PA-28-181 ARCHER TX/LX

OPERATIONS MANUAL

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Just Flight™

PA-28-181 ARCHER TX/LX

Operations Manual

Please note that X-Plane 12 must be correctly installed on your PC prior to the installation and use of this PA-28-181 Archer TX/LX simulation.

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INTRODUCTION

The PA-28-181 Archer TX/LX is a four-seat, piston-engine aircraft equipped with fixed tricycle landing gear, 180 HP four-cylinder engine and fixed-pitch propeller.

The origins of the Archer start with the Piper Cherokee, which began production in 1961. The Cherokee was introduced as a more affordable alternative to Piper's Comanche and to compete with the popular Cessna 172. Piper continued to develop variants of the Cherokee and the Archer III, certified in the mid-1990s, was one of the most recent PA-28 variants to be built, reflected in its streamlined cowling and cockpit overhead panel controls. Capable of cruising at 118 knots and with a range of nearly 500 miles, it is ideal for touring and flight training.

The TX/LX is a modernised version of the Archer III, equipped with a G1000 glass cockpit system. The TX is aimed at the training market and the LX the private market.

Aircraft specifications

Dimensions

Length	7.3 m (24 ft)
Wingspan	10.8 m (35.6 ft)
Height (to top of tail)	2.2 m (7.3 ft)
Wing area	15.8 m2 (170 ft2)

Engine

Type	Lycoming O-360 four-cylinder, horizontally opposed, air-cooled piston
Power	180 horsepower at 2,700 RPM
Propeller	Two-blade, fixed-pitch

Weights

Empty weight	1,683 lb (763 kg)
Maximum take-off/landing weight	2,550 lb (1,157 kg)
Maximum baggage weight	200 lb (91 kg)
Maximum useful load	875 lb (397 kg)

Fuel and oil

Fuel capacity	50 US gallons
Usable fuel	48 US gallons
Oil capacity	8 US quarts

Performance

VNE (never exceed speed)	154 KIAS
VNO (max. cruising speed)	125 KIAS
VA (manoeuvring speed)	113 KIAS (at 2,550 lb)
	89 KIAS (at 1,634 lb)
VFE (max. flap speeds)	102 KIAS
VSO (stall speed)	45 KIAS (landing configuration)
Service ceiling	13,200 ft
Range (max. payload)	522 nautical miles

Paint schemes

The Archer TX/LX is supplied with the following five static liveries:

- D-EKKP (Germany)
- G-IBEX (UK)
- N280HG (USA)
- N667LB (USA)
- N752ND (USA)

The Archer TX/LX also comes with Thranda's innovative Dynamic Livery system, allowing you to create and save your own custom liveries from the EFB.

INSTALLATION, UPDATES AND SUPPORT

You can install this Archer TX/LX software as often as you like on the same computer system:

1. Log in to your Account on the Just Flight website.
2. Select the 'Your Orders' button.
3. A list of your purchases will appear and you can then download the software you require.

To install the aircraft in X-Plane 12:

1. Download the Archer TX/LX from your Just Flight Account.
2. Unzip the downloaded .zip file. The resulting folder will be named 'JF12_PA28_Archer_TX_G1000'.
3. Copy the 'JF12_PA28_Archer_TX_G1000' folder into the 'X-Plane 12/Aircraft' folder.

Accessing the aircraft

To access the aircraft in X-Plane 12:

1. From the Main Menu, click 'New Flight' or go to the Flight Configuration window.
2. Click on the 'PA28 Archer TX G1000 for XP12' in the aircraft selection screen.
3. Click 'Customize' and choose a livery from the drop-down menu in the top right.
4. Click 'Start Flight'.

Uninstalling

To uninstall this software from your system:

1. Go to your X-Plane 12 folder.
2. Open the 'Aircraft' folder.
3. Delete the 'JF12_PA28_Archer_TX_G1000' folder.

Recommended X-Plane settings

For maximum enjoyment of this aircraft in X-Plane, we recommend setting your joystick 'Stability Augmentation' sliders to 0. This will help prevent control issues, such as running out of pitch trim, and results in more realistic flight behaviour.

To turn off Stability Augmentation, follow these steps:

1. Launch X-Plane and go to the 'Settings' window.
2. Go to the 'Joystick' tab.
3. Click on the 'Control Sensitivity' button along the bottom of the window.
4. Set all three of the 'Stability Augmentation' sliders to 0% to disable them.
5. The 'Control Response' sliders can be set as desired.
6. Press 'Done'.

Updates and Technical Support

For technical support (in English) please visit the Support pages on the Just Flight website.

As a Just Flight customer you can obtain free technical support for any Just Flight or Just Trains product.

If an update becomes available for this aircraft, we will post details on the Support page and we will also send a notification email about the update to all buyers who are currently subscribed to our Newsletter and emails.

Regular News

To get all the latest news about Just Flight products, special offers and projects in development, just subscribe to our regular emails.

We can assure you that none of your details will ever be sold or passed on to any third party and you can, of course, unsubscribe from this service at any time.

You can also keep up to date with Just Flight via Facebook and X.

SYSTEMS GUIDE

Airframe

The Archer TX/LX is a single-engine, all-metal aircraft with fixed landing gear. It has seating for up to four occupants, a 200-pound luggage compartment and a 180 HP engine.

The basic airframe is constructed out of aluminium alloy. Aerobatics are prohibited in this aircraft since the structure is not designed for aerobatic loads. The fuselage is a semi-monocoque structure. There is a front door on the right side and a cargo door aft of the rear seat.

The wing is of conventional semi-tapered design and employs a laminar flow NACA 652-415 airfoil section. The main spar is located at approximately 40% of the chord aft of the leading edge. The rear spar, in addition to taking torque and drag loads, provides a mount for flaps and ailerons. The four-position wing flaps are mechanically controlled by a handle located between the front seats. When fully retracted, the right flap locks into place to provide a step for cabin entry. Each wing contains one fuel tank.

A vertical stabiliser, an all-movable horizontal stabilator and a rudder make up the empennage. The stabilator incorporates an anti-servo tab which improves longitudinal stability and provides longitudinal trim. This tab moves in the same direction as the stabilator but with increased travel.

Fuel system

The fuel system was designed with simplicity in mind. Fuel is contained in two 25 US gallon tanks, one in each wing. Of the total 50-gallon capacity, only 48 gallons are usable.

The tanks are attached with screws to the leading edge of the wing and are an integral part of the wing structure.

A fuel tank selector allows the pilot to control the flow of fuel to the engine and is located on the left sidewall below the instrument panel. It has three positions: OFF, LEFT TANK and RIGHT TANK. The arrow on the handle of the selector points to the tank which is supplying fuel to the engine.

An auxiliary electric fuel pump is provided in case the engine-driven pump fails. The electric pump should be adequate for all take-offs and landings and when switching tanks. The fuel pump switch is on the overhead panel.

Fuel quantity and flow indications are integrated into the G1000 MFD.

Electrical system

The battery master and alternator switches are located on the overhead switch panel. A radio master switch is located on the right side of the overhead panel. The circuit breaker panel is located on the lower right side of the instrument panel. Each breaker is clearly marked to show which circuit it protects.

Standard electrical accessories include alternator, starter, electric fuel pump, primer and stall warning horn.

The annunciators integrated into the G1000 include low oil pressure and low vacuum, low bus voltage, starter engaged and pitot heat indicator warning lights.

The primary electrical power source is a 28-volt, 70-amp alternator. The alternator provides full electrical power output even at low engine RPM. This provides improved radio and electrical equipment operation and increases battery life by reducing battery load.

Secondary power is provided by a 24-volt battery. A standby battery is installed which provides at least 30 minutes of emergency power to the pilot's G1000 display and the Aspen EFD 1000 standby instrument display in the event of a failure of the primary battery or charging system. The switch to arm the standby system is on the right side of the overhead panel, next to the avionics/radio master switch.

Pitot-static system

The system supplies both pitot and static pressure for the G1000 air data computer and Aspen EFD standby instrument.

Pitot pressure is picked up by the pitot head on the bottom of the left wing. The switch for pitot heat is located on the switch panel. Static pressure is sensed by button-type vents on each side of the aft fuselage.

Lighting system

Lights fitted to the aircraft include navigation, anti-collision strobe, landing, instrument panel and cabin dome lights.

The lighting control switches and knobs are on the overhead switch panel.

Instrument markings

Airspeed indicator markings

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White arc	45-102	Full flap operating range. Lower limit is maximum weight VSO in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green arc	50-125	Normal operating range. Lower limit is maximum weight VS1 with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow arc	125-154	Operations must be conducted with caution and only in smooth air.
Red line	154	Maximum speed for all operations.

Engine indicator markings

INSTRUMENT	Red line or arc Minimum limit	Yellow arc Caution range	Green arc Normal operating	Red line Maximum limit
Tachometer	—	—	500-2,700 RPM	2,700 RPM
Oil temperature	—	—	100-245°F (38-118°C)	245°F (118°C)
Oil pressure	25 PSI	25-55 PSI (idle) and 95-115 PSI (start/ warm-up)	55-95 PSI	115 PSI

Limits

Weight limits

Maximum ramp weight	2,558 lb (1,160 kg)
Maximum take-off/landing weight	2,550 lb (1,157 kg)
Maximum weight in baggage compartment	200 lb (91 kg)

Centre of gravity limits

Weight (lb)	Forward limit Inches aft of datum	Rearward limit Inches aft of datum
2,550	88.6	93.0
2,050 and below	82.0	93.0

The datum used is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

Manoeuvre limits

This aircraft is certified in the normal category, which is applicable to aircraft intended for non-aerobatic operations. These include any manoeuvres incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles and steep turns in which the angle of bank is no more than 60° and pitch is no more than 30°.

Aerobatic manoeuvres, including spins, are not approved.

Flight load factor limits

Positive load factor (maximum)	+3.8 G
Negative load factor (maximum)	No inverted manoeuvres approved

Types of operation

The aircraft is approved for the following operations:

- Day VFR
- Night VFR
- Day IFR
- Night IFR
- Non-icing

Fuel limitations

Total capacity	50 US gallons
Unusable fuel	2 US gallons (1 gallon per wing tank)
Usable fuel	48 US gallons (24 gallons per wing tank)

Landing gear

The Archer TX/LX is equipped with fixed landing gear.

The nose gear is steerable through a 30-degree arc each side of centre by use of the rudder pedals and toe brakes. A spring device is incorporated for rudder centring and to provide rudder trim.

The brake system includes toe brakes on the left and right sets of rudder pedals and a handbrake lever located below and near the centre of the instrument panel. The toe brakes and the handbrake have individual brake cylinders, but all the cylinders use a common reservoir. The parking brake is incorporated in the lever brake and is operated by pulling back on the lever and depressing the knob attached to the top of the handle. To release the parking brake, pull back on the brake lever and then allow the handle to swing forward.

Doors and exits

The aircraft is fitted with a passenger door and a baggage door.

The passenger door can be opened from within the virtual cockpit by clicking on the two door latches to rotate them to the OPEN position and then clicking and dragging on the door handle to push it open. It can be closed by pulling on the door handle to pull it closed and then clicking on the two door latches to rotate them to the LATCH position.

