



MODULAR FLIGHT DECK ADVANCED AVIATION TRAINING DEVICE SET UP AND OPERATIONS MANUAL



6.0
Modular Flight Deck (MFD) Advanced Aviation Training Device
January 2021
-

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1.1 Introduction

This Set Up and Operations Manuals has been prepared for the user with information for the proper installation and efficient operation of the MFD Advanced Aviation Training Device.

This manual includes sections that are to be followed only under the direct instruction of a Precision Flight Controls, Inc (PFC) support technician. These sections are clearly marked.

For the operation of real aircraft equipment such as the Garmin 430, G530, G1000 and others, the operation manuals of the respective vendor must used.

1.2 Warnings, Cautions, and Notes

The following definitions apply to these terms used in the manual



Warning: Non-observation will result in bodily injury.

Caution: Non-observation may result in damage or disrupt the use of the device.

Note: Special or unusual item note related to safety.

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1.3 Definitions and Abbreviations

1.3.1 Hardware

MFD:	MFD Advanced Aviation Training Device
KVM:	Keyboard, Video and Mouse (switchbox)
	Remote Instrument Console (vertical panel on the left and right of the
RIC:	instrument screen with knobs to control Heading, Course, OBS1, OBS2 and
	etc.
IOS:	Instructor Output Station
Master PC1:	Computer that runs the Instruments, X-Plane IOS and the optional $PFC530W$
Visual PC2:	Computer that runs the left and right visual displays
Visual PC3:	Computer that runs the front-left, center and right-front visual displays
USB:	USB Serial Bus (connections used by components of the MFD)

1.4 Dimensions

1.4.1 External Dimensions of the MFD without motion

Depth:	84 in	(213.36 cm)
Width:	95 in	(241.3 cm)
Height:	72 in	(182.88 cm)

1.4.2 External Dimensions of the MFD with ProMotion II

The height measurement below is measured when each actuator is fully extended.

Depth:	84 in	(213.36 cm)
Width:	95 in	(241.3 cm)
Height:	79 in	(200.66 cm)

1.5 Weight of the MFD

Weight: 700 lbs (317.51 kg)

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1.6 Room Requirements

1.6.1 Power Requirements for the MFD

The MFD with five-screen visual will one independent twenty amperes.

1.6.2 Power Requirements for the MFD with ProMotion II

The MFD with five-screen visual and ProMotion II require two independent twenty amperes. One for the MFD unit and computer rack; the other is for ProMotion II.

1.6.3 Room Size for MFD

The room required for MFD with five-screen visual with or without ProMotion II is the same.

A minimum of:

LENGTH	12 ft
WIDTH	12 ft
HEIGHT	8 ft

1.6.4 Internet Connection

For remote assistance and software updates a wired hi-speed internet connection is required with speeds of at least 10 Mbps.

1.6.5 Room Temperature

Room must be air-conditioned and kept between 70 to 75 degrees Fahrenheit (21 C to 24 C).

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2.1 Introduction

The install section has been prepared with information for the proper and efficient installation of the MFD Advanced Aviation Training Device. In this and succeeding sections of this manual the MFD Advanced Aviation Training Device, will be referred to as MFD.

2.2 Boxes and Crate Condition on Delivery

Upon delivery, please inspect that your boxes and crate(s) are in a good acceptable condition. Box or crate damage is a sign that your system was mishandled and may have sustained damage in transport. Upon delivery, please inspect that your boxes and crate(s) are in a good acceptable condition. Box or crate damage is a sign that your system was mishandled and may have sustained damage in transport.

If you suspect any damage, immediately report any damage to your carrier. Make sure that it is written on the on the bill of lading that your carrier will ask you sign. Carefully document the damages taking pictures if necessary, as this may be required when filing a claim.

Once documented, please report the damages to Precision Flight Controls at (916) 414-1316 or techsupport@flypfc.com.

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2.2.1 Unpacking the crate

If there are no visible signs of any damage, carefully unpack the boxes and crate(s).

- 1. Start by unlatching the front and back opening.
- 2. Remove all boxes and set it aside.
- 3. Unbolt the brackets that are holding the MFD to the floor of the crate.



Caution: Do not pick up the MFD with the forklift from nose side. Pick up the MFD seat side only to prevent damage to the protective pan. The pan installed to prevent damage to the pedal assembly.





