X-Plane
Boeing 737-800

Pilot's Operating Manual

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Contents

Background: The Boeing 737

The Boeing corporation developed the 737 in the mid-1960s to serve as a lower-cost twin-engined, short-range companion to the larger 727 and 707 models. Production of the original variant (designated 100) began in 1966, with capacity for 85 passengers, five-abreast seating, and powered by two Pratt & Whitney JT8D-15 low-bypass turbofan engines, situated beneath the wings.

A slightly larger model 200 followed in 1967, with increased thrust to compensate for additional weight.

In 1984, Boeing introduced the first of three variants that would subsequently be designated “Classics”. These were the 300, 400 and 500 series. The new models were heavily revised, and featured winglets for increased lift and range, and CFM International CFM56-3C-1 high-bypass turbofan engines. Modifications to the landing gear to incorporate the larger engines was required. The ‘Classics’ were larger, quieter and more economical, and also featured EFIS CRT avionics, replacing conventional instrumentation.

In 1998, Boeing again heavily revised the 737, with the 600, 700, 800 and 900 variants, designated ‘NG’ (Next Generation). These aircraft featured FADEC controlled CFM56-7 high-bypass turbofan engines, larger and more efficient wings (without winglets in some cases), a strengthened fuselage, revised avionics, and a higher cruise speed.

In 2016 (as a response to the Airbus A320 NEO), Boeing introduced the ‘MAX’ series – designated MAX-7, MAX-8, MAX-9, MAX-10, MAX-200. The MAX-8 was the first to enter service – in 2017. The MAX variants offer four lengths, with options for 138 to 230 seats and a range of between 3,215 and 3,825 nautical miles. These aircraft are equipped with split winglets and powered by the CFM International LEAP high-bypass turbofan engines.

The Boeing 737 (all variants including military and cargo not discussed above) is the highest-selling commercial jetliner in history, with over 10,000 deliveries as of 2018.

B737-800 Series Specifications

Engines:

Model	---	2 x CFM56-7B24 turbofans
Power	---	2 x 24,200 lb. thrust

Fuel:

Capacity	---	6,875 Gallons / 26,020 liters / 46,000 lbs.
Fuel	---	Jet A-1
Fuel Burn (average)	---	5,700 lbs. per hour

Weights and Capacities:

Max. Takeoff Weight	---	174,000 lbs. / 79,000 kg.
Max. Landing Weight	---	145,500 lbs. / 66,000 kg.
Empty Operating Weight	---	91,700 lbs. / 41,500 kg.
Maximum Payload	---	45,300 lbs. / 20,540 kg.
Maximum Passengers	---	189

Performance:

Max. Level Speed	---	490 KTAS
Long Range Cruise Speed	---	450 KTAS
Final Approach Speed		135 - 155 KTAS (full flap/gear down)
Takeoff Distance	---	8,700 ft. / 2,650 m.
Landing Distance	---	5,360 ft. / 1,635 m
Range	---	4,000 nm
Service Ceiling	---	41,000 ft. / 12,500 m.

The X-Plane B737-800

Unlike other flight simulators, X-Plane employs a technique called “blade element theory. This utilizes the actual shape of the aircraft (as modeled in the simulator) and breaks down the forces on each part separately. The force of the “air” acting on each component of the model is individually calculated, and combined, to produce extremely realistic flight.

When you “fly” an airplane in X-Plane, there are no artificial rules in place to govern how the aircraft behaves. Your control inputs move the control surfaces of the aircraft, and these interact with the virtual flow of air around it. As such, you may consider that you are really flying the aircraft.

Due to the use of ‘Blade Element Theory’ in X-Plane, an aircraft must be modeled with great accuracy, in order that it behave like its real-life counterpart. This means the fuselage, wings and tail surfaces must be the right size and shape, the center of lift and center of gravity must be in the right places, and the engine(s) must develop the right amount of power. In fact, there are a great many properties that must be modeled correctly to achieve a high-fidelity flight model.

The 737-800 featured in X-Plane has been modeled by our design team with a degree of accuracy that ensures its flight characteristics are like the real aircraft. However, despite this, some differences will be apparent, because even the smallest factor plays into the ultimate behavior of the aircraft, both in real life, and in X-Plane. The systems modeling of this aircraft involves some compromise too, because of the degree of complexity present in the real aircraft. However, in most cases, the actual 737-800 procedures could be followed when operating the X-Plane version. Checklists are presented later in this document (with modifications to suit this specific simulation platform and model). It is recommended that X-Plane pilots follow those procedures to extract the maximum capability and enjoyment from this aircraft.

Views and Controls

The X-Plane B737-800 features a detailed 3-D cockpit with a great many of the primary controls and systems modeled, including: Flight controls (yoke, rudder pedals, thrust levers, prop levers, condition levers), electrical systems, pneumatic systems, navigation aids, radios, autopilot, interior and exterior lighting, and fuel systems.

Hint:

To best view some of the switches featured in this aircraft, it is helpful to hide the pilot and co-pilot yokes. This can be accomplished selecting “Joystick and Equipment” from the “Settings” menu, and assigning a button, or key, to the following:

Operation | Toggle Yoke Visibility

(The default keyboard assignment is ‘y’).

Use the assigned button/key to toggle the yoke view as required. This will have no effect on the yoke operation.

Creating “Quick Look” views

Before discussing the controls, we suggest that the pilot establish a series of “Quick Look” views that will be helpful later when interacting with this particular aircraft. If you are not familiar with this technique, more information is available in the X-Plane Desktop Manual.

The following “Quick Look” views are recommended for the B737-800, in a situation where the pilot is not using a Virtual Reality (VR) headset, or a head tracking device. To some degree, these correspond (on the keyboard Number Pad) with their physical locations in the cockpit, and are therefore logical and easy to recall later.

Control Display Unit (CDU)

Pilot’s Primary Instrument Panel

Thrust Lever Quadrant and Center Console

Co-Pilot's Primary Instrument Panel

Pilot's EFIS (Electronic Flight Instrument System) Control Panel

Engine Instrument Panel / Autopilot Panel

Co-Pilot's EFIS (Electronic Flight Instrument System) Control Panel

Pilot’s Left
Glance View

Overhead Panel

Co-Pilot’s Right
Glance View

Operating the controls

This section covers the basics techniques for the operation of the controls that you will encounter in the cockpit of an X-Plane aircraft. Control manipulators are consistent across all X-Plane aircraft. However, the specific **ILLUSTRATIONS** in THIS chapter may differ from YOUR aircraft.

Toggle and Rocker switches are operated with a single click of the mouse. Place the mouse pointer slightly above, or below, the center point of the switch, depending on the direction you intend to move it. A small white arrow is displayed to confirm the intended direction. Click the mouse button to complete the operation.

Levers are operated by assigning a peripheral device to the necessary axes in X-Plane (throttle, prop, mixture etc.). More information is available in the X-Plane Desktop Manual.

Levers may also be operated by clicking and dragging the mouse pointer.

Some rotary dials are operated by positioning the mouse pointer on top of the control, and then a click and drag to the right, or to the left. The same can be accomplished using the mouse wheel - if one is present on your device.

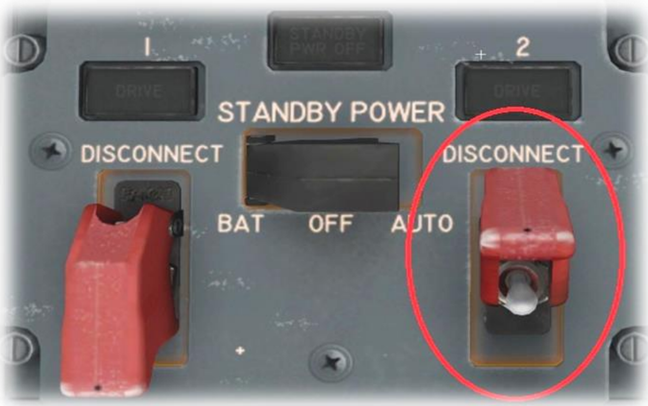
Other rotary controls require finer precision. When the mouse pointer is positioned slightly to the left of such a control, a counter-clockwise arrow appears. This indicates that you are ready to rotate the control counter-clockwise. Correspondingly, a clockwise arrow indicates that you are ready to rotate the control clockwise. After positioning the mouse pointer, changing the frequency in the desired direction is accomplished in two ways:

i) By rolling the mouse wheel forwards, or backwards

ii) By clicking (dragging is not supported here)

Radio and Navigation frequency rotary dials are grouped together as “twin concentric knobs”. Here, the larger rotary is used to tune the integer portion of the frequency, and the smaller rotary is used to tune the decimal portion. Each works independently, using the same technique, as described above.

Push buttons are operated by pointing and clicking with the mouse.



Guarded switches are used in situations where accidental activation of the switch must be prevented. To operate a guarded switch, the guard must first be opened. Do this by positioning the mouse pointer over the switch until the two vertical white arrows are displayed. Click once. If the switch is currently closed, it will open, and vice-versa. After the guard has been opened, the switch may be operated like a toggle and rocker switch (see earlier in this section).

The Yoke / Stick / Joystick is operated by assigning a peripheral device to the “roll” and “pitch” axes in X-Plane. This is discussed in greater detail later in the guide.

The Rudder Pedals are operated by assigning a peripheral device to the “yaw” axis in X-Plane. If your rudders also support toe braking, create additional assignments to the “left toe brake” and “right toe brake” axes in X-Plane. This is discussed in greater detail later in the guide.

Note that you may also assign keys on your keyboard, or buttons on your external peripheral to move the rudder to the left or right, or to center the rudder.

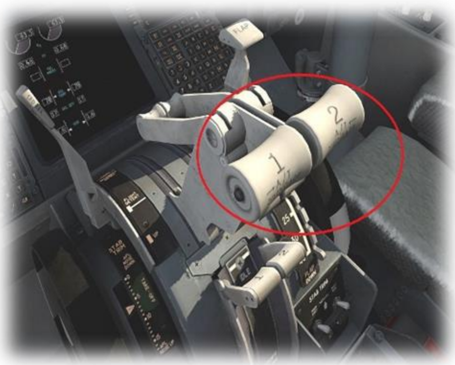
Assigning peripheral devices

This section of the manual deals with an “ideal” scenario, in terms of the assignment of external computer peripherals to operate the X-Plane B737-800 with the highest degree of realism. If you are missing some of these external peripherals, you may elect to choose a different configuration that better suits your hardware.

The B737-800 is equipped with Yokes, for roll and pitch control.

To simulate this, assign the lateral axis of your yoke (or joystick) to the “Roll” command in X-Plane, and the vertical axis to the “Pitch” command.

More information is available in the X-Plane Desktop Manual.



The B737-800 is equipped with dual thrust levers – which control the thrust generated by the left and right engines respectively.

To simulate the thrust levers for a B737-800, assign two levers on your quadrant to the “Throttle 1” and “Throttle 2” property in X-Plane.

The B737-800 is equipped with a “Fuel Flow lever” for each engine. These are manually actuated by the flight crew to introduce fuel to the engines during the start procedure.

To simulate this, assign two levers on your quadrant to the “Mixture 1” and “Mixture 2” properties in X-Plane.
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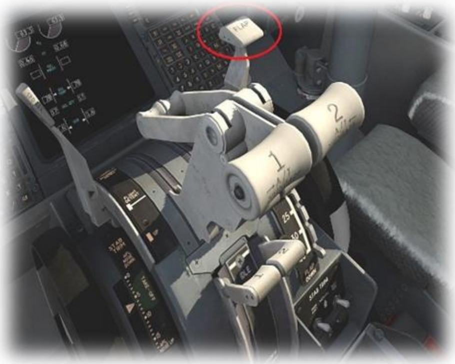

The B737-800 is equipped with a Flap lever, which controls the deployment of the flaps for takeoff and landing.

To simulate this, assign a peripheral lever to the "Flaps" property in X-Plane.
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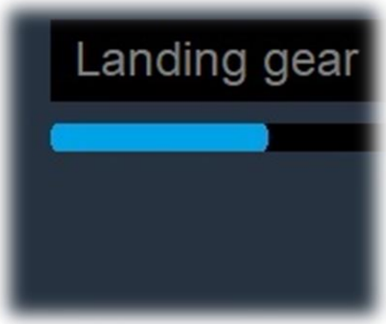

The B737-800 is equipped with a Landing Gear lever.

To simulate this, assign a peripheral lever to the "Landing gear" property in X-Plane.
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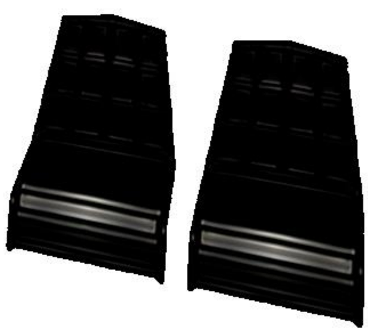
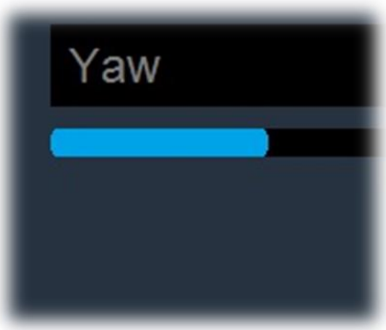
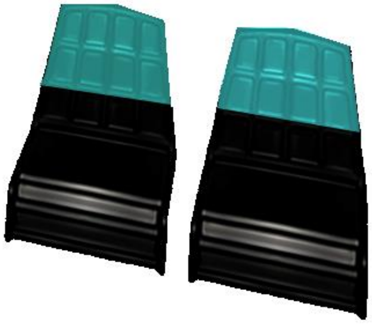




The B737-800 has conventional rudder controls, actuated by the rudder pedals.

The pedals activate the rudder, which is part of the tail assembly, and this "yaws" the aircraft to the left or right. The rudders keep the aircraft straight during takeoff and landing, and help make coordinated turns.

To simulate this, assign the yaw axis of your pedals peripheral device (or a joystick axis) to the "yaw" property in X-Plane.



The B737-800 has rudder toe-braking, actuated by the tip of the rudder pedals.

To simulate this, assign the brake “toe-tipping” motion of each individual pedal (or a joystick axis) to the “left toe brake” and “right toe brake” property in X-Plane.

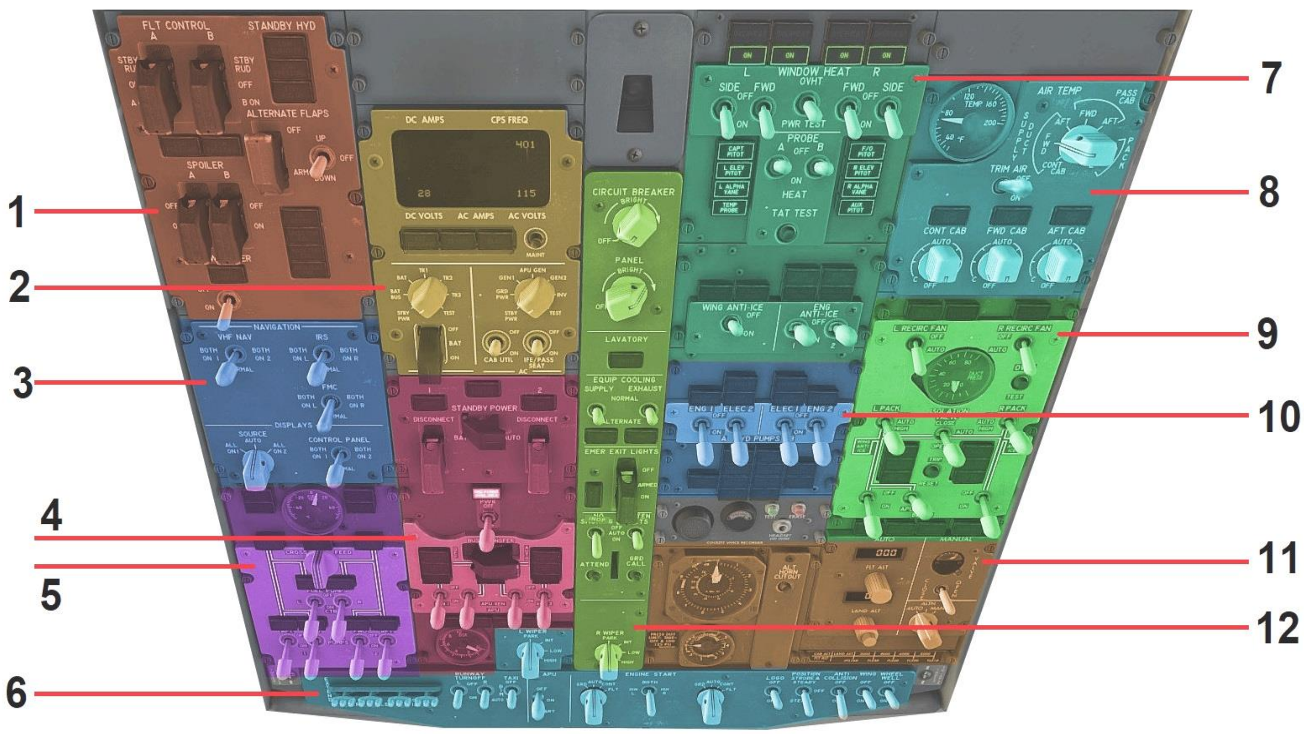
A Tour of the Cockpit

In this section of the manual, the cockpit will be broken down into distinct functional areas, and the controls that are featured in those areas will be identified and described. This will assist in locating the necessary instruments and controls later, when working through the aircraft check lists, and flying the aircraft.