A large baggage area, located behind the rear seats, is accessible either from the cabin or through a large outside baggage door on the right side of the aircraft. When baggage is loaded, it is the pilot's responsibility to ensure that the aircraft's centre of gravity falls within the allowable CG range.

The Archer's passenger door is programmed in X-Plane to react to environmental forces, such as oncoming air (when trying to open the window while flying), as well as G-forces (when yawing the plane on the ground or in flight). If it is not closed and latched properly, this may result in some interesting movement, as it would in real life.

Flight controls

Dual flight controls are provided as standard equipment. A cable system provides actuation of the control surfaces when the flight controls are moved. The horizontal surface (stabilator) features a trim tab/servo mounted on the trailing edge. This tab serves the dual function of providing trim control and pitch control forces.

The trim function is controlled by a trim control wheel located on the control console between the two front seats. Rotating the wheel forward gives nose-down trim and rotation aft gives nose-up trim.

The rudder is conventional in design and incorporates rudder trim. The trim mechanism is a spring-loaded recentring device. The trim control is located on the right side of the pedestal, below the throttle quadrant. Turning the trim control clockwise results in nose-right trim and anti-clockwise rotation results in nose-left trim.

Manually controlled flaps are provided. They are extended by a control cable and are spring-loaded to the retracted (up) position. The control is located between the two front seats on the control console. To extend the flaps, pull the handle up to the desired flap setting of 10, 25 or 40 degrees. To retract the flaps, depress the button on the end of the handle and lower the control.

The aircraft will experience a pitch change during flap extension or retraction. This pitch change can be corrected either by stabilator trim or by increased control wheel force. When the flaps are in the retracted position the right flap, provided with an over-centre lock mechanism, acts as a step.

Engine

The Archer TX/LX is powered by a four-cylinder, horizontally opposed engine rated at 180 horsepower at 2,700 RPM. It is equipped with a starter, a 70-ampere 28-volt alternator, two magnetos and a fuel pump. The aircraft is equipped with a fixed-pitch propeller.

Engine controls

The engine controls consist of a throttle control and a mixture control lever. These controls are located on the control quadrant on the lower centre of the instrument panel, where they are accessible to both the pilot and the co-pilot.

The throttle lever is used to adjust the engine RPM. The mixture control lever is used to adjust the air-to-fuel ratio. The engine is shut down by placing the mixture control lever in the fully lean position.

The alternate air control lever is located to the right of the control quadrant.

Ignition and starter system

Engine ignition is provided by a dual magneto on two spark plugs per cylinder. An electrical engine priming system is provided to facilitate starting. The primer and start switches are on the left side of the overhead switch panel and separate left/right magneto switches are located in the centre of the panel.

Stall warning system

An approaching stall is indicated by a stall warning horn which is activated between 5-10 knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on a graph in the OPERATING DATA MANUAL.

The stall warning horn emits a continuous sound and is activated by a lift detector installed on the leading edge of the left wing. The battery master (BATT MASTR) switch must be ON for the stall warning system to function.

PANEL GUIDE

The instrument panel is dominated by the two large digital screens of the G1000 system. An audio panel is mounted between the screens and a smaller Aspen EFD 1000 screen for the standby instruments. The engine indications are incorporated into the G1000's Multifunction Display (MFD) on the right and can be shown on the Pilot's Flight Display (PFD) on the left in the event of a failure of the MFD screen.

Additional information and detailed operating instructions for X-Plane's G1000 system can be found in 'X-Plane G1000 Manual.pdf', located in the 'X-Plane 12/Instructions' folder.

The overhead switch panel contains all the engine-related (left side) and exterior lighting (right side) switches.

Additional features include a pilot storm window and two sun visors.

EFB 2D pop-out

The EFB 2D pop-out arrow appears in the top left corner of the screen every time you load the Archer TX/LX.

Left-click on this arrow to open the 2D EFB pop-out. This icon can easily be faded out and hidden completely by hovering your mouse over it and moving the scroll wheel. It will reappear for the next flight.

Please see dedicated EFB manual for further details of the EFB operation.

Left main panel

1. G1000 Pilot's Flight Display (PFD)
2. G1000 audio panel
3. Aspen EFD 1000 standby instruments

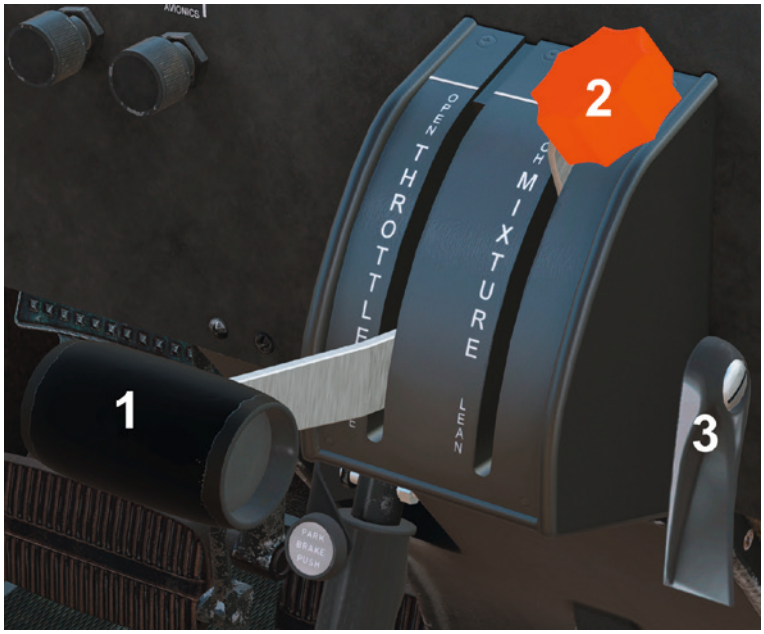
Left lower panel

1. Yoke toggle clickspot (same location on right yoke)
2. Pitot heat and ventilation fan control switches
3. Panel light controls
4. Pilot's headset jack (click to simulate a noise-cancelling headset)

Left sidewall

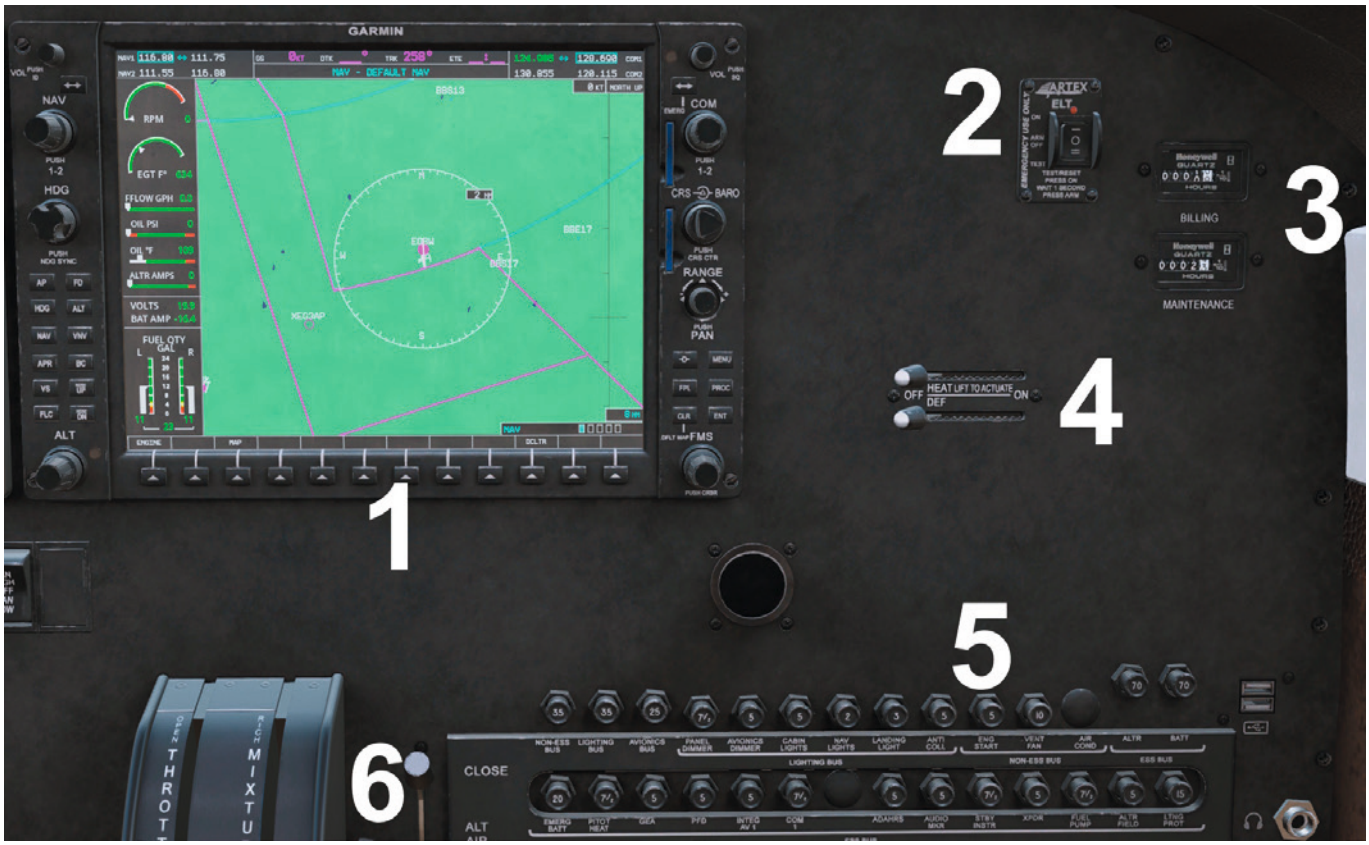
1. Fuel tank selector
2. Storm window (the window can be opened by clicking on the latch)

