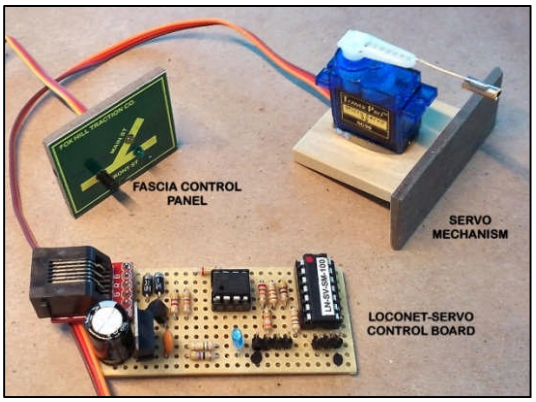
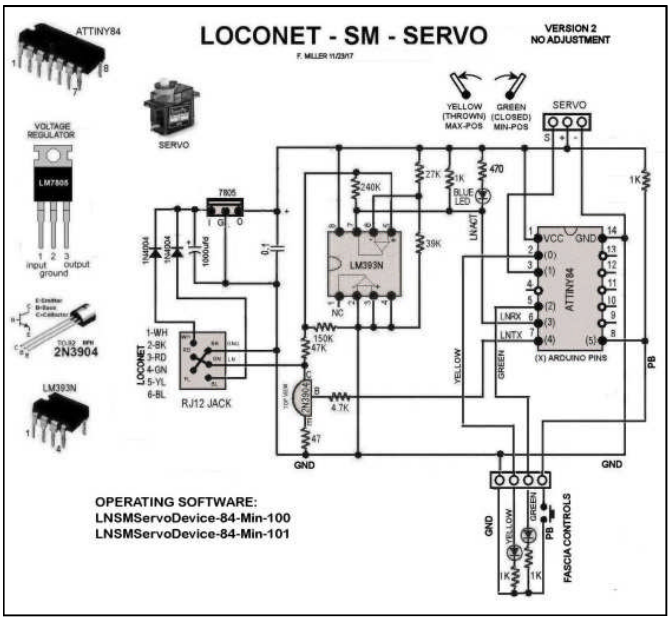
INEXPENSIVE LOCONET TURNOUT CONTROLS
By F. Miller, MMR

This article will describe a simple inexpensive way to control turnouts powered by miniature Servos and controlled by LocoNet DCC commands. This version makes use of self-contained control with a fascia strip panel and is a LocoNet based project. Another DCC only version which does not rely on LocoNet, but instead uses standard DCC switch commands issued over the DCC powered rails is described in another article, *DCC SERVO TURNOUT CONTROL,*

These projects make use of various Arduino based micro-controllers and miniature servo motors. The author has used these techniques for controlling turnouts on both his HO trolley dioramas and a small N-Scale switching module. The servo motor control boards require custom wiring of circuits and programming Arduino based micro-controllers. This represents a somewhat more advanced electronic project, but not difficult to learn and provides a good introduction into the application of newer technology in model railroading. The author makes use of overseas sources for servos and micro-controllers which bring the price of a servo switch machine and controlling circuit to around $5 - $15. Note that similar commercial products (e.g. Tam Valley Depot) might provide easier, but significantly more expensive implementations.

