

Boeing 707 Tutorial

1. Preperation

The Boeing 707 is the first commercially successful passenger jetliner. Although there was the British DeHavilland Comet it was run out by the 707 soon. As it was the first of it kinds it's technology is also kind of old and not comparable with modern jets. This tutorial is not a deep-system tutorial but just a brief introduction into the plane, so that you at least get the engines running and get to know how to fly it with the old Autopilot.

We start with a Cold&Dark Cockpit. First thing, as with every aircraft, we have to supply it with power. Therefore we go to the Upper Flight Engineer Panel (Second Officer Panel) and put the **Battery-Switch** to **ON**.



Since the Battery isn't sufficient to supply the plane with power for long, we have to get some additional help. Now there are two possibilities for the 707:

- 1) Most versions were highly dependent on ground equipment – for sufficient power supply on the ground they were in need of a Ground Powering Unit (GPU) to supply the airplane with external power.
- 2) Cargo versions were equipped with an APU (Auxiliary Powering Unit), a small turbine connected with a Generator, supplying the aircraft with power.

*REMARK: This tutorial is based on the CaptainSim 707. In this addon, you either have a Panel with an APU or one without APU. I based this tutorial on the APU version. If you use the other panel, you simply have to connect the External Power (**SHIFT+G**) and using then use the External Powerswitch instead of starting up the APU.*

To Start-Up the **APU** we go to the APU-Window and lift the **Start Switch** (Left Upper Corner) to **START**, it will flip back to the neutral position. Wait until you hear the APU spool up and till the **EXH TEMP Gauge** displays **300°C**. Then close the **Field and Generator Circuits**, by pushing the switches to **CLOSE**. The amber lights next to the switches should go out.



Next thing to do is to now really supply the aircraft with the additional power. Therefore we switch the **Essential Power Source Selector** to **EXT PWR**.



The blue **FAILURE Light** should go out now and the gauges right to the selector should rise. (Duct Low and High Pressure Indicator)

Lets summarize what we've done so far:

We supplied the aircraft with power by switching the **BAT** to **ON** and thereafter we started up the **APU** by: Putting the Starter Switch to **START**, waiting for the **APU EXH TEMP** to rise and after it stabilized at around **300°C** we **CLOSE** the **FIELD** and **GENERATOR Circuit**. After that we switched the **Essential Power Source** to **EXT PWR**.

Or Short:

BAT ON
APU START
FIELD&GENERATOR CIRCUIT CLOSE
ESSENTIAL POWER EXT PWR

2. Engine Startup

After this relatively simplified preparations of the flightdeck, we are now nearly ready to start our engines. Before we do that, we should look at the lower Flight Engineer Panel to check if the **FUEL BOOST PUMPS** of the filled tanks are **ON** and the four Engine **FUEL VALVES** are **OPEN**.

Then we go again to the upper Flight Engineer Panel and move the **WING VALVES** switches to **OPEN** (located on the upper right part of the panel).

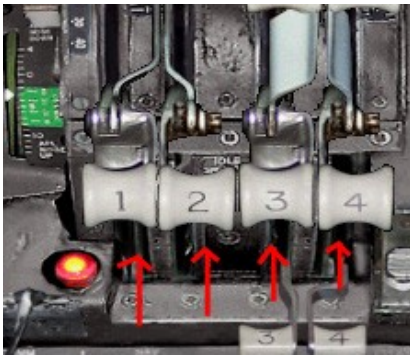


Having done so, we can proceed with the startup itself.

A Remark for the Captain Sim 707:

Unfortunately Captain Sim hasn't modeled the 707 how simmers would like it. You can hold/keep down the Start-Switches and Open the Fuel-Cutoff at the same time, so we have to, although it's unrealistic, to open the Cutoff Switches before the startup.

Another Bug of the Captain Sim Version is, that sometimes it seems to dislike the "manual" startup. They suggest in the manual to use STRG+E to startup the engines, which is I think we all agree pretty unrealistic. I tested it on my laptop and my homecomputer sometimes the manual startup i will now describe wont work, sometimes it will. So if the now explained procedure doesn't work, you have to use the STRG+E Command to "automaticly" start the engines.



First open all four **FUEL CUTOFF** Switches below the Throttle Levers.

Thereafter we go to the upper right corner of the Overhead panel, where the Start-Switches are located. The order of start procedure is pretty much up to you. We can start with the #1 Engine and then continue with #2 and so on...



Hold the Switch down to the **GROUND** position and wait for **N2** to rise, after around **20% N2**, the engine light up should occur and the **EGT** should rise. The engine should stabilize and you can release the switch.

Repeat the procedure for the other three engines.

After all engines are running, you have to switch the Essential Power Source Selector to one of the engines generators. (either **GEN1**, **GEN2**, **GEN3** or **GEN4**)



Next is to close all the circuits as now the engine generators can supply the aircraft with power. So we move all switches on the left middle part of the upper Flight Engineer Panel to the **CLOSE** position. That are:



The four **GEN CONTROL** switches, the four **GEN BREAKER** switches and the four **BUS-TIE BREAKER** switches. All of the twelve amber lights should be out by then.

