

Flight Replicas

Super Cub

For Microsoft FSX plus Acceleration



To get full enjoyment of this aircraft, please read this manual carefully.

**Warning: This Manual and FSX model must not be used
for real flight training purposes.**

Aircraft Available:

1. *Early - 95 hp*
2. *Standard - 150 hp*
3. *Standard with Carbon-fibre Wheel-Skis - 150 hp*
4. *Standard with Amphibious Floats - 160 hp*
5. *L-18 Military - 95 hp*
6. *L-21 Military (two versions) - 150 hp*
7. *IFR equipped on Amphibious Floats w. square instrument panel – 180 hp*
8. *Classic Bush Plane on 32" wheels*
9. *Classic Bush Plane on Edo 2000-type Floats*
10. *Classic Bush Plane on Federal-type Skis*
11. *N8050C on 26" wheels – 150 hp*
12. *N8050C on Edo 2000 floats – 150 hp*
15. *N8050C on Federal skis – 150 hp*
14. *Bush Plane on 35" wheels - 150 hp*
15. *Bush Plane on 32" wheels w. square instrument panel – 180 hp*
16. *Extreme Bush Plane on 35" wheels w. thrust line mod – 180 hp*
17. *Extreme Bush Plane (L-21) on 35" wheels w. square inst. panel - 180 hp*
18. *Extreme Bush Plane (Experimental) on 36" wheels w. squared wings, droop aileron system, square instrument panel – 210 hp*

(Would you like us to put together a Super Cub that meets your specific criteria? Contact us at <http://www.flight-replicas.com/Contact.htm>)

Introduction

The Super Cub is one of aviation's most successful aircraft stories. In close to 40 years of production, over 9,000 were built, and a number of speciality companies continue to produce replicas and further developments to this day.

Introduced in 1949 by Piper Aircraft, it was developed from the Piper PA-11, and traces its lineage back through the J-3 to the Taylor E-2 Cub of the 1930s.

The Super Cub remained in production with Piper through until 1981, when almost 7500 had been built over an uninterrupted 32 year production run. Piper continued building Super Cubs on behalf of Texas based WTA who held the manufacturing and marketing rights from 1981 until 1988. In 1988 Piper resumed marketing responsibility for the Super Cub and continued low rate production. Financial troubles meant that Super Cub production ceased in 1992, before resuming once more the following year. Finally in late 1994 Piper announced that the Super Cub would not form part of its model line for 1995 and that it would cease production after the last of 24 on order for distributor Muncie Aviation were completed. (source: Airliners.net)

Famed as a Bush Plane on wheels, floats and skis, Super Cubs can be found all over the world in a great variety of roles, from a general GA aircraft to banner towing and glider tug.

Today, companies such as CubCrafters, Backcountry, Turbine and Mackey offer kits, parts and fully assembled aircraft for those who want to continue flying this outstanding aircraft design.