Forward Overhead Panel

The forward overhead panel comprises a collection of smaller panels that manage the aircraft's electrical, pneumatic, lighting, pressurization, engine start, and other systems. Many of these were previously the domain of a flight engineer in the era of three-person flight crews.

Note: Not all of the functions contained within these panels are fully simulated in the X-Plane 737-800 model.



1. Flight Controls

This panel is used to select the active flight control systems (rudder, flaps, spoilers, and features a yaw damper toggle switch.

In the X-Plane model of the 737-800, this panel supports only the Yaw Damper toggle switch.

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2. AC and DC Metering

This panel is used to select and monitor the source of electrical power to the aircraft (both DC on the left, and AC on the right. It also features the master battery switch.

3. Transfer

This panel is used to control the active navigation devices, in the event of a failure.

If either Nav Radio receiver / Inertial Reference System / Flight Management Computer fails, the associated control switches on this panel may be used to transfer the remaining (good) system to both pilot and first-officer in unison.

In Normal mode, these systems may be used independently by the pilot and first-officer.

The SOURCE Rotary is used on the ground for maintenance purposes.

The CONTROL PANEL Rotary manually switches control of left and right-side displays to a single EFIS control panel.

In the X-Plane model of the 737-800, this panel supports only the VHF NAV switch.

4. Standby Power & Generator Bus

This panel controls the standby electrical buses (AUTO, BAT or OFF). AUTO is the normal mode and will engage the battery standby electrical buses (via a relay), automatically when needed.

BAT - forces manual transfer to the standby electrical buses.

OFF - standby electrical buses are not powered.

The Disconnect switches remove the left or right generators from providing power to the electrical buses – in the event of a failure of the corresponding generator.

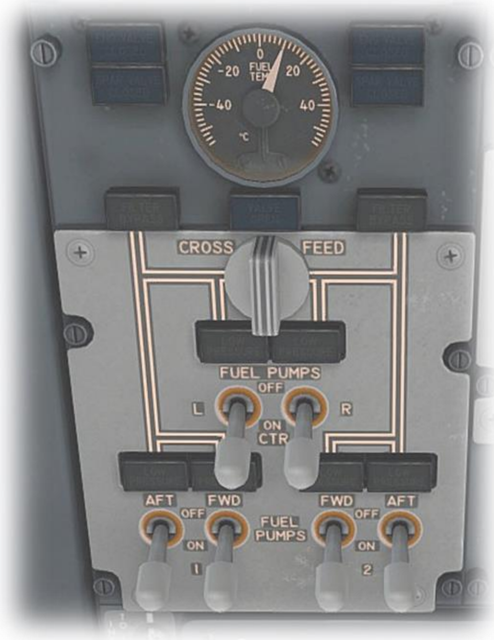
The GRD PWR switch engages the use of ground electrical power (via an umbilical cable) if this is available.

The BUS TRANSFER switch controls the automated transfer of power to the remaining good generator, in the event of a failure of the other generator.

The GEN 1 and GEN 2 switches activate the main electrical generators which are fed from the engines (when running).

The APU GEN 1 and APU GEN 2 switches activate the Auxiliary Power Unit electrical generators. These are powered by the APU turbine at the rear of the aircraft, which is a preliminary source of power prior to engine start.

5. Fuel



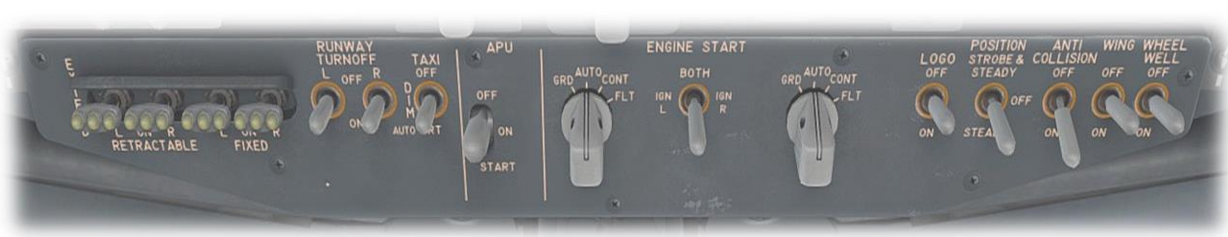
This panel controls the fuel flow and fuel pumps.

The Fuel Temp gauge reports the temperature of the fuel in tank #1. Fuel is heated using the engine oil, to minimize icing potential.

The lower portion of this panel is arranged schematically, and the fuel pump switches represent the actual location of the pumps in the aircraft. These switches control the fuel pumps for tanks 1 (left), 2 (right), and the center tank.

The cross-feed rotary opens or closes the cross-feed valve. When open, either of the engines may source fuel from any tank. Under normal circumstances, the left engine is fed by the left, and center tanks, and the right engine by the right and center tanks.

6. APU and Engine start / External Lights



This panel supports two main functions: APU and Engine start, and control of the external taxi, runway, and collision lights.

Starting the APU is accomplished by holding the switch in the START position for a few seconds, then releasing back to the ON position. APU shut-down is accomplished by moving this switch to the OFF position.

The engine ignition system in use is controlled by the switch located between the two engine start rotaries. There are two independent ignition systems, which may be used in isolation (LEFT or RIGHT), or together (BOTH)

Engine start is accomplished by turning the left or right engine rotary control to GND until the start sequence has been completed (covered in detail in the checklists later in this guide). Once the engine has been started, this switch is normally set to AUTO, However, in the event of sever precipitation, turbulence or icing, these switches should be set to CONT (continuous use of selected igniter) or FLT (continuous use of both igniters). This prevents a possible engine flame-out.

The external landing lights are controlled by the switches at the left side of this panel. The two left-most switches control the (wing) outboard lights, and the two right-most the (wing) inboard lights.

The anti-collision lights are controlled by the switches at the right side of this panel.

7. Ice & Rain Protection

This panel is used to control the window and pitot tube heaters, to protect against fogging and icing.

Switches at the top of this panel are provided to activate the left-side and forward window heaters, the right-side and forward window heaters, and the two-external pitot-tube heaters (A and B).

Switches at the bottom of this panel are provided for the wing (electrical) anti-ice, and engine intake anti-ice heaters.

8. Temperature Control

This panel monitors and controls the cabin temperature.

The rotary control at the top-right is used to select the region of the cabin to be monitored, with the associated temperature being displayed by the gauge to at the upper-left.

The three rotary controls at the lower portion of the panel set the temperature of (left to right) the flight deck, forward cabin, and aft cabin.

9. Pneumatics

This panel controls the aircraft pneumatic system, which can be supplied by the engines, APU or a ground source.

The pneumatic system provides air for engine starting, air conditioning packs and the wing anti-ice boots.

The DUCT PRESSURE gauge displays the available air pressure in the left, and right pneumatic systems.

The recirculating fans recirculate filtered air back to the cabin, to reduce bleed air requirements.

The LEFT PACK and RIGHT PACK switches direct bleed air to the air-conditioning packs, for cabin environmental control.

The isolation valve is used to isolate the left and right pneumatic systems. When set to AUTO, this valve opens and closes automatically, as required by the pneumatic systems. When set to CLOSE, the left and right pneumatic system operate independently.

The Wing Anti-ice switches direct bleed air to the left and right de-icing boots at the leading edge of the wings.

When the APU Bleed switch is on, the pneumatic system is pressurized using bleed air from the Auxiliary Power Unit (APU). This is a small (internal) turbine located at the rear of the aircraft.

10. Hydraulics

Pressure to the two hydraulic systems (A and B) may be provided from engine-driven, and electrical-driven pumps.

The switches on this panel control the source of hydraulic pressure.

Hydraulic system ‘A’ may be sourced from engine-driven pump #1, or electrical-driven pump #2, or both.

Hydraulic system ‘B’ may be sourced from engine-driven pump #2, or electrical-driven pump #1, or both.

11. Cabin Pressurization

This panel displays and controls the cabin pressurization.

The gauges on the left show the current cabin pressure, and the differential between the internal, and external pressures.

The FLT ALT rotary is used to manually set the anticipated peak altitude for the flight (in feet).

The LAND ALT rotary is used to manually set the landing altitude for the termination of the flight (in feet).

12. Miscellaneous

Rotary controls for the circuit breaker board lighting level, and overhead panel backlighting are located at the top of this panel. The circuit breaker boards themselves are located on the back wall of the cockpit, behind the pilot and first-officer.

The EMERGENCY EXIT LIGHTS guarded switch controls the state of these lights. When ARMED, the lights will illuminate automatically. When ON, the lights are illuminated immediately.

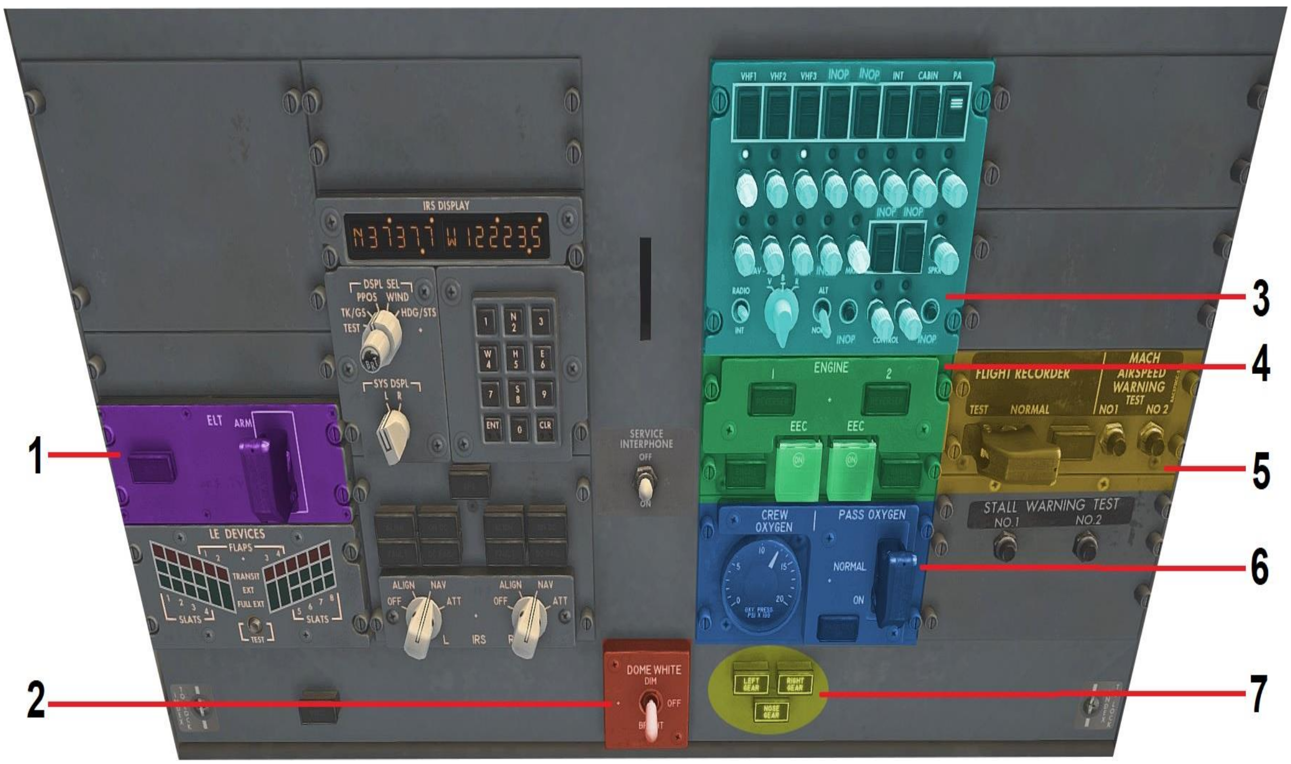
The Flight attendant and ground personnel call buttons are located on this panel. Also, the FASTEN SAFETY BELTS switch.

A rotary control exists at the bottom of the panel to control the windshield wipers.

Aft Overhead Panel

The aft overhead panel comprises a collection of smaller panels that manage the aircraft's electrical, pneumatic, lighting, pressurization, engine start, and other systems. Many of these were previously the domain of a flight engineer in the era of three-person flight crews.

Note: Not all of the functions contained within these panels are fully simulated in the X-Plane 737-800 model.



1. Emergency Locator Transmitter (ELT)

This panel is used to control the activation status of the Emergency Locator Transmitter (ELT).

When in the (guarded) ARM position, the ELT will activate automatically in the event an impact is detected.

When in the ON position, the ELT activates immediately.

The annunciator is illuminated when the ELT is operating.

2. Dome Light

This panel contains a single switch used to control the overhead cockpit ‘dome’ lighting.

3. Audio Control

This panels controls the active mic, and active audio source.

The buttons along the top of the panel activate or deactivate the associated mics. For example, clicking the VHF1 button to ON will activate the mic connected to the VHF 1 (pilot-side) radio.

The illuminated ‘rotaries’ below the buttons behave as toggle switches, and are used to activate, or deactivate the associated audio source. For example, clicking the toggle below the VHF1 button will activate audio from the VHF 1 (pilot-side) radio.

4. Electronic Engine Control (EEC)

This panel controls the Electronic Engine Control system mode.

The ‘Engine Control’ annunciators illuminate when a malfunction is detected in the electronic engine control system, or the flight conditions data required by this system is compromised.

The EEC buttons provide control over the Electronic Engine Control system. When ON is selected, this engages NORMAL mode – the EEC uses the current flight conditions (temperature, pressure and other data) to protect from exceeding the redline value for N1 (the low-pressure compressor fan). In ALTN (alternate) mode, the EEC uses the last valid flight conditions (before becoming compromised) to accomplish this task.

‘Reverser’ annunciators illuminate temporarily when the thrust-reverser retracts back to the stowed position. The annunciates illuminate permanently when a malfunction in the thrust-reversers is detected.

5. Flight Recorder

This panel controls the flight data recorder.

When in the NORMAL (guarded) position, the flight recorder operates anytime the engines are running.

When in the TEST position, the flight recorder operates regardless of engine status.

6. Oxygen

The CREW OXYGEN gauge indicates the pressure available in the crew oxygen cylinder, which provides supplemental oxygen in the event of a pressurization failure.

