X-Plane
King Air C90B

Pilot's Operating Manual

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Background: The King Air Model 90 Series

Photo Credit: Wikipedia

The Beech Aircraft Corporation first conceived of the King Air Model 90 series in 1961. At that time, the aircraft was designated the Beechcraft Model 120, and was derived from the company's successful "Queen Air" series (a twin-engine piston powered light aircraft produced from 1960 to 1978). The new King Air was to be a "civil utility aircraft", with military variants also to be adopted by the US Army, the US Navy, and other defense forces around the world.

Although based on the Queen Air, the new King Air featured the introduction of Turbo Prop power, utilizing two Pratt & Whitney PT6A engines. The PT6 is one of the most popular Turbo Prop engines in history, known for extreme reliability that allows for a mean time between overhaul (MTBO) of up to 9,000 hours. The original PT6A's developed between 580 and 920 shaft horsepower, although later variants have considerably exceeded this.

Test flights began in May of 1963, and Beechcraft started taking orders the following month, with the first production aircraft delivered on October 8th, 1964. The model C90 was introduced in 1971, with an increased wingspan, upgraded PT6A-20A engines, and a maximum take-off weight of 9,650 lb. (4,378 kg). A further derivative of the C90, designated C90B came in 1992, with airframe improvements, four-bladed propellers, and propeller synchrophasing (to reduce cabin noise). The C90B featured Pratt & Whitney PT6A-21 engines. To date, over 3,100 King Air aircraft (various variants) have sold. The aircraft remains in production.

C90 Specifications

Engine:		
Model	---	2 x Pratt & Whitney PT6A-21
Power	---	550-shaft horsepower per engine
Propeller	---	Constant Speed
Fuel:		
Capacity	---	384 Gallons / 2,573 Lbs.
Recommended fuel	---	JP-4; JP-5; Jet A; Jet A-1; Jet B
Fuel Burn (average)	---	280 Kg. per hour / 617 Lb. per hour
Weights and Capacities:		
Max. Takeoff Weight	---	9,650 Lb. / 4,377 Kg.
Max. Landing Weight	---	9,168 Lb. / 4,159 Kg.
Standard Empty Weight	---	5,765 Lb. / 2,615 Kg.
Max. Useful Load	---	3,885 Lb. / 1,762 Kg.
Baggage Capacity	---	350 Lb. / 159 Kg.
Performance:		
Max. Operating Speed	---	223 KTAS
Cruise Speed	---	215 KTAS
Stall Speed (Clean)	---	89 KTAS
Stall Speed (Landing Configuration)	---	76 KTAS
Best Climb Rate	---	1,955 Feet Per Minute @ 9,650 Lb.
Wing Loading	---	32.8 Lb. / Sq. Ft.
Power Loading	---	8.8 Lb. / Hp.
Service Ceiling	---	28,100 Ft. @ 9,650 Lb.

The X-Plane King Air C90B

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

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

Because of this technique, an aircraft must be modeled with great accuracy in X-Plane, in order that is behave like its real-life counterpart.

This means the fuselage, wings and tail surfaces must be the right size and shape, the center of lift and center of gravity must be in the right places, and the engine(s) must develop the right amount of power. In fact, there are a great many properties that must be modeled correctly to achieve a high-fidelity flight model.

The Beechcraft King Air C90B in X-Plane has been modeled by our design team with a degree of accuracy that ensures its flight characteristics are very like those of the real aircraft. However, despite this, some differences will be apparent, because even the smallest factor plays into the ultimate behavior of the aircraft, both in real life, and in X-Plane. The systems modeling of this aircraft involves some compromise too, because of the high degree of complexity present in the real aircraft. As such, simplified procedures and checklists are provided later in this guide.

Views and Controls

The X-Plane King Air C90B features a detailed 3-D cockpit with a great many of the primary controls and systems modeled, including: Flight controls (yoke, rudder pedals, throttles, prop levers, condition levers), electrical systems, navigation aids, radios, autopilot, instrument and cabin lighting, fuel and environmental systems.

Hint:

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

Operation | Toggle Yoke Visibility

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

Creating “Quick Look” views

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

The following “Quick Look” views are recommended for the King Air C90B, in a situation where the pilot is not using a Virtual Reality (VR) headset, or a head tracking device. To some degree, these correspond (on the keyboard Number Pad) with their physical locations in the cockpit, and are therefore logical and easy to recall later.

Auto Pilot

Pilot Switches

Throttle Quadrant

Co Pilot Switches

Pilot's Primary Instruments

Engine Instruments and Avionics

CoPilot's Primary Instruments

Pilot’s Left
Glance View

Overhead Panel

Pilot’s Right
Glance View

Operating the controls

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

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

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

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

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

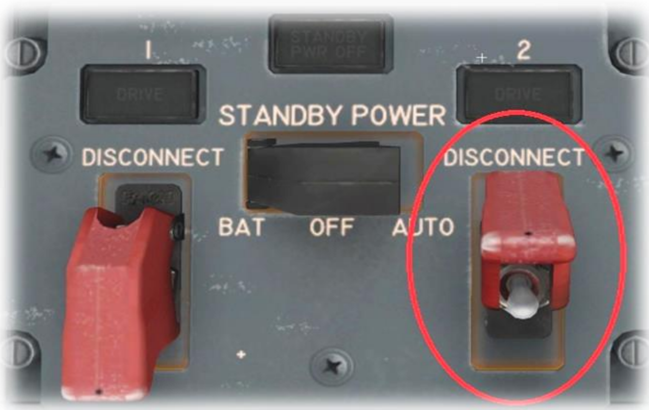
Other rotary controls require finer precision. When the mouse pointer is positioned slightly to the left of such a control, a counter-clockwise arrow appears. This indicates that you are ready to rotate the control counter-clockwise. Correspondingly, a clockwise arrow indicates that you are ready to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

i) By rolling the mouse wheel forwards, or backwards

ii) By clicking (dragging is not supported here)

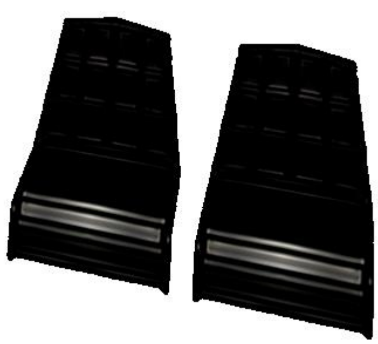
Radio and Navigation frequency rotary dials are grouped together as “twin concentric knobs”. Here, the larger rotary is used to tune the integer portion of the frequency, and the smaller rotary is used to tune the decimal portion. Each works independently, using the same technique, as described above.

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



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

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



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

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

Assigning peripheral devices

This section of the manual deals with an “ideal” scenario, in terms of the assignment of external computer peripherals to operate the X-Plane King Air C90B with the highest degree of realism. If you are missing some of these external peripherals, you may elect to choose a different configuration that best suits your hardware.

The King Air C90B is equipped with Yokes, for roll and pitch control.

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

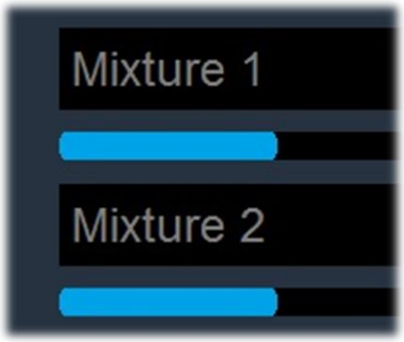
More information is available in the [X-Plane Desktop Manual].

