

PS Panels 737NG

Operations Manual

Version 1.0

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1 Introduction

1.1 About the PS Panels 737NG

The PS Panels 737NG has been designed from the ground up to appeal to the average simmer. It combines maximum realism with complete Flight Simulator integration allowing you to continue to use FS features such as the flight planner and ATC, whilst following many real world operational procedures for the 737NG aircraft.

The panel system includes too many systems to list here, so please read on through this manual so that you may get the best out of the product.

If you have any queries that are not answered here, our forums are available 24x7 at <http://www.forum.pspanels.co.uk/cgi-bin/yabb/YaBB.pl>

1.2 Panel Installation

Once the installer has completed its work the only thing left to do is associate your new panel with your favourite 737NG aircraft. In order to do this we must alter the aircrafts panel.cfg.

Navigate in windows explorer to you're flight simulator main install directory (C:\Program Files\Microsoft Games\Flight Simulator 9\ by default). Now go into the aircraft folder, and then the folder of the aircraft you wish to use. You should see a folder called 'panel'. Before we go any further, make a backup copy of this folder.

Now if you go into the panel folder, you will find a file called 'panel.cfg'. (If there are other files here, you can safely delete these – as long as you have taken a backup!). Open panel.cfg in notepad and replace the text with the following:-

```
[fltsim]
alias=PSPanels/PS737NG/Panel
```

Save the file and you're done.

1.3 Checklist Installation

1. Navigate in windows explore to the main aircraft folder for the aircraft you wish to install with. (E.g. .../FS9/Aircraft/b737_400/)
2. Copy PS737_Checklists.htm, tickbox_empty.gif, and tickbox_full.gif from the checklists folder in the PS Panels start menu group, into this folder.
3. Open the aircraft.cfg file in notepad and look for all lines beginning 'kb_checklists='. Change these to read 'kb_checklists=PS737NG_Checklists'.
4. Save the aircraft.cfg file and you are done.

2 Panel Layouts

2.1 Main Panel

The main panel layout is shown below in fig 2.1

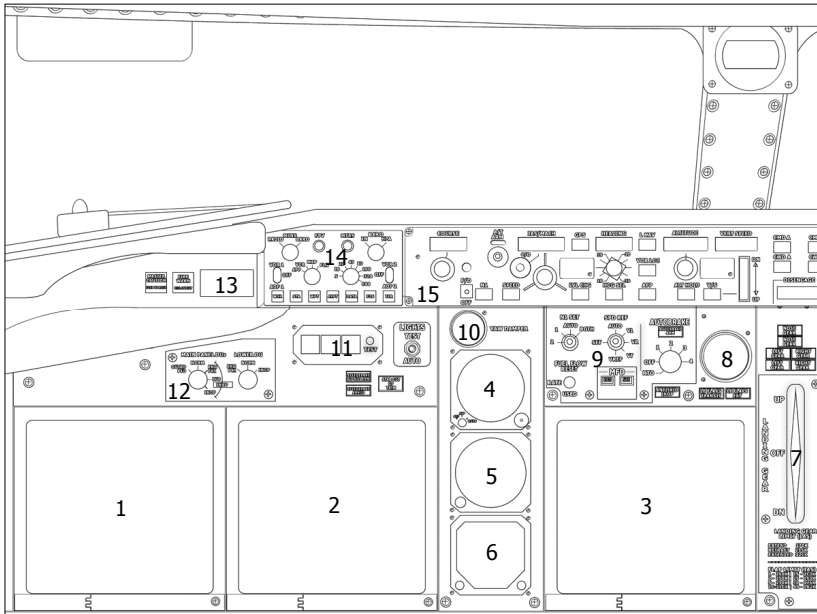


Figure 2.1 – Main Panel Layout

2.1.1 Main Panel Detail

1. Electronic Attitude Direction Indicator (EADI) – Displays aircraft attitude, speed, altitude etc. Also shows current autopilot mode as well as ILS

indicators if an ILS frequency is selected on NAV1. For more information, see the chapter on Flight Instrumentation, later in this manual.

2. Electronic Horizontal Situation Indicator (EHSI) – This is the navigation display. Has various modes that can be used depending on the navigation method currently employed. Controls for this display are mounted on the EFIS Control Panel (14). For more information, see the chapter on Navigation Systems, later in this manual.
3. Engine Indication and Crew Alerting System (EICAS) – Displays information and warnings about the aircraft's engines. More detail can be found in the Flight Instrumentation section, later in this manual.
4. Standby Artificial Horizon. Mechanical Artificial Horizon for use if main instruments fail. Also can show VOR/ILS track bars from NAV1 radio.
5. Standby Alt/Speed Indicator. Mechanical Alt/Speed indicator for use during main instrument failure. (Speeds 0 to 250Kts only shown).
6. Standby RMI. Mechanical direction indicator for ADF/NAV bearings. For use during main instrumentation failure.
7. Landing Gear Lever and indication lights.
8. Flaps position/motion indicators.
9. EICAS control panel and autobrake panel. Switch between Fuel Flow/Fuel Used indication as well as Engine Indication mode using ENG/SYS switches.
10. Yaw Damper Indicator.
11. AP Disengage Warning Lights. Shows alerts if AP, A/T or FD are disengaged.
12. DU control panel. Switches between various configurations for the panels control screens.
13. Master Warning Panel. Alerts pilot to warning conditions throughout the aircraft.

14. EHSI Control Panel. Used to set mode and display options for the EHSI. For more information, see the chapter on Navigation Systems, later in this manual.
15. Mode Control Panel. Controls the autopilot. For more information, see the chapter on the autopilot later in this manual.

2.2 Overhead Panel

The overhead panel layout is shown below in fig 2.2

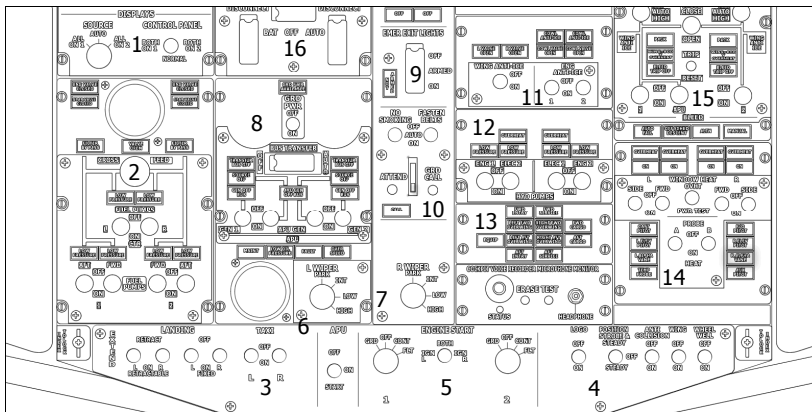


Figure 2.2 – Overhead Panel Layout

2.2.1 Overhead Panel Detail

1. Instrument Transfer Switches. The control panel switch sets which EHSI control panel talks to which flight computer. (Not simulated).
2. Fuel Control Panel. Controls fuel distribution throughout the aircraft. See the fuel systems section later in this manual for full details.
3. Landing/Taxi Lights. Controls the aircrafts landing and taxi lights.
4. Other Lights. Logo, Strobe, Beacon, Wing and Wheel Well light controls.
5. Engine Starter Panel. Controls for engine starting.

6. APU Switch and EGT gauge. Switch to start/stop the APU. The gauge monitors APU Exhaust Gas Temperature. See the section on the APU later in this manual for more details.
7. Windscreen Wiper Controls. Set wiper speed for left and right windscreen wipers. (Not simulated).
8. Generator/Bus Selector Panel. Used to control how electrical power is distributed from the various sources onto the systems powering aircraft busses. See the section on the Electrical System, later in this manual for more details.
9. Emergency Lights Control. Used to arm the emergency lights.
10. Seat Belt/No Smoking Switches. Used to set cabin seat belt and no smoking lights.
11. Engine Cowl/Wing Anti-Ice controls. Used to open/close the wing and engine anti-ice valves. See the section on Aircraft Heating Systems later in this manual for more details.
12. Hydraulic Pumps. Used to control the two electrical and two mechanical hydraulic pumps. See the section on Hydraulic Systems later in this manual for more details.
13. Entry Lights. Illuminate when aircraft doors/entries are open.
14. Pitot/Window Heat Controls. Set pitot and cockpit window heating on/off. See the section on Aircraft Heating Systems later in this manual for more details.
15. Pneumatics Panel. Used to control the source for the pneumatic system. Air is bled from either engine or the APU for engine starting and wing anti-ice systems.
16. Standby Power Panel. Contains the battery switch for allowing battery power to power the aircraft systems in an emergency.

