



# Boeing 777 Version 2

## FSX Flight Deck Panel

### Documentation

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## INSTALLATION

If you are reading this you have already unzipped the ZIP file. To install the panel on any aircraft simply copy the panel.cfg and B777V2.cab to the aircraft directory either replacing the existing panel sub-directory or as “panel.XX” where XX is the name on the “panel=” entry in the aircraft.cfg.

Many aircraft.cfg files have errors and omissions which need correction before this panel can be used successfully.

### **[Flaps]**

Corrections to the [Flaps] section are essential as errors are prevalent in most aircraft.cfgs. Under [Flaps there are three entries [Flaps.0], {Flaps.1], and [Flaps.2].

Under [Flaps.1] some files show flaps-position.1 as 5 and flaps-position.2 as 10. This is wrong. Flaps-position.1 should equal 1 and flaps-position.2 should equal 5.

Under [Flaps.2] flaps-position.1, flaps-positon.2, flaps-position.3, and flaps-position.4 should all equal 1. The default aircraft in FS9 has 0.5 but this is does not work correctly. 5 & 6 can be any number greater than 1 up to 20.

### **[Autopilot]**

Ensure that the autopilot section of the aircraft.cfg has the entry:

```
yaw_damper_gain = 1.0
```

### **Jetways**

For jetways to work in FSX you need to have this section in your aircraft.cfg:

```
[exits]
number_of_exits = 4
//open/close rate percent per second, longitudinal, lateral, vertical
positions from datum (feet), type (0=Main 1=Cargo 2=Emergency)
exit.0 = 0.1, 87.0, -10.0, 8.0, 0
exit.1 = 0.1, -146.0, 8.0, -7.5, 1
exit.2 = 0.08, -42.3, 9.0, -7, 0
exit.3 = 0.08, -42.3, 9.0, -7, 1
```

This can be used for any aircraft even if doors are not defined. Some of the numbers can be modified by experimentation to make the jetway extension more accurate. Jetways are a feature of FSX only – not FS9.

It is recommended to study the instructions before using this complex panel. It may seem daunting however there are many useful hidden features described below.

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## INSTRUCTIONS

### *Introduction*

This panel is an extensive upgrade to my previous version 1 of this panel largely based on data from the Boeing Operations Manual. The PFD and MFD have been replaced with new ones with many new features including V speeds, Flap speeds, and a TAWS map amongst others. Night back lighting with the “green glow” effect is a feature of this panel.

The EICAS has been upgraded with a very large number of scrolling messages which can appear based on the Boeing Manual and now closely mirrors the real EICAS in a Boeing 777.

The Boeing 777 has many sub-models and this panel supports any of them although some better than others. The V speeds, Flaps speeds, and landing weights will not be as accurate on some models.

Although this is a fairly complex panel it can nevertheless be flown easily as all of the additional features are purely optional. The key feature however is that everything works.

This version retains all of the display screens most of which have been upgraded to comply more closely to the Boeing manual There is still a simple Ground Handling panel which connects jetways, opens up to four individual doors, and does pushback. TCAS, terrain, and all functions of the Efix panel are built in to the MFD. The overhead panel and Throttle quadrant now include the fire handles.

This panel was developed on FSX Accelerator edition and designed for a 1920X1080 screen although it should work on other sizes although there may be scaling distortions on screens with a different size ratio.

All gauges are XML gauges so although this has been tested on FSX it will probably mostly work on FS9 as well although many features such as the TAWS maps are not supported on FS9.

Note that although FSX has an option for metric or imperial measurements, this panel operates on metric only for weights and temperatures. Other measurements follow the Boeing standard.

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## **Technical Issues**

### **Spoilers**

Due to a technical problem in FSX Spoilers have only three positions: Off, Armed, and fully deployed. Partial deployment is not possible.

### **Exits**

FSX allows for up to four exits to be defined in the aircraft.cfg. Internally a variable is provided to test if exits are open called "Exit Open:x" where x can be 1 to 4. This variable works only for Exit 1. The workaround has been to use "local" variables to determine if the door is open – this is how there can be four doors even if less are defined.

### **Compatibility**

This panel has been tested with several aircraft models some of which have been found to be unstable. The most stable is the default Boeing 777 from FS9. Other models used have been OSB773 which is OK and Boeing 777-300ER General Electric 90-115B1. The version using Pratt and Whitney engines has proved unstable. Matching a modified default aircraft.cfg file with other models has been quite successful.

There are different sound files available but the default sound file from FS9 seems to be the best although not necessarily the most authentic. Others are too loud and many continue with engine sound after engines are shut down. Modifying the default sound.cfg with a few extra sounds has been very successful.

### **Model Selection**

Before using this panel you need to ensure that the model of your aircraft.cfg is matched with the panel. The panel will automatically adjust to the model you specify.

The model is specified under the [General] section of your aircraft.cfg with the ATC\_MODEL= parameter. ATC\_MODEL should equal one of the following:

- 777-200
- 777-200ER
- 777-200LR
- 777-200FTR
- 777-300
- 777-300ER

If anything else is specified under this parameter the panel will default to the Boeing 777-200. The name of the model appears in the lower left corner of the main panel. Note however that simply changing this parameter will NOT change the model aircraft you are using. The rest of the aircraft.cfg as well as the .air file and .mdl file must be set up as a whole to match the model of aircraft.

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There are very many engine and hull combinations however this panel models just three combinations closely:

- Boeing 777-200 with GE90-76B engines
- Boeing 777-200ER with Trent 892 engines
- Boeing 777-300 with PW4090 engines

All of the V speeds, Flaps speeds, and landing weights should be accurate for these three variations. The panel can be used with other types however these variables will not be as accurate. Below is a table of equivalences showing which engines have similar power ratings to these engines:

Base Engine	Same Power	Within 10%
GE90-76B		GE90-77B, Trent 875, Trent 877, PW4074, PW4077, Trent 884
Trent 892 & PW4090	GE90-90B	Trent 895, GE90-85B, GE90-94B, PW4098

Unfortunately data was not available for the more powerful GE90-110B1 and GE90-115B engines used on the Boeing 777-200LR and the Boeing 777-300ER. The panel can still be used for these models but the V speeds and landing weights will not be right.

In the panel.cfg supplied there are three gauges for the three engines but if you are going to use only one engine then the other two gauges can be deleted although this is not essential.

## Night Lighting



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The panel backlighting has been designed with the “green glow” effect seen in photos of this aircraft type. The backlighting can be switched on and off with the two switches on the bottom left of the Overhead panel: the OVHD CB switch for the Overhead Panel and the PNL/FLOOD Switch for the Main panel and Glareshield. The STORM Switch can be used to switch the FSX default panel lighting on and off.

When switching the backlighting on and off there is a small delay each time it is switched.

## Icons



There are the standard icons on the bottom left of the main panel with two additional icons. The first is the “Compass” icon which displays the Compass at the top of the screen together with the panel lights switch, landing lights switches, and the engine start panel from the Overhead panel: all of which are functional. The second is the Maximum Landing Weight (MLW) calculator described below.

Below the icons is the name of the current model of aircraft that the panel is simulating.

## Maximum Landing Weight (MLW) Calculator

MLW CALCULATOR BOEING 777-300	
RUNWAY LENGTH 7600 FEET	AIRPORT TEMPERATURE 20 °C
AIRPORT ALTITUDE 100 FEET	MAXIMUM LANDING WEIGHT 276918 KGS (FLW)
WIND COMPONENT 0 KNOTS	FUEL TO REMAIN (for Fuel Dump) 113400 KGS
DRY	

This is a small popup calculation window to allow the calculation of the Maximum Landing Weight using Runway Length, Airport Altitude, Wind, Wet or Dry, and Temperature as parameters. The MLW is used for Fuel Jettison and to check the landing weight prior to landing.

The MLW is the lower of the Field Landing Weight (FLW) or the Climb Limit Weight (CLW) and the calculator indicates which of these has been selected. FLW is calculated for Flaps 30 and CLW is calculated for approach at Flaps 20 and landing at Flaps 25 or 30.

The Airport Temperature affects only the CLW whilst Runway length, Wind, and Wet or Dry affect only the FLW.

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## **Panel Controls**

This panel behaves a little differently than most other panels. In order to operate any of the dials the left button on the mouse is clicked to turn anti-clockwise and the right button is clicked to turn clockwise. Some dials in the EFIS Panel have a centre press function and this is done by pressing the centre button on the mouse (which in many mice is done by pressing the mouse wheel).

This method makes it much easier to operate as there is only one mouse area per dial so any button can be pressed anywhere on the dial.

Simple on/off switches still use the left button as usual as do simple two position dials.

See the Throttle Quadrant section to see how this has been taken a step further to simplify operating the Throttles.

## **Main Panel**



The main features of the main panel are the three CRT screens: the first displaying the Primary Flight Display (PFD), the second and third displaying one of thirteen different screens available by selecting from the buttons panel on the top right of the Main Panel. The initial display for screen 2 is the Main Flight Display (MFD) and for screen 3 is the EICAS.

The EFIS Panel on the left of the Glareshield is fully integrated with the MFD with all buttons functioning. The Autopilot is a fairly standard Boeing panel. The “Buttons” panel on the right allows the selection of display screens on the two CRTs plus a third pop-up CRT in the right windscreen – useful for checklists.

More detailed descriptions of the sub-panels appear on the following pages.

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## The Master Caution and Warning Lights



The Master Caution and Warning lights have two lights to signal non-normal configuration or emergencies. As there can be a large number of causes for these lights to illuminate further investigation is needed from the EICAS messages.

These lights come on in the following cases:

- WARNING: - any Red ALERT message on the EICAS
- CAUTION: - any Yellow CAUTION message on the EICAS

See the EICAS section below for more information on EICAS messages.

## The Clock



This looks like the default clock from the Boeing 747 but is in fact completely rewritten to provide useful functions for FSX.

The clock and the sweep hand operate all the time including at start up. Local time is shown in the bottom window by default and GMT is shown in the top window. Clicking the date button will display the date in DDMMYY format in the top window. Clicking again returns to GMT time.

Clicking on the CHR button will set the bottom window to zero then pressing the RUN button will start a timer in the bottom window. Pressing the RUN button again will stop the timer and pressing the CHR button while the timer is on will reset it to zero. Pressing the CHR button again after reset will return to displaying the local time.

A useful feature for FSX is the Time button on the bottom right. Clicking it once will immediately increase the simulation rate to 16 times. Clicking it again will return to normal time.

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## The EFIS



This panel controls the settings in the MFD display on whichever CRT it is displayed.