The King Air C90B is equipped with dual throttles – which control the torque (power) transmitted by the left and right engines. The throttles do not change the propeller RPM, which is set elsewhere, using the Prop Levers.

To simulate the throttles for a King Air, assign the (black) throttle levers on your quadrant to the “Throttle 1” and “Throttle 2” properties in X-Plane.

The King Air C90B is equipped with constant speed (and variable pitch) propellers. The RPM for each engine is controlled by a “governor”, and the desired RPM setting is made using the Prop Levers, which are part of the aircraft’s throttle quadrant. Once the RPM has been set, this remains the same, irrespective of the throttle position.

To simulate this, assign the (blue) prop levers on your quadrant to the “Prop 1” and “Prop 2” properties in X-Plane.



The King Air C90B is equipped with “Condition” levers. These control the fuel flow to the engines during idle, and have three settings – “High Idle”, “Low Idle” and “Fuel Cut Off”.

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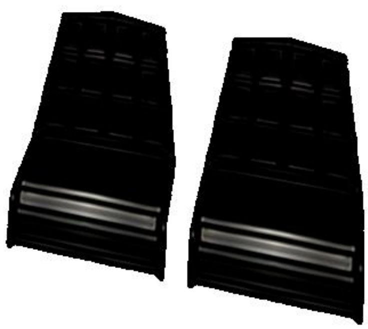
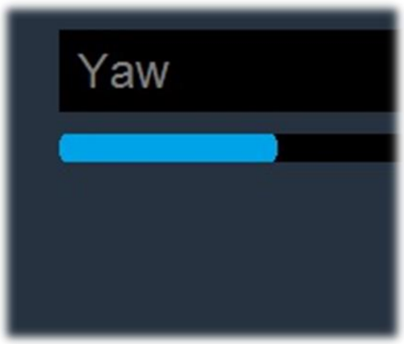
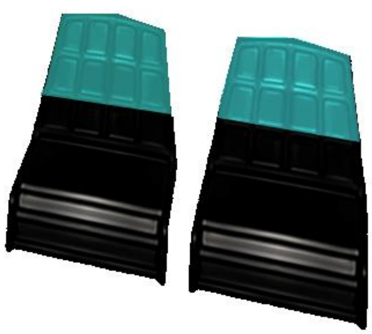




The King Air C90B has conventional rudder controls, actuated by the rudder pedals.

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

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



The King Air C90B has conventional rudder toe-braking, actuated by the tip of the rudder pedals.

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

A Tour of the Cockpit

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

Fuel Management Panel

1	**Left Transfer Pump Switch**	[Not modeled] The left transfer pump moves fuel from the (lower) wing tanks to the (higher) nacelle tank, which feeds the left engine. In Auto mode, this pump cycles on, and off, automatically, depending on the fuel-level in the left nacelle tank. In Override mode, the pump stays on.
2	**Transfer Test Switch**	[Not modeled] This switch is used to verify that fuel is indeed transferring between the tanks. The switch works in conjunction with the NO FUEL XFR annunciator. When this switch is set to Transfer Test, the annunciator will illuminate if the transfer is not functioning correctly.

3	**Right Transfer Pump Switch**	[Not modeled] The right transfer pump moves fuel from the (lower) wing tanks to the (higher) nacelle tank, which feeds the right engine. In Auto mode, this pump cycles on, and off, automatically, depending on the fuel-level in the left nacelle tank. In Override mode, the pump stays on.
4	**Right Boost Pump Switch**	The right boost pump moves fuel from the nacelle tank to the right engine before it starts. This switch should therefore be used during the start procedure, which is covered later in the checklist section. An engine-driven pump will perform this task once running.
5	**Cross Feed Switch**	[Not modeled] This switch controls the cross-feed valve. In Auto mode, the cross-feed valve will open automatically in the event of a boost pump failure, to ensure the affected engine continues to receive fuel from the opposite-side boost pump. During single engine operation, it may become necessary to supply fuel to the operative engine from the fuel system on the opposite side. In this circumstance, the switch is set to Open.
6	**Right Fuel Gauge**	Displays the fuel remaining, in all (right) tanks, or just the (right) nacelle tanks, depending on the setting of the Fuel Quantity switch.
7	**Fuel Quantity Switch**	[Not modeled] This switch toggles the fuel quantity gauges between two modes – ‘Total’ and ‘Nacelle’. This causes the gauges to display either the remaining fuel in all tanks, or just the nacelle tanks respectively. The main tanks are in the wings, and the nacelle tanks directly behind the engines.
8	**Left Fuel Gauge**	Displays the fuel remaining, in all (left) tanks, or just the (left) nacelle tanks, depending on the setting of the Fuel Quantity switch.
9	**Left Boost Pump Switch**	The left boost pump moves fuel from the nacelle tank to the left engine before it starts. This switch should therefore be used during the start procedure, which is covered later in the checklist section. An engine-driven pump will perform this task once running.

Pilot's Primary Instruments

Airspeed Indicator

This instrument displays the speed of the aircraft (in knots) relative to the air (and not relative to the ground).

Electronic Attitude Director Indicator (EADI)

This is the top LCD panel in the Collins Avionics cluster, and displays the attitude of the aircraft relative to the horizon. This informs the pilot whether the aircraft is flying straight, or turning, and whether the aircraft is climbing, or descending. This information is crucial in "instrument conditions" - when the outside horizon is not visible.

Electronic Horizontal Situation Indicator (EHSI)

This is the bottom LCD panel in the cluster, and shows the aircraft's position and (magnetic) heading. The display is presented in a plan view, as if looking down at the aircraft from directly above. If a flight plan has been input into the GPS, this panel also displays the aircraft's position relative to the desired track.

Turn Coordinator

This instrument informs the pilot of both the rate of turn, and whether the aircraft is slipping sideways during a turn.

The "L" (left) and "R" (right) indicators at the four and six o-clock locations on the dial correspond with a "two-minute turn", which is considered ideal when maneuvering an aircraft in instrument conditions. When the wings of the white aircraft in the center of the dial intersect with these markings (during a turn), it will take exactly 2 minutes for the aircraft to make a 360 degree turn back to its original course.

The floating ball is used to assist the pilot in making a "coordinated turn", so the aircraft does not slip to the side, but instead follows the desired course. If the ball moves to the right, depress the right (rudder) pedal, until the ball is centered again. Correspondingly, if the ball moves to the left, depress the left (rudder) pedal, until the ball is centered again. When the ball is centered, the aircraft is making a coordinated turn.

Altimeter

The altimeter displays the altitude above sea level (not the altitude above the ground). This model combines a digital and analog presentation.

Altimeters use barometric pressure to determine altitude. As such, they must be calibrated at the start of the flight, and periodically re-calibrated during the flight, to account for the current local conditions. To calibrate this instrument, the pilot must set the published barometric pressure at his current location. This setting is also displayed here, both in millibars, and inches of mercury.

Chronometer

This instrument supports four modes:

Current Time (GMT)
Current Time (Local)
Current Date
Elapsed Time

Cycling through each of these modes is accomplished by clicking the “SELECT” button.

Starting, stopping and re-setting the elapsed time is accomplished by clicking the “CONTROL” button.

VOR / ADF (Automatic Direction Finder)

This instrument displays a direct course to or from a selected VOR (VHF Omnidirectional Range) receiver, or a selected NDB (Non-Directional Beacon).

EADH/EHSI Brightness Control Panel.

This panel contains combined rotary controls that adjust the brightness of the EADI and EHSI displays respectively. Rotate the inner control to the left or right, to reduce or increase the brightness of the EADI display. Rotate the outer control to the left or right, to reduce or increase the brightness of the EHSI display.

