



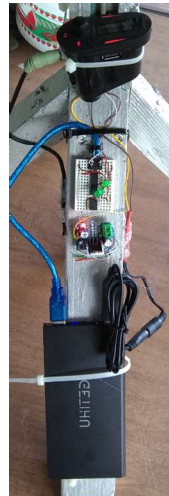
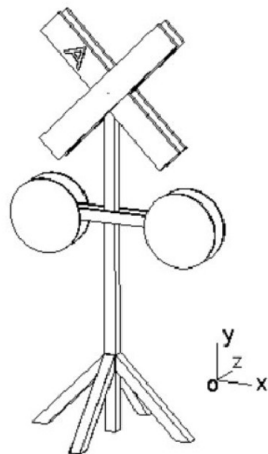
Model Crossbuck 7/31/19

The model crossbuck has flashing lights and a sound track of diesel bells and horns. It is powered by a 5 volts 10 amp-hr. battery pack. For local use, two USB charging units can be used to replace battery pack.

To start system, plug in the two USB connectors to the battery packs. One of USB connectors is a 5 volt to 12 volt convertor. The audio system will not work on 5 volts.

The battery pack must be charged using a cell phone charger. This should be done by removing the battery pack from the crossbuck leg. When the charger is hooked up and all 4 of the blue lights are on, the pack is fully charged.

The flasher circuit, MP3 player, audio amplifier and battery pack are mounted on a support leg. The speakers are mounted above the crossbucks.





The lights for the crossbuck are red LED automotive lamps used in automobile brake lights.

They are Red 1156 BA15S 67 22SMD Bulb Lamps. They consume 70 ma.

The flasher circuit consists of microprocessor and a motor drive module to drive the LEDs..

The microprocessor is an 8 pin DIP PICAXE chip, PICAXE-08M.

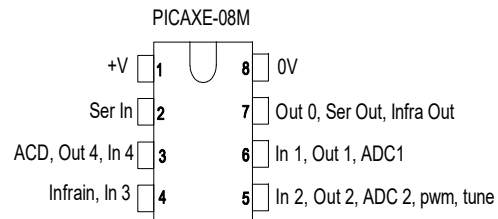
The motor drive chip is 16 pin DIP, L293D.

The price of each Integrated circuit is less than \$2.00. An alternative circuit would consist of a timer chip (NE-555) and transistors to drive the LEDs (along with several resistors.) Or as the Daisey street signal uses a timing rely at a cost of \$60.00. This design is less work and less money. And more fun!

The program uploaded to the microprocessor is written in BASIC:

```

main: high 4
low 2
pause 300
low 4
high 2
pause 300
goto main
  
```



The numbers in the above program refer to the output ports NOT the pin numbers.

The flashing rate is determined by the **pause 300** statement.

This causes the program to wait for 300 milli-seconds.

The L293D motor control chip is used to drive the LEDs. It is a dual chip and only half of it is used.

