

The TinMouse II Version 1.30 readme and Manual

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This free add-on was designed for Microsoft FS9/FS2004 “A Century of Flight” and from release 1.30, also for FSX.

For a summary of new additions with version 1.30, see the end of this document.

IMPORTANT: The TinMouse II panel requires two third-party modules to be present to function in both FS9 and FSX.). FS2Audio.dll, supplied with the TinMouse II package, must be placed in the Windows\System32 directory, and on 64-bit operating systems, also in the Windows\sysWOW64 directory. A full registered copy of FSUIPC is required (3.70 or later for FS9, 4.60 or later for FSX).

Beginning with version 1.30, FSSound.dll is no longer needed or used. We thank Daniel Steiner for the many years of good use of his free audio module for FS9.

The latest version of FSUIPC may be obtained from: <http://www.schiratti.com/dowson.html>

Installation: Unpack the archive keeping the directory structure intact. Place the folders into the FS9 or FSX directory using the same folders and overwriting any old files when prompted...i.e. everything in \aircraft should go into the <your FS9 directory>\aircraft\ or <your FSX directory>\Simobjects\aircraft folder. The \aircraft\fsfsconv\panel.B732ADV folder should not be renamed. The panel (not aircraft) sounds are contained in the three files TMSoundBank.xsb, TMWavebank.xwb, and TMPanelSound.xgs. All three of these files must be placed into the FS9 and/or FSX sound folder. Sounds are not directly editable in this format.

Users of previous versions of the TinMouse II can use their repaints. **Users of earlier versions should save a backup of their aircraft.cfg file before installing V1.30 so they can transfer the [fltsim.xxx] sections for any repaints they may have installed.** The models in the FS9 and FSX version of the package are identical, and repaints work for both. The models have not changed since the first release of the TinMouse II.

In addition to the included models, the TinMouse II panel also includes a config file to integrate the freeware FFX model by Erik Cantu. The panel gauge detects which model is in use and sends the appropriate controls to work the animations in either the TinMouse or FFX/Cantu models.

Additionally, a single CIVA Litton INS unit or the ISG implementation of the Honeywell XLSGNS or Smiths RNAV unit are supported and integrated into the panel. The (freeware) CIVA unit or the (payware) ISG RNAV must be obtained and installed separately. Run the CIVA installer and load into its default location. The panel works fine without the INS or RNAV installed, and/or with it installed and turned off. **The TinMouse II – CIVA integration only works with version 1.50 or later of the CIVA INS gauge. Earlier versions of the CIVA work but will not communicate with the panel.**

The standard configuration for this panel supports Terry Gaff's (included) models with Gustavo Rodrigues's FDE, and Christoffer Petersen's sound set. A second supplied aircraft.cfg file is provided for the widely available FFX/Eric Cantu freeware model.

This simulation closely models the systems in the real B737-200ADV. Users wishing to understand Boeing 737 systems operation are encouraged to visit Chris Brady's 737 website (<http://www.b737.org.uk>) for a wealth of detail on the airplane and its operation.

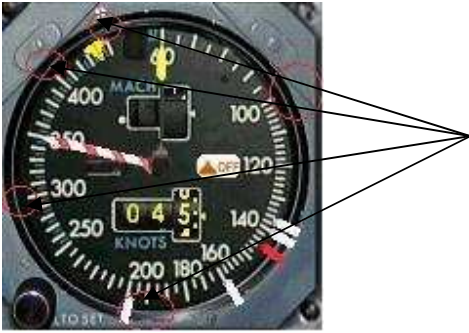
0. Internal selection of JT8D-9 and JT8D-15 engine variants, in addition to the JT8D-17R modeled in the first TinMouse II version, is supported. By placing the text "JT8D-9" or "JT8D-15" anywhere in the title= line in the aircraft.cfg [fltsim.x] section, the panel will make the necessary changes to model the dynamics and characteristics of the selected engine.

1. Metric fuel quantity and fuel flow gauges are now selectable by placing the text (without quotes) "KGS" in the title= line of each aircraft where they are desired. Similarly, the text "-MB" will change the altitude alert gauge to use millibars/hectopascals instead of inches of mercury.

Example of a Lufthansa B732 with -15 engines, metric gauges, and an altitude alerter set in mb:

```
[fltsim.2]
title=Boeing 737-200 Lufthansa JT8D-15 KGS -MB
sim=737-200adv
model=PHK
panel=
sound=
texture=LH
kb_checklists=Boeing737-200_check
kb_reference=Boeing737-200_ref
atc_id=D-ABFP
atc_airline=Lufthansa
atc_flight_number=541
ui_manufacturer=Boeing
ui_type="737-200"
ui_variation=Lufthansa
description="Boeing 737-230 ADV with JT8D-15A engines and metric gauges\n"
```

2. Airspeed autobug scheduling has been implemented into the ASI for SP77-equipped (original version) panels, and manual clickspots have been added to allow adjustment/setting of the bugs manually. Clicking in the center of the ASI dial face sets the bugs...for takeoff if acft is on the ground, for landing if in the air. Multiple clicks will scroll through the available flap settings. The invisible clickspots are located on the outer ring of the ASI where the bugs are, just outside the 100-200-300-400-450 KIAS marks. Bug 1 is controlled by the clickspot at 100KIAS, Bug 2 at 200KIAS etc. For takeoff, the bugs are set to: V1 Vr V2 V2+15 and flaps-up maneuvering speed. For landing, the bugs are set to Vref (bug 2 adjacent to bug 1) approach target speed, Vref+15, and flaps-up maneuvering speed. You can set the bugs with the auto-set feature by clicking on the instrument face and then adjust (i.e. for gusts).

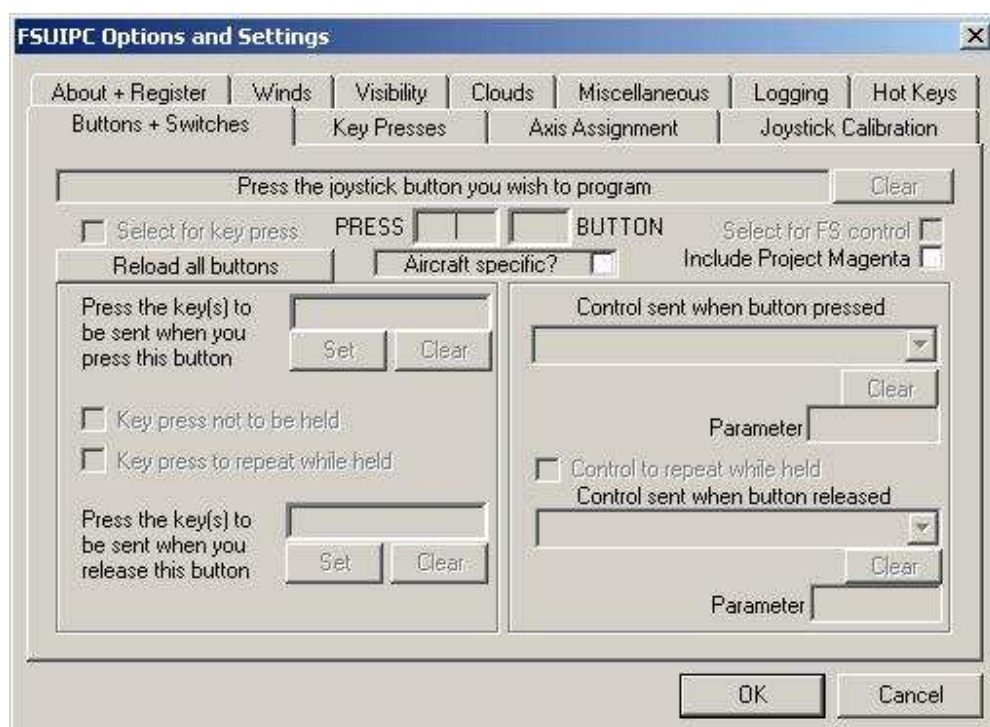


3. The Performance Data Computer System (PDCS) is partially modeled. It functions in most (but not all) modes. The EPR and airspeed autobugs (SP77 version only) are both controlled by the PDCS. See the included file PDCS.doc for detailed operation instructions. Cruise modes are modeled based on flight test data for speed ranges of 260-340 KIAS (10,000 ft – FL230) and mach 0.70 – 0.78 (FL 240 and above).



4. A throttle lock and throttle trim feature has been added to allow precise manual control of power settings. The throttle trim can be engaged with an invisible clickspot in the lower left corner of the #1 EPR gauge, or through use of FSUIPC-programmed buttons (available with registered version of FSUIPC only). When the throttle trim is engaged by clicking/pressing a button in either direction (up/down) the joystick throttle input is temporarily locked out and the power setting may be adjusted in fine increments with the mouse or buttons. To disengage, simply move the throttle lever a short distance from the position it was in when trim was engaged and throttle trim will disengage and return control to the throttle. When on the ground, the throttle trim can command reverse thrust, so the same button programmed for down throttle trim can also be used to engage proportional reverse thrust when landing. Just move the throttle up out of idle a ways to bring the reversers quickly out of reverse.