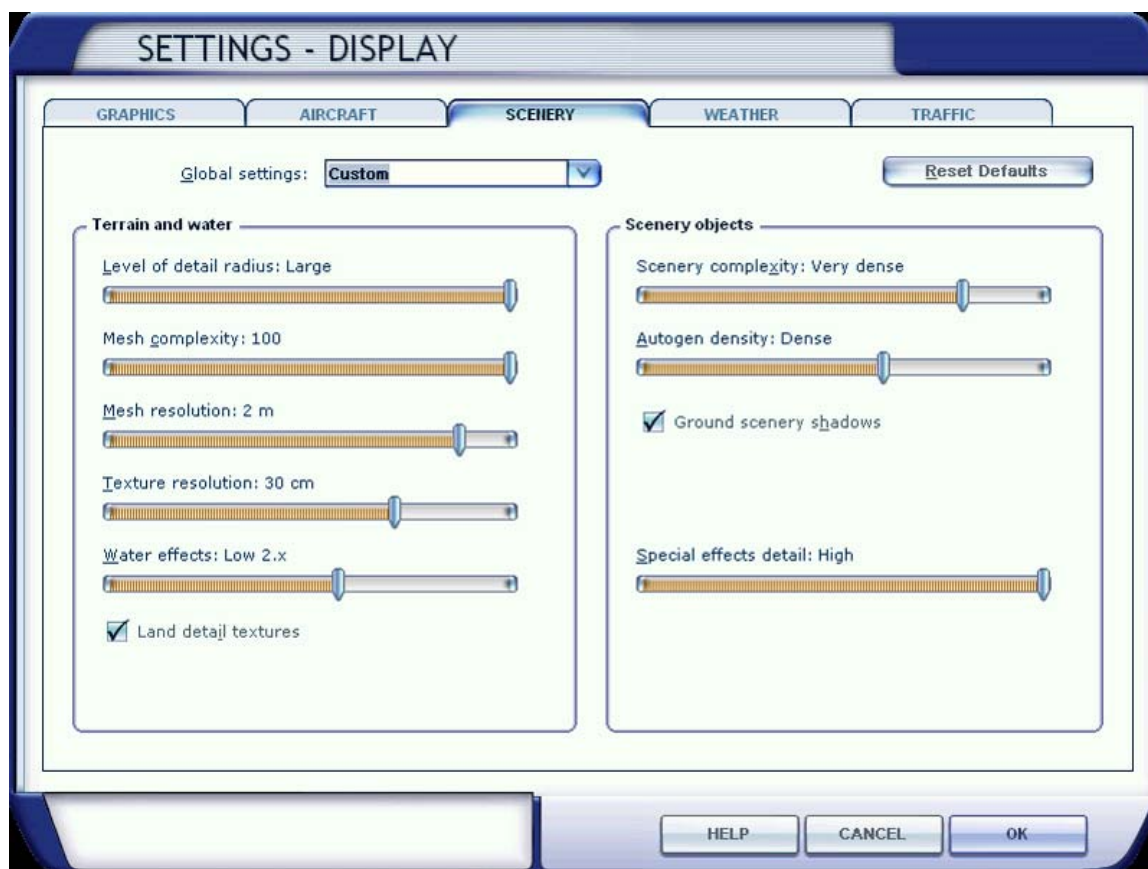
Simulator settings

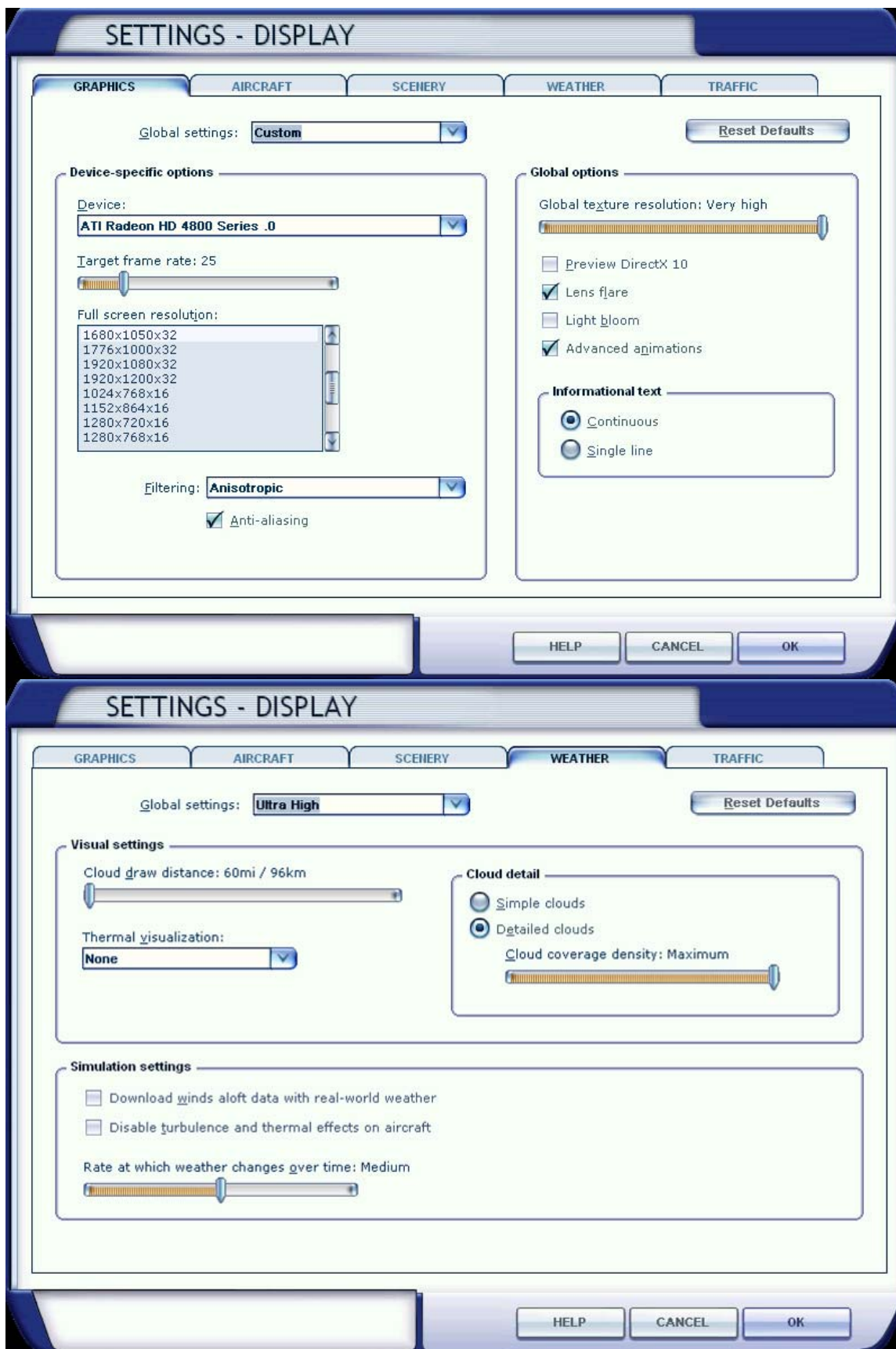
These are the settings at which the Super Cub was built and tested, and are those behind any performance-related statements. These settings are not necessarily a recommendation for your own computer – they are supplied as reference and illustrate conditions under which no unusual performance penalties were observed and the plane performed extremely well.