Caution: Do not drive the fork underneath the seat side of the MFD beyond 50 inches. Exceeding 50 inches will damage the pan and pedals.

4. From the seat side, gently drive the forklift underneath the MFD, take the MFD out of the crate.

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2.3 Positioning the MFD

The MFD needs to have a minimum of 30 inches from any wall but 36 inches is preferred. This space is necessary for connecting cables during set up, servicing in the future and airflow.

2.4 Steps to getting the MFD through a single door

The MFD with Platform can be taken apart to get through a single door. This door must have a minimum width 36 inches.

2.4.1 Tools and personnel required

- → #2 Head Phillips Screwdriver.
- → #3 head Phillips Screwdriver
- → ¼-inch socket and socket driver.
- \rightarrow 7/16 inch socket and wrench.
- → Minimum of three people required.

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2.4.2 Seat Removal

1. Remove the two stop plates per seat by removing the three screws on the very back of each seat rail. Screws to be removed highlighted in green in the picture below.



2. Rails with the stop plate removed.



3. Slide the seat all the way back and pull until it comes out of the rail.

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2.4.3 Removal of the Center console

4. Remove the side plates of the center console.



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5. Remove the screws to the rear board plate.



- 6. Gently pull the panel back and unplug all the cables to the board and set it aside. This will expose two screws securing the center console.
- 7. Remove the two screws.

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8. Remove the fuel panel and disconnect all the cables.



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9. Remove the screws as shown.



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2.4.4 Removing the Overhead light

- 10. Locate the overhead light panel inside the MFD.
- 11. Disconnect the power connector.
- 12. Remove the four screws holding the overhead light panel to the roof.



13. Once removed, set it aside.

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2.4.5 Removing the Enclosure Roof

- 14. To assure that roof will not fall, position one person on the front, one on the left and one on the right of the roof to catch it.
- 15. Remove the screws of the roof as highlighted in green below.



- 16. Slide the roof forward about six inches and then lift the roof as you are sliding it back to clear all obstacles.
- 17. Set the roof aside.
- 18. Inside the MFD, have someone hold the left visual monitor. Since you will be removing the monitor, you must assure that someone will catch it and not allow it to fall down or damage will occur.

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2.4.6 Removing the Monitors

The monitors must be removed as sequenced below:

- Left TV
- Center TV
- Right TV
- Center-Left TV
- Center-Right TV

19. Make sure that a person is holding the TV you are attempting to remove.



Caution: Failure to ensure that the TV is securely held by another person prior to removing the screws may result in the TV being damaged.

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20. Outside the cabin, remove the Allen screws on the bottom of each TV. The sample below is for the Center Screen.



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21. Remove the Phillips screws for the left TV mounting plate highlighted in green. Do not remove the, screws highlighted in red.



- 22. Once the screws are removed, gently tilt the TV assembly towards the inside of the cockpit and disconnect the power and HDMI cable from the opening outside.
- 23. Set the monitors aside, make sure that they are adequately protected.
- 24. Repeat this steps until you have removed all the monitors.

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2.4.7 Removing the Left TV Tray

- 25. Gently pull all power and video cables towards the center screen.
- 26. On the inside, remove the four screws securing the filler bracket.



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27. Remove the left external side support (struts).



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28. Remove the external screws under the left tray, highlighted in green.



29. Remove the vertically aligned external screws left TV tray, highlighted in green.



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2.4.8 Removing the Right TV Tray

- 30. Remove the right external side support (struts).
- 31. On the inside, remove the four screws securing the filler bracket.



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32. Remove the external screws under the right tray, highlighted in green.



33. Remove the vertically aligned external screws right TV tray, highlighted in green.



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2.4.9 Removing the Center / Front Tray

34. The next item to be removed is the center tray. Start by removing the left corner screws highlighted in green then followed by right.



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35. The next item to be removed is the center tray. Start by removing the left corner screws highlighted in green then followed by right.



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2.4.10 Removing the Rear Roof

36. The next item to be removed is the rear roof. Start by removing the screws attaching the rear roof on the right side panel, highlighted in green.



37. Remove the screws attaching the rear roof on the left side panel, highlighted in green.



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38. Remove the two back screws on each side of the rear roof.



Rear Roof Left Screws



Rear Roof Right Screws

39. Push up on the rear roof to clear the sides and set aside.

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2.4.11 Removing the Side Panels

40. Remove the corner screws on the left side panel.



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41. Remove the lower screws on the left side panel.



