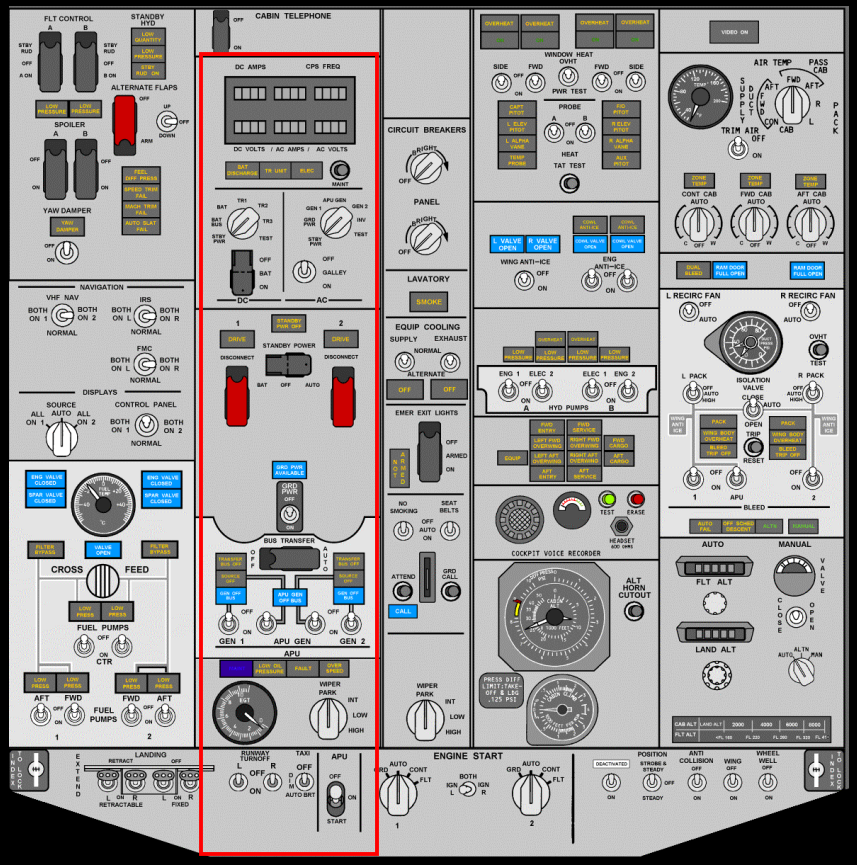
Credits: Thanks to Joseph Martin for the Original Idea