Propeller Synchronization Indicator.

Propeller synchronization reduces the “beats” generated by propellers turning at slightly difference speeds, and in turn this increases passenger comfort.

When both propellers are turning, a stationary disc indicates they are synchronized.

Set the toggle switch to the up (on) position to activate the synchronization system.

Variometer

The Variometer informs the pilot of the rate of climb, or the rate of descent, in terms of thousands of feet per minute.

Engine Instrumentation

Inter-Stage Turbine Temperature

The internal temperature of the left and right engines, in Degrees Celsius x 100.

The green band indicates the normal operating range.

Torque

The rotational force transmitted from the engine to the left and right propellers in Feet Pounds x 100. This is analogous to the power each engine is delivering to the propellers.

The green band indicates the normal operating range.

Propeller RPM

The RPM of the left and right propellers - in revolutions per minute x 100. RPM is set by the Prop Levers.

The green band indicates the normal operating range.

Turbine RPM

The RPM of the left and right turbine engines themselves. This is different to the RPM at the propellers, because of the presence of a reduction gearbox.

The green band indicates the normal operating range.

Fuel Flow

The rate at which fuel is flowing from the fuel system into the left and right engines.

Oil Temperature and Pressure

The oil temperature and pressure in the left and right engines, presented in Degrees Celsius, and Pounds per Square Inch.

The green bands indicate the normal operating range.

Avionics Panel

Pilot and Co-Pilot Audio Switching Panels

The switches in these panels are used to enable or disable audio from the selected radio and navigation devices. For example, if the Comm 1 switch is set to 'On' and the Comm 2 switch is set to 'Off', the pilot will hear only audio from the Comm 1 radio.

Audio from Comm devices will be in the form of speech from ATC, and audio from Navigation devices will be in the form of Morse code. Each navigation aid (VOR, NDB, ILS etc.) has a Morse code identifier, to confirm the frequency selection is correct.

Altitude Pre-Select

The Altitude Pre-Select control is used to pre-select the desired altitude for the autopilot.

When engaged, and in control of the aircraft altitude, the autopilot will automatically level off at the pre-selected altitude.

More on autopilot operations later in this manual.

COMM 1 and COMM 2 Radios

This aircraft is equipped with two communications radios (COMM 1 and COMM 2).

COMM 1 and COMM 2 are used for ATC voice communications, and are identical in function, and either can be used at any time. The presence of two COMM radios provides redundancy, in case of failure of the other unit.

More on radio operations later in this manual.

NAV 1 and NAV 2 Radios

This aircraft is equipped with two navigation radios (NAV 1 and NAV 2).

NAV 1 and NAV 2 are used together with VOR, NDB and ILS ground radio-based navigation aids.

The presence of two NAV radios provides redundancy, in case of failure of the other unit.

More on radio operations later in this manual.

Transponder

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

Use the outer-rotary control to adjust the transponder code up or down, in units of 100.

Use the inner-rotary control to adjust the transponder code up or down, in units of 1.

Set the transponder to STBY when setting and operating the transponder on the ground, and ON when airborne.

Automatic Direction Finder (ADF)

The Automatic Direction Finder (ADF) is a radio receiver that can be tuned to any Non-Directional Beacon (NDB) that is within range. It provides a direct course to or from the radio source, which is displayed by the needle on the VOR/ADF instrument (see Pilot's Primary Instruments).

GNS 530

The GNS 530 is Laminar Research's interpretation of the Garmin 530 series of GPS (Global Positioning System) receivers.

This unit provides the pilot with the ability to input a pre-determined flight plan, which is then presented in 'plan' view on the display. The pilot may elect to follow the course either manually, or using the autopilot.

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

GNS 430

The GNS 430 is Laminar Research's interpretation of the Garmin 430 series of GPS (Global Positioning System) receivers.

This unit provides the pilot with the ability to input a pre-determined flight plan, which is then presented in 'plan' view on the display. The pilot may elect to follow the course either manually, or using the autopilot.

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

Main switch panel and Landing Gear

Battery On/Off Switch

This switch provides power to all electrical systems, except of those that are activated separately by the Avionics Master Switch, and EFIS power switch.

Avionics Master Power Switch

This switch provides power to the avionics stack, which comprises the following:

. EHSI
. Comm and Nav radios
. Transponder
. ADF
. G530 GPS
. G430 GPS

Inverter Switch

An inverter converts DC electrical current generated by the engines into AC electrical current required by some of avionics, and systems.

In this aircraft there are two inverters, to provide redundancy. Set the switch to the UP position to activate the primary inverter, and the DOWN position to activate the secondary inverter.

Note: The autopilot will not operate without an inverter activated.

Engine Auto Ignition Switches

The Engine Auto Ignition system on the King Air is comprised of a simple electrical relay that activates the ignitors whenever torque is low (for example in the event of an engine flame-out). This allows the engines to be re-started in-flight, using just the airflow that turns the propellers.

Engine Auto Ignition is not required during normal flight, but may be left on for the duration if desired.

Generator Switches

The generators are used to charge the aircraft battery system when the engines are running. This prevents the batteries from becoming exhausted while the Battery Switch is 'On'.

GEN1 is driven by engine-1, and Gen 2 is driven by engine-2.

Engine Anti Ice Switches

The Engine Anti Ice system actuates anti-ice vanes in the PT6 turbines, allowing super-cooled water droplets over a certain mass to bypass the engine intakes, which prevents the potential for damage, or engine failure.

This system should be employed only in circumstances where the temperature and moisture of the outside air make icing possible.

Engine Start Switches

These switches engage the ignition and left and right engine-starter.

Click the left or right switch to start the desired engine.

Auto Feather Switch

When this system is "Armed", and the power setting for the engines is sufficiently low there is no useful thrust, this system automatically changes the propeller pitch to "Feathered", to reduce drag.

Landing Lights Switches

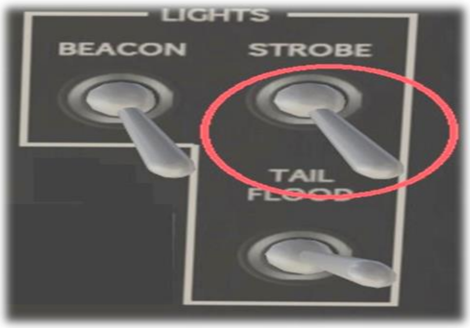
Taxi Light Switch

Navigation Lights Switch

Ice Light Switch

Recognition Lights Switch

Beacon Switch



Strobes Switch

Tail Flood Switch

Landing Gear Lever

The King Air C90B is equipped with retractable landing gear, controlled by the Landing Gear Lever. Retract the ‘gear’ shortly after takeoff, and extend the ‘gear’ shortly before landing.

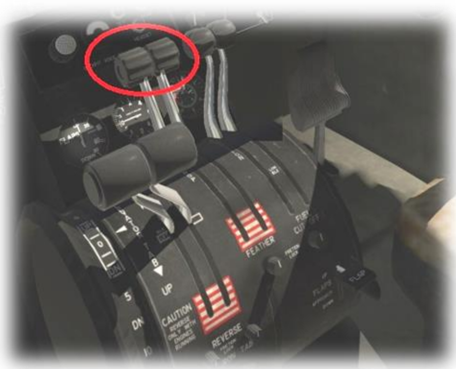
When the landing gear is extended correctly, three green indicator lights will illuminate.

