

## Suzuki GS500 LED 7-Segment Gear Indicator: Fabrication Instructions

This document describes a method for fabrication of a 6-speed gear indicator for a Suzuki GS500 motorcycle. The circuit displays the current gear on a 7-segment display. Neutral is not indicated on the display (the OEM neutral lamp is used for this).

The circuit was originally installed and tested on a 1995 GS500E by Roberto Venditti (gsTwin.com member beRto) in January 2008. I apologize for the bare-bones fabrication instructions; please feel free to PM me at gsTwin if you have any questions.

Special thanks are owed to gsTwin.com member John Bates for inspiration derived from his original 6-LED version and for technical assistance he provided on the 7-segment modified version described here.

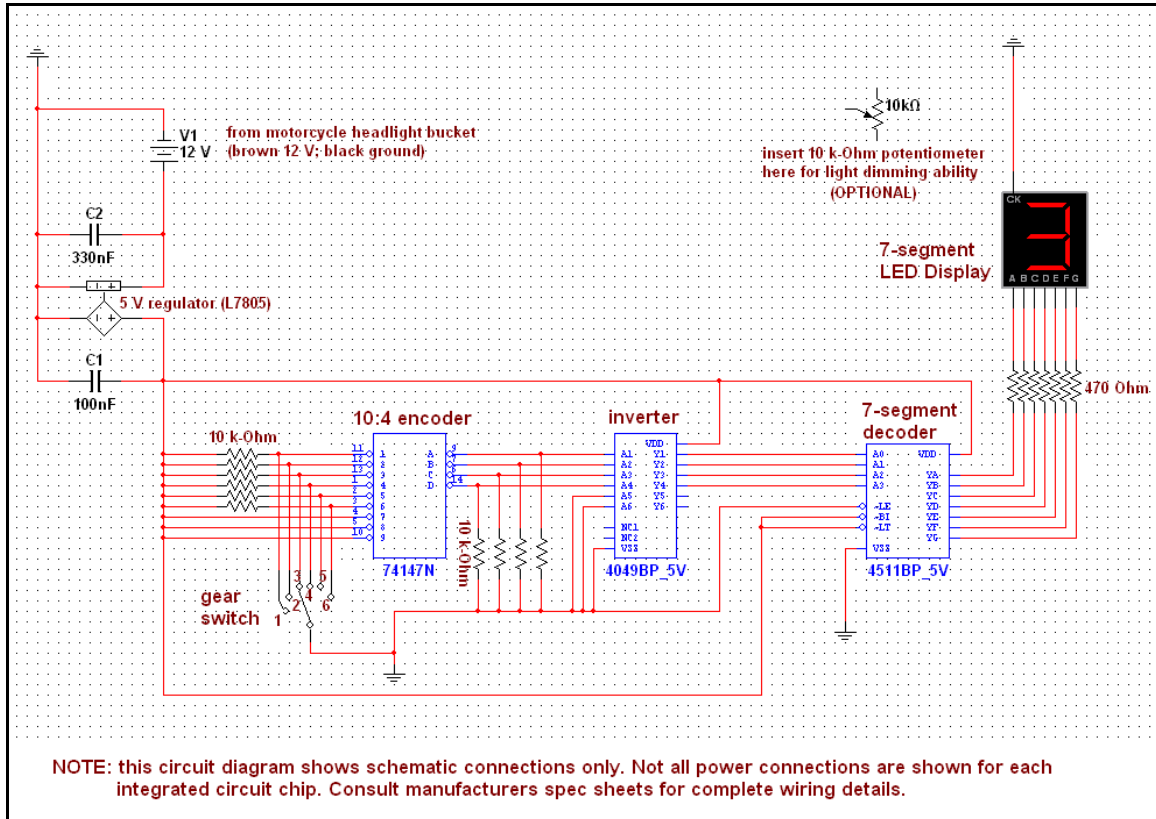
### **1. ELECTRICAL CIRCUIT FABRICATION**

The circuit requires the following components:

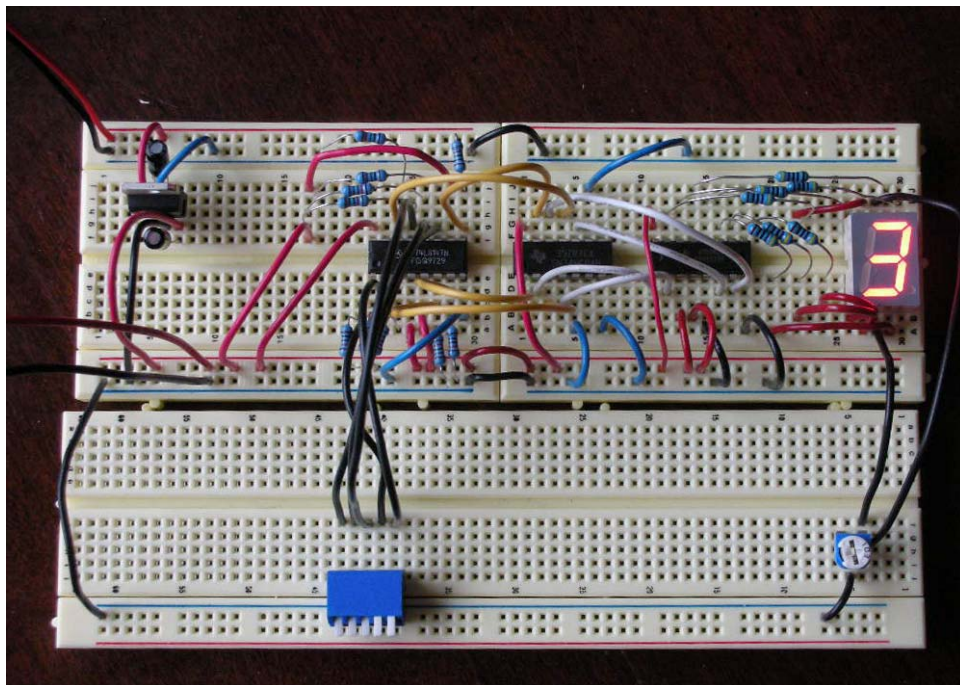
- 74147 (x1) – 10 line to 4 line priority encoder (integrated circuit)
- 4049 (x1) – hex inverter (integrated circuit)
- 4511 (x1) – CMOS BCD to 7-segment decoder (integrated circuit)
- LDS-C516RI (x1) – common cathode 7-segment LED display
- 330 nF capacitor (x1)
- 100 nF capacitor (x1)
- L7805 (x1) – 5V voltage regulator
- 10 k $\Omega$  resistor (x10)
- 470  $\Omega$  resistor (x7)

Electrical components can be purchased at [www.digikey.com](http://www.digikey.com) or at your local electrical component supplier. It is strongly recommended that you take a look at the component electrical specification sheets to better understand the wiring inputs and circuit function. Spec sheets are available on the digikey website, or at [www.datasheetcatalog.com](http://www.datasheetcatalog.com)