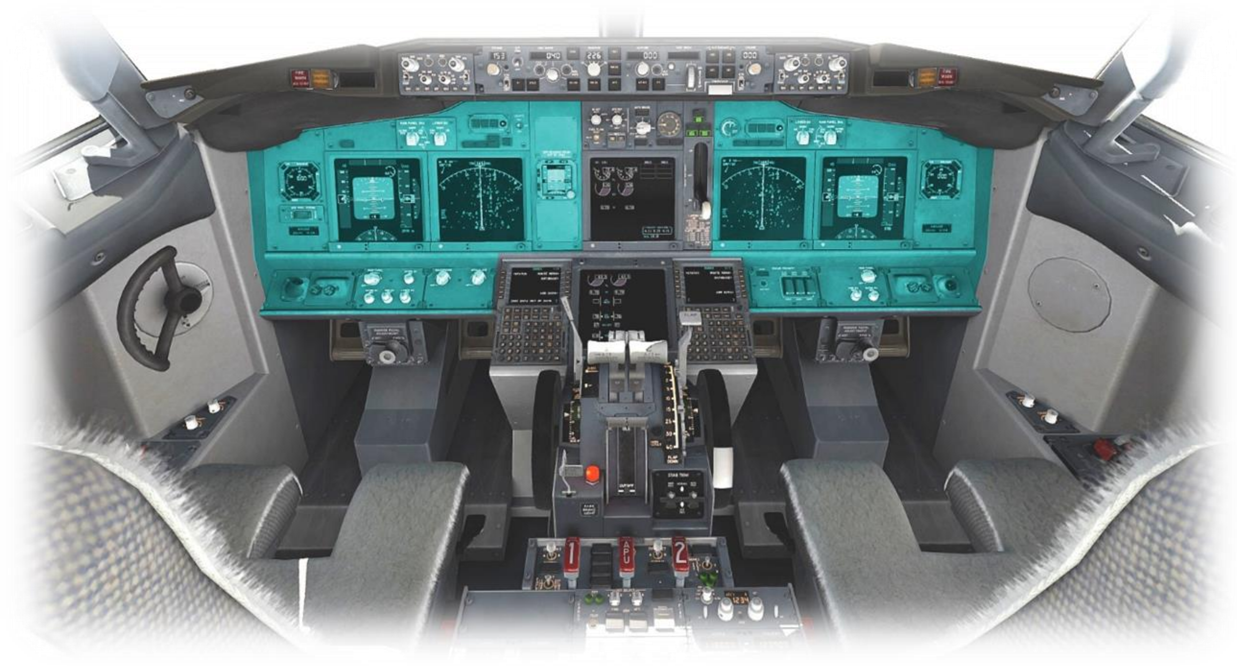
The annunciator illuminates if the passenger supplemental oxygen system has deployed.

The PASSENGER OXYGEN guarded switch has two modes – NORMAL (supplemental oxygen system deploys automatically) and ON (supplemental oxygen system deploys immediately).

7. Redundant Landing Gear Annunciators

A separate set of annunciators that indicate the status of the landing gear - to provide redundancy in the event the primary annunciators (on the main instrument panel) fail.

Primary Instrument Panels



Electronic Attitude Director Indicator (EADI)

This is the left LCD panel in the avionics cluster. The EADI displays the attitude of the aircraft relative to the horizon, and the altitude (above sea level) - via the scale on the right.

The attitude display informs the pilot whether the aircraft is flying straight, or turning, and whether the aircraft is climbing, or descending. This information is crucial in “instrument conditions” - when the outside horizon is not visible.

The EADI also displays localizer and glideslope deviation, when coupled to an ILS approach.

The EADI is covered in detail in a separate chapter:

Electronic Attitude Director Indicator (EADI) Components

Electronic Horizontal Situation Indicator (EHSI)

This is the right LCD panel in the avionics cluster. The EHSI displays the aircraft’s position & (magnetic) heading.

The display is presented in a plan view, as if looking down at the aircraft from directly above.

If a flight plan has been input (using the FMS), this panel also displays the aircraft’s position relative to the desired track.

The EHSI is covered in detail in a separate chapter:

[Electronic Horizontal Situation Indicator (EHSI) Components]

Backup EADI/EHSI

This instrument provides redundancy in the event of a failure of the primary EADI and EHSI and combines the functions of both into a single unit.

The backup EADI/EHSI is powered by a separate electrical source.

Instrument Lighting Control Panel

This panel contains a series of rotary controls that adjust the instrument lighting.

MAIN PANEL controls the backlighting to the upper and lower instrument panels.

UPPER DU controls the brightness of the upper-center multi-function display unit (See: xxx).

LOWER DU controls the brightness of the lower-center multi-function display unit (See: xxx).

BACKGROUND controls the brightness of the lower instrument panel flood lighting.

ADFS FLOOD controls the brightness of the upper instrument panel flood lighting.

OUTBO DU controls the brightness of the EADI.

INBO DU controls the brightness of the EHSI.

Chronometer

This instrument displays the current time, and (flight) elapsed time.

Current time is displayed in UTC, or local (controlled by the button at the upper-right).

Start, Hold and Reset the chronometer timer using the CHR button at the upper-left.

Tiller

Large aircraft are frequently equipped with a tiller for nosewheel steering. The tiller here will respond to rudder commands for steering on the ground.

Annunciators

This panel displays the status of the aircraft's equipment and systems.

Red indicators are warnings, amber indicators are cautions, and green indicators are for information.

Every annunciator light on this panel may be illuminated by moving the LIGHTS switch to TEST. This ensures they are operational before a flight.

A/P P/RST: Auto-pilot caution or warning. Push to reset.

A/T P/RST: Auto-throttle caution or warning. Push to reset.

FMC P/RST: Flight Management Computer caution or warning. Push to reset.

TAKEOFF CONFIG: Takeoff configuration caution or warning.

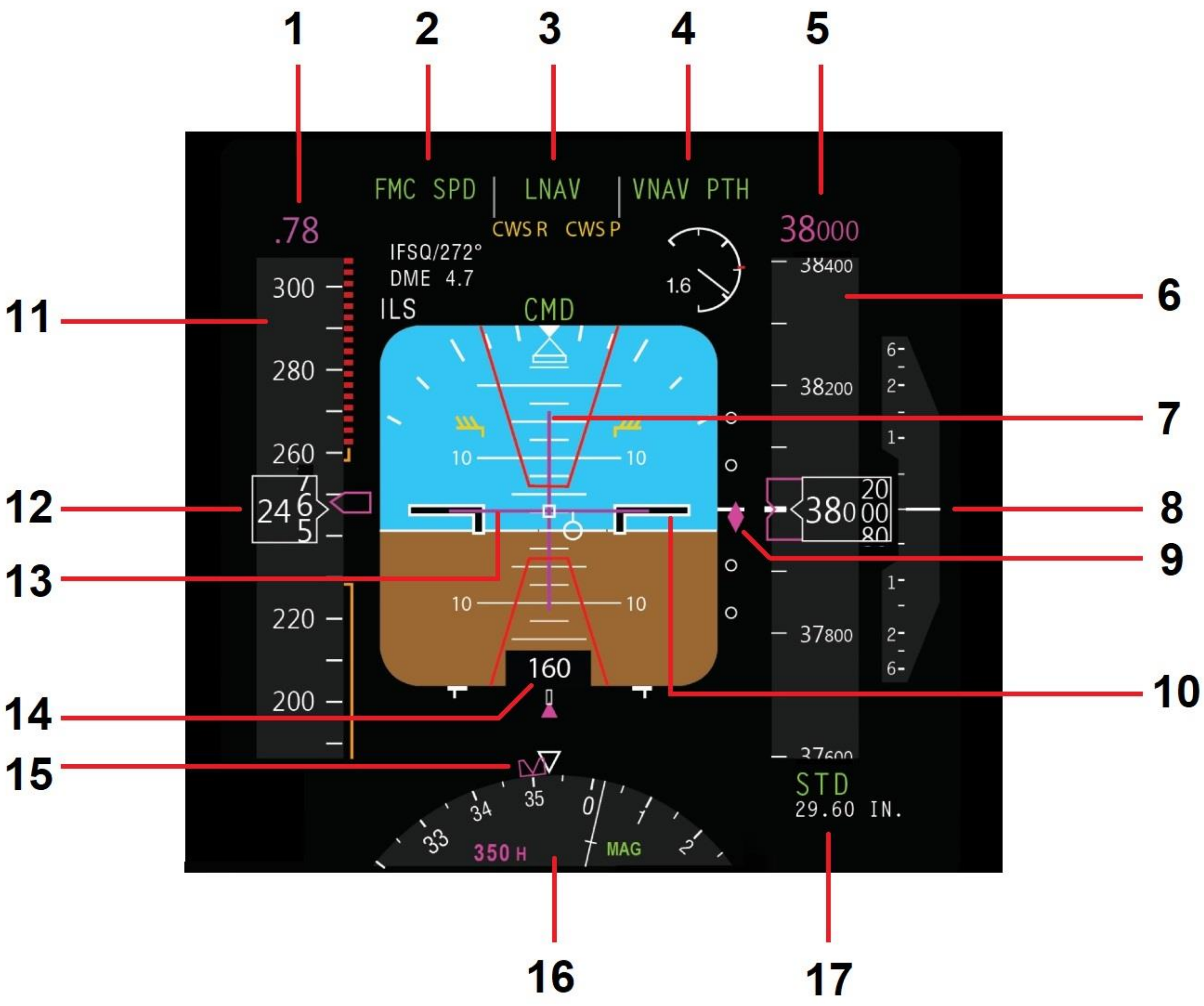
CABIN ALTITUDE: Cabin pressurization system is not operating, and cabin altitude is above safe limits.

SPEED BRAKE ARMED: Automatic speed-brake deployment is armed for landing.

SPEED BRAKE DO NOT ARM: Automatic speed-brake deployment armed, but a failure has been detected.

STAB OUT OF TRIM: Illuminates when the auto-pilot is engaged and a high degree of trim has been applied. The pilot needs to be aware of this when resuming manual control of the aircraft.

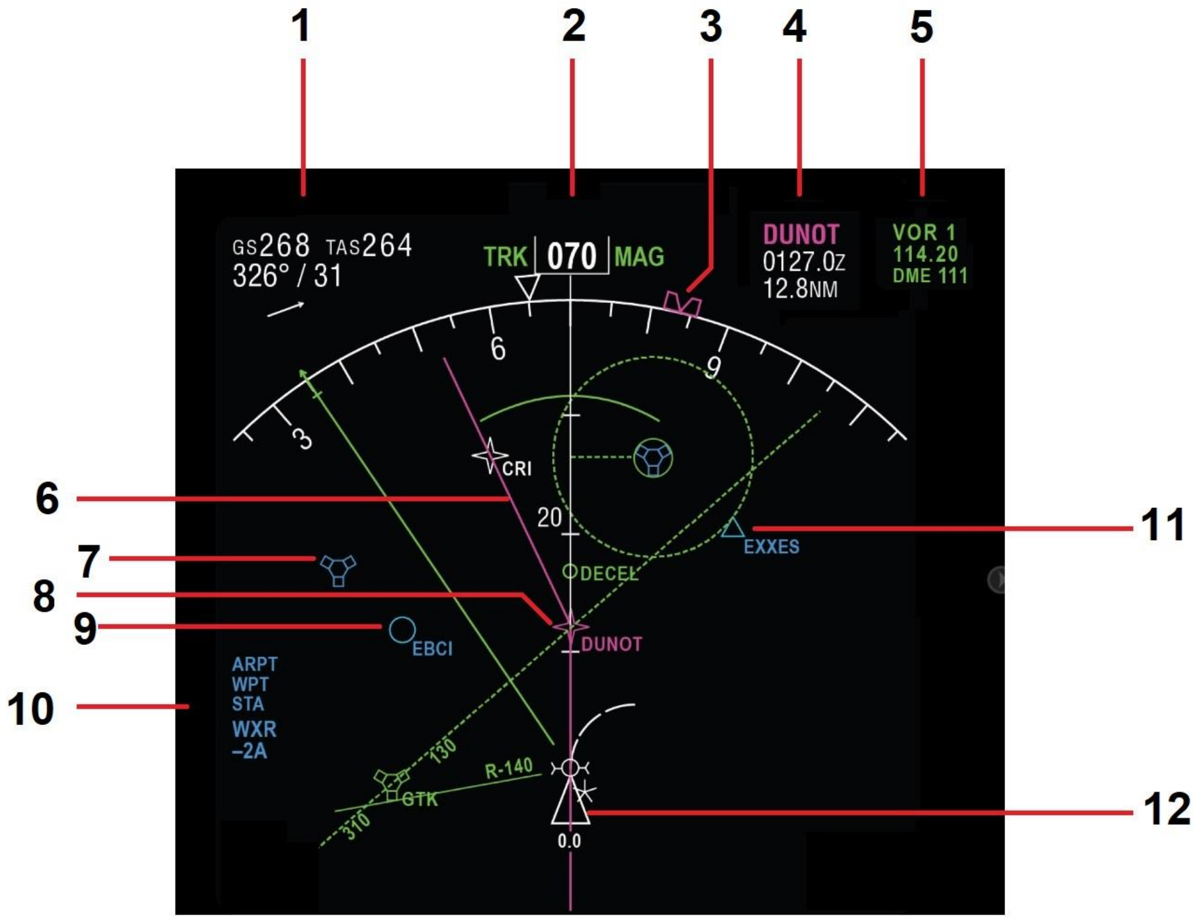
Electronic Attitude Director Indicator (EADI) Components



1	Mach Number	Airspeed expressed as a percentage of the speed of sound (Mach-1).
2	FMC SPD	Aircraft speed is controlled by the FMC (Flight Management Computer)
3	LNAV	LNAV (Lateral Navigation Mode) engaged. The autopilot will steer the aircraft laterally according to the programmed flight plan.
4	VNAV	VNAV (Vertical Navigation Mode) engaged. The autopilot will manage altitude according to the programmed flight plan.
5	Altitude Pre-Set	Pre-set altitude at which the autopilot will level off.

6	Altitude Scale	
7	Flight Director Horizontal Deviation Bar	When the aircraft is following a flight-plan, or according to a navigation aid, this bar informs the pilot to climb, or descend, to intercept the desired altitude.
8	Current Altitude	
9	ILS Vertical Deviation Scale	Displays the extent of any vertical deviation above, or below the desired ILS glide slope.
10	Static Reference Lines	A static reference showing the position of the aircraft with respect to the artificial horizon – in terms of ascent, descent, a left turn, or a right turn.
11	Airspeed Scale	
12	Current Airspeed	
13	Flight Director Vertical Deviation Bar	When the aircraft is following a flight-plan, or according to a navigation aid, this bar informs the pilot to steer left, or right, to intercept the desired track.
14	Altitude Above Ground (AGL)	Altitude Above Ground (from the radio-altimeter) between 0 and 2,500 feet
15	Heading Bug	Sets the desired heading for the autopilot (when in the appropriate mode).
16	Magnetic Heading	The aircraft's current magnetic heading.
17	Altimeter Setting	STD (29.92 inches of mercury) or manual setting.