Throttle quadrant



1. Throttle lever
2. Mixture lever
3. Friction control

Right panel

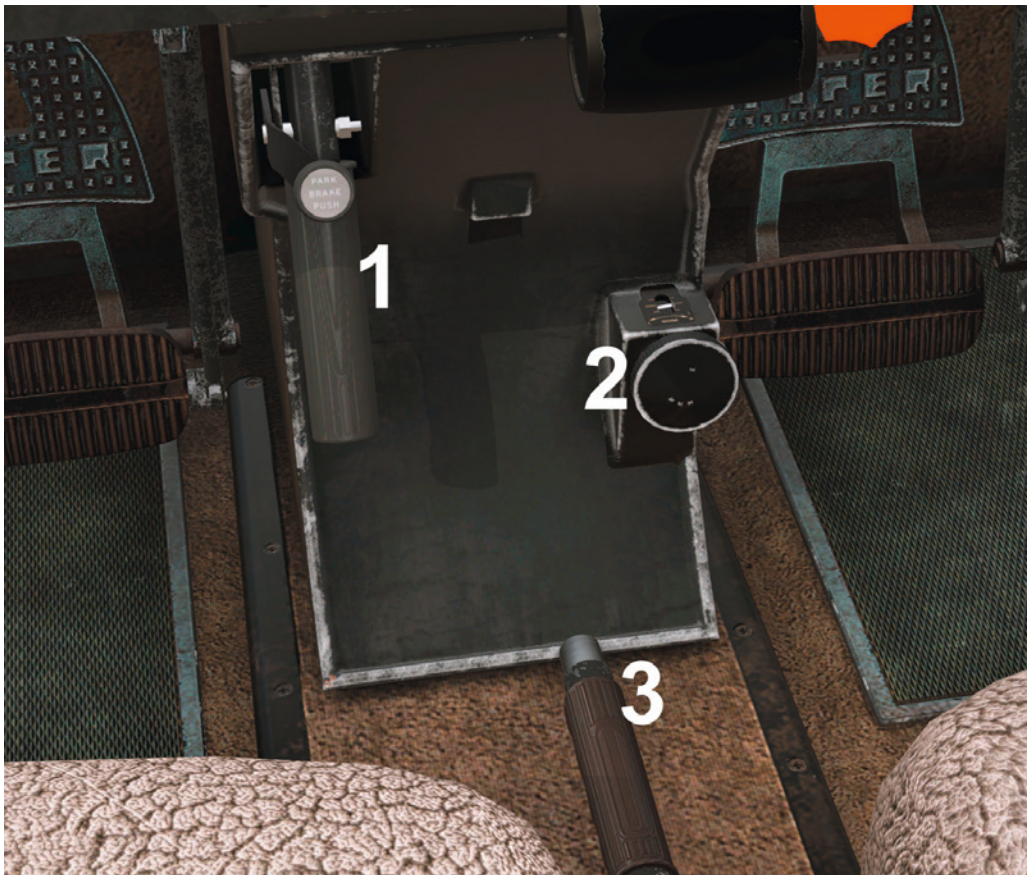


1. G1000 Multifunction Display (MFD)
2. Emergency locator transmitter switch
3. Hour meters
4. Heating and defrosting controls
5. Circuit breaker panel
6. Alternate air control lever

Overhead switch panel

1. Dome light
2. Engine start switch
3. Battery master switch
4. Alternator switch
5. Fuel pump switch
6. Left magneto switch
7. Right magneto switch
8. Landing light switch
9. Navigation lights switch
10. Strobe (anti-collision) lights switch
11. Standby battery switch
12. Avionics master switch

Lower cockpit



1. Parking brake handle
2. Rudder trim knob and indicator – turning the trim control clockwise results in nose-right trim and anti-clockwise rotation results in nose-left trim.
3. Flap lever
4. Elevator trim wheel and indicator – rotating the wheel forward gives nose-down trim and rotation aft gives nose-up trim.

G1000 audio panel

The G1000 audio panel between the PFD and MFD allows the pilot to control the transceiver and receiver outputs through the use of audio select buttons. The buttons will illuminate when they are selected on.

The COM1 MIC and COM2 MIC buttons select the radio to transmit, while the COM1 and COM2 buttons select which radios are audible to the pilot. Changing the transmitting radio automatically selects that radio for listening.

The buttons labelled DME, NAV1, NAV2 and ADF (not installed) are used to toggle the associated audio source(s) to monitor.

The MKR MUTE button toggles whether the marker beacon audio (outer, middle and inner marker beacons) can be heard.

The HI SENS button changes the marker beacon sensitivity. When the button is lit, the system is in high-sensitivity mode and marker beacons will be audible from further away from their vertical transmission axis.

The red button at the bottom enables display reversionary mode. This causes the PFD and MFD screens to both show the same display, including engine instruments. This is used in case of a failure of one of the screens.

G1000 PFD/MFD

The Archer TX includes a comprehensive simulation of the G1000 system. This system includes a pair of large digital colour screens, the Primary Flight Display (PFD) and the Multifunction Display (MFD). Clicking on either screen will bring up a 2D pop-up window, which can be popped out and moved to a separate window or monitor.

A detailed manual for X-Plane's G1000 can be found in your 'X-Plane 12/Instructions' folder, in 'X-Plane G1000 Manual.pdf', but here is a quick reference for a few of the most common operations:

COM and NAV radios

1. Navigation radio volume
2. NAV radio swap button
3. NAV radio frequency selector knob
4. NAV radio frequencies
5. COM radio frequencies
6. COM radio frequency selector knob
7. COM radio swap button
8. COM radio volume

The COM and NAV radio frequencies are shown in the upper corners of the G1000 PFD screen. The active frequencies are shown in the inner portion, while the standby frequencies are in the outer portion. Additionally, the COM frequency that is currently selected for transmitting by the audio panel is highlighted in green.

A blue box is drawn around the frequency that is currently selected for editing. To switch to editing the other radio, push on the centre of the COM or NAV rotary knob.

The COM and NAV knobs each have two sections. Rotating the outer portion of the knob will change the selected standby frequency in steps of 1MHz. The inner knob adjusts the digits to the right of the decimal.

To swap the standby and active frequencies, press the button just above the frequency knob, labelled with a double-ended arrow.

Transponder

The G1000 features a built-in Mode-C transponder. To access the transponder functions, press the softkey along the bottom edge of the display, labelled XPDR. This will change the softkeys to several options:

- STBY, ON and ALT are the transponder modes. The currently selected mode is highlighted in white.
- VFR – this sets the transponder code to 1200.
- CODE – this will change the softkeys to allow you to manually select a code, one digit at a time.
- IDENT – the pilot can press this when requested by ATC to ident.
- BACK – exits the transponder mode and returns the softkeys to their normal mode.

Important codes:

7700: Emergency

7600: Communications failure

7500: Hijacking

1200: VFR code (USA)

7000: VFR code (Europe)

Timer / Stopwatch

A simple timer can be brought up by pressing the TMR/REF softkey. By default the ‘START?’ indication is highlighted. Pressing the ENT button on the right will start the timer.

The pilot can also make changes to the selections using the FMS knob in the lower right corner. Rotating the outer knob will move the highlighted area to the next selection, and rotating the inner knob will make changes to that selection. This general principle is used throughout the G1000 system for making changes to selections.

For example, the timer defaults to a Count Up timer, but the pilot can select a Count Down timer instead by following these steps:

1. Rotate the FMS outer knob one click to the left, to select UP.
2. Rotate the FMS inner knob by one click to change UP to DN.
3. Rotate the FMS outer knob left again to highlight the time: ‘00:00:00’.
4. Now rotate the FMS inner knob as required to set the desired time.
5. Finally, rotate the FMS outer knob to the right to highlight ‘START?’ and press the ENT key to start the timer.

Pressing ENT a second time will stop the timer and pressing it a third time will reset it.

To hide the timer, press the TMR-REF softkey.

Additional information and details (including autopilot, flight plan functions, instrument approaches and auxiliary functions) can be found in the ‘X-Plane G1000 Manual.pdf’ in your ‘X-Plane 12/Instructions’ folder.

Flight Plan

The G1000 has a comprehensive flight plan system. The interface for entering and selecting waypoints is very similar to the timer function, where the FMS inner and outer knobs are used.

1. Press the FPL button to bring up the flight plan page. This can be done on the PFD for a small-format window or on the MFD for a more complete window. We'll use the MFD 'FPL' button for this example.
2. Press on the centre of the MFD's FMS knob. This will turn on the blue 'cursor', which will highlight the first waypoint.
3. Rotate the FMS inner knob to start editing the waypoint. This will bring up a separate window in which we will enter the new waypoint.
4. Keep rotating the FMS inner knob to set the first alphanumeric.
5. Rotate the FMS outer knob to move to the next character.

Repeat steps 4 and 5 until you have entered the complete waypoint identifier, for example 'EGLL' for London Heathrow.

6. Once the complete waypoint has been entered, press the ENT button. This will remove the highlighting from the waypoint.
7. Press ENT a second time to accept the input. The waypoint entry window will disappear and the waypoint will be shown in the flight plan.

You can enter additional waypoints as required. To add a new waypoint at the end of the list, use the FMS outer knob to highlight the blank last line of the flight plan. Then rotate the FMS inner knob to begin entering the waypoint identifier.

To add a waypoint in the middle of the plan, highlight the waypoint after where you want to add it, then rotate the FMS inner knob to start entering the new waypoint. For example, if we have a flight plan with two waypoints, 'A' and 'C', and we want to enter waypoint 'B' in between them:

1. Highlight waypoint C.
2. Begin typing the identifier for waypoint B, as described above.
3. Once it has been entered and accepted, waypoint B will appear in the list before waypoint C.

To delete a waypoint, simply highlight it in the flight plan and press the CLR button. A dialogue will appear asking if you want to confirm. Press ENT to confirm or press CLR a second time to cancel.

EFD1000

1. Left mode knob – press to toggle between CRS (navigation course) and IAS (airspeed) modes.
2. Left bearing pointer – press to cycle between NAV 1, NAV 2 and no bearing pointer.
3. NAV source – press to cycle through GPS, NAV 1 and NAV 2 as the navigation source.
4. Right bearing pointer – press to cycle between NAV 1, NAV 2 and no bearing pointer.
5. Right mode knob – press to cycle through HDG (heading), ALT (altitude), BARO (altimeter correction) and MIN (minimum altitude).
6. GPSS – not simulated.
7. MAP – not simulated.
8. 360 – not simulated.
9. MIN – toggles visibility of the minimum altitude display, for approaches.
10. TPS – toggles display of the speed and altitude tapes.
11. MENU – not simulated.
12. Range buttons – these adjust the range of the map objects on the EHSI display.
13. Reversionary mode – pressing this swaps the positions of the PFD and EHSI, in case of a partial failure of the display or computer.

The Archer TX/LX uses the EFD1000 for its standby instruments. This system combines a digital primary flight display and an electronic HSI into a single compact display.

The PFD includes an artificial horizon as the background. Airspeed in knots is shown on the left side, while altitude in feet is shown on the right.

An information bar is located below the artificial horizon. This includes true airspeed (TAS), ground speed (GS), the outside air temperature (OAT), an indication of the wind direction and strength, and the altimeter's barometric setting in inches of mercury.

The EHSI is a top-down compass rose with a green course pointer and course deviation indicator. The currently selected NAV source is indicated in the upper right, with the distance shown below. The selected course, magnetic heading and heading bug are indicated across the top. Vertical speed is shown in the upper right corner.

The bottom of the display includes two knobs and three buttons. Pressing either of the knobs allows different values to be changed. The currently selected item is shown in magenta.

The left knob adjusts these items:

1. CRS – navigation course.
2. IAS – indicated airspeed for the autopilot and flight director.

The right knob adjusts these items:

1. HDG – heading for the autopilot.
2. ALT – altitude for the autopilot.
3. BARO – altimeter's barometric setting.
4. MIN – approach minimums in feet above sea level.

The first press of the knob will change the selection to magenta, indicating that it can be adjusted by rotating the knob. Subsequent presses will select the next item. After several seconds of no activity, the item will return to the default blue colour.

The centre push-button cycles through the navigation sources. These are NAV 1, NAV 2 and GPS.