- 42. The left right side panel can now be removed and set aside.
- 43. Repeat the same steps for the right side panel.

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2.4.12 Removing the Side Rail

44. Remove the bolts that hold the rail to the motion mount.



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45. Remove the bolts that hold the rail to floor.



- 46. Set the rail aside.
- 47. Repeat the steps to remove the other side rail.

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2.4.13 Diassembling the Floor

48. Remove the five pair of screws as highlighted below.



49. Pull the rear floor from the front and set it aside.

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2.5 Reassembling the MFD

- 1. Position the nose section a minimum of 30 inches from the wall.
- 2. Attach the rear floor to the front nose section and secure with screws.
- 3. Install the side rails and secure with bolts.
- 4. Install the side panels and secure with screws.
- 5. Install the rear roof and secure with screws.
- 6. Install the right TV tray secure with screws.
- 7. Install the left TV tray secure with screws.
- 8. Install the center TV tray secure with screws.

2.5.1 TV Installation Sequence

The TVs must be installed in a specific order to assure proper installation. The order must be:

- A. Left Front TV.
- B. Right Front TV.
- C. Left TV.
- D. Right TV.
- E. Center TV.
- 9. Position the Left Front TV.
- 10. Connect power and HDMI cable to TV.
- 11. Secure the TV using the screws.
- 12. Repeat steps for the remaining TVs.
- 13. Install the roof.
- 14. Install the overhead light.
- 15. Install the center console.
- 16. Install the seat.

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2.6 **ProMotion II Installation**

One of the most popular add-on for our flight decks is the ProMotion II. The ProMotion II is a 3-DOF cueing system that provides moderate motion to include climbs and descents, turns, turbulence, stall buffet, engine out, ground handling feedback and engine vibration. If your system is not equipped with ProMotion II, you may skip this portion of Section 2.

2.6.1 Components Needed

- → (4) Actuators.
- → (4) Controller Box connected to each actuator.
- ➔ (4) Actuator toe cups.
- \rightarrow (4) Power cable for controller box.
- ➔ (3) 3 foot network cable.
- ➔ (1) 10 foot network cable
- \rightarrow (2) 3 inch network cable installed on the controller box.
- → (1) KCU-1P motion controller with USB Cable (installed on the computer rack).



2.6.2 Tools Required

➔ Floor Jack

2.6.3 Personnel Required

➔ Minimum of two people.

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2.6.4 Installation Steps

Each ProMotion II actuator is labeled for its applicable position. The positions are front left, front right, rear left and rear right. Make sure that the actuators are in their proper position prior to use.



Warning: Do not disconnect the connectors from actuators or controller boxes. Failure to follow to these warning may result in bodily injury and may damage the device.

2.6.5 Front Actuator Installation

- 1. It is recommended to have at least two people for installation of the ProMotion II.
- 2. Slide the floor jack on the middle left side of the deck it reaches about 4 inches into floor.
- 3. Lift the deck 6 inches or until you get enough clearance to slide actuator in place.
- 4. Slide the actuator in the front left mount with the cable of the actuator towards the center.
- 5. Secure the actuator to the mount with 4 Allen screws, washers and nuts.
- 6. Repeat these steps for the rear left.
- 7. Connect the power cable and one side of the three and ten foot network cable to the front controller.
- 8. Gently slide the controller box underneath the deck.



Caution: Make sure that the controller, cables and wirings are away from areas that may pinch or crush it prior to lowering the deck.

9. Recheck that no cables are pinched.

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2.7 KCU-1P Connection

The KCU-1P module facilitates the communication between the computer and the controllers. This box is in the computer rack. The only connection necessary is the network cable which will be properly labeled with colored number dot.



Warning: Do not connect the RJ-45 connectors to a network device it may cause damage to KCU-1P.

1. Take the other end of the ten-foot network cable can connect it to the RJ-45 port of the KC-1P.

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3.1 Introduction

Section 3 of this manual contains descriptions of the MFD system hardware and software.



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3.1.1 Air Vents

The Air Vents are parts of the gasper system. The blower fan is controlled by the small toggle switch located on the side of each vent. The blower fan will run if either switch is in the on (up) position. Both switches must be in the off position to turn off the blower fan.

3.1.2 Clock

This clock is Davtron M800.