2.3 Radio Panel

The radio panel layout is shown below in fig 2.3

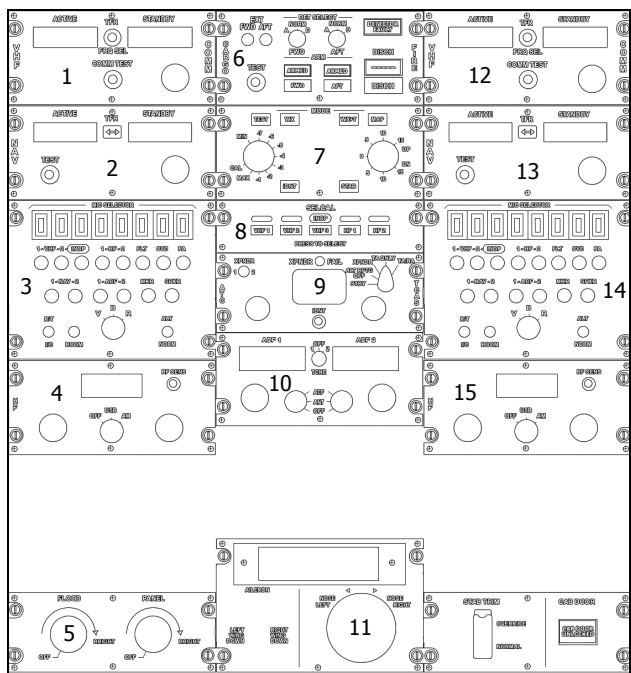


Fig 2.3 – Radio Panel Layout

2.3.1 Radio Panel Detail

1. COM1 Communications Radio. For more information see the communications section later in this manual.

2. NAV1 Navigation Radio. For more information, see the chapter on Navigation Systems, later in this manual.
3. Captains Audio Control Panel. The MIC Selector buttons control which radio the Captains microphone is currently transmitting two. (Only COM1&2 supported in Flight Simulator). The second row of round switches allows for marker/VHF/ADF ident tones to be switched on/off.
4. HF Radio 1. An alternate communications radio, for use when the main COM VHF radios are unavailable. (Not supported in FS).
5. Panel Lights Switch. Controls the panel lights. Switch between Off/Cruise/Bright using the selector knob.
6. Cargo Hold Fire Protection Panel. Controls for detecting and dealing with a fire in the cargo hold. Functions are not simulated.
7. Weather Radar Control Panel. Controls the weather radar display in the EHSI. (Not simulated).
8. SELCAL Panel. The SELCAL light will illuminate if the aircraft is being selcal'd on either HF or VHF radios. (Not simulated).
9. Transponder. Controls to setup the aircrafts transponder. For more information see the communications section later in this manual.
10. ADF Radios. Provide support for navigation using NDB (Non-Directional radio Beacon) stations. For more information, see the chapter on Navigation Systems, later in this manual.
11. Rudder Trim. Rudder trim can be set using this control.
12. COM2 Communications Radio. For more information see the communications section later in this manual.
13. NAV2 Navigation Radio. For more information, see the chapter on Navigation Systems, later in this manual.

14. First Officers Audio Control Panel. The MIC Selector buttons control which radio the Captains microphone is currently transmitting two. (Only COM1&2 supported in Flight Simulator). For more information see the communications section later in this manual.
15. HF Radio 2. An alternate communications radio, for use when the main COM VHF radios are unavailable. (Not supported in FS).

2.4 Throttle Panel

The throttle panel layout is shown below in fig 2.4

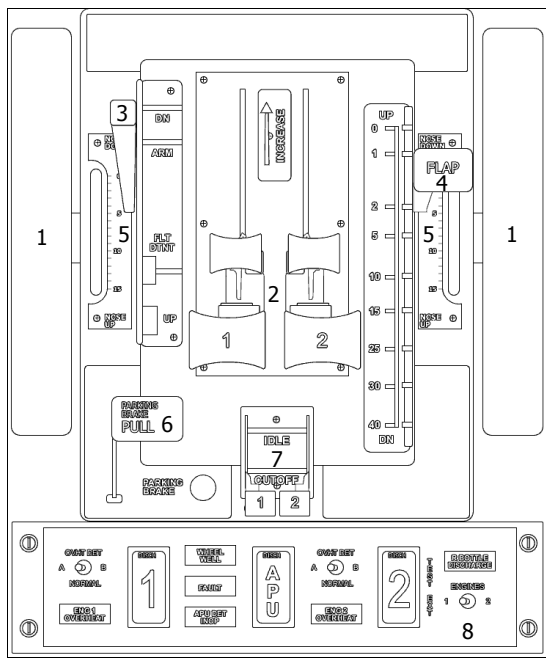


Fig 2.4 – Throttle Panel Layout

2.4.1 Throttle Panel Detail

1. Pitch Trim Wheels. Used to set pitch trim.

2. Throttle Levers. Set thrust levels for engines. Clicking on either lever will move them independently; clicking in the gap between them will move them both together.
3. Spoilers Lever. Used to switch spoilers between Down/Armed/Up positions.
4. Flaps Lever. Used to set flaps position.
5. Pitch Trim Markers. Show degree of pitch trim applied.
6. Parking Brake Lever. Used to set the aircrafts parking brake.
7. Fuel Engine Valve Switches. When set to cut-off, closes the respective engine valve which will shutdown the engine.
8. Fire Protection Panel. Controls for detecting and dealing with engine/apu fires. (Not simulated).

3 Aircraft Systems

3.1 Electrical System

3.1.1 Introduction

There are five power sources available to the PS Panels 737NG. Generators are attached to both engines and the APU, and power can also be obtained from either external ground power, or the aircrafts batteries.

The selection and distribution of this power is controlled by the Generator/Bus panel on the aircrafts overhead panel.

3.1.2 System Overview

Figure 1.1 overleaf, shows an overview of the aircrafts electrical system. At the top of the diagram, the four main power sources can be seen as well as their respective selection switch. (The numbers in brackets next to the switch descriptions indicates their position on the actual Generator/Bus panel diagram, figure 1.2).

Below the power sources, the two main transfer buses are shown. From these busses both AC and DC power is derived to power the redundant and non-redundant systems listed below. In the event of power failure, the redundant systems through a series of transformers and DC to AC converters are powered from the aircrafts batteries. There is approximately 30mins of power available from the backup batteries. If on entering the cockpit you find everything dark, chances are 1) the batteries are flat or 2) the battery switch is set to off. If 1 is the case, start the APU or engines to provide power and charge the batteries.

Each of the main buses can be powered from one source at a time only. This means that the last selected source will always be the current one. Should this source be disconnected, the previous source will come back online.