The two buttons on either side toggle the additional bearing pointers. These will be shown in blue on the EHSI. Pressing these buttons will cycle through NAV 1, NAV 2 or none.

GROUND EQUIPMENT

The aircraft can be fitted with chocks and tie-downs whilst on the ground.

The chocks and tie-downs are activated by the toggle buttons in the AIRCRAFT OPTIONS app of the tablet EFB. They can appear whenever the aircraft is on the ground and stationary, with the engine off and the parking brake applied.

They will disappear when those conditions are no longer met.

FAILURES

In addition to supporting the simulator's own failures system, this Archer simulation includes a few of the more common failures found on these aircraft:

- **Spark plug fouling** – this can occur if the engine is kept at low RPM for prolonged periods and symptoms include rough running with a subsequent increase in cockpit vibration. If fouling occurs, increase engine RPM and aggressively lean the mixture. This can be done at low power settings on the ground without harming the engine. An indication of the amount of spark plug fouling can be found on the EFB's Engine Configuration app.
- **Vapour lock** – this can occur for up to approximately 30 minutes after the engine has been shut down. After shutdown, fuel vapour can remain within the fuel lines as the result of high temperatures. This vapour disrupts the operation of the fuel system and creates an incompatible mix of air and fuel, so you might need a few attempts at starting the engine before ignition occurs. This problem is more likely to occur when operating in high temperatures. If vapour lock is suspected, operate the electric fuel pump for 20-30 seconds with the mixture in the idle cut-off position, then repeat the engine starting attempt.
- **Battery failure** – the battery can be quickly drained, either by leaving electrical systems switched on without the engine (and therefore alternator) running, or by repeated attempts to start the engine. The battery can be recharged using the Engine Configuration app on the EFB.

These failures are enabled by default and can be disabled/enabled by clicking on 'Simulate Spark Plug Fouling and Vapour Lock' in the EFB's Engine Configuration app.

If you are unable to start the engine, please check the following items:

Fuel flow – to ensure sufficient fuel flow for ignition, confirm that the fuel pump is switched on and the mixture lever is set to rich (forward). Confirm fuel flow using the flow gauge prior to attempting an engine start. Refer to the NORMAL PROCEDURES section in the manual for more information.

Vapour lock – this can occur for up to approximately 30 minutes after the engine has been shut down. After shutdown, fuel vapour can remain within the fuel lines as the result of high temperatures. This vapour disrupts the operation of the fuel system and creates an incompatible mix of air and fuel. If vapour lock is suspected, operate the electric fuel pump for 20-30 seconds (with the mixture in the idle cut-off position), then repeat the engine starting attempt.

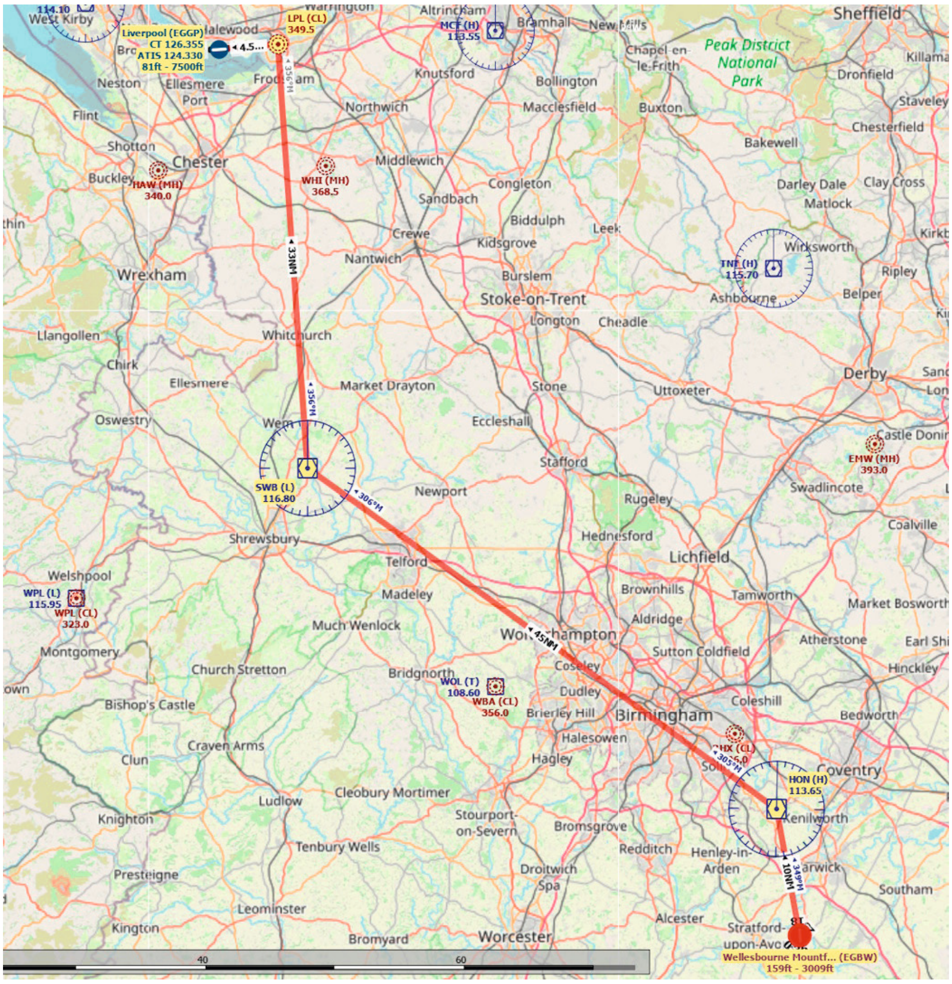
FLYING THE ARCHER TX/LX

In this tutorial flight we will be departing from Wellesbourne Mountford Airfield, close to the historic city of Stratford-upon-Avon, Warwickshire, UK. We will head northwest passing the city of Birmingham, the town of Telford and turning overhead Shawbury Aerodrome to head north to Liverpool Airport.

Covering approximately 91 nautical miles, this short flight is the ideal length for learning about the essential systems on board the PA-28 Archer TX/LX.

Here are the details for today's flight:

EGBW > HON (113.65) > SWB (116.80) > LPL (349.5)> EGGP



Estimated time en route: 45 minutes

Route distance: 87 nautical miles

Departure time: 0800 (local time)

Weather: Clear

Now that we are prepared for the flight, we can proceed to the cockpit to begin our pre-flight checks. To load up the PA-28 Archer TX/LX tutorial flight, follow these steps:

1. Start X-Plane 12.
2. From the Main Menu, click **New Flight** or go to the Flight Configuration window.
3. Click on the PA-28 Archer TX in the Aircraft Selection screen.
4. Click **Customize** and choose the desired livery from the drop-down menu in the top right. Uncheck the box labelled **Start with engines running**.
5. Under the Location box, type **EGBW** and select **Wellesbourne Mountford**. Click the **Customize** button.
6. Under 'Starts', select **Ramp** and choose a ramp start location. Press **Confirm** when done.
7. Click **Start Flight**.

You should now find yourself sitting in the cockpit at Wellesbourne Mountford. The aircraft is configured in a 'cold and dark' state, with all the cockpit systems switched off, as you would find the aircraft prior to the first flight of the day. By beginning in this configuration we will need to spend some additional time setting up the cockpit, but doing so will allow you to learn a considerable amount about the features and functions on board this light aircraft.

This tutorial will cover the necessary steps for you to get from point A to point B, but it will not explore each system in depth. Please refer to the rest of this manual for details of each system.

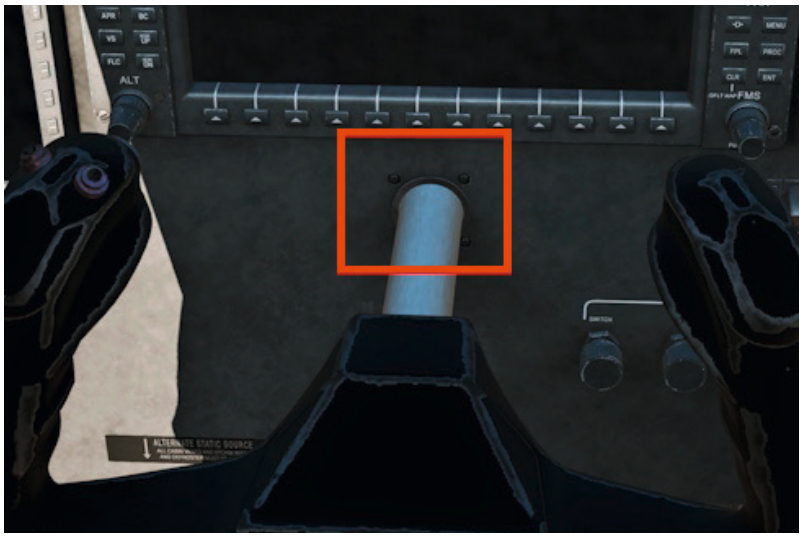
Getting started

The first step is to open the door to allow entry into the cockpit. In the virtual cockpit, click on the upper and lower door latches to rotate them to the **OPEN** position and then click and drag on the door armrest to push it open.

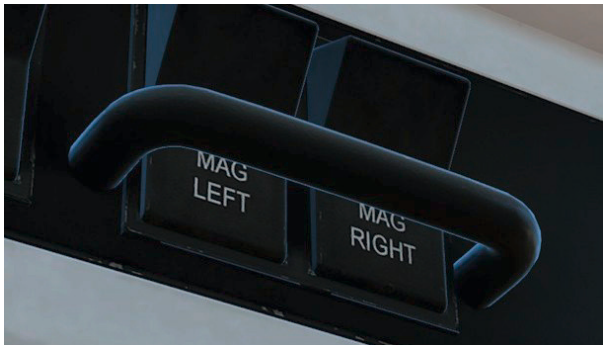
Use the EFB Aircraft Options app to open the baggage door. Use the chase camera to confirm that the baggage door has opened and then return to the cockpit.

We can now start working through the pre-flight inspections.

To enable easier access to the controls, you may want to hide the yoke by using the clickspot at the base of the yoke, where it is mounted to the panel.



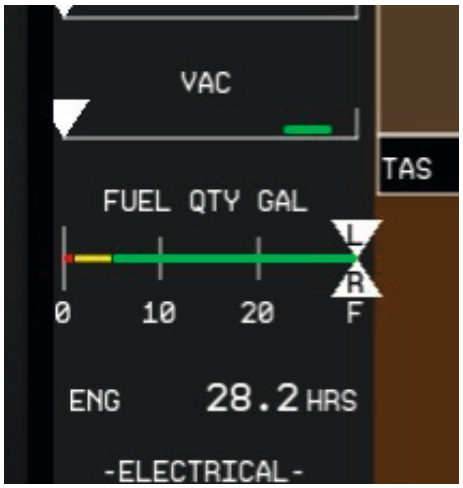
Check that the two magneto switches on the overhead panel are set to **OFF**.



Confirm that the parking brake handle is set **ON**.

Check that all avionics and the radio master switch are **OFF**, and that the mixture lever is set to **IDLE CUT-OFF**. Then switch **ON** the battery master.