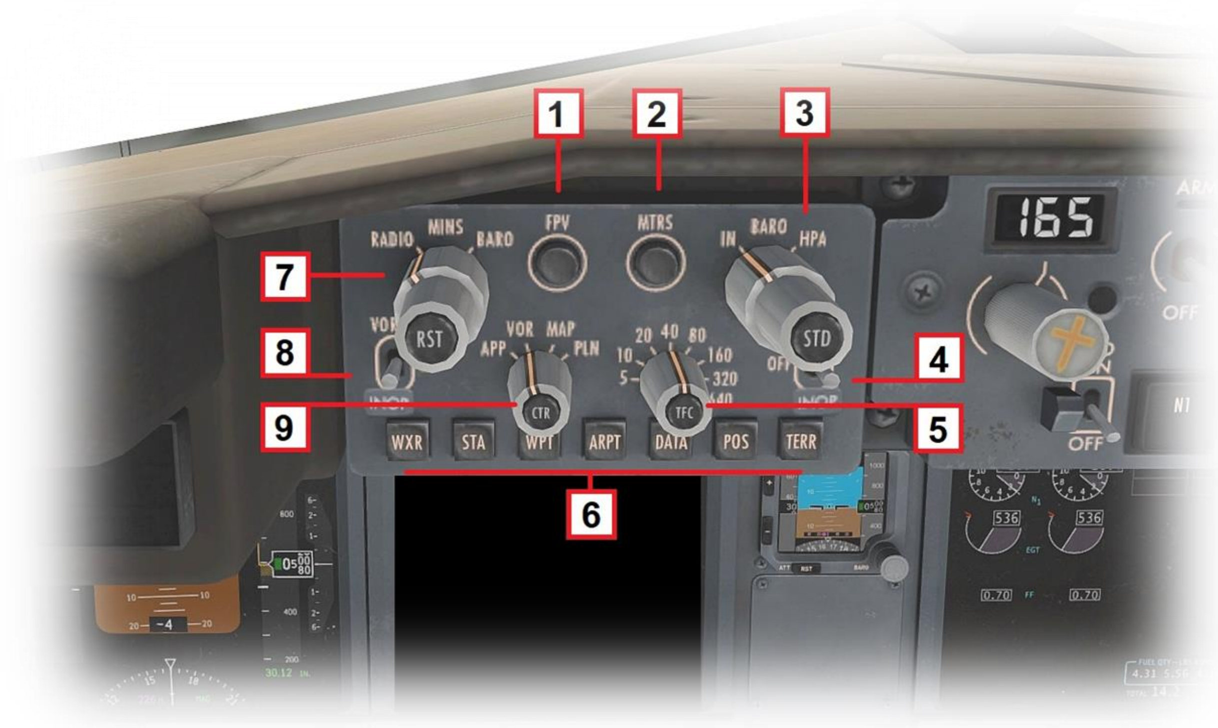
Electronic Horizontal Situation Indicator (EHSI) Components



1	GS / TAS / Wind	GS: Ground Speed TAS: True Air Speed Wind speed and direction. The graphic indicates wind direction relative to the aircraft's current heading.
2	Current Magnetic Heading	
3	Heading Bug	Sets the desired heading for the autopilot (when in the appropriate mode).
4	Next Flight Plan Waypoint	If a flight plan is currently in effect
5	VOR Information	Frequency and distance of VOR tuned by NAV radio
6	Flight Plan Course	

7	VOR	The location of a VOR relative to the current position of the aircraft
8	Next Flight Plan Waypoint	
9	Airport	The location of an airport relative to the current position of the aircraft
10	Active Features	The features currently displayed by the EHSI ARPT: Airports are displayed WPT: Waypoints are displayed STA: Radio navigation aid STATIONS WXR: Weather radar
11	Waypoint	
12	Current Location	

Electronic Horizontal Situation Indicator (EHSI) Control Panel



A separate EHSI Control Panel is provided for the pilot and first-officer. These work independently, and are used to control and customize the settings and information presented on the left, and right EHSI display:

1	Flight Path Vector Display	Not currently supported
2	MTRS	Selects the additional display of EADI altitude in meters
3	Baro Rotary	Used to set the altimeter barometric pressure and units
4	VOR 2	Enables navigation using the VOR tuned by the NAV 2 radio.
5	Map Display Distance	The maximum distance displayed by the EHSI map
6	Features Buttons	Enable or disable features displayed on the EHSI map WXR = Weather; STA = Nav Stations; WPT = Waypoints; ARPT = Airports
7	MINS Reference Selector	Selects a minimum altitude reference - displayed on the EADI altitude scale
8	VOR 1	Enables navigation using the VOR tuned by the NAV 1 radio.

9	EHSI Mode	APP: Places the EHSI display in ‘Approach’ mode. Lateral deviation from the desired course is included. VOR: Places the EHSI display in ‘VOR’ mode. Lateral deviation from the desired radial is included. MAP: Places the EHSI display in ‘MAP’ mode. The location of the aircraft is presented at the bottom of the screen, and the map incorporates airports, navigation aids and waypoints (within the selected range) that are ahead of, and 45 degrees either side of, this position. PLAN: Places the EHSI display in ‘PLAN’ mode. The location of the aircraft is presented at the center of the screen, and the map incorporates airports, navigation aids and waypoints (within the selected range) in all directions.

Center Panel

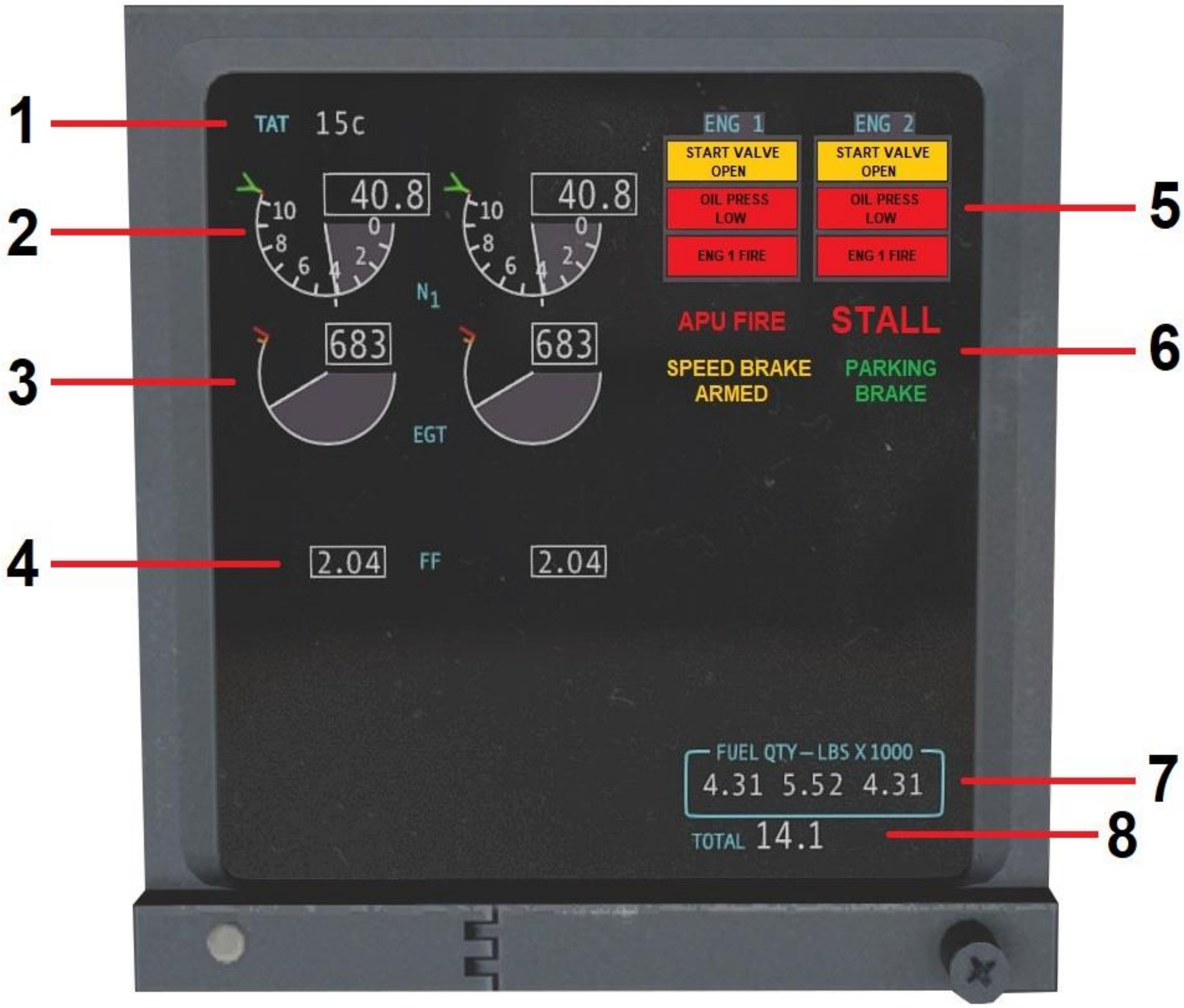
Multi-Function Panel

The N1 SET rotary controls the maximum throttle setting (as a percentage of N1) that may be used by the auto-throttle in TOGA (Take-Off and Go Around) situations. Use the outer rotary to select the engine to which this applies. Use the inner rotary to select the percentage value.

The Anti-Skid rotary controls the braking force that will be applied by the auto-braking system. The choice of setting depends on the level of reverse thrust that will be used by the pilot on touchdown.

The flap indicator dial shows the current wing-flap position.

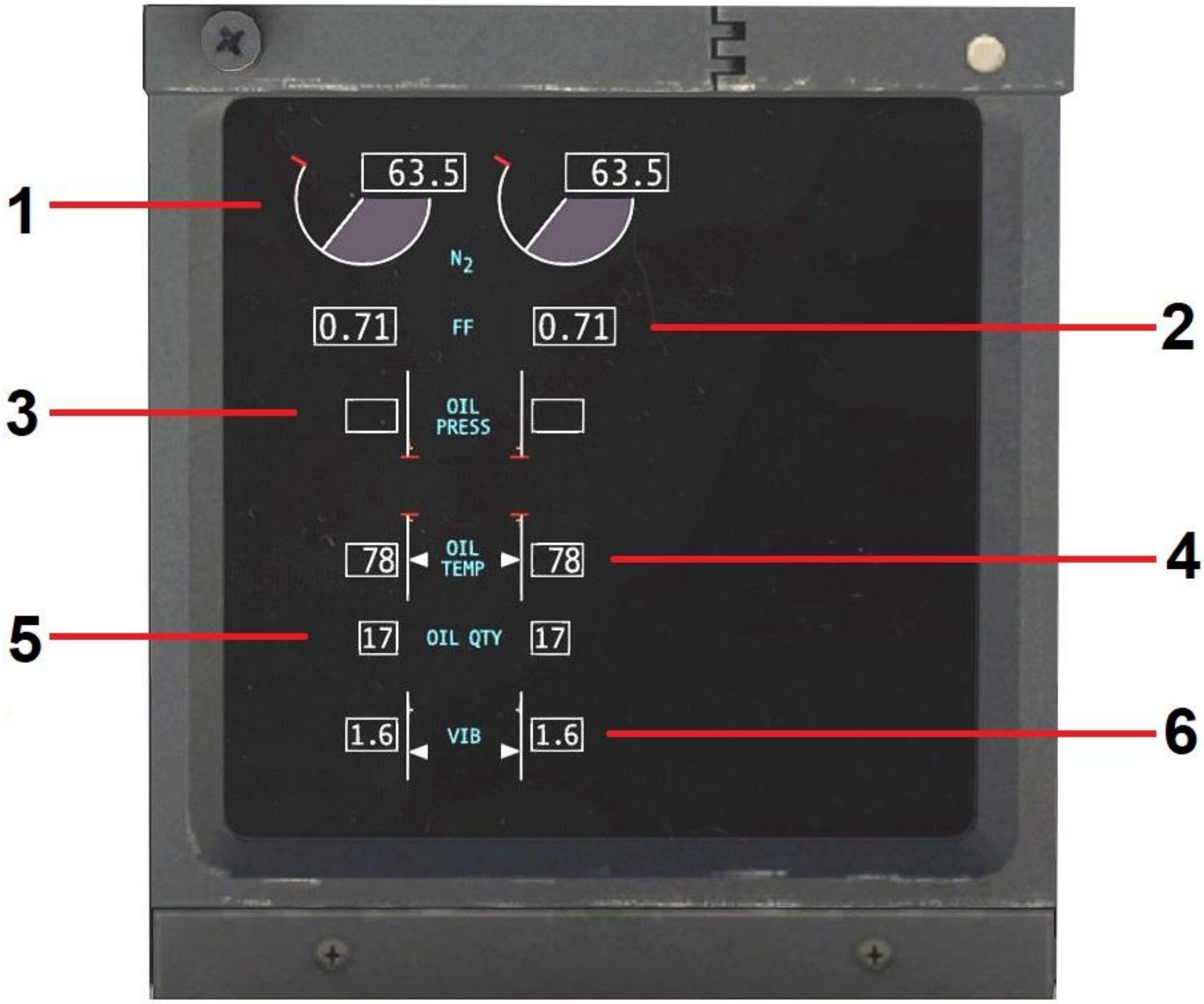
Upper EICAS (Engine Indications and Crew Alerting System) Display



1	TAT	Total Air Temperature: Measured by an external probe
2	N1	N1 Fan rotation speed, as a percentage of maximum
3	EGT	Exhaust Gas Temperature
4	FF	Fuel Flow (in lbs. per hour x 1000)
5	Engine Annunciators	
6	General Annunciators	

7	Fuel Quantity (Per Tank)	Fuel quantity remaining in the LEFT, CENTER and RIGHT tank respectively (in lbs. x 1000)
8	Fuel Quantity (Total)	Total fuel quantity remaining (in lbs. x 1000).

Lower EICAS (Engine Indications and Crew Alerting System) Display

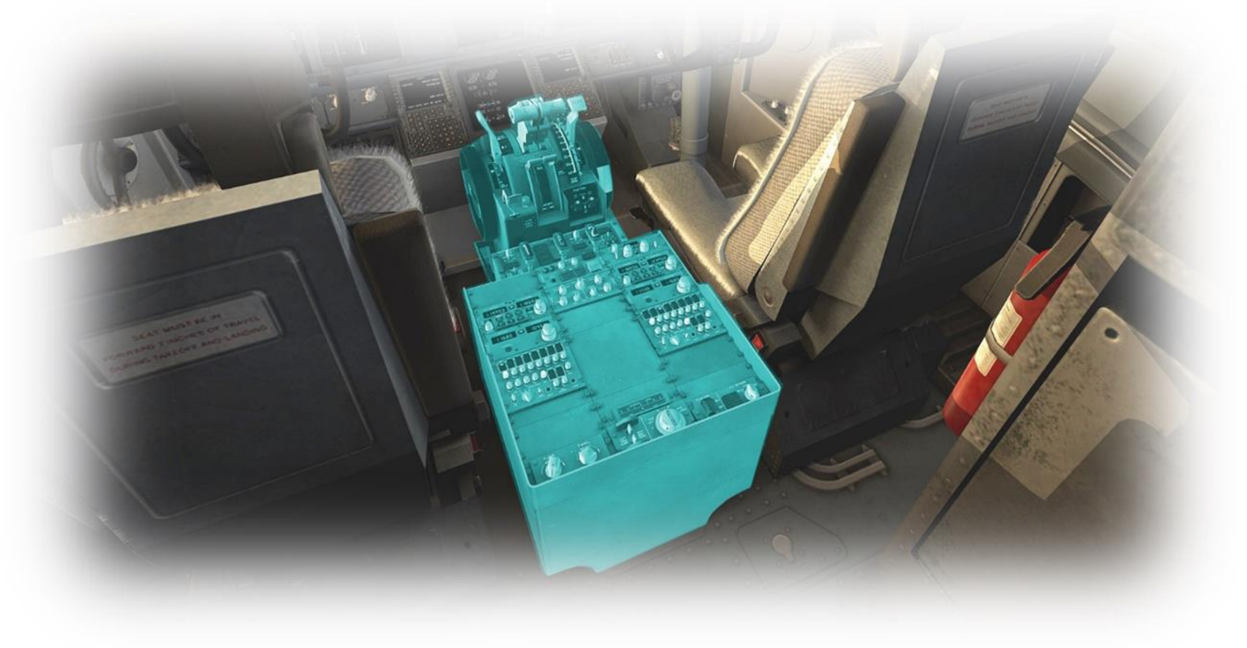


1	N2	N2 Fan rotation speed, as a percentage of maximum
2	FF	Fuel Flow (in lbs. per hour x 1000)
3	OIL PRESS	Engine and gearbox oil pressure (in psi)
4	OIL TEMP	Engine and gearbox oil temperature (in degrees Celsius)
5	OIL QTY	Engine and gearbox oil quantity remaining (in quarts)
6	VIB	Engine vibration expressed on a scale of 1.0 (good) to 4.0 (bad).