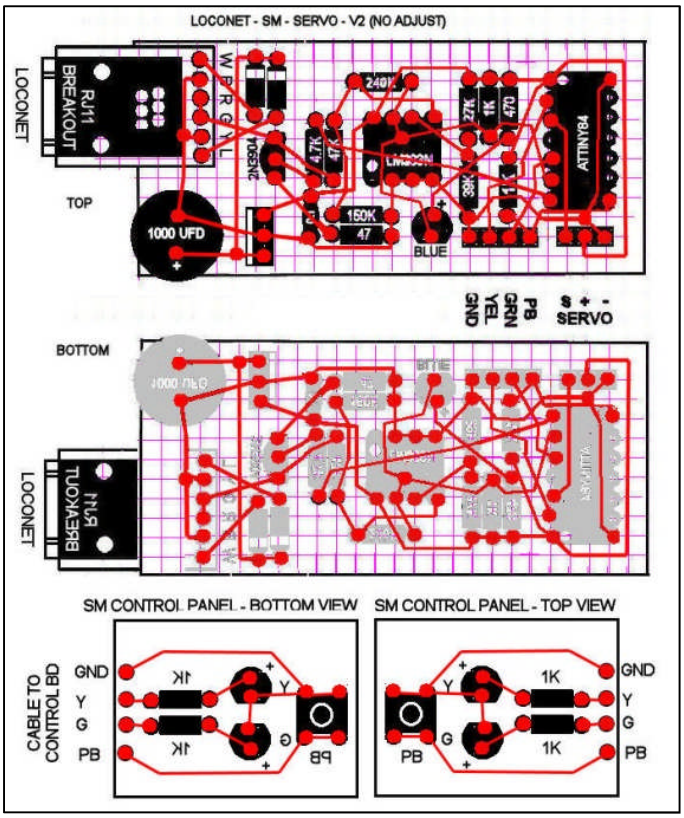


LocoNet based Turnout Switch Machine



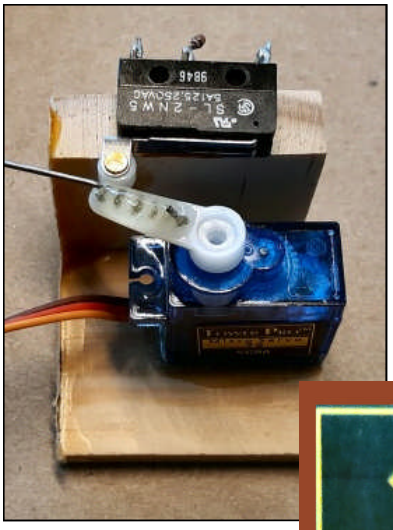
The servo activated switch machines are operated in two ways: one by a LocoNet system “switch” command , and the other with a Push-Button on a panel mounted on a layout’s fascia strip. Actually the Push-Button approach sends a LocoNet message to a Digitrax Command Station which then is bounced back to the Servo Control Board as the “switch” command. This allows the board to also be controlled by throttles or JMRI panels, etc.

The circuit is implemented using an ATTINY84 micro-controller. The Arduino program (sketch) was developed on an Arduino UNO with a Breadboard Shield. When the circuit and program work satisfactorily the code is moved to the smaller micro-controller, in this case an ATTINY84.

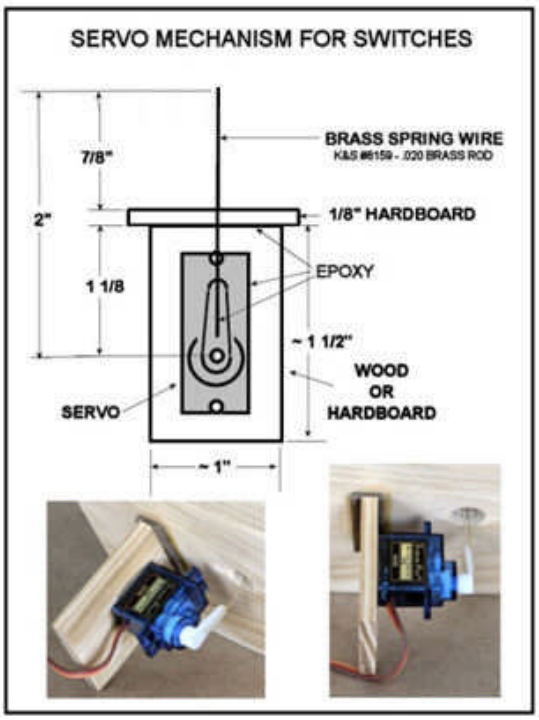


It is useful to then recheck the operation with the ATTINY84 on a breadboard to ensure it is operating correctly.
The author's usual project approach is to graphically lay out the components on a perf board template and then "wire" the components graphically in a top view. The drawing is then flipped to represent the bottom or wiring side of the circuit.