Check the left and right fuel quantity indications to confirm that we have full tanks (25 gallons per tank). If this is not the case, use the Weight and Balance app on the EFB to set FULL fuel by using the scroll wheel on the left and right tanks or by clicking FULL under Set Fuel Level.

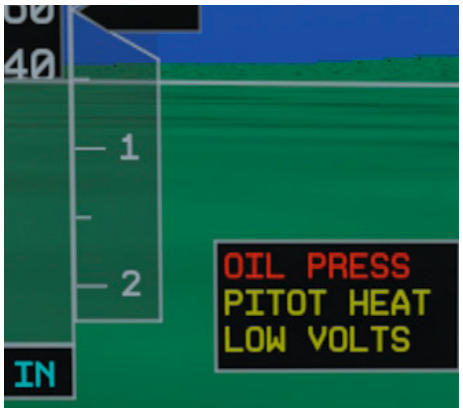


Switch **ON** the navigation, strobe (anti-collision) and landing lights using the controls on the overhead panel.

Switch to the exterior (Chase) view and confirm that all of the lights are illuminated before returning to the cockpit and switching them all **OFF**.

Check that the following annunciators are visible on the PFD: ‘OIL PRESS’, ‘PITOT HEAT’ and ‘LOW VOLTS’. Turn on the PITOT HEAT switch, verify that the annunciation extinguishes, then turn the pitot heat back off.

Then switch **OFF** the battery master.

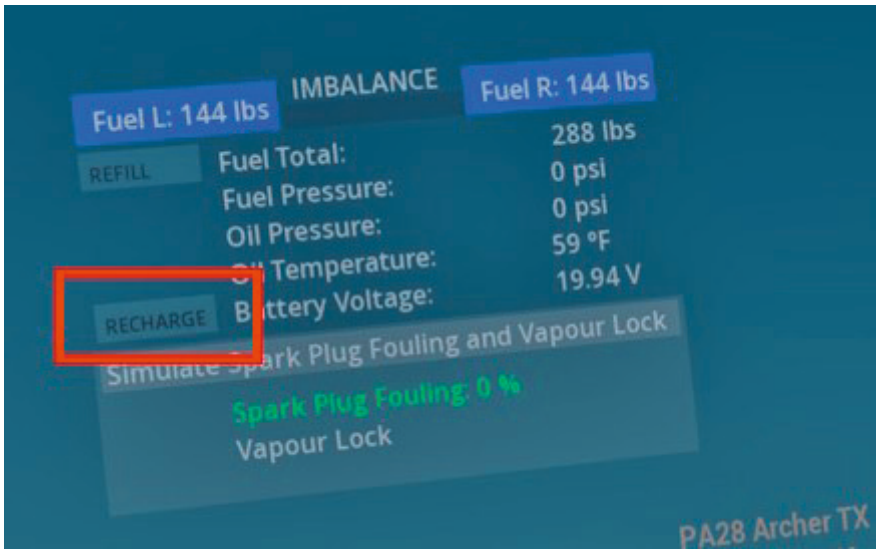


Check that you have full and free movement of the flying controls and that the mechanically controlled flaps extend fully.

Move the elevator and rudder trims to the centre/neutral position.

Switch to the external (Spot) view and carry out a visual inspection of the aircraft. The wheel chocks, tie-downs and towbar should be visible.

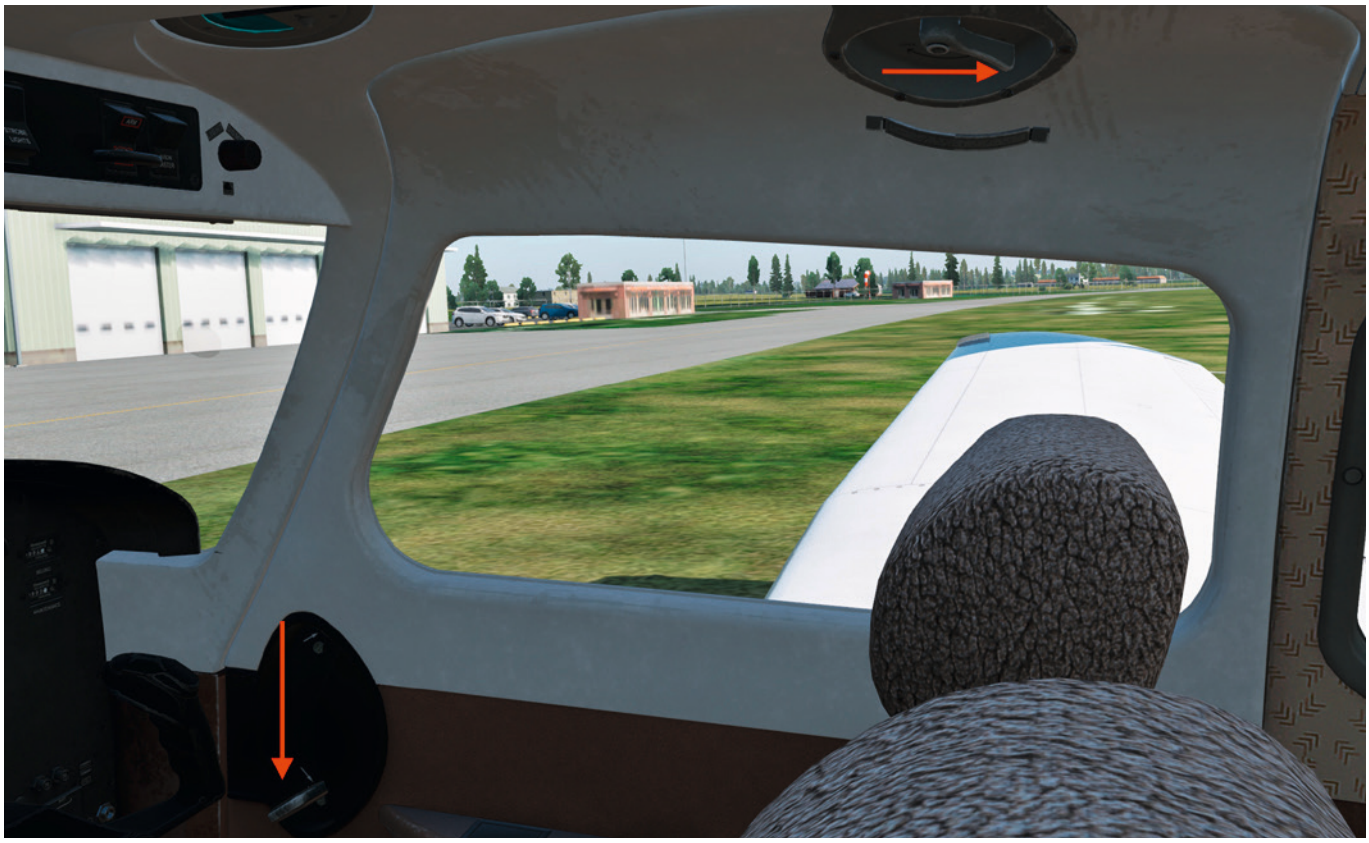
Use the Engine Configuration app on the EFB to recharge the battery in case it has discharged while you've been finding your way around the cockpit.



Starting the engine

To avoid draining the battery, we will start the engine before configuring the avionics for our departure.

Close the baggage door via the EFB Aircraft Options and then close the passenger door by first clicking on the door to pull it shut and then clicking on the door latches to rotate them to the **LATCH** position.



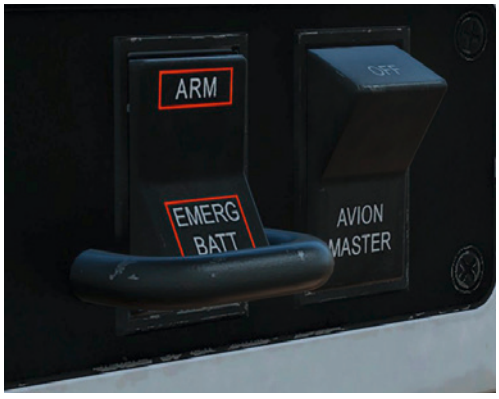
Retract the flaps, check that the parking brake is set and check that all circuit breakers are pushed in.

On the left sidewall, right-click on the fuel selector to rotate it to the **LEFT** position.

On the throttle quadrant, move the mixture lever to the **FULL FORWARD** position and advance the throttle lever to approximately **1/4 open**.

Confirm that the alternate air lever is set to **CLOSE** (up) and that all avionics are still **OFF**.

Turn the EMERG BATT switch to **ARM** and verify that the PFD and Aspen standby instruments power up.

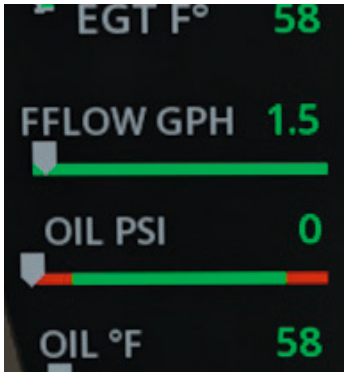


Verify that COM 1, NAV 1 and the engine indications are working, and that there are no red ‘X’s on the attitude, altitude, airspeed or vertical speed indicators.

Switch **ON** the battery master to provide electrical power to the rest of the aircraft.

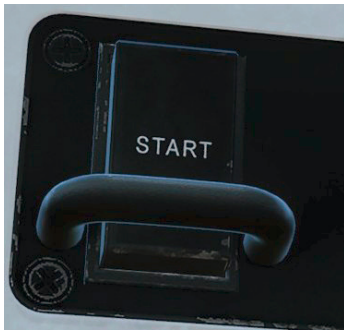
Turn **ON** the navigation lights, warning anyone in the area that we are about to start the engine.

Switch **ON** the fuel pump and confirm that a small positive fuel flow is shown.



Switch **ON** the left magneto.

Check that the area surrounding the aircraft is clear of obstructions and then push the **START** button.



Switch **ON** the right magneto and check that the oil pressure and temperature are rising.

Switch **ON** the ALTR (alternator) and confirm that the LOW annunciator extinguishes.

Adjust the throttle to maintain approximately **1,000 RPM**.

With the engine running and the alternator charging the battery, we can now switch on the avionics master switch on the right side of the overhead panel.

To clear the splash screen from the MFD, press the right-most softkey along the bottom or press the ENT button.

Finally, rotate the fuel selector switch to the **RIGHT** and then the **LEFT** position, checking that the engine operates correctly on both tanks, before selecting the fullest tank.