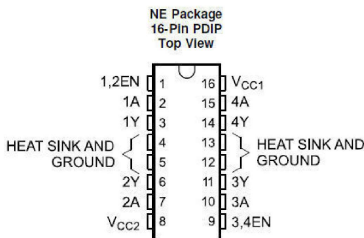
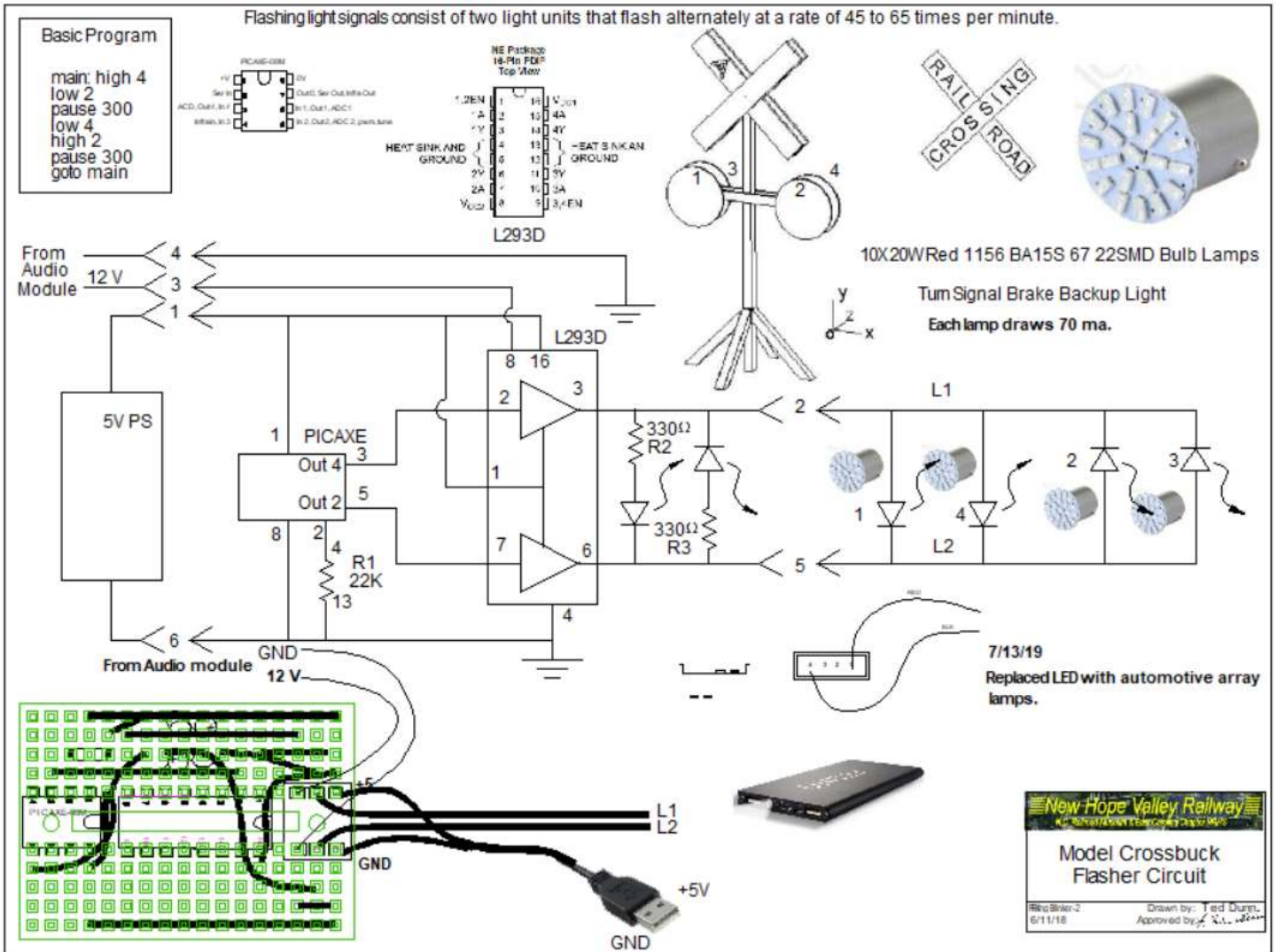


Table 3. Bidirectional DC Motor Control

EN	1A	2A	FUNCTION ⁽¹⁾
H	L	H	Turn right
H	H	L	Turn left

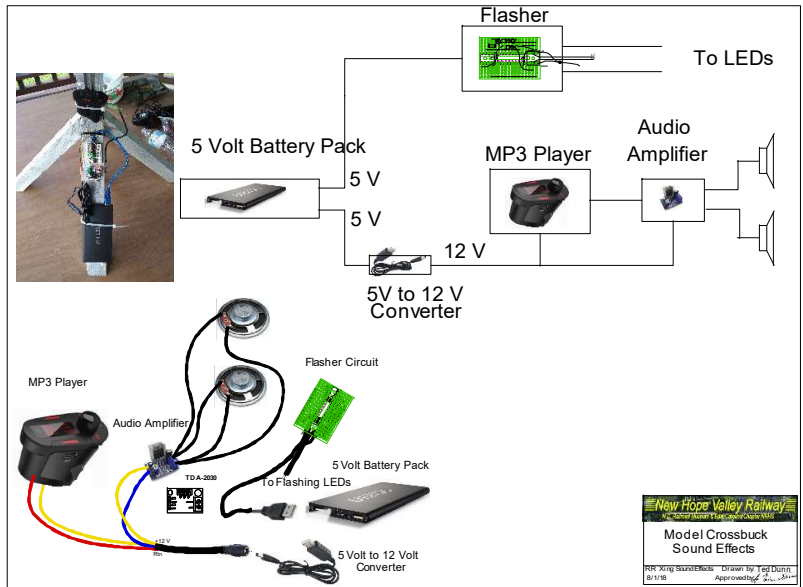
(1) L = low, H = high, X = don't care

V_{cc1} is the internal chip power supply, 5 volts. V_{cc2} is the switched motor (LED) power, 4.5 to 36 volts. In this version, V_{cc2} is 12 volts and is supplied by the 5v to 12 converter from the audio module.