FMS Control Display Units (CDUs)

See the (separate) **X-Plane Flight Management System (FMS) Manual** for comprehensive instructions in relation to the function and operation of the Flight Management System installed in this aircraft.

Center Pedestal



Thrust Levers

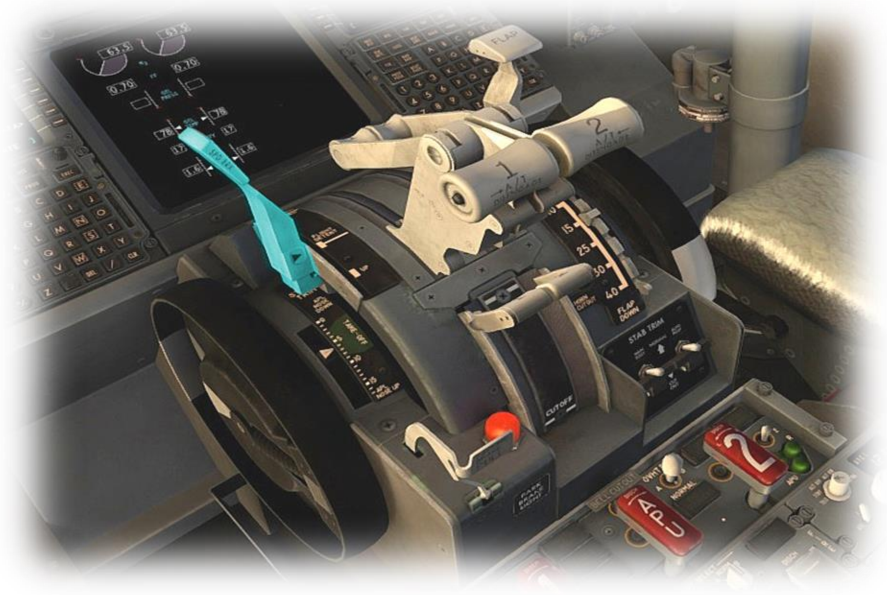
The B737-800 is equipped with dual thrust levers – which control the thrust generated by the left and right engines respectively.

Also included in this unit are (smaller) reverse-thrust levers, located behind the (larger) thrust levers.

Advance the thrust levers to increase thrust and retard them to reduce thrust.

Pull the reverse thrust levers towards you to engage reverse thrust, and back to their resting position to disengage.

Speed Brake Lever



The B737-800 is equipped with a speed brake lever, which deploys the speed brakes located on top of the wings.

Speed brakes are very effective at reducing lift generated by the wings and adding drag, and are usually deployed partially during descent, or fully at touchdown.

There are four speed brake settings…

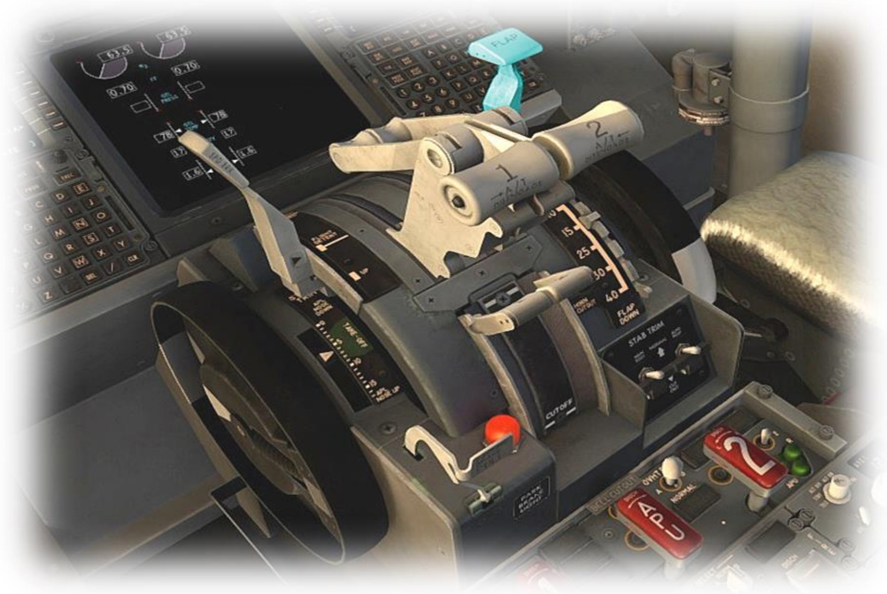
Down: Not deployed.

Armed: For automatic deployment on touchdown.

Flight Detent: Deployed to the maximum position for in-flight use.

Up: Deployed to the maximum position for ground use.

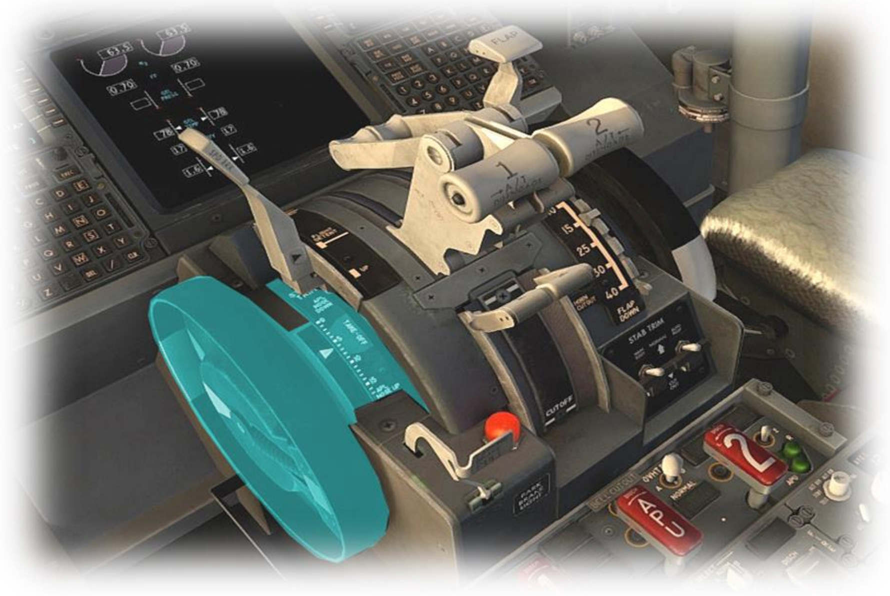
Flap Lever



The Flap Lever operates the wing flaps. Wing flaps change the contour of the wing. When extended, the flaps generate more lift, and more drag, which is beneficial during the takeoff and the landing phases of the flight.

This lever provides for a fixed position of the flaps, at 0, 1, 2, 5, 10, 15, 25, 30 and 40 degrees.

Pitch Trim Wheel

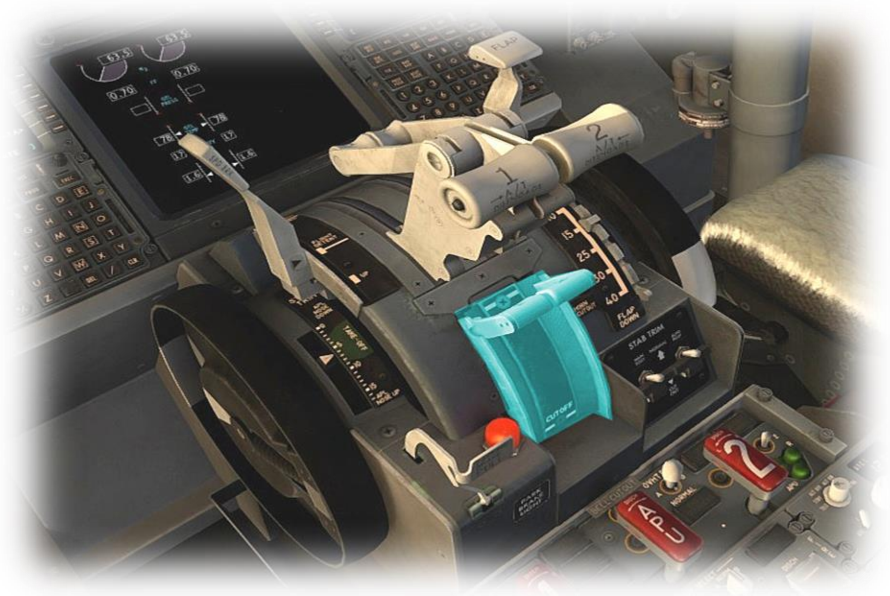


The elevator is a control surface built into the tail assembly and is used to pitch the aircraft up or down.

The Pitch Trim Wheel operates a trim tab that is built into the elevator. This control is used to relieve the pilot from continuous manual input to the elevator.

It is recommended the pilot assign an external peripheral axis to this control if one is available.

Fuel Control Levers



The Fuel Control Levers are manually actuated by the pilot to introduce fuel into the engines, or cut-off fuel from the engines.

During startup, the pilot moves the lever to the up position to introduce fuel when the jet turbine has achieved the desired rotation speed.

During shutdown, the pilot moves the lever to the down position to close the supply of fuel to the engine.

VHF (Comm) Radios

This aircraft is equipped with three communications radios - VHF 1, VHF 2 and VHF 3.

Control panels are located on either side of the center console, for access by pilot and first-officer.

Use the buttons marked VHF1/VHF2/VHF3 to connect the panel to the associated VHF radio.

Use the toggle switch located between the frequency displays to select the active frequency (indicated by a green light)

Use the rotary controls below each of the frequency displays to change the frequency. The outer-rotary changes the numeric value, and the inner-rotary changes the decimal value.

See: Audio Control

NAV Radios

This aircraft is equipped with two NAV radios – NAV 1 and NAV2.

Control panels are located on either side of the center console, for access by pilot and first-officer.

Use the toggle switch located between the frequency displays to select the active frequency (indicated by a green light)

Use the rotary controls below each of the frequency displays to change the frequency. The outer-rotary changes the numeric value, and the inner-rotary changes the decimal value.

See: Audio Control and EHSI Control Panel

For localizer and ILS approaches:

NAV1 works in conjunction with the pilot's EHSI, and Autopilot A.
NAV2 works in conjunction with the first-officer's EHSI, and Autopilot B.

Transponder

The transponder works in conjunction with ATC radar, to identify the aircraft to controllers. When operating in controlled airspace, each aircraft is provided with a unique transponder code to accomplish this.

Use the left outer rotary control to adjust the code in units of 1000.

Use the left inner rotary control to adjust the code in units of 100.

Use the right outer-rotary control to adjust the code in units of 10.

Use the right inner-rotary control to adjust the code in units of 1.

Use STBY when operating on the ground, and ALT ON when in flight.

Audio Control

See: Audio Control

Lighting

Use the 'FLOOD' rotary to control the overhead flood lighting for the center console.

Use the 'PANEL' rotary to control the back-lighting for the center console.

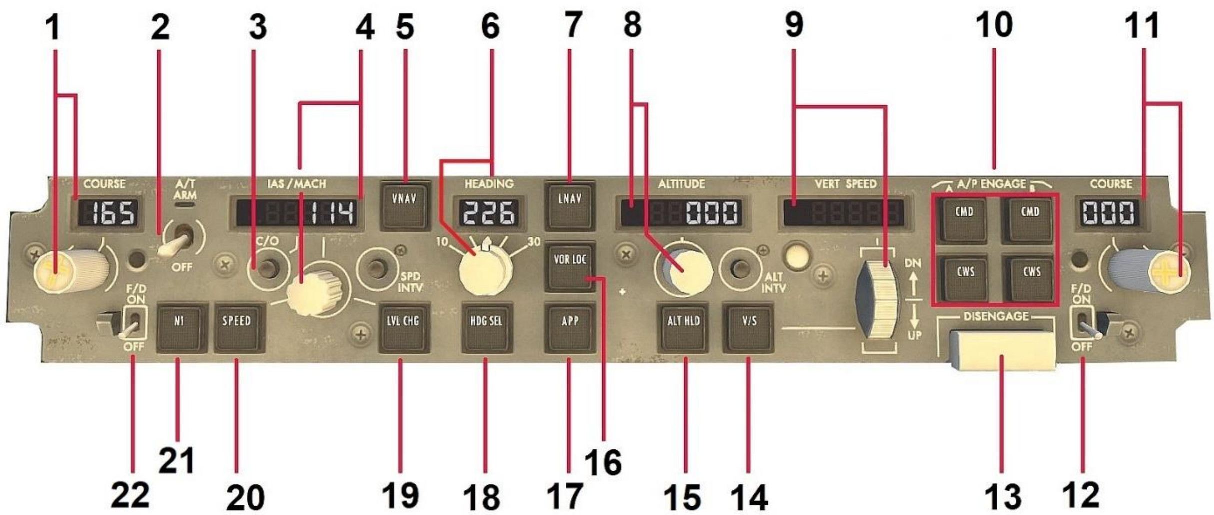
Trim

This panel features trim adjustments for roll and yaw.

Use the Left / Right wing down switch for aileron trim. (You may choose to map a joystick control to this function).

Use the Rudder rotary control for yaw trim – in accordance with the rudder trim indicator. (You may choose to map a joystick control to this function).

Autopilot Operation



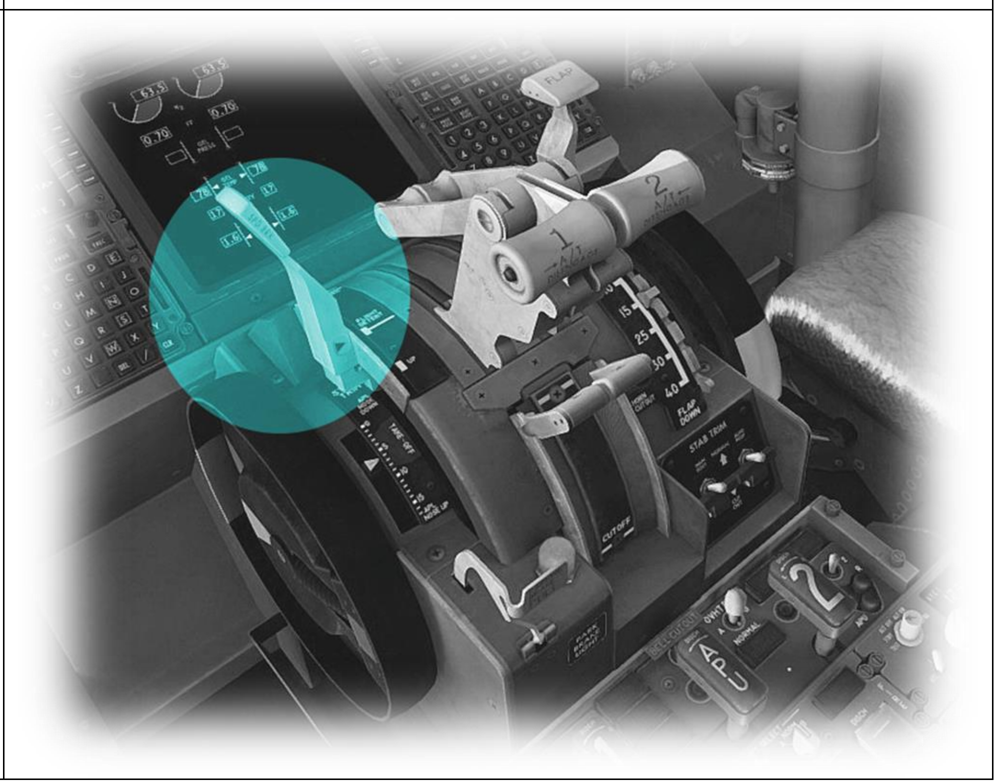
1	**Left COURSE Display and Rotary**	Used to select the desired VOR radial for the captain's EHSI. This works in conjunction with the VOR selected using the pilot's EHSI Control Panel.
2	**Auto Throttle Switch**	This switch is used in conjunction with the IAS / MACH Rotary and Display. Use this switch to toggle the Auto Throttle on, or off. When Auto Throttle is engaged, the autopilot has command of the throttles, and will govern the airspeed according to the value indicated by the IAS / MACH Display.
3	**C/O Toggle**	Toggles the IAS / MACH display units between Knots and Mach-number
4	**IAS / MACH Display and Rotary**	When used in conjunction with the Speed Button, and Auto-Throttle, the autopilot will govern the speed according to this value.
5	**VNAV Button**	**VNAV (Vertical Navigation).** The autopilot / autothrottle will follow the vertical components of your flight plan.
6	**Heading Display and Rotary**	This display is used in conjunction with the HEADING Rotary. When Heading-Select mode is engaged, the autopilot will steer the aircraft according to the value displayed here. Use the Rotary Control outer ring to adjust the bank angle / rate of turn. Use the Rotary Control inner ring to adjust the heading.
7	**LNAV Button**	**LNAV (Lateral Navigation).** The autopilot will follow the lateral components of your flight plan.