Configuring the avionics

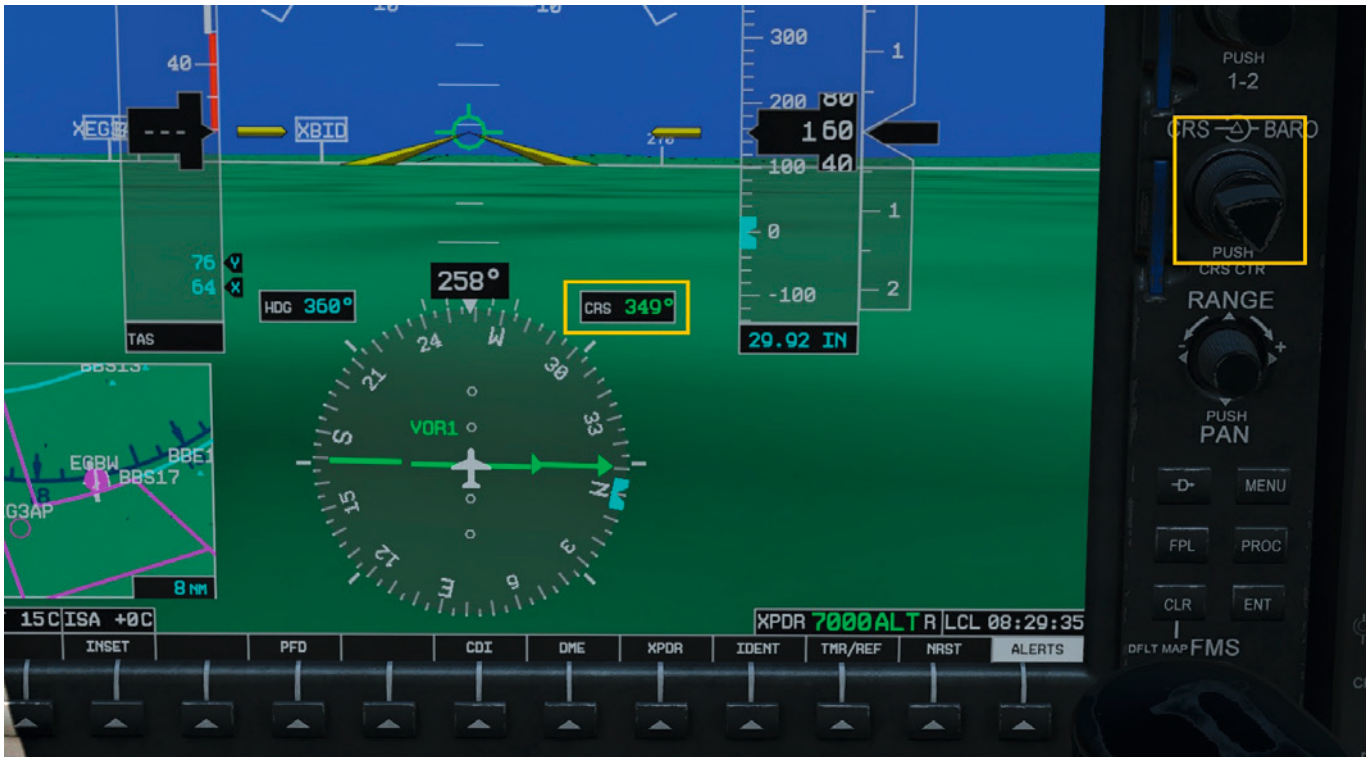
We now need to configure the avionics for our departure.

We are going to take off on runway 36 and for the initial climb we will maintain the runway heading, so rotate the heading bug on the HSI to **360 degrees**.

Once we are settled into our climb to the north, we will make a slight left turn to fly towards the first waypoint on the route, Honiley VOR (**113.65**). In preparation, tune the VOR frequency into the G1000 using the NAV frequency knobs in the upper left, then swap it to the active frequency on the right hand side using the flip button. Confirm the identifier HON is visible next to the frequency.

Then make sure the NAV source is set to NAV 1 by pressing the CDI softkey until the HSI shows VOR1.

Rotate the course knob on the right side of the PFD to select **349 degrees**. This is the course inbound to the Honiley VOR from Turweston.



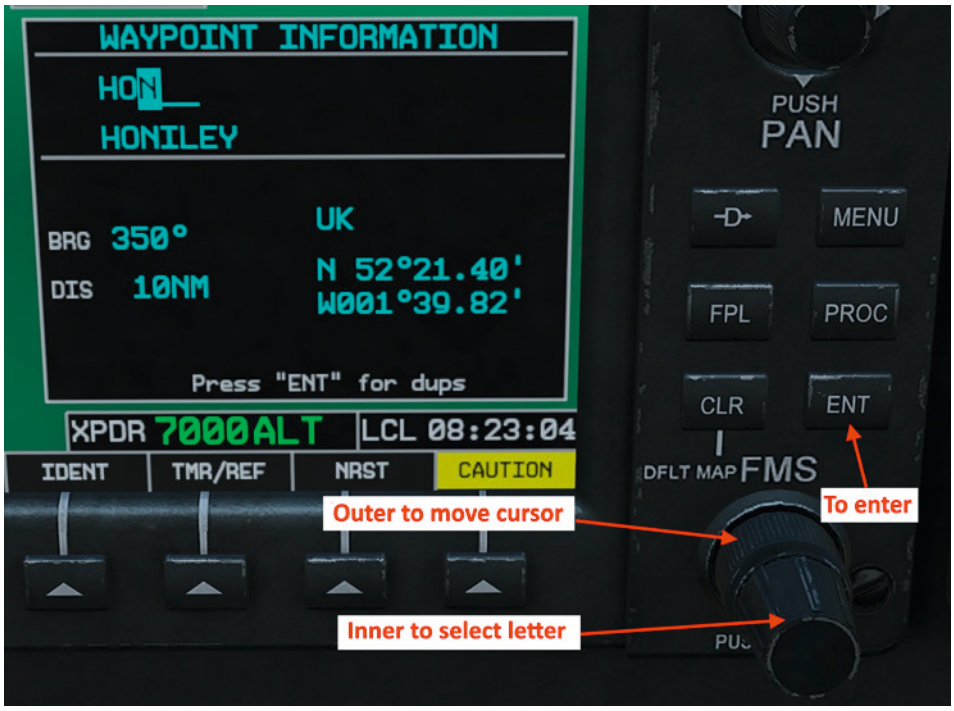
Tune the second waypoint on our route, Shawbury VOR (**116.80**), as the active NAV 2 frequency. This can be done by pressing the inner NAV button to swap to the NAV 2 selection and then rotating the knobs as previously. The identifier will not yet display as the VOR is out of range.

We can also use this time to enter our waypoints into the G1000's flight plan.

To do this, select the FPL key to open the Flight Plan menu. The FLIGHTPLAN display will show in the bottom left-hand side of the PFD.

Upon opening, the departure airfield EGBW will already be entered. Rotate the outer knob on the FMS knob to move to the next line of the flight plan.

Use the inner knob to select the first letter of the identifier for HON. Use the outer knob to move the cursor to the next column. Once HON has been entered, press the ENT key 3x to confirm the Honiley VOR and add it to the flight plan.



Use the outer knob to move to the next line and add Shawbury (**SWB**) VOR, Liverpool NDB (**LPL**) and Liverpool (**EGGP**) airport in the same manner.

The entire route can be viewed on the right-hand map display. To obtain a clear view of the route, use the DCLTR softkey and range knobs.

We will also preset our autopilot altitude to **4,000 feet**, using the ALT knob in the lower left corner of the PFD. The selected altitude will display in the box above the altitude tape.

Taxi

We can now taxi to the runway. Check that the area around the aircraft is clear of obstacles and then release the parking brake. Apply power slowly to get the aircraft rolling and then start the short taxi to the threshold of runway 36.

Steering the aircraft with the rudder pedals only is generally sufficient. Combined use of the rudder pedals and the brakes permits, if necessary, tight turns.

Check the operation of the instruments (horizontal attitude, heading and turn and bank indicators) by means of alternate turns.

Stop at the holding point just short of runway 36. We can carry out the power (ground) checks here.

Set the parking brake and advance the throttle lever to obtain 2,000 RPM. Switch **OFF** the left magneto, note the RPM drop and then switch it back **ON**. Repeat the process for the right magneto.

Check that the oil temperature, oil pressure and ammeter readings are within limits.

Make sure that the mixture lever is set to **FULL RICH** (fully forward) and that the fuel selector is set to the fullest tank.

To carry out an alternate air check, pull the alternate air lever to **ON** (down) and check that there is no drop in RPM, then push the lever back to **OFF** (up). If the RPM decreased, this indicates that the main air filter is clogged and requires maintenance before flight.

Check the operation of the fuel system by switching the fuel pump **OFF** and confirming that the engine continues to run. Return it to **ON**.

Finally, reduce the throttle to idle and check for rough running. Return the throttle to **1,000 RPM**.

We can now run through the before take-off checks.

Confirm that the battery master and alternator switches are both set to **ON**.

Rotate the fuel selector to the fullest tank and switch the fuel pump back **ON**.

Check that the alternate air lever is set to **OFF** and that the mixture lever is in the **FULL FORWARD** position.

Confirm that both magneto switches are **ON** and then switch **ON** the landing and strobe lights.

Rotate the pitch trim wheel until the indicator sits in the neutral/centre position.

Confirm that both door handles are **LOCKED** and that you have full and free movement of the flying controls.

Finally, switch **ON** the PITOT HEAT switch and ensure the annunciator extinguishes.

With the before take-off checks complete, have a look left and right, verify that nothing is on approach and that the runway is clear, and then taxi onto the runway.

Take-off

Line up with the runway centre line and then come to a stop. Smoothly apply full power and, as the aircraft starts to gather speed, keep it running down the centre line with rudder inputs. As you approach **60 knots** start to raise the nose of the aircraft.

Make elevator inputs as required to maintain an initial climb speed of approximately **76 knots**, holding the runway heading (360 degrees).

Climb

Switch **OFF** the fuel pump and landing light on reaching 1,000 feet.

We can now begin a left turn towards the first waypoint, Daventry (DTY) VOR. With the VOR now in range, the CDI needle on the HSI will indicate our deviation from the selected course. Use the needle deflection to judge a suitable heading for intercepting the course towards the VOR – approximately **330 degrees** in this case.

As the needle returns to the centre position, turn right onto **349 degrees** to intercept the course (there is zero wind, so no heading correction is required).

We will now reduce our workload by utilising the autopilot for the remainder of the climb and cruise.

Press the **NAV** button on the autopilot unit once to engage navigation hold mode and power on the autopilot by pressing the **AP** button. The VOR annunciator will appear and the autopilot will steer the aircraft to maintain the course towards the Honily VOR.

Press the **VS** button to engage vertical speed hold mode. The autopilot will control the pitch of the aircraft to maintain your current vertical speed (in hundreds of feet per minute). It is important to note that this mode offers no speed or stall protection, so you will need to use the **NOSE UP / NOSE DN** buttons to increase/decrease the selected vertical speed to maintain our climb speed – **76 knots**. The selected vertical speed can be seen in the box above the vertical speed indicator.

Alternatively, we can press the **FLC** button to use flight level change mode. This will hold a constant airspeed, which we can adjust with the **NOSE UP / NOSE DN** buttons in one-knot increments. The selected airspeed can be seen above the airspeed tape.