EFIS		
Switch	Function	Action
RST Dial	Increases or decreases the Decision Height for landing. This can be seen in the Pfd and will be reflected in the Callouts during Approach.	Left click to decrease or right click to increase the Decision Height. Limits are 0 and 360 feet. Centre click will switch between Radio and Barometric heights.
Left VOR / ADF Switch	Switches between VOR 1, ADF 1, or no display in the bottom left of the MFD	Left click to switch down and right click to go up.
FPV Button	Switches on the Flight Path Vector on the PFD.	Click once to switch on or off
CTR Dial	Select between Approach, VOR, Map, or Plan for display on the VOR. Usually leave on Map for best detail.	Click on the left to move anti-clockwise or right for clockwise. Centre click to switch the MFD between Rose and Expanded display.
MTRS Button	Display altitudes in Metres on the PFD	Click to display metres and click again to switch off.
TFC Dial	Alters the range on the MFD from 10 to 640 nautical miles.	Left click to move anti-clockwise or right click for clockwise.
STD Dial	Increases or decreases the barometric pressure and switches between Millibars and Inches of Mercury (IN) on the PFD and on the Standby Altimeter.	Left click to move anti-clockwise or right click for clockwise. Click in the centre to switch between inHg and Mb.
VOR / ADF Switch Right	Switches between VOR 2, ADF 2, or no display in bottom right of the Mfd	Left click to switch down and right click to go up.

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<b>EFIS</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
<b>Buttons</b>		
WXR	In the real aircraft this button displays the weather radar map. As this is not supported in FSX it is used to switch the map display to a TAWS map. The TERR switch must first be selected then WXR to select TAWS.	Click once to switch to TAWS and again to switch back to Terrain display.
STA	Displays or suppresses NDBs and VORs on the MFD.	Click once to display and again to suppress the NDBs and VORs
WPT	Display Waypoints on the MFD	Click once to display Waypoints and again to suppress them.
ARPT	Display Airports on the MFD	On by default, Click once to suppress airports and again to display them.
DATA	Display additional information on the MFD – e.g. Airport names and IFR landing displays.	Press once for additional detail and again to suppress the detail.
POS	Displays a monochrome map on the MFD	Press once for the map and again to suppress the map.
TERR	Displays terrain in colour with colours depicting altitude of the terrain above sea level. The colours follow the Garmin schema and are more readable than the default colours. The water colour is also modified to give greater contrast.	Press once to see terrain and again to suppress.

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## The Primary Flight Display (PFD)



The PFD displays all information about the orientation of the aircraft including Heading, Speed, Attitude, rate of climb, as well as substantially more information. This is a close replica of the appearance of the PFD on the real aircraft.

This PFD displays V speeds along the left speed tape as well as Flap retraction speeds. The calculation includes the criteria: wet or dry runways, temperature, wind, and altitude. The only criterium not included is runway slope which can not be determined in FSX. The adjustment for slope is rarely more than 1 knot so this is not too serious. Note that the calculation for V1, VR, and V2 is made only on the ground when flaps are in a valid takeoff configuration which on the Boeing 777 is Flaps 15. The calculation for Vref is made only when airborne and flaps are in landing configuration: Flaps 20, Flaps 25, or Flaps 30.

Takeoff V speeds are based on maximum thrust for takeoff and are MINIMUM speeds.

The PFD Radio Altimeter measures altitude from its antenna to the ground but should display altitude with wheels down from its wheels to the ground. A correction factor equal to the height of the antenna above the ground is automatically applied by this panel at startup which will be correct for any aircraft if it is on the ground. If not on the ground a correction factor of 16 feet is applied which is correct for most Boeing 777 models.

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## The Autopilot



This is a fairly standard Autopilot similar to those on most Boeing aircraft. Buttons and their functions from left to right are:

AUTOPILOT		
Switch	Function	Action
A/P	Autopilot Master Switch. Yellow bar when on.	Click to turn on Autopilot. Click to turn off Autopilot. Does not turn Autothrottle on or off.
F/D ON	Switches the Flight Director on or Off	Click up for On and down for Off.
A/T ARM	Arms the Autothrottle before activating.	Click up for on and down for off.
CLB CON	Maintain the current N1 setting. Only operative above 400 feet altitude.	Click to set N1 hold to the current rate and again to disengage N1 setting.
A/T	Engage or disengage Autothrottle to maintain speed shown in the IAS window.	Click once to engage and once to disengage.
IAS / MACH Switch	Switches IAS window from Speed display to Mach number display.	Click once to switch from one to the other.
IAS / MACH WINDOW	Display the desired Indicated Air Speed (IAS) or the Mach Number depending on the setting of the IAS/Mach Switch.	Left click decrease the desired speed or right click to increase.
IAS Dial	Adjusts the speed shown in the IAS / MACH Window.	Left click decrease the desired speed or right click to increase.
LNAV Button	Engages or disengages navigation mode. When engaged the aircraft will fly along the flight path already entered in the flight plan. Note that this button also automatically connects or disconnects NAV1 to the GPS navigation.	Click once to engage and again to disengage.

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<b>AUTOPILOT (continued)</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
VNAV Button	Engages Vertical Navigation mode which is essentially the same as Altitude hold. Engaging this button will also engage Altitude hold and vice versa.	Click once to engage and again to disengage.
FLCH Button	If current airspeed or mach is greater than that set in the window then the current airspeed will be set in the window otherwise no action.	Click once to engage and again to disengage.
A/P DISENGAGE	Clicking on this will disconnect both Autopilot and Autothrottle. Clicking again will not reconnect them however.	Click once to disconnect Autopilot and Autothrottle. After clicking once yellow and black bars are displayed. The Autopilot can not be re-engaged until this switch is clicked again and returned to its normal status. Clicking this button again does NOT however reconnect the Autopilot.
HDG/TRK Switch	Switches Heading window and PFD between HDG and TRK but has no effect on the numerical display.	Click once to display TRK and again to display HDG
Heading Window	Displays the selected Heading in Degrees (0 to 359).	Right click increase the desired Heading and left click to decrease.
Bank Limit Dial	Changes to the Bank Limit do not work in FSX. The bank limit is set in the aircraft.cfg and for the Boeing 777 is 25 degrees. This dial can be used to alter the heading.	Left click to rotate heading left or right click to rotate right.
Heading Hold Button	Activate or deactivate the Autopilot Heading Hold function which will turn the aircraft to the heading magnetic selected ion the Heading window.	Click once to engage and again to disengage.
V/S FPA Button	Switches between VS and FPA mode in the Vertical Speed window.	Function not available in FSX.
V/S Window	Displays the Vertical Speed of the aircraft in plus or minus feet per minute.	The default for ascent or descent is set in the aircraft.cfg and is usually 1800 feet per minute
V/S Dial	Dial up or down to increase or decrease the Vertical speed.	Use the mouse wheel to rotate the dial Up or Down
V/S Button	Activates or deactivates the Autopilot Vertical speed hold function. Activates automatically when Altitude hold is selected.	Click once to engage and again to disengage.
Altitude Window	Displays the Autopilot selected altitude in feet.	Right click increase the desired Altitude or left click to decrease.

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<b>AUTOPILOT (continued)</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
Display Selector	Switches between displaying altitude in the Altitude window in feet or thousands of feet.	Default is feet. Click once to change to 000s and again to change back to normal.
Altitude Hold Button	Activates or deactivates the Autopilot Altitude hold function.	Click once to engage and again to disengage.
LOC Button	When activated the aircraft will fly to the Localiser selected by NAV1 radio but will NOT follow the glideslope.	Click once to engage and again to disengage.
APP Button	When activated the aircraft will fly to the Localiser selected by NAV1 radio then will follow the Approach glideslope.	Click once to engage and again to disengage.
A/P	Autopilot Master Switch. Yellow bar when on.	Click to turn on Autopilot. Click to turn off Autopilot. Does not turn Autothrottle on or off.
F/D ON	Switches the Flight Director on or Off	Click up for On and down for Off.

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## The Buttons Panel



This panel controls the displays appearing in three CRTs: the MFD CRT, the EICAS CRT and an additional CRT which appears in the top right windscreen. The following table details the selections that can be made:

BUTTONS		
Switch	Function	Action
L INBD	Selects the MFD panel for changing the panel display.	Click to select the MFD CRT. Clicking on another panel (LWR CTR or R INBD) will deselect the L INBD. Clicking again on L INBD will also deselect the CRT
LWR CTR	Selects the EICAS panel for changing the panel display.	Click to select the EICAS CRT. Clicking on another panel (L INBD or R INBD) will deselect the LWR CTR. Clicking again on LWR CTR will also deselect the CRT
R INBD	Selects a pop-up panel which appears in the top right hand windscreen.	Click to select the pop-up CRT. The pop-up panel will appear with a blank screen after selection. Clicking again on R INBD will cause the panel to disappear. Clicking on another panel (L INBD or LWR CTR) will deselect the R INBD but the panel will remain visible.
ENG Button	Displays the EICAS Panel on the selected CRT.	Click to display the EICAS panel and click again to revert to the default for the selected CRT.
STAT Button	Displays the full Messages Panel from the EICAS on the selected CRT.	Click to display the Messages panel and click again to revert to the default for the selected CRT.
ELEC Button	Displays the Electrical Panel on the selected CRT.	Click to display the Electrical panel and click again to revert to the default for the selected CRT.

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<b>BUTTONS (continued)</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
HYD Button	Displays the Hydraulics Panel on the selected CRT.	Click to display the Hydraulics panel and click again to revert to the default for the selected CRT.
FUEL Button	Displays the Fuel Panel on the selected CRT.	Click to display the Fuel panel and click again to revert to the default for the selected CRT.
AIR Button	Displays the Compressed Air Panel on the selected CRT.	Click to display the Compressed Air panel and click again to revert to the default for the selected CRT.
DOOR Button	Displays the Exits Open/Closed Panel on the selected CRT.	Click to display the Exits Open/Closed panel and click again to revert to the default for the selected CRT.
GEAR Button	Displays the Landing Gear Panel on the selected CRT.	Click to display the Landing Gear panel and click again to revert to the default for the selected CRT.
FCTL Button	Displays the Flight Controls Panel on the selected CRT.	Click to display the Flight Controls panel and click again to revert to the default for the selected CRT.
FLT Button	Displays the Flight Information Panel on the selected CRT.	Click to display the Flight Information panel and click again to revert to the default for the selected CRT.
CHKL Button	Displays the Checklists Menu Panel on the selected CRT.	Click to display the Checklists Menu panel and click again to revert to the default for the selected CRT.
COMM Button	Displays a Radio Information Panel on the selected CRT	Click to display the Comms panel and click again to revert to the default for the selected CRT.
NAV Button	Displays the MFD Panel on the selected CRT.	Click to display the MFD panel and click again to revert to the default for the selected CRT.
CANC/RCL	Suppresses the messages display on the EICAS Panel (on any CRT)	Click to cancel the display of messages on the EICAS Panel. Click again to recall the messages. Red messages and Memo messages will not be cancelled.