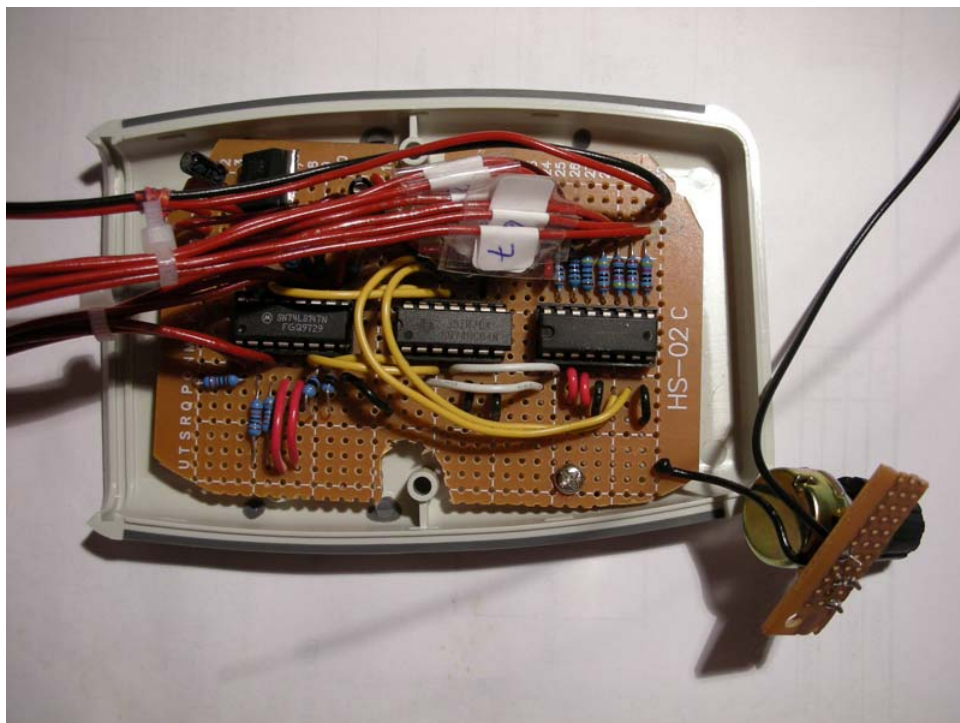
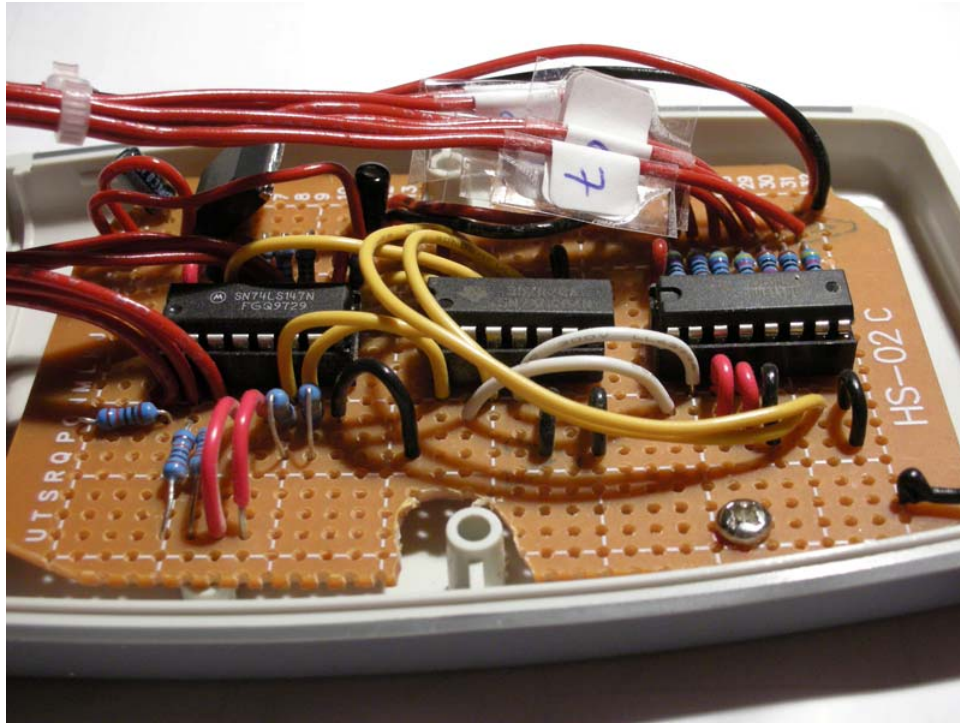
Components are assembled according to the following wiring diagram:



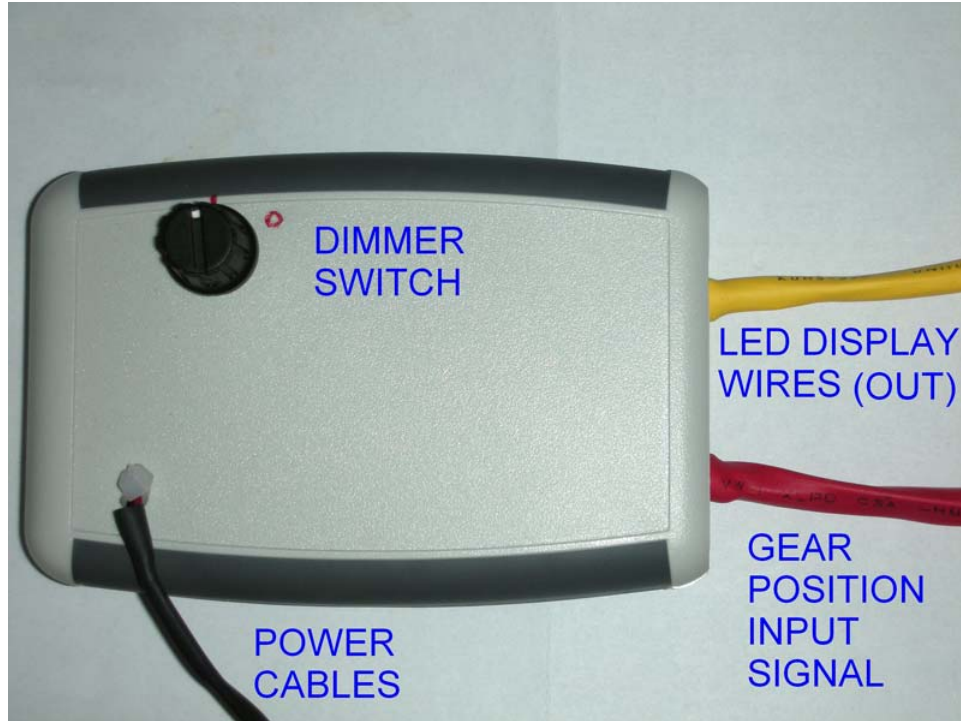
The following figure shows a prototype mock-up:



Figures 3 and 4 show the assembled circuit board:



This figure shows the enclosed circuit box:

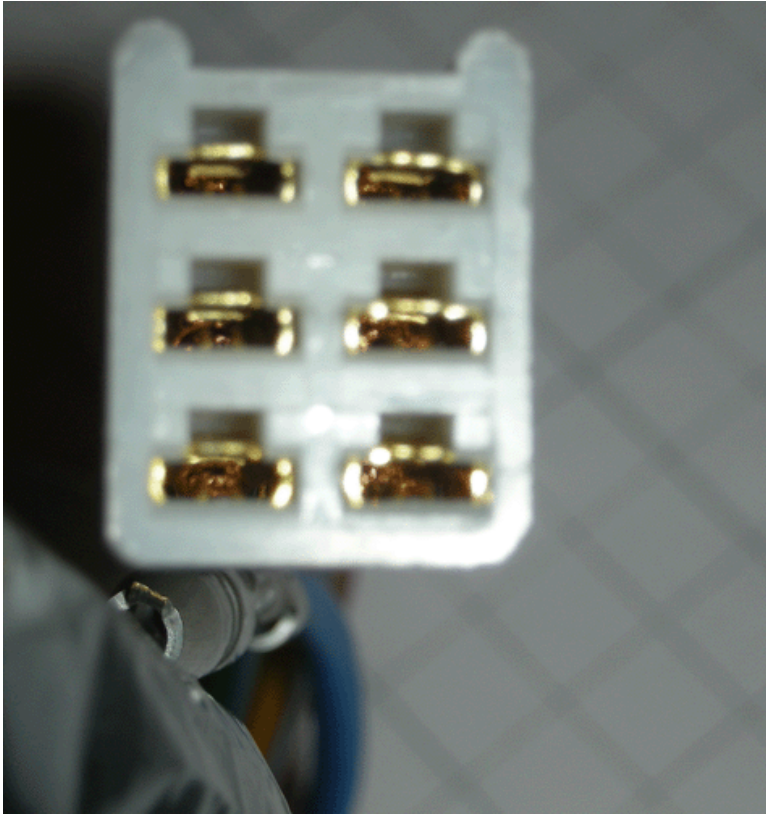


## 2. SUZUKI GEAR SWITCH REPLACEMENT

The stock neutral pickup switch will need to be replaced with the following OEM Suzuki switch (Suzuki part number: 37720-45100)



The end connector of the new switch looks like this



Remove the existing neutral switch, as shown below (refer to shop manual for detailed procedure)



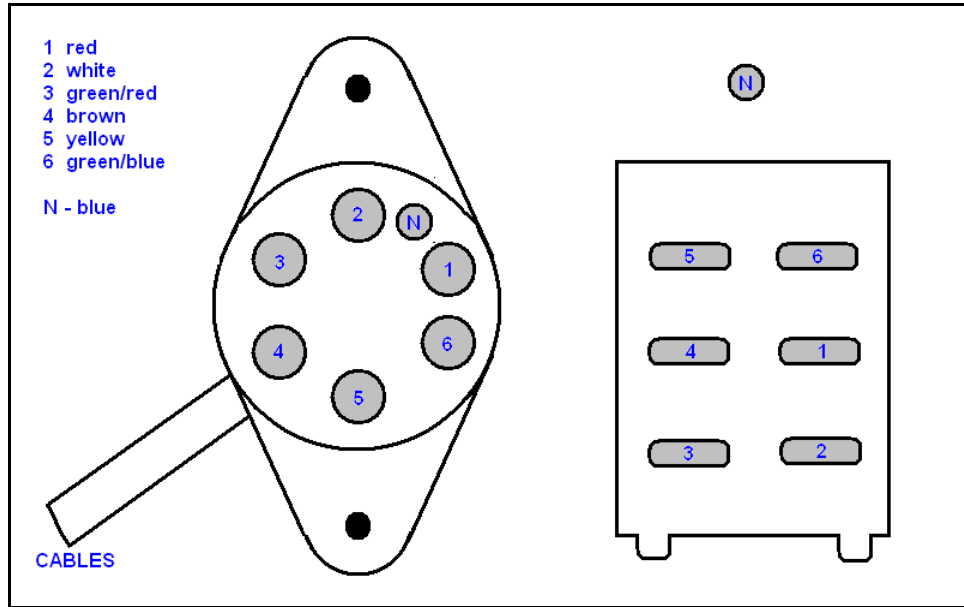
There is a contact behind the switch that rotates a fixed amount with each gear change. When this contact touches the contact in the switch, it connects the corresponding wire to ground (thereby giving a signal to identify the gear you are in)