To summarize:

We put the **CUTOFF Switches** to **ON**, then start the engines, couple one engine generator to the Essential Power Source and close all Generator circuits.

Or in short form:

CUTOFF SWITCHES	...ON
ENG START	...GROUND (4x)
ESSENTIAL POWER SOURCE	...GEN1,GEN2,GEN3 or GEN4
GEN CONTROL	...CLOSE (4x)
GEN BREAKER	...CLOSE(4x)
BUS TIE-BREAKER	...CLOSE(4x)

3. Final Cockpit preparations

A few things are still left to do, before we can takeoff.

We turn on the **Pitot Heat** on the Overheadpanel, so that all the sensors won't freeze and give bad data. To turn it on, just put the two switches to the **ON** Position



Also, if we takeoff at bad weather, such as heavy rain or snow, or icing conditions we should activate the **Continuous Ignition** during takeoff. This will ensure that the engines won't flameout. To activate the **Continuous Ignition**, simply put the switch, which is located on the Overhead panel above the engine start switches, to to the **ON** position.



Also don't forget the seatbelt signs ;)



On more important step now, our final step, is the pressurization of the Cabin. In nowadays aircraft, air is taken from the engines (Engine Bleed) and used for the air conditioning&pressurization system. The 707 had to “weak” engines for this procedure, so there were three engine driven compressors installed on three of the four engines. These compressors supplied the air conditioning system.

First we need to start them. Therefore we go to the upper Flight Engineer (Second Officer) Panel and look at the upper right corner.



We can find three **RPM gauges** there. As we can see, Engine 2, 3 and 4 are equipped with a compressor. To start them simply push the corresponding **start-switch** to the **START-position**. You should see the **RPM** rising and establish, after that the amber **LOW PRESS** light should extinguish.

Start up all three compressors.

After that we turn on the **LEFT** and **RIGHT AIR CONDITIONING UNIT ON**

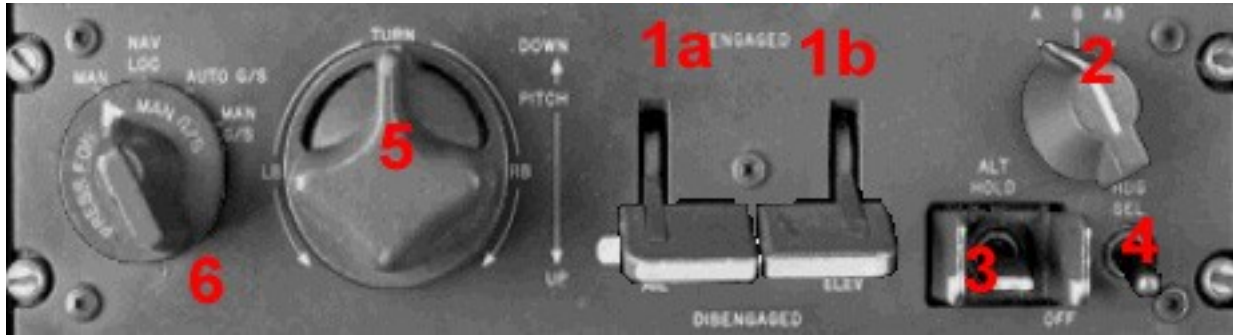


The **PACKS** will be left in the **OFF** position, till after the takeoff, for increased power during the takeoff roll.

Last but not least, we activate the **YAW-DAMPERS**, for damped yaw-motion in flight.



4. Autopilot



Compared to modern flight computers, the old autopilots were completely mechanical and are a bit different from their modern counterparts concerning their usage.

Switch 1a and 1b are the MAIN-Switches with which you can engage/disengage the autopilot. The 1a switch is for the AILERONS the 1b switch for the ELEVATOR. You can either only activate the AILERON control by bringing switch 1a in the up position or engage both switches. Also you can disconnect the ELEV switch separately, however you can't disconnect the AILERON and leave the ELEVATOR on.

Switch 2 selects the control-axis. Either A, B or A and B. This switch is not of much importance

Switch 3 is the ALT HOLD mode. If engaged it will make the airplane to hold the current altitude.

Switch 4 is the HDG SEL mode. If engaged it will make the airplane follow the current HDG selected on the HDG selector.

Switch 5 is your vertical control. You can either move it up or down, or turn it left and right. By pulling it down you increase your climb rate (around 200ft/min per pull) and by pushing it up you can decrease the climb rate/increase your sink rate (around 200ft/min per push). If you turn the switch to the left, your aircraft will bank left, if you turn it right, it will bank right. Depending on how far you turn the switch the aircraft will bank more. This mode is pretty good to fly the aircraft on approaches or to make more precise turns.

Switch 6 is the NAV mode selector, you can put it in 4 modes.

MAN – Manual mode – the autopilot will follow ALT and HDG commands selected

NAV LOC – The autopilot will make the aircraft intercept a VOR radial or a ILS Localizer

AUTO G/S – The autopilot will make the aircraft intercept an ILS and automatically keep the Glideslope

MAN G/S – The autopilot will make the aircraft intercept an ILS while you have vertical control of the aircraft.