RSMC User Guide

Revision v1.8 01/02/2021

Introduction

This document describes the functional blocks of the Remote Stall Motor Controller (RSMC) and how to assemble it.

Revision History

v1.8a   01/02/2020   SN – added panels, parts layout
v1.8   04/09/2017   CC
v1.4   06/08/2015   CC
v1.3   04/17/2015   CC
v1.2   12/26/2014   CC
v1.1   04/16/2014   CC
v1.0   01/29/2014   CC

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1. RSMC SYSTEM OVERVIEW

The Remote Stall Motor Controller (RSMC) is designed to connect to a stall motor style turnout motor, primarily the Circuitron Tortoise™.   The RSMC consists of five sections.
- 8 position stall motor pads
- Stall motor power input, 9-12 vdc
- Throw input port
- Turnout position feedback port
- Route LED ports, Normal/Reverse (Common Anode)
- Frog power routing using external switch contacts (Tortoise, Switchmaster™)

Pads for connection to a Tortoise stall motor are .156" for Molex™. The pad spacing also mates to a standard 8 position .156" edge connector. Right angle or straight header pins can be soldered directly to the Tortoise edge connector and mate to a Molex connector on the ITC.

Pads for connection to .100" (2.54mm) screw terminal blocks or other .100" spaced connectors are parallel connected to the .156" pads.
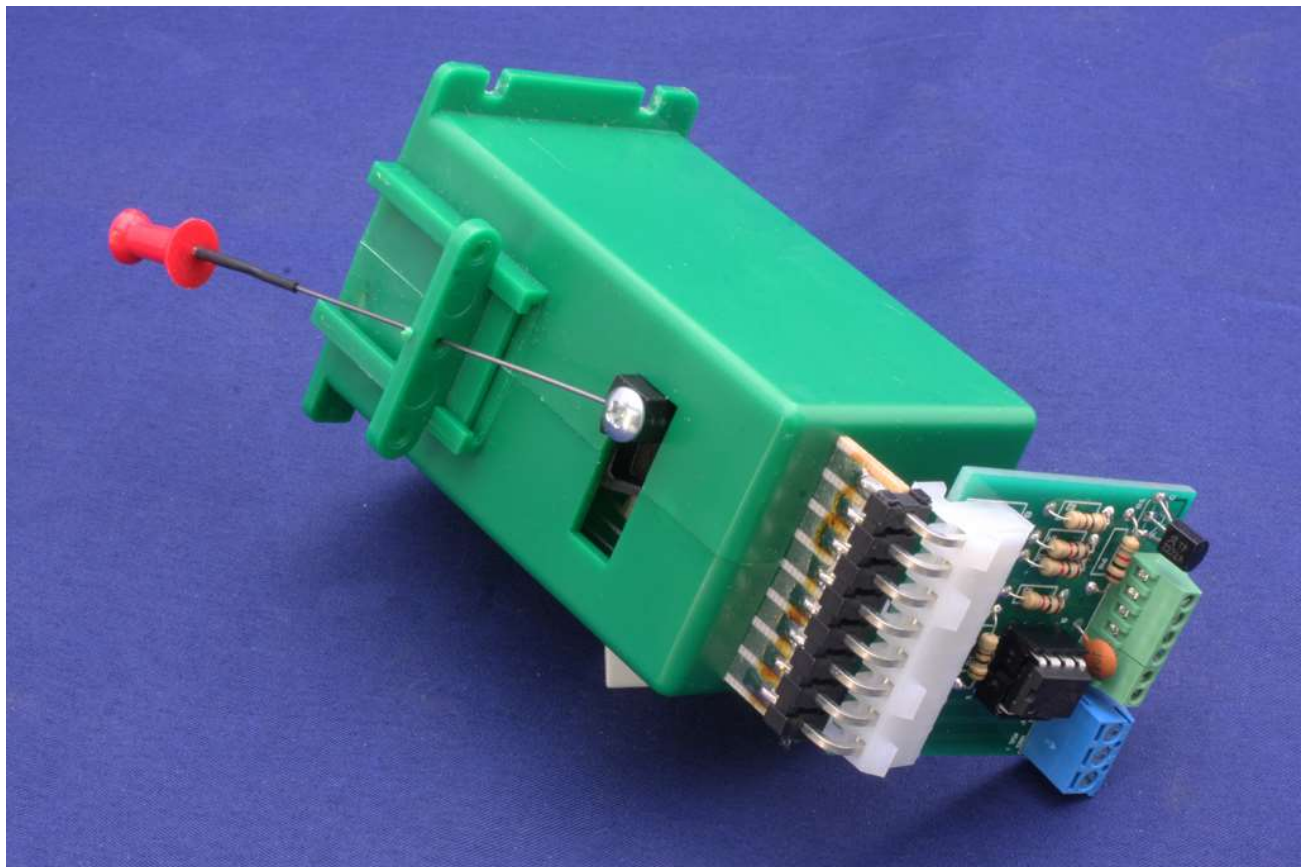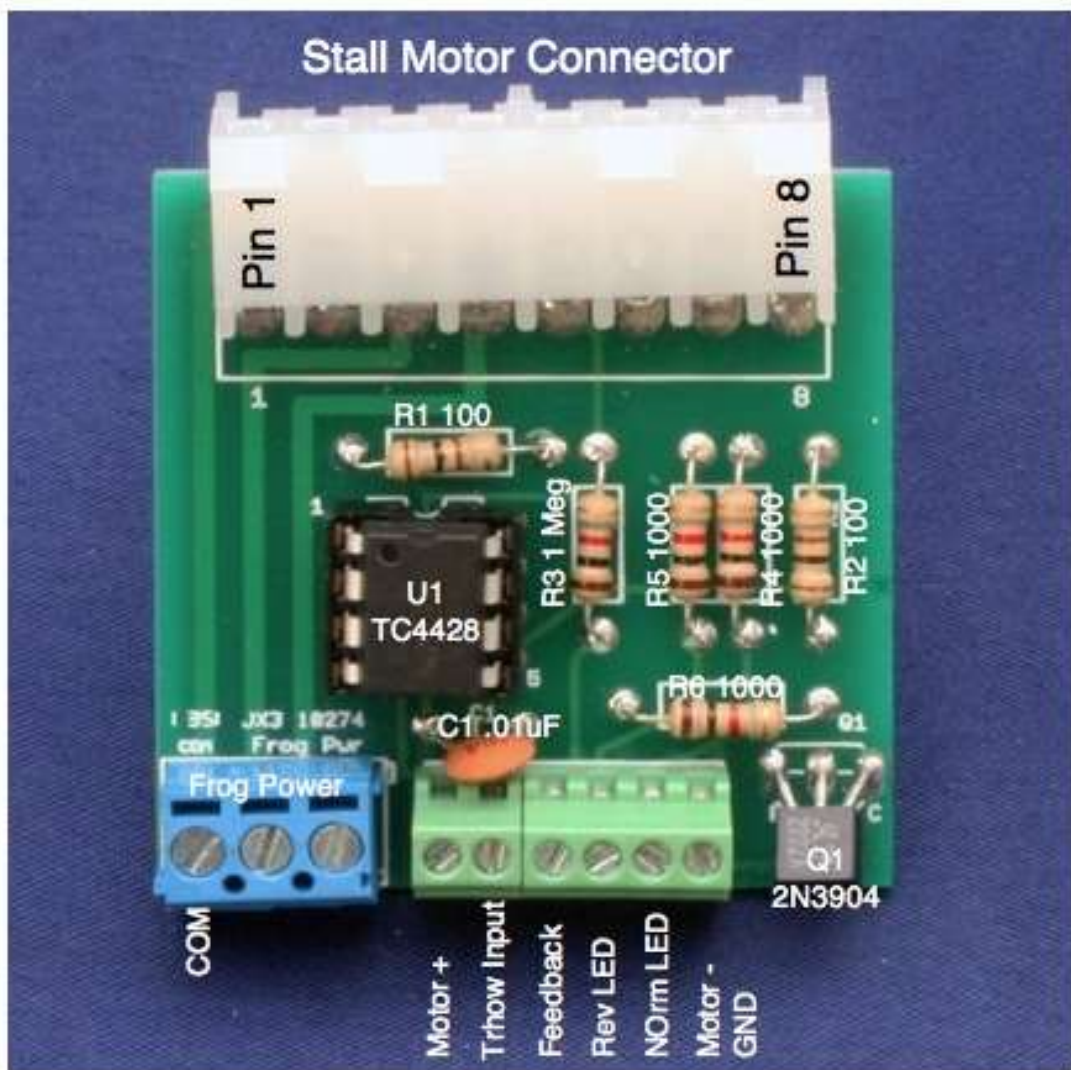

Figure 1 - RSMC Mounted

Figure 2 - Remote Stall Motor Controller Component Locations

2. STALL MOTOR INTERFACE

The RSMC drives the stall motor through a MOSFET chip connected to the motor voltage. When the Throw Input pin is grounded, the polarity of to the Tortoise motor is reversed, and the motor moves to the opposite direction. A SPST toggle switch, connected between the motor minus terminal and the Throw Input pin, is all that is need to operate the RSMC. On power up, the RSMC drives the Tortoise to a default position. If the power up route of the connected turnout is not what is desired, flip the RSMC and plug in upside down.