737NG Overhead

Step By Step

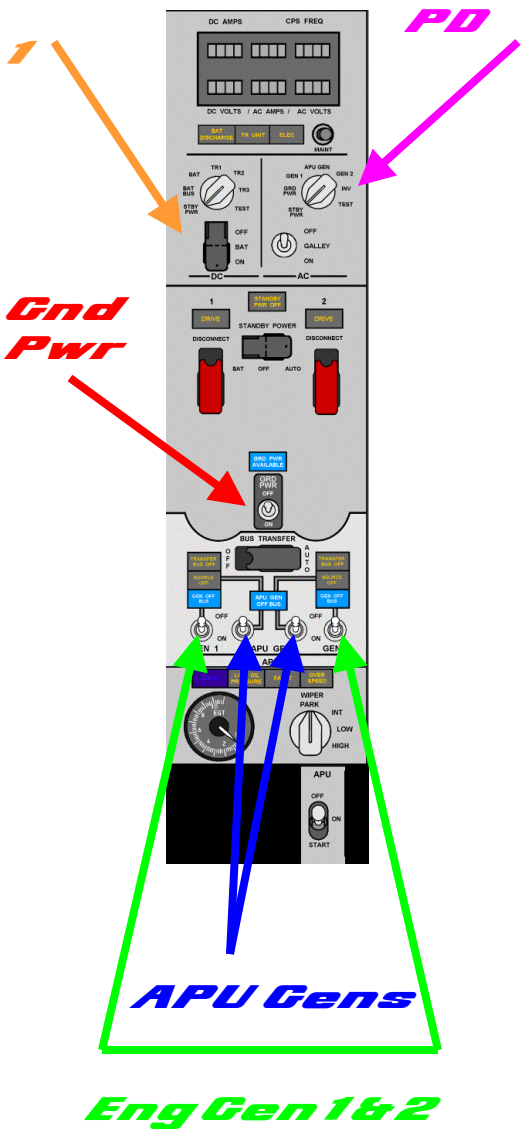
1. The Electrical Distribution Panel

The purpose of this project is to replicate the behaviour of the electrical system of the 737NG overhead without the need for expensive hardware and software interfacing. Using DPDT switches, it becomes possible to not only control the voltage routing behaviour of the system, but to control the actual software switches in synchronisation using a controller card and the FSUIPC macro technique. It's inexpensive to achieve and although quite a complicated undertaking, the end result is very satisfying.

I am using this system with the PMDG 737 inside FS9.1, but it can be applied to any aircraft, either electrical only, switch only or in the 'dual switch/power' configuration.

At this time, the switching between power supply options is manual, but when time permits, I'll look at an auto option.

ian@737ng.co.uk January 2009



First Stage is to get the Power onto the Overhead Panel and have the ability to control it with a Switch. I elected to use the Battery Switch **(1)** on the Meter Panel and an ATX 500w Computer Power Supply (PSU).

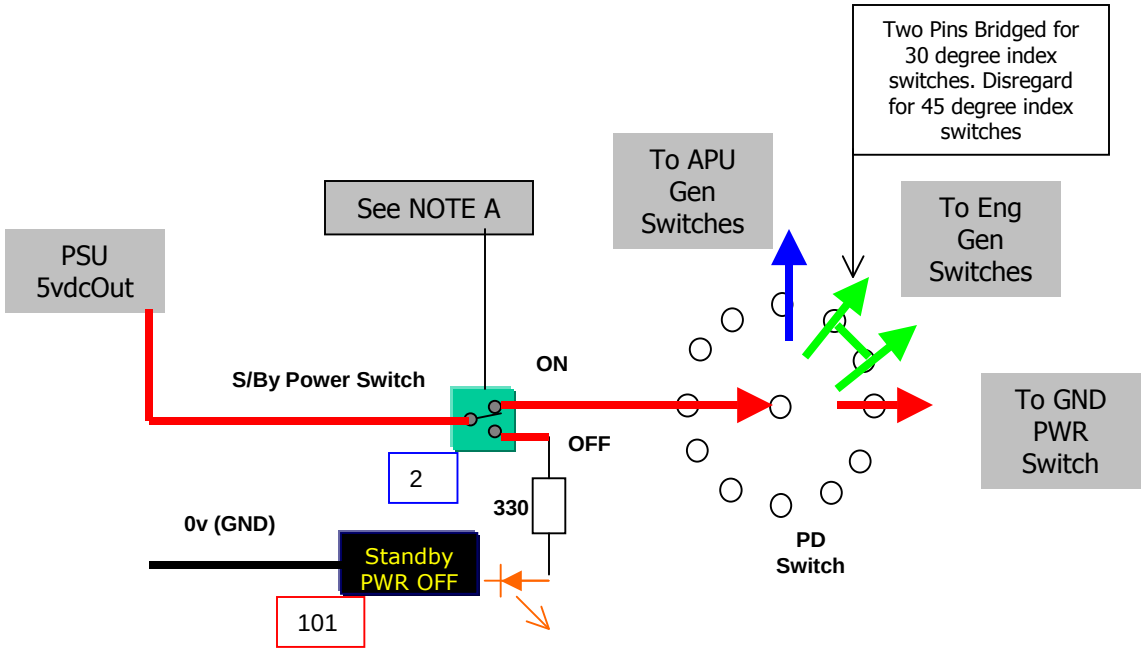
Connect the GREEN wire coming out of the PSU to any BLACK through the Battery switch. When the Switch is closed the PSU starts and when it is open, the PSU stops.

Ok, so the PSU is running and delivering 5vdc from the RED output wires. It's this 5v that will be used to power up the LED Annunciators.