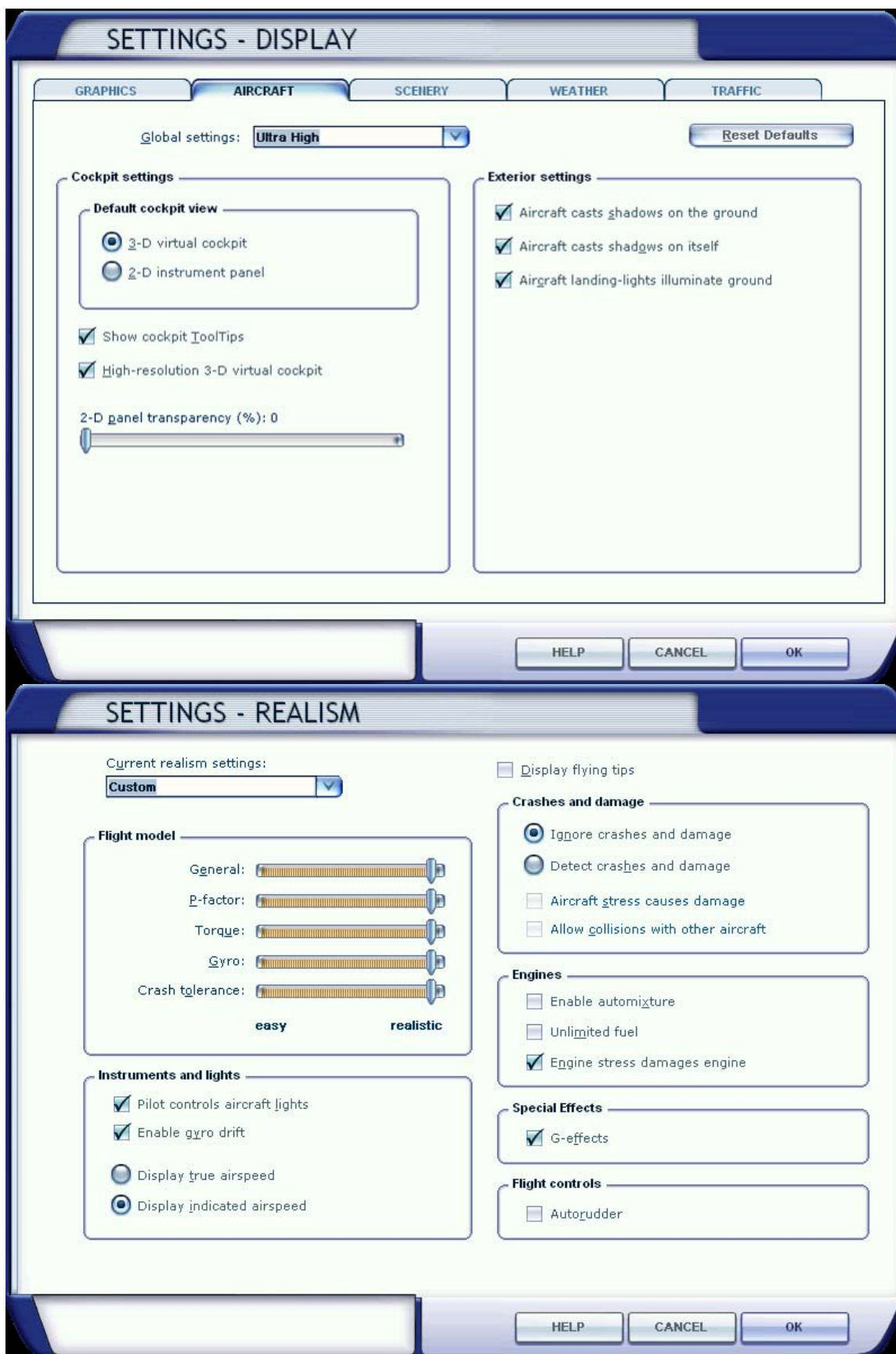
Beta testers had computers of different level capabilities, from what a knowledgeable casual observer could call “middle-of-the-road” to “strong” by today’s overall standards (late 2009).

