IR REMOTE DEVICE TO OPERATE MULTI-FUNCTION ANIMATION DECODERS

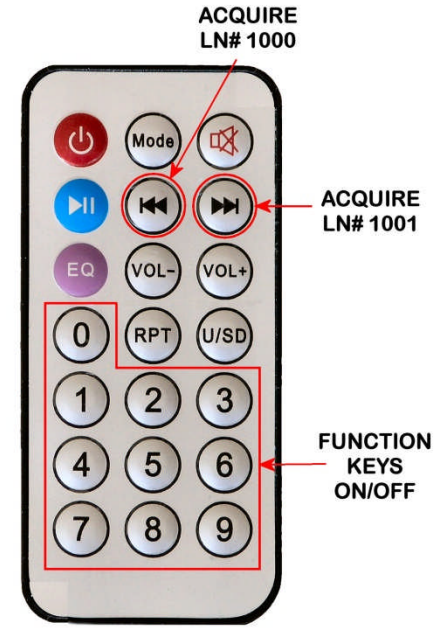
By Fred Miller, MMR

Another document describes the construction and operation of what I call a "Multi-function Animation Decoder" or MFAD. This decoder responds to DCC commands addressed to the DCC device for Functions 0-8 to perform a variety of tasks including control of lights, sounds and servo motions. The intent was to make it easy to animate the activities in several of the buildings on my layout.

MFADs are controlled by standard NMRA DCC decoder function commands. Those commands can be issued from a number of different sources including DCC throttles and JMRI scripts or panels. For my Digitrax LocoNet layout, I have built an IR device to operate the MFADs with a handheld remote controller.

IR Pad MFAD Commander:

This device was developed to make use of a handheld IR pad, similar to the remotes used on TVs and audio equipment. For demonstration purposes, the device lets me select the appropriate LocoNet address from a series of pre-defined addresses (for example 1000 for the demo Café building, or 1001 for the demo Import Motors building). The number keys (0-8) on the IR pad then control the DCC functions F0 – F8 by cycling them ON or OFF.