At this point I just want to clarify a couple of things to avoid any kind of confusion. There are two sections to the Electrical System. The DISTRIBUTION and the BUS. In this part we will deal with DISTRIBUTION

1. The DISTRIBUTION section powers up the Aircraft BUS from any available Power Source **BATTERY**, **GND PWR**, **Eng.Gens** or **APU Gens**. It's automatic via control circuits in the real Aircraft, but I don't have $65m to get a real one. So, I chose to use the Right Rotary Switch on the Meter Panel because it has positions for the APU, GND PWR and Eng.Gens. This switch has been designated **PD** (Power Distribution).

2. The BUS feeds all the Aircraft systems with their power source. By systems, I mean every other overhead switch and/or annunciator combination that is not involved in the distribution of the voltage.

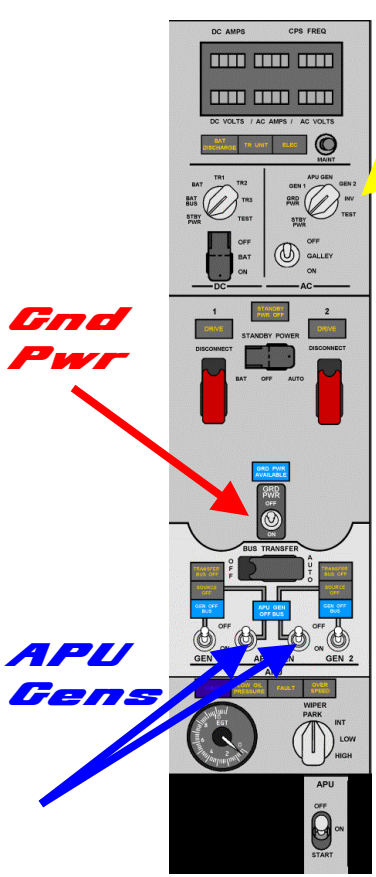


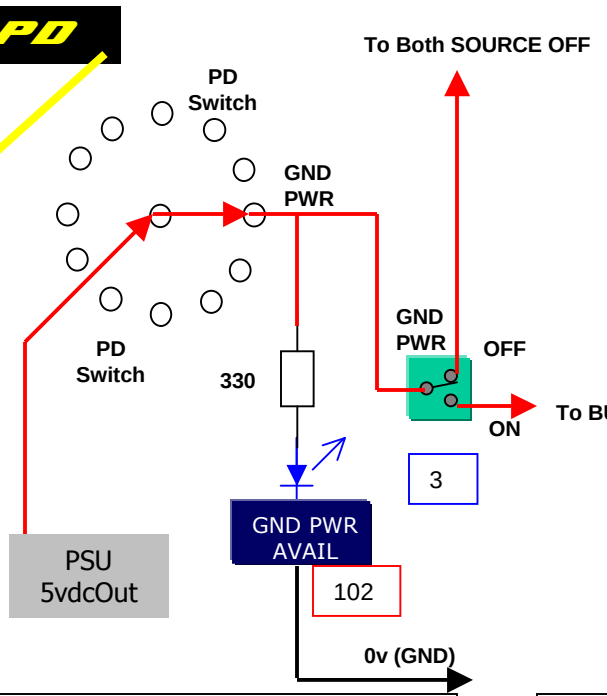
102 = ANNUNCIATOR #

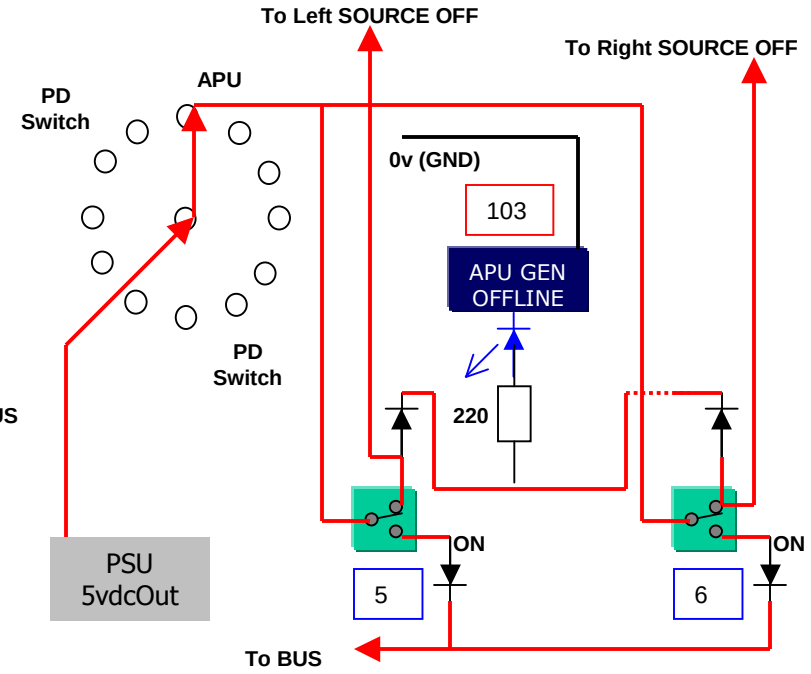