Programming buttons for throttle trim. This is best done with a 3-position rocker type switch like on the PFC yokes, or the radio slider switch on the Thrustmaster Cougar for example. One button is programmed for throttle trim up, the other for throttle trim down. If you only have a single button, you can program it for throttle trim down only...set the throttle above the setting desired and use trim down to reduce the setting precisely. This also preserves the ability to use it for reversers on the ground. In FS, click on the Modules menu, and open FSUIPC. Select the "Buttons + Switches" tab:



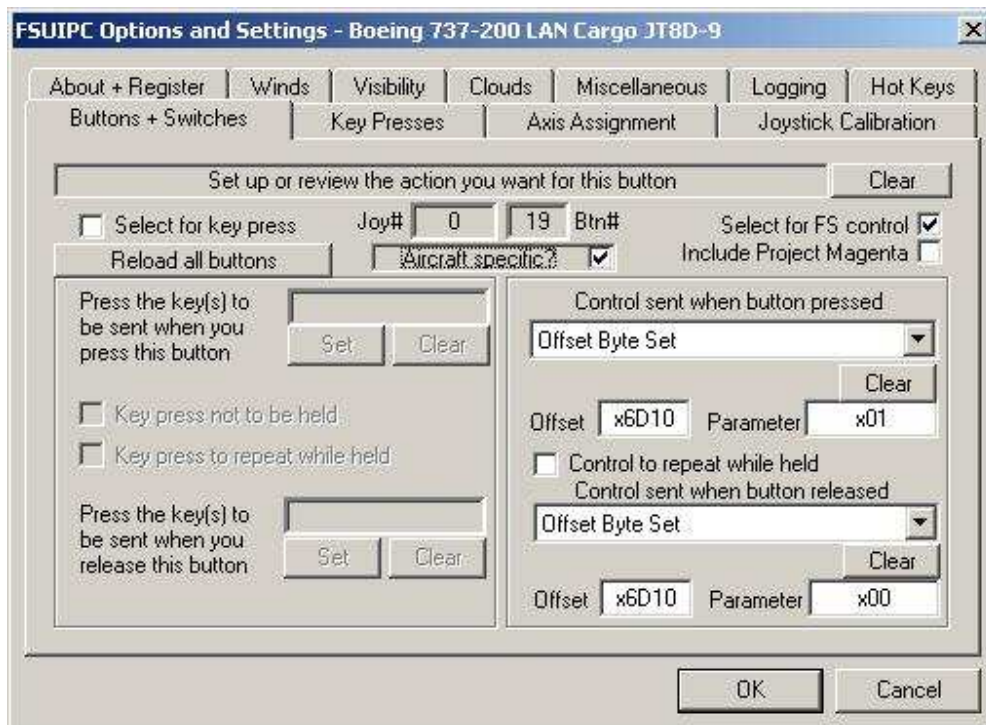
If you want to program this button **ONLY** for this aircraft, check the "Aircraft Specific" box.

Now press the button you want to program for Throttle Trim UP. FSUIPC will detect and show the button details.

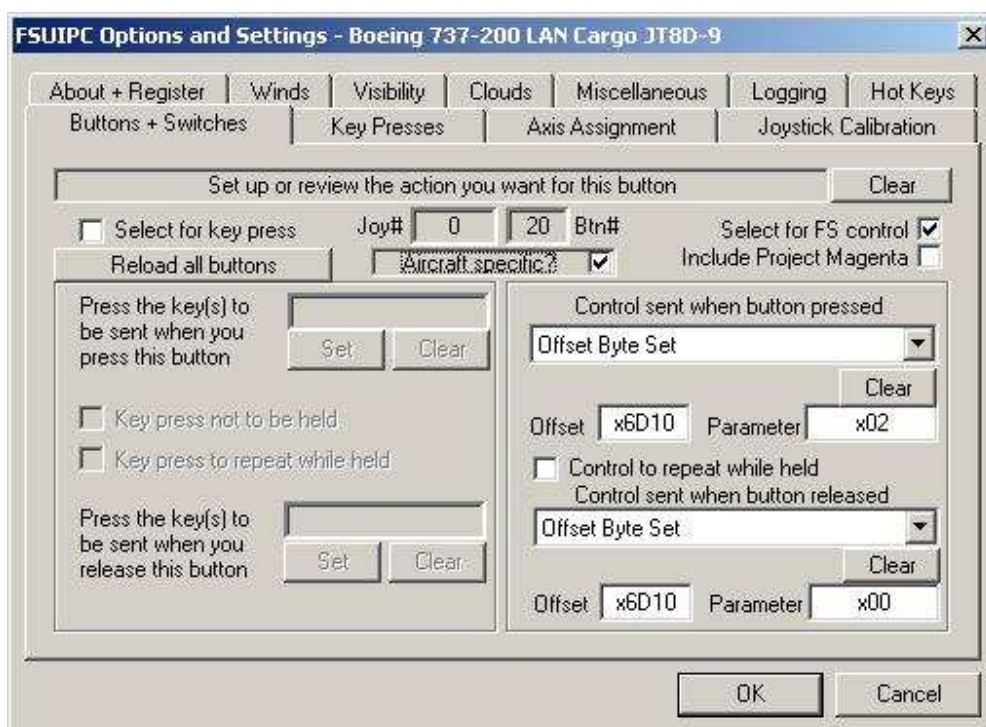
On the right, check the "Select FS Control" Box, and select "Offset Byte Set" in the "Control sent when button pressed" dropdown menu. In the Offset box, type in "6D10" and in parameter type in "1".

You're **NOT** done yet.

Under “Control sent when button released” select “Offset Byte Set” again, offset 6D10, and now place “0” in the second parameter box. Click OK.



Now do the same for the Throttle trim DOWN button, **except the first parameter box is set to “2”** instead of 1.



5. Configuration and a custom center pedestal bitmap has been supplied for users of the RealityXP (tm) WX-500 weather radar. See the commented section of the panel.cfg files in the FS9\fsfsconv\panel.b732adv folder.
6. Flap sounds have been integrated directly in the gauge.
7. Bug fixes and major revision of the pressurization system logic. The max selectable flight altitude is now 35000 for the JT8D-9 powered acft, and 37000 for the -15 and -17 birds per their respective flight manuals.
8. Detailed performance profiles were developed for users of Ernie Alston's FSBuild flight planning software. They are available under the aircraft performance data link on <http://www.fsbuild.com> The raw flight test data used to build those profiles is available to anyone who wishes to write a custom fuel planner.

Basic features

1. Fuel panel - proper feed and crossfeed behavior, and appropriate power sources for all the boost pumps. It also features simulated asymmetric feeding from center tank when climbing with less than 2000 lbs in the center tank (real world misbehavior).
2. CIVA Litton INS integration with CDI indications and leg distance on HSI. The NAV/RAD button near the lower right corner of the HSI switches the HSI source between nav radios and the INS. [SP-77] With "NAV" (INS) selected and a valid active leg, the INU drives the heading mode of the autopilot (but not the HSI heading bug, which can be set independently while in (L)NAV mode). **[SP-177] The Litton INS is fully integrated with the SP-177 MCP. Selection of "LNAV" on the MCP with a valid leg active in the INS will couple the autopilot to the INS, and illuminate the LNAV annunciator on the APD. Selection of LNAV display on the HSI is accomplished independently with the aforementioned Nav/Rad button.** The Litton MSU is located in the upper left corner of the overhead panel. The CDU is located on the fwd center console panel next to the radar. No backlighting is available for the INS panels at the present time. For operating instructions see the CIVA docs (www.simufly.com).
3. Electrical system - nearly all of the electrical busses and many of their interdependencies are simulated, including simulation of AC load/DC current. Clicking on the "gnd power available" light located at top center of the generator panel while on the ground with the parking brake set makes a request for gnd power connect/disconnect, which occurs ~30 sec after the request.
4. Engine instruments sourced to proper electrical bus and failure mode. AC instruments freeze, DC instruments go to 0 when depowered.
5. Hydraulic systems are now modeled and tied to proper sources. Pump spinup and system pressure bleed down times are modeled. A digital hydraulic/brake pressure display is provided.
6. Flight control shutoffs and alternate flap extension are modeled. Alternate gear extension is not modeled...yet. Manual reversion (cables only with no hydraulics) flight control is simulated with loss of all hydraulic power to flight controls.