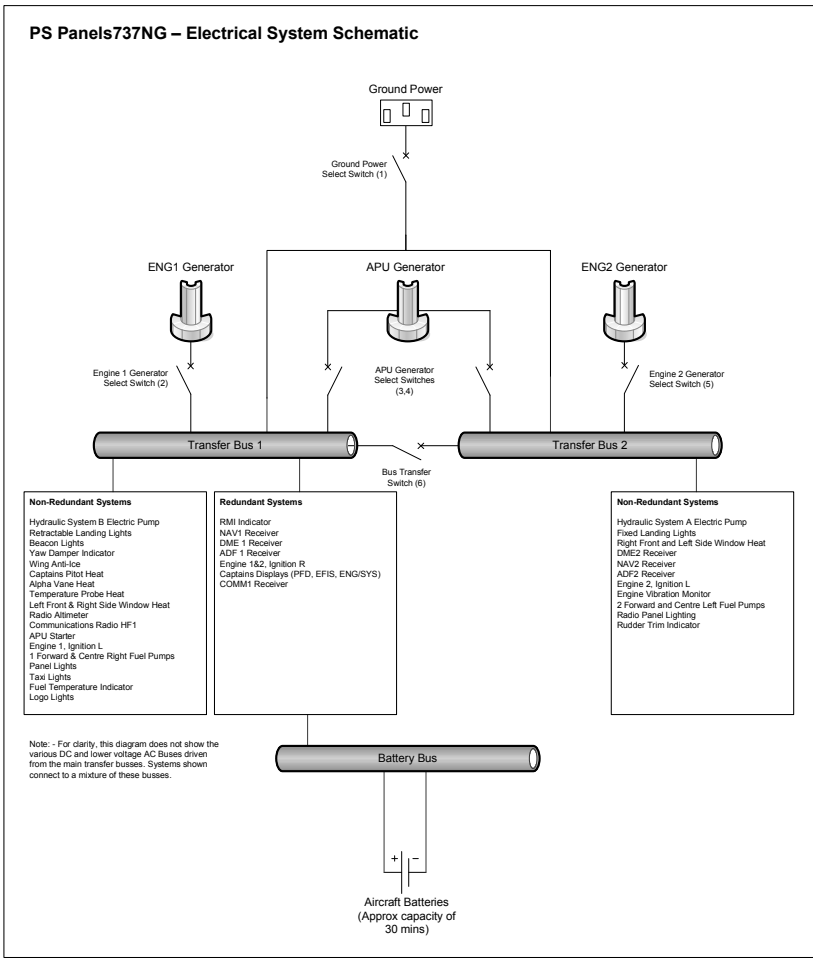


Fig 3.1.2 – Electrical System Overview

3.1.3 Generator/Bus Selector Panel

The Generator/Bus Selector panel (figure 1.2) is used to control how electrical power is distributed from the various sources onto the systems powering aircraft busses.

The left side of the panel controls power sources for Transfer Bus 1, the right side, Transfer Bus 2. A description of each of the controls follows below:-

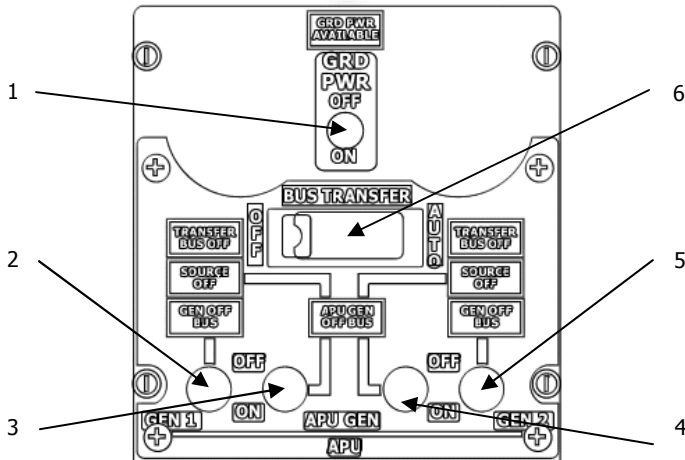


Fig 3.1.3 – Generator/Bus Panel

Switches

1. Ground Power Switch (momentary, three-way). If moved to on, connects both transfer busses to external ground power if available. (In this simulation, ground power is available when the aircraft is on the ground with the parking brake set). If this switch is moved to off, ground power will be disconnected if it was previously connected.
2. Engine 1 Generator Switch (momentary, three-way). If moved to on, connects transfer bus 1 to engine 1's generator if available. (In this

simulation, the generator is online whenever the engine is running). When moved to off, power from engine 1's generator will be disconnected.

3. Left APU Generator Switch (momentary, three-way). If moved to on, connects transfer bus 1 to the APU's generator if available. (In this simulation, APU power is available whenever the APU is running). When moved to off, power to transfer bus 1 from the APU generator will be disconnected.
4. Right APU Generator Switch (momentary, three-way). If moved to on, connects transfer bus 2 to the APU's generator if available. (In this simulation, APU power is available whenever the APU is running). When moved to off, power to transfer bus 2 from the APU generator will be disconnected.
5. Engine 2 Generator Switch (momentary, three-way). If moved to on, connects transfer bus 2 to engine 2's generator if available. (In this simulation, the generator is online whenever the engine is running). When moved to off, power from engine 2's generator will be disconnected.
6. Bus Transfer Switch (guarded two-way). When set to auto, if power is lost to either bus, the system will attempt to power it from the other bus if it is available. When set to off, a bus will lose all power if its sources are all removed.

Warning Lights

- Transfer Bus Off (Amber). This light indicates that the respective bus is currently not powered.
- Source Off (Amber). This light indicates that the selected source for the respective bus is not providing power.
- Gen Off Bus/APU Gen Off Bus (Blue) Indicates that the respective generator (or APU) is online but not currently connected to the respective bus. In the case of the APU light, it is only on when the APU generator is online and not connected to either bus.
- Gnd Pwr Available (Blue). Indicates that ground power is connected and available as a source.

3.1.4 Battery Switch

The battery switch is located on the Standby Power Panel directly above the Generator/Bus Panel. The switch location is shown on the diagram below:-

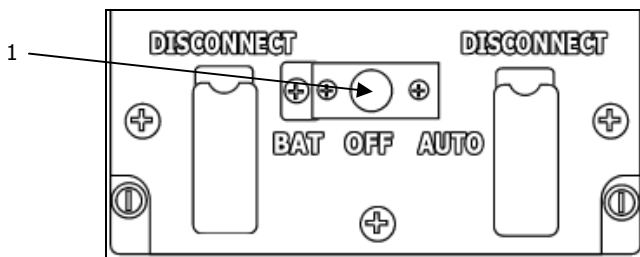


Fig 3.1.3 – Standby Power Panel

SWITCHES

1. Battery switch – Set to BAT or AUTO to allow battery power to power aircraft systems if main power is lost.

3.2 Fuel System

3.2.1 Introduction

The PS Panels 737NG is fuelled from 3 tanks via a series of mechanical and electrical booster pumps. Fuel flow and pump operation is controlled from the fuel panel on the aircrafts overhead.

3.2.2 System Overview

Fuel is supplied to the engines from three fuel tanks fitted in the centre of the aircraft. Tank No.1 is fitted into the port (left) wing, No.2 in the starboard (right) wing with the final centre tank fitted into the fuselage.

Two mechanical and six electrical pumps draw fuel into the engines. The mechanical pumps are driven directly from the engines and can deliver enough fuel to keep the engines turning over once they are up and running (although they will not be able to reach full power). The electrical booster pumps allow the engines to be started and to reach full power and therefore should be used whenever electrical power is available.

Figure 2.1 overleaf shows an overview of the fuel system.

Fuel system control is achieved through the fuel control panel on the overhead. Its functions are described in the next section.