3 = SWITCH #

= 1N4001 Diode

330 = Resistor + value in ohms







<u>GROUND POWER.</u> When the PD Switch is turned to the GND PWR position, 5vdc is routed to the GND PWR switch (3). It also lights the GND PWR AVAIL annunciator LED (102).

With the GND PWR Switch in the ON position, 5vdc is then sent to the BUS.

With the GND PWR switch in the OFF position 5vdc is routed to the SOURCE OFF Annunciators (104 and 105)…see page 6 & 7

<u>APU Gens</u>. With the PD Switch turned to the APU position, voltage is supplied to both the APU Gen Switches.

If either APU Switch is turned on, voltage is sent direct to the BUS.

If either APU Switch is OFF, not only does it illuminate the OFFLINE Annunciator (103), but it also illuminates it's corresponding SOURCE OFF Annunciators (104) or (105)…see page 6 & 7

Both APU Gen Switches need to be ONLINE before the APU Gen Annunciator (103) is extinguished.

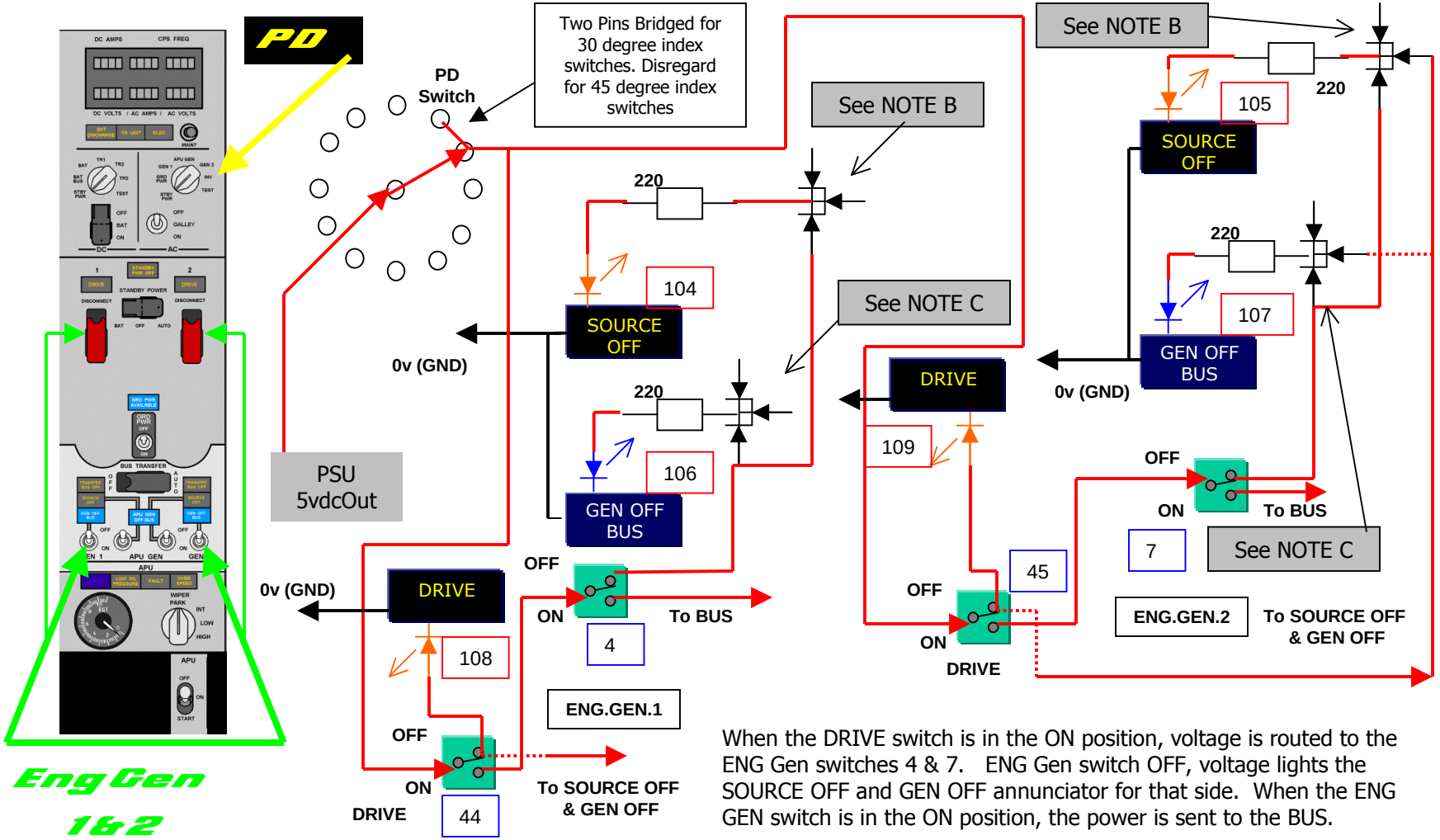
<u>SOURCE OFF</u> is dealt with on Page 6 & 7