7. Pneumatic system simulated, with duct pressures modeled to respond to source/load configuration, including effects of engine RPM on bleed pressure. External air is not yet modeled, so engine starts require APU bleed air.
8. Pressurization controller modeled in auto, standby, and manual modes. Altitude set knobs increment/decrement (decrement clickspot on left side of knob, increment on right side) by 1000 with a right click, by 100 with a left click. Clicking on the center of the silvered FLT ALT knob simulates pushing the knob (reset function). Aircraft will not pressurize with the doors open. Cabin Alt warning horn works, and sounds same as the gear horn. Smoke clearance switch shuts down one pack and gradually depressurizes to ~10,000 ft cabin alt in order to evacuate smoke from the jet.
9. Anti/de-icing panels modeled and tied to proper electrical sources.
10. Wing/engine anti-ice modeled to include all the various valves in the system.
11. Door panel modeled with clickspot over fwd entry door light that will open the main door. On the Terry Gaff/Flight1 model, right-clicking the door light deploys the airstair and opens the rear door. Note that the parking brakes must be set and the aircraft on the ground for the door animations to work.
12. Constant-speed drive (CSD) disconnects are modeled. Right click to open/close red switch guard, left click on switch with guard up to disconnect the CSD. Once disconnected, the CSD will not reconnect until on the ground with engine shut down (or panel reload).
13. Engine start-up. Eliminated MSFS classic instant spool-up during lightoff. Will simulate hot start if fuel selector is brought to "run" too early (20% N2 is optimum).
15. Engine indications mathematically modeled based on r/w data and FDE set (JT8D-17A engines) provided by Gustavo Rodrigues.
16. Auto V-speed calculations and callouts reworked to conform to AFM data and now include temp and pressure altitude corrections. Click on ASI on the ground to set for takeoff (keep clicking to cycle through the various flap settings). Click on ASI in the air to set landing data.
17. SquawkBox radar transponder integration. Squawk code, ident, and stby/on modes are all sent via FSUICP to SB3 (FS9) or SB4 (FSX) when the switches are set in the panel gauge. Off and STBY mode set STBY in SquawkBox, ON and LOW SENS modes both translate to ON. For this to work you must have the SB modules installed. To Squawk IDENT, right click over the ident knob on the transponder. There is no ill effect if the SquawkBox modules are not used.
18. An invisible clickspot to the right of the RAD/NAV switch (under the IVSI) toggles a digital display of TAT (deg C) and current CG (% of MAC). Clicking on the gauge will make it disappear again. TAT can also be obtained on the temp page of the PDCS.
19. Engine windmilling behavior for secured/seized engines implemented.
20. True/Magnetic heading mode. Compass switch on radio panel allows selection of True heading mode for high-latitude operations.
21. Cold-wx behavior...engine RPMs normalized to correct idle RPM at extreme temperatures. Oil press and temp for extreme cold also modeled.

22. Altitude warning system now defaults to use altimeter settings in inches rather than MB. Placing the text “-MB” (no quotes) into the title= line in the aircraft.cfg file will revert to pressure settings in MB.

[SP-177] With the SP-177 AFCS installed, the altitude warning panel has been left in, but is slaved to the settings on the MCP.

23. Spoiler logic. Ground spoilers may now be armed by mouse drag of the handle in the pedestal view, by right clicking on the spoiler handle in the pedestal view, by clicking on the spoiler-ARMED light on the main panel, by use of a FSUIPC-programmed button, or by moving a hardware axis control into the arm range. **New to V1.30: use of the FS-standard keyboard control is now supported, but axis control (i.e levers on hardware controllers) must be done as described below.** To program a FSUIPC button for the arm/disarm function, you will need to program the button to OFFSET BYTE SET (as described for the Throttle Trim) with offset=x6D11 and parameter=1. For those using hardware control levers, you will need to set the lever to control **PROP PITCH 1** (using FSUIPC) and not to control the spoiler axis directly. The panel will intercept the control input from the **PROP PITCH 1** axis and control the spoilers independently of FS’s flawed spoiler control logic.

24. Implementation of alternate flap control system, and correct flap behavior based on available hydraulic and electrical power. **Changed in V1.30: Control of flaps may be performed with the standard FS increment/decrement controls (but not with the full up/down controls),** mouse drag of flap handle on pedestal, or by use of FSUIPC-programmed buttons. To program flap buttons, program buttons in FSUIPC for OFFSET BYTE SET as in throttle trim section described below, using offset x6D11 and parameter=2 for flaps up button, and parameter=3 for flaps down button. The flap controls will always move the handle, however the flaps will only move if hyd/elec pwr is available. Placing the ALT FLAP switch on the overhead panel to ALT and moving the up/down select switch will override the flap handle and move the flaps up/down, using standby hydraulics if needed.

25. RMI DME recoded for smooth operation, and now works with DME-only stations. DME hold has also been implemented.

26. FSUIPC control for Yaw Damper switch. Programming a button or key to set FSUIPC offset 6D11 to value 4 will result in toggling the Yaw Damper switch on/off. Provided by request for easier sim management of X-wind landings.

27. Autobrakes. **New in V1.30: Use of the standard FS-assigned key for braking is supported.** User may also use FS or FSUIPC-assigned axes. Use of the FS brake axis will result in standard FS braking—the autobrakes only recognize brake application through the FS-assigned brake key or the FSUIPC offset input, so they will not automatically disengage upon brake application if using a hardware lever or other variable axis.

28. When the panel starts, you will see it quickly cycle all the subpanels open/close. This was added to ensure a good initialization of the gauges on the subpanels.

NOTES FOR VERSION 1.30

1. FSX compatibility. Version 1.30 is the first FSX-compatible version of the TinMouse II. The side views available in the FS9 version have been removed. FSX uses fixed-camera virtual-cockpit views for the side views, and the ‘mouse does not have a VC, so no side views.

2. Sperry SP-177 Advanced Automatic Flight Control System. Beginning with V1.30, the TinMouse can be flown with the original SP-77, or with an integrated analog SP-177 controller. See separate docs for operation of the SP-177.

3. Several of the FS9 panel configurations have settings to include Lee Hetherington's excellent freeware ILH TCAS-II gauges (available separately). No FSX configurations are provided with this gauge configured, as it has an incompatibility with FSX that will cause an immediate CTD if the FS window is resized or switched between full-screen and windowed mode.

4. Several additional FSUIPC offset commands have been added for those using the SP-177 advanced autopilot, also at offset 6D11 like the flap/spoiler/brake commands. Setting value 5 at offset 6D11 is an autopilot disconnect command, 6 is an autothrottle disarm/disconnect, and 7 will toggle Go Around mode on and off. Note that the A/P and A/T offsets are disconnects only—you can't toggle them on via this command.

Known Issues:

1. Cockpit lights. The main instrument panel lights will come on automatically at night regardless of electrical configuration. This is a function of the original gauges, and will require major re-engineering to change.

2. Overhead lighting. Some minor back lighting issues around a few of the overhead switches (battery, CSD temp select). The CIVA INS gauges do not support backlighting.

3. Virtual Cockpit. Not implemented or planned.

4. Pitch sensitivity when hand-flown. Generally, this can be improved by ensuring a forward CG (a lower CG % MAC). The invisible gauge under the IVSI can be used to determine CG. Loading cargo and pax forward to reduce the CG MAC will result in improved longitudinal stability.

Future Plans: Failure management subsystem, hydraulic and emergency gear blowdown subpanels, further PDCS expansion, hardware SDK,...and probably some stuff we haven't thought of yet. Just don't ask us when...

Bug reports and support issues: The TinMouse II project is a work in progress. Periodic updates, fixes, and improvements are anticipated through the hopefully long life of the project. User edits, re-integrations, and other creative applications are encouraged, provided that no money changes hands—directly or indirectly—as a result of using our work.

Support is provided only to the extent that it suits the authors and the many knowledgeable users who provide it—kindness and good manners will go a long way towards keeping this project and its support network alive. This software is our gift to you; please approach both it and us with that in mind.

The original tinmouse.org website referenced in some of the docs still available on the internet no longer exists.

Visit us on the TinMouse forum, graciously hosted by our friends at <http://www.avsim.com>

The TinMouse II is brought to you by:

Richard Probst and all those in the simming community who contributed to the original TinMouse project

Bob Scott: Follow-on project integration & advanced panel and aircraft systems gauge programming

Terry Gaff and Flight1 Software: GMAX aircraft modeling and animation

Gustavo “Omykron” Rodrigues: Flight dynamics & supporting mathematical models

Christoffer Petersen: Aircraft soundset

Peter Dowson: FSUIPC, and the treasure trove of FS knowledge derived from it

Bryan York: FSCrew Audio, without which there would be no FSX version

Dai Griffiths, Arne Bartels, and Bill Leaming: Professors Emeritus at Large of FS Gauge Programming

Special thanks:

Chris Brady for allowing use of his cockpit photos in the panel and for his excellent and informative B-737 website (<http://www.b737.org.uk>)

Marco Ravanello and Gianfranco Corrias, for their excellent freeware CIVA Litton INS gauge

Ernie Alston, for the ISG FMS gauges and development of the external interface needed to integrate it into the panel.

Paul Scaratt and Mark McCoy for the bitmaps used to make the SP-177 MCP

Around the Flight Deck

Here's a quick tour of the original SP-77 based panel. See separate manual for SP-177 differences.