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## **The MFD, EICAS, and the CRT Display Panels**

The aircraft will initially load with the MFD displayed in the Left Inboard CRT and the EICAS displayed in the Centre CRT. The third pop-up CRT will remain invisible until selected. The left PFD CRT will remain unchanged at all times.

Each of the three selectable CRTs will display one of 13 different display panels selected through the Buttons panel. In addition if Checklists are selected then the 11 different checklists can be selected interactively on the screen.

A detailed description of each panel is shown in the following CRT Display Panels section.

## **The Standby Attitude Indicator, Speed Indicator, and Altimeter Panel**



This panel varies between aircraft in real life. Some aircraft have a single full small PFD instead of the three gauges. These three gauges are fairly close replicas of the gauges on aircraft that have them.

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## The Landing Gear Panel



This is a fairly good replica of the Landing Gear panel in the original aircraft although slightly rearranged due to chopping off the lower right extension. The flap limits shown will correspond with the selected aircraft model. The GPWS Switches work in a similar but not the same way as in a real aircraft.

Switches on the panel work as follows:

LANDING GEAR		
Switch	Function	Action
G/S INHIBIT	Illuminates with GND PROX when lower than 1000 feet above ground. Warning can be switched off by this switch.	Click to Override Ground Proximity Warning and click again to restore warning. Only works below 1000 feet altitude above ground.
FLAP OVRD	Illuminates with FLAPS when below 1000 feet above ground without Flaps set.	Click to Override TOO LOW FLAPS warning and click again to restore warning. Only works below 1000 feet altitude above ground.
GEAR OVRD	Illuminates with GEAR when below 1000 feet above ground without Landing Gear lowered.	Click to Override TOO LOW GEAR warning and click again to restore warning. Only works below 1000 feet altitude above ground.
TERR OVRD	Illuminates with TERR when below 500 feet above ground.	Click to Override TOO LOW TERRAIN warning and click again to restore warning. Only works below 1000 feet altitude above ground.

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<b>LANDING GEAR (continued)</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
Gear Lever	Raises or lowers the Landing Gear	Click to raise the landing gear and click again to lower the landing gear. Can also be operated using "G" from the keyboard.
ALTN GEAR NORM	Dummy Switch	
**AUTO BRAKE	Set for Automatic braking on landing or to RTO for automatic braking for aborted takeoff.	Click on the right to rotate the dial clockwise and on the left to rotate anti-clockwise.

## **\*\* Notes on Autobrake function**

In FSX the standard Autobrake function applies brakes on touchdown and maintains the brakes until the aircraft is stopped. This is not a realistic scenario as normally brakes are not applied at high speed and normally the pilot does not wish to completely stop the aircraft.

This panel replaces the FSX standard Autobrake function with deploying reversers and spoilers on touchdown and maintaining them until the speed falls below 30 knots. The Autobrake function will then return to off. The pilot may also manually apply brakes at his option during or after the Autobrake sequence. The power of the reverser varies according to the Autobrake selection made by the pilot (1, 2, 3, or Max). Spoilers are deployed in each case. The same system applies to aborted takeoff (RTO setting) when maximum reverse thrust is applied. The function will activate if selected when throttles are retarded to idle.

## ***CRT Display Panels***

There are 13 different Panels that can be selected to display in any of 3 CRTs as described above.

Detailed descriptions of the 13 Panels follow.

# Boeing 777 V2 Panel

## The MFD Panel



The MFD panel always displays by default in the Left Inboard CRT. It is controlled by the EFIS Panel immediately above the Left Inboard CRT. The EFIS will control the MFD regardless of which CRT it appears in. It can be selected in any CRT by clicking the NAV Button in the Buttons panel.

New features include concentric circles as these seem to be more common than without, matching of VOR colours with symbols, slight change in layout to more accurately reflect the real aircraft, and addition of a TAWS map.

For the VORs “NS” appears when there is No signal. This is to prevent confusion when the VOR has been tuned but not detected.

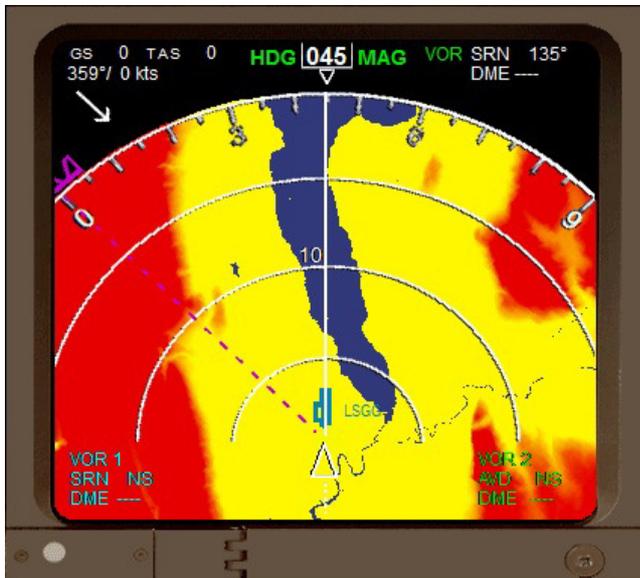
The symbols for the TCAS radar have been changed to aircraft symbols to clarify their meaning for a non-pilot.

There is new colouring for the Terrain map to give it more contrast based on the Garmin colouring and Map shadowing (see below). It has also been made more realistic by extending the display to the bottom of the screen as per the real aircraft. On the real aircraft the terrain map is actually a TAWS map but this map is included as well as the TAWS map as it would be more familiar to the FSX user.

Clicking on the centre of the MFD will switch between Expanded and Rose displays. On the real aircraft pressing the CTR button on the EFIS panel does the same thing and this function can also be done in this panel with a centre click on the CTR button.

# Boeing 777 V2 Panel

## The TAWS Map



**TAWS Map**



**Terrain Map**

The Terrain Awareness (TAWS) Map is a map which measures terrain altitudes from the height of the aircraft rather than from sea level. The system used on this aircraft follows the colour scheme specified for a Boeing 737-800 however does not have the same accuracy as colours can only be defined in FSX per 1000 feet instead of 250 feet as needed by the specification. I have not seen any differing specification for the Boeing 777.

This TAWS map shows terrain from 2000 feet below the aircraft to 1000 feet below the aircraft in Green, from 1000 feet below to 2000 above the aircraft as Yellow, and Terrain more than 2000 feet above the aircraft as Red. Other terrain is not shown. The map above is what you see if the aircraft is on the ground. The specification states that the Green should extend to 500 feet below the aircraft (or 250 feet if gear extended) and the Yellow above that.

The map is temperamental and refreshes at every 500 feet change in altitude. This can take several seconds. Sometimes it is necessary to press the button twice.

Note that this TAWS map does not support look ahead terrain as this is not modelled in FSX.

# Boeing 777 V2 Panel

## The EICAS Panel



The EICAS Panel will always appear by default in the Centre CRT and can be selected in any CRT by clicking the ENG button on the Buttons panel. It displays detailed information on the engines and also a scrolling list of messages prioritised by urgency in the top right hand corner. These messages can be suppressed by clicking on the CANC/RCL button on the Buttons panel.

The Boeing 777 usually has an expanded display across two CRTs with engine information however I have chosen to use the condensed display on one screen as more suitable for FSX. Nevertheless this is an authentic Boeing format.

The fuel display in the bottom right provide a basic display until conditions specified in the Boeing manual exist when it changes to an expanded display.

The EICAS also displays the Landing Gear status and the Flaps settings. Note that when Flaps are set to zero (not deployed) the Flaps indicator does not appear.

# Boeing 777 V2 Panel

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## **EICAS Messages**

There is an extensive library of possible messages which are listed below. All of the messages follow the specifications in the Boeing Operations Manual but only a subset of messages are available as many messages are for functions not supported in FSX. Messages are prioritised as follows with the highest priority appearing first:

### **WARNING (Red):**

The highest priority; reporting an abnormal condition which is a threat to the safety of the aircraft and requiring immediate attention. These messages can not be cancelled by the CANC/RCL button.

### **ALERT (Yellow):**

- **Caution** Messages are the next highest priority after Warning messages. They can be cancelled or recalled by pressing the CANC/RCL button
- **Advisory** Messages are the lowest priority alert messages and are indented one space to indicate their lower priority. They can be cancelled or recalled by pressing the CANC/RCL button.

### **MEMO (White):**

Reminder messages of the state of controls or systems. . They can not be cancelled by pressing the CANC/RCL button.

Boeing specifies an additional category of Communication messages however these are not supported in this panel.

Note that many messages are accompanied by aural warning however these are beyond the scope of this panel.

# Boeing 777 V2 Panel

The following table lists the messages that can be seen in this panel:

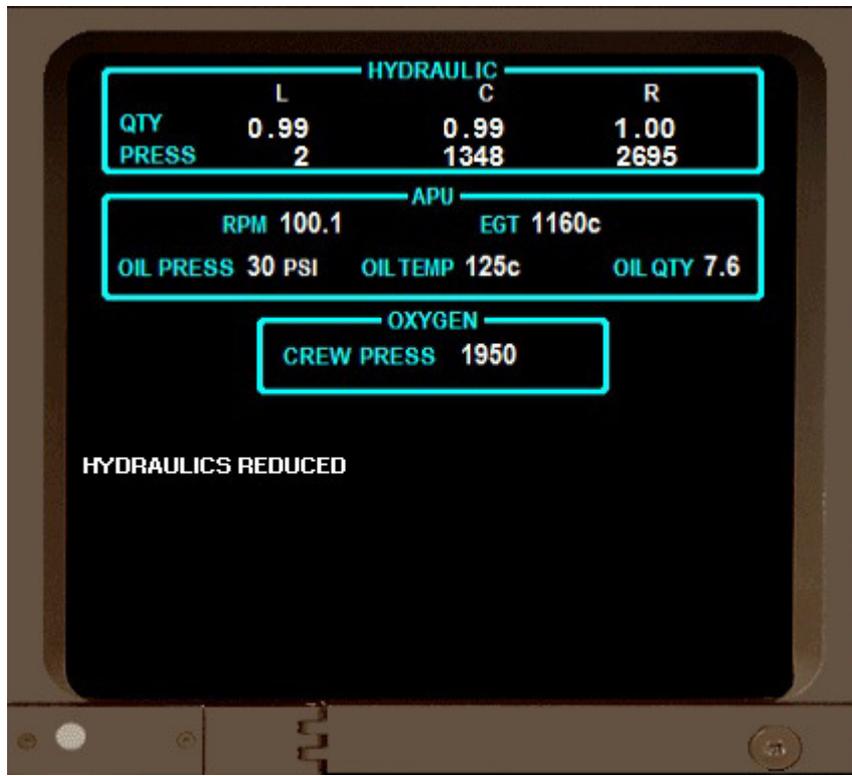
<b>EICAS MESSAGES</b>		
<b>Message</b>	<b>Level</b>	<b>Message Logic</b>
FIRE ENG L or R	Alert	Fire in Engine
APU FIRE	Alert	Fire in APU
CONFIG	Alert	On ground, throttles advanced, speed under V1 but > 80 knots and one or more of: <ul style="list-style-type: none"> <li>• Exit Open</li> <li>• Flaps not Flaps 15 for takeoff</li> <li>• Parking Brake on</li> <li>• Spoilers are deployed</li> </ul>
FUEL IMBALANCE	Alert	Main tank fuel differs more than 500 kilograms
CONFIG PARKING BRAKE	Alert	Takeoff Thrust set and Parking brake is on.
CABIN ALTITUDE	Alert	Cabin Altitude is greater than 10000 feet
CONFIG GEAR	Alert	Altitude below 800 feet with throttles idle and gear not extended
AUTOPILOT DISC	Alert	The Autopilot is disconnected
OVERSPEED	Alert	Airspeed is greater than VMO/MMO
STALL WARNING	Alert	Stall Warning is normally the stick shaker but since many FSX users do not have one this message is displayed instead.
ENGINE SHUTDOWN L or R	Caution	The engine is shut down
HYD PRESS SYS L, C, or R	Caution	Hydraulic system pressure is less than 1000 psi
HYD QTY LOW L or R	Caution	Hydraulic reservoir less than 10% full.
FUEL QTY LOW	Caution	Fuel less than 10% in either main tank.
FUEL LOW CENTRE	Caution	Fuel less than 10% in Centre tank
AUTO THROTTLE DISC	Caution	Autothrottle not connected
CONFIG DOORS	Caution	An Exit door is open
DOOR AFT CARGO	Caution	Aft Cargo Door is open
DOOR FWD CARGO	Caution	Forward Cargo door is open
CONFIG FLAPS	Caution	Flaps are not at 15 on the ground
ALTITUDE ALERT	Caution	More than 300 feet from assigned altitude
SPEEDBRAKE EXTENDED	Caution	Spoilers are deployed
AIRSPEED LOW	Caution	Airspeed is below minimum manoeuvring speed
ELEC GEN OFF L or R	Advisory	Engine Generator is Off
AUTOBRAKE	Advisory	Autobrakes are Off
PARKING BRAKE SET	Advisory	Parking Brake is on
AUTOPILOT ON	Advisory	Autopilot is on
FUEL PUMP L FWD R FWD L AFT R AFT	Advisory	Fuel Pump is off

# Boeing 777 V2 Panel

<b>EICAS MESSAGES (continued)</b>		
<b>Message</b>	<b>Level</b>	<b>Message Logic</b>
FUEL CROSSFEED FWD or AFT	Advisory	Fuel Crossfeed is on
FUEL IN CENTRE	Advisory	Centre Fuel tank not selected but more than 3400 kgs in tank.
FUEL IN AUX	Advisory	Fuel in Auxiliary Tank more than 100 kgs (777-200LR only)
FUEL LOW AUX	Advisory	Fuel in Auxiliary Tank less than 100 kgs (777-200LR only)
RAT UNLOCKED	Advisory	The RAM Air Turbine is deployed
ENG AUTOSTART RUN	Advisory	Engine Autostart in progress
ENG AUTOSTART OFF	Advisory	The Engine Autostart function has been switched off
DOOR BULK CARGO	Advisory	The Bulk Cargo (Luggage) door is open.
DOOR ENTRY 1L	Advisory	The main entry door is open
DOOR ENTRY 2L	Advisory	The 2 <sup>nd</sup> passenger door is open
LANDING ALT	Advisory	There is no Flight Plan
PACK L or R	Advisory	The Bleed Air Pack is off
TRIM AIR L or R	Advisory	The Trim Air Switch is off
RECIRC FANS OFF	Advisory	The Air recirculating fans are off
ANTI-ICE ENG L or R	Advisory	Engine Anti-Ice switch is off
ANTI-ICE ON	Advisory	Both Engine anti-ice switches are on
WINDOW HEAT	Advisory	More than two window heat switches are off
ELEC BATTERY OFF	Advisory	The Master Battery is off
THRUST ASYM COMP	Advisory	Asymmetric Thrust control is off
AUTOBRAKES RTO, DISARM, 1, 2, 3, 4, MAX	Memo	Autobrakes are at the displayed setting
PASS SIGNS ON	Memo	No Smoking and Seatbelts signs are on
NO SMOKING ON	Memo	No Smoking sign on
SEATBELTS ON	Memo	Seatbelts sign is on
APU RUNNING	Memo	The APU is on
SPEEDBRAKE ARMED	Memo	Speedbrake is armed.

# Boeing 777 V2 Panel

## The Status Panel



The Status Panel is now closer to the Boeing specification.

The Hydraulic information is as per Boeing but the APU and Crew Oxygen numbers below it are dummy since this data is not available in FSX.

The screen permanently displays messages describing failures and events during the flight. Unlike the EICAS these messages do not disappear when the condition no longer exists – e.g. if an engine fire is extinguished the FIRE message will disappear on the EICAS but remain on the status panel. On the real aircraft there is a large range of messages describing minor failures not available in FSX (e.g. LAV-GALLEY FAN R). In FSX this panel only shows messages for failures supported by FSX so the screen is often empty and the messages themselves are FSX rather than Boeing messages.

It will usually show “HYDRAULICS REDUCED” on startup as the hydraulic pressure initialises at zero.

An additional FSX message “UNLIMITED FUEL” has been added when FSX is set to unlimited fuel to indicate that fuel displays are meaningless.

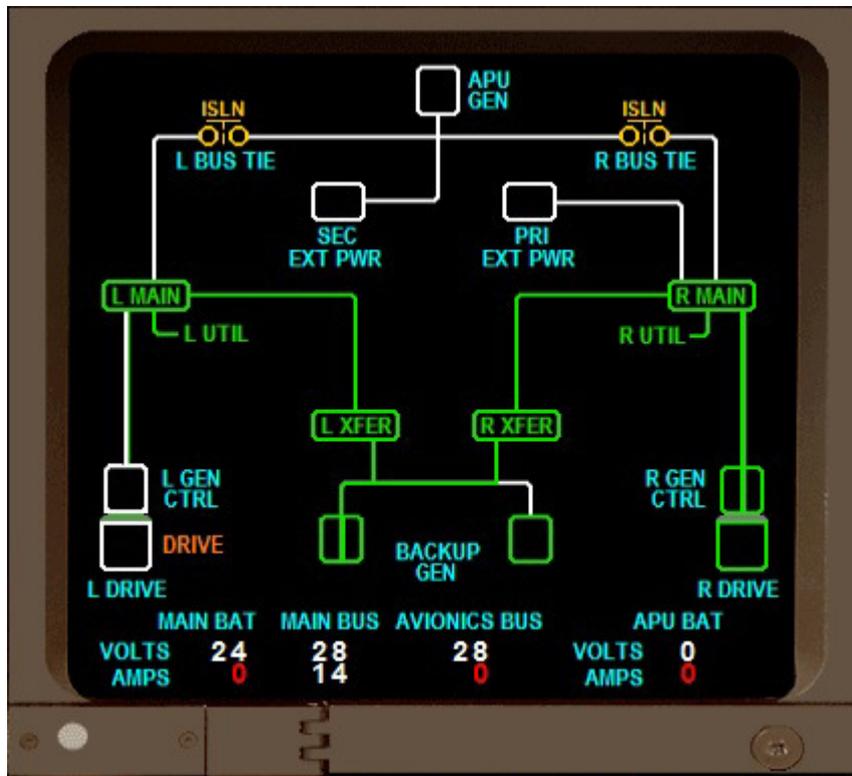
A list of possible messages on this panel follows (not all are applicable for the Boeing 777).

# Boeing 777 V2 Panel

<b>STATUS MESSAGES</b>	
<b>Message</b>	<b>Message Logic</b>
FIRE ENGINE 1 or 2	Fire in Engine
FIRE APU	Fire in APU
UNLIMITED FUEL	FSX is set to Unlimited Fuel
OIL LEAK ENGINE L or R	Oil leak in Engine
DAMAGE ENGINE L or R	Damaged Engine
FAILED ENGINE L or R	Engine Failure
FAILED ADF	ADF Failed
FAILED AIRSPEED	Airspeed measurement failed
FAILED ALTIMETER	Altitude measurement failed
FAILED ATTITUDE	Attitude measurement failed
FAILED COMM	Communications Radio Failed
FAILED COMPASS	Auto compass failed
FAILED ELECTRICAL	Electrical System failed
FAILED AVIONICS	Avionics systems failed
FAILED ENGINE GAUGE	EICAS failed
FAILED FUEL INDICATOR	Fuel measurement failed
FAILED HEADING	Heading measurement failed
FAILED VS INDICATOR	Vertical Speed measurement failed
FAILED TRANSPONDER	Transponder failed
FAILED NAV	NAV Radio failed
FAILED PITOT	Pitot measurement failed
FAILED TURN COORDINATOR	Turn Coordination failed
FAILED VACUUM	Failed Vacuum system
DAMAGE FLAPS	Flaps damaged by speed
DAMAGE GEAR	Landing Gear damaged by speed
HYDRAULICS REDUCED	Hydraulics pressure low

# Boeing 777 V2 Panel

## The Electrical Panel



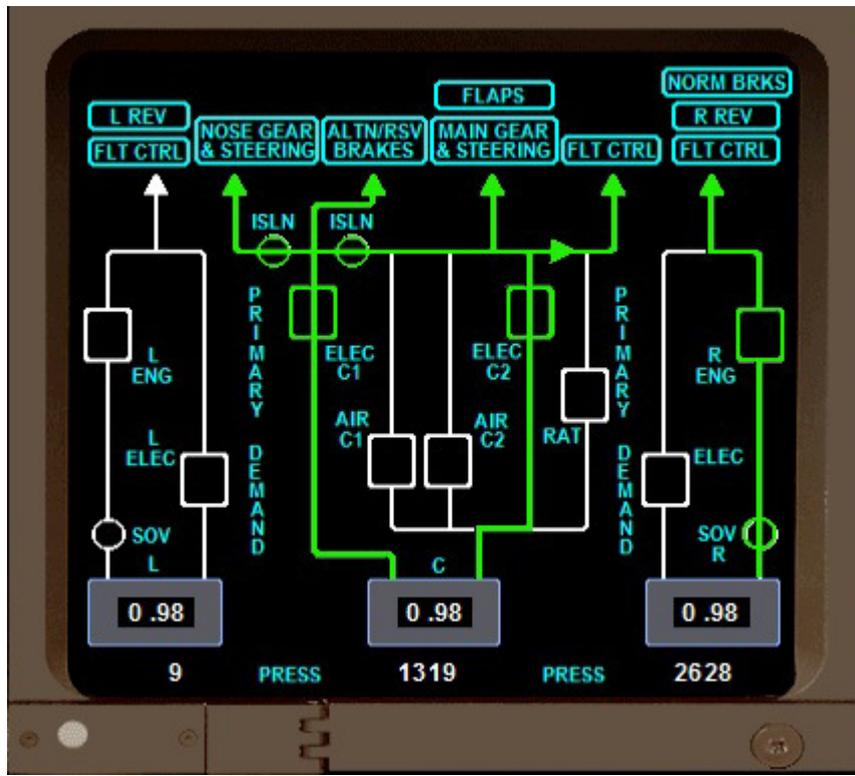
The Electrical Panel diagrammatically displays the settings on the Electrical Switch Panel on the left of the Overhead Panel. Changes to the switches on this Overhead panel will result in changes to the diagram. Note that, to start the APU, the APU Switch is clicked to START followed by switching on the APU GEN switch. The DRIVE will be off if the engine is not running as shown for the left engine in the above picture.