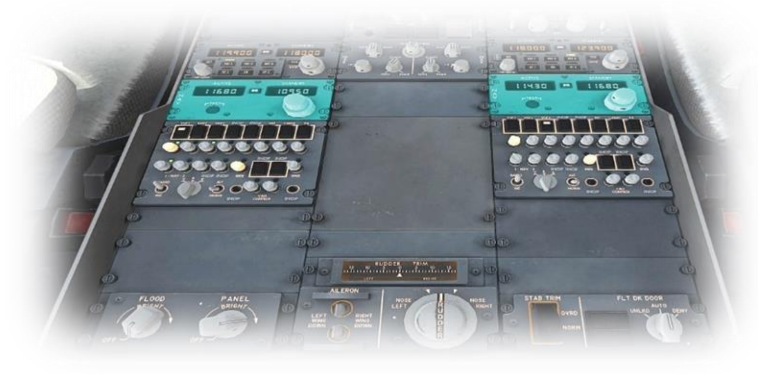
8	**Altitude Display and Rotary**	Used in conjunction with the Altitude Hold Button and Vertical Speed Button. When Altitude Hold is engaged, the autopilot will immediately level-off, and the level-off altitude will be displayed here. When Vertical Speed mode is engaged, the autopilot will ascend, or descend at the desired rate, until reaching the altitude displayed here, at which point it will level-off.
9	**Vertical Speed Display and Rotary**	When VS (Vertical Speed) Mode is engaged, the autopilot will govern the rate of ascent, or descent, according to this value.
10	**A/P ENGAGE**	The CMD buttons are used to engage the autopilot, noting there are two separate and identical systems – A, and B. Note that, after engaging the autopilot, the desired mode must still be selected subsequently. Systems A and B are normally engaged exclusively. However, when in 'auto-land' mode, both are typically engaged together, to provide redundancy in case of failure. The CWS buttons are used to engage Control Wheel Steering mode, whereby the autopilot will allow the pilot to make inputs using the control wheel, after which it will hold the resulting attitude. **CMD / A – Engages Autopilot A** **CMD / B – Engages Autopilot B** **CWS / A – Engages Autopilot A in Control Wheel Steering mode** **CWS / B – Engages Autopilot B in Control Wheel Steering mode**
11	**Right Course Display and Rotary**	Used to select the desired VOR radial for the first-officer's EHSI. This works in conjunction with the VOR selected using the first-officer's EHSI Control Panel.
12	**First-officer's Flight Director Switch**	Use this switch to toggle the 'Flight Director' display on, or off for the first-officer's EADI. The flight director computes and displays the proper pitch and bank angles required for the aircraft to follow the desired flight plan. The flight-crew can manually fly the aircraft according to the flight plan - by aligning the attitude indicator with the Flight Director pitch and bank command bars.
13	**Autopilot Disengage**	Click this button to disengage the autopilot and return full manual control to the flight crew.
14	**VS Button**	Click this button to engage **Vertical Speed Mode**. Used in conjunction with the auto-throttle, the autopilot will govern the rate of ascent, or descent, according to the value indicated by the Vertical Speed Display.
15	**ALT Hold Button**	Click this button to engage **Altitude Hold Mode**. The autopilot will level-off and hold the current altitude.
16	**VOR / LOC Button**	Click this button to engage **VOR or Localizer Mode**. The autopilot will steer the aircraft laterally to intercept and track the VOR radial, or ILS localizer that is selected via the active Nav radio.

17	**APP Button**	User in conjunction with the auto-throttle and NAV-1 radio to activate a localizer or ILS approach.
18	**HDG Select Button**	Click this button to engage **Heading Mode.** The autopilot will steer according to the Heading Display / EHSI heading bug.
19	**LVL CHG Button**	Click this button to engage **Vertical Speed Mode**. Used in conjunction with the auto-throttle, the autopilot will maintain the current airspeed while ascending, or descending to the selected altitude.
20	**Speed Button**	Click this button to engage Speed Mode. Used in conjunction with the auto-throttle, the autopilot will maintain airspeed according to the IAS / MACH Display.
21	**N1 Button**	(Not currently supported). In the real aircraft, this button causes the auto-throttles to advance to a pre-defined limit N1 (turbine) limit expressed using the FMC.
22	**Pilot's Flight Director Switch**	Use this switch to toggle the 'Flight Director' display on, or off for the first-officer's EADI. The flight director computes and displays the proper pitch and bank angles required for the aircraft to follow the desired flight plan. The flight-crew can manually fly the aircraft according to the flight plan - by aligning the attitude indicator with the Flight Director pitch and bank command bars.

Auto-Land

This aircraft is capable of full auto-land, provided the ILS in use if CAT-3 approved (check this using the X-Plane map). Establish the aircraft first on a sensible intercept for both the localizer and glide-slope, and then follow this procedure:

Select the desired speed, ARM and engage the Auto-Throttle. Even when using the auto-throttle, the selected speed must be managed by the pilot throughout the approach phase. Begin with a speed of 180 knots with no flaps deployed, and end with a speed of 140 knots with full flap deployment.	
ARM the Speed Brakes	

Tune the ILS on both NAV1 and NAV2 receivers	
Set the ILS front course on both CRS1 and CRS2 selectors	
Check both Flight Director switches (FD1 and FD2) are ON	
Engage autopilot A or B using the appropriate CMD button	
Arm APP mode	
While still above 1500 ft radar altitude, with approach mode active, engage the other autopilot (A or B) using the appropriate CMD button	

Below 1500 ft radar altitude, observe ROLLOUT and FLARE arm annunciations	
Immediately following touch-down, disable the Auto-Throttle to facilitate braking and taxi-operations	

Flight Planning

Flight planning is the process of determining a route from origin to destination that considers fuel requirements, terrain avoidance, Air Traffic Control, aircraft performance, airspace restrictions and notices to airmen (NOTAMS).

General information about flight plans is available on Wikipedia at http://en.wikipedia.org/wiki/Flight_planning

Flight plans can be generated by onboard computers if the aircraft is suitably equipped. If not, simulation pilots may elect to use an online flight planner. A web search for the phrase “Flight Planner” will yield a great many options, many of which are free services.

A good online flight planner will utilize the origin and destination airports, together with the aircraft type and equipment, the weather conditions, the chosen cruise altitude, known restrictions along the route, current NOTAMS, and other factors to generate a suitable flight plan. The waypoints incorporated into the flight plan can be subsequently input into the aircraft’s Flight Management Computer (FMS), or Global Positioning System (GPS). Some online flight planners provide the option to save the plan as an X-Plane compatible file, with an ‘fms’ extension. A saved flight plan can be loaded into the GPS or Flight Management Computer unit featured in the B737-800.

It is recommended the pilot generate a flight plan for the chosen route before using the FMS or GPS units.

Instructions for operating the Laminar Research FMS and GPS units can be found in separate (dedicated) manuals.

Fuel Calculation

Note: All calculations here are based on the X-Plane B737-800, and NOT the real-life B737-800. Differences may exist.

Load Sheet Tables

The tables below illustrate a series of hypothetical load-sheet scenarios.

For these purposes, passengers are deemed to have an average weight of 165 lbs. and the aircraft will carry a flight crew of two pilots and six cabin-crew.

These tables do not include ground operations. Add **500 lbs.** of fuel for every **10-minutes** of taxi-time.

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		10	10	10	300	300	6,870	14.7	-24
40	1,000	4,100	5,100	2,550	2,550		10	10	10	300	300	6,870	14.7	-24
60	1,000	6,150	7,150	3,575	3,575		10	10	10	300	300	6,870	14.7	-24
80	1,000	8,200	9,200	4,600	4,600		10	10	10	300	300	6,870	14.7	-24
100	1,000	10,250	11,250	5,625	5,625		10	10	10	300	300	6,870	14.7	-24
120	1,000	12,300	13,300	6,650	6,650		10	10	10	300	300	6,870	14.7	-24
140	1,000	14,350	15,350	7,675	7,675		10	10	10	300	300	6,870	14.7	-24
160	1,000	16,400	17,400	8500	8,500	400	10	10	10	300	300	6,870	14.7	-24
180	1,000	18,450	19,450	8500	8,500	2,450	10	10	10	300	300	6,870	14.7	-24
200	1,000	20,500	21,500	8500	8,500	4,500	10	10	10	300	300	6,870	14.7	-24
220	1,000	22,550	23,550	8500	8,500	6,550	10	10	10	300	300	6,870	14.7	-24
240	1,000	24,600	25,600	8500	8,500	8,600	10	10	10	300	300	6,870	14.7	-24
260	1,000	26,650	27,650	8500	8,500	10,650	10	10	10	300	300	6,870	14.7	-24
280	1,000	28,700	29,700	8500	8,500	12,700	10	10	10	300	300	6,870	14.7	-24
300	1,000	30,750	31,750	8500	8,500	14,750	10	10	10	300	300	6,870	14.7	-24
320	1,000	32,800	33,800	8500	8,500	16,800	10	10	10	300	300	6,870	14.7	-24
340	1,000	34,850	35,850	8500	8,500	18,850	10	10	10	300	300	6,870	14.7	-24
360	1,000	36,900	37,900	8500	8,500	20,900	10	10	10	300	300	6,870	14.7	-24
380	1,000	38,950	39,950	8500	8,500	22,950	10	10	10	300	300	6,870	14.7	-24
400	1,000	41,000	42,000	8500	8,500	25,000	10	10	10	300	300	6,870	14.7	-24
420	1,000	43,050	44,050	8500	8,500	27,050	10	10	10	300	300	6,870	14.7	-24

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		20	20	20	600	600	12,420	14.4	-25
40	1,000	4,100	5,100	2,550	2,550		20	20	20	600	600	12,420	14.4	-25
60	1,000	6,150	7,150	3,575	3,575		20	20	20	600	600	12,420	14.4	-25
80	1,000	8,200	9,200	4,600	4,600		20	20	20	600	600	12,420	14.4	-25
100	1,000	10,250	11,250	5,625	5,625		20	20	20	600	600	12,420	14.4	-25
120	1,000	12,300	13,300	6,650	6,650		20	20	20	600	600	12,420	14.4	-25
140	1,000	14,350	15,350	7,675	7,675		20	20	20	600	600	12,420	14.4	-25
160	1,000	16,400	17,400	8500	8,500	400	20	20	20	600	600	12,420	14.4	-25
180	1,000	18,450	19,450	8500	8,500	2,450	20	20	20	600	600	12,420	14.4	-25
200	1,000	20,500	21,500	8500	8,500	4,500	20	20	20	600	600	12,420	14.4	-25
220	1,000	22,550	23,550	8500	8,500	6,550	20	20	20	600	600	12,420	14.4	-25
240	1,000	24,600	25,600	8500	8,500	8,600	20	20	20	600	600	12,420	14.4	-25
260	1,000	26,650	27,650	8500	8,500	10,650	20	20	20	600	600	12,420	14.4	-25
280	1,000	28,700	29,700	8500	8,500	12,700	20	20	20	600	600	12,420	14.4	-25
300	1,000	30,750	31,750	8500	8,500	14,750	20	20	20	600	600	12,420	14.4	-25
320	1,000	32,800	33,800	8500	8,500	16,800	20	20	20	600	600	12,420	14.4	-25
340	1,000	34,850	35,850	8500	8,500	18,850	20	20	20	600	600	12,420	14.4	-25
360	1,000	36,900	37,900	8500	8,500	20,900	20	20	20	600	600	12,420	14.4	-25
380	1,000	38,950	39,950	8500	8,500	22,950	20	20	20	600	600	12,420	14.4	-25
400	1,000	41,000	42,000	8500	8,500	25,000	20	20	20	600	600	12,420	14.4	-25
420	1,000	43,050	44,050	8500	8,500	27,050	20	20	20	600	600	12,420	14.4	-25

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		30	30	30	900	900	17,970	14.2	-26
40	1,000	4,100	5,100	2,550	2,550		30	30	30	900	900	17,970	14.2	-26
60	1,000	6,150	7,150	3,575	3,575		30	30	30	900	900	17,970	14.2	-26
80	1,000	8,200	9,200	4,600	4,600		30	30	30	900	900	17,970	14.2	-26
100	1,000	10,250	11,250	5,625	5,625		30	30	30	900	900	17,970	14.2	-26
120	1,000	12,300	13,300	6,650	6,650		30	30	30	900	900	17,970	14.2	-26
140	1,000	14,350	15,350	7,675	7,675		30	30	30	900	900	17,970	14.2	-26
160	1,000	16,400	17,400	8500	8,500	400	30	30	30	900	900	17,970	14.2	-26
180	1,000	18,450	19,450	8500	8,500	2,450	30	30	30	900	900	17,970	14.2	-26
200	1,000	20,500	21,500	8500	8,500	4,500	30	30	30	900	900	17,970	14.2	-26
220	1,000	22,550	23,550	8500	8,500	6,550	30	30	30	900	900	17,970	14.2	-26
240	1,000	24,600	25,600	8500	8,500	8,600	30	30	30	900	900	17,970	14.2	-26
260	1,000	26,650	27,650	8500	8,500	10,650	30	30	30	900	900	17,970	14.2	-26
280	1,000	28,700	29,700	8500	8,500	12,700	30	30	30	900	900	17,970	14.2	-26
300	1,000	30,750	31,750	8500	8,500	14,750	30	30	30	900	900	17,970	14.2	-26
320	1,000	32,800	33,800	8500	8,500	16,800	30	30	30	900	900	17,970	14.2	-26
340	1,000	34,850	35,850	8500	8,500	18,850	30	30	30	900	900	17,970	14.2	-26
360	1,000	36,900	37,900	8500	8,500	20,900	30	30	30	900	900	17,970	14.2	-26
380	1,000	38,950	39,950	8500	8,500	22,950	30	30	30	900	900	17,970	14.2	-26
400	1,000	41,000	42,000	8500	8,500	25,000	30	30	30	900	900	17,970	14.2	-26
420	1,000	43,050	44,050	8500	8,500	27,050	30	30	30	900	900	17,970	14.2	-26

