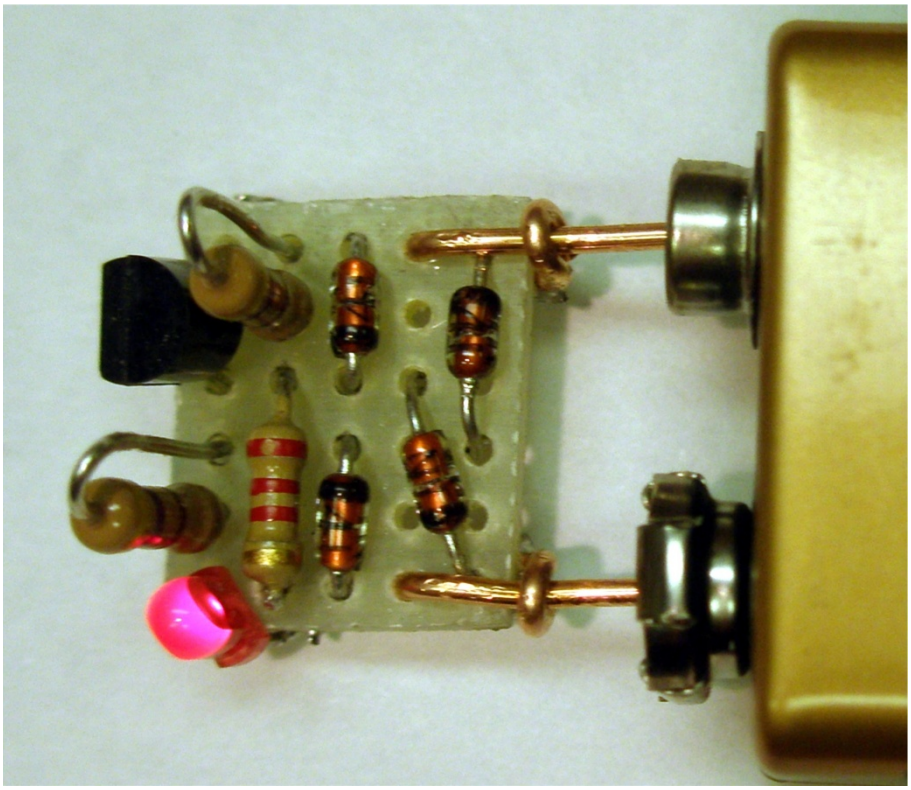
9V Battery Tester



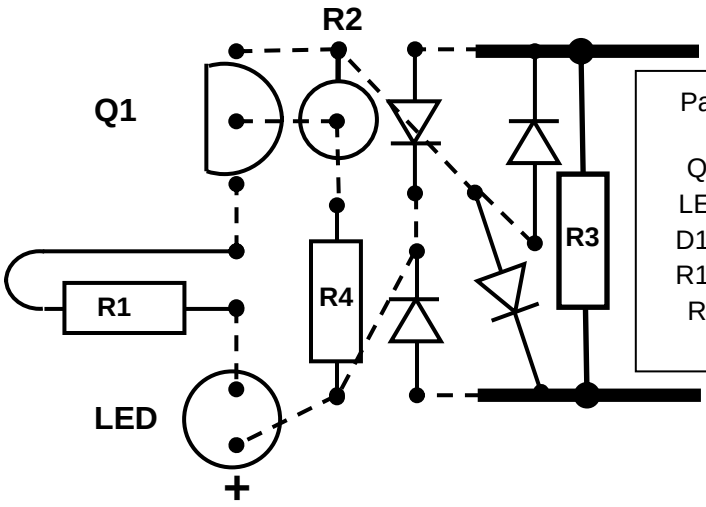
Perf Boards, 0.045" dia. holes on 0.1” centers. (5 by 6 Holes)

This 9 Volt Battery Testing Circuit can help you decide if you’re 9 Volt Battery is too ***weak*** to operate a Digitrax Throttle. The testing circuit is based on a NPN Darlington Transistor MPSA27, which has a very high DC current gain.

The four diodes form a bridge, so that the Battery polarity does not matter. The bridge loss is about 1.2 volts.

Resistor **R3** still loads the battery even when **Q1** is turn **OFF**.