- | | | |
|-------------------------------|-------------------------|-----------------------------|
| 1. Wind shear/GPWS switch | 17. Radar altimeter | 33. Flaps |
| 2. Airspeed Indicator | 18. Panel selector | 34. Antiskid inop lights |
| 3. RMI | 19. Spd Brk lights | 35. Antiskid switches |
| 4. Instrument Comparator | 20. Fuel Gauges | 36. Autobrake control |
| 5. ADI | 21. Stab trim warning | 37. Engine Fire Light |
| 6. HSI | 22. Engine Press Ratio | 38. Master Caution Light |
| 7. Altitude Alert | 23. N1 RPM | 39. Caution "sixpack" |
| 8. Flt Dir/Autopilot Status | 24. Exhaust Gas Temp | 40. Flt Director Control |
| 9. Autopilot Disconnect | 25. N2 RPM | 41. Autopilot Nav mode |
| 10. Mkr beacon Sensitivity | 26. Fuel Flow | 42. Heading Hold switch |
| 11. Marker Beacon | 27. Engine Annunciators | 43. A/P Aileron Axis engage |
| 12. Warning light test/dim sw | 28. Oil Press | 44. A/P Elev Axis Engage |
| 13. Altimeter | 29. Oil Temp | 45. A/P Alt Hold switch |
| 14. IVSI | 30. Oil Quantity | |
| 15. Nav/Radio sw | 31. Hyd/Brake press/qty | |
| 16. Hidden TAT/CG gauge | 32. Ldg gear (expanded) | |

1. Wind Shear/GPWS Switchlight. Pressing and holding the GPWS (right) switchlight will test the GPWS. You will get an audio “Glideslope...Pull Up...Pull Up...”
2. ASI – Clicking on the face of the ASI will auto-set the bugs, as previously described in the readme. The yellow ASI bug is normally set by the PDCS computer, but can be manually set by pressing the knob in the lower left corner of the gauge (should see an “M” in the window at top of dial face) and then setting bug manually. The red off flag left of the “120” knot mark indicates that the PDCS is NOT controlling the speed marker. The speed marker is for pilot reference only; the SP-77 based acft is not equipped with an autothrottle system.
3. The Radio magnetic Indicator provides raw VOR and ADF bearing and DME information. The red flags at the “10” and “2” O’Clock positions of the gauge face indicate that no valid course info is available for the selected navaid on that side. The Buttons in the lower left and right corner toggle between the VOR and ADF. The single-arrow bearing pointer is VOR or ADF #1 (as selected), and the double-arrow pointer is VOR/ADF #2. The red-hatched off flags indicate no valid DME info for the selected DME channel. This acft is equipped with a DME hold feature (see radio panel for operation). If true heading mode is engaged (see upper radio panel) the gauge will depict true heading and bearing info.
4. Instrument comparator. Not currently simulated.
5. ADI (attitude indicator). Displays glideslope info on left side of gauge, and rising runway indicator based on radar altitude. Yellow annunciator in upper right corner illuminates when radar altitude is below the altitude set on the radar altimeter bug. When flight director is engaged, a yellow V-bar type steering bar appears in view. This cannot be coupled to the SP-77 autopilot.
6. Horizontal Situation Indicator. The HSI displays selected navigation course, course deviation, heading, and distance information. With the Rad/Nav switch (15) set to Nav, the HSI shows nav guidance based on VOR #1 and DME #1 (or DME #1 hold if engaged). The HSI can directly couple to either the CIVA Litton INS gauge (version 1.50 or later) or the ISG FMS gauges (either the Honeywell XLSGNS or the Smiths will work). With the CIVA gauge, use the stock Rad/Nav switch...in “Nav” Mode the HSI will show course to fly, deviation, and distance to next waypoint, provided a valid nav leg is active in the INS. With the ISG gauges, the ISG LNAV switch (included in the ISG package) replaces the Rad/Nav switch, and when pressed (amber letters showing), the HSI shows GPS-based course and distance info. For autopilot control, both the CIVA and ISG units will control the heading bug when coupled to the HSI, and the autopilot should be operated in heading hold mode.
7. Altitude Alert – this light illuminates in conjunction with an audible tone when the aircraft is within 1000 feet of the selected altitude (selector is on the upper radio panel) and if the aircraft deviates by more than 300 feet once the selected altitude is reached.
8. Flight director and autopilot approach progress lights. Amber depicts “armed” and green depicts capture. Lights are independent for the F/D and A/P, as the two do not couple together. Pressing on the light matrix tests the bulbs (left side amber, right side green).
9. Autopilot Disconnect light. Illuminates along with triple-tone when A/P is disconnected. Will continue to flash until either the light is pressed or the A/P disconnect is pressed again (using the FS autopilot disconnect button/switch control).

10. Marker beacon sensitivity switch – just below the eyebrow panel, sets marker beacon detection sensitivity to low (wide-normal) or high (narrow).
11. Marker beacon lights. Blue – outer marker. Amber – middle marker. White – inner marker.
12. Indicator light test/dim switch. In upper position tests most of the warning annunciator lights on the panel. Bright (default) in middle position. Low in down position.
13. Altimeter. Indicates altitude (feet) with dual Holzmann windows for mb (hPa) and inches Hg. Yellow bug is for pilot cue only, it is not connected to any warning system. The red off flag peeking out of top of digital window is normal. If power is not applied to the instrument, the red bar will obscure the digital altitude window.
14. Instantaneous Vertical Speed Indicator. As depicted, this is an instantaneous (computer compensated) VSI, which means there is no significant lag in the instrument indications. Many users replace the IVSI with Lee Hetherington's excellent TCAS II-enabled combo VSI indicator. Options to enable this gauge are pre-installed in the panel.cfg file, but Lee's TCAS gauge must be downloaded and installed separately.
15. Nav/Radio switch. Used to switch between regular nav radio guidance and FMS/INS guidance on aircraft equipped with the CIVA or default GPS gauges.
16. At this spot is a hidden gauge to display the Total Air Temp (also obtainable on the PDCS) and the current aircraft CG datum. Click there to show it, click again to make it disappear.
17. Radar altimeter. Shows altitude of the aircraft above the terrain immediately below it (in feet). Knob on lower left corner sets bug used by amber lamp indicator on upper-right corner of HSI to indicate passage through decision height.
18. Panel selector. Used to display subpanels. From top to bottom: Upper radio panel, lower radio panel, throttle quadrant, map, overhead eyebrow panel, main overhead panel, GPS/FMS, clock, Go-Around (inop), and ATC.
19. Speed Brake lights. Upper (amber) light indicates a system fault that requires speed brakes to be stowed and not used. Lower (green) light indicates spoilers are armed. Clicking on this light will arm/disarm the spoilers (a shortcut to prevent having to pull up the throttle quad on final).
20. Fuel gauges. Fuel qty in lbs. If the text "KGS" is contained anywhere in the title= line in the [fltsim.x] section of the aircraft.cfg file, this gauge will indicate in kilograms instead of pounds. When changing fuel loads, be sure to first place the sim on pause, otherwise the panel may not recognize the change and could revert to the previous fuel load.
21. Stab Out-of-trim warning. Indicates and out-of-trim condition. It's normal for this light to flash intermittently under A/P control, as the A/P flies the jet with trim.
22. Engine Pressure Ratio (EPR) gauges. This is the primary means of setting engine power. The upper digital window is the actual EPR, the smaller lower window is the commanded EPR corresponding to the yellow bug. The bugs are normally set by the PDCS computer, but you can press the knob in the lower right of each gauge and then set them manually. They are for pilot reference only, there is no autothrottle system in the aircraft. Special note: this simulation includes a throttle trim/fine adjustment to counteract the effects of throttle axis jitter in some joysticks. There are two invisible clickspots in the lower left

corner of the #1 EPR gauge. You can fine adjust both engines together up/down (upper clickspot has a “+” in the cursor hand, lower has a “-“). The engines will stay there until the throttle is moved about 10% of its travel from where it was when the throttle trim was engaged. This can also be engaged through FSUIPC by programming a button or key—see item #4 in the preceding readme for step-by-step instructions.

23. N1 RPM. Low-speed fan speed in percent.

24. EGT, in degrees centigrade.

25. N2 RPM. High-speed fan RPM, in percent.

26. Fuel flow. Pounds per hour, or, if “KGS” appears in the title= line, in Kgs/hr.

27. Engine annunciators. Reverser unlocked – a T/R is out of it’s locked position. Start Valve open – an engine starter valve is open. Low Oil Press - <35 PSIG oil pressure. Oil Filter Bypass – excessive differential pressure across the oil filter, resulting in oil bypassing the filter.

28. Oil Press indicator. PSI.

29. Oil Temp indicator. Deg C

30. Oil Quantity – Gallons. One note on engine instruments in general—you will note that seldom do all the needles line up exactly, as variances in engines produce small differences in operating temps, pressures etc. I have introduced this variability intentionally, consistent with a well-used aircraft and engines.

31. This is a normally-invisible digital hydraulic pressure and quantity gauge, which displays the data that would normally come from round-dial gauges on the right side of the gear handle assembly. Data is color-coded (green-in limits, amber – caution, red – out of limits). Click on the left side of the blank plate below the #1 oil quantity gauge to display, click again to disappear.

32. Expanded landing gear “Christmas Tree” lights. Green lights indicate a gear is down and locked, red lights indicate that the gear handle and the gear position are in disagreement (normal indication while gear is in-transit). In cruise all lights should be off, in landing config all lights should be green. This is an invisible gauge that will automatically appear below the #2 oil quantity gauge for ~30 seconds after the gear handle is moved (up or down), or anytime a red gear light is illuminated. It can be displayed full-time by clicking on the spot under the #2 oil qty gauge, and if clicked again, will revert to only appearing during configuration changes.