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		40	40	40	1200	1200	23,520	13.9	-27
40	1,000	4,100	5,100	2,550	2,550		40	40	40	1200	1200	23,520	13.9	-27
60	1,000	6,150	7,150	3,575	3,575		40	40	40	1200	1200	23,520	13.9	-27
80	1,000	8,200	9,200	4,600	4,600		40	40	40	1200	1200	23,520	13.9	-27
100	1,000	10,250	11,250	5,625	5,625		40	40	40	1200	1200	23,520	13.9	-27
120	1,000	12,300	13,300	6,650	6,650		40	40	40	1200	1200	23,520	13.9	-27
140	1,000	14,350	15,350	7,675	7,675		40	40	40	1200	1200	23,520	13.9	-27
160	1,000	16,400	17,400	8500	8,500	400	40	40	40	1200	1200	23,520	13.9	-27
180	1,000	18,450	19,450	8500	8,500	2,450	40	40	40	1200	1200	23,520	13.9	-27
200	1,000	20,500	21,500	8500	8,500	4,500	40	40	40	1200	1200	23,520	13.9	-27
220	1,000	22,550	23,550	8500	8,500	6,550	40	40	40	1200	1200	23,520	13.9	-27
240	1,000	24,600	25,600	8500	8,500	8,600	40	40	40	1200	1200	23,520	13.9	-27
260	1,000	26,650	27,650	8500	8,500	10,650	40	40	40	1200	1200	23,520	13.9	-27
280	1,000	28,700	29,700	8500	8,500	12,700	40	40	40	1200	1200	23,520	13.9	-27
300	1,000	30,750	31,750	8500	8,500	14,750	40	40	40	1200	1200	23,520	13.9	-27
320	1,000	32,800	33,800	8500	8,500	16,800	40	40	40	1200	1200	23,520	13.9	-27
340	1,000	34,850	35,850	8500	8,500	18,850	40	40	40	1200	1200	23,520	13.9	-27
360	1,000	36,900	37,900	8500	8,500	20,900	40	40	40	1200	1200	23,520	13.9	-27
380	1,000	38,950	39,950	8500	8,500	22,950	40	40	40	1200	1200	23,520	13.9	-27
400	1,000	41,000	42,000	8500	8,500	25,000	40	40	40	1200	1200	23,520	13.9	-27
420	1,000	43,050	44,050	8500	8,500	27,050	40	40	40	1200	1200	23,520	13.9	-27

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		50	50	50	1500	1500	29,070	13.8	-28
40	1,000	4,100	5,100	2,550	2,550		50	50	50	1500	1500	29,070	13.8	-28
60	1,000	6,150	7,150	3,575	3,575		50	50	50	1500	1500	29,070	13.8	-28
80	1,000	8,200	9,200	4,600	4,600		50	50	50	1500	1500	29,070	13.8	-28
100	1,000	10,250	11,250	5,625	5,625		50	50	50	1500	1500	29,070	13.8	-28
120	1,000	12,300	13,300	6,650	6,650		50	50	50	1500	1500	29,070	13.8	-28
140	1,000	14,350	15,350	7,675	7,675		50	50	50	1500	1500	29,070	13.8	-28
160	1,000	16,400	17,400	8500	8,500	400	50	50	50	1500	1500	29,070	13.8	-28
180	1,000	18,450	19,450	8500	8,500	2,450	50	50	50	1500	1500	29,070	13.8	-28
200	1,000	20,500	21,500	8500	8,500	4,500	50	50	50	1500	1500	29,070	13.8	-28
220	1,000	22,550	23,550	8500	8,500	6,550	50	50	50	1500	1500	29,070	13.8	-28
240	1,000	24,600	25,600	8500	8,500	8,600	50	50	50	1500	1500	29,070	13.8	-28
260	1,000	26,650	27,650	8500	8,500	10,650	50	50	50	1500	1500	29,070	13.8	-28
280	1,000	28,700	29,700	8500	8,500	12,700	50	50	50	1500	1500	29,070	13.8	-28
300	1,000	30,750	31,750	8500	8,500	14,750	50	50	50	1500	1500	29,070	13.8	-28
320	1,000	32,800	33,800	8500	8,500	16,800	50	50	50	1500	1500	29,070	13.8	-28
340	1,000	34,850	35,850	8500	8,500	18,850	50	50	50	1500	1500	29,070	13.8	-28
360	1,000	36,900	37,900	8500	8,500	20,900	50	50	50	1500	1500	29,070	13.8	-28
380	1,000	38,950	39,950	8500	8,500	22,950	50	50	50	1500	1500	29,070	13.8	-28
400	1,000	41,000	42,000	8500	8,500	25,000	50	50	50	1500	1500	29,070	13.8	-28
420	1,000	43,050	44,050	8500	8,500	27,050	50	50	50	1500	1500	29,070	13.8	-28

Flight Time (Minutes)	T/O and Climb Fuel	Cruise Fuel (lbs.)	Total Fuel	Left Wing Tank (lbs.)	Right Wing Tank (lbs.)	Center Tank (lbs.)	PAX Fwd	PAX Mid	PAX Aft	Cargo Fwd	Cargo Aft	Payload (lbs.)	CG %MAC	CG X-Plane (in.)
20	1,000	2,050	3,050	1,525	1,525		60	60	60	1800	1800	34,620	13.6	-29
40	1,000	4,100	5,100	2,550	2,550		60	60	60	1800	1800	34,620	13.6	-29
60	1,000	6,150	7,150	3,575	3,575		60	60	60	1800	1800	34,620	13.6	-29
80	1,000	8,200	9,200	4,600	4,600		60	60	60	1800	1800	34,620	13.6	-29
100	1,000	10,250	11,250	5,625	5,625		60	60	60	1800	1800	34,620	13.6	-29
120	1,000	12,300	13,300	6,650	6,650		60	60	60	1800	1800	34,620	13.6	-29
140	1,000	14,350	15,350	7,675	7,675		60	60	60	1800	1800	34,620	13.6	-29
160	1,000	16,400	17,400	8500	8,500	400	60	60	60	1800	1800	34,620	13.6	-29
180	1,000	18,450	19,450	8500	8,500	2,450	60	60	60	1800	1800	34,620	13.6	-29
200	1,000	20,500	21,500	8500	8,500	4,500	60	60	60	1800	1800	34,620	13.6	-29
220	1,000	22,550	23,550	8500	8,500	6,550	60	60	60	1800	1800	34,620	13.6	-29
240	1,000	24,600	25,600	8500	8,500	8,600	60	60	60	1800	1800	34,620	13.6	-29
260	1,000	26,650	27,650	8500	8,500	10,650	60	60	60	1800	1800	34,620	13.6	-29
280	1,000	28,700	29,700	8500	8,500	12,700	60	60	60	1800	1800	34,620	13.6	-29
300	1,000	30,750	31,750	8500	8,500	14,750	60	60	60	1800	1800	34,620	13.6	-29
320	1,000	32,800	33,800	8500	8,500	16,800	60	60	60	1800	1800	34,620	13.6	-29
340	1,000	34,850	35,850	8500	8,500	18,850	60	60	60	1800	1800	34,620	13.6	-29
360	1,000	36,900	37,900	8500	8,500	20,900	60	60	60	1800	1800	34,620	13.6	-29
380	1,000	38,950	39,950	8500	8,500	22,950	60	60	60	1800	1800	34,620	13.6	-29
400	1,000	41,000	42,000	8500	8,500	25,000	60	60	60	1800	1800	34,620	13.6	-29
420	1,000	43,050	44,050	8500	8,500	27,050	60	60	60	1800	1800	34,620	13.6	-29

Setting the Weight, Balance and Fuel in X-Plane

After calculating your fuel requirements (see Fuel Calculation) and referencing the Load Sheet Tables, you are ready to configure the weight, balance and fuel for your upcoming flight. Select the B737-800 from the flight menu, and click on the 'Customize' button, followed by the 'Weight, Balance & Fuel' button. Now input the Center of Gravity, Payload Weight, Fuel Weight (Fuel Tank 1) and Fuel Weight (Fuel Tank 2) and Fuel Weight (Fuel Tank 3).

The example below is for the scenario highlighted in blue in the Load Sheet Tables.

Checklists

The following check lists are designed with the convenience of the simulation pilot in mind and customized to the X-Plane B737-800 aircraft. These differ from those of the real aircraft.

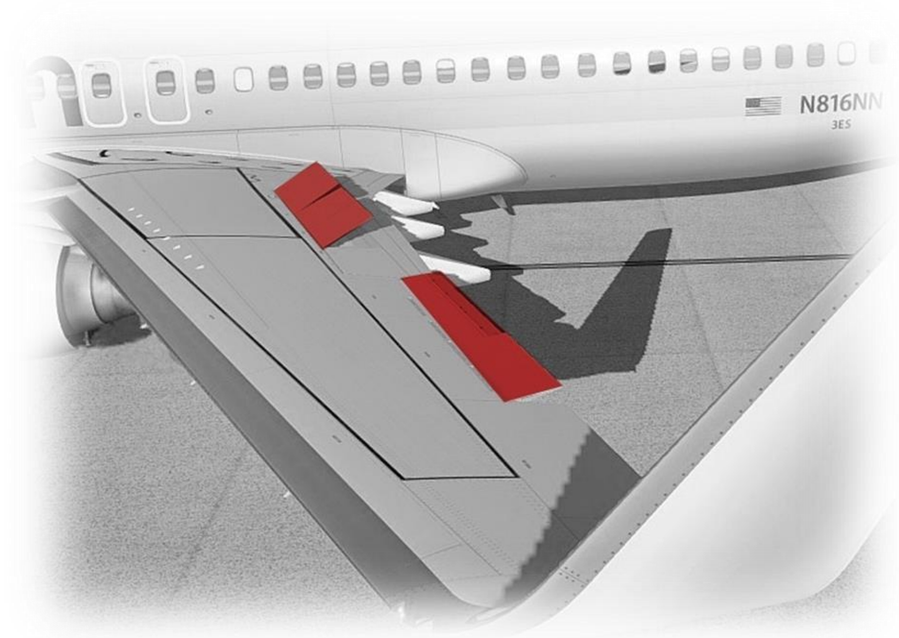
Pre-Flight Exterior Inspection

A Pre-Flight Inspection should always precede flight in any aircraft. The purpose of this inspection is to ensure the aircraft is in a state of readiness for the upcoming flight.

In X-Plane, a pre-flight inspection is not merely undertaken to simulate reality, but does in fact have real purpose, because the control surfaces of the aircraft interact directly with the airflow over and around them, just as in real life. As such, correct movement of all control surfaces is necessary for normal flight.

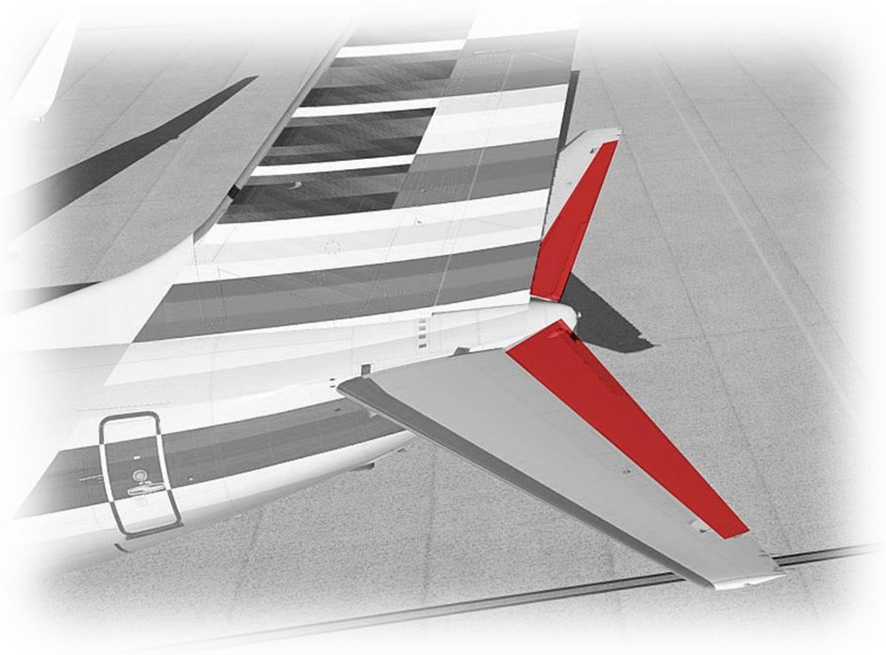
Hold roll axis at full deflection.

Visually check corresponding movement of ailerons and speed-brakes.



Hold pitch axis at full deflection.

Visually check corresponding movement of elevators.

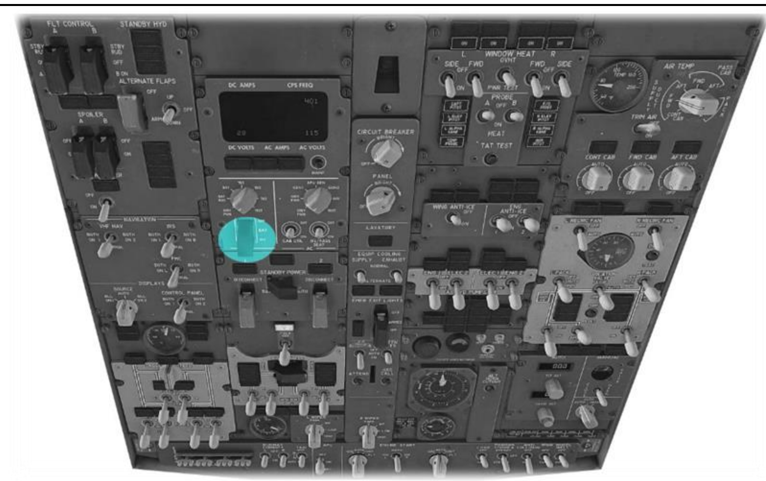
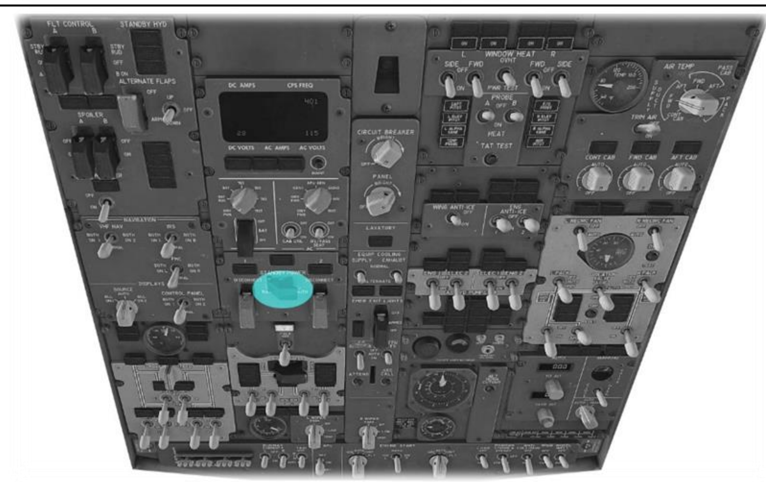


Hold yaw axis at full deflection.

Visually check corresponding movement of rudder.