The Main Bat Amps, Avionics Bus Amps, and APU Bat fields do not work in FSX.

This diagram is almost identical to the Boeing diagram.

# Boeing 777 V2 Panel

## The Hydraulics Panel

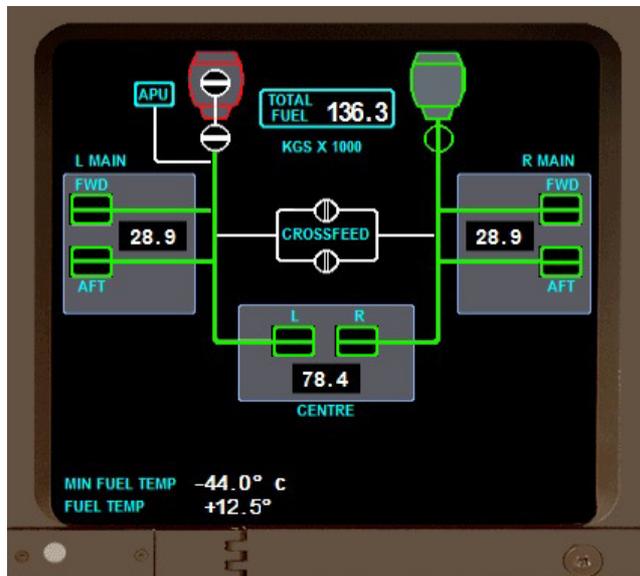


The Hydraulics Panel diagrammatically displays the settings on the Hydraulics Switch Panel left of centre on the Overhead Panel. Changes to the switches on this Overhead panel will result in changes to the diagram. Note that “Fault” will be displayed on the Overhead panel if the engines are not running but the Hydraulics Display panel does not directly show if the engines are running or not – although it can be inferred from the diagram.

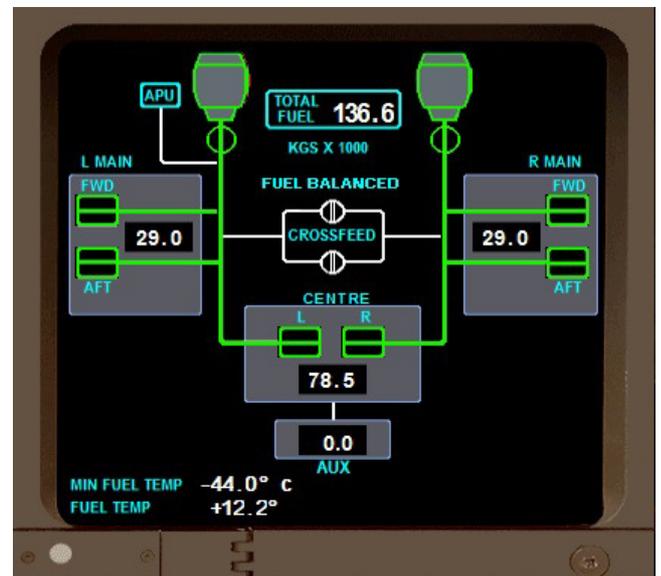
This diagram is almost identical to the Boeing diagram but does not reproduce all the functions.

# Boeing 777 V2 Panel

## The Fuel Panel



Other Models



Boeing 777-200LR

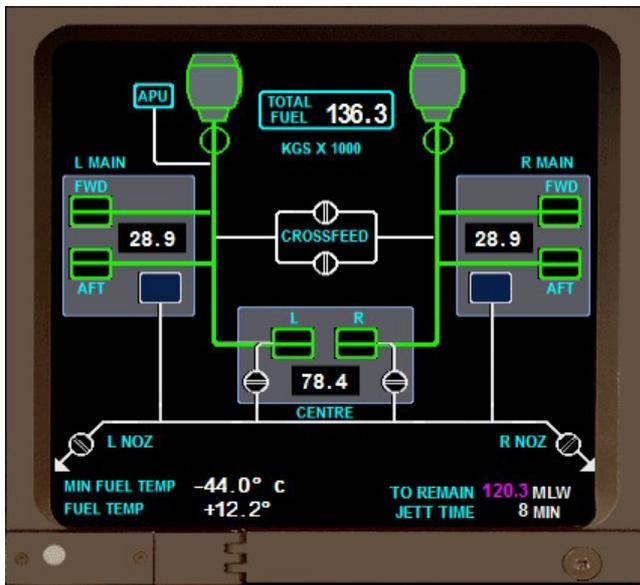
The Fuel Panel diagrammatically displays the settings on the Fuel Switch Panel right of centre on the Overhead Panel. Changes to the switches on this Overhead panel will result in changes to the diagram. The diagram shows fuel available in each of the tanks together with the selected fuel flow. The engines appear red when off and Green when running. Note that to start the APU, the APU Switch is clicked to START followed by switching on the APU GEN switch.

For the Boeing 777-200LR only an additional Auxiliary tank is shown at the bottom of the diagram. In order for this to show fuel contents this tank must be defined as CENTER2 in the aircraft.cfg.

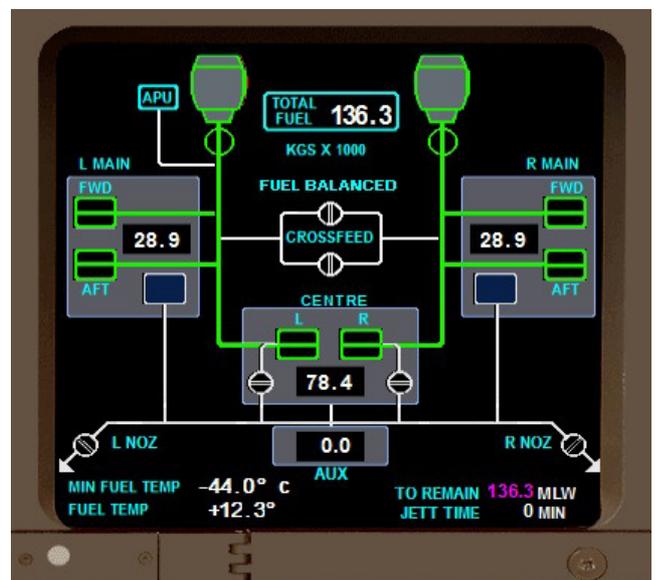
This diagram is almost identical to the Boeing diagram apart from the colour change in the engines.

# Boeing 777 V2 Panel

When Fuel Jettison is armed the following sub-panel appears:



Other Models

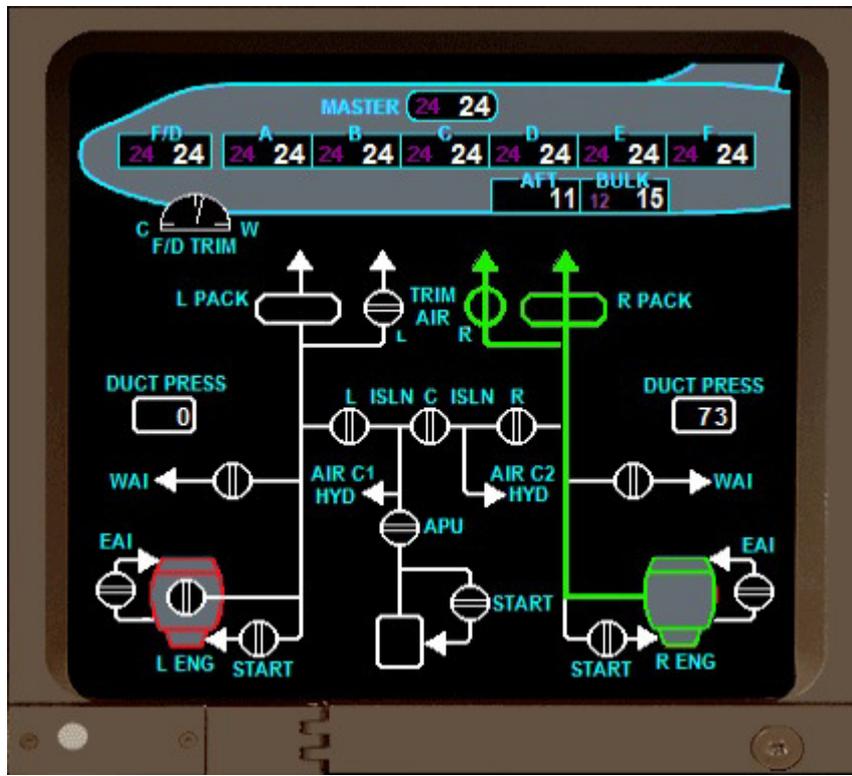


Boeing 777-200LR

Fuel to remain is displayed for the Maximum Landing Weight (MLW) with the Jettison time displayed based on a jettison rate of 2000 kgs/minute. See under Fuel Jettison in the Overhead Panel section for more details of how this works.