33. Flap gauge. Shows wing flap position. Leading edge slat position is indicated by LE Flaps Transit (amber) and LE Flaps Ext (green) lights below this gauge. There are two invisible clickspots on the face of the gauge—left clicking on the upper half of the gauge will move the flap handle up one notch, and clicking on the bottom gauge will move the handle down one notch. You can also set a button/switch or another key to send an FSUIPC offset command (see readme item #24). Note that moving the flap lever does nothing to the flaps if there isn’t appropriate electrical and hydraulic power available. Alternate flap extension is also provided for on the flight control section of the overhead panel. Important note: analog controls, like levers on a throttle quadrant, don’t work for flap movement with this panel.

34. Antiskid inop lights.

35. Autobrake control and INOP light. Brakes are best controlled by the FS-assigned brake key or by sending a single byte value of “1” to FSUIPC offsets 6D12 (left) and 6D13 (right) (you can also send a 2-byte word of hex 0101 to 6D12 to activate both at the same time). This enables the brake inputs to be detected and for application of manual braking to turn off the autobrakes. If other means are used (i.e. toe pedal axis inputs not mapped through FSUIPC as previously described), the brakes should work, but the autobrakes will remain engaged on landing rollout until ~40 kts groundspeed. Reduction of throttle to idle after reaching 50 knots with “RTO” selected will result in autobrake activation as well. Brake operation depends on hydraulic pressure availability.

36. Engine fire indication. Accompanied by fire bell.

37. Master caution light – press to deactivate sixpack lights associated with the caution and re-arm master caution light. Note that pressing light does not correct underlying warning.

38. Caution/warning “sixpack” gauge. Press to test warning systems. Illumination generally indicates the presence of other warnings on the overhead or other panels.

39. Flight director control panel. Note that none of the settings made here affect autopilot operation in the least—the FD and the A/P are independent systems that do not interconnect at all. The mode select selects the nav mode for the FD steering bar. The OFF position retracts the steering bar from view. The Alt Hold switch on this panel only causes the steering bars to command a pitch to maintain level flight. Likewise, the Pitch Command knob only serves to allow the pilot to select the pitch he wants the steering bar to command...think of it like a vertical version of a heading bug.

Sperry 77 autopilot. The Sperry 77 included as original equipment in the B737-200, is a unique system. Today, most similar capability is called “control wheel steering” on some advanced autopilot systems. The A/P is “flown” with the control yoke. When engaged in basic mode, the aircraft holds the last pitch set...pulling back on the yoke with the system engaged commands the A/P to hold a higher pitch. In basic lateral (roll) mode, if the airplane is rolled to 5 deg or less, the plane will roll wings-level when the yoke is released. If the yoke is released with more than 5 deg of bank, it will hold that bank angle. The roll mode can be coupled to heading hold, or to fly a VOR/ILS course as well. The pitch mode can only be coupled to a glideslope for an automatic ILS approach, or to an altitude hold mode. The roll and pitch axes can be engaged separately.

40. Autopilot nav mode knob. MAN is SP-77 basic mode, VOR/LOC is lateral-only course hold, AUTO APP is ILS course and glideslope coupling, and MAN GS allows the pilot to manually control pitch while the A/P maintains course guidance.

41. Heading-hold switch. Upper position is HDG off—A/P will hold whatever bank angle is set when yoke is released. HDG Hold – Rolls wings level if yoke released with less than 5 deg bank, otherwise holds last bank angle set. HDG Set – flies the heading selected on the HSI heading bug. For flight with the CIVA INS or IGS FMS units, when engaged, they control the heading bug, and the A/P should be set to HDG SET mode to allow the long range nav system to steer the plane with heading bug control. The A/B/AB system selector should always be set to “B” in the TinMouse.

42. Aileron axis engage/disengage paddle. Up position is engaged. System cannot be engaged unless appropriate power/hydraulics are available, system selector is set to “B”, and yoke/joystick aileron axis is centered.

43. Same as 43, except for elevator axis. Yoke/joystick must be centered fore/aft to engage.
44. Altitude Hold mode. Autopilot will maintain altitude the aircraft is at when engaged. To change altitude, you must disengage ALT HOLD, then fly the airplane with basic A/P (or hand-fly) to new altitude, then re-engage ALT HOLD. TURB setting is inop in the simulation.

Overhead Panel



1. CIVA Mode Control Panel
2. Flight control shutoff switches
3. Stby Hyd low qty/low press lights
4. Spoiler system shutoff switches
5. Alternate flap control switches
6. Yaw Damper switch/indicator
7. Elevator artificial feel diff press light
8. Mach trim test switch & fail light
9. Engine fuel shutoff valve indicator
10. Engine fuel heat system switch & indicators
11. Fuel temperature gauge
12. Crossfeed valve control switch & indicator
13. Center tank pumps and low fuel press lights
14. Left tank pumps and low fuel press lights
15. Right tank pumps and low fuel press lights
16. DC Ammeter
17. AC frequency meter
18. DC Voltmeter
19. AC Voltmeter
20. DC meter selection switch
21. AC meter selection switch
22. Battery switch
23. Galley power switch
24. Residual (field) volt selector button
25. Standby power selector switch
26. Constant speed drive disconnect & indicators
27. Drive temp/temp rise selector switch
28. CSD temperature gauge
29. AC Loadmeter
30. Ground power contactor sw and indicator lt
31. Bus transfer switch
32. Generator bus status and gen off bus lights
33. APU Off Bus indicator light
34. Generator contactor switch
35. APU generator contactor switch
36. APU EGT, Load and warning panel
37. Panel light switches
38. Equipment cooling fan control
39. Emergency exit light Switch
40. Cabin seat belt/no smoking light switches
41. Flight attendant/ground crew call buttons
42. Rain repellent/wiper control switches
43. Windshield heat overheat/system on lights
44. Window heat control & test switches
45. Pitot static heat switches
46. Wing heat switches and valve pos indicators
47. Eng heat switches and valve pos indicators
48. Hydraulic ground interconnect switch
49. Sys A Hyd control switches & low press lts
50. Sys B Hyd ctrl switches & ovht/low press lts
51. Door indicator lights
52. Cockpit voice recorder (not simulated)
53. Cabin altitude and diff press gauge
54. Cabin altitude warning horn cutout switch
55. Cabin rate of climb gauge
56. Cabin smoke clearance switch
57. AC air mixer valve position gauge
58. Air cond temp gauge selector switch
59. AC duct overheat light
60. Air cond temperature gauge
61. Air cond temp control rheostat
62. Dual bleed warning light
63. Ram air door pos indicator lights
64. Gasper fan switch
65. Bleed duct press gauge
66. AC pack overheat test switch
67. AC pack control switch
68. Bleed duct isolation valve control switch
69. AC pack warning lights
70. AC Pack warning light reset button
71. Engine bleed valve control switch
72. APU bleed valve control switch
73. Press system warning/advisory lights
74. Press sys flt altitude selector and indicator
75. Press sys landing alt selector and indicator
76. Press stby rate controller knob
77. Press cabin alt selector and indicator
78. Press outflow valve pos indicator
79. Press outflow valve man control switch
80. Press system mode control switch
81. Press flight/ground mode selector switch

1. CIVA INS mode control panel (when installed). See CIVA documentation.
2. Flight control shutoff switches. Left switch is system A, right is system B. These are three position switches. With guard down system is on (normal). With guard up and switch in center position, the selected flight control system is shutoff. With the switch in the upper (STBY RUD) position, the standby hydraulic pump is powered up and powers the rudder. If both flight control systems are shut off, the system reverts to manual reversion (cable control) mode. Flight control forces required will be very heavy and exaggerated, and control response is very sluggish (this is simulated).
3. Standby hydraulic system low quantity and low press lights. It is normal for the low press light to flash momentarily when system is selected, as the standby pump pressure builds.
4. Spoiler system shutoff switches. Shuts off hydraulic press from selected system to spoiler system.
5. Alternate flap control switches. To operate in alternate flap control mode, open red guarded alt flap switch, and then use the 3-pos up/off/dn switch to run the flaps in the desired direction. It is recommended that the flap lever be moved to match the selected position to ensure GPWS and gear warning systems work normally.
6. Yaw damper switch/indicator. This light is usually the reason you will see the FLT CONT sixpack light on the main panel during routine preflight ops.
7. Elevator artificial feel diff press warning light. The flight control artificial feel system has malfunctioned.
8. Mach trim test switch and fail light. Pressing switch should result in light illuminating and then extinguishing after 10-20 sec. If light illuminates in flight, observe AOM mach speed limits associated with failure of mach trim system.
9. Engine fuel shutoff valve position indicator. Illuminated when main fuel shutoff valve is closed. Note on B732 valve position lights: light will illuminate bright when valve is in transit, then goes to dim when valve reaches full open or closed position.
10. Engine fuel heat system switch & indicators. Filter icing light (amber) at top illuminates when a pressure differential is detected across the fuel filter. Blue valve open light indicates position of fuel heat valve, controlled by switch below the light.
11. Fuel temperature gauge. Deg C – temperature of fuel measured at the L fuel filter inlet.
12. Crossfeed valve control switch & indicator. Allows pump on one side to feed opposite engine. It is not possible to transfer fuel from one side to the other.
13. Center tank pumps and low fuel press lights. The press lights illuminate when the pump is selected on but is not producing sufficient pressure. The center tank pumps have a higher output pressure than the wing tanks, so they will keep the flow regulator valves on the wing tanks closed with the back pressure and fuel will feed only from the wing tank while pressure is available on that side. Note: the fuel standpipes for the center tank pumps are located forward and aft of each other in the tank. When climbing with less than 2000 lbs of fuel in the center tank, the fuel level drops below the forward standpipe, which feeds the left system, while the aft pump operates normally. This results in the left side

reverting to feeding from its wing tank, while the right system continues to feed from the center tank, causing a fuel imbalance to develop. Open the crossfeed during climbs when feeding fuel from the center tank with less than 2000 lbs in the center tank, to ensure that fuel pumped from the center tank pump(s) feeds both engines.