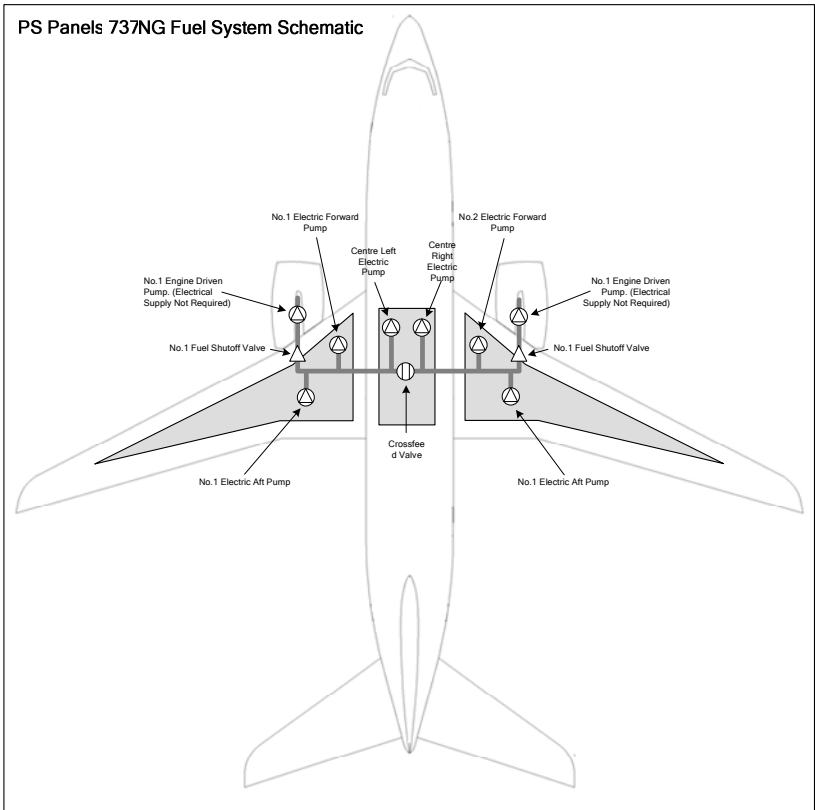


Figure 3.2.2 – Fuel System Overview

3.2.3 Fuel Control Panel

The Fuel Control Panel (figure 2.2), situated on the aircrafts overhead is used to control how fuel is pumped around the aircraft. The left side of the panel controls fuel being fed into engine 1, the right side, engine 2. A description of each of the controls follows below:-

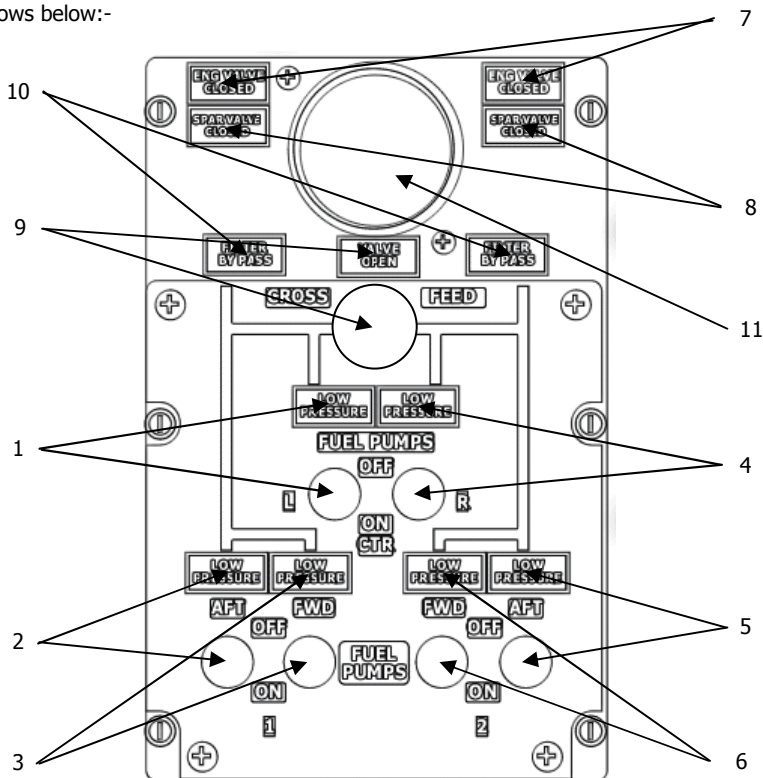


Fig 3.2.3 – Fuel Control Panel

Controls

1. Centre Left Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical centre left fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 2.
2. No.1 Aft Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical no.1 aft fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 1.
3. No.1 Forward Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical no.1 forward fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 1.
4. Centre Right Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical centre right fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 1.
5. No. 2 Aft Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical no. 2 aft fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 2.
6. No. 2 Fwd Fuel Pump Switch and Low Pressure Warning Light. Switches the electrical no. 2 fwd fuel pump, on/off. The low pressure warning light is illuminated when fuel pressure from this pump is low. This pump is powered from transfer bus 2.
7. Engine Valve Closed Warning Lights. When illuminated, indicates that the relative engine valve is closed. The engine valves switches are located on the throttle panel. When closed, the engine is completely starved of fuel and will shutdown.
8. Spar Valve Closed Warning Lights. When illuminated, the relative spar valve is closed. (Spar valves not simulated).
9. Cross Feed Switch and Warning Light. The cross feed valve allows fuel from one side of the aircraft to cross to the other allowing the pilot to 'even up'

fuel distribution. The warning light shows bright whilst the valve is in motion, dull when it is open and off when closed. (Cross feeding of fuel is not simulated, but switch and light operation is).

10. Filter Bypass Warning Lights. Illuminated when the filter bypass valve is open. (Not simulated).
11. Fuel Temperature Gauge. Shows current fuel temperature.

3.3 Aircraft Heating Systems

3.3.1 Introduction

The 737NG has an intricate heating system to prevent the failure of instruments or structural components due to ice build up. Pitot and Cockpit Window heat is provided through electrically driven heaters, whilst wing and engine anti-ice systems use bleed air from either engine or the APU.

3.3.2 System Overview

Controls for airframe heating are located on two panels of the overhead. One panel controls heating for the various Pitots and the cockpit windows, the other controls the wing/engine anti-ice.

The left front and right side cockpit windows, as well as the captains Pitots are heated through heaters powered from the left electrical transfer bus, no.1.

The right front and left side cockpit windows, as well as the 1st Officers Pitots are heated using power supplied from transfer bus no.2.

All cockpit window heaters are protected by an automatic overheat protection. If the appropriate switch is on and the window gets to hot, this system will shutoff power to the heater until normal temperatures are resumed. The orange overheat light for the appropriate window will illuminate during this process.

The engine and wing anti-ice systems are fed from bleed air supplied by either engine or the APU. See the section on the Pneumatic System later in this manual for details of how to ensure bleed air is available.

3.3.3 Electrical Heating Panel

The diagram overleaf shows the electrical heating panel:-

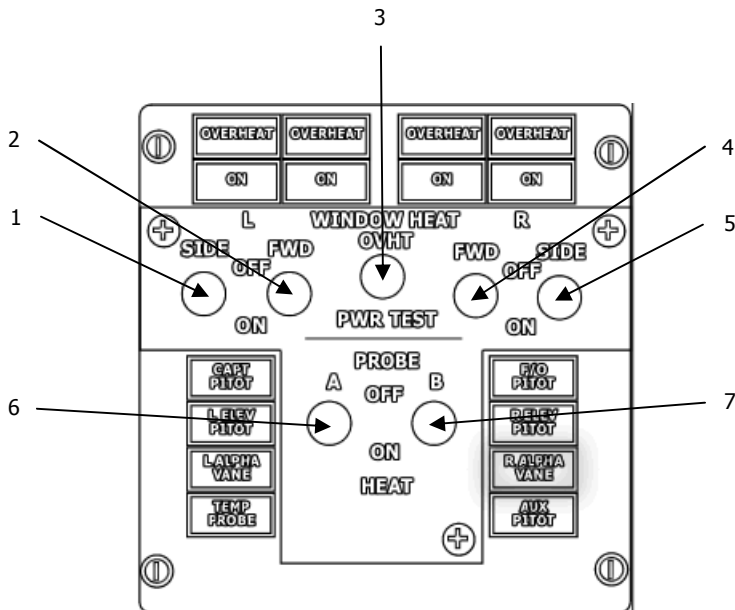


Fig 3.3.3 – Electrical Heating Panel

Switches

1. Left Side Window Heater Switch. (On/Off)
2. Left Forward Window Heater Switch. (On/Off)
3. Power Test. When pushed on, checks all lights on the heating panel.
4. Right Forward Window Heater Switch. (On/Off)
5. Right Side Window Heater Switch. (On/Off)
6. Captains Pitot Heater Switch. (On/Off)
7. 1st Officers Pitot Heater Switch. (On/Off)