In any aircraft, the landing gear should never be extended if the airspeed exceeds the design parameters. In the King Air C90B, this is indicated by the white band on the airspeed indicator.

Throttle Quadrant and Center Console

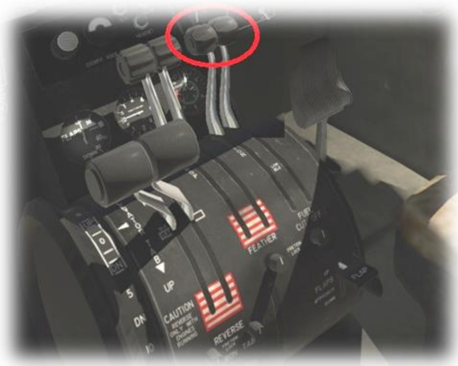
Throttle Levers

The King Air C90B is equipped with dual throttles – which control the torque (power) transmitted by the left and right engines to the propellers. The throttles **do not change** the propeller RPM, which is set using the Prop Levers.



Prop Levers

The King Air C90B is equipped with constant speed (and variable pitch) propellers. The RPM for each engine is controlled by a “governor”, and the desired RPM setting is made using the Prop Levers, which are part of the aircraft’s throttle quadrant. Once the RPM has been set, this remains the same, irrespective of the throttle position.



Condition Levers

The King Air C90B is equipped with “Condition” levers. These control the fuel flow to the engines during idle, and have three settings – “High Idle”, “Low Idle” and “Fuel Cut Off”.

These settings apply when taxiing the aircraft, and at the conclusion of the flight, when the fuel cutoff position is selected to stop the engines.

Flap Lever

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

The King Air C90B is equipped with flaps that have three positions – “Up” (used during normal flight), “Approach” (used during initial approach to landing, and takeoff) and “Down” (used during final approach to landing”).

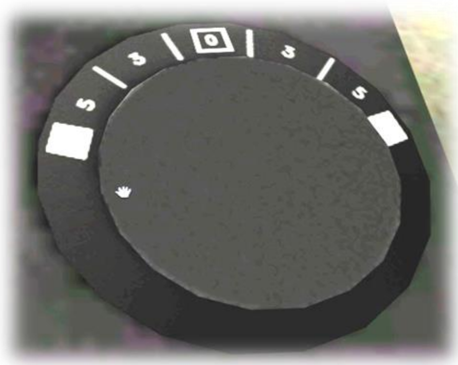
In any aircraft, the landing flaps should never be extended if the airspeed exceeds the design parameters. In the King Air C90B, this is indicated by the white band on the airspeed indicator.

Aileron Trim Wheel

The ailerons are control surfaces on the wing used to roll the aircraft to the left, or the right. The roll action causes the aircraft to turn.

The Aileron Trim Wheel operates trim tabs that are built into the ailerons. These control surfaces are used to relieve the pilot from continuous manual input to the ailerons.

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



Rudder Trim

The rudder is a control surface built into the tail assembly, and is used to yaw the aircraft to the left, or the right. The rudder is used to keep the aircraft straight during takeoff and landing, and also to make coordinated turns, and to counter the effect of crosswinds.

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

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

Elevator Trim Wheel

The elevator is a control surface built into the tail assembly, and is used to pitch the aircraft up or down. The elevator changes the angle of attack of the wing, which initiates a climb or a descent, or levels the aircraft from an existing climb or descent. A change in pitch initiated by the elevator is usually followed by a change in power in order to maintain the desired attitude.

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

Elevator trim is also used to control the speed of the aircraft. When there is a net upward trim, the aircraft will fly more slowly. When there is a net downward trim, the aircraft will fly more quickly.

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

Copilot's Primary Instruments

Airspeed Indicator

This instrument displays the speed of the aircraft relative to the air (and not relative to the ground).

Attitude Indicator (AI)

This instrument displays the attitude of the aircraft relative to the horizon. This informs the pilot whether the aircraft is flying straight, or turning, and whether the aircraft is climbing, or descending. This information is crucial in "instrument conditions" - when the outside horizon is not visible.

This instrument also features two course deflection indicator (CDI) needles. When the pilot selects an appropriate navigation aid (for example an ILS), these needles display the aircrafts position relative to the intended course (too high, too low, to the left, or to the right).

Turn Coordinator

This instrument informs the pilot of both the rate of turn, and whether the aircraft is slipping sideways during a turn.

The "L" (left) and "R" (right) indicators at the four and six o-clock locations on the dial correspond with a "two-minute turn", which is considered ideal when maneuvering an aircraft in instrument conditions. When the wings of the white aircraft in the center of the dial intersect with these markings (during a turn), it will take exactly 2 minutes for the aircraft to make a 360 degree turn back to its original course.

The floating ball is used to assist the pilot in making a "coordinated turn", so the aircraft does not slip to the side, but instead follows the desired course. If the ball moves to the right, depress the right (rudder) pedal, until the ball is centered again. Correspondingly, if the ball moves to the left, depress the left (rudder) pedal, until the ball is centered again. When the ball is centered, the aircraft is making a coordinated turn.

Altimeter

The altimeter displays the altitude above sea level (not the altitude above the ground). This model provides an analog-only presentation.

Altimeters use barometric pressure to determine altitude. As such, they must be calibrated at the start of the flight, and periodically re-calibrated during the flight, to account for the current local conditions. To calibrate this instrument, the pilot must set the published barometric pressure at his current location. This setting is also displayed here, in inches of mercury.

Chronometer

This instrument supports four modes:

Current Time (GMT)
Current Time (Local)
Current Date
Elapsed Time

Cycling through each of these modes is accomplished by clicking the "SELECT" button.

Starting, stopping and re-setting the elapsed time is accomplished by clicking the "CONTROL" button.

Directional Gyro and combined VOR / ADF (Automatic Direction Finder)

This instrument displays the aircraft heading (according to the onboard directional gyroscopes), and a combined direct course to or from a selected VOR (VHF Omnidirectional Range) receiver, or a selected NDB (Non-Directional Beacon).

Variometer

The Variometer informs the pilot of the rate of climb, or the rate of descent, in terms of thousands of feet per minute.

Overhead Panel

DC Load (left and right generators)

These instruments indicate the total DC electrical load on the left and right generators, as a percentage of the maximum-rated load for each.

In the event of generator failure, the DC Load indication is crucial for minimizing battery depletion.

DC Volts

The King Air C90B has a single 24 volt battery, and duel 28 volt engine-driven generators.

This instrument indicates the total voltage available at the electrical bus.

Normal values are 24 volts when the generators are not running, and 26 to 28 volts when the generators are running.

AC Volts

AC power is provided by an inverter, which converts Direct Current (DC) to Alternating Current (AC). AC is required by some of the electrical equipment aboard the aircraft (including the autopilot).

When the inverter is on, this instrument indicates the available AC voltage from the inverter.

Overhead Rotary Controls

Wipers

This rotary control operates the windshield wipers. Three positions may be selected, “Off”, “Slow” and “Fast”.

Pilot Flight Lights

This rotary control operates the backlighting for the Analog instruments in the Pilot’s Primary Instrument Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Pilot Gyro Instrument Lights

This rotary control operates the backlighting for the electronic display panels (EADI and EHSI) in the Pilot’s Primary Instrument Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Engine Instrument Lights

This rotary control operates the backlighting for the engine instruments. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Avionics Panel Lights

This rotary control operates the backlighting for the instruments contained within the Avionics Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Overhead Sub Panel and Console Lights

This rotary control operates the backlighting for the instruments, and rotary controls contained within the Overhead Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Side Panel Lights

This rotary control operates the backlighting for the Fuel Management (side) Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Copilot Gyro Instrument Lights

This rotary control operates the backlighting for the Copilot’s attitude indicator (AI). The intensity level is continuously variable between a setting of “Bright” and “Off”.