14. Left tank pumps and low fuel press lights. The forward pump is powered by the #1 generator bus, the aft pump is powered by the #1 generator transfer bus. The APU receives fuel pressure from the left-side pumps, and burns ~360 lbs/hr from the left tank when running.

15. Right tank pumps and low fuel press lights. The forward pump is powered by the #2 generator bus, the aft pump is powered by the #2 generator transfer bus.

16. DC Ammeter. Displays current for the DC power source selected by the DC meter selector knob

17. AC frequency meter. Displays AC frequency of the power source selected by the AC meter selector knob.

18. DC Voltmeter. Shows DC voltage for the power source selected by the DC meter selector knob.

19. AC Voltmeter. Shows AC voltage for the power source selected by the AC meter selector knob.

20. DC meter selection switch. Selects DC power source to connect to the DC meters—Standby Power, Battery Bus, Battery, APU Battery, Transformer-rectifier #1, TR2, and TR3.

21. AC meter selection switch. Selects AC power source to connect to the AC meters—Standby power, Ground Power, Generator 1, APU generator, Generator 2, Inverter. in the TEST position, both AC meters should indicate full deflection.

22. Battery switch. Main aircraft battery.

23. Galley power switch.

24. Residual (field) volt selector button. Pressing this button causes the AC field excitation voltage for the selected generator to be displayed. Only works with Engine and APU generators.

25. Standby power selector switch. Allows battery to be connected as alternate source for the standby bus.

26. Constant speed drive disconnect & indicators. Low oil pressure and high oil temp lights for the constant-speed drives. To disconnect the CSD, right-click on the red guarded switch, and then left-click on the switch when it is exposed. The CSD (and therefore it's associated generator) cannot be re-connected until parked on the ground with the engine off.

27. Drive temp/temp rise selector switch. Selects source for CSD temp gauges. Normal is "IN" (lower) position for CSD oil inlet temp. In "RISE" position displays temp differential between inlet and outlet from the CSD.

28. CSD temperature gauge. Deg C. Bottom scale is inlet temp (40-160 deg C) , upper scale is rise temp (0-30 deg C).

29. AC Loadmeter. AC load for the engine-driven generator (amps).

30. Ground power contactor sw and indicator light. Clicking on ground power light with aircraft on the ground and parking brakes engaged will make request for ground power connection, or request its removal if already connected. Blue ground power available light indicates that voltage is detected from the ground power connection. It does not ensure that voltage and/or frequency are good. Always check the voltage and current with the AC meter before connecting. The three position contactor switch connects ground power when moved momentarily to the down position, and disconnects power when moved momentarily up to the "OFF" position. Selecting ground power will disconnect all other AC power sources from the aircraft busses.

31. Bus transfer switch. Disables automatic bus transfer connection when a generator is off. Isolates left and right transfer busses.

32. Generator bus status and gen off bus lights. Transfer Bus Off (amber) light indicates that the respective transfer bus is unpowered. Bus Off (amber) light indicates that the respective generator bus is unpowered. Gen Off Bus (blue) light indicates that the generator is producing electrical power, but is not connected to its bus. The B732 does not automatically connect ANY power source to the aircraft electrical busses, so it must always be done manually.

33. APU Off Bus indicator light. Indicates that the APU is producing power, but is not connected to one or both generator busses. When the APU contactor is selected ON, it will automatically disconnect the generator on that side and the ground power if connected.

34. Generator contactor switch. . The three position contactor switch connects the generator to its respective generator bus when moved momentarily to the down position, and disconnects the generator from the bus when moved momentarily up to the "OFF" position. Selecting generator power will disconnect all other power sources from its generator bus (but does not affect the other side).

35. APU generator contactor switches. The three position contactor switches connect the APU generator to the left or right generator bus when moved momentarily to the down position, and disconnects the generator from its respective bus when moved momentarily up to the "OFF" position. Selecting APU generator power on one side will disconnect all other power sources from that generator bus (but does not affect the other side).

36. APU EGT, Load and warning panel. APU status panel has four warning lights, Low Oil Qty (blue), and low oil press, high oil temp, and overspeed (amber). Includes APU EGT gauge on left, and APU loadmeter (amps) on right.

37. Panel light switches. Controls panel light lighting.

38. Equipment cooling fan control. Not simulated.

39. Emergency exit light Switch. With guard open, exit lights are off, and the amber NOT ARMED light will illuminate. With guard closed, lights are armed.

40. Cabin seat belt/no smoking light switches.

41. Flight attendant/ground crew call buttons. Pressing the ground crew call button makes a request to connect air from an external air source. ~30 sec after making the request, the Equip door light will

illuminate, and you will see air pressure (which is connected to the air manifold on the right side of the isolation valve, opposite the APU). When the Equip door light is illuminated, pressing the button again makes a request to remove the air power. The air will be immediately removed if the parking brake is released.

42. Rain repellant/wiper control switches. Not simulated except with sound.

43. Windshield heat overheat/system on lights. Upper row of amber lights are overheat lights for the respective windshield heat sections (left side, left front, right front, right side). Second row are green ON lights that show system is powered.

44. Window heat control & test switches. Center switch is overheat and power test switch. In upper position you should see all four overheat lights, in down position, all four green ON lights.

45. Pitot static heat switches. Pitot-static heat control for the A and B systems. Fault warning lights for the associated parts of each system: sysA—captain pitot heat, f/o static and #2 alt p/s heat, left elevator pitot heat, and TAT temp probe; sysB: F/O pitot heat, capt static and #1 alt p/s heat, and right elev pitot heat.

46. Wing heat switches and valve pos indicators. Wing heat (other than test mode) cannot be actuated on the ground—indicators will show valve stuck in transit (bright blue) if selected on the gnd.

47. Eng heat switches and valve pos indicators. Engine anti-ice switch and three valve position indicators associated with each system (left valve, right valve, and cowl heat valve).

48. Hydraulic ground interconnect switch. Allows hydraulic sys B to power system A for preflight and maintenance ops on the ground.

49. Sys A Hyd control switches & low press lts. Controls left and right engine-driven pump shutoff valves. Low press lights illuminate anytime pump output press is below 1500 PSI.

50. Sys B Hyd ctrl switches & ovht/low press lts. Controls #1 and #2 electric hydraulic pumps. Upper lights are pump case overheat warning lights, lower pair are low press lights that illuminate anytime pump output pressure is below 1500 PSI.

51. Door indicator lights. Left-clicking on the upper-left light (FWD ENTRY) will open the doors. Right-clicking on the same light will extend the airstairs (if equipped) and open the rear (or cargo) door.

52. Cockpit voice recorder (not simulated).

53. Cabin altitude and diff press gauge. Outer dial shows cabin differential pressure in PSI. Inner dial shows cabin pressure altitude in thousands of feet.

54. Cabin altitude warning horn cutout switch. Turns off the cabin altitude warning that occurs if cabin altitude exceeds 10,000 feet.

55. Cabin rate of climb gauge. Rate of pressurization change in the cabin—feet per minute.

56. Cabin smoke clearance switch. Opens the outflow valve to partially depressurizes the cabin to ~10,000 feet cabin altitude in order to evacuate smoke from the cabin.