# Boeing 777 V2 Panel

## The Compressed Air Panel



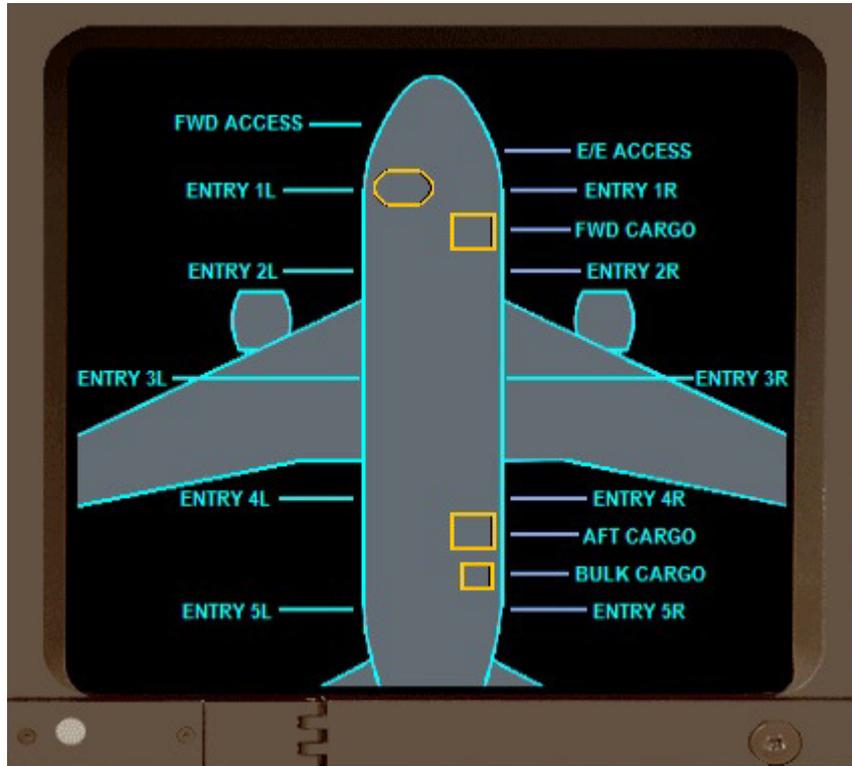
The Compressed Air Panel diagrammatically displays the settings on the two Air Pressure Panels in the top right of the Overhead Panel. Changes to the switches on these Overhead panels will result in changes to the diagram. The diagram depicts temperatures in the cabin and Flight Deck which, in a simulator, are fanciful. The temperatures can be adjusted using the Flight Deck and Cabin Temperature Dials in the top left of the Overhead Panel. The rest of the Display diagram changes with changes to the switches on the Bleed Air Overhead Panel. The engines appear red when off and Green when running.

It can be interesting to adjust the various switches and see the effect on the diagram. It has no effect on the flying of the aircraft in the simulator. Note that to start the APU, the APU Switch is clicked to START followed by switching on the APU GEN switch.

This diagram is almost identical to the Boeing diagram except that the engine outline colour changes from red to green when engines are running. This does not happen on the Boeing aircraft as it is usually obvious that engines are running however in FSX it is not always obvious – especially when many engine sound files continue after engines are shutdown. Nothing on this panel affects the FSX simulation.

# Boeing 777 V2 Panel

## The Door Panel



The Door Panel diagrammatically displays the exits and their status. This panel follows the Boeing system to display doors open but only for four doors. It follows the Opensky model and depicts Door 1L as Exit 1 (M), Door 2L as Exit 3 (2), Forward and Aft Cargo together as Exit 2 (C), and Bulk Cargo as Exit 4 (R). If the Ground Handling panel is used these doors will show as open even if they are not animated on the aircraft model.

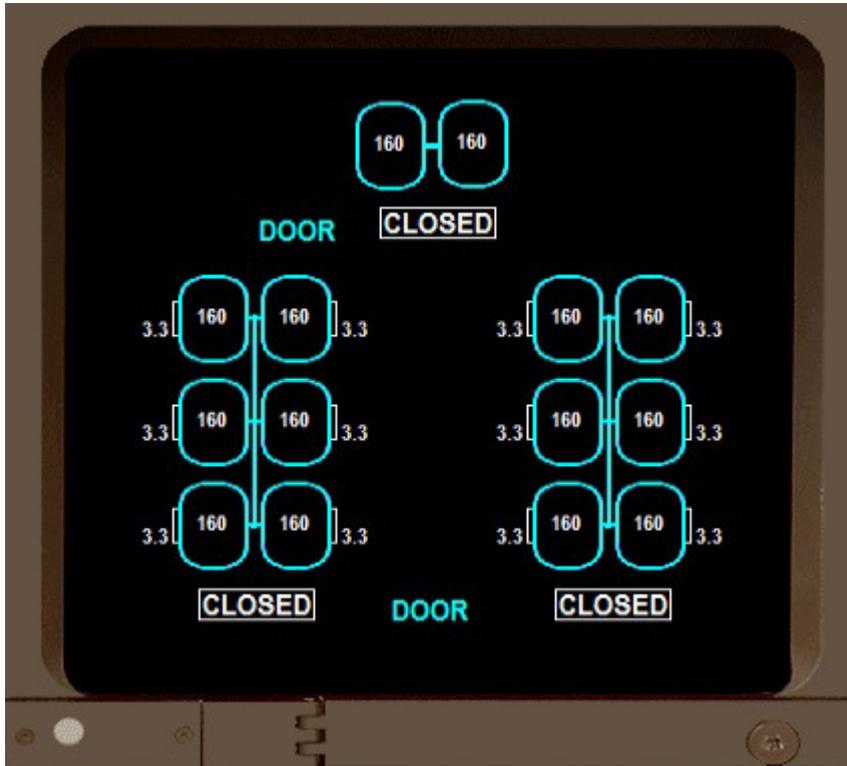
Different FSX models vary as to how many opening exits they have. Tests have been done on models with 1, 3, and 4 exits.

This diagram is very similar to the Boeing diagram and the Boeing method of depicting open doors is used but only for 4 doors. Once four doors are closed and both engines are running the panel will show all doors as Auto (Green A).

# Boeing 777 V2 Panel

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## The Gear Panel

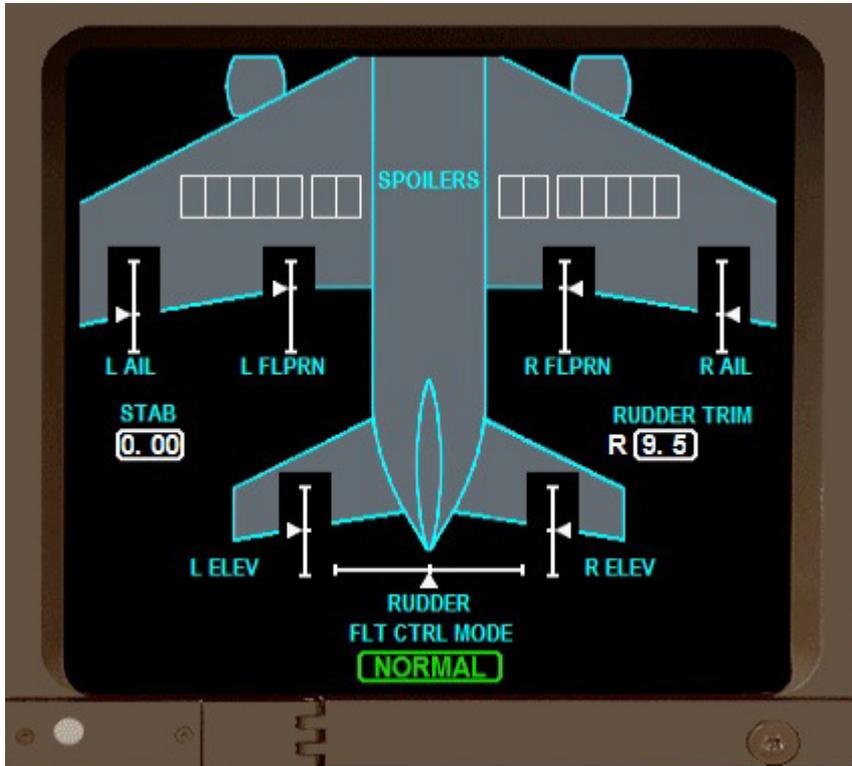


The Gear Panel shows the tyre pressure and brake temperature in all individual tyres on the aircraft. Since FSX does not simulate tyre pressures or brake temperatures this is just a dummy panel with unchanging numbers.

This diagram is very similar to the Boeing diagram but obviously does not emulate its functions.

# Boeing 777 V2 Panel

## The Flight Controls Panel



The Flight Controls Panels diagrammatically shows the position of the various flight control surfaces: Ailerons, Flaps, Elevators, Rudder, and Spoilers. Changes to the diagram can be seen when manipulating the flight controls.

This diagram is very close to the Boeing diagram and replicates most of its functions..

# Boeing 777 V2 Panel

## The Flight Information Panel



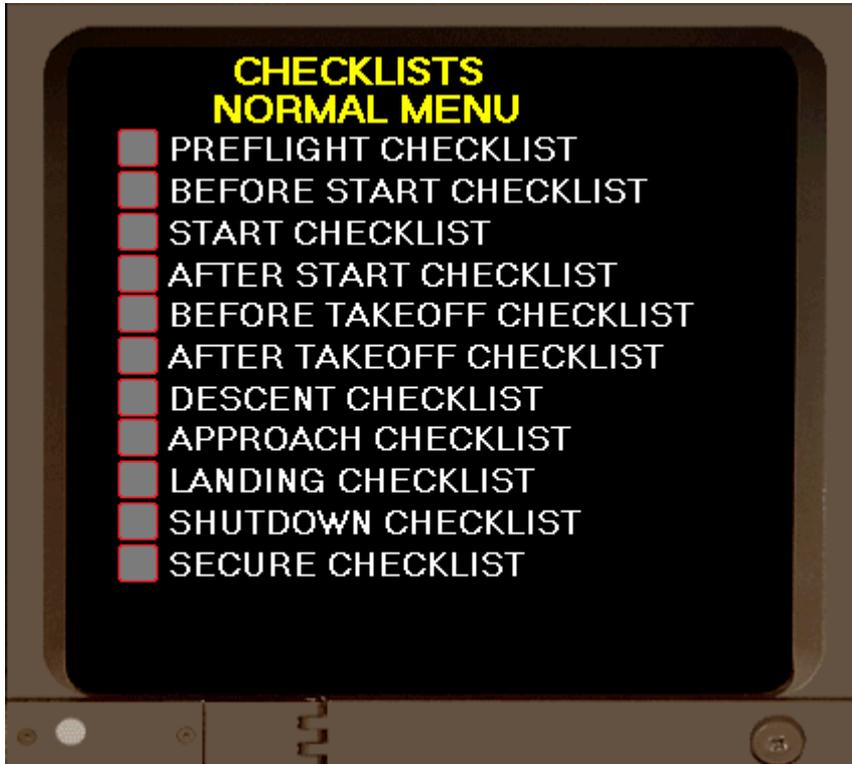
The Flight Information Panel displays tabular information about the flight including details like Flight Number, Waypoints, Heading, Speed, Time wind etc. It is a simplified tabular display of information that is mostly shown in the PFD and MFD and can be useful as a quick reference.

The panel is not based on a Boeing panel.

# Boeing 777 V2 Panel

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## The Checklists



The initial Checklists Menu shows a list of all 11 available Checklists. These Checklists have been adapted to make them suitable for FSX with steps shown in similar sequence as they occur in FSX. For this reason although the Checklists do resemble the Boeing Checklists, they are not the same nor are they as comprehensive as the Boeing system. Only Normal checklists are available – there are no non-normal checklists.

On the Checklists Menu, clicking in the box next to the Checklist name will display that Checklist. Each checklist has up to 11 items. Some items have a gray box next to them, others do not. Those with a gray box are manually clicked on when they have been done. Other items without a gray box will show as done when another event takes place – e.g. the pressing of a switch.