Intuitively, one would assume that as the Super Cub is a simple aircraft, it should be a simple model – actually, just the opposite is true, as there is so much exposed structure. You may have to adjust your computer as necessary.

The only strong recommendation is to have fps limited to 25 or lower.







Preparation for flight:

Your Super Cub may or may not have its baggage/fuel pod installed when you arrive at the aircraft. You will have to make some brief decisions before you fly, depending on the type of flight you're going to make. Do you need the **pod**, and, if you are about to fly into a remote area, should you take a **rifle** for protection against potential bear attack or help acquire food if you crash-land and need to walk out?

First, enter your own weight (plus clothes, boots, headset, etc., seasonally adjusted), into the 'Aircraft/Fuel and Payload' dropdown menu (or you can leave it as is, it's up to you).

Baggage/Fuel Pod:

As in real life, baggage/fuel pods must be added and removed by the owner, and filled/emptied as well. As a Super Cub owner yourself, you now have the same choices to make.

In the simulator, pod weights must be manually added/changed via the cargo/fuel menu. Adding the pod itself (visual) is done via the clickspot on the panel (see illustration).

Fuel in the pod is not directly used by the engine: you must land, empty the fuel from the pod, and then manually add it to the wing fuel tanks.

Rifle:

Simple to add, and may save your life in remote wilderness areas. Add it via the panel clickspot (see illustration).

Fuel:

Early aircraft have a single 18 Gal. tank, the majority have two 18 Gal. tanks for a total of 36 Gal., and some have two upgraded 25 Gal. tanks for a total of 50 Gal.. Check what your aircraft has, to make sure you have the range for your flight (along with your belly pod fuel, if it's being used).

Oil:

Nothing to really worry about. As Tom Falley, owner of N8050C, states: “Unlike a radial, a good O-320 doesn't use any oil on startup and shouldn't have a cloud of white or blue smoke. Charlie has no discernable oil consumption in 25 hours (time between changes).”

Speaking of hours, all the aircraft have a working **Hobbs meter** (situated on the face of the RPM gauge), so you'll always know how many hours you have on that particular aircraft. Good to know for maintenance, your log book and perhaps your skill level if you're going to try something difficult.

GPS:

If you're only going for a short flight, or know the way, then you can put your GPS unit away with a simple click of a screw on the windscreen pillar (see illustration). If you find it hard to see on the panel, you can call it up in a separate window, which used the FSX default unit.

The GPS is a portable stand-alone unit, running on its own power supply. It is independent of the aircraft's power, and must be switched on and off manually (via the button with the red marking).

Avionics:

The Super Cubs here come with a **com radio** and a **transponder**, which will allow you to go anywhere in FSX. See the illustrated cockpit tour (below) for method of use. FSX default units can also be called up in separate windows

On the **deluxe IFR-equipped amphibious model**, the avionics can be traded out for your own third-party choices. You can free up one, two or three of the panel spaces, and substitute whatever you like. As this plane would cost in the region of \$300,000 US in reality, we thought you might want the ability to add suitably upgraded avionics to match.

Gross Weight:

Make sure to check the maximum gross weight allowed in your Super Cub before you fly. Some have the increased Max Gross weight kit installed and some do not. Those with it installed have a Max Gross of 2000 lbs, for example.

Instrument Panels:

There appears to be no such thing as a standard Super Cub instrument panel these days, as all have been completely modified in some way over time, or, like the CubCrafter's "square" panel, completely re-designed. The models attempt to illustrate some of that variety. Only the **Early** and **Standard** versions have panels that come from the pilot's operating handbooks (and even then....). All panels have been derived from real life examples (but with some changes).



Night Lighting:

The panel light comes on automatically when the navigation lights are switched on. Individual instruments are not illuminated in the Flight Replicas models, as is the case in most real Super Cubs.

Suspension Types:

The tail-dragger models have three types of suspension: Standard bungee, spring, and AOSS low-rebound.

Bungee and Spring have fairly high give and rebound and the airplane will bounce easily if landed too firmly. The AOSS suspensions are used mainly by the off-airport airplanes, bounce much less, and appear to move less as the energy is used up in their unique energy-damping system plus the give of the large tundra tires.

Engines:

There are 5 types of engines represented. They are:

Continental C90-14F, 95 hp

Lycoming O-320, 150 hp

Lycoming O-320 (uprated), 160 hp

Lycoming O-360, 180 hp

Lycoming O-375, 210 hp

L-21B's were originally delivered with 135 hp O-290 engines, but as all L-21's in this package represent modern restored versions, they have been updated to O-320's.

Sound:

Sounds are a mixture of default and custom sounds. Added sounds have been provided by the use of a custom sound module, developed by Bill Leaming.