Cold and Dark to Engine Start

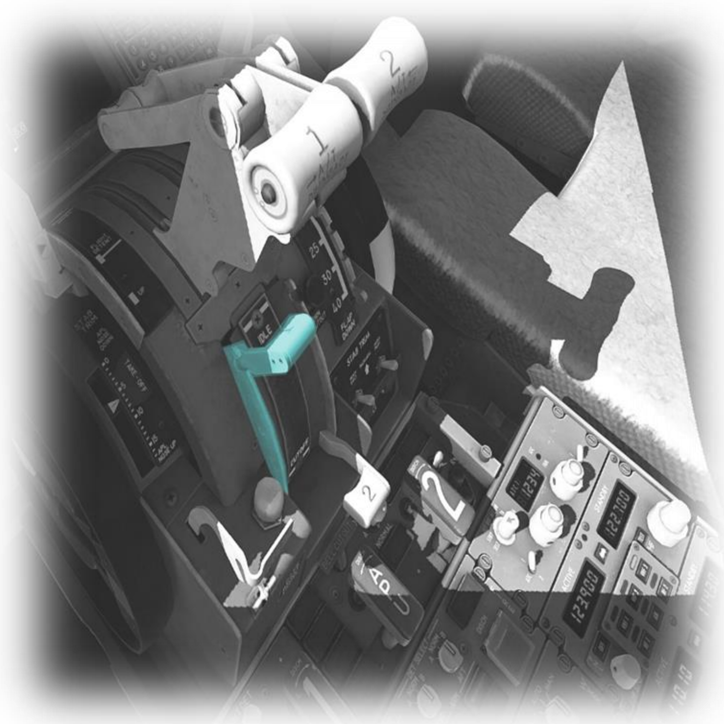
The following check list is a sub-set of the real procedures, and includes only the essential steps leading to engine start:

PARKING BRAKE – ON	
BATTERY MASTER – ON	
STANDBY POWER – ON	

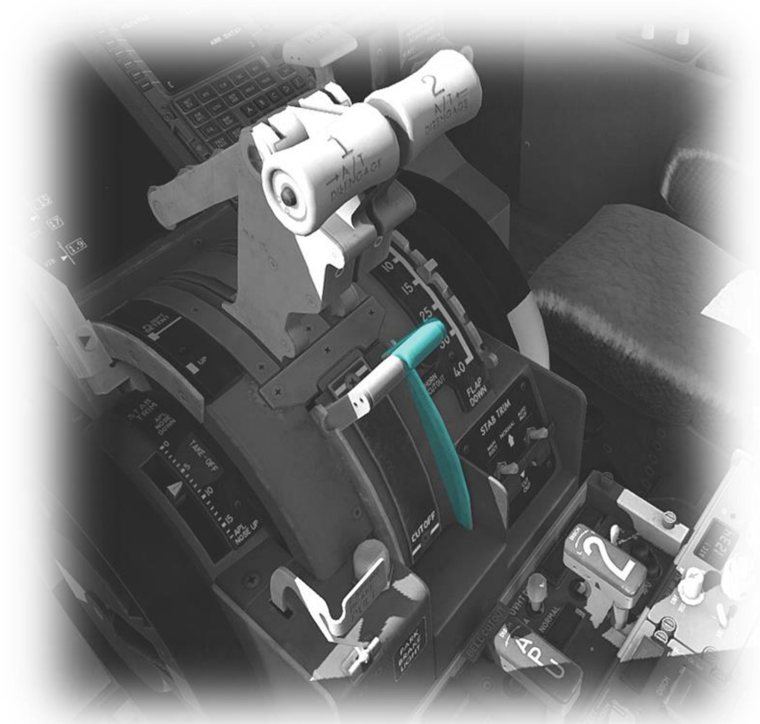
GROUND POWER – ON	
APU – START *Move switch to START, then release to ON.* *Wait for Blue Light illumination on APU panel.*	
APU GENERATOR 1 – ON APU GENERATOR 2 – ON	

GROUND POWER – OFF	
AFT & FWD FUEL PUMPS 1 – ON AFT & FWD FUEL PUMPS 2 – ON	
APU BLEED - ON	

HYDRAULIC PUMPS A & B – ON ELECTRICAL PUMPS A & B – ON	
ENGINE 1 – GRD (GROUND)	

Wait until OIL FILTER BYPASS And LOW OIL PRESSURE extinguish.	
ENGINE 1 FUEL CONTROL LEVER – UP (ON)	

<table>
<tr><td>ENGINE 2 – GRD (GROUND)</td><td></td></tr>
<tr><td>Wait until
OIL FILTER BYPASS
And
LOW OIL PRESSURE
extinguish.</td><td>
</td></tr>
</table>

ENGINE 2 FUEL CONTROL LEVER – UP (ON)	
(ENGINE) GENERATOR 1 – ON (ENGINE) GENERATOR 2 – ON APU GENERATOR 1 – OFF APU GENERATOR 2 – OFF	

APU BLEED - OFF	
APU – OFF	

Before Taxi

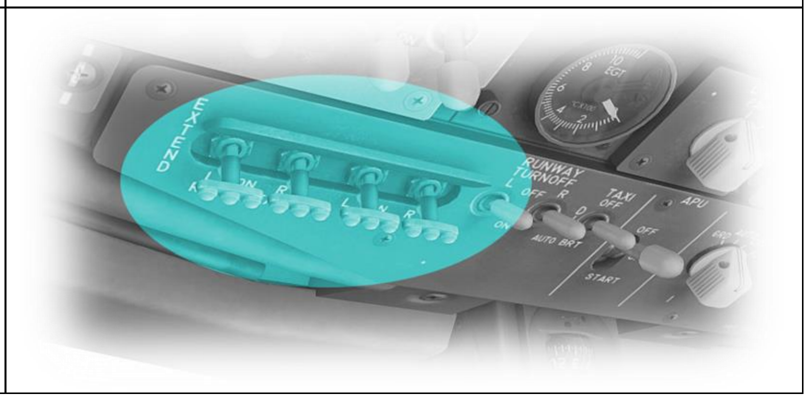
SEATBELT SIGN - ON	
ELEVATOR TRIM – SET FOR TAKEOFF (+ 10 Degrees)	

FLAPS – SET (5 Degrees)	
FLIGHT CONTROLS – CHECKED (Pitch / Roll / Yaw) See: Assigning peripheral devices	

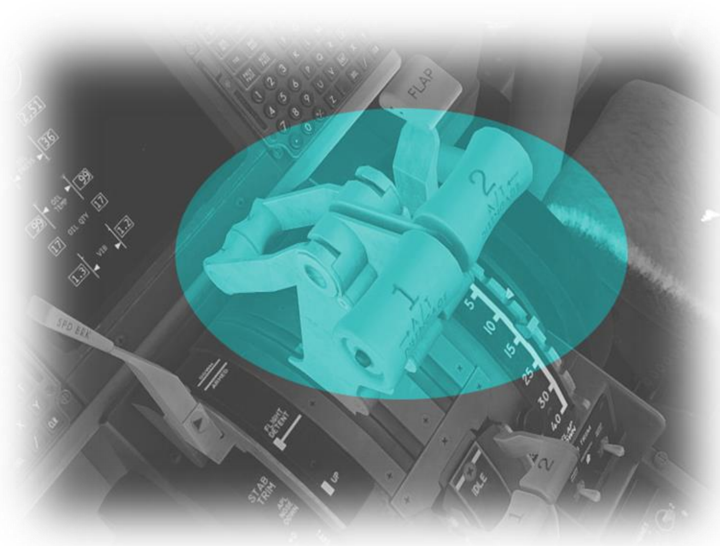
<table>
<tr><td>TAXI LIGHTS - ON</td><td></td></tr>
<tr><td>TRANSPONDER – ALT OFF</td><td>
</td></tr>
<tr><td>PARKING BRAKE – OFF</td><td></td></tr>
</table>

Before Takeoff

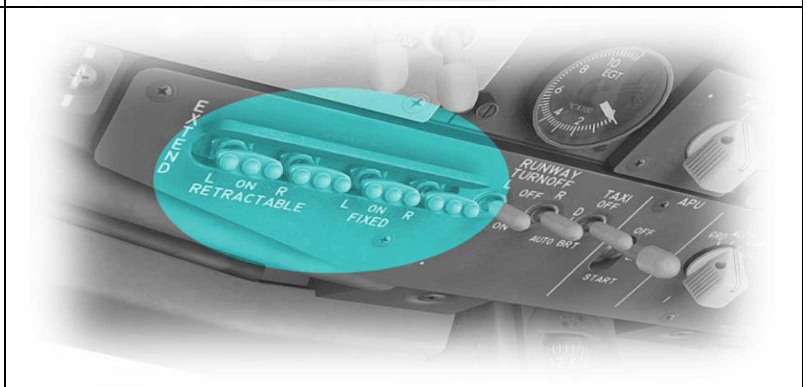
<table>
<tr><td>ALTIMETER - SET</td><td>
</td></tr>
<tr><td>TRANSPONDER – ALT ON</td><td>
</td></tr>
<tr><td>LANDING LIGHTS – ON

(TAXI LIGHTS – OFF)</td><td>
</td></tr>
</table>

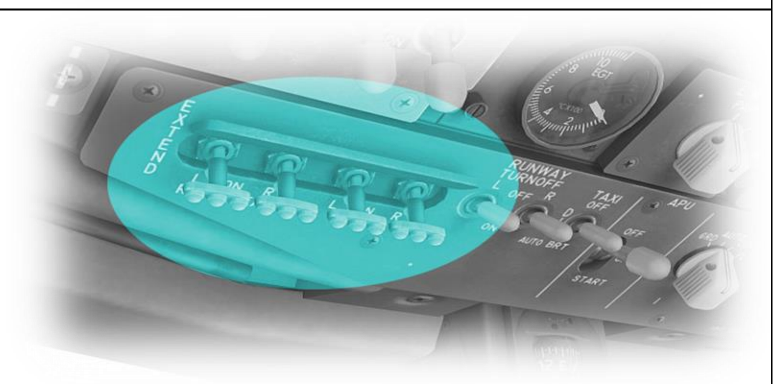
After Takeoff

LANDING GEAR – UP	
FLAPS – RETRACTED	
THRUST – SET AS REQUIRED	

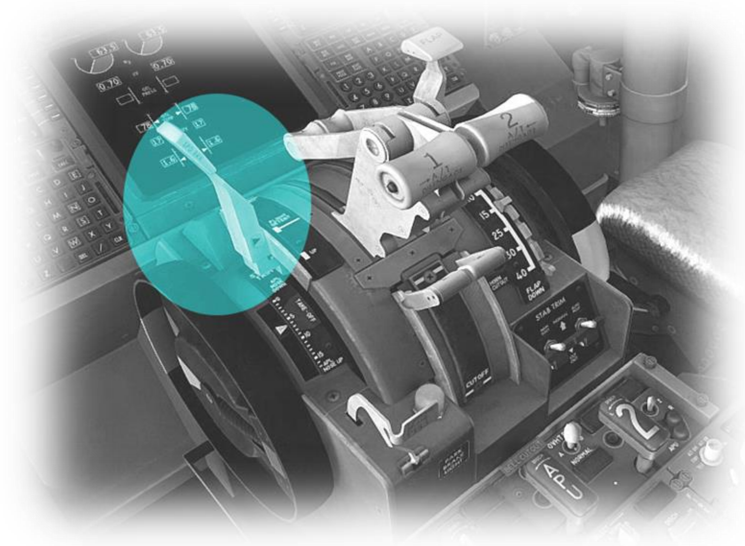
Cruise

SEATBELT SIGN - OFF	
WING / LANDING LIGHTS - OFF	
ALTIMETER - SET	

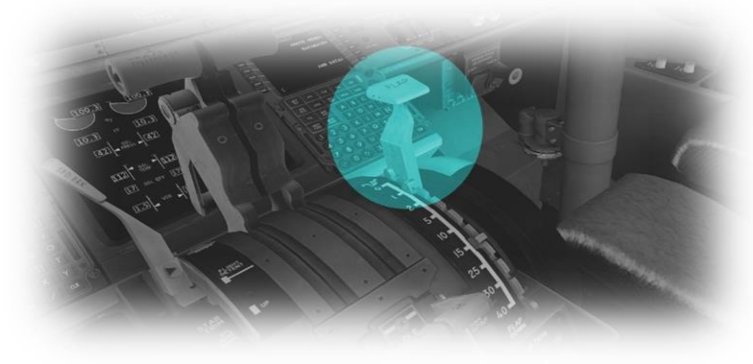
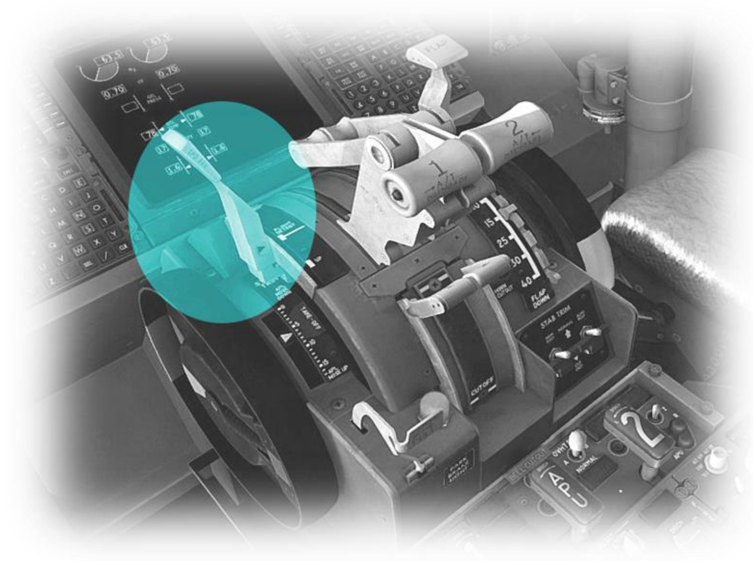
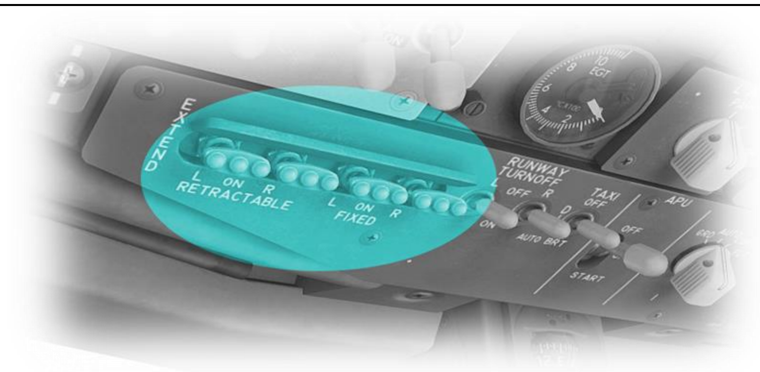
Before Landing

SEATBELT SIGN - ON	
ALTIMETER - SET	
WING / LANDING LIGHTS - ON	

Landing

SPEED BRAKES – SET AS REQUIRED	
FLAPS – SET AS REQUIRED	
LANDING GEAR – DOWN	

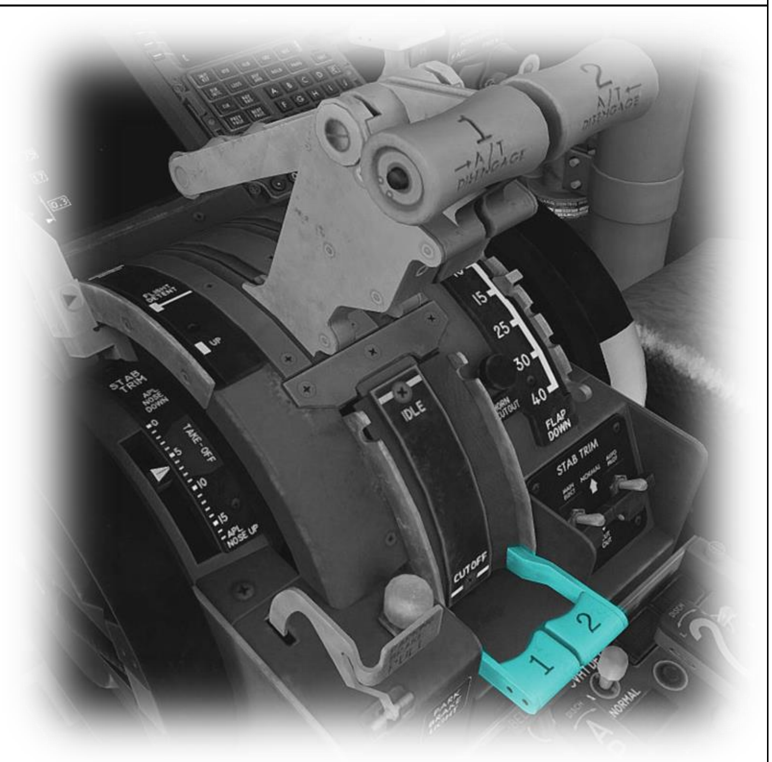
After Landing

FLAPS – RETRACTED	
SPEED BRAKES – RETRACTED	
WING / LANDING LIGHTS - OFF	

TRANSPONDER – ALT OFF	

Parking

PARKING BRAKE – ON	
SEATBELT SIGN - OFF	
TRANSPONDER – STBY (Standby)	

(ENGINE) GENERATOR 1 – OFF (ENGINE) GENERATOR 2 – OFF	
FUEL CONTROL LEVERS – DOWN (OFF)	

HYDRAULIC PUMPS A & B – OFF ELECTRICAL PUMPS A & B – OFF	
AFT & FWD FUEL PUMPS 1 – OFF AFT & FWD FUEL PUMPS 2 – OFF	
STANDBY POWER – OFF	

BATTERY MASTER – OFF