This figure shows the wiring of the new switch once it was installed on the bike

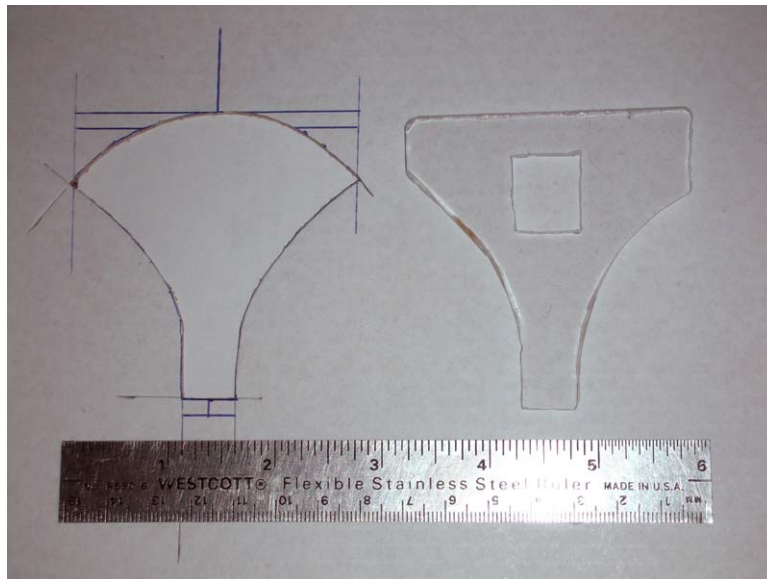


This schematic diagram details which gear corresponds to which wire (you will have to make the proper connections to the same circuit built in step 1)

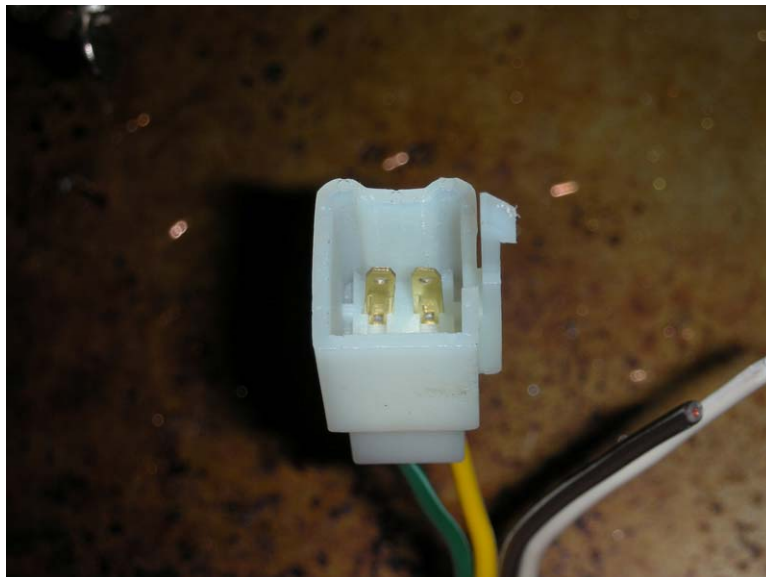


### 3. MECHANICAL INSTALLATION

Using plexiglas, a mount was fabricated for the 7-segment display:



A 6-pin Hitachi connector set was purchased at <http://www.vintageconnections.com/> (#HP6; 2.8mm spades; \$3.00 USD). This connector matches the end of the OEM gear switch (see figure shown above). The spades were crimped onto wiring to connect the gear switch to the control circuit box.



The brown (+12V) and black (ground) wires in the headlight bucket were used to power the control circuit.



The LED display was mounted between the gauges using the bolt already present behind the gauge cluster.



The signal input wires were routed along the wiring harness and connected to the gear position switch.



The neutral wire (blue) from the gear position switch was attached to the same blue wire previously connected to the neutral position indicator. Neutral shows up as zero on the display (and the original neutral light turns on).



With the wiring complete, only testing remains:



And the finished product!  
(with compliments to gsTwin member “airbrush” for the custom keychain).



#### FINAL NOTES:

- Having completed the project, my main concern is that the wiring of the prototype will not be sufficiently robust for a motorcycle environment. Testing (i.e. riding!) will determine if this device will stand up to the task as-is
- The control circuit box turned out to be too large to fit comfortably behind the windshield. Future builds might consider a printed circuit board to help reduce the size (this would probably also help make the circuit more robust and reliable)