As well as customary engine and environmental sounds, opening the window and doors in flight provide additional sound for enhanced realism. In my experience this is not usually a great increase in volume when opening things, as things are already pretty loud: one notices the sudden lack of it more when closing the doors and windows – and this is represented here.

Flight Dynamics:

Flight dynamics have been calculated from manufacturer's data, anecdotal information taken from a number of sources (in order to account for tundra tires, etc.), and most importantly from the personal experience of real Super Cub owner Tom Falley, who is also an experienced Flight Simulator beta tester and real-life Boeing 747 Captain.

NOTE: Extending the flaps will produce a large degree of pitch up (*this is accurate*). This is reduced if extended below 60 mph IAS. The effect also is reduced at higher aircraft weights.

Float plane:

To taxi on the water, you will need to lower the water rudder via the handle in the cockpit (see image **Cockpit Right**). In FS, the water rudder only becomes effective at a fairly high speed, so be careful.

Land and take-off with water rudder in the **up** position.

The water rudder steers using the standard rudder pedals.

As it is harder to judge height above water due to the lack of nearby physical objects with which to judge scale, your final approach for a

water landing should be carefully held to the landing speeds and correct aircraft attitude. Do not worry about last-second flare – get things set up, make a stable approach, and let the aircraft fly itself gently onto the water.

Ski plane:

Flying a ski-equipped aircraft in FSX is not that much different than the wheeled version. The important thing to remember is that there are **no brakes**, which will effect landing distances and the turning radius. Turning is done using rudder only, with a careful blast of throttle to help bring the tail around only **if needed**.

Standard Super Cub on Amphibious Float



A Tour of Your Super Cub Cockpits:

Instruments are identified by **function** – **they may appear in any combination on any aircraft**. The two principle panel types are illustrated – the classic “curved” panel and more modern “Square” panel.

Main Instrument Panel: “Curved” type



- | | |
|----------------------------------|--|
| 1. Throttle | 14. RPM and Hourmeter |
| 2. Mixture Control | 15. Cabin Heat |
| 3. EGT (Exhaust Gas Temperature) | 16. Starter Buton |
| 4. Whiskey Compass | 17. Primer Pump |
| 5. Magneto switch | 18. Clickspot GPS visible |
| 6. Carb Heat Control | 19. Clickspot Rifle on Strut |
| 7. Vertical Speed Indicator | 20. Clickspot Baggage/Fuel Pod |
| 8. Airspeed | 21. Radio and Transponder |
| 9. Gyro Direction Indicator | 22. Passenger vis ext view (95hp “Early” version only) |
| 10. Artificial Horizon | 23. Pilot visible in external view |
| 11. GPS | 24. Intercom |
| 12. Altimeter | |
| 13. Oil Temp and Pressure | |

Main Instrument Panel: “Square” type

(Panel screws have the same clickspot function as on the curved panel view)



1. Amphibious Landing Gear Panel
2. Volts/ Amps (use switch in middle to change reading)
3. Cylinder Selector for 4:
4. EGT/CHT gauge (use switch in middle to change reading)
5. Turn and Bank
6. Light Switches

Cockpit Upper Right:



- 1,2,3,4,5. Light Switches
- 6. Fuel Quantity Indicator (ball)
- 7. Landing Light Right

- 8. Landing Light Left
- 9. Ammeter

Radio and Transponder:



1. Radio on-off (mouse wheel)
2. Frequency Selector (mouse wheel): Inner and Outer Knob
3. Active/Standby Frequency selector
4. Transponder Switch (mouse wheel): In flight: **On (light will blink)**; to test: **TST (light remains on)**
5. Transponder Indicator Light
6. Transponder Number Selector Knobs (mouse wheel)

Cockpit Left:

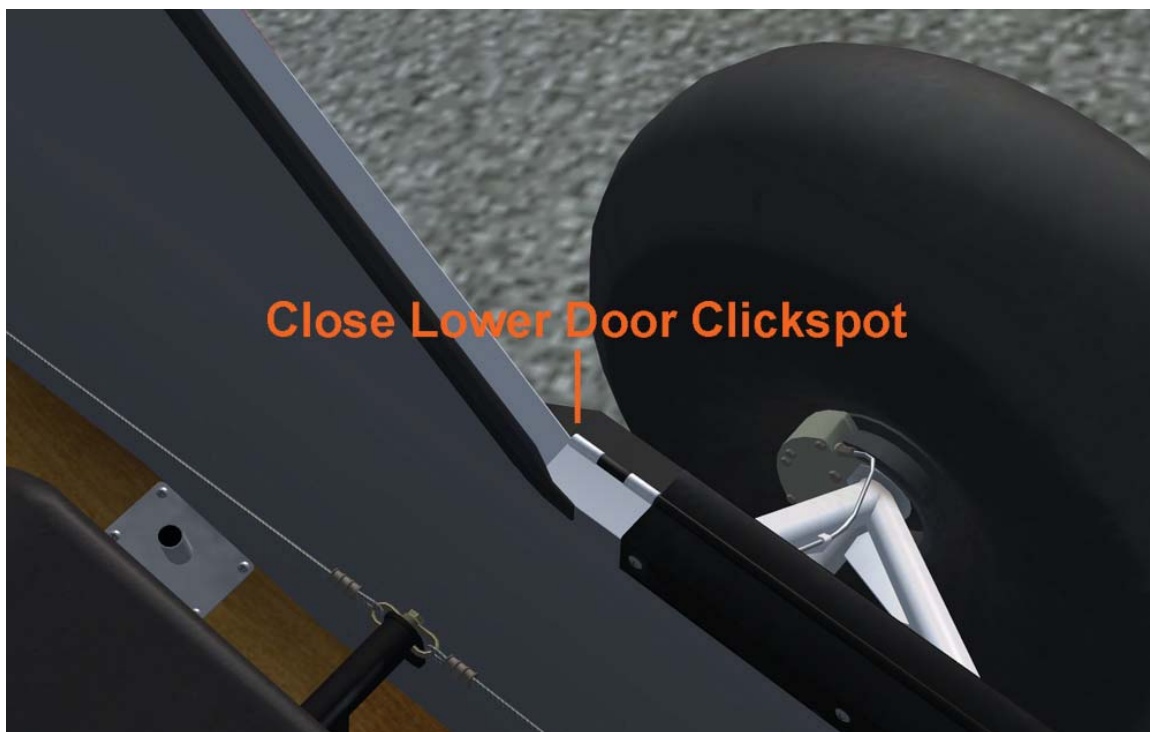


1. Trim indicator (click and drag)
2. Fuel Tank Selector (click and drag)
3. Flap lever (mouse wheel)
4. Sliding Window (click and drag the frame)

Cockpit Right:



1. Float Rudder Up/Down handle (click)
2. Lower Door Handle (click)
3. Upper Door Handle (click)
4. Upper Door closing clickspots (all screws) (click)

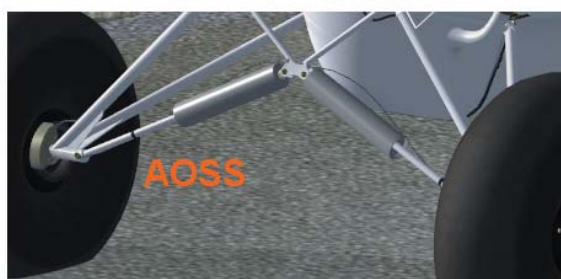


Aircraft Equipped with Amphibious Floats:



Some external differences between Super Cubs:

Suspension Types



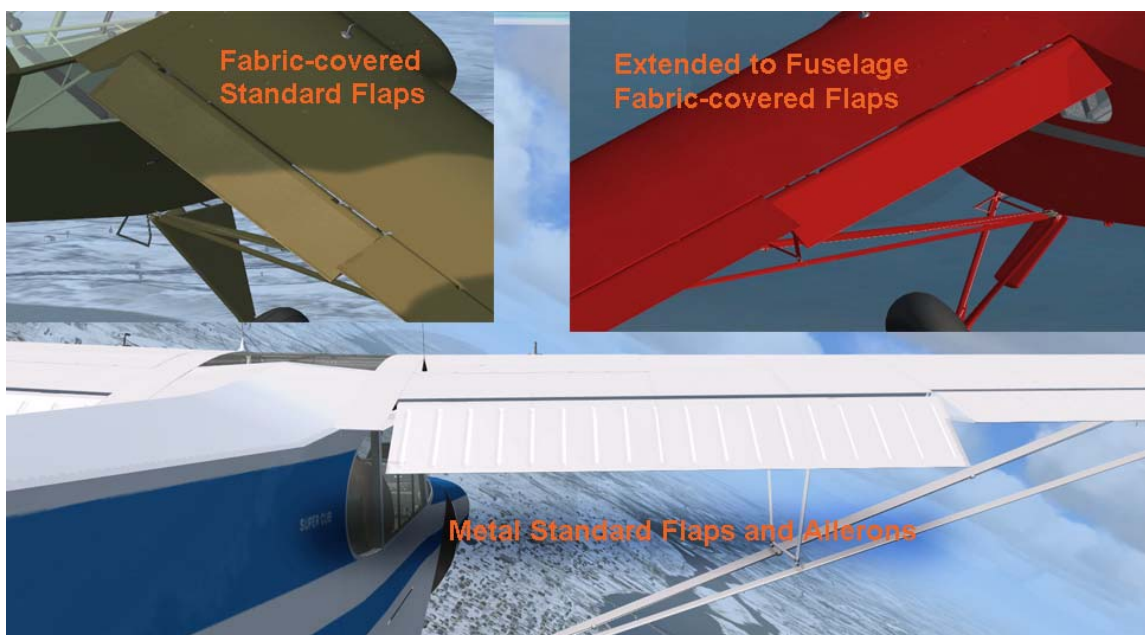
Tailwheel Types



Left: Large Bushwheel

Right: Standard Scott Tailwheel

Flap Types



Deluxe Edition Amphibious: Avionics Replacement:



Circled screw clickspots will make the connected avionic disappear.

