# ST4s LED Tail Light Conversion

I have never been happy with a single tail light bulb.If that blows you are left with no rear light, potential trouble from the police or worse being rear ended by a motorist who doesn't see you.
I therefore chose to convert my previous Ducati 900ss to LED stop/tail light for increased reliability and a faster response time on the brake light.
I was a bit brassed off to find that the ST4s also has only one bulb in the tail light. So, using experience gained from the 900 I built an LED light for the ST4s, this time constructing an array of Superflux LEDs on a Panel. The 900 was a bit more time consuming because I had drilled the reflector and filled each hole with a 3mm Ultra-bright LED.

For the light source I chose to use Superflux 3,000 Mcd LEDs. I'm happy with these but might consider an upgrade to 11,000 Mcd 10mm LEDs in the future

## LED SPECIFICATION

PART NO. 3W3000

NOTE: TOLERANCE +/- 0.3mm

| PART NUMBER | | CHIP | |
|---|---|---|---|
| 3W3000 | MATERIAL | EMITTING | P ( nm ) |
| | GaN/GaN | WHITE | / |

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | TEST CONDITION |
|---|---|---|---|---|---|---|
| FORWARD VOLTAGE | VF | 3.0 | 3.4 | | V | If = 20 M/A |
| DOME WAVELENGTH | / d | / | / | / | nm | |
| REVERSE CURRENT | IR | | | 10 | uA | VR = 5V |
| POWER DISSIPATION | Pd | | 170 | | mW | |
| LUMINOUS INTENSITY | IV | 2000 | | 3000 | mcd | If = 20 M/A |
| VIEWING ANGLE | Degrees | | 90 | | degrees | If = 20 M/A |
| PEAK FORWARD CURRENT | If (Peak) | | | 100 | m/A | |
| RECOMMAND FORWARD CURRENT | If (Rec) | | 20 | | m/A | |
| ELECTROSTATIC DISCHARGE | ESD | | 2000 | | V | |

1. ABSOLUTE MAXIMUM RATINGS: (Ta = 25C)
2. OPERATING TEMPERATURE: -40C to 80C
3. LEAD SOLDERING: 260C FOR 5 SECONDS
4. STORAGE HUMIDITY RATE: 60%