Note: Dc voltage input for the motor, must be connected to the +motor, -motor with the correct polarity.

Turnout position feedback is provided from the Position Feedback pin. This is an open collector output and is set low (zero) when the reverse switch contacts are active.

Route LEDs are driven by one set of internal contacts in the Tortoise. Common Cathode (sourcing) LED connections are supported. Stall motor voltage is routed from the external contacts through onboard limiting resistors to the terminal strip. Resistor values for R4/R5 can be selected to adjust the brightness of the LEDs. The route LEDs, if mounted on a fascia panel, will only light if the internal switch contacts mate correctly.

The other set of external switch contacts provide connections for routing power to an isolated turnout frog. Heavier traces are routed to a 3.5mm screw terminal for the frog connections.
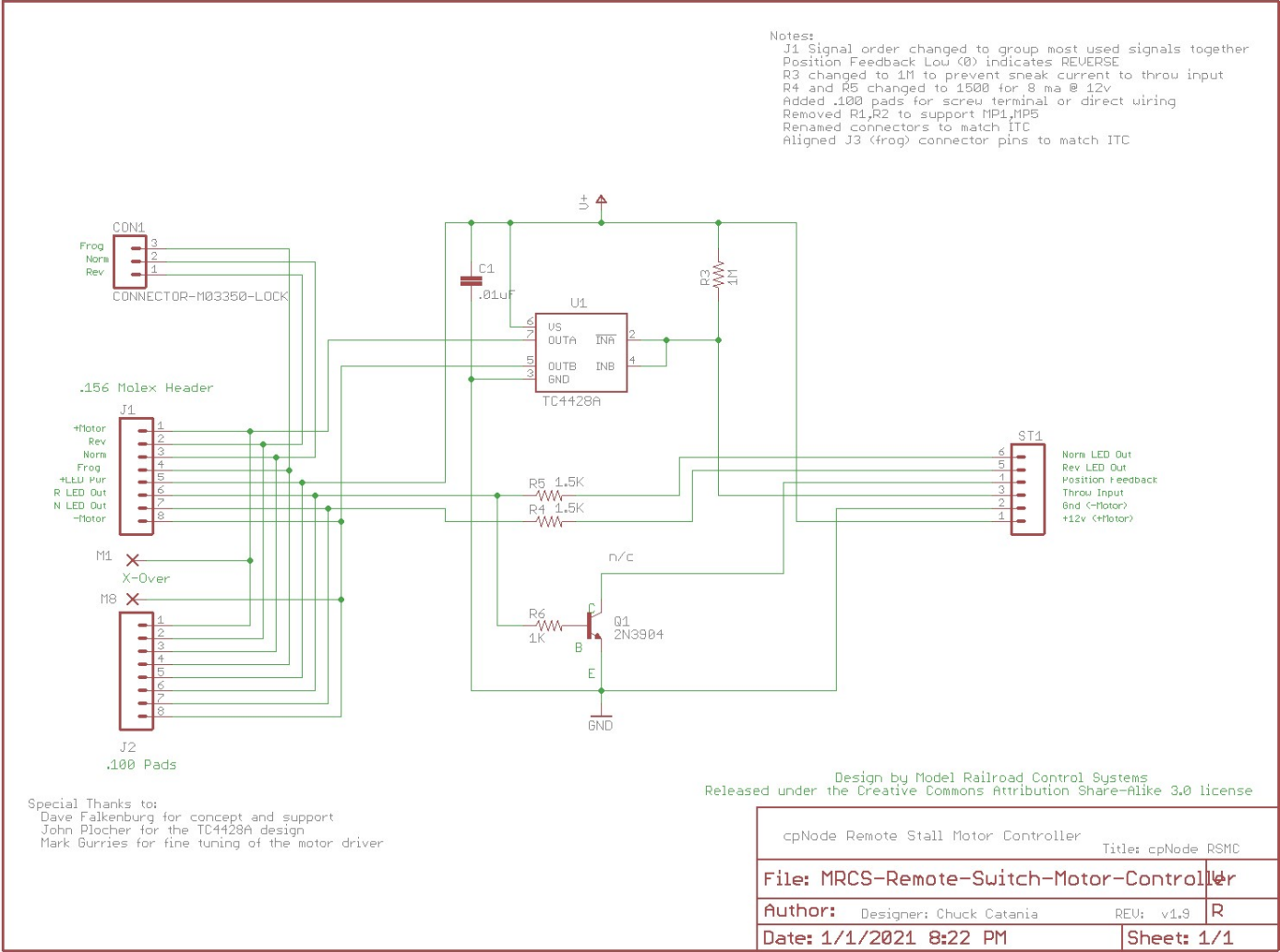
3. SCHEMATIC DRAWING