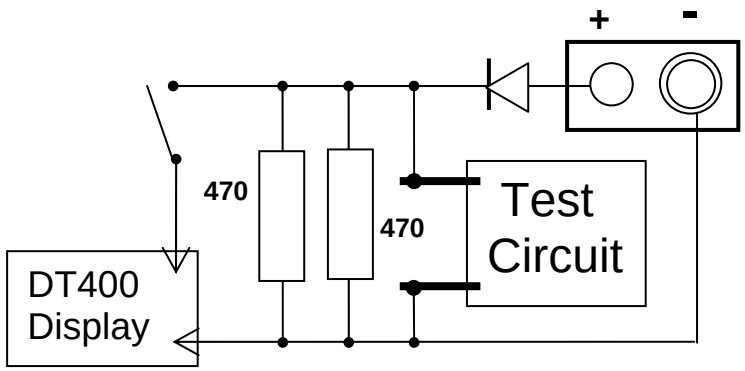
DT400R Volts, Load	**LED** Description
6.8 V, 15 ma	LED is **OFF**
7.0 V, 18 ma	Slight Color
7.2 V, 20 ma	LED is ***weak***
7.5 V, 26ma	LED is **ON**
9.0 V, 31ma	LED is **Strong**



Part	Description	WWW.digikey.com
Q1	TRANS NPN DARL BIPO	MPSA27G-ND
LED	3.1X2MM RED DIFFUSED	511-1228-ND
D1-4	RECTIFIER 0.15A	1N4148-TPMSCT-ND
R1-3	RES 470 OHM 1/4W 1%	P470CATB-ND
R4	RES 2.20K OHM 1/4W 1%	P2.20KCACT-ND

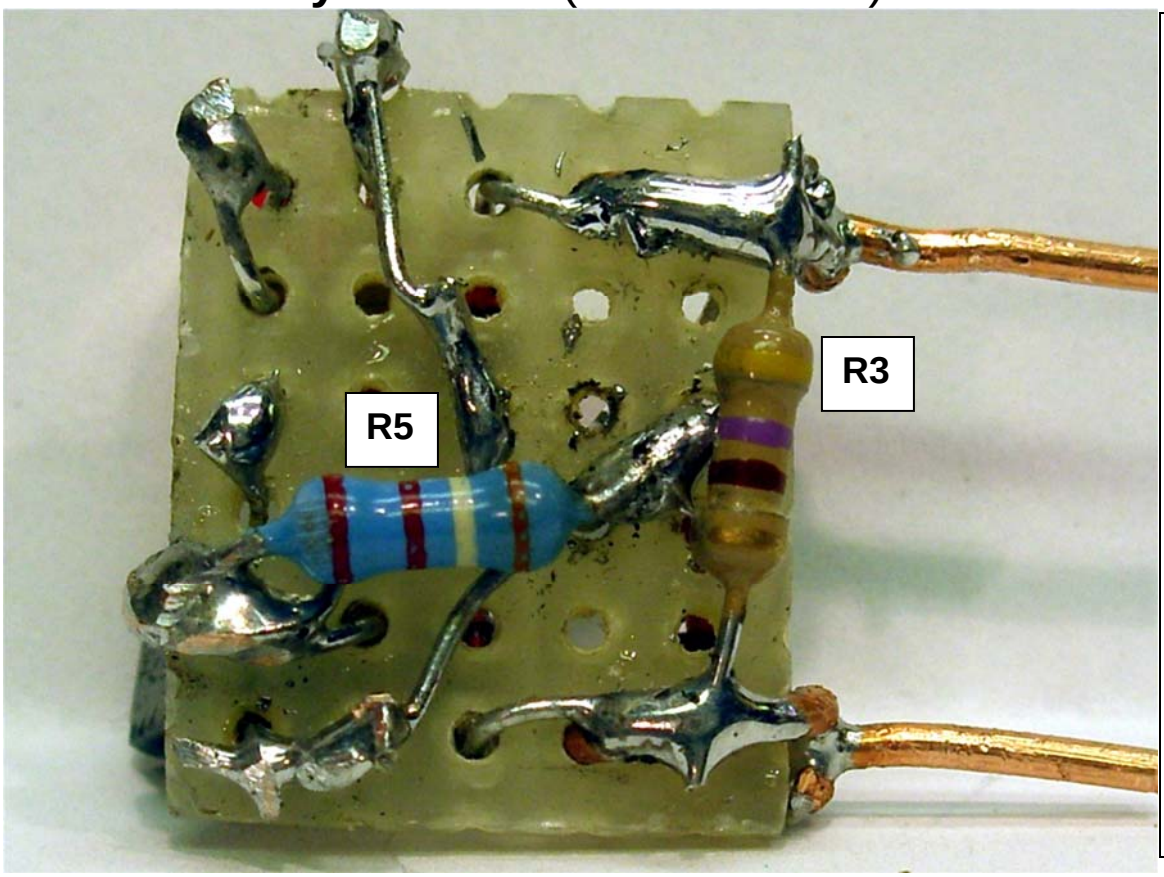
Calibration: A Digitrax DT400 Throttle displays battery voltage when it is installed. Take a new battery and add a diode and two resistors. With clip-leads to the DT400 battery terminals, add more resistors if the display is above **7.5v**