Using 0.1" pitch Veroboard perforated copper strip board I built the circuit below. Note that there are a number of modules, each consisting of 3 LEDs in series with a 22 Ω resistor. I managed to get 4 rows of 3 such modules in the space available, totalling 36 LEDs. I also added another 4 ultra-bright LEDs left over from the 900ss project, mainly because I had a bit of space between the centre rows of Superfluxes due to bad layout planning on my part and I wanted to fill the space with more light.
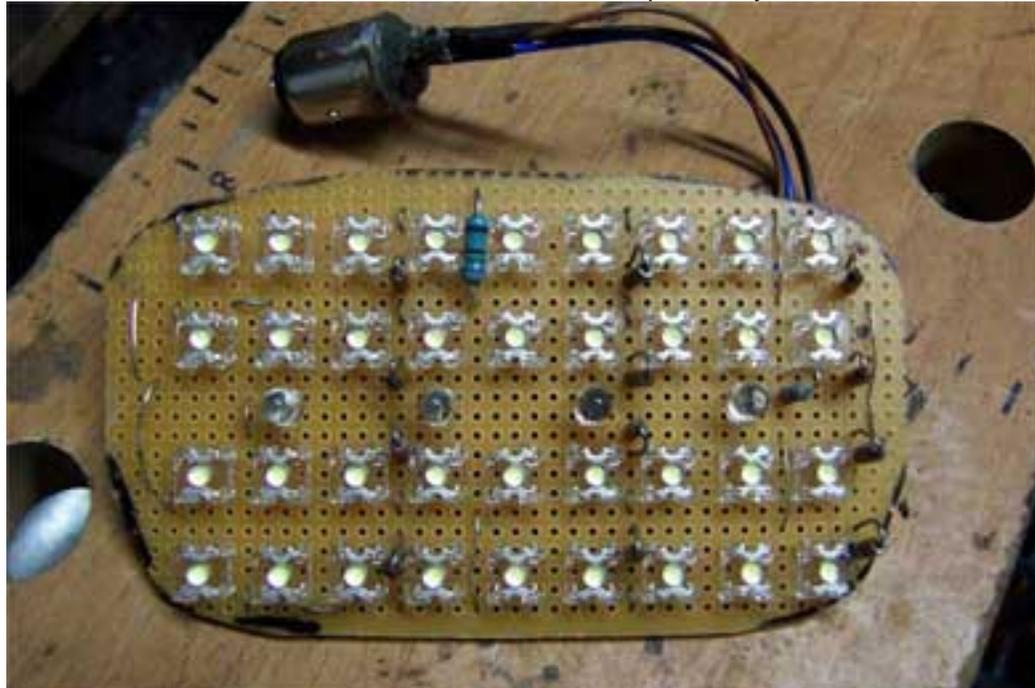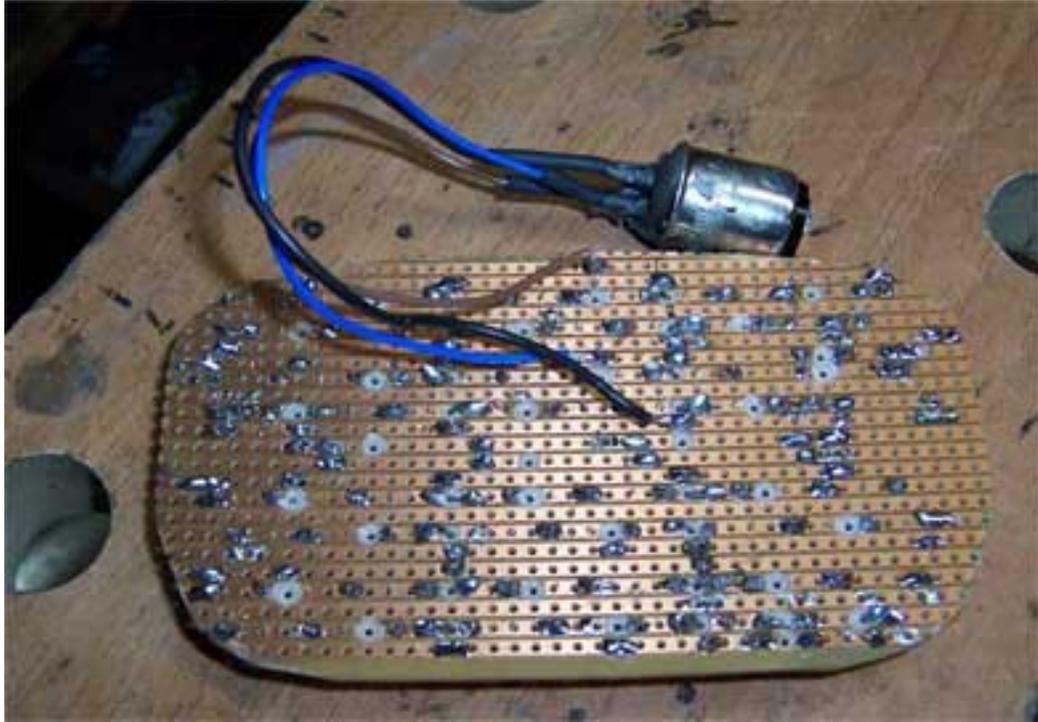
75 ohm

From Stop light circuit

22 ohm Resistors

The resistors for each module are 22 ohm $\frac{1}{8}$ watt. The tail light circuit is supplied via a 75 ohm ½ watt resistor, dimming the LEDs to normal brightness. The stop light by-passes this resistor illuminating the LEDs at full brightness. I have chosen to run the LEDs at 95m/A for maximum brightness. This is only 5m/A less than their rated maximum but since the brakes are not usually on for prolonged periods I don't expect premature failures.
I connected the wires from the panel to an old light bulb base to make the connections using the light socket, embedding them in Plastic Padding.

This a view of the completed panel I shaped it to fit the shape of the reflector but a rectangular bit of Veroboard at 60mm X 110mm would probably have done.

The rear view of the completed panel.

The completed panel mounted in the tail light. Currently held in place with sticky tape but Bluetack has been suggested as a means of securing it.

Tail light illuminated only.          Stop light on – Maximum brightness



This note added to Derek's original document in his cover email:
"As for the conversion. I used stripboard and covered it with an array of Superflux LEDs. I used these because of their very wide 90 deg viewing angle although they only have a brightness of 6,500mcd, which is still pretty bright.

I've since found some 15,000 Red LEDS (now that is bright). They have a viewing angle of only 20 deg but I reckon that should be OK. I fancy mounting them on a a piece of acrylic so that the small amount of light that is emitted to the rear is reflected back adding to the effect. I found suitable LEDs at sensible prices from http://www.goodwillsales.com/ who also sell on eBay. Although it might be cheaper (and quicker) to source them from a supplier in your part of the world.

Good luck and let me know how you get on."

(I have seen these type of LED's available cheaply at the local Dick Smiths chain of stores.)

Original Author: Derek, as published here: http://www.st4s.com/cgi-bin/discus/show.cgi?15/936