Figure 3 - Schematic Drawing

4. BILL OF MATERIALS

| Description	Ref	Qty		
cpNode RSMC PCB	PCB1	1	MRCS	RSMC
TC4428A MOSFET	U1	1	Digikey	TC4428AEPA-ND
2N3904	Q1	1	Jameco	38360
Capacitor .01uF Mono	C1	1	Jameco	151116
Resistor 1M Ohm	R3	1	Jameco	691585
Resistor 1500 Ohm	R4,R5	2	Jameco	690902
Resistor 1000 Ohm	R6	1	Jameco	690865
DIP Socket 8 pin	TC4482	1	Jameco	112206
6 pos Screw Terminal .100"	ST1	1	Electronics Salon	GS019-2.54
8 Pin .156" RA Female Header	J1	1	Digikey	WM13505-ND
8 Pos Card Edge Connector	J1 Edge Conn	0	Jim's Trains	JMT/TCONN
8 pos Screw Terminal .100"	J2	0	Electronics Salon	GS019-2.54
3 pos Screw Terminal 3.5mm	J3	1	Jameco	2094514

Figure 4 - Bill of Materials
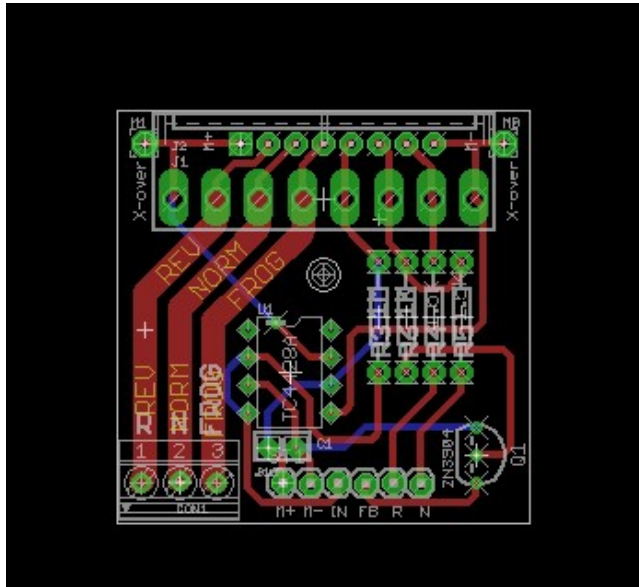
Figure 5 - Parts Layout

5. ASSEMBLY

[ ] All of the components are through-hole technology with wire leads. A lead bender is a useful tool for forming the leads at 90 degrees for easy insertion into the pad holes. Start by inserting the lower height components.

[ ] Install the IC socket for U1. Orient the socket with pin 1 shown on the silk screen.

[ ] Install resistor R3 (1 Meg ohms)

[ ] Install resistors R4,R5 (1500 ohms). Select value to adjust LED brightness.

[ ] Install resistor R6 (1000 ohms)

[ ] Install the bypass capacitor C1 (.1uF)

[ ] Install transistor Q1, (2N3904). Orient the transistor to the silkscreen markings.

[ ] Install the 6 position, .100" screw terminal block, ST1

[ ] Install the 8 position, .156" Molex connector, J1
    OR
[ ] Install the 8 position,.156" Edge Connector, J1
    OR
[ ] Install the 8 position, .100" screw terminal block, J2

[ ] Install the 3 position, 3.5 mm screw terminal block, J3