# Boeing 777 V2 Panel



Each line shows white until it is done when it changes to Green and a Green tick appears. Each line shows the Checklist item followed by the expected response from the First Officer. When a Checklist has all been done “Checklist Complete” will appear at the bottom of the Checklist and a green tick will appear against the Checklist on the Checklist Menu.

At the bottom of the screen clicking on “Next” brings you to the next Checklist, “Prev” to the Previous Checklist and “Main Menu” to the Checklist Menu.

The Checklists are not linked to the Flight controls so do not prevent the aircraft from being flown if the items are not done. They are an additional option which may or may not be used.

# Boeing 777 V2 Panel

## The Communications Panel



The Communications displays information on the Radios including frequency, signal, type of station and various other items depending on the type of station tuned. It is similar to the Radio stack but gives more information.

On the real aircraft the COMM button displays messages received and sent.

This diagram has no resemblance to any Boeing Panel but in FSX it can be a useful panel particularly for determining if a radio is correctly tuned.

# Boeing 777 V2 Panel

## Overhead Panel



The Overhead panel is a fair replica of most of the Boeing overhead panel with most switches working and performing their assigned function. This version preserves the perspective of the panel and hopefully makes it more realistic.

The Overhead Panel is divided into several sub-panels some of which are linked to the CRT displays. The following sections detail the sub-panels and their functions:

# Boeing 777 V2 Panel

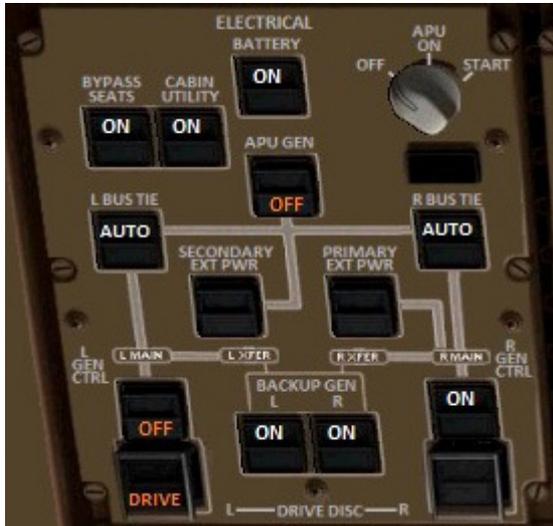
## Overhead ADIRU Panel



OVERHEAD		
Top Left Panel		
Switch	Function	Action
ADIRU	The Air Data Inertial Reference Unit (ADIRU) supplies data to the PFD and MFD. When this unit is off the PFD can not operate so switching off this switch also switches off the PFD.	Click to switch off and again to switch on. Switching off will also switch off the PFD.
THRUST ASYM COMP	The Thrust Asymmetry Compensation Switch applies Rudder to counteract Yaw in cases of one engine failure. In this simulation 95% of rudder trim is applied in the opposite direction to the failed engine.	Auto by default. Click to switch off and click again to switch back to Auto.
PRIMARY FLIGHT COMPUTERS	The Primary Flight Computers assist the operation of Flight Controls and interact with the Autopilot. Essentially for the purposes of the simulation disconnecting the Primary Flight Computers disconnects the Autopilot and Autothrottle.	Click to switch off the primary Flight Computers. Click again to switch them back on. The Autopilot will not automatically reconnect.

# Boeing 777 V2 Panel

## Overhead Electrical Panel



### Electrical Panel

The Electrical Panel Buttons control the functions displayed on the Electrical Panel Display selected from the Buttons Panel.

Note in particular that, to start the APU, click on APU Start then click on APU GEN.

Note also that clicking on the DRIVE button will irreversibly shut down the generator which is usually highly undesirable and only done in reality if there is a malfunction. It must be reset again by ground engineers. Clicking again on the Drive button will not restart the generator.

## Overhead Windscreen Wiper Panels



Two panels at left and right at the bottom of the Overhead Panel control the windscreen wipers. The Camera LTS Switch operates although performs no function. The windscreen wipers do not.

# Boeing 777 V2 Panel

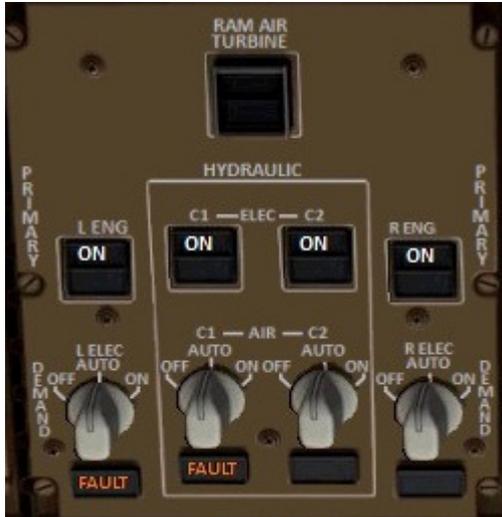
## Overhead Window Heat Panel



Window Heat Panel		
Switch	Function	Action
EMER LIGHTS	Switches on Emergency Lights during an Emergency	Dummy Switch
SERV INTPH	Switches on the service interphone system.	Click once to switch on and again to switch off. Performs no function.
PASS OXYGEN	When switched on it causes the Passenger Oxygen Masks to drop.	Click once to deploy Oxygen Masks.
WINDOW HEAT	Switches on Window heaters. If two or more are not switched on there is a message in EICAS.	Click to switch on.

# Boeing 777 V2 Panel

## Overhead Hydraulics Panel



### Hydraulics Panel

The Hydraulic Panel Buttons control the functions displayed on the Hydraulic Panel Display selected from the Buttons Panel.

Note that “Fault” appears in below the dials if the dial is set to off or if Hydraulic pressure is low (e.g. when the engines are off).

It can be interesting to try the buttons in conjunction with the Hydraulic Display Panel to see the effect of the various switches.

# Boeing 777 V2 Panel

## Overhead Passenger Signs and Lights Panel

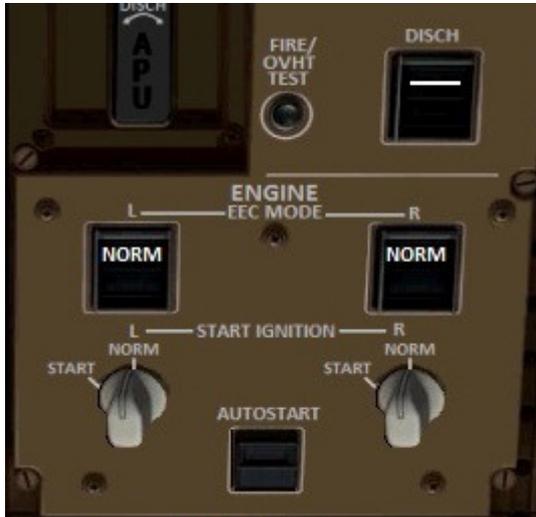


The bottom row of this panel also appears with the Compass above the main panel.

Passenger Signs Panel		
Switch	Function	Action
NO SMOKING	Switch to Auto for the sign to illuminate on the ground and when depressurisation occurs. Modern flights tend to have this switch on at all times.	Right click to turn clockwise and left click to turn anti-clockwise.
SEAT BELTS	Switch to Auto for the sign to illuminate below 10300 feet or when flaps are down, and when depressurisation occurs.	Right click right to turn clockwise and left click to turn anti-clockwise.
OVHD CB	Switches on the Overhead panel background lighting.	Click once to switch on the Overhead Panel backlights and again to turn them off. Note that there is a small delay when switching them on or off.
DOME	Switches on Overhead Dome lighting	Dummy Switch.
STORM	Switches the default FSX lighting on and off. This can be as well as or instead of the backlighting.	Click once to switch on FSX lighting and again to turn it off.
MASTER BRIGHT	Controls the brightness of Flight Deck lights.	Dummy Switch
PNL FLOOD	Switches the Main Panel and Glareshield backlighting on or off	Click once to switch on the Main Panel backlights and again to turn them off. Note that there is a small delay when switching them on or off.
LANDING LIGHTS	Switches Landing Lights on or off.	Clicking once on any of the three landing lights switches will turn on all Landing Lights. Clicking again on any of the switches will turn them all off.

# Boeing 777 V2 Panel

## Overhead Engine Start Panel



Engine Start Panel		
Switch	Function	Action
APU Fire	Illuminates if there is a fire in the APU. Turning once discharges the fire extinguisher.	Click once to discharge the fire extinguisher if illuminated.
Fire Test	Click on this button to test the APU and Engine fire handles on the Throttle Quadrant. All handles illuminate when pressed.	Click left and right on the Engine fire handles to discharge the extinguishers and click once on the APU handle. Click the Fire Test button again to return all to normal state.
Cargo Fire Switch	The Disch switch discharges the fire extinguisher bottles into the cargo compartment.	No function in FSX.
EEC Mode Switches	Function varies depending on the Engine type. It sets either N1 or EPR as the parameter for the computer to control the engines.	Click once to switch to ALT mode and again to switch back to NORM. Performs no function.
START IGNITION	Clicking on either dial will start the corresponding individual engine. See below under Autostart Switch for options.	Click once to start the engine. (See below)
AUTOSTART	See below for two modes of operation.	See below.

# Boeing 777 V2 Panel

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## **The Autostart button**

On this panel the Autostart button can operate in one of two modes: FSX mode or Boeing mode. The default is FSX mode.

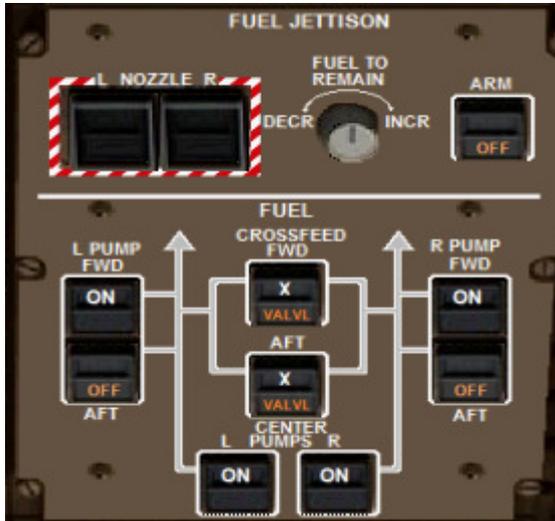
In FSX mode left clicking this button will sequentially start both engines and is the same as the FSX Ctrl-E control character. This however is not what happens in the real aircraft.

To simulate its real function right clicking on this button will change to Boeing mode. In this mode if the Autostart switch is on then clicking on either engine start dial will automatically start that engine. Left clicking on the Autostart switch to switch the switch off. If the Autostart switch is off then the engine can only be started manually. This is done by clicking on the Engine start dial then, on the Throttle Quadrant, set the Cutoff Switch to “Run” once N1 (shown on the EICAS) reaches about 2.8.