102 = ANNUNCIATOR #

3 = SWITCH #

= 1N4001 Diode

330 = Resistor + value in ohms



When the DRIVE switch is in the ON position, voltage is routed to the ENG Gen switches 4 & 7. ENG Gen switch OFF, voltage lights the SOURCE OFF and GEN OFF annunciator for that side. When the ENG GEN switch is in the ON position, the power is sent to the BUS.

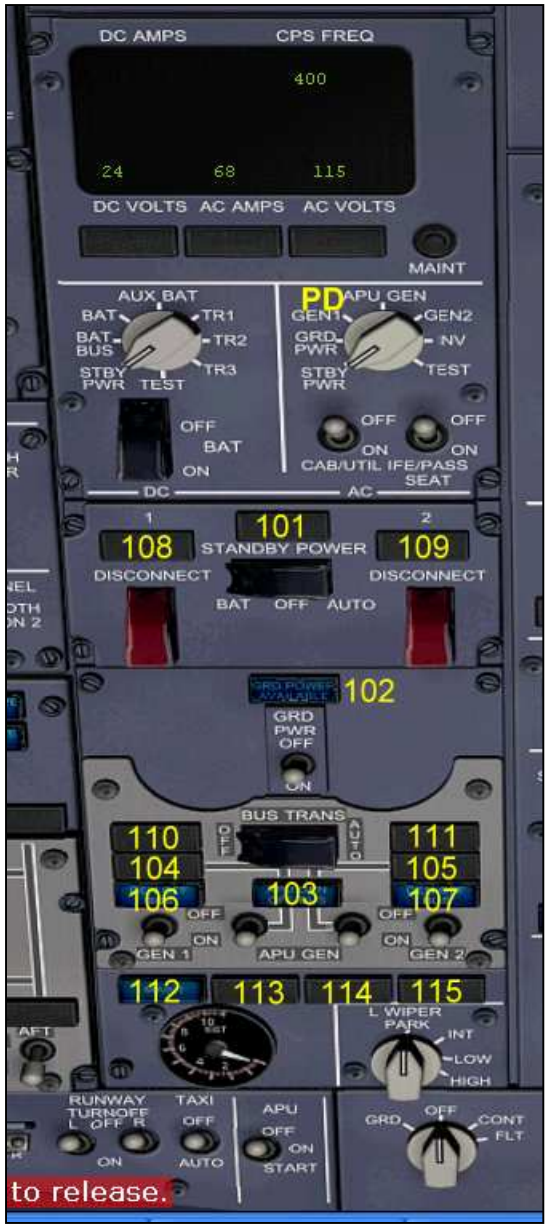
ENG Gens. The PD switch is turned to the Eng Gens position and voltage is routed thru the L & R DRIVE switches (44 and 45) to the Eng Gen Switches. If a DRIVE switch is OFF voltage is routed away from the Eng Gen Switch illuminating the DRIVE annunciator 108 (L) or 109 (R) and the corresponding GEN OFF and SOURCE OFF annunciator. DRIVE can only be reset on the ground.