57. AC air mixer valve position gauge. Shows relative position of mixer valve that blends cold air from the AC pack with bleed air going to the cabin.
58. Air cond temp gauge selector switch. Selects whether the AC temp gauge indicates supply duct temp or temp measured in the cabin.
59. Air conditioning duct overheat light. Illuminates when sensors have detected an overtemp in the AC supply duct.
60. Air cond temperature gauge. Shows duct or cabin temp, as selected by the air cond temp gauge selector.
61. Air cond temp control rheostat. Controls temperature of flt deck/fwd cabin (left) or main cabin (right). Changing this setting should result in some movement of the mixer valve until temp stabilizes.
62. Dual bleed warning light. Illuminates anytime both engine bleed and APU bleed air are on at the same time. Use of engine bleed at power settings above idle with the APU bleed valve open can result in damage to the APU.
63. Ram air door pos indicator lights. Normally open during ground ops—position of ram air inlet doors that augment airflow across the AC pack heat exchangers.
64. Gasper fan switch. Not simulated.
65. Bleed duct press gauge. Two needles show press in PSI on the left and right side of the isolation valve.
66. AC pack overheat test switch. Pressing this should illuminate the WING-BODY OVHT lights after a few seconds as the overheat system test progresses. Press the TRIP RESET button to extinguish the lights.
67. AC pack control switch. Controls the AC pack shutoff valve at the bleed air inlet to the AC pack.
68. Bleed duct isolation valve control switch. Three-position switch. Upper position is CLOSE, will isolate the left and right bleed air systems. Center position is AUTO—normal position for flight, will close automatically in event of a bleed duct overheat. Bottom position is OPEN—forces isolation valve open.
69. AC pack/bleed air warning lights. Three amber lights. Upper is PACK TRIP OFF, and illuminates if AC pack shuts itself down. Middle is WING-BODY OVHT, and indicates an overheat in proximity to the bleed duct. Bottom is BLEED TRIP OFF, and indicates that the bleed valve has been closed automatically due to a fault (overtemp or overpressure).
70. AC Pack trip reset button. Resets auto trip systems and their warning lights.
71. Engine bleed valve control switch. Opens engine bleed valve to pressurize the engine's respective (L or R) bleed duct.

72. APU bleed valve control switch. Opens the APU bleed valve to put APU bleed air on the left bleed duct.
73. Press system warning/advisory lights. Four warning indicator lights, AUTO FAIL (amber) indicates that the automatic pressurization controller has failed. It is possible to reset the auto controller by pressing the center of the silver FLT ALT knob. If auto mode cannot be restored, another mode (STBY or manual) must be selected. The second light is OFF SCHED DESCENT (amber). This indicates that a descent was started before the aircraft reached the altitude set in the FLT ALT selector. The system can be reset by setting the FLT ALT to an altitude lower than the aircraft's present altitude and pressing the silver FLT ALT knob to reset the system. The third light is STANDBY (green) and indicates that the acft has been placed into STANDBY mode. The aircraft pressurization is done by manually adjusting the climb/descent rate with the STANDBY controller knob. The last light is MANUAL (green) and indicates that the system is in manual mode and that the cabin is being controlled by manually opening and closing the outflow valve with the OPEN-CLOSE switch. For normal ops, ensure that the filed flight level is set in the FLT ALT window, the destination field elevation is set in the LAND ALT window, and an appropriate value is entered into the CAB ALT window. For flights planned at 29,000 feet or higher, use 6000 feet. For lower flights, or flights into high-altitude destinations, cabin altitude can be adjusted accordingly.
74. Press sys flt altitude selector and indicator. Pressing this knob in the center forces a pressurization controller reset. Use to set the expected flight altitude for the flight.
75. Press sys landing alt selector and indicator. Set the expected destination field elevation. DO NOT land with more than 0.3 PSID differential pressure, or you could rupture the fuselage.
76. Press stby rate controller knob. Used to manually control cabin climb/descent rate in STANDBY mode.
77. Press cabin alt selector and indicator. Sets desired cabin altitude for the flight. Note that if the flight is at high altitude, or if destination landing elevation is very high, this setting may be overridden by the controller.
78. Press outflow valve pos indicator. Shows relative position of the outflow valve. Used to monitor system in AUTO or STANDBY modes, and used to control the valve directly in MANUAL mode.
79. Press outflow valve man control switch. Spring-centering switch, active only in MANUAL mode. Right position opens outflow valve (depressurizes) and left position closes valve (pressurizes).
80. Press system mode control switch. Selects AUTO, STANDBY, or MANUAL modes. There are two possible manual modes, one controls the AC outflow valve, the other controls the DC outflow valve.
81. Press flight/ground mode selector switch. Used to select flight or ground ops mode. Select flight before taxiing, and observe the cabin rate indicates a descent and that the acft pressurizes to 0.3 PSID. Set GND during taxi in to ensure that there is no pressure in the cabin when doors are opened.

Upper Radio Panel (with optional CIVA Litton INS and RealityXP radar installed)



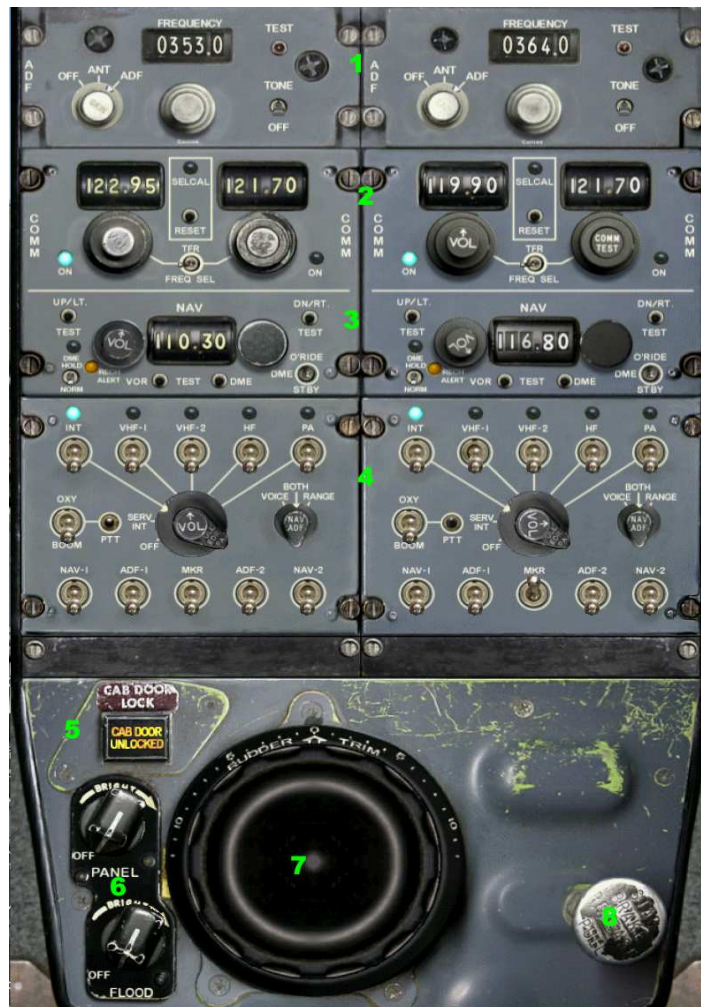
1. CIVA Control Data Unit (CDU). Optional—available at www.simufly.com. Panel configs for the CIVA, and the CIVA plus Lee Hetherington's TCAS II gauge are included ("panel with CIVA INS.cfg" and "panel with CIVA INS and TCAS.cfg") Make a copy of the appropriate file and rename it to panel.cfg
2. HF Radio control head (not implemented)
3. Vertical gyro and VHF nav source switches. (not implemented)
4. Compass Mag/True Heading Switches. Right click to toggle between magnetic (default) and true heading modes. True heading mode is normally only used at very high latitudes close to the magnetic poles.
5. Altitude alerter. Used to sound an altitude alert warning approaching ~1000 feet from the set altitude, and for deviations of >300 feet once reached. If the text "-MB" is placed onto the title= line in the aircraft.cfg, the baro set will be in MB rather than Inches Hg. left clicking on the left side of the knobs decreases the window setting one increment (100 feet or .01 In), left clicking on the right increases it. Right clicking makes a 10x adjustment (.1 In or 1000 feet).
6. Weather radar. The optional (payware) RealityXP WXR-500 is depicted, and the config file includes the necessary gauge reference. The default is a dummy radar panel.
7. CIVA ADEU (optional). Included with the freeware CIVA gauges, this is a data loader that can be used to load the INS rather than keying in all the waypoints by hand. See the CIVA docs for operating instructions.

8. Performance Data Computer System (PDCS). This computer determines EPR settings for takeoff (full power or assumed-temperature/reduced), climb (econ, best rate, manual set), cruise (in the range of 260-340 KIAS between 10,000 ft and FL230, and in the range of mach 0.70 – 0.78 from FL240-FL350), computes holding speed and EPR, max continuous thrust, and go-around settings and speeds. **MUST BE INITIALIZED TO WORK**—set mode knob to STBY, use page right button to scroll to page STBY 3-3 (self-test) and press engage light. See separate included instructions in file PDCS.rtf
9. Radar transponder. Integrates directly with the SquawkBox module for VATSIM online ATC if installed. If using Lee Hetherington's TCAS gauge (ILH_TCAS.gau) this will be replaced with the transponder control from the ILG gauge package.
10. Same as #3—not implemented.
11. Memory aid – used to set a number (i.e. cleared flight level, heading, whatever is useful). Left click on left side of wheel to decrease digit, left click on right side to increase. Mouse wheel should work here too.



1. ISG Honeywell XLSGNS lateral-mode only FMS. See website at www.fsbuild.com If installed, place the text "ISG" into the title= line of any aircraft that uses it in the aircraft.cfg. If there are multiple fltsim.xx sections, the ISG needs to be in the title= line in each one. **DO NOT** put ISG in the title= line if you do not have the ISG gauge package installed, or it will crash FS when the TinMouse loads. For operating instructions, see the docs that come with the package. This FMS steers the plane with the heading bug, so the A/P needs to be in heading set mode for the FMS to provide steering guidance. When using the ISG gauges, use the LNAV gauge in place of the Nav/Rad gauge. A working config file is provided (panel isg.cfg) – make a copy of it and rename it to panel.cfg.
2. Standard (dummy) weather radar.