Cruise

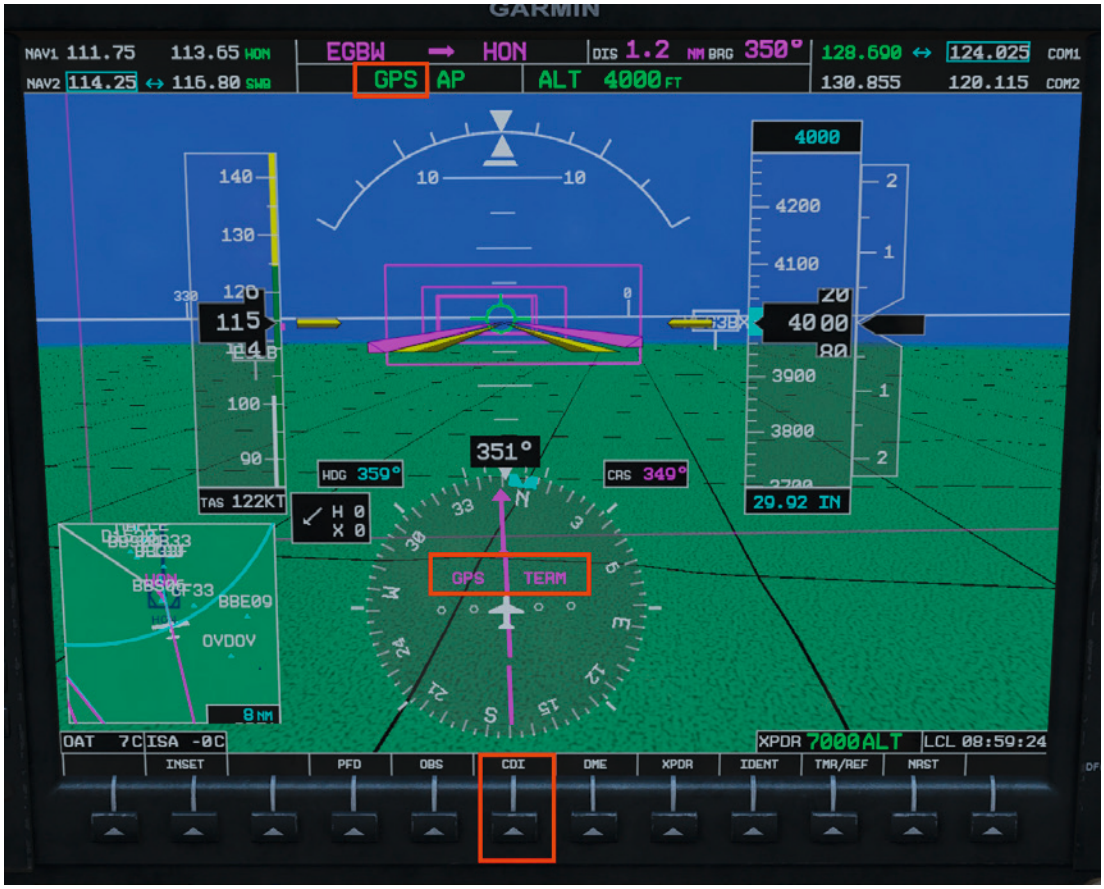
As you approach 4,000 feet, the autopilot mode will automatically change from VS (or FLC) to ALTS in green, with ‘ALT’ displayed in white. This indicates that altitude select mode is active and altitude hold mode is armed. As the autopilot levels off, it will change to ALT mode in green, indicating that altitude hold mode is now active.

As the aircraft levels out and begins to accelerate, reduce the throttle to obtain approximately **2,400 RPM**. This is a typical cruise power setting.

It is important to remember that the engine is only being fed with fuel from a single tank at any given time, so the fuel quantity in each tank should be monitored carefully. It is recommended that you change fuel tanks every half hour and do not exceed a fuel imbalance of five US gallons.

If you want to avoid worrying about switching fuel tanks, enable the automatic fuel selector from the Aircraft Options app in the EFB.

With the aircraft stabilised in cruise and a few miles from the **Honily VOR** (as indicated in magenta at the top of the PFD), press the **CDI** softkey on the PFD to change the NAV source to GPS to engage GPS navigation hold mode. The GPS annunciation will appear and the autopilot will steer the aircraft to maintain the GPS course instead of using the VOR signal.



The Shawbury VOR (116.80) can be tuned into NAV 1 after passing Daventry VOR. This is also the ideal opportunity to take a quick look at some of the features of the aircraft.

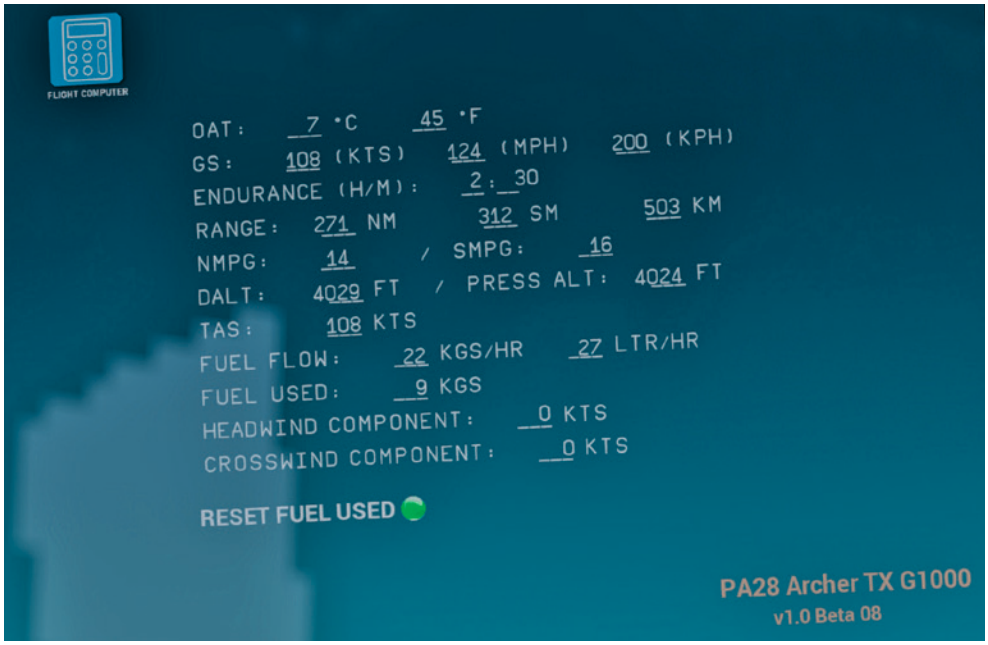
The Archer has some very useful IFR-capable avionics. We'll take a quick look at some of the features of those avionics. Make sure you keep an eye on the distance remaining to the Gamston VOR, as we'll need to return to navigating the aircraft once we are five miles from it.

The G1000 shows the GPS distance to the next waypoint in magenta along the top of the PFD screen, but we can also call up independent DME (Distance Measuring Equipment) indication for NAV 1.

To do so, press the **PFD** softkey on the PFD, then select **DME**. An information block will appear on the lower left side of the HSI, showing the frequency and distance to the NAV 1 station.

Press the **BACK** softkey on the right to return to the normal softkey menu.

Another useful feature for navigation is the Flight Computer panel, which can be opened from the EFB. The flight computer shows a variety of real-time information related to everything from speed to fuel burn/flow and range/ endurance.



The G1000's MFD contains a large map that gives a good overview of the flight plan and surrounding areas. The zoom can be adjusted by the **RANGE** knob on the right side of the screen.

The map can be decluttered by pressing the **DCLTR** softkey on the bottom of the screen. Each press of the key cycles through the four declutter levels and removes more of the elements of the map, making it easier to read at a glance.

The **MAP** softkey also allows the pilot to select overlays for the topographic map, terrain height and airways.

With the remaining time in the cruise, take the opportunity to explore the cockpit using the PANEL GUIDE and EFB Manual for reference.

As we are already in GPS mode for navigation, the aircraft will automatically turn north as we pass the SWB VOR. You can monitor our progress on the map display. The GPS distance to the next waypoint is displayed in magenta at the top of the PFD.

Descent

To give us time and capacity to set up for the approach, we will begin our descent with approximately 20 miles DME distance after passing SWB VOR as displayed on our DME information block. This is also 12.6 NM from the LPL NDB.

Set the altitude preselect to **1,000 feet**, using the **ALT** knob in the lower left corner of the PFD.

Reduce the throttle to obtain **2,000 RPM** and, once the airspeed has reduced to 90 knots, start the descent by engaging vertical speed (VS) hold mode and then selecting a descent rate of **-500ft/min**.

As the aircraft stabilises in its descent, adjust the throttle to maintain **90 knots**.

Approach and landing

We will carry out the ILS runway 27 approach into Liverpool Airport. Tune the ILS frequency, **111.75**, into the G1000 NAV 1.

With 5 NM to go before the LPL NDB, push the **HDG** knob to synchronise the bug to the current heading and select the **HDG select** push-button.

Now push the CDI button to enable LOC 1 and rotate the CRS knob to the localiser course of 266 degrees.

The airport should now be visible to our 11 o'clock position. The autopilot will level out automatically at 1,000ft. At this point increase power to maintain 90 knots.

At 1 NM from LPL, rotate the heading bug to **296 degrees** to intercept the localiser at a 30-degree angle.

Press the **APR** button on the autopilot to arm approach mode.

The autopilot will maintain your heading and after a short time will capture the localiser and glideslope, as indicated by the APR and GS annunciations.

Switch **ON** the landing light and fuel pump.

When established on the localiser and glideslope, disengage the autopilot and continue descending towards the runway, using the HSI indications.

Confirm that the mixture lever is fully forward and that the fuel selector is set to the fullest tank.

Begin to reduce your airspeed to **75 knots** and extend the flaps to the **25**° position. Be prepared for a nose-down input to counteract the nose-up (ballooning) effect of flap deployment.

Passing through 500ft, extend the flaps to the **40**° (fully down) position. Reduce power to begin slowing to a touchdown speed of approximately **66 knots**.

As the aircraft arrives over the runway, start to bring the aircraft into a flare, gently raising the nose just above the horizon. Reduce the throttle to idle and the aircraft should touch down smoothly.

Apply gentle braking and once the aircraft has slowed to a fast walking pace, turn left off the runway. When you are safely off the runway, raise the flaps and switch **OFF** the landing and strobe lights.

You can also switch **OFF** the fuel pump and pitot heat.

Shutdown

Begin your taxi to the nearest available parking spot.

Once you have come to a stop at your chosen parking spot, engage the parking brake and switch **OFF** the emergency battery and avionics master switches.

Bring the throttle lever back to **IDLE** and then bring the mixture lever back to **IDLE CUT-OFF** to shut down the engine.

Once the engine comes to a stop, set both magneto switches to the **OFF** position, switch **OFF** the navigation lights and then switch **OFF** the alternator and battery to disconnect the electrical powers.

Rotate the fuel selector to the **FUEL OFF** position and open the passenger and baggage doors.

Congratulations – you have completed the Archer TX/LX tutorial flight!