102 = ANNUNCIATOR #

3 = SWITCH #

= 1N4001 Diode

330 = Resistor + value in ohms



NOTES:

The purpose of this project is to replicate the behaviour of the electrical system of the 737NG overhead without the need for expensive hardware and software interfacing. Using DPDT switches, it becomes possible to not only control the voltage routing behaviour of the system, but to control the actual software switches in synchronisation using a controller card and the FSUIPC macro technique. It's inexpensive to achieve and although quite a complicated undertaking, the end result is very satisfying.

I am using this system with the PMDG 737 inside FS9.1, but it can be applied to any aircraft, either electrical only, switch only or in the 'dual switch/power' config.

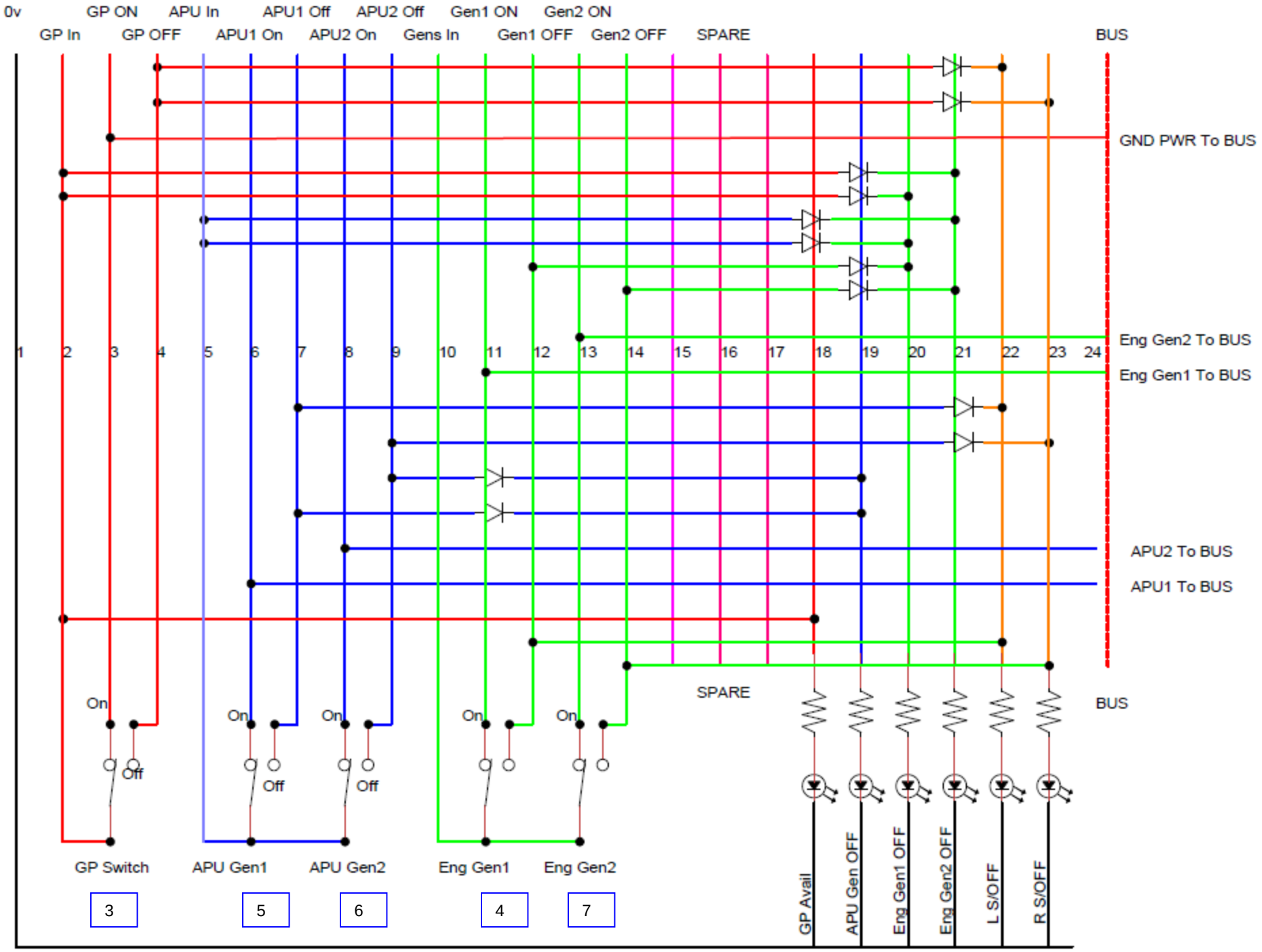
How good is your imagination?