3.1.2.1 Select and Control Buttons

The Select button selects what is to be displayed on the four digit window. Pressing Select sequentially selects UT, Local Time, Elapsed Time and back to UT.

The Control button controls what is being displayed. The Control button starts, stops, and resets Elapsed Time when momentarily pushed. Normal operation of the M800 cannot accidentally reset time.

3.1.2.2 Setting UT (Universal Time)

Select UT for display in the four digit window with the Select button.

- 1. Simultaneously press both the Select and Control buttons to enter the set mode.
- 2. The tens of hours digit will start flashing.
- 3. The Control button has full control of the flashing digit and each button push increments the digit.
- 4. Once the tens of hours is set, the Select button selects the next digit to be set.
- 5. After the last digit has been selected and set with the Control button, a final push of the Select button exits the mode.
- 6. The lighted annunciator will resume its normal flashing, indicating the UT clock is running.

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3.1.2.3 Setting LT (Local Time)

- 1. Select Local Time, LT, using the Select button.
- 2. Simultaneously push the Select and Control buttons to enter set mode.
- 3. The tens of hours digit will start flashing.
- 4. The set operation is the same as for UT, except that minutes are already synchronized with the UT clock and can only be incremented by 15 minutes.
- LT may be switched from 12 to 24 hour format by pressing Select for 5 seconds while in LT mode. The display will show current hour format.
- 6. Press Control button to change hour format then press Select to exit.

3.1.2.4 Test Mode

In UT mode, hold the Select button down for five seconds and the display will indicate 88:88 and activate all three annunciators.

3.1.2.5 Elapsed Time Count Up

- 1. Select ET for display.
- 2. Pressing the Control button will start ET counting.
- 3. Elapsed time counts up to 59 minutes, 59 seconds, and then switches to hours and minutes. It continues counting up to 99 hours and 59 minutes.
- 4. Pressing the Control button again stops ET.
- 5. Another press resets ET to zero.

3.1.2.6 Elapsed Time Count Down

- 1. Select ET for display and enter set mode by pressing both buttons.
- 2. The countdown timer can now be set.
- 3. Entering the time is identical to UT time setting. When the time is entered and the last digit is no longer flashing the clock is ready to start the countdown.
- 4. Momentarily pressing the Control button starts the countdown.
- 5. When the count reaches zero the displays flash.
- 6. ET continues counting up.
- 7. Pressing Control again will stop counting.
- 8. Another press will reset to zero.

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3.1.3 Panel Lights

The Panel Lights are in several locations on the face plate that provides additional lighting. There is also a light underneath the brow of the dash.

3.1.4 Pilot Instrument Monitor

The Pilot Instrument Monitor will display the pilot set of instruments.

3.1.5 Pilot Vertical Remote Instrument Console (RIC)

There are two Vertical Remote Instrument Console (RIC) makes it possible for the pilot to control the following items:

Pilot Left Vertical RIC		
A/S'	Adjusts the Calibrated Airspeed if aircraft is equipped or	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Airspeed marker for jet aircraft	
R-ALT:	Controls the radar altimeter decision height aural warning value.	
4	Adjusts the Aircraft Reference Symbol.	
ADF:	Adjusts the adjustable compass card on and ADF.	
DG:	Adjusts the DG compass card.	
Single RMI Needle:	Toggles the single RMI needle from ADF to NAV1.	
Double RMI Needle:	Toggles the double RMI needle from ADF to NAV1.	

Pilot Right Vertical RIC		
BARO:	Adjusts the barometric pressure setting in the Kollsman window.	
HDG:	Adjusts the heading bug position.	
CRS:	Adjusts the CDI needle.	
OBS 1:	Adjust the OBS1 compass card.	
OBS2:	Adjust the OBS 2 compass card.	

3.1.6 Master Caution / Warning Panel

Where applicable the master caution and master warning light will illuminate. Pressing lighted buttons will reset these alerts. These lights only work in the King Air fleet.

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3.1.7 Engine Fire Warning Light and Extinguisher Discharge

The Engine Fire Warning Light will extinguish the light. Pressing the extinguisher discharge button will stop the engine fire which results in a inoperative engine. The extinguisher functions on all aircraft regardless if the real aircraft is equipped.

3.1.8 Annunciator Panel

In the King Air fleet this is populated with the appropriate annunciators. In some of the piston aircraft this will serve as display for the modes of the autopilot. In some aircraft this will be empty.