3.3.4 Engine/Wing Anti-Ice Panel

The diagram below shows the engine/wing anti-ice panel:-

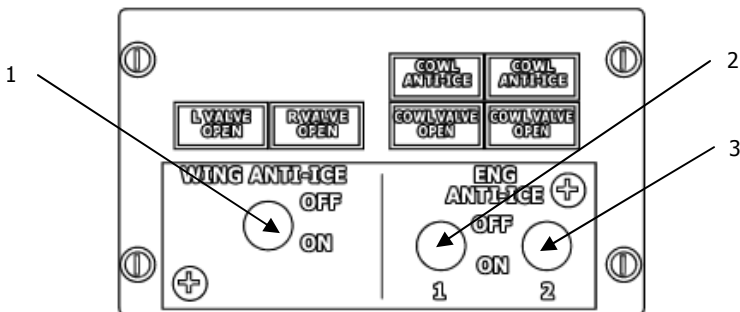


Fig 3.3.4 – Engine/Wing Anti-Ice Panel

Switches

1. Wing Anti-Ice (On/Off).
2. Eng1 Anti-Ice (On/Off).
3. Eng2 Anti-Ice (On/Off).

The corresponding valve warning lights show bright blue when the valve is in motion and a slightly duller blue when the valve is locked open.

3.4 APU

3.4.1 Introduction

The APU is a small jet engine located in the tail section of the aircraft used to as an extra source of bleed air and electrical power when appropriate ground services are unavailable. This allows the aircraft to operate from more remote airfields where ground services are limited.

3.4.2 System Overview

The APU is controlled from the overhead panel. The layout is shown in the diagram below:-

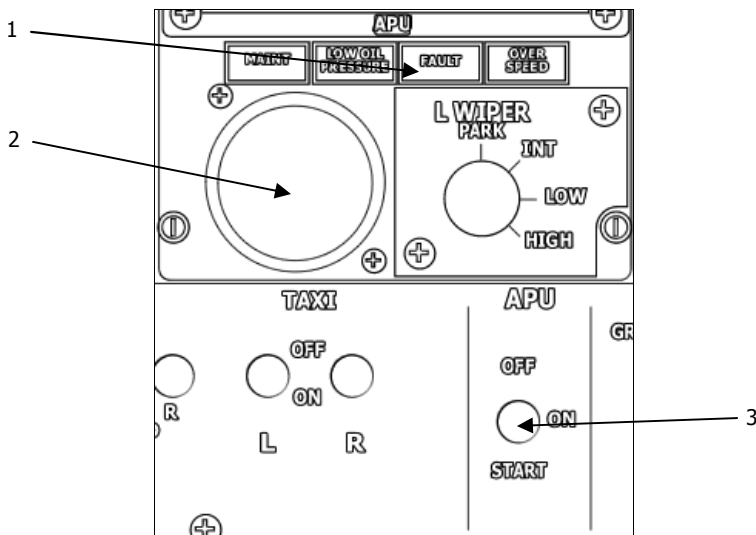


Fig 3.4.2 – APU Panel Layout

Controls

1. APU Warning Lights. Show various conditions that can affect the APU. Only active when the APU switch is in either the Start or On positions.
2. APU EGT Gauge. Shows EGT (Exhaust Gas Temperature) for the APU.
3. APU Switch. Move to start to start the APU. The switch will return to on when the APU is up and running. Move to off to shutdown the APU. (There will be a 60 second rundown period after moving the switch to off before the APU shuts down).

3.5 Autopilot Systems

3.5.1 Introduction

The 737NG has an extensive autopilot that can control most aspects of the aircrafts operations. This section describes how to use the functions through the MCP (Mode Control Panel) on the main instrument panel.

3.5.2 MCP Layout

The diagram below shows the MCP layout:-

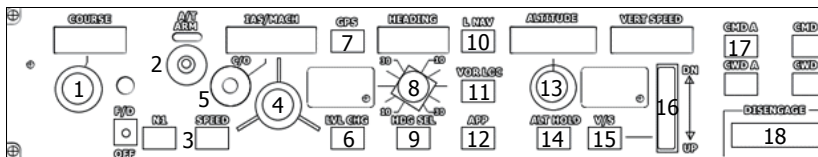


Fig 3.5.2 – MCP Layout

1. Course Knob. Alters the course setting for use in ILS/VOR navigation.
2. Auto-Throttle Switch. Arm/disarm the auto-throttle.
3. Speed Switch/N1 Switch. When the speed switch is on, the autopilot will try to keep the aircraft at the selected speed. (Unavailable if the auto-throttle is not armed). The N1 switch selects TO/GA power when the auto-throttle is armed.
4. Speed Selector Knob. Alter the selected speed.
5. Mach/IAS Switch. Switches between IAS and Mach speed modes.

6. Wing Leveller. The autopilot will keep the aircraft's wings level with the horizon.
7. GPS Mode Switch. When selected, the NAV mode of the autopilot switches to GPS. In this mode the autopilot will follow the current flight plan when NAV mode is activated.
8. Heading Selector Knob. Alter the selected heading.
9. Heading Hold. The aircraft will hold the selected heading.
10. LNav Hold. If GPS is selected the aircraft will follow the flight plan, if not, it will follow the tuned VOR course.
11. Backcourse Hold. Used to navigate away from tuned VOR.
12. Approach Hold. Autopilot will control pitch and yaw to fly the aircraft down the tuned ILS.
13. Altitude Selector Knob. Alters the selected altitude.
14. Altitude Hold. The aircraft will hold the selected altitude.
15. Vertical Speed Hold. The aircraft will hold the selected V/S.
16. Vertical Speed Selector. Alters the selected V/S.
17. Autopilot Command. Switches on the autopilot.
18. Autopilot Disengage. Disengages the autopilot.

3.6 Autobrake System

3.6.1 Introduction

The PS Panels 737NG panel has an accurately modelled 737NG Autobrake system. Its functions are discussed below.

3.6.2 Autobrake Panel Layout

The diagram below shows the autobrake panel layout:-

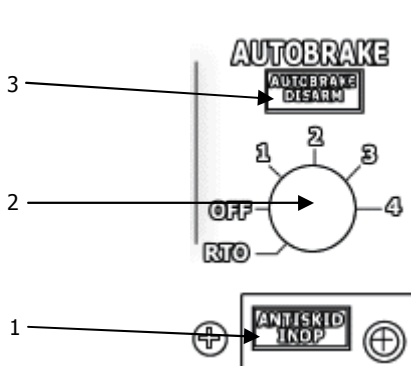


Fig. 3.6.2 – Autobrake Panel Layout

1. Antiskid INOP Warning Light. Illuminates if a problem is detected in the aircraft's anti-skid system.
2. Autobrake Setting Knob. Change the autobrake setting.
3. Autobrake Disarm Warning Light. Illuminates when the autobrake is disengaged by increasing the throttle levers when on the ground to more

than 10 percent extension. Also illuminates during the RTO mode system test when the RTO mode is selected.

3.6.3 Autobrake Operation

There are two main modes for the autobrakes. RTO (Rejected Take-Off) mode is used during takeoff and will automatically apply full braking if the take-off attempt is rejected. In this mode the brakes will remain on until the aircraft reaches a complete stop. When RTO is first selected, the system will run a self test. The autobrake disarm light will illuminate during the test (approx 2 sec).

In landing mode there are four possible settings, 1, 2, 3, and 4. Each setting respectively increases the amount of brake pressure that will be applied on touchdown. In landing mode the autobrake can be disengaged on the ground by either returning the selector knob to off or by applying more than 10% throttle. If the latter option is used, the autobrake disarm light will illuminate until the selector is returned to off.

3.7 Flight Instrumentation Systems

3.7.1 Introduction

This section of the manual offers a description on the EADI and EICAS systems used on this aircraft. The EADI allows the pilot to monitor the aircrafts pitch and yaw as well as altitude and speed. The EICAS (Engine Instrumentation and Crew Alerting System) is used to manage/monitor the aircrafts engines.