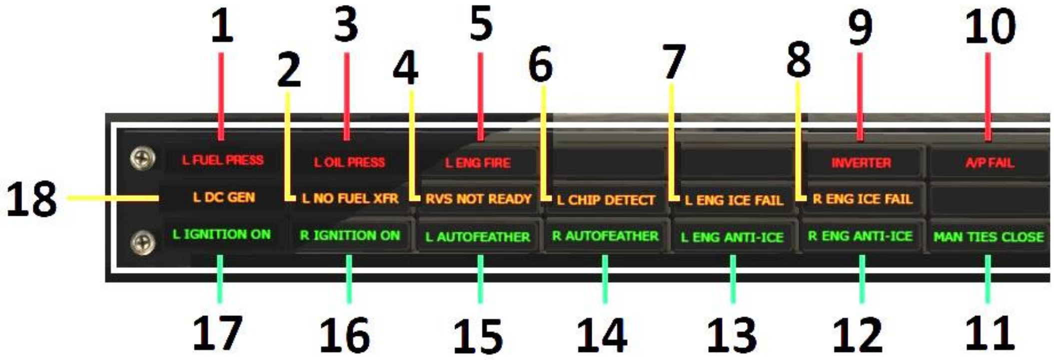
Copilot Flight Lights

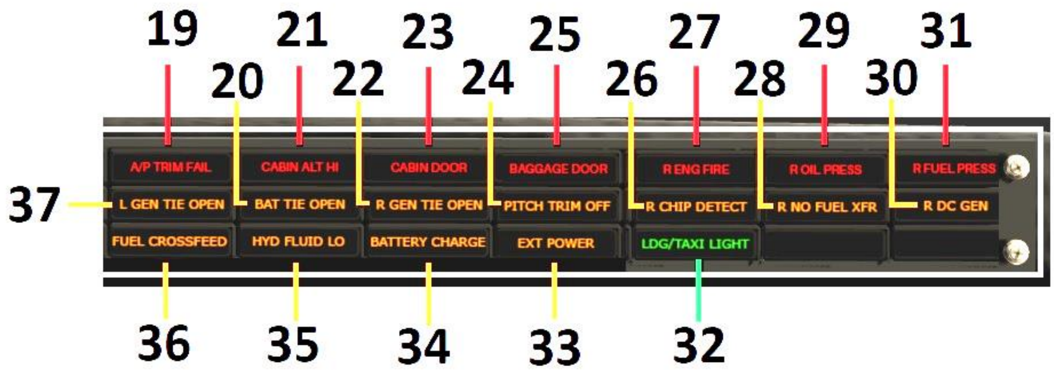
This rotary control operates the backlighting for the Analog instruments in the Copilot’s Primary Instrument Panel. The intensity level is continuously variable between a setting of “Bright” and “Off”.

Annunciator Panel

This panel features a group of lights that indicate the status of the aircraft's equipment or systems. Red indicators are warnings, amber indicators are cautions, and green indicators present advisory information.

A test button is located immediately to the left of the annunciator panel. Depressing this button illuminates every light in the panel, to confirm each one is working prior to the flight.





1	**L FUEL PRESS**	Severity: Warning Left Fuel Pressure: Indicates a drop in fuel pressure to the left engine. This usually occurs in the event of fuel starvation, a fuel leak, or the failure of a fuel pump.
2	**L NO FUEL XFR**	Severity: Caution (not currently modeled) Left No Fuel Transfer: The left transfer pump moves fuel from the (lower) wing tanks to the (higher) nacelle tank, which feeds the left engine. In the event of a pump failure, this indicator will illuminate. A drop in fuel pressure to the left engine will likely follow.
3	**L OIL PRESS**	Severity: Warning Left Oil Pressure: Indicates a drop in oil pressure in the left engine. This usually occurs in the event of oil starvation, an oil leak, or a pump failure. A failure of the left engine may follow.

4	**RVS NOT READY**	Severity: Caution Indicates the prop levers are not in the appropriate position (HIGH RPM) when the landing gear is extended.
5	**L ENG FIRE**	Severity: Warning Left Engine Fire: Indicates a fire in the left engine. Fire detection is accomplished by a combination of smoke detectors, and heat sensors, situated near the engine and hydraulic systems.
6	**L CHIP DETECT**	Severity: Caution Left Chip Detection: Indicates possible metal contamination in the left engine gear reduction oil supply.
7	**L ENG ICE FAIL**	Severity: Caution Left Engine Ice (protection) Failure: Indicates the left engine anti-ice vanes are inoperative.
8	**R ENG ICE FAIL**	Severity: Caution Right Engine Ice (protection) Failure: Indicates the right engine anti-ice vanes are inoperative.
9	**INVERTER**	Severity: Warning Indicates the currently selected inverter has failed. This aircraft has two inverters, to provide redundancy. In the event of a failure, the pilot may elect to switch to the backup inverter. If both inverters fail, systems that rely on the presence of A/C (alternating current) will no longer operate.
10	**A/P FAIL**	Severity: Warning Autopilot Failure: Indicates the failure of the autopilot, requiring the pilot to fly the remainder of the trip manually.
11	**MAN TIES CLOSE**	Severity: Advisory (not currently modeled) Manual Ties Closed: Indicates generator bus ties have been manually closed.
12	**R ENG ANTI-ICE**	Severity: Advisory Right Engine Anti-Ice: Indicates right engine anti ice vanes are in position for icing conditions.
13	**L ENG ANTI-ICE**	Severity: Advisory Left Engine Anti-Ice: Indicates left engine anti ice vanes are in position for icing conditions.

14	**R AUTOFEATHER**	Severity: Advisory Right (prop) Auto-Feather: Indicates the auto-feather system is engaged, and the right propeller is feathering.
15	**L AUTOFEATHER**	Severity: Advisory Left (prop) Auto-Feather: Indicates the auto-feather system is engaged, and the left propeller is feathering.
16	**R IGNITION ON**	Severity: Advisory Right Ignition On: Indicates the right engine ignition/engine-start switch is in the ON position.
17	**L IGNITION ON**	Severity: Advisory Left Ignition On: Indicates the left engine ignition/engine-start switch is in the ON position.
18	**L DC GEN**	Severity: Caution Left DC Generator: Indicates a failure of the left DC generator. The generators provide DC power to the electrical systems. A generator failure may compromise the aircraft electrical system. Consider turning off non-vital systems to compensate for this.
19	**A/P TRIM FAIL**	Severity: Warning Autopilot Trim Failure: Indicates a failure in the autopilot trim command. When the autopilot initiates a command to the elevator (to ascend or descend), it follows this with a trim command, so continued pressure on the elevator is not required. Failure of that (secondary) trim command causes this annunciator to illuminate.
20	**BAT TIE OPEN**	Severity: Caution (not currently modeled) Battery Tie Open: Indicates the battery is isolated from the Generator buses. The battery is therefore not being charged by the generator(s).
21	**CABIN ALT HI**	Severity: Warning Cabin Altitude High: Indicates the cabin altitude (cabin-pressure) has exceeded 12,000 feet (with the potential for associated hypoxia).
22	**R GEN TIE OPEN**	Severity: Caution (not currently modeled) Right Generator Tie Open: Indicates the right electrical bus is isolated from the central electrical bus.
23	**CABIN DOOR**	Severity: Warning Indicates the cabin door is not closed fully.