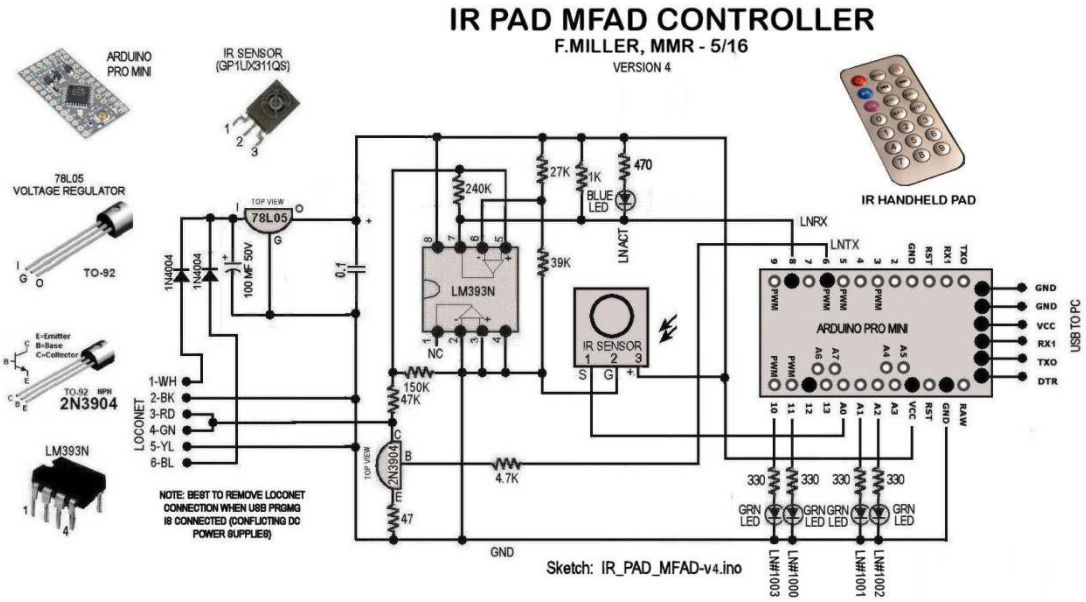


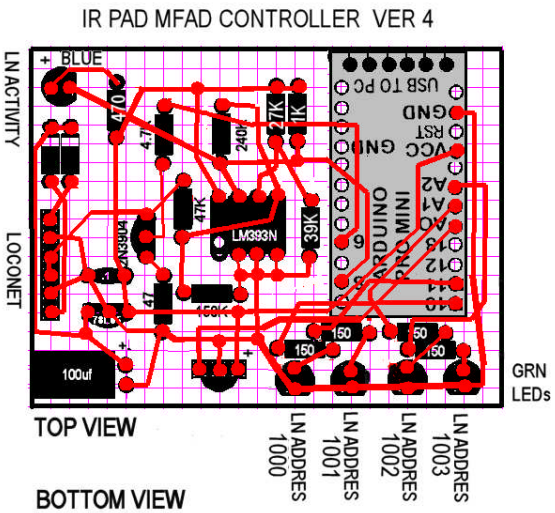
IR REMOTE MFAD CONTROLS

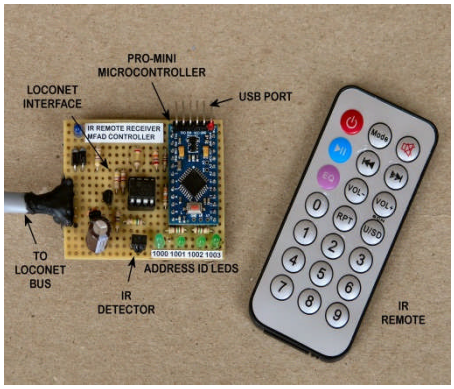
The circuit includes an Arduino MiniPro microcontroller running a sketch which detects encoded IR signals sent from the pad and the necessary LocoNet interface circuit. The sketch makes use of the *LocoNet* library developed by Alex Shepherd to send LocoNet commands, and the Arduino library *IRremote* to help decipher the IR commands. I used the IR Pad shown since I had a bunch of them from previous projects, but almost any IR remote, including TV remotes, could be used after determining the codes they produce.

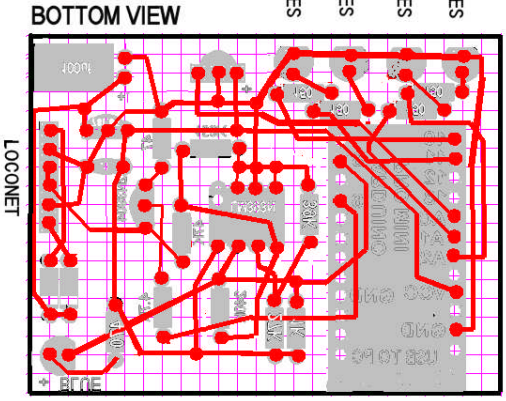
Construction followed my usual practice of first designing and testing the circuit using a breadboard. When the software and hardware seem to be operating correctly, the circuit is graphically drawn on what I call my "wiring aid" and then constructed on a perf board following the top and bottom views of the wiring aid.

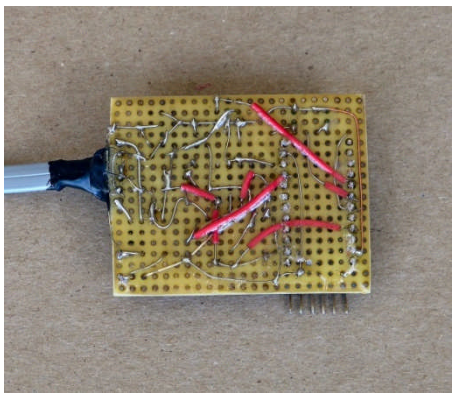
Most connections can be made with the leads of the parts but some additional wire is needed. Cross over points are insulated with pieces of wire insulation. After testing, I generally seal the wiring on the bottom of the perf board with 5-minute epoxy.











IR PAD MFAD CONTROLLER

QTY	DESCRIPTION	SOURCE	PART #	COST	EXT	
2	1N4001 DIODE	JAMECO	35975	$ 0.05	$ 0.10	
1	78L05 5V REGULATOR	JAMECO	51182	$ 0.25	$ 0.25	
4	T1 3MM GREEN LED	JAMECO	697629	$ 0.09	$ 0.36	PKG 10
1	T1 3MM BLUE LED	JAMECO	2168421	$ 0.29	$ 0.29	
1	240K OHM RESISTOR	JAMECO	690718	$ 0.10	$ 0.10	PKG 10
1	39K OHM RESISTOR	JAMECO	691243	$ 0.10	$ 0.10	PKG 10
1	1K OHM RESISTOR	JAMECO	690865	$ 0.10	$ 0.10	PKG 10
1	27K OHM RESISTOR	JAMECO	691201	$ 0.10	$ 0.10	PKG 10
1	470 OHM RESISTOR	JAMECO	690785	$ 0.10	$ 0.10	PKG 10
1	150K OHM RESISTOR	JAMECO	691382	$ 0.10	$ 0.10	PKG 10
1	47K OHM RESISTOR	JAMECO	691260	$ 0.10	$ 0.10	PKG 10
1	4.7K OHM RESISTOR	JAMECO	691024	$ 0.10	$ 0.10	PKG 10
1	47 OHM RESISTOR	JAMECO	690540	$ 0.10	$ 0.10	PKG 10
4	330 OHM RESISTOR	JAMECO	690742	$ 0.10	$ 0.40	PKG 10
1	100UF 25V CAPACITOR	JAMECO	63761	$ 0.12	$ 0.12	PKG 10
1	0.1 UF 25V DISK CAPACITOR	JAMECO	151118	$ 0.15	$ 0.15	PKG 10
1	8-PIN IC SOCKET	JAMECO	112206	$ 0.25	$ 0.25	
1	LM393	JAMECO	2120647	$ 0.35	$ 0.35	
1	2N3904	JAMECO	38359	$ 0.08	$ 0.08	PKG 10
1	PRO-MINI MICROCONTROLLER	ALIEXPRESS		$ 1.32	$ 1.32	
1	IR SENSOR (GP1UX311QS)	DIGIKEY	425-2528-ND	$ 0.96	$ 0.96	
1	6 POS MALE HEAD	JAMECO	103393	$ 0.08	$ 0.08	STRIP 10
	LENGTH 6-POS LOCONET WIRE					
				TOTAL	$ 5.61	

The table to the left suggests parts list resources.

Further information, help and Arduino code is available from the author:

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