3.7.2 The Electronic Attitude Direction Indicator (EADI)

The diagram below shows the EADI layout. Note EADI data is only shown if at least one of the IRS systems have been aligned. See section 3.7.2 for more details.

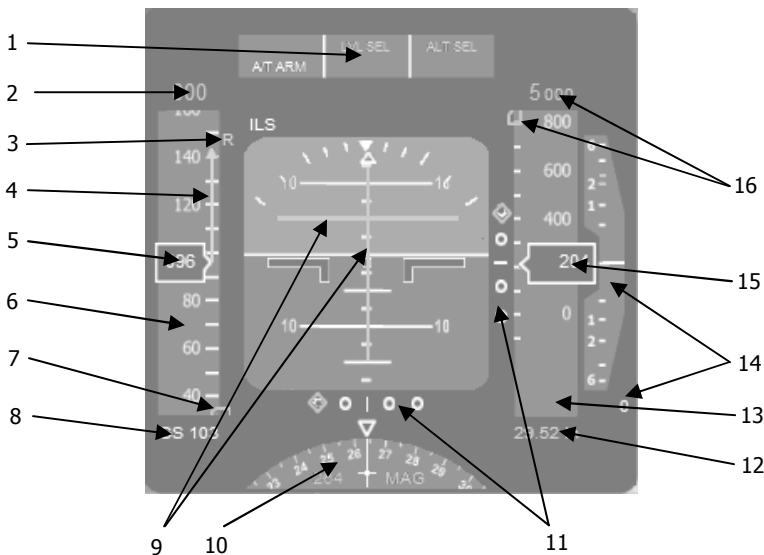


Fig 3.6.2 – EADI Layout

1. Autopilot Indicators. Shows which autopilot modes are currently active. (A box will show around any indicator for two seconds after it comes active).
2. Autopilot Selected Speed. Show the selected speed for the autopilot.
3. V_{Rotate} Indicator. Shows rotate speed based on aircraft weight and outside conditions.
4. Speed Trend Indicated. Constantly updates to show your predicted speed in 10 seconds time. Useful for judging acceleration/deceleration.
5. Current IAS (Indicated Air Speed).
6. Speed Tape. Moving scale showing current IAS.
7. Autopilot Selected Speed Bug. Shows on the speed tape the selected speed in the autopilot window. (IAS mode only).
8. Ground Speed/Mach Display. Under Mach 0.4 shows ground speed in knots. Else shows current speed in Mach.
9. Flight Director Bars. Shows attitude/yaw to fly to get to autopilot flight settings.
10. Heading Indicator. Shows current heading in degrees.
11. ILS Indicators. When an ILS is tuned to NAV1, shows the pitch/direction to fly the approach.
12. Altimeter Pressure Setting.
13. Altitude Tape. Moving scale showing current altitude.
14. Vertical Speed Indicators. Shows numerically/graphically current vertical speed.
15. Current Altitude (Feet).

16. Autopilot Altitude Indicator. Shows the current selected altitude in the autopilot.

3.7.3 The EICAS (Engine Indication and Crew Alerting System)

The diagram below shows the EICAS Eng mode layout. Note EICAS data is only shown if at least one of the IRS systems have been aligned. See section 3.7.2 for more details.

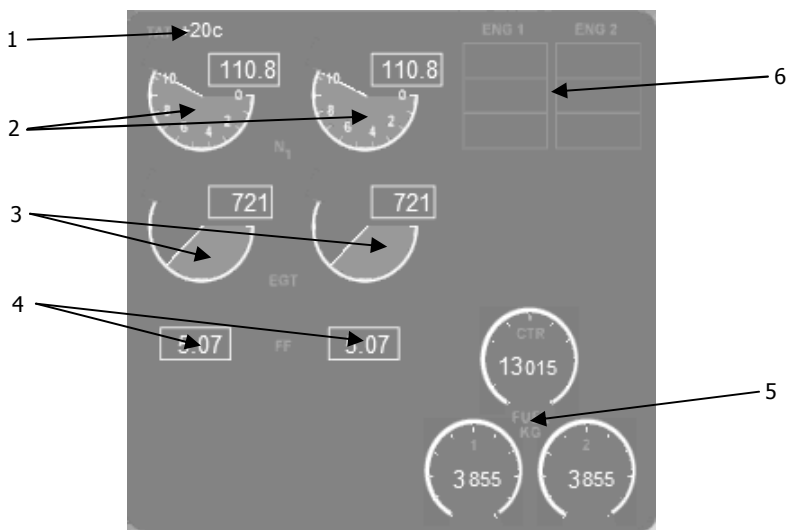


Fig 3.6.3a – EICAS Eng Mode Layout

1. Total Air Temperature.
2. Engine N1 Indicators.

3. Engine EGT Indicators.
4. Fuel Flow Reading. (Can be switched to fuel used using the switch located directly above the EICAS).
5. Fuel Gauges for Left, Centre and Right tanks.
6. Engine Warning Panel. Alerts for Start Valve Open and Low Oil Pressure.

The diagram below shows the EICAS Sys mode layout (selected using the MFD Sys button above the EICAS screen):-

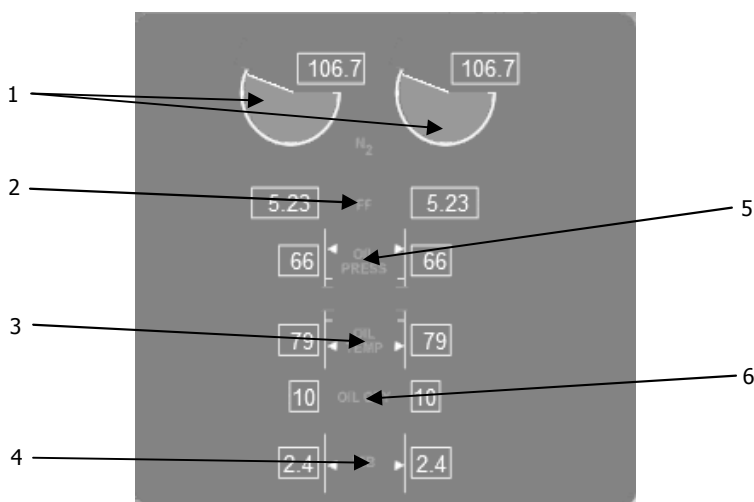


Fig 3.6.3b – EICAS Sys Mode Layout

1. Engine N2 Indicators
2. Fuel Flow Indicators

3. Eng Oil Temperature
4. Eng Vibration Indicators.
5. Eng Oil Pressure.
6. Eng Oil Quantity.

3.8 Navigation Systems

3.8.1 Introduction

There are 4 main elements used to setup navigation on the PS Panels 737NG. These are the IRS systems, the Navigation Radios, the EHSI display, and the EHSI control panel on the glare shield. Each is described in the following sections.

*Note: The IRS systems data is also used in the EADI.

3.8.2 IRS (Inertial Reference System) Systems

The 737NG is fitted with two IRS systems. The IRS is used to provide the following flight data into the FMC (Flight Management Computer) and Flight Data displays.

The IRS provides;

- Attitude
- True/Magnetic Heading
- Acceleration
- Vertical Speed
- Ground Speed
- Wind Speed/Direction
- Aircraft Position

When neither IRS is active and aligned (more later), Navigation and flight data systems are unavailable. In this case, the screens will look like fig.3.7.2a below.