Depending on what you choose to substitute, you can replace one, two or all 3 avionics, and replace them with whatever third party gauge you choose, by inserting them into the panel.cfg.

All three spaces are covered by just a single gauge poly, so you can fill the entire area as you choose, the three spaces in the illustration do not have to be adhered to.



Here the default gauges have been replaced by third-party gauges:



Flight Replicas Super Cub for FSX with Acceleration

Flying the Super Cub

NOTE: STOL techniques follow the standard flying instructions. See separate section.

Starting the Engine:

1. Mixture to RICH
2. Pump engine primer 3 or 4 times
3. Turn fuel selector valve to either LEFT or RIGHT position
4. Turn magneto switch to BOTH
5. Press starter button
6. As soon as engine starts firing, release starter button.
7. Open the throttle to 800 rpm as quickly as possible
8. Check oil pressure for an indicated pressure.

Engine Ground Operation:

1. As soon as the oil pressure has reached the proper indication, adjust throttle to obtain the smoothest speed between 800 and 1200 rpm.
2. Limit warm-up time to 4 minutes in cold weather and 2 minutes at temperatures above 70 degrees Fahrenheit.

Ground Tests:

1. Fuel selector valve – Check operation of engine on each fuel tank.
2. Instruments – Check instruments for appropriate oil pressure and oil temperature readings.

Taxiing Instructions:

1. Allow airplane to run forward slightly and check the brakes.
2. Taxiing speed should not exceed that of a brisk walk. Any faster and the tail will come off the ground.
3. All taxiing shall be done with the mixture control in RICH and the carburetor heat control in the OFF position.

4. Because of the restricted forward visibility as a tail-dragger, S-turn the airplane while taxiing to provide a clear, unrestricted forward view.

Upwind Taxiing:

1. Hold control stick as far to the rear as possible to hold the tail firmly down. This holds the tail wheel firmly on the ground to ensure proper steering action.

Downwind Taxiing:

1. Hold control stick forward to keep the tail from being lifted off the ground as a result of wind pressure building up beneath the elevators.

Cross Wind Taxiing:

1. Hold control stick into the wind to keep the wings level. The primary control will be by use of the rudder, which is adequate even in strong winds. A slight amount of downwind brake may be used if necessary, but should be kept to a minimum.

Before Take-Off:

1. Magneto switch check – Advance the throttle to 1800 rpm and turn the magneto switch to **L** and check for rpm drop off. Return magneto switch to **BOTH** and allow engine rpm to stabilize. Then turn to **R** and again check for rpm drop off. Return the magneto switch to **BOTH**.
2. Acceleration and Deceleration check – With the mixture control at **RICH** position, advance throttle from idle to 1800 rpm and back to idle. The engine should accelerate and decelerate smoothly.

Take-Off:

1. Check all flight controls for free and easy movement.
2. Check stabilizer trim control. Center the position indicator.

3. Altimeter set.
4. Flaps full up.
5. Carburetor heat control **OFF**
6. Mixture control **RICH**
7. Engine primer in.
8. Adjust cabin heat control as necessary.
9. Observe and check for the approach of any aircraft. If none, release brakes and roll into take-off position, airplane lines up with the runway.
10. Advance throttle smoothly to full **OPEN**.
11. When aircraft has gained sufficient speed, raise tail slightly.
12. When flying speed has been reached, **allow the airplane to fly itself off the ground, using slight back pressure on the control stick.**

After Take-Off:

1. After the airplane is airborne, bring back the throttle to **2300 rpm**.
2. Trim airplane as necessary.
3. Raise wing flaps if used on take-off.

Climb:

1. The best climb rate (overall, depending on aircraft model) is attained at 70 mph. The minimum airspeed for engine cooling in climb is 65 mph.

Decent for Landing:

1. Before entering the decent, the mixture control should be set to rich to provide smooth engine operation with reduced power.
2. Because of rapid engine cooling during the long glide in making an approach for landing with the throttle back, clear the engine approximately every half-minute by slowly and smoothly, partially opening and closing the throttle.
3. During the decent, keep the carburetor heat control in full **ON** position.

Normal Landing:

1. Maintain normal power-off approach speed (wing flaps full down).
2. Sideslips may be safely executed during approach with wing flaps down.
3. After landing, apply brakes **carefully** during the landing roll.
4. Raise wing flaps after landing.
5. Carburetor heat control off.