Flasher circuit diagram

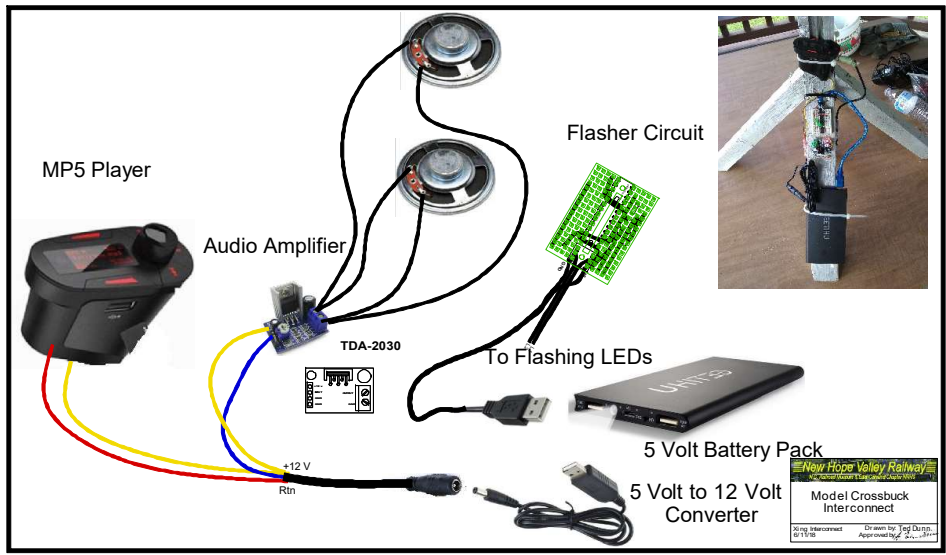
Link to drawing: http://wedcrew.yolasite.com/resources/Model_Crossbuck/RR%20Xing%20Blinker.pdf



Sound Effects diagram

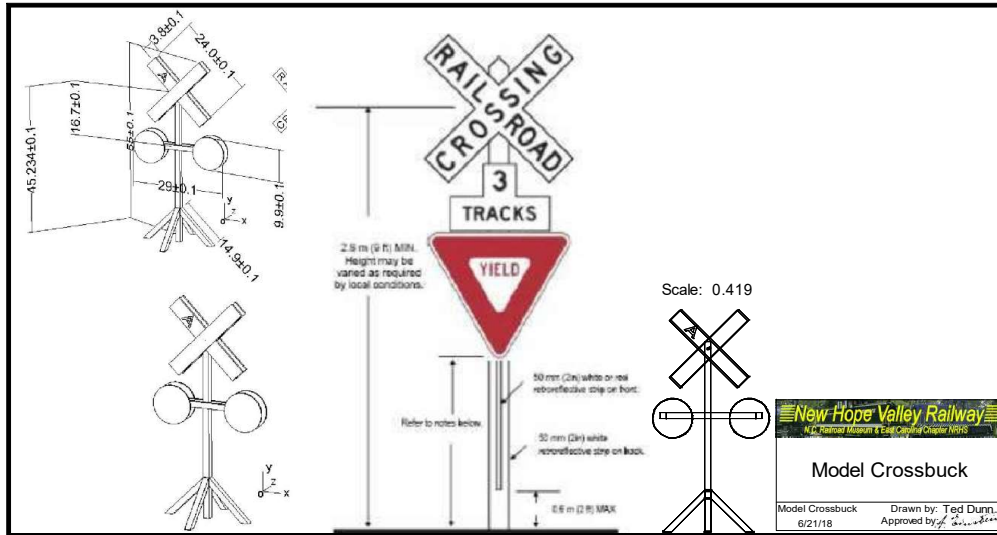
Link to drawing:

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Interconnect Diagram

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Dimension diagram

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