3.1.9 Audio Panel / Altitude Preselect Panel

3.1.9.1 Altitude Preselect Panel



The Altitude Preselect Panel allows the pilot to preselect a desired altitude in a climb or descent. The system provides automatic capture and hold upon reaching the selected altitude.

The altitude preselect display has two modes; the Altitude indicated by the feet (FT) light on the lower right of the display and Rate indicated by the feet/min (FT/MIN). The Set knob is used to set the target altitude or rate. Pressing the knob toggles between the altitude and rate.

3.1.9.1.1 Altitude Preselect Operation

To select a new altitude the panel must be displaying feet (FT). If it is displaying feet per minute (FT/MIN), push the inner concentric knob to toggle the feet mode. Rotating the outer concentric knob will select altitude in 1000 ft. increments. The inner concentric knob controls altitude in 100 ft. increments. Once the correct altitude has been entered, push the ARM button to arm the altitude capture mode. Use pitch attitude hold or select a vertical speed to guide the aircraft to the new altitude.

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As the aircraft nears the selected altitude, a pitch round out is computed based on the aircraft's vertical speed. When the round out begins, the display will change from arm (ARM) to capture (CAPT) and Vertical Speed mode will be disengaged if in use. At the selected altitude, Altitude Hold is engaged and CAPT mode is disengaged.

3.1.9.1.2 Vertical Speed Select Operation

Vertical speed may be engaged in either of two ways, one is by preselecting a vertical speed on the preselect panel. The other is by engaging vertical speed at its present value and then modifying a rate of climb or descent using the vertical trim rocker switch on the Autopilot Panel, the CWS button or rotating the select knob on the panel, making sure that the Feet / Minute mode is selected.

3.1.9.1.3 Preselecting Vertical Speed

To preselect a vertical speed, push the inner concentric knob. The last used vertical speed, an up or down arrow, and FT/MIN will be annunciated. Rotating the inner knob adjusts vertical speed in 100 feet per minute increments while the outer knob controls the 1,000 feet per minute digit up to a maximum of 3,000 feet/in. When the selected vertical speed passes through zero the up/down arrow will change directions.

To engage this selected rate, push the engage (ENG) button (while vertical speed is displayed). Altitude Hold, if engaged, will be canceled and the system will capture the commanded vertical speed. If a change in vertical speed is desired, the vertical trim rocker switch may be used to slew the rate up or down at 100 feet per minute for every second the rocker switch is held down.

Vertical speed can also be modified by holding down the CWS button and changing pitch attitude until the desired vertical speed command is displayed on the altitude preselect panel. If the altitude preselect panel is displaying altitude at the time, vertical speed will be displayed until after the CWS switch is released. The inner knob on the altitude preselect panel can be pushed at any time to display the vertical speed command.

3.1.9.1.4 Vertical Speed Synch

Vertical Speed synch may be used to maintain the aircraft's current vertical speed by pushing the engage (ENG) button while the altitude preselect panel is displaying altitude. The Vertical Speed can be varied up or down just as described in Vertical Speed Preselect.

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3.1.9.2 Audio Panel

The Audio Panel allows the pilot to select the source for the audio. Some functions in the audio panel are only procedural. These procedural functions will not interact with the software.

The operational items are:

Marker Mute: Toggles the marker beacon audible alert.

- COM1: Toggles the Com 1 Audio.
- COM2: Toggles the Com 2 Audio.
- NAV1: Toggles the Nav 1 Morse code ID. This needs to be select in conjunction with pressing the Ident button on Nav 1 to hear morse code.
- NAV2: Toggles the Nav 2 Morse code ID. This needs to be select in conjunction with pressing the Ident button on Nav 2 to hear the morse code.
- DME2: Toggles the DME Morse code ID.
 - ADF: Toggles the ADF Morse code ID. This needs to be select in conjunction with pressing the Ident button on ADF to hear the morse code.
- TEST: Toggles the testing of all the displays on the Enhanced Avionics
- SENS: Toggles the marker beacon sensing to Hi or Lo.
- ANNUN TEST: Toggles the annunciator test of the audio and altitude preselect

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3.1.10 PFC530W



The PFC530W includes a display in the unit just as the real Garmin 530W. The PFC530W interfaces with the Reality XP GNS WAAS 530W software and will provide GPS information, COM1 and NAV1. The unit will function almost exactly like the Garmin 530W. Please refer to that manual for operation.

