

BOEING 737NG OVERHEAD SWITCHMAP



Just before I get going, I would say that I have assumed you are familiar with FSUIPC, Joystick Cards and especially the Opencockpits USBKeys Card configuration and setup.

This is the method I used to get my hardware Overhead Panel controlling the software PMDG Overhead Panel. These are the Cards Used:

BU0836X Joystick Controller Leo's Card gives me the ability to input 32 Joystick Buttons which are recognised and assigned in FSUIPC Buttons & Switches page. FSUIPC sees the button press and it is assigned a function from the 737 OHD items in the FSControl dropdown menu. FSUIPC also allows me another function when the button is released, so in certain instances, two functions can be achieved with a single switch.

Opencockpits USBKeys Card Basically a keyboard emulator operating over a Matrix to achieve upto 88 separate key (or key combination) sends. Once you have the configuration set up, a key (or combo) can be sent to FSUIPC which as with the Joystick controller, it will see. This time you go to the Key Presses Page and in the FSControl Dropdown Menu, one of the 737 OHD items is assigned to that keysend. **Added 24/08/2008. I have since upgraded to using all BU0836X inputs, but have left the USBKeys element still in the document for those who still wish to use this type of input.**

What Switch Is Used With Which Card?

I try to connect switches which are permanently ON to the BU0836X. These tend to be switches which also route the voltage to the BUS or to Led's. But it is suitable for any type of switch connection.

With the USBKeys Card, I try to connect the Momentary Switches (Seatbelts, No Smoke) and Push Buttons (Attend, Guard) because they return to an off position once the switch is released. I have encountered some issues with the USBKeys card using permanently on switches. However, that being said, I am now using permanently On switches with the USBKeys card by fitting diodes in the line to the 'common'.



PARKING BRAKES - Press PERIOD (.) to release.

- 1. BATT TEST
- 2. BATT DISCONNECT
- 3. BUS TRANSFER
- 4. GEN 1
- 5. GEN 2
- 6. GEN 3
- 7. GEN 4
- 8. SPOILER
- 9. FEED
- 10. FUEL
- 11. FUEL
- 12. FUEL
- 13. CROSS FEED
- 14. FUEL
- 15. FUEL
- 16. WING ANTIICE
- 17. ANTIICE
- 18. ENG ANTIICE
- 19. ENG 1 ELEC 2
- 20. ELEC 1 ENG 2
- 21. HYD PUMPS
- 22. HYD PUMPS
- 23. FLT ALT
- 24. FLT ALT
- 25. LAND ALT
- 26. LAND ALT
- 27. TEST
- 28. TEST
- 29. TEST
- 30. ENG FAN
- 31. REC'D
- 32. TRIM AIR
- 33. BRIGHT
- 34. ATTND
- 35. ATTND
- 36. ATTND
- 37. HIGH
- 38. HIGH
- 39. DOWN
- 40. DOWN
- 41. TEST
- 42. TEST
- 43. TEST
- 44. DISCONNECT
- 45. DISCONNECT

COLOUR KEY: **RED** = POWER DISTRIBUTION, **YELLOW & GREEN** = BU0836X,

Switch	Type	Input	Assigned	Action
1. Battery Switch	DPDT	JB	FSUIPC	Also turns PSU On & OFF
2. Standby Power	DPDT	JB	FSUIPC	Also controls Power to BUS
3. Ground Power	DPDTCO	JB	FSUIPC	Also controls Power to BUS
4. Eng 1 Gen	DPDTCO	JB	FSUIPC	Also controls Power to BUS
5. APU Gen 1	DPDTCO	JB	FSUIPC	Also controls Power to BUS
6. APU Gen 2	DPDTCO	JB	FSUIPC	Also controls Power to BUS
7. Eng 2 Gen	DPDTCO	JB	FSUIPC	Also controls Power to BUS
8. Yaw Damper	DPDT	JB	FSUIPC	Also Controls LED & MIP LED
9. Aft 1 F/Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
10. Fwd 1 F/Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
11. Fwd 2 F/Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
12. Aft 2 F/Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
13. X Feed	Rotary 2P	JB	FSUIPC	Also controls Valve Open LED
14. Ctr Left Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
15. Ctr Right Pump	DPDT	JB	FSUIPC	Also controls Low Press. LED
16. Wing A/Ice	DPDT	JB	FSUIPC	Also controls Valve Open LED
17. Eng 1 A/Ice	DPDT	JB	FSUIPC	Also controls Valve Open LED
18. Eng 2 A/Ice	DPDT	JB	FSUIPC	Also controls Valve Open LED
19. Eng 1 Hyd.	DPDT	JB	FSUIPC	Also controls Low Press. LED *
20. Elec 2 Hyd.	DPDT	JB	FSUIPC	Also controls Low Press. LED
21. Elec 1 Hyd.	DPDT	JB	FSUIPC	Also controls Low Press. LED
22. Eng 2 Hyd.	DPDT	JB	FSUIPC	Also controls Low Press. LED *
23. Flt Alt Dec	ENC	JB	FSUIPC	
24. FLT Alt Inc	ENC	JB	FSUIPC	
25. Land Alt Dec	ENC	JB	FSUIPC	
26. Land Alt Inc	ENC	JB	FSUIPC	
27. L Bleed	DPDT	JB	FSUIPC	Also controls Cowl Flap LED **
28. APU Bleed	DPDT	JB	FSUIPC	Also controls Dual Bleed LED **
29. R Bleed	DPDT	JB	FSUIPC	Also controls Cowl Flap LED **
30. L Circ Fan	SPST	JB	FSUIPC	
31. R Circ Fan	SPST	JB	FSUIPC	
32. Trim Air	SPST	JB	FSUIPC	
33. No Smoke Up	MOM	JB	FSUIPC	See notes in red. I have now dispensed with the USBKeys Cards in favour of using a 2 nd BU0836X. But a lot of people still ask me about this type of connection, so I've left them in for information only.
34. No Smoke Dn	MOM	JB	FSUIPC	
35. SeatBelts Up	MOM	JB	FSUIPC	
36. SeatBelts Dn	MOM	JB	FSUIPC	
37. Attendant	PB	JB	FSUIPC	
38. Guard Call	PB	JB	FSUIPC	
39. Alt Flaps Up	MOM	JB	FSUIPC	Routed Thru the Arm Switch ***
40. Alt Flaps Down	MOM	JB	FSUIPC	Routed Thru the Arm Switch ***
41. L Pack	MOM	JB	FSUIPC	2 way action from 2 inputs + & -
42. R Pack	MOM	JB	FSUIPC	As Above
43. Isol Valve	MOM	JB	FSUIPC	As Above
44. Eng 1 DRIVE	DPDT	JB	FSUIPC	44 & 45 Also Controls Drive LED on their side and feed S/Off and Gen Off
45. Eng 2 DRIVE	DPDT	JB	FSUIPC	