Right clicking again on the Autostart button will switch back to FSX mode.

# Boeing 777 V2 Panel

## Overhead Fuel Panel



### Fuel Panel

The Fuel Panel Buttons control the functions displayed on the Fuel Panel Display selected from the Buttons Panel.

Note that clicking on Fuel Jettison “ARM” will show the Fuel Jettison sub-panel on the Fuel Panel display. Fuel can then be jettisoned using the Left and right nozzles. The fuel remaining can be adjusted by dialling the Fuel to Remain dial.

On the Boeing 777-200LR an extra switch appears at the bottom of the panel for the Auxiliary Fuel Tank. Although this tank can be switched on or off, FSX does not recognise this so this is a dummy switch. FSX considers additional centre tank to be always connected to the main centre tank.

It can be interesting to try the buttons in conjunction with the Fuel Display Panel to see the effect of the various switches. Note that the engines are Red when off and Green when running.

### Fuel Jettison

When the Fuel Jettison is armed a fuel jettison diagram will appear at the bottom of the Fuel Panel. By default this will show the amount of fuel to remain at the Maximum Landing Weight (MLW). If FSX is paused this number will be wrong and after switching off pause mode the Fuel Jettison must be disarmed and rearmed again.

The maximum landing weight is calculated based on the model of aircraft according to the Boeing Operations Manual so if the aircraft.cfg does not match the model used the calculation will be wrong.

# Boeing 777 V2 Panel

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The Fuel to remain is displayed on both the Fuel panel and the EICAS with the text MLW. If a different fuel remaining is desired this can be selected using the Fuel remaining dial. In this case MLW will change to MAN for manual selection.

MLW has default values for a 9000 foot runway at an altitude of 1000 feet in dry conditions. This can be changed with a small popup calculator which can be seen by pressing the  icon in the bottom left of the screen. The parameters can be altered on this calculator for a new MLW. See the earlier section for description of this calculator.

The rate of Fuel Jettison varies widely on a real aircraft and depends on many factors including number of pumps used, number of nozzles used, temperature, altitude etc. In FSX however there is only one jettison rate regardless of number of pumps or number of nozzles. This is defined in aircraft.cfg under [Fuel] as fuel\_dump\_rate=. A figure often recommended for this parameter is 0.0167 however this results in the entire fuel load being dumped in about 5 minutes which is far from the real rate.

For a more realistic rate the figure 0.000167 can be used which roughly gives a dump rate of 2000 kgs per minute which is realistic. In real life of course it takes a long time to dump a lot of fuel – sometimes more than an hour so the more realistic rate can be tedious.

In this simulation, unlike the real aircraft, fuel can be dumped on the ground so experimentation with different numbers is feasible.

# Boeing 777 V2 Panel

## Overhead Anti-Ice and Lights Panel



### **Anti-Ice Panel**

The Anti-Ice switches can be set to Off, Auto or On. When set to Auto on the real aircraft the anti-ice switches on and off automatically as ice is detected. FSX does not detect engine ice and therefore the anti-ice switches perform no function except for check lists.

### **Bottom Right Centre Lights Panel**

The effect of the Beacon, NAV, Logo, Wing, and other switches on this panel will vary according to the FSX model used. Some models have all lights while others do not – in particular few models seem to have Logo lights.

Clicking on any of the Switches will turn the lights on and off. The IND LTS Switch does not perform any function.

# Boeing 777 V2 Panel

## Overhead Air Conditioning and Bleed Air Panels



These two panels control the air circulation in the aircraft and therefore have limited utility in FSX. They control the functions displayed on the Air Panel Display selected from the Buttons Panel.

The Equip Cooling button is to switch fans for cooling of equipment on and off. In FSX it performs no function. The Gasper switch delivers air to the passenger air vents which are adjustable by the passenger. In FSX the switch performs no function.

The next two buttons are the Recirculating Air switches which perform no function in FSX other than appearing on the Secure Checklist.

The two dials are used to adjust the temperature shown on the Air Display in the cabin and on the flight deck. Since there is no way of determining true temperature in the fictitious FSX aircraft, the temperatures shown are just the numbers set on the dial.

It can be interesting to try the Bleed Air buttons in conjunction with the Air Display Panel to see the effect of the various switches. Note that the engines are Red when off and Green when running.

The Cabin Pressurisation Switches perform no function except for the dial which can be used to adjust the Cabin Altitude as seen on the EICAS.

# Boeing 777 V2 Panel

## **Throttle Quadrant**



The Throttle Quadrant or Pedestal is a semi-3D reproduction of the Boeing 777 Pedestal. All controls work including the Stabiliser Cutout buttons which are useful to reset the Elevator trim to zero.

Due to lack of artwork it was necessary to take some of the control levers from the Boeing 747 however the Throttle levers are from a photo of a Boeing 777 Pedestal as is the Pedestal itself. The pedestal now has functioning engine fire handles and a popup Rudder trim dial

## **Throttle Operation**

The Mouse grip function commonly used can be unpredictable while the mouse map that I used in my Boeing 747-400 panel is rather complex. This panel uses a new simpler way of controlling the throttle quadrant with the mouse wheel and both mouse buttons.

All levers are operated with left and right mouse clicks: left click to pull the lever and right click to push the lever. This can be done anywhere in the single mouse area for each lever. The Throttle itself is operated with the mouse wheel in a similar way to the slider on a joystick. More details are given under throttles.

# Boeing 777 V2 Panel

<b>THROTTLE QUADRANT</b>		
<b>Switch</b>	<b>Function</b>	<b>Action</b>
Parking Brake	The Parking Brake for use on the Ground.	Click to set the brake and click again to release the brake. The Parking Brake can also be set using the “.” Key and also from the Ground Handling window.
Pitch Trim	Moving the Pitch Trim alters the Elevator Trim according to the Gauge on the left of the lever.	Use the mouse wheel to move the Pitch Trim lever in either direction.
STAB	These switches switch off the Elevator Trim. FSX does not have this function however switching this switch does reset the Elevator Trim to zero.	Click on either switch to reset the Elevator Trim.
Speed Brake	This lever deploys Spoilers but see Technical Issues above for problems associated with this function.	Click once to arm the spoilers and again to fully deploy them. Right click retracts the spoilers from either position.
Throttles	The main Throttle levers for the two engines.	See below for details of how to operate the throttles.
Fuel Control	When engines are running these will be in the RUN position. To shut down engines move to CUTOFF.	Click on each switch once to shut down engines. To restart engines the Start or Autostart buttons on the Overhead Panel must be used.
Flaps Lever	Moving this lever will deploy flaps to the degrees indicated on the Pedestal	Left click to incrementally deploy flaps and right click to incrementally retract them.

## **Throttles and Reversers**

The Throttles have a simple up and down sliding action. The use of the mouse may take a little getting used to but is very simple in practice.

Moving the mouse wheel up while positioned on either Throttle mouse area will increase the throttles and moving the wheel down will decrease them. By default moving the mouse wheel will move both throttles together.

To move an individual engine throttle right click anywhere in either throttle mouse area. Following the right click only the engine on which the mouse is positioned will move when the mouse wheel is turned. Moving the mouse to the other engine will also move that engine individually. To return to synchronised engine movement right click again however note that Engine 1 throttle will move to the same position as Engine 2 on clicking the right button again.

Left click to return engines to idle either individually or together.

# Boeing 777 V2 Panel

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If you are reducing throttle with the mouse note that it will not stop at idle but will continue and deploy the reversers from the mouse wheel. It is best to use the left button if you want the engines idle but not reversed.

The use of the mouse wheel is fairly smooth however note that each click of the wheel increases or decreases the throttle by 10%. For the reversers each click increases or decreases the reverse thrust by 20% of the maximum reverse thrust of 25% of the forward thrust (so 5 clicks to the maximum reverse thrust).

## Fire Panel

The Fire handles for the two engines are located behind the throttle quadrant while the fire handle for the APU is located on top of the Overhead panel.

All of the fire handles can be tested by clicking on the test switch on the Overhead panel next to the APU fire handle.

In test mode all of the fire levers illuminate (there should be only one in a real fire). The fire bottles can then be discharged using the left mouse button to discharge the left bottle and the right button to discharge the right bottle. Note that the APU has only one bottle. Clicking on the Overhead test switch again returns the handles to normal and recharges the fire bottles.

## Rudder and Aileron Trim



The Throttle Quadrant has an additional Popup panel below which can be seen by clicking anywhere on the narrow band panel at the back of the Throttle Quadrant.

The Rudder and aileron trim can be adjusted by left and right clicks on the Aileron trim levers and the Rudder trim dial. Clicking on the Manual trim cancel button will return the Rudder Trim to zero.

Note that if the Thrust Asym Comp Switch on the Overhead Panel is set to AUTO, the rudder trim will automatically set to 95% on the opposite side of a failed engine. This can be overridden by switching off the Asym Comp Switch.

# Boeing 777 V2 Panel

## Radio Stack



The Radio Stack panel is the standard default Boeing radio stack which is perfectly OK for the Boeing 777.

# Boeing 777 V2 Panel

## **Ground Handling Panel**



This is a small heads-up display that appears only when the left engine is shut down. Parking Brakes must be applied before any of the other functions work: clicking on the Parking Brakes switch on the panel is one way to apply them.

Where there is a Jetway it can be connected by clicking on the “Press for Jetway” Switch. Note that Jetways will generally only be visible if Scenery Complexity is set to “Dense” or more and not in FS9.

Up to 4 doors can be opened individually by clicking on “M” (Main) “2” (2<sup>nd</sup>), “R” (Rear), and “C” (Cargo) Buttons under Exits. The 4 Exits open can be seen on the Door display panel selected from the Buttons Panel. These will display even if the FSX aircraft does not have all animated opening doors. These switches have been tested with model OSB773 (3 exits), Boeing 777-300ER General Electric 90-115B1 (4 exits), and Boeing777-300ER-MR-MKIII (Meljet: 1 rear door, 2 RH doors, and Engine Cowlings all from the main exit switch) and should work with other models but results may be slightly different as the doors may be numbered differently. Note the problems documented in the Technical Issues section.

The door opening function should not be used when the simulator is Paused as it becomes confused about which doors are open. Due to the method used by FSX to operate doors they can be quite temperamental and the buttons need to be pressed with a pause between each one.

A Fuel Truck can be requested by clicking on the “Not Requested” button.

Finally pushback can be easily done first by selecting the direction required then clicking on “Pushback Off”.

Note that as this panel only becomes visible when the left engine is off and, as FSX starts by default with engines running, it is necessary to shut down the engine before you can see this panel. The panel will disappear when the engine is restarted which normally happens after pushback.

# Boeing 777 V2 Panel

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