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3.1.11 Enhanced PFC430W



The Enhanced PFC430W includes a display in the unit just as the real Garmin 430W. The PFC430W interfaces with the Reality XP GNS WAAS software and will provide GPS information, COM2 and NAV2. The unit will function almost exactly like the Garmin 430W. Please refer to that manual for operation.

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3.1.12 Autopilot Panel



The PFC Autopilot is similar in design and functionality of a KFC150 in aircraft equipped with flight directors and will function as a KAP150 for aircraft not equipped with flight director.

3.1.12.1 System Self Test

When initially powered (no modes selected) the trim light will be lit as a reminder of the need to perform the system self-test. The test must be performed before the autopilot portion of the system can be used, but need not be performed before using the flight director portion. This test determines, before takeoff, that the system is operating normally. To perform a test - shortly push the test button. The following actions will occur:

- → All annunciator lights, the trim light and autopilot lights will illuminate.
- → The trim light will flash 4 times.
- ➔ The annunciator legends will go blank, an aural tone will beep (approx. six times), and the "AP" light will flash (approx. 12-13 times) and go off.

3.1.12.2 Vertical Trim Button

These two allows you to make small corrections in selected altitude while in altitude hold, or adjust pitch attitude at a rate of approximately 0.9 degrees per second when not in altitude hold.

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3.1.12.3 FD Button

The Flight Director is activated by pressing the FD button or the CWS button on the control wheel. When pressed, the V-bar will appear and provide command to maintain wings level and the pitch attitude existing at the time of engagement. If a change in pitch attitude is desired, the control wheel steering (CWS) button on the pilot's control wheel can be used to synchronize the V-bar (in the FD mode with autopilot disengaged) without removing your hand from the control wheel. The vertical trim button above may be used to adjust the selected pitch attitude up or down at .9 degrees per second.

The flight director can also be activated by direct selection of any specific mode, which will activate the command V-bar. Such selection will illuminate both FD and the appropriate annunciator mode. Selection of a mode, which supersedes one already selected, will cause the flight director and/or autopilot to follow the mode most recently selected by the pilot.

3.1.12.4 ALT Button

The altitude hold mode is activated by pressing ALT button. It provides guidance to the pilot (or autopilot) for maintaining the altitude at which this mode was engaged. To operate in the ALT mode:

→ Depress the "ALT" button when the aircraft has reached the altitude you wish to maintain.



Note: For smoother operation, press the "ALT" button when the vertical velocity is no more than 500 fpm.

- ➔ The V-bar will command the required pitch to maintain the selected altitude. The pilot can maintain this altitude manually by following the V-bar or engage the autopilot and have it satisfy the flight director commands.
- ➔ The vertical trim switch may be used to adjust altitude up or down at a maximum rate of 500 fpm without disengaging altitude hold.

Note: The ALT mode is canceled by automatic glideslope capture or by depressing the "ALT" button.

➔ When the vertical trim switch is released, the flight director V-bar will begin to command pitch changes to maintain the new altitude.

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3.1.12.5 HDG Button

The heading select mode is activated by pressing the HDG button. It provides guidance to the pilot or autopilot for maintaining the heading selected. To operate in heading select mode:

- → Move the heading "bug" to the desired heading using the HDG on the RIC.
- → Depress the HDG button to engage the heading select mode. The V-bar on the FCI will command a bank towards the selected heading, in the direction of the shortest turn. If the autopilot is engaged, it will turn the aircraft to intercept and fly the heading.
- → The V-bar will continue to command the bank necessary to maintain the selected heading. If you move the heading "bug" again while heading select mode is engaged, the V-bar will immediately command a turn to the new heading. If the autopilot is engaged, it will immediately turn the aircraft in the direction of the new heading.
- ➔ The HDG mode is canceled when NAV or APR coupling occurs, or when the HDG or FD mode button is pushed again, to "off," the autopilot will intercept and fly a selected heading. Select a desired heading on navigation instrument then select HDG mode. The V-bar will command the necessary bank to turn to and maintain the selected heading.

3.1.12.6 NAV Button

The Navigation mode is activated by pressing the NAV Button. It provides guidance to the pilot (or autopilot) in intercepting and tracking VOR and RNAV courses.

