

Federation of Model Engineering Societies

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Boiler level Indicator

This document was presented by John Fuller and was published by Worthing and District SME in their newsletter in the Spring of 2011 after appearing on a 16mm scale locomotives forum with permission to reproduce from Alan Coombe and Dick Moger.

As a member of a forum dedicated to 16 mm scale locomotives, I came across an article describing a simple electronic boiler water level indicator. This device would have application to models in any scale particularly where the traditional sight glass is difficult to read. I am indebted to Alan Coombe for his permission to reproduce the article and to Dick Moger for his drawings.

The device consists of 5 resistors, 1 IC, and 2 LEDs - size of strip board 18mmX 23mm. (9 holes by 7 holes). A simple probe in the boiler wall detects the presence of water. Dead easy to build and the parts only cost pennies - go on have a

PARTS LIST

Resistors 0.25 W 5% carbon

R1 56k

R2, R3 150R

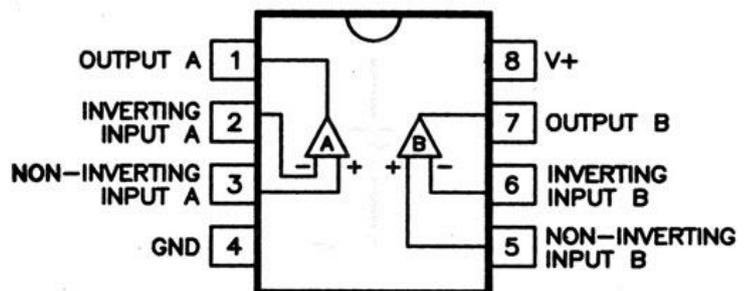
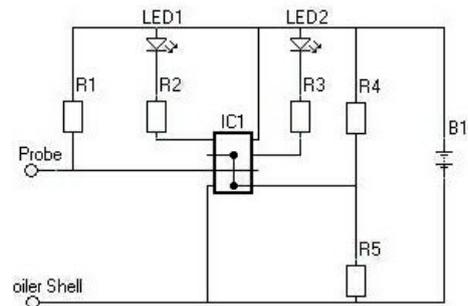
R4, R5 6k8

IC1 LM393

LED1 Green

LED2 Red

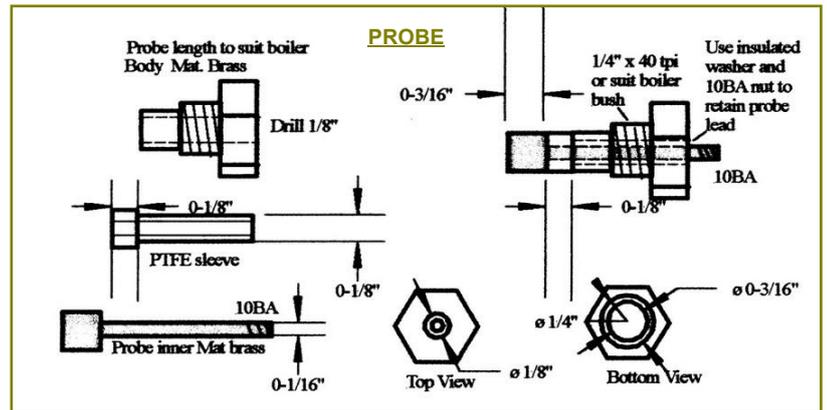
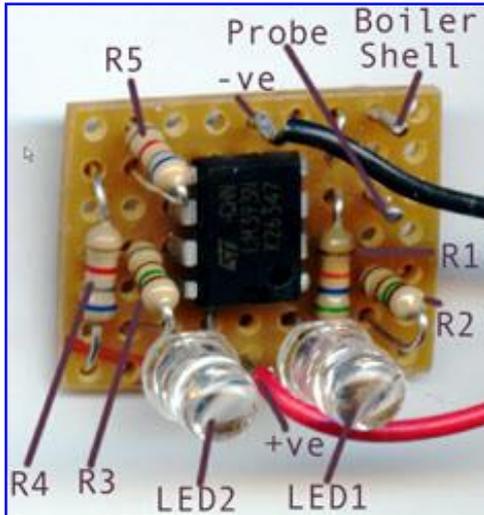
Veroboard, 7 strips wide by 9 holes long.



POWER

The circuit is designed to work from 4.8 volts. This can be either a stand-alone battery or taken from a radio control installation if that is being used. I managed to buy some cheap surplus packs of four rechargeable NiMH button cells of 250 maH capacity - very small but should run the unit all day. No switch is specified just plug the circuit into the battery. Do not use the circuit as shown on 9 volts because it will over run the LEDs. However, if R2 and R3 are each changed to 390 ohms then the circuit would be OK on 9 volts. A rechargeable PP3 would give about two hours continuous service.

CONSTRUCTION



Standard strip-board building techniques were used to fabricate the circuit. To save space some of the link wire connections are under the IC. No real sequence to follow. Cut the tracks where shown in Fig 1, fit link wires as shown in Fig 2 making sure the board is correctly orientated, then just place all the parts in the right holes and solder them in one go. For convenience when testing I used Veropins to make the lead connections to the board but direct fixing will do just as well. After the unit has been tested it can either be fitted in a small case as shown or sealed up into some clear heat shrink.

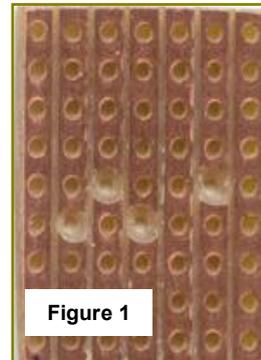
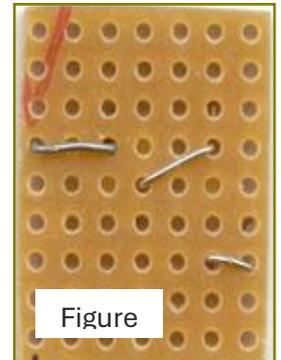


Figure 1



Figure

TESTING

First recheck the circuit board to make sure all the components are fitted in the correct place, the correct way around and that there are no accidental solder bridges across the tracks.

I would certainly recommend the use of a good magnifying glass to check the track side of the board for short circuits before power is applied. Rechargeable cells can deliver a very high current and generate a lot of heat when shorted. Therefore, when using these cells to test a new circuit for the first time, I connect the negative side of the battery but only briefly touch the positive wires together. If there is no spark then I make the proper connection. When power is applied LED2 (Red) should light up. Touching the low probe wire onto the boiler shell wire should make LED1(Green) light and LED2(Red) go out.

