

Including lighting for model railroad water towers, bridge, runway, running and crossing lights, 'rolling hardware' and storefront dress-up lights are now easy then ever. While there are several kits readily available to provide any number of flashing, pulsing and dancing light displays, this application provides instructions for assembling a small board, enabling selection of 4 display formats, using 5 outputs, including combinations of sequenced, bouncing and dual beacon displays.

Needing only a screwdriver to hookup your own heart's desire, the prototype perf-board assemble, shown in Figures 1.0 and 2.0, measures 2 by 2 inches. Using an 8 pin socket for the controller, all hardware is through hole for easy assembly.

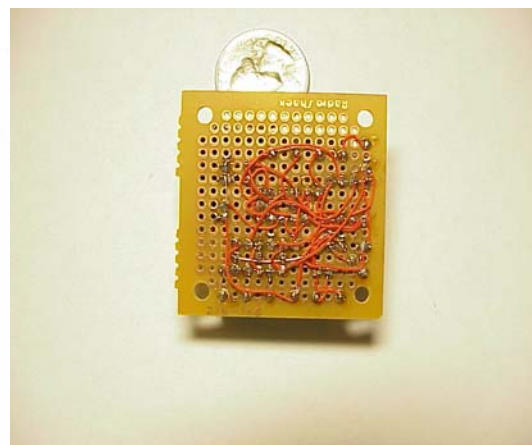
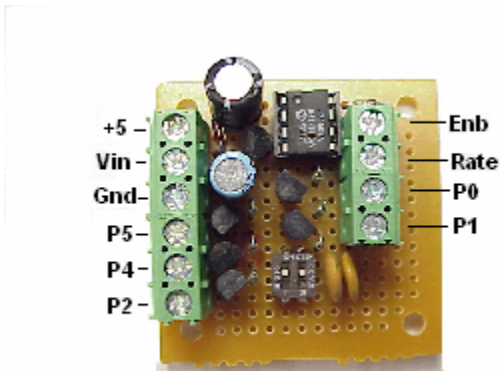


Figure 1.0, Top of display assemble

Figure 2.0, Board rear wiring detail

Referencing the schematic in Figure 3.0, the implementation is based around the 12C508A, MicroChip controller. The assemble based processes sequence the 4 formats from a table based structure.

The more complicated beacon drivers are generated by a PWM output, using 18 tabled on and off period settings to define the relative power profile for the beacon displays. The beacons are initialized to be 180 degrees out of phase. The discrete outputs are defined by a sequenced tabled mask which defines the desired display output pattern.

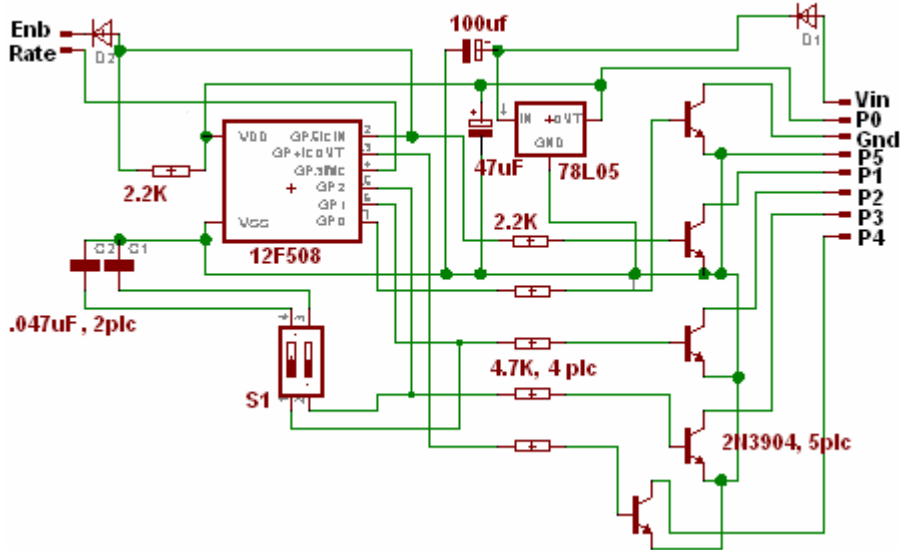


Figure 3.0, Schematic for display application

Referring Table 1.0, the board's implementation uses a 2 throw, single pole, board mounted switch, to configure the micro-controller to the desired sequence.