The V-bar will command the bank necessary to turn to and maintain a VOR or RNAV course selected by the pilot on Nav 1 only. The V-bar will command the bank and pitch necessary to capture and track localizer and glideslope for ILS approaches, or to capture and track the appropriate course for VOR or RNAV. The V-bar will command the bank necessary to capture and track a reverse localizer course.



Note: You should consider using HDG select mode just prior to VOR station passage. If the autopilot is engaged in NAV mode, it may cause erratic maneuvers while following a rapidly changing course deviation needle as the aircraft flies in the cone of confusion.

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3.1.12.7 APR Button

The Approach mode is activated by pressing the APR Button. It provides guidance to the pilot (or autopilot) in intercepting and tracking ILS (both localizer and glideslope), and VOR and RNAV courses.

To operate in the APR mode:

- → Tune the frequency for the selected ILS, VOR or RNAV approach.
- → Set the course pointer to the final approach course (ILS front course even when flying a back course approach).
- → Set the heading bug to the desired intercept angle and activate the HDG mode.
- ➔ Depress the "APR" button. This arms the automatic capture function. (The "APR" light will flash to signify the approach mode is armed.)
- → The V-bar will command the required bank to maintain the selected heading until the capture point is reached. Then the V-bar will command a turn to intercept the course. If the autopilot is engaged, it will turn to satisfy the commands.
- → As the V-bar commands the turn to intercept the selected course, the heading mode will be canceled and the APR mode will go from arm to engage. (HDG light will go out and APR light will go from flashing to steady.)
- → The V-bar will continue to command the required bank to maintain course and the autopilot (if engaged) will satisfy those commands.
- ➔ Once localizer course capture has occurred on an ILS, the glideslope mode is armed. Automatic capture occurs as the aircraft approaches the glideslope from below.
- → When the intercept occurs, "GS is illuminated on the annunciator panel. The V-bar commands the pitch necessary to maintain the glideslope. If the autopilot is engaged, it will satisfy these commands. If the altitude hold (ALT) mode had been engaged prior to GS capture, it will disengage at capture and the "ALT light will go out.

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3.1.12.8 BC Button

The back course mode is activated by pressing the BC button. It provides guidance to the pilot (or autopilot) in intercepting and tracking a reverse course LOC. To operate in the back course mode:

- → Tune the frequency for the selected
- ➔ Be certain to set in the ILS Front Course even though you will be flying a reciprocal heading on an ILS Back Course Approach. For example, the back course might have a front course of 090 degrees which you will set in the as you fly a back course heading 270 degrees to runway 27
- → Set the heading bug to the desired intercept angle and activate the HDG mode.
- → Select the back course mode by either depressing the "APR" button and then the "BC button or by merely depressing the BC button by itself. (BC will light and the 'APR' light will flash to signify approach mode is armed.)
- → The V-Bar will command the required bank to maintain the selected heading until the capture point in reached, and then it will command a turn to intercept the course. The "HDG" light will go off and the "APR" light will illuminate steadily as the BC mode goes from arm to engage. If the autopilot is engaged, it will turn to satisfy the commands.
- → The V-bar will continue to command the required bank to maintain course and the autopilot (if engaged) will satisfy those commands.



Note: The glideslope is locked out during a back course approach.

3.1.12.9 Test Button

See 3.1.12.1 Self System Test

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3.1.12.10 AP ENG Button



Note: The autopilot cannot be engaged until the flight director is engaged.



Caution: Prior to autopilot engagement, the pilot should make sure the V-bar commands are satisfied. This will prevent any rapid changes in the aircraft's attitude when the autopilot is engaged.

The AP ENG button will engage or disengage the autopilot. Once engaged, the autopilot will attempt to satisfy the V-bar commands generated by the selected flight director modes. The autopilot provides stabilization and automatic elevator trim as well as response to all selected flight director commands.

3.1.12.10.1 Y/D

Yaw Damper is engaged by depressing the Y/D button on the autopilot. The associated LED located above the Y/D button will light up when the yaw damper is engaged.

Note: With the autopilot engaged using the CWS Control Wheel Steering button (mounted on the control wheel) allows you to maneuver the aircraft in pitch and roll without disengaging the autopilot. After the CWS button is released, the autopilot resumes control of the aircraft.

3.1.13 Transponder Panel

The PFC Transponder Panel looks and functions like the Bendix King's KT76A model.