24	**PITCH TRIM OFF**	Severity: Medium Indicates the electrical trim switch (on the yoke) is set to the “OFF” position.
25	**BAGGAGE DOOR**	Severity: Warning (not currently modeled) Indicates the baggage door is not closed fully.
26	**R CHIP DETECT**	Severity: Medium Right Chip Detection: Indicates possible metal contamination in the right engine gear reduction oil supply.
27	**R ENGINE FIRE**	Severity: Warning Right Engine Fire: Indicates a fire in the right engine. Fire detection is accomplished by a combination of smoke detectors, and heat sensors, situated near the engine and hydraulic systems.
28	**R NO FUEL XFR**	Severity: Caution (not currently modeled) Right No Fuel Transfer: The right transfer pump moves fuel from the (lower) wing tanks to the (higher) nacelle tank, which feeds the left engine. In the event of a pump failure, this indicator will illuminate. A drop in fuel pressure to the left engine will likely follow.
29	**R OIL PRESS**	Severity: Warning Right Oil Pressure: Indicates a drop in oil pressure in the right engine. This usually occurs in the event of oil starvation, an oil leak, or a pump failure. A failure of the right engine may follow.
30	**R DC GEN**	Severity: Caution Right DC Generator: Indicates a failure of the right DC generator. The generators provide DC power to the electrical systems. A generator failure may compromise the aircraft electrical system. Consider turning off non-vital systems to compensate for this.
31	**R FUEL PRESS**	Severity: Warning Right Fuel Pressure: Indicates a drop in fuel pressure to the right engine. This usually occurs in the event of fuel starvation, a fuel leak, or the failure of a fuel pump.
32	**LDG/TAXI LIGHT**	Severity: Advisory Landing Light/Taxi Light: Indicates landing light(s) or taxi light ON with landing gear in the UP position.
33	**EXT POWER**	Severity: Caution External Power: Indicates external power connector is plugged-in.
34	**BATTERY CHARGE**	Severity: Caution Indicates battery charge rate is too high. Damage to the battery may follow.

35	**HYD FLUID LO**	Severity: Caution Hydraulic Fluid Low: Indicates the hydraulic fluid in the power pack is low. This is an electric motor that pressurizes the aircraft's hydraulic system.
36	**FUEL CROSSFEED**	Severity: Caution (not currently modeled) Indicates the fuel cross-feed valve is open. This connects the left and right fuel system, and is usually used in the event of a single engine failure.
37	**L GEN TIE OPEN**	Severity: Caution (not currently modeled) Left Generator Tie Open: Indicates the left electrical bus is isolated from the central electrical bus.

EFIS Control Panel and Autopilot Operation

EFIS Control Panel

This section of the manual covers the operation of the EFIS Control Panel, which is modeled on a Collins variant. This panel controls the Electronic Flight Instrumentation System (see EADI and EHSI in Pilot’s Primary Instruments).

EFIS POWER

This switch provides power to the EFIS system, which is separate from the avionics electrical bus. This switch must be in the ON position for the EADI and EHSI to be operational.

Display Format Rotary Control

Selects desired display mode for the EHSI:

MAP: Enroute format. Expanded compass segment at top of the display, with aircraft symbol located at bottom-center of the display.

ARC: Approach or Sector format. Expanded compass segment across the top of the display, with aircraft symbol located at bottom-center of the display.

HSI: Circular compass around perimeter of display. Aircraft symbol located at center of display.

WX Modes: Weather radar superimposed.

NAV DATA (Outer) Rotary Control

Selects the desired data displayed in the upper-right corner of the EHSI:

GSP: Ground Speed.

WND: Wind speed and direction (relative to the aircraft heading).

TTG: Time To Go – estimated time remaining to destination.

ET: Elapsed Time – since the start of the flight.

Course (Outer) Rotary Control

Works in conjunction with the CRS SEL (Course Selection button.

ACT: The CRS SEL button will cycle through the available navigation sources (GPS, VOR, etc.)

PRE: Not Modeled.

XFR: Not Modeled.

HDG (Inner) Rotary Control

Works in conjunction with the magenta EHSI Heading Bug, to program the desired heading when the Autopilot is in HDG mode.

HDG Synch Push Button

Sets the magenta EHSI Heading Bug to the aircraft's current heading.

CRS/Course (Inner) Rotary Control

Works in conjunction with the NAV1/VOR. This controls the desired radial to be flown to, or from, the VOR.

CRS Direct Push Button

When the COURSE Rotary is set to ACT, the pilot may choose a Nav Source via the CRS SEL button. Hold the CRS SEL button for a few seconds until the Nav Source displayed on the EHSI turns white. Click the button to "cycle" through the Nav Sources. Once you find the one you want, click and hold the CRS SEL button down until the Nav Source display turns green, at which point it becomes the ACTIVE Nav Source.

Autopilot Operation

This section of the manual covers the operation of the autopilot provided with the X-Plane King Air C90B, and may differ from autopilot systems found in real aircraft.

AP ENG

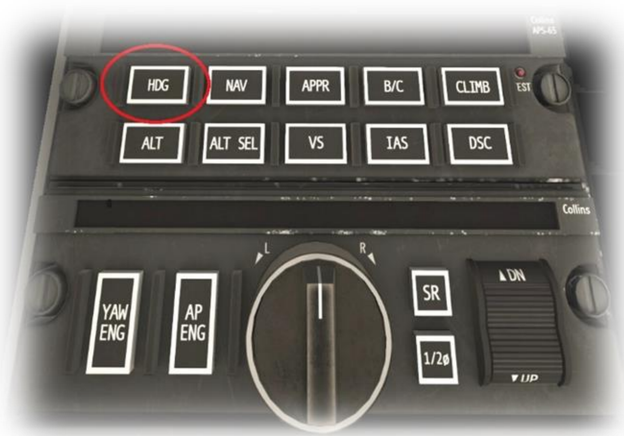
This is a toggle button, used to engage and dis-engage the autopilot system respectively.

When the autopilot is initially engaged, the pilot still has full manual control of the aircraft, because no autopilot mode has yet been selected.

YAW (Damper) ENG Mode

This is a toggle button, used to engage and dis-engage the yaw damper system respectively.

A Yaw Damper reduces rolling and pitching oscillations, and uses a computer system that works in conjunction with a series of yaw-rate sensors located on the aircraft.



HDG (Heading) Mode

This is a toggle button, used to engage and dis-engage HEADING mode respectively.

When this mode is engaged, the autopilot will turn the aircraft to the heading selected by the pilot. The pilot may select the desired heading using the "Heading Bug" – the magenta indicator on the EHSI. The Heading Bug responds to the HDG rotary on the EFIS Control Panel.

ALT (Altitude) Mode

When this mode is engaged, the autopilot will level the aircraft at the current altitude, and hold this.

At the same time, the altitude pre-select will become set to the current altitude.

V/S (Vertical Speed) Mode

When this mode is engaged, the autopilot will maintain the current rate of climb or descent. The pilot is responsible for selecting a V/S that does not exceed the performance capability of the aircraft, otherwise the airspeed will be sacrificed by the autopilot to maintain the selected vertical speed.

The Vertical Control can be used in this mode to change the VS in 200ft/minute increments, either UP, or DOWN.

ALT SEL + V/S Mode

Combining these modes directs the autopilot to climb or descend at the current vertical speed until the desired altitude pre-select is achieved, at which time the aircraft will level off at that altitude.