Landing Roll:

1. Remain alert for any swerve, bounce or skip on landing. A sudden swerve may occur when landing with a slight drift.
2. Whenever possible, take advantage of runway length to save brakes.

Stopping Engine:

1. Open throttle to approximately 1300 rpm, then pull the mixture control to the **IDLE CUT-OFF** position.
2. When the propeller stops spinning, turn the magneto switch to **OFF**, return the mixture control to the **RICH** position and slowly advance the throttle to the **OPEN** position.

STOL (Short Take-Off and Landing) Techniques:**“Brake-Stand” Take-off:**

1. Raise viewpoint as high as possible to obtain best forward view.
2. Apply full brakes.
3. Advance throttle to full open.
4. Observe tail rising, and when airframe begins to rock, release brakes.
5. As airplane reaches flying speed, one notch of flaps may be used to ‘jump’ the airplane off the ground, but be aware the flaps increase drag and hence may increase take-off distance.

6. As soon as airplane reaches take-off speed, pull back on stick and when at a safe altitude (100 ft) place wing flaps (if used) at full up. Be aware that airplane will adopt different attitude as flaps are raised.
7. Maintain normal climb airspeed.

Short-Field and Off-Airport Landing:

Note: This approach and landing technique does not use a standard gliding approach. Instead, a power-on approach is used. You will be using the throttle to control the rate of descent and the elevator to control pitch and thus airspeed.

1. Fly over, observe and carefully check landing area for ground condition and obstacles. Make as many low passes as required to be confident of the landing area before attempting to land.
(Note: it take greater distance to take-off than to land: choose landing sites accordingly!)
2. Line up with landing area, and use standard decent techniques to set up the engine controls (see above).
3. At approximately 60 mph, apply one notch of flap. Do not lose sight of landing area as airplane attitude changes.
4. At approximately 50 mph, apply second notch of flap. Again, do not lose sight of landing area.
5. At this point in the approach, you will be going **behind the power curve**. Strict attention to airspeed and rate of decent is essential.
6. Maintain final approach speed of 43-45 mph.
7. Round out in ground effect, in flat trajectory, then cut throttle just before landing point, and drop to desired landing point.
8. Pump brakes carefully while keeping stick fully back until stopped.

Practice to obtain absolute consistency before attempting this landing technique! Practice these techniques at the flying weight that will be in effect at time of take-off and landing at the STOL landing strips!

Suggestions for Practice:

1. Very precise circuits.
2. STOL techniques, until you get **very** consistent take-off and landing spots and distances.
3. A cruise over beautiful scenery – practice getting best trim/power setup as close to hands-off as possible.
4. Practice flying behind the power curve: use throttle to control rate of descent, and stick to control airspeed.
5. Practice 4 (above) at different aircraft weights.

Special Effects Notes:

Water Skimming: Like real Super Cubs, yours, if equipped with Tundra Tires (Bushwheels) will be able to skim along the surface of lakes and rivers. Go too fast and you will bounce off, however, and too slow and you will sink in. Try it at approximately 60 mph IAS.

It will dip in a bit lower than in reality, but this is what we could achieve within the boundaries of FSX.

When landing on extremely short off-airport landing spots that are adjacent to water, you may also drop your wheels into the water just prior to touching land, to help shorten the landing run. Do not attempt this on take-off!

Doors: If you choose to fly with the doors open (always nice in hot weather, or if conducting a search), you will notice that the lower door will move a little with the airflow. It will stay close to the fuselage, however, due to the boundary layer. But, should you choose to pull negative G's, you will see it come up. If you manage to pull a parabolic arc at 0 G, you can make it float half way up.

Keychain: This will react to most dynamic forces with FSX, and can be a helpful visual aid as to what the aircraft is doing, as well as an indicator of the forces you would be feeling in reality.

Brake-Stands: We were unable to get the elevator to function in the initial stages of lifting the tail, but as you gain speed function returns.

Thanks:

This Super Cub series has been made what it is with the help of the following people:

Tom Falley, owner of Super Cub N8050C, who graciously took photos, answered questions, and tweaked the airfiles, despite his hectic schedule.

Wozza (aka Warwick Carter) for his expertise and superb gauge assistance and creation, plus beta testing.

Jacques Alluchon, for being perhaps the most enthusiastic, involved and exacting beta tester in all of the FS world.

Roger Law, for his great competence, patience and long experience as a beta tester for the entire sim community.

Support:

Me-262a-1a@hotmail.com

All requests for support must be accompanied by **all** the following information:

1. Place/website where the Super Cub was purchased;
2. Order number;
3. Name used when purchasing; and
4. Date of purchase.

No support will be forthcoming without this information.

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