A. Voltage is supplied from the PSU & routed thru the Standby Power switch. With the switch off the Standby Power Off Annunciator (101) is lit and power is removed from the Overhead.

B. The SOURCE OFF Annunciators are lit when any of the selected sources are not ON BUS. **See the Diagram on Page 6 and the description on Page 7**

C. Gen OFF BUS Annunciator is lit when Eng.Gen Off Line. **See the Diagram on Page 6 and the description on Page 7**

Resistors. You may notice that some resistors have a lower value than others. The reason for this is they are behind a Diode. There is a voltage drop across a diode, hence less resistance is required to protect the LED. Too high a resistance and the efficiency of the LED is reduced (dimmer).


0v
GP In
GP ON
GP OFF
APU In
APU1 On
APU1 Off
APU2 On
APU2 Off
Gens In
Gen1 ON
Gen1 OFF
Gen2 ON
Gen2 OFF
SPARE
BUS
GND PWR To BUS
Eng Gen2 To BUS
Eng Gen1 To BUS
APU2 To BUS
APU1 To BUS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
On
Off
GP Switch
APU Gen1
APU Gen2
Eng Gen1
Eng Gen2
3
5
6
4
7
SPARE
BUS
GP Avail
APU Gen OFF
Eng Gen1 OFF
Eng Gen2 OFF
L S/OFF
R S/OFF

Above is a diagram of a stripboard circuit I made to route the voltage around the Overhead Distribution Panel, it's switches and annunciators.

It is Colour Coded as **GROUND PWR**, **APU**, **ENG GENS** and **SOURCE OFF** to enable easy identification.

First let's look at the **GROUND POWER**. When the **PD** switch supplies the GROUND POWER circuit, it does two things. It lights the GND PWR Avail LED (102) and also delivers voltage to both the **ENG GEN 1 & 2 OFF** annunciators (106 & 107) which remain on while GND PWR supply is selected. When the GND PWR Switch is turned OFF, voltage is routed to the two **SOURCE OFF** (104 & 105) annunciators as well. When the GND PWR switch is turned ON, the two SOURCE OFF annunciators go off and voltage is routed to the BUS.

Secondly it's the **APU** circuit. Turning the **PD** switch to the APU position again does two things. First it sends voltage to both the **ENG GEN OFF** annunciators (106 & 107) and to both the APU GEN switches (5 & 6). When the APU GEN switches are OFF, they route the voltage to the **SOURCE OFF** annunciator (either 104 or 105) on that side and also to the **APU GEN OFF** (103) annunciator. If either APU GEN switch is turned on, it routes voltage to the BUS and removes it from the **SOURCE OFF** LED on that side. Both APU GEN switches have to be ON to turn off the **APU GEN OFF** annunciator.

Finally, the **ENG GENS** circuit. Turning the PD switch to the ENG GEN position, routes the voltage thru the L & R DRIVE (44 & 45) switches to the **ENG GEN 1** switch (4) and **ENG GEN 2** switch (5). With the Drive Switches in the Off Position, voltage is routed to the DRIVE ANNUNCIATOR, the SOURCE OFF and the ENG Gen OFF on that side. With the Drive switch ON, voltage is routed to the ENG Gen Switch on that side. If an ENG GEN switch is off, it sends voltage to it's **SOURCE OFF** and **ENG GEN OFF** LED's. Turning the switch ON routes the voltage to the BUS and extinguishes the **SOURCE OFF** and ENG GEN OFF LED's on that side.