APPR (Approach) Mode

This mode is engaged to fly an ILS approach. The autopilot will **initially** be in APPR (Approach) ARM and GS (Glide-Slope) ARM modes, until the localizer and glide-slope are captured respectively.

The pilot must select the appropriate ILS frequency on the NAV 1 radio.

This mode may be combined with HDG (Heading) mode, to accomplish an initial intercept of the ILS localizer.

BC Mode

The BC (Back Course) mode is engaged to fly an ILS localizer via the back course. GS (Glide-Slope) mode is not available in these circumstances.

Many ILS systems use only a single localizer and glideslope that services the same runway from either direction. The runway may be approached using the front course, or the back course. When using the back course, the autopilot must be in the appropriate mode, to react in the opposite way to deviations from the localizer.

The pilot must select the appropriate ILS frequency on the NAV 1 radio.

This mode may be combined with HDG (Heading) mode, to accomplish an initial intercept of the ILS localizer.

IAS Mode

IAS mode is used in conjunction with ALT SEL, when climbing or descending. The autopilot will capture and maintain the current airspeed (as a priority over vertical speed), until the selected altitude is reached.

The Vertical Control can be used in this mode to change the IAS reference in 1 knot increments, either UP, or DOWN.

NAV (Navigation) Mode

If the Garmin G530 is currently in “GPS” mode, selecting this autopilot mode will direct the aircraft **laterally**, according to any flight plan currently programmed into the GPS device.

If the Garmin G530 is in “VLOC” mode, selecting this autopilot mode will direct the aircraft according to any VOR radial that has been selected. The pilot must select the appropriate ILS frequency on the NAV 1 radio. The autopilot will initially be placed in NAV ARM mode, until the radial has been intercepted. This mode may be combined with HDG (Heading) mode, to accomplish an initial intercept of the VOR radial.

Turn Knob

When the autopilot is engaged, this rotary-control commands the aircraft to maintain a fixed rate of roll, to the left, or right.

The rate of roll is dependent on the deflection of the control.

Flight Planning

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

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

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

A good online flight planner will utilize the origin and destination airports, together with the aircraft type and equipment, the weather conditions, the chosen cruise altitude, known restrictions along the route, current NOTAMS, and other factors to generate a suitable flight plan. The waypoints incorporated into the flight plan can be subsequently input into the aircraft’s Flight Management Computer (FMS), or Global Positioning System (GPS). Some online flight planners provide the option to save the plan as an X-Plane compatible file, with an ‘fms’ extension. A saved flight plan can be loaded into the GPS or Flight Management Computer unit featured in the King Air C90B.

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

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

Fuel Calculation

Note: All calculations here are based on the X-Plane C90B, and NOT the real aircraft. Differences may exist.

Load Sheet Tables

The tables in the next pages illustrate a series of hypothetical load-sheet scenarios. For these purposes, passengers are deemed to have an average weight of 165 lbs. and cruise will be 215 **KTAS / 145 KIAS @ 20,000 feet**.

PAYLOAD: EMPTY

T/O and Climb Time (Minutes)	T/O and Climb Fuel (lbs.)	Cruise Time (Minutes)	Cruise Fuel (lbs.)	Descent Time (Minutes)	Descent Fuel (lbs.)	Total Fuel Weight (lbs.)	Crew	PAX	Cargo (lbs.)	Payload Weight	CG
20	205	30	310	25	75	590	2	0	0	330	**DEFAULT**
20	205	60	620	25	75	900	2	0	0	330	**DEFAULT**
20	205	90	930	25	75	1210	2	0	0	330	**DEFAULT**
20	205	120	1240	25	75	1520	2	0	0	330	**DEFAULT**
20	205	150	1550	25	75	1830	2	0	0	330	**DEFAULT**
20	205	180	1860	25	75	2140	2	0	0	330	**DEFAULT**

PAYLOAD: MEDIUM

T/O and Climb Time (Minutes)	T/O and Climb Fuel (lbs.)	Cruise Time (Minutes)	Cruise Fuel (lbs.)	Descent Time (Minutes)	Descent Fuel (lbs.)	Total Fuel Weight (lbs.)	Crew	PAX	Cargo (lbs.)	Payload Weight	CG
20	205	30	310	25	75	590	2	2	50	710	**DEFAULT**
20	205	60	620	25	75	900	2	2	50	710	**DEFAULT**
20	205	90	930	25	75	1210	2	2	50	710	**DEFAULT**
20	205	120	1240	25	75	1520	2	2	50	710	**DEFAULT**
20	205	150	1550	25	75	1830	2	2	50	710	**DEFAULT**
20	205	180	1860	25	75	2140	2	2	50	710	**DEFAULT**

PAYLOAD: FULL

T/O and Climb Time (Minutes)	T/O and Climb Fuel (lbs.)	Cruise Time (Minutes)	Cruise Fuel (lbs.)	Descent Time (Minutes)	Descent Fuel (lbs.)	Total Fuel Weight (lbs.)	Crew	PAX	Cargo (lbs.)	Payload Weight	CG
20	205	30	310	25	75	590	2	4	100	1090	**DEFAULT**
20	205	60	620	25	75	900	2	4	100	1090	**DEFAULT**
20	205	90	930	25	75	1210	2	4	100	1090	**DEFAULT**
20	205	120	1240	25	75	1520	2	4	100	1090	**DEFAULT**
20	205	150	1550	25	75	1830	2	4	100	1090	**DEFAULT**
20	205	180	1860	25	75	2140	2	4	100	1090	**DEFAULT**

Setting the Weight, Balance and Fuel in X-Plane

After referencing the Load Sheet Tables, you are ready to configure the weight, balance and fuel for your upcoming flight. Select the C90B from the flight menu, and click on the 'Customize' button, followed by the 'Weight, Balance & Fuel' button.

Use the 'Total Fuel Weight' slider to set the fuel according to the load sheet tables in the previous chapter. This will distribute the fuel in the manner required to maintain the default center of gravity (CG).

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

Check Lists

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

Initial Cockpit Check

Landing Gear Lever – DOWN.

Parking Brake – ON (not modeled in cockpit).

Battery Switch – ON.

Battery Voltage – CHECK (24+).

Landing Lights – ON.

Taxi Lights – ON.

Navigation Lights – ON.

Beacon – ON.

Strobes – ON.

Flaps – EXTENDED.

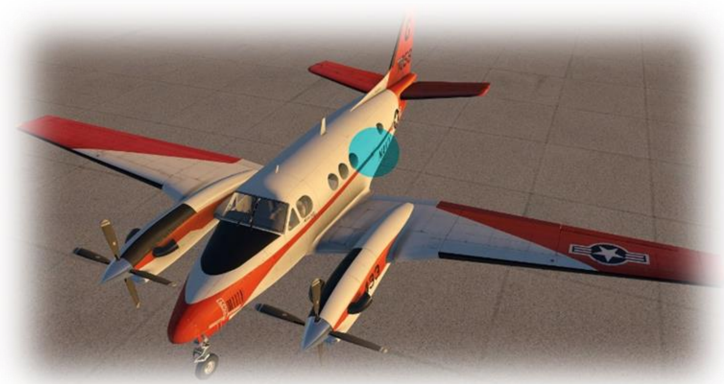
Pre-Flight Exterior Inspection

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

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

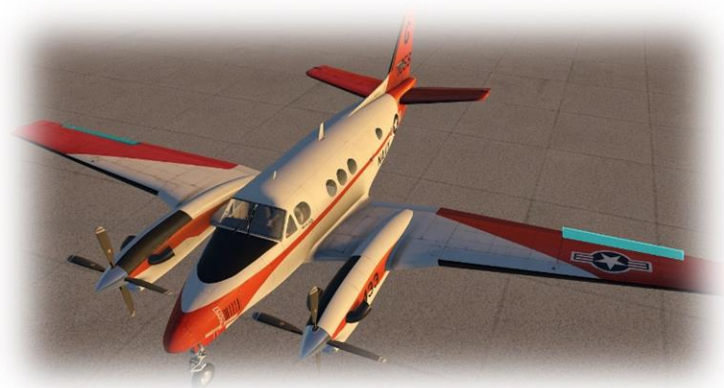
Check passenger door is closed.