NORMAL PROCEDURES

Airspeed (IAS) for safe operations

Best rate of climb	**76 KIAS**
Best angle of climb	**64 KIAS**
Operating speed in turbulent air	**113 KIAS**
Maximum flap speed	**102 KIAS**
Final approach speed (flaps 40)	**66 KIAS**
Maximum demonstrated crosswind	**17 KIAS**

Pre-flight

Cockpit

Parking brake	**SET**
Avionics master	**OFF**
Mixture	**IDLE CUT-OFF**
Magneto switches	**OFF**
BATT MASTR switch	**ON**
Fuel gauges	**CHECK QUANTITY**
PITOT HEAT OFF message	**ILLUMINATED**
BATT MASTR switch	**OFF**
Primary flight controls	**CHECK OPERATION**
Flaps	**CHECK OPERATION**
Trim	**NEUTRAL**
Baggage door	**CLOSED**

Left/right wing

Flap and aileron	**CHECK**
Wing tip and lights	**UNDAMAGED**
Tie-down	**REMOVED**
Fuel tank	**CHECK LEVEL**

Nose section

Chocks	**REMOVED**
Towbar	**REMOVED (NOSE GEAR)**

Oil	**CHECK LEVEL**
Propeller	**GOOD CONDITION**
Air inlets	**CLEAR**
Landing light	**CHECK**

Tail section

Fin	**CHECK CONDITION**
Rudder	**CHECK CONTROLS**
Stabilator and trim tab	**CHECK CONTROLS**
Tail cone	**CHECK CONDITION**

Before starting engine

Brakes	**SET**
Circuit breakers	**IN**
Alternate air	**OFF**
Avionics master	**OFF**
Fuel selector	**DESIRED TANK**
EMERG BATT switch	**ARM**

Verify PFD and Aspen EFD 1000 illuminate.

Engine starting

Caution: *If a positive oil pressure is not indicated within 30 seconds after an engine start, stop the engine and determine the cause of the trouble. In cold weather it will take a few seconds longer to get a positive oil pressure indication.*

Cold engine

Throttle	**¼ INCH OPEN**
ALTR switch	**ON**
BATT MASTR switch	**ON**
Left magneto switch	**ON**
Fuel pump	**ON**
Mixture	**FULL RICH**
Propeller	**CLEAR**
Starter	**ENGAGE**

If engine does not start within 10 seconds, prime and repeat starting procedure.

When the engine starts:

Right magneto switch	**ON**
Throttle	**ADJUST**
Oil pressure	**CHECK**
Throttle	**800-1,200 RPM**

Hot engine

Throttle	**½ INCH OPEN**
ALTR switch	**ON**
BATT MASTR switch	**ON**
Left magneto switch	**ON**
Fuel pump	**ON**
Mixture	**FULL RICH**
Propeller	**CLEAR**
Starter	**ENGAGE**

When the engine starts:

Right magneto switch	**ON**
Throttle	**ADJUST**
Oil pressure	**CHECK**
Throttle	**800-1,200 RPM**

Taxiing

Avionics master	**ON**
Taxi area	**CLEAR**
Parking brake	**RELEASE**
Throttle	**APPLY SLOWLY**
Brakes	**CHECK**
Steering	**CHECK**

Steering the aircraft with the rudder pedals only is generally sufficient. Combined use of rudder pedals and brakes permits, if necessary, tight turns.

Ground check

Parking brake	**SET**
Throttle	**2,000 RPM**
Magnetos	**CHECK (max. drop 175 RPM)**
Vacuum	**4.8-5.2 inHg**
Oil temperature	**CHECK**

Oil pressure	**CHECK**
Alternator amps	**CHECK**
Alternate air	**CHECK**
Fuel pump	**OFF**
Verify engine operation.	
Throttle	**RETARD**

Before take-off

BATT MASTR switch	**ON**
ALTR switch	**ON**
Magnetos	**ON**
Flight instruments	**CHECK**
Standby flight instruments	**CHECK**
Fuel selector	**AS REQUIRED**
Fuel pump	**ON**
Engine gauges	**CHECK**
Alternate air	**OFF**
Mixture	**SET**
Flaps	**SET**
Trim	**SET**
Controls	**FREE**
Doors	**LATCHED**

Take-off

Lined up on runway	**CHECK HEADING**

Normal technique

Flaps	**UP**
Trim	**SET**
Throttle	**FULL POWER**
Accelerate to 60 KIAS.	
Yoke	**Back pressure to rotate smoothly to climb attitude**

Short field/obstacle clearance technique

Flaps	**25° (second notch)**
Throttle	**FULL POWER**
Accelerate to 55 KIAS.	

Yoke	**Back pressure to rotate smoothly to climb attitude**

Maintain 60 KIAS until obstacle is cleared then accelerate to 76 KIAS.

Flaps	**Retract slowly**

Climb

Best rate (flaps up)	**76 KIAS**
Best angle (flaps up)	**64 KIAS**
En route	**87 KIAS**
Fuel pump	**OFF**

Cruise

Refer to the OPERATING DATA MANUAL for cruise power settings.

The normal maximum cruising power is 75% of the rated horsepower of the engine.

Use of the mixture control in cruising flight reduces fuel consumption significantly, especially at higher altitudes. The mixture should be leaned during cruising operation when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the FULL RICH position for all operations.

The pilot should monitor weather conditions while flying and should be alert to conditions which might lead to icing.

To keep the aircraft in the best lateral trim during cruise flight, fuel should be used alternately from each tank at 15-minute intervals. Always remember that the electric fuel pump should be set to ON before switching tanks and should be left on for a short period thereafter.

Descent

Normal

Throttle	**2,500 RPM**
Airspeed	**122 KIAS**
Mixture	**FULL RICH**

Power off

Throttle	**CLOSED**
Airspeed	**AS REQUIRED**
Mixture	**AS REQUIRED**

Apply engine power every 1,500ft to prevent excess engine cooling and spark plug fouling.

Approach and landing

Fuel selector	**FULLEST TANK**
Fuel pump	**ON**
Mixture	**SET**
Flaps	**SET (102 KIAS max.)**
Trim to 75 KIAS.	
Final approach speed (flaps 40°)	**66 KIAS**

Shutdown

Flaps	**RETRACT**
Fuel pump	**OFF**
EMERG BATT switch	**OFF**
Avionics master	**OFF**
Electrical switches	**OFF**
ALTR switch	**OFF**
Throttle	**CLOSED**
Mixture	**IDLE CUT-OFF**
Magnetos	**OFF**
BATT MASTR switch	**OFF**
Parking brake	**SET**
Standby instruments	**VERIFY SHUTDOWN**

Stalls

The stall characteristics of the Archer are conventional. An approaching stall is indicated by a stall warning horn which is activated between 5-10 knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall.

The gross weight stalling speed of the Archer with power off and full flaps is 45 KIAS. With the flaps up, this speed is increased by 5 knots. Loss of altitude during stalls varies from 100 to 350 feet, depending on configuration and power.

Note: *The stall warning system is inoperative with the battery master switch OFF.*

EMERGENCY PROCEDURES

Airspeed (IAS) for safe operations

Stall speed (2,550 lb, flaps 0)	**50 KIAS**
Stall speed (2,550 lb, flaps full)	**45 KIAS**
Manoeuvring speed (2,550 lb)	**113 KIAS**
Manoeuvring speed (1,634 lb)	**89 KIAS**
Never exceed speed	**154 KIAS**
Power off glide speed (2,550 lb, flaps 0)	**76 KIAS**

Engine failures

Engine fire during start

Starter	**CRANK ENGINE**
Mixture	**IDLE CUT-OFF**
Throttle	**OPEN**
Fuel pump	**OFF**
Fuel selector	**OFF**

Engine failure during take-off

If sufficient runway remains for a normal landing, land straight ahead.

If sufficient altitude has been gained to attempt a restart:

Fuel selector	**SET TO FULLEST TANK**
Fuel pump	**ON**
Mixture	**CHECK RICH**
Alternate air	**ON**

If power is not regained, proceed with power-off landing.

Engine failure in flight

If at low altitude:

Airspeed	**76 KIAS minimum**

Prepare for power-off landing.

If altitude permits:

Fuel selector	**SWITCH TO FULLEST TANK**
Fuel pump	**ON**
Mixture	**RICH**
Alternate air	**ON**
LEFT/RIGHT MAG switches	**Turn OFF then ON, one at a time**
Engine gauges	**Check for indication of cause**

If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When power is restored:

Alternate air	**OFF**
Fuel pump	**OFF**

If power is not restored, prepare for power-off landing. Trim for 76 KIAS.

Power-off landing

Trim for 76 KIAS. Locate suitable field and establish spiral pattern 1,000ft above field at downwind position for normal landing approach.

When field can be easily reached, slow to 66 KIAS for shortest landing.

Fires

Engine fire in flight

Fuel selector	**OFF**
Throttle	**CLOSED**
Mixture	**IDLE CUT-OFF**
Fuel pump	**OFF**
Cabin heat	**OFF**

Proceed with power-off landing procedure.

Electrical fire

EMERG BATT switch	**VERIFY ARM**
BATT MASTR switch	**OFF**
ALTR switch	**OFF**
Cabin heat	**OFF**

Land as soon as possible.

Low oil pressure

Oil pressure annunciator light	**ON**
Pressure indicator	**IN YELLOW SECTOR**
Throttle	**REDUCE AS FAR AS POSSIBLE**
Oil temperature	**CHECKED**
If oil temperature in yellow sector	**REDUCE THROTTLE**

Prepare for a forced landing and land as soon as possible.

Low fuel pressure

Fuel pump	**ON**
Fuel quantity	**CHECKED**
Fuel selector	**SWITCH TANKS**

Electrical failures

Check the circuit breaker panel. If the circuit breaker is open, close it only once. If it opens again do not try to close the circuit breaker as the equipment has failed.

Alternator annunciator light illuminated:

Verify failure	**Check ALTR AMPS indication**

If ammeter shows zero:

ALTR switch	**OFF**

Reduce electrical loads to minimum:

ALT FIELD circuit breaker	**Check and reset as required**
ALTR switch	**ON**

If power is not restored:

ALTR switch	**OFF**
EMERG BATT switch	**Verify ARM**

If alternator output cannot be restored, reduce electrical loads and land as soon as it is practical. The battery is the only remaining source of electrical power. As the battery is depleted and reaches a point where the system voltage is insufficient to support the required electrical load, the emergency battery should activate automatically.

Icing

IMPORTANT! *Flight into known icing conditions is prohibited.*

Cabin heat	**FULL HOT**
Pitot heat	**ON**
Engine	**MAX. POWER/RPM**

Adjust course and/or altitude to obtain best outside air conditions. Divert to nearest airport.

Spin recovery

Intentional spins are prohibited, but if an inadvertent spin does occur, the following recovery procedure is recommended:

Rudder	**HOLD OPPOSITE DIRECTION OF ROTATION**
Yoke	**FULL FORWARD, AILERONS NEUTRAL**
Throttle	**IDLE**

When spinning stops, centralise rudder, level the wings and ease out of the dive.

Airspeed indicating system failure

In case of erroneous indications in flight:

Pitot heat	**ON**

If erroneous indications persist, carry out a precautionary approach, maintaining an adequate airspeed margin above stall warning activation speed.

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Special thanks to all the testers and to David Gould for giving us permission to photograph his aircraft.

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