The miniature Servo is simply mounted to scrap wood or plastic material and then a spring wire is fastened to the Servo arm. The spring wire is extended up through the layout to the turnout throw bar. The author uses 5-Min Epoxy to attach the servo and spring wire and then Walther's Goo Glue to mount the assembly to the bottom of the layout. The glue allows for some time to adjust the assembly location while activating the servo.



A small snap-action switch operated by the servo motion can provide the appropriate Rail Power to an <u>isolated</u> turnout frog.



References:

- Arduino website (*for tutorials, etc.*): https://www.arduino.cc/
- Jameco website (*for parts*): https://www.jameco.com
- AliExpress website (*for parts*): https://www.aliexpress.com
- Download LocoNet library: https://www.arduinolibraries.info/libraries/loco-net
- *Authors email (for further information, files, etc.):* tractionfan@aol.com

LOCONET CONTROLLED SERVO SWITCH MACHINE

QTY	PART	SOURCE	PART #	@PRICE	*	X PRICE
LOCONET TURNOUT CONTROL						
1	7805 5V 1 AMP REGULATOR	JAMECO	51262	$ 0.45	*	$ 0.45
1	2N3904	JAMECO	38359	$ 0.15	*	$ 0.15
1	LM393 DUAL OP AMP	JAMECO	24281	$ 0.69	*	$ 0.69
2	1N4001 DIODE	JAMECO	35975	$ 0.09	*	$ 0.18
1	1000 ufd 16V CAPACITOR	JAMECO	30015	$ 0.29	*	$ 0.29
1	0.1 ufd CAPACITOR	JAMECO	15270	$ 0.15	*	$ 0.15
1	240K RESISTOR (Rd-Yw-Yw)	JAMECO	690718	$ 0.06	*	$ 0.06
1	27K RESISTOR (Rd-Pu-Or)	JAMECO	690961	$ 0.06	*	$ 0.06
1	39K RESISTOR (Or-Wh-Or)	JAMECO	691243	$ 0.06	*	$ 0.06
1	1K RESISTOR (Bw-Bk-Rd)	JAMECO	690865	$ 0.06	*	$ 0.06
1	470 RESISTOR (Yw-Pu-Bk)	JAMECO	690785	$ 0.06	*	$ 0.06
1	150K RESISTOR (Bn-Gn-Yw)	JAMECO	691382	$ 0.06	*	$ 0.06
1	47K RESISTOR (Yw-Pu-Or)	JAMECO	691260	$ 0.06	*	$ 0.06
1	47 RESISTOR (Yw-Pu-Bk)	JAMECO	690540	$ 0.06	*	$ 0.06
1	4.7K RESISTOR (Yw-Pu-Rd)	JAMECO	691024	$ 0.06	*	$ 0.06
1	RED LED (T1)	JAMECO	333851	$ 0.12	*	$ 0.12
1	GREEN LED (T1)	JAMECO	697626	$ 0.12	*	$ 0.12
1	BLUE LED (T1)	JAMECO	98968	$ 0.29	*	$ 0.29
1	8 PIN IC SOCKET	JAMECO	112206	$ 0.16	*	$ 0.16
1	14 PIN IC SOCKET	JAMECO	112214	$ 0.14	*	$ 0.14
1	RJ12 6P6C SOCKET	ALI-EXPRESS	~	$ 0.15	*	$ 0.15
1	ATTINY84 MICROCONTROLLER	ALI-EXPRESS	~	$ 2.71		$ 2.71
1	SG90 MICRO SERVO	ALI-EXPRESS	~	$ 0.78		$ 0.78
	MULTI COLOR WIRE	~	~	~		~
	LOCONET CABLE W/PLUG	~	~	~		~
	PERF BOARD	JAMECO	616690	~	**	~
	MISC HARDWARE/SOLDER/GLUE	~	~	~		~
						$ 6.92

* UNIT PRICE SHOWN FOR ITEMS SOLD IN QTY OF 10

** 4.5" X 6.5" BOARD @ $4.95