(Note: The door is opened and closed from inside the main cabin using a mouse point a click operation).



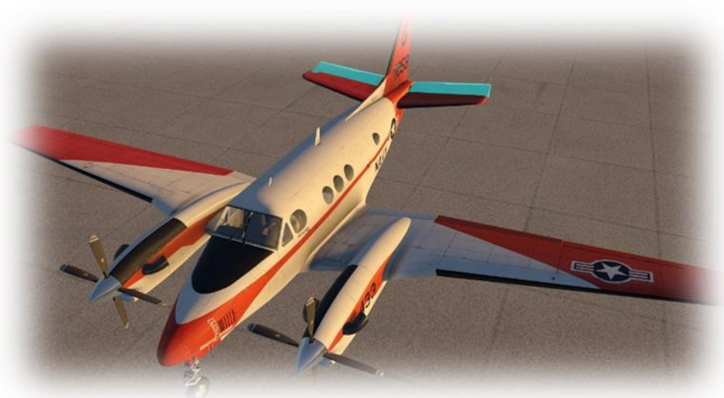
Hold roll axis at full deflection.

Visually check corresponding movement of ailerons.



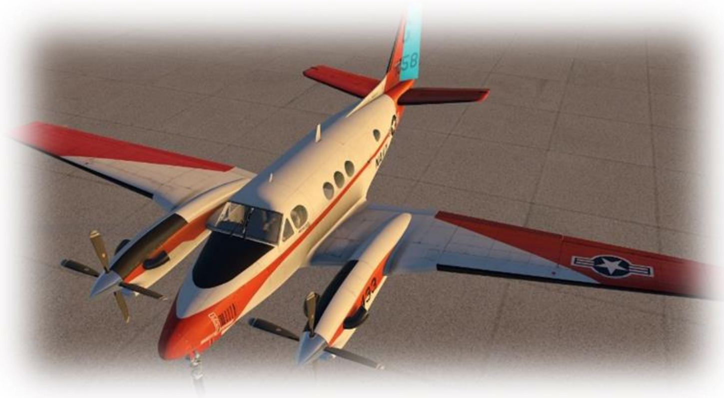
Hold pitch axis at full deflection.

Visually check corresponding movement of elevators.

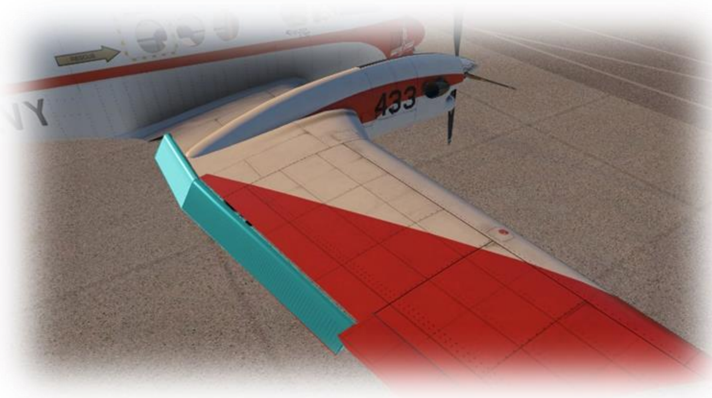


Hold yaw axis at full deflection.

Visually check corresponding movement of rudder.



Visually check flaps are extended.



Visually check strobe lights are operating.

Visually check beacon light is operating.

Visually check navigation lights are operating.

Visually check taxi light is operating.

Visually check landing lights are operating.

Before Starting Engines

Exterior Inspection – COMPLETED.

Power Levers - IDLE.

Propeller Levers – FULL FORWARD.

Condition Levers – CUT OFF.

All switches – OFF.

Battery Switch – ON.

Fuel Quantity – CHECK.

Engine Start

Inverter 1 (or Inverter 2) - ON.

Right Engine Auto Ignition Arm – ON.

Right Ignition and Engine Start Switch – ON

When Turbine RPM reaches 12%

Right Condition Lever – LOW IDLE.

Right Engine Oil Pressure – CHECK.

Right Engine Turbine RPM – CHECK.

Right Generator – ON.

Left Engine Auto Ignition Arm – ON.

Left Ignition and Engine Start Switch – ON

When Turbine RPM reaches 12%

Left Condition Lever – LOW IDLE.

Left Engine Oil Pressure – CHECK.

Left Engine Turbine RPM – CHECK.

Left Generator – ON.

Before Taxi

Flaps – RETRACTED.

Avionics Master Switch – ON.

EFIS Power – ON.

Lights – AS REQUIRED.

Radios – AS REQUIRED.

TRANSPONDER – ON AND SET.

Before Takeoff

Condition Levers – HIGH IDLE.

Elevator Trim – SET FOR TAKEOFF (recommend 5 degrees nose up).

Flaps – SET TO APPROACH (One Notch).

Autopilot - OFF.

Takeoff

Brakes – ON.

Propeller Levers – CHECK FULL FORWARD.

Condition Levers – CHECK HIGH IDLE.

Brakes – OFF.

Throttles – TAKEOFF POWER.

Monitor ITT and Engine Torque.

Rotate at 90+ KNOTS.

Climb away at 100+ KNOTS.

Climb

Gear - UP.

Flaps – CHECK RETRACTED.

Climb Power – SET.

Propeller RPM - 2000.

Auto Feather - OFF.

Engine Instruments – MONITOR.

Landing & Taxi Lights – OFF.

Cruise

Cruise Power – SET.

Engine Instruments - CHECKED.

Fuel System - CHECKED.

Descent

Altimeters – SET.

Descent Power – SET.

Engine Instruments – CHECKED.

Before Landing

Auto Feather - ARM.

Flaps – AS REQUIRED.

Landing Gear – DOWN.

Landing Lights – ON.

Taxi Lights – AS REQUIRED.

Propeller Levers – FULL FORWARD.

Power – AS REQUIRED.

After Landing

Landing & Taxi Lights – AS REQUIRED.

Auto Feather – OFF.

Right Engine Auto Ignition Arm – OFF.

Left Engine Auto Ignition Arm – OFF.

Elevator Trim – ZERO.

Flaps – RETRACTED.

TRANSPONDER – OFF.

Operational Speeds

Minimum Single Engine Control	92 KIAS
Single Engine Best Angle of Climb	101 KIAS
Single Engine Best Rate of Climb	112 KIAS
Two Engine Best Angle of Climb	101 KIAS
Two Engine Best Rate of Climb	118 KIAS
Turbulent Air Penetration Speed	169 KIAS
Maximum Demonstrated Crosswind Speed	25 KNOTS
Cruise Climb Sea Level to 10,000 feet	140 KIAS
Cruise Climb 10,000 to 20,000 feet	120 KIAS
Cruise Climb 20,000 to 25,000 feet	110 KIAS
Cruise Climb Above 25,000 feet	100 KIAS