Try 8.2K, 4.7K. or 3.3K resistor across R2. See back of board for this Calibration Resistor.



Calibrate 7.0 or 7.2 when shown on the DT400 Display.

9V Battery Tester (back of board)



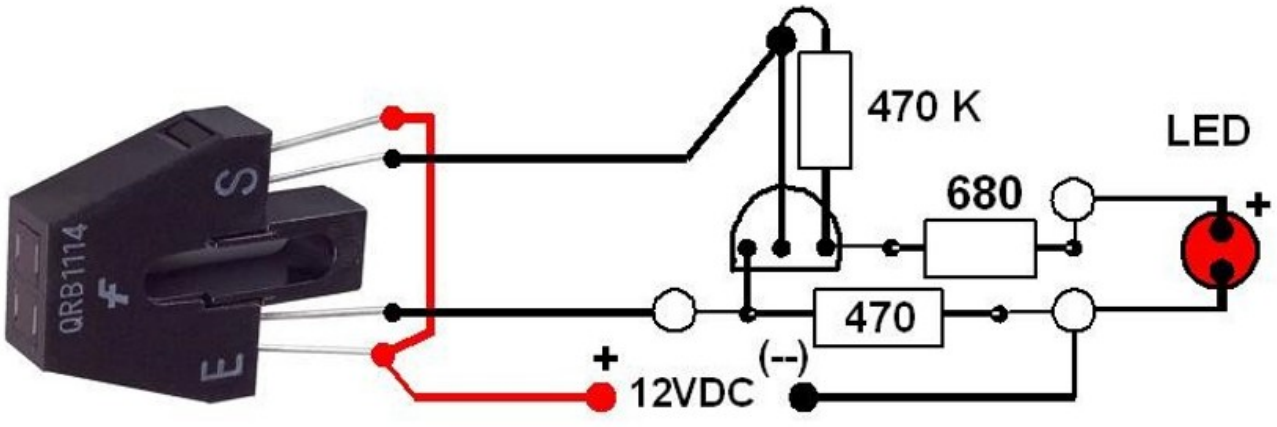
R5 Calibration Resistor

Try a 8.2K, 4.7K. or 3.3K resistor connected in parallel with R2.

Select the resistor that meets the following conditions:

"Slight Color" when DT400R display is **7.0** or **Weak** when display is **7.2** or "slightly weak", & display is **7.4v**

In the following circuit I have again used a MPSA27 Transistor. It is for a ***single*** IR Detection using a Reflective QRB1114. The 470 resistor allows about 20 ma. to flow through "E". When 0.2 ma. of detection flows through "S" into the 470K resistor, then about 1 volt is produced across the b to e of the NPN transistor. When the transistor turns on, about 15 ma. then flows through the 680 resistor and also through the LED. This makes for about a total of 35 ma, through "E" This increase of the current in "E" makes for a very quick turn-on point. It can sense the tip of your finger at a distance greater than 1/2 inch in a room with overhead fluorescent lights. The current rating of "E" is 50 ma. max. If the sensor "S" is pointed directly at an overhead Incandescent lamp, then the LED will light.



www.digikey.com/ SENSOR PHOTOTRAN IR NPN REFLECTIVE **QRB1114** TRANS NPN DARL BIPO **MPSA27**

In the October 2009 issue of Model Railroader, the article "Simple train detection" Page 64 is the connection circuit for **two** Reflective QRB1114 sensors using a 4 wire cable.