Switch Key

DPDT = Double Pole, Double Terminal

DPDTCO = Double Pole, Double Terminal, Centre Off

ENC = CTS288 Rotary Encoder (Can also Use a Pulse Switch for this application)

MOM = Momentary Switch (ON)/OFF/(ON) Spring Loaded To Centre

PB = Push To Make Pushbutton

Rotary 2P = 2 Pole 6 Way Rotary Switch

SPST = Single Pole, Single Terminal (Basic on/off switch)

JB = Joystick Button Input via FSUIPC

USBK = Keystroke Input via USBKeys Card

28/08/2008 All USBKeys Inputs have now been transferred to a BU0836X board to enable good housekeeping and free out keystrokes.

- * Both the Eng Hydraulic Lo Pressure Annunciators also feed the Feel Diff Press Annunciator thru a diode. This means that if either of the Hyd Pumps are switched off with the engines running, the Feel Annunciator Lights.
- ** L & R Bleed Annunciators also feed the APU Bleed Switch so that if the Bleeds are on and the APU Bleed is also turned on, the Dual Bleed Annunciator lights.
- *** The Alternate Flaps Up/Down switch is only active if the Guarded Arm Switch is on. The momentary switch raises or lowers the flaps one stage at a time dependant on which side of the switch is operated.

Lets Talk About Switch Action and FSUIPC Choices

I like to ensure that as many switches are turned off at any given time. This reduces the risk of erroneous switching or 'ghosting'. That is where the continuity finds its own way back to the card instead of where you want it to go (yes even with the best laid out plans and triple checked connections, it does happen – moisture, electrical noise, fluorescent lighting can all have an influence on your setup).

By careful planning, it is possible to reduce the number of switches making contact at a given point of the flight thereby reducing the risk of an unwanted switch action.

So, to reduce the risk of any unwanted switch actions, I approach it like this :

First I take a look at the switch. What does it do and how does it operate? All Momentary and Pushbutton switches can be ignored because they return to an off position when released, thus cutting the route back to the interface card.

But permanently On switches have a route back (even with a diode in line, maybe the signal isn't going down that wire).

So for example lets think about a couple of switches, what they do and does the aircraft system they control spend more time ON than OFF during a flight or vice versa. This is going to dictate how I would assign the 'Button Pressed' and 'Button Released' choice in FSUIPC.

Eng Gens. (2 way action – Up/Dn) During flights, it's more than likely that you will have the Gens On Line more than they will be Off Line. So because we have to control Voltage as well as continuity with the Eng. Gen Switches and because they are On more than Off, I would normally assign in FSUIPC that the Gens are Off when button pressed and on when button released. So the voltage and the continuity are on different sides of the toggle.

APU Gens. (2 way action – Up/Dn) These are different. The APU Gens are on for only a short time during a flight, usually at the gate for Push and Start and prior to arrival at the destination gate until Ground Power is available. So, again as I have to control voltage as well as continuity here because the time on is shorter than the time off, I elected to assign APU Gens ON when 'Button Pressed' and OFF 'When Button Released'. So the voltage and the contiuity are on the same side of the switch.

Ground Power. (2 way action – Up/Dn) Again Off more than On, so same rule applies as with the APU Gens.

Fuel Pumps, Hydraulic Pumps etc. (Toggle Action) Ok, with just Toggle Action software switches, I tend to use DPDT (Centre Off) switches. I 'loop' both ends of the switch and have a common return thru the centre connection. That way, the switch will make continuity whichever way you throw it sending the same thing on both sides of the toggle. The other side may be controlling voltage for the LED and synchronising the switches is easy.

Just a few examples to get you thinking, it's not law and not set in stone, but making life easy and the experience more enjoyable is what it's all about.

Thanks for taking the time to read this and any comments or corrections are always welcome.

Regards Ian

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