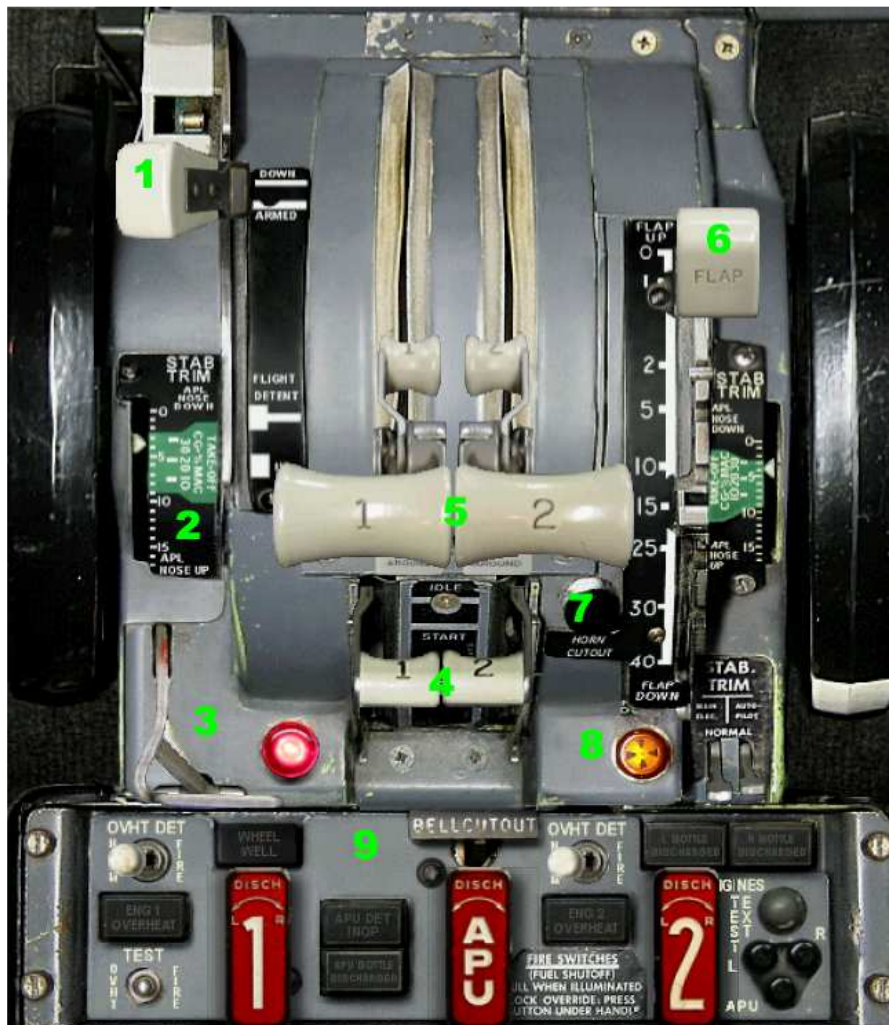
Lower radio panel



1. ADF receivers. Mode switch should be in ADF. Left clicking on left side of freq knob decreases freq in increments of 10 KHz, right clicking on left side of knob increases by increment of 10 KHz.. Left clicking on right side of knob decreases freq in increments of 0.5 KHz, right clicking on the right side increases freq by 0.5 KHz.
2. Comm receivers. Freq knobs work the same as ADF, left side is whole MHz, right side is fractional MHz. The TFR/FREQ SEL switch selects which freq is set in the radio, and turns on the blue "ON" light on that side.
3. Nav receivers. Left click on left side of freq knobs to decrease, right side increases. Mouse wheel works on these knobs. (new to v1.25-DME hold: while receiving a DME station on the receiver, place the DME Hold switch to "DME Hold" and the DME display on that receiver will remain locked to the station being received at the time hold is activated. You can then switch to another nav freq and see course guidance independent of the DME still being displayed from the other station. This is often used for ILS approaches that use the DME from a nearby VOR/TAC to identify approach fixes, for example. If the HSI is in nav mode (i.e. not coupled to GPS/INS/FMS) then the held DME #1 station will be displayed in the HSI as well as the RMI.

4. Audio Control Panels. Switches across the top select comm channels to be monitored by the captain/copilot. The large knob in the center selects the transmit device, and the blue light above the selected device indicates it is active. In FS, only VHF1 and VHF2 are selected. The NAV/ADF knob selects whether to receive voice, morse code (range) or both types of ident signals. If selected to voice, you will not be able to monitor morse idents (the only kind implemented in FS). The bottom row of switches selects which idents will be monitored.
5. Cabin door lock. Press to bar virtual hijackers from the mighty mouse's pilot's lair.
6. Panel/flood light switches.
7. Rudder trim knob. Click on left or right, or use mouse wheel.
8. Parking brake release knob. (inop – use parking brake knob on throttle quadrant).

Throttle Quadrant



1. Speedbrake Lever. To arm, right click the knob in this panel, or you can left-click on the Speed Brake Armed light in the main panel, or send a command via an FSUIPC offset as described in the readme. If using a hardware controller, make sure it is mapped to the PROP PITCH 1 axis, and not directly to the speed brakes. Terry Gaff's model uses the wing fold animation to move the ground spoilers in the exterior model, so the panel introduces the artificiality of requiring the nosewheel to be on the ground for speed brake deployment to avoid a rather hard slam-on that results from the wing fold. The FS-assigned spoiler key (default is "/") will open/close the speed brakes, but it will not arm them. Autoretract is coded in the sim—if the throttles are advanced to a high power setting with the ground spoilers deployed, they will be automatically retracted (i.e. bailed landing).
2. Stab trim index. The stab trim wheels on the sides of the quad do not move in this simulation. Attempting to set takeoff power with the trim out of the green range will cause a takeoff configuration warning.
3. Parking brake lever and indicator light. Left click to toggle.
4. Engine fuel cutoff switches. Click to toggle on/off—used in engine start/shutdown.
5. Throttles. Reverser handles not modeled—use F2 key or hardware control.
6. Flap lever. Can be grabbed and dragged here, or moved with FS-assigned flap increment/decrement keys. Buttons can be configured via FSUIPC as described in the readme. At present, analog axes can't be used to set flaps. Proper power and hydraulic pressure are needed to move the flaps. If ALT FLAP switch is selected on overhead, the flap lever will move but will not affect flap setting.
7. Gear warning horn cutout switch. Left click to silence the gear horn where possible (some warning modes cannot be silenced). Left-clicking on the partially visible red gear indicator is provided as a shortcut to avoid having to pull up the throttle quad when the warning horn comes on.
8. Trim movement indicator light.
9. Engine/APU fire control panel. New in V1.30. Click on the handle to pull out, then click on right or left side of handle to fire the left or right fire bottle. Note that it takes ~15-25 sec for an engine to shut down after pulling a fire handle, and ~10-15 sec to see a "Fire Btl Discharged" indication after firing an extinguisher.

Overhead Eyebrow Panel



1. Landing lights.
2. Runway turnoff lights
3. Taxi lights
4. APU Control Switch. When placed in start, the APU RPM will display in yellow text to the left and below the switch. When placed off, the APU slowly reduces RPM for ~1 minute before shutting down. The APU will shut down immediately if the battery is shut off. The APU will only power one generator bus inflight.
5. Engine start switches. Solenoid-held switches will lock in GRD during engine start until ~45% N1 RPM, and then should release automatically. Clicking on right side of knob energizes LOW IGN (continuous low-energy airstart ignition) and flight start mode.
6. Exterior light control switches.

New in version 1.30:

1. A unified multigauge compatible with both FS9 and FSX is provided.
2. Addition of an integrated Sperry SP-177 autopilot and autothrottle system. The original SP-77 autopilot is still available.
3. Significant re-work of the ADI, with new flight director logic for the SP-177.
4. Go-Around mode implemented.
5. Added FSUIPC offset commands for autopilot disconnect, autothrottle disconnect, and go-around mode, which can be programmed in FSUIPC for actuation with a controller button or key. Offset byte 6D11 set to 5 is A/P disconnect, 6 is autothrottle disarm/disconnect, 7 is go-around mode toggle.
6. Improved ADI with flight director logic to support the SP-177
7. Interoperability between the radar transponder and both Squawkbox 3 and Squawkbox 4 for VATSIM flyers.
8. Accomodation of standard FS-assigned keyboard controls for flaps, speed brakes, and wheel brakes.
9. Many improvements in mouse wheel operation of knobs throughtout the panel
10. Fire handle and fire bottle operation implemented.
11. Ground air cart is now implemented. Press Gnd Call button on overhead panel to request external air. After 30 sec, the equip door will illuminate, and air pressure should be apparent on the manifold. Pressing the button again makes a disconnect request—after 30 sec equip door will extinguish and air pressure from the ground cart is removed from the system. Releasing the parking brake will immediately disconnect external air (baaaaad pilot!!)