These switch

positions are read at power up and the when the controller pin becomes enabled. The switch settings are shown with their description of the resulting sequence.

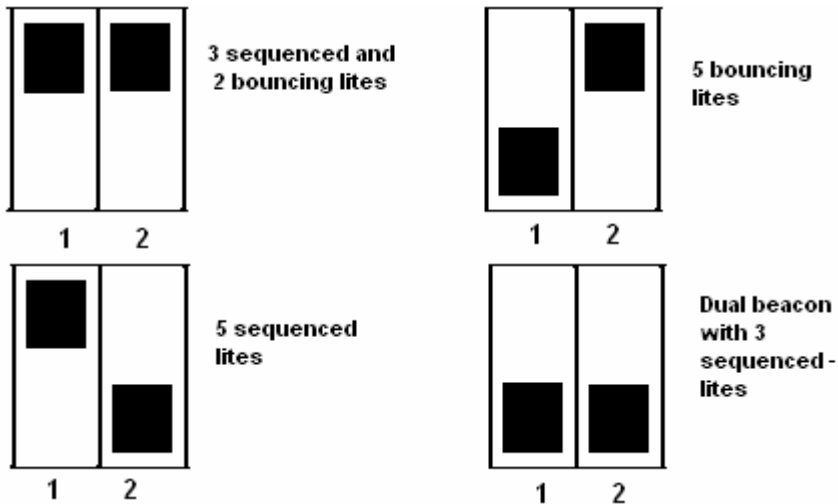


Table 1.0, Switch configuration settings and formats

Wiring was done with 30 gauge solid wire. Construction is straight forward. The assembly is shown with a simple layout mounted on tenth inch centered perf board, with solderable pads on 1 or both sides. Screw down terminal blocks, included in the BOM, make the user interface screw-driver ready.

Powered from 7 to 18 volts AC/DC, the circuit uses only a few milliamps. The outputs are driven with open collector transistors to ground. This allows outputs to be logically connected in wired OR configurations and provide up to a few hundred ma of current sink. This works nicely for applications using miniature incandescence, driven from an

unique 12 volt source or for LED or from grain of wheat, bulbs from an appropriate source. The locally regulated +5volt from the application is also provided to a terminal pin. Projects using multiple modules, operating with unique formats can be crossed wired to form more complex display variations.

Light emitting diodes, LEDs, often form integrated displays into a number of purchased scaled models. In this example I have used an incandescent bulb as a beacon and 3 LED for the flashing sequence configuration to produce a nice water tower display using an off the self HO scale kit, Atlas #703, Figure 4.0. The water tower has the beacon mounted on top and the 3 sequenced lights circling the tower's base. The second beacon was not used.



Figure 4.0, HO scale, Atlas #703 Kit

The assembled model and board are shown in Figure 5.0.

This controller includes the enable and also a rate control, both brought out to terminal pins. The rate control selects 1 of 2 display sequence update rates, allowing a more dynamic display, based on layout sensors or other external switches.

The prototype perf-board, dip part and the through hole parts are included in the BOM.

The assemble language program is included with this article's listing,



Figure 5.0, Completed water tower and display control board

Since the architecture is tabled based, the application allows the possibility of simple re-defining and customizing with longer display sequences.

Whether using this application as presented or pursuing new tabled based sequences, the simplicity of this implementation should find a home in your next layout. If interested in this or other display sequence options please email me at wjgrill1@netzero.com.

Quan	Part Number	Description
1	507-0037	100uF 25V Cap
1	507-0032	47uF 25V Cap
2	507-0423	4700pF ceramic Cap
4	296-6222	4.7K 1/8W resistor
2	296-6218	2.2K 950-0001
2	950-0001	1N4148 diode
1	263-0136	78L05 regulator
5	431-0406	2N3904 transistor
1	948-0152	2PST board mount switch
1	237-0026	proto board .1" squares
2	409-0082	3 Post Terminal
1	409-0083	4 Post Terminal
1	PIC12C508A	MicroChip controller