Fig 3.7.2a – Inboard/Outboard DUs when IRS not aligned

The IRS devices are controlled through the IRS Mode/Display panel shown below;

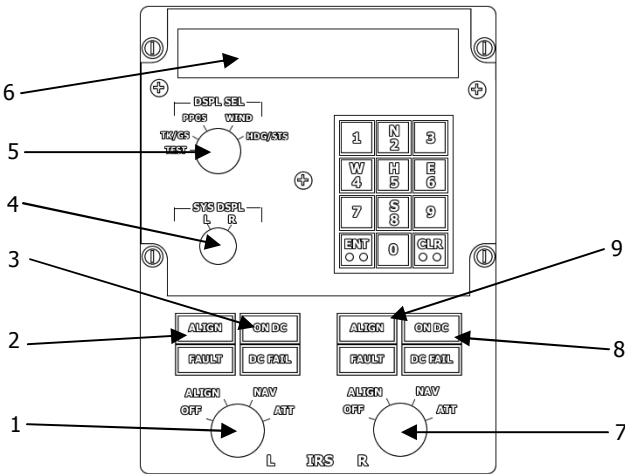


Fig 3.7.2b – IRS Mode/Display Panel

1. Left IRS Mode Switch. Each IRS has 3 modes available for use. The ALIGN mode sets the IRS up to do a quick realign, the NAV mode starts a full align – See the section on aligning the IRS later for more information. Moving the switch to OFF shuts down the left IRS. ATT Mode is not simulated.
2. Left IRS Align Light. This light is on whilst the left IRS is aligning. It is very important that the aircraft is not moved whilst alignment is in progress, if it is, the alignment will fail indicated by a flashing align light. The process will have to be restarted in this condition.
3. Left On DC Light. Shows when either the left IRS is running from battery power, or a DC Test is being run. (A DC Test is run at the beginning of both the quick and full alignment processes).
4. Sys Display Knob. Chooses which IRS information is shown in the IRS Display (6).
5. IRS Display Mode. TEST mode will light all the warning lights as well as all the segments in the IRS display. This is used to test the display system. TK/GS mode shows Track (degrees) and Ground Speed (knots) respectively calculated by the selected IRS (4) in the display. PPOS shows the current aircraft position as calculated by the selected IRS (4). WIND shows the calculated Wind Direction (degrees) and speed (knots) from the selected IRS (4). HSG/STS shows the current aircraft heading as calculated by the selected IRS.
6. IRS Display. 7 Segment display showing IRS information.
7. Left IRS Mode Switch. Each IRS has 3 modes available for use. The ALIGN mode sets the IRS up to do a quick realign, the NAV mode starts a full align – See the section on aligning the IRS later for more information. Moving the switch to OFF shuts down the left IRS. ATT Mode is not simulated.
8. Right IRS Align Light. This light is on whilst the right IRS is aligning. It is very important that the aircraft is not moved whilst alignment is in progress, if it is, the alignment will fail indicated by a flashing align light. The process will have to be restarted in this condition.

9. Right On DC Light. Shows when either the left IRS is running from battery power, or a DC Test is being run. (A DC Test is run at the beginning of both the quick and full alignment processes).

ALIGNING THE IRS SYSTEMS

FULL ALIGN

*These instructions apply to either IRS.

- Move the IRS mode knob to NAV. The respective ON DC light will come on whilst a DC power test is run.
- After a few seconds the ON DC light will extinguish and the ALIGN light will come on. This marks the start of the alignment process.
- After approx 1 minute the ALIGN light will extinguish and the IRS will be aligned. If the light has begun to flash, this indicates there has been an error (normally the aircraft has moved) and the procedure must be restarted. (Move switch to off, wait for the shutdown process to run (align light will extinguish) and start again).

QUICK REALIGN

*These instructions apply to either IRS.

- Move the IRS mode knob to ALIGN. The respective ON DC light will come on whilst a DC power test is run.
- After a few seconds the ON DC light will extinguish and the ALIGN light will come on. This marks the start of the alignment process.
- After approx 20 seconds the ALIGN light will extinguish and the IRS will be aligned (The mode switch will move to NAV automatically). If the light has begun to flash, this indicates there has been an error (normally the aircraft has moved) and the procedure must be restarted. (Move switch to off, wait for the shutdown process to run (align light will extinguish) and start again).

IRS SHUTDOWN

*These instructions apply to either IRS.

Move the IRS Mode Knob to off to start the shutdown procedure. The ALIGN light will illuminate. After approx 20 seconds, the light will extinguish indicating that the IRS has been shutdown.

3.8.3 Navigation Radios

The 737NG is fitted with four navigation radios, two NAV radios for ILS/VOR work and two ADF devices for use with NDBs. The functions of these radios are described below:-

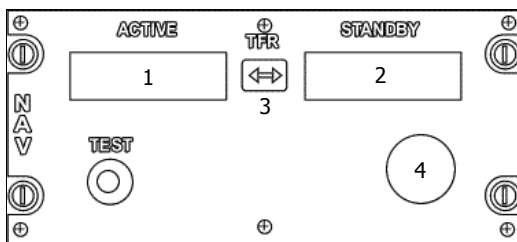


Fig 3.7.3a – NAV Radio Layout (1+2 are identical)

1. Active Frequency.
2. Standby Frequency.
3. Transfer Button. Switches the Active/Standby frequencies.
4. Standby Frequency Selector Knob. The inner ring increases/decreases the standby frequency by 0.05MHz, the outer ring by 1MHz.

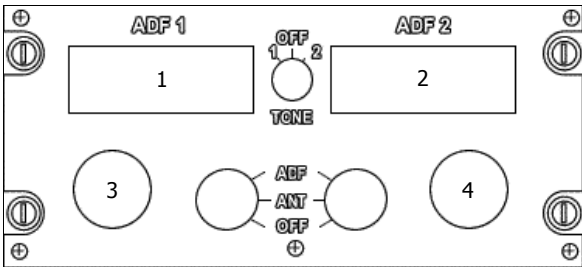


Fig 3.7.3b – ADF Radio Layout

1. ADF1 Frequency.
2. ADF2 Frequency.
3. ADF1 Tuning Knob.
4. ADF2 Tuning Knob.

3.8.4 EHSI Control Panel

The EHSI control panel, controls how the navigation screens are setup on the EHSI. Its functions are described below:-

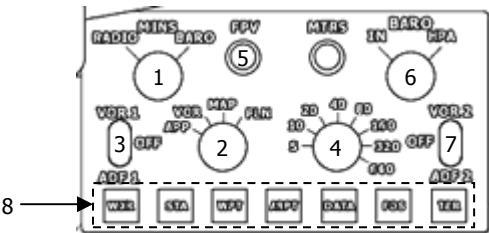


Fig 3.7.3 – EHSI Control Panel

1. Minimums Setting (Displayed in EADI). Outer ring changes between barometric and radio methods of measuring altitude. Inner ring changes the actual mins setting. Centre button resets setting to zero.
2. EHSI Mode. Outer ring switches between APP/VOR/MAP/PLAN Modes. Centre button switches between expanded and centred versions.
3. NAV1 Radio Select. Selects between NAV1 and ADF1 radios for marker arrows on EHSI Display.
4. MAP/PLAN Range Knob. Sets the range to be shown in the MAP and PLAN modes.
5. Flight Plan View. Switches the flight plan view on/off in the MAP and PLAN modes.
6. Altimeter Barometric Pressure Setting. Outer ring switches between IN and HPA modes, inner ring changes setting.
7. NAV2 Radio Select. Selects between NAV1 and ADF1 radios for marker arrows on EHSI Display.
8. MAP Display Buttons. STA shows NDBs, ARPT shows airports, VOR to show VORs, and TER to show terrain details.

3.8.5 EHSI

The EHSI has four modes. Each is described below.

APP Mode



Fig 3.7.4a – APP Expanded Mode



Fig 3.7.4b – APP Centred Mode

The APP mode is used for ILS landings. In the bottom left corner, the ILS Name and DME distance is shown. At the top left, ground speed, true airspeed, and wind speed

and direction are shown. Top centre shows current heading, the pink dotted line shows autopilot selected heading.

The horizontal and vertical glidescope deviation markers are shown bottom centre and right side respectively.

VOR Mode



Fig 3.7.4c – VOR Expanded Mode



Fig 3.7.4d – VOR Centred Mode

Used for flying with VOR navigation, this display is identical to the APP mode with the removal of the vertical deviation markers.

