bill of Materials

1 PCB
https://www.pcbway.com/project/shareproject/DCC_Turnout_Decoder_with_capacitor_discharge_unit_352e06bc.html

1 Arduino Nano https://store-usa.arduino.cc/products/arduino-nano

2 2W10 Bridge Rectifier 1000V 2A

1 7805 Voltage Regulator - 5V TO220

1 TIP41C NPN TO220 transistor

2 1N4001 rectifier diode

1 1N4749A 24V Zener diode

1 Led 3mm blue

1 6N137 opto isolator

2 Tantalum Capacitor voltage 20V; capacitance 1µF
1 Electrolytic Capacitor voltage 20V; capacitance 22µF
1 Ceramic Capacitor voltage 20V; capacitance 100nF

1 Electrolytic Capacitor voltage 25V; capacitance 4700 - 10000µF

2 1kΩ Resistor resistance 1kΩ 0.25w
3 10kΩ Resistor resistance 10kΩ; 0.25w

2 Screw terminal - 2 pins 0.2in (5.08mm)

2 Generic male header 0.1in (2.54mm) - 2 pins
2 Shunt jumper 0.1in (2.54mm) - 2 pins

8 Screw terminals 0.1in (2.54mm) - 3 pins

2 ULN2803 Darlington driver arrays

2 Generic female header 0.1in (2.54mm) - 15 pins (if you bought a kit from RosscoeTrain then this could be 2 x 10pin and 2 x 5pin)

Optional - see page

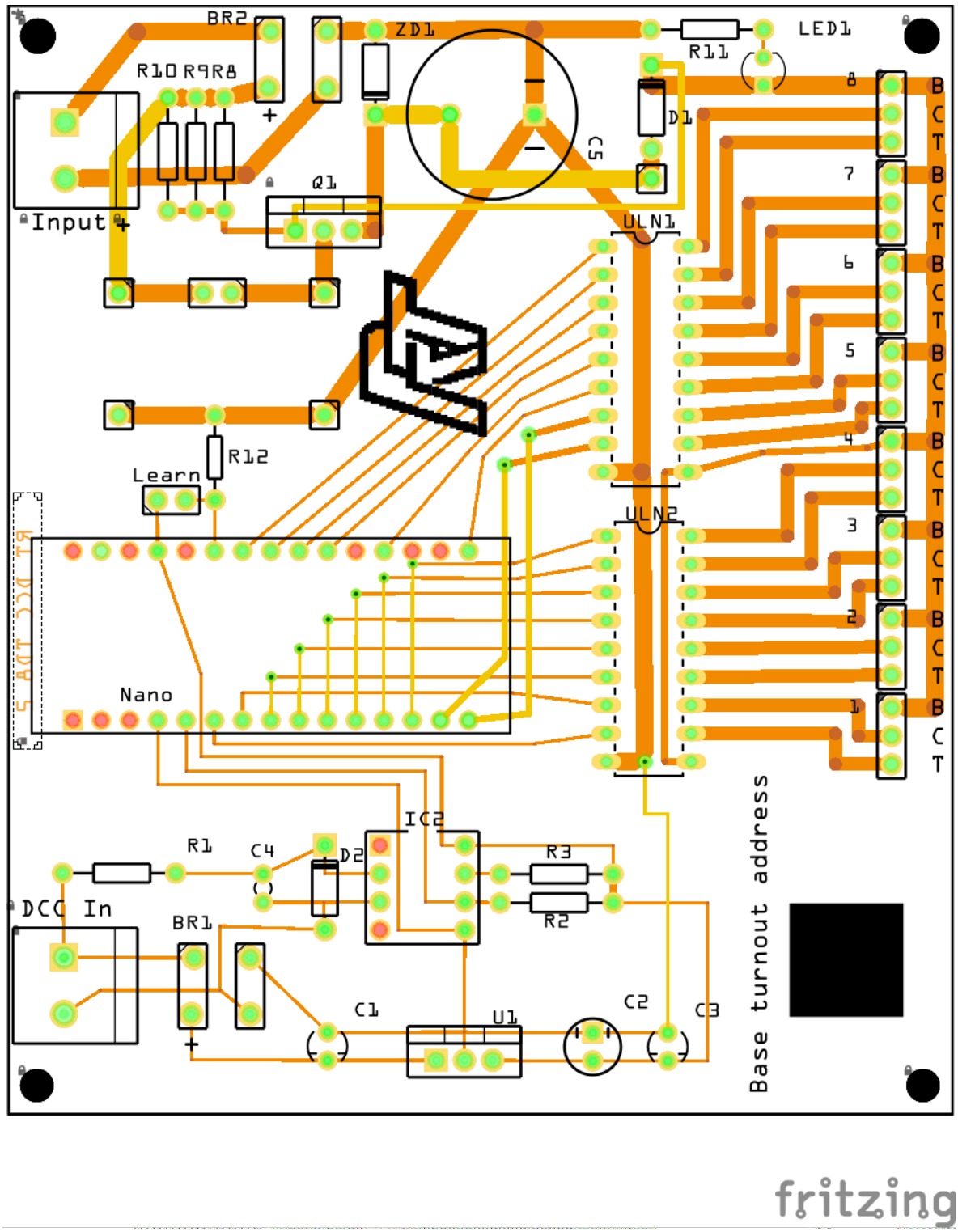
1 HW-668 Boost converter.
4 Generic male header - 1 pin

Construction Manual

Construction of the board.

As with most pcb construction start with soldering in the lowest profile items first, eg resistors, diodes, leds, etc.

I suggest marking them of the list on the next page as you go.



Construction Manual

Recommended soldering order:

		Done
R1	1KΩ	
R2	10KΩ	
R3	10KΩ	
R11	1KΩ	
R12	10KΩ	
D1	1N4001 Diode	
D2	1N4001 Diode	
ZD1	Zener Diode	
C1	1uF Tantalum capacitor	
C2	22uF Electrolytic capacitor	
C3	1uF Tantalum capacitor	
C4	100nf Ceramic capacitor	
Led1	3mm red	
BR1	2W10 Bridge rectifier	
BR2	2W10 Bridge rectifier	
IC2	6N137 Optoisolator (use IC or turned pin sockets)	
ULN1	ULN2803 Darlington driver (use IC or turned pin sockets)	Note orientation
ULN2	ULN2803 Darlington driver (use IC or turned pin sockets)	Note orientation
U1	7805 Voltage regulator	
Learn	Generic male header 0.1in (2.54mm) - 2 pins	
CDU	Power jumper Generic male header 0.1in (2.54mm) - 2 pins Install the Jumper shunt on the header.	This is unmarked on the PCB, it is the two holes below resistors R8 and R9.

The following will depend on your requirements

C5	4700-10000µF Electrolytic Capacitor.	This can be any capacitance we recommended 10000µF The limiting factor for this capacitor is the diameter (18mm) and the lead spacing (7.5mm). This can be mounted vertially or horizontally. See completed photo.
Nano headers.		If your nano has male headers then the two 15 pin pcb headers are female. If you nano has female headers then the two 15 pin pcb headers are male.

Output connectors 1 - 8	The kit is supplied with 8 3 way screw terminals. These will stack side by side however are a tight fit. If you are using other connectors then solder them now.
DCC in and power input.	The kit is supplied with pluggable connectors for 5.08mm spacing. If you are using other connectors then solder them now.
Insert the Arduino Nano into the headers.	**NOTE** orientation. Pin one is bottom left in the image on page 3

Other information.