MAP Mode



Fig 3.7.4e – MAP Expanded Mode

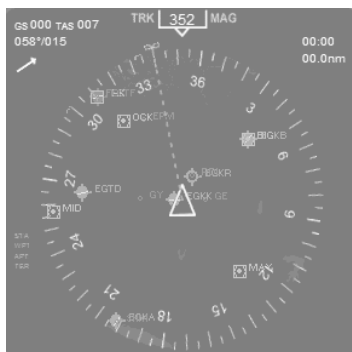


Fig 3.7.4f – MAP Centred Mode

The MAP mode expands on the VOR/ILS modes, to let the pilot see local airports and navaids as well as terrain details overlaid on the EHSI screen. It also adds the ability

to see the currently programmed flight path as well as distance/time to the next waypoint. (Top right).

PLAN Mode

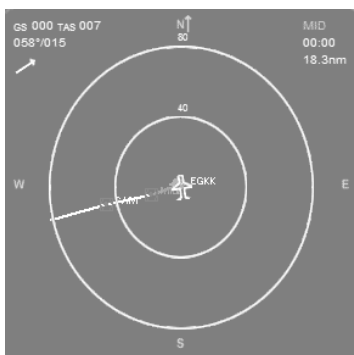


Fig 3.7.4g – PLAN Mode

The plan mode allows the pilot to view the current flight plan. The aircraft marker in the middle rotate according to the aircraft's heading, the view is always north up.

3.9 Communications System

3.9.1 Introduction

The PS Panels 737NG is equipped with two communications radios, COM1 and COM2. Either can be used for communication with ATC.

3.9.2 COM Radio Operation

Both radios operate in the same fashion detailed below:-

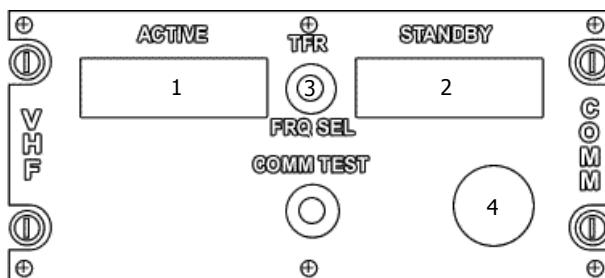


Fig 8.3.2 – COM Radio Layout

1. Active Frequency.
2. Standby Frequency.
3. Transfer Switch.
4. Standby Frequency Tuner Knob.

4 Engine Start/Shutdown Procedures

The PS Panels 737NG automatically detects at the start of any flight if the engines are running or not and sets up all the systems appropriately. You will need to save a default flight with the engines off if you want to start with a cold and dark cockpit.

4.1 Engine Startup

Below are the procedures for engine startup.

- APU Start. (Overhead Panel)
- When APU Gen online select as power source for transfer bus 1 and 2. (Overhead Panel)
- Open APU bleed valve. (Overhead Panel)
- Set APU Gen or Ground Power as power source (Overhead Panel)
- Check fuel cut-off valves off. (Throttle Panel)
- Check fuel pumps on and low pressure warning lights off. (Overhead Panel)
- Emergency lights armed. (Overhead Panel)
- No Smoking/Seatbelt lights on. (Overhead Panel)
- Hydraulic Pump switches on. (Overhead Panel)
- Parking Brake on. (Throttle Panel)
- Select either Left, Right or both ignitors, both may be necessary in extremely cold conditions. (Overhead Panel)
- Eng1 Start Switch GRD. (Overhead Panel)

- When Eng1 N2 reaches 20-22%, open Eng1 fuel cut-off valve. (Throttle Panel).
- When engine running, Eng1 GEN switch on. (Overhead Panel).
- Eng1 Bleed Valve Open. (Overhead Panel)
- Isolation Valve Open. (Overhead Panel)
- Eng2 Start Switch GRD. (Overhead Panel)
- When Eng2 N2 reaches 20-22%, open Eng2 fuel cut-off valve. (Throttle Panel).
- When engine running, Eng1 GEN switch on. (Overhead Panel).
- Eng2 Bleed Valve Open. (Overhead Panel)
- APU Off. (Overhead Panel)

4.2 Engine Shutdown

Below are the procedures for engine shutdown.

- Parking Brake On. (Throttle Panel)
- Set electrical power for both buses to APU or Ground Power as appropriate (Overhead Panel)
- Engine Fuel Cut-Off Valves Closed. (Throttle Panel)
- Fuel Pumps Off. (Overhead Panel)
- Hydraulic Pumps Off. (Overhead Panel)
- Eng1 + 2 Bleed Valves Closed. (Overhead Panel)
- Emergency Exit Lights Off. (Overhead Panel)

- Seatbelt/No Smoking Lights Off. (Overhead Panel)

5 Appendix A – Adding Cockpit Views

The PS Panels 737NG Panel does not come with cockpit views as standard. However these are very simple to add them as the panel.cfg file is pre-prepared.

To add the panels you need to put them into the Aircraft\PSPanels\PS737NG\Panel folder using the following naming standard:-

View	Filename
Forward Left	FORWARDLEFT.bmp
Left	LEFT.bmp
Rear Left	REARLEFT.bmp
Rear	REAR.bmp
Rear Right	REARRIGHT.bmp
Right	RIGHT.bmp
Forward Right	FORWARDRIGHT.bmp

The panels should be 1024x768 (Or a multiple thereof) for best results. Any areas of black will be shown as transparent in FS.

6 Appendix B – aircraft.cfg File Parameters

In order for the PS Panels 737NG panel to work correctly, you will need to make sure the aircraft.cfg file for the aircraft you are using, contains the sections as shown below:-

Under the electrical section (Marked by [electrical]);

```
electric_always_available      = 1
```

Under the radios section (Marked by [radios]);

```
[Radios]
Audio.1      = 1
Com.1        = 1, 1
Com.2        = 1, 1
Nav.1        = 1, 1, 1
Nav.2        = 1, 1, 0
Adf.1        = 1
Adf.2        = 1
Transponder.1 = 1
Marker.1     = 1
```

Some users have experienced problems with the aircrafts lights. This is usually caused by inconsistencies set in the lights section of the aircraft.cfg file. Look at the example below;

```
[LIGHTS]
//Types: 1=beacon, 2=strobe, 3=navigation, 4=cockpit, 5=landing, 6=Taxi,
7=Recognition, 8=Wing, 9=Logo, 10=Cabin
light.0 =1, 17.20, 0.00, 10.30, fx_beaconh , //upper beacon
light.1 =1, 0.00, 0.00, -4.30, fx_beaconb , //lower beacon
light.8 =3, -53.75, 0.00, 7.00, fx_navwhi , //aft id
light.9 =2, -53.75, 0.00, 7.00, fx_strobeh , //aft strobe
light.10=4, 61.00, 0.00, 5.50, B738_vclight , //cockpit splash
light.11=5, 29.40, -6.65, 2.50, fx_navwhih , //left inspection light
light.12=5, 29.40, 6.65, 2.50, fx_navwhih , //right inspection light
//IF FOR SOME REASON YOU CANNOT SEE THE BELOW LIGHTS ON YOUR FS, SIMPLY REMOVE THEM
FROM THE CONFIG, SOME HAVE PROBLEMS VIEWING THESE FX
light.13=8, 26.00, -6.00, 5.00, B738wing , //-----|
light.14=8, 26.00, 6.00, 5.00, B738wing , //-----|
light.15=8, 12.40, -19.10, 16.40, B738wing , //-----|
light.16=8, 12.40, 19.10, 16.40, B738wing , //inspection light splashes on wings
light.17=6, 70.00, 0.00,-10.00, MJ772TL , //nose gear light splash
```


The numbers shown in red relate to which switch that particular light will respond to. It may be necessary to change these figures on some aircraft to allow the panel switches to correctly model the lighting systems. Use the figures below to assign to the appropriate switch.

- 1 – Beacon
- 2 – Strobe
- 3 – Navigation or Position
- 4 – Cockpit
- 5 – Landing
- 6 – Taxi
- 7 – Recognition
- 8 – Wing
- 9 – Logo
- 10 – Cabin