3.1.13.1.1 Transponder Panel Operation

Make sure that the Functions Selector knob is turned on and position the function selector to your desired position. Our current selected code and altitude will be shown in the Instructor's station in X-Plane. When pressed, the IDENT button will make the code flash red in the instructor's station and as well as the Ident light on the panel.

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3.1.14 Automatic Direction Finder (ADF) Panel

The PFC ADF panel operates similar to a King ADF KR-87.

3.1.14.1 ADF Frequency Selection

The active frequency (to which the ADF is tuned) is displayed in the left side of the window at all times. A standby frequency is displayed in the right side when "FRQ" is annunciated. The standby frequency is placed in "blind" memory when either FLT (Flight Time) or ET (Elapsed Time) mode is selected. With "FRQ" annunciated, the standby frequency is selected using the frequency select knobs, which may be rotated either clockwise or counterclockwise.

Turn the small inner knob out to tune 1's. The outer knob tunes the 100's and the 1000's up to 1799. The standby frequency selected may then be put into the active window by pressing the "FRQ" button. The standby and active frequencies will be exchanged (flip-flopped), the new frequency will become active, and the former active frequency will go into standby.

3.1.14.2 ADF Modes

The ADF Panel has a toggle between ADF and antenna. The ADF mode is the only working mode. The antenna (ANT) is only procedural. The ADF / ANT light on the right side of the panel indicate the current mode.

3.1.14.3 Timer Mode

The flight timer will always be automatically reset to 00 whenever power is interrupted either by the avionics master switch or by the unit's ON/OFF switch. It should be emphasized that the start/stop function will only operate with power applied to the unit. Always read flight time prior to power shutdown. Flight time or elapsed time are displayed and annunciated alternatively by depressing the FLT/ET button. The flight timer continues to count up until the unit is turned off or stopped with an external switch. The elapsed timer may be reset back to 00 by pressing the SET button. It will then start counting again. (NOTE: pressing the SET/RST button will reset the elapsed timer whether it is being displayed or not.)

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3.1.15 Copilot Vertical Remote Instrument Console (RIC)

There are two Vertical Remote Instrument Console (RIC) makes it possible for the copilot to control the following items:

Copilot Left Vertical RIC		
A/S:	Adjusts the Calibrated Airspeed if aircraft is equipped or	
	Airspeed marker for jet aircraft	
R-ALT:	Controls the radar altimeter decision height aural warning value.	
4	Adjusts the Aircraft Reference Symbol.	
ADF:	Adjusts the adjustable compass card on and ADF.	
DG:	Adjusts the DG compass card.	
Single RMI Needle:	Toggles the single RMI needle from ADF to NAV1.	
Double RMI Needle:	Toggles the double RMI needle from ADF to NAV1.	

Copilot Right Vertical RIC		
BARO:	Adjusts the barometric pressure setting in the Kollsman window.	
HDG:	Adjusts the heading bug position.	
CRS:	Adjusts the CDI needle.	
OBS 1:	Adjust the OBS1 compass card.	
OBS2:	Adjust the OBS 2 compass card.	

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3.1.16 ELT (Emergency Locator Transmitter)

This is procedural switch and does not activate and alarm sound.

3.1.17 Copilot Instrument Monitor

The Pilot Instrument Monitor will display the pilot set of instruments.

3.1.18 Hour / Hobbs Meter

This keeps the time of system usage. The hour meter will begin counting as soon as X-Plane is running on the Master PC 1. The hour meter will also count when the PFC Test GUI or PFC Hardware Calibration is running.

3.1.19 IOS Extension Panel

The Instructor Output Station (IOS) Extension panel allows the user to pause, freeze or reset the flight from the inside the flight deck. The microphone and headset jacks for the copilot are also in this panel.

3.1.20 Circuit Breaker Panel

The Circuit Breaker Panel breakers can be failed by pulling the handle. Some breakers when pulled will have a corresponding failure in X-Plane but some will not. A failed breaker can be made operational again by pushing in the breaker and will automatically eliminate the failure in X-Plane.



Note: Failing or resetting an item in X-Plane will not trip or reset a circuit breaker.

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3.1.21 Pilot and Copilot Rudder Pedals

The MFD AATD features our Dual Professional Rudder Pedal set.

These pedals are linked and have proportional braking for both pilot and copilot.

3.1.22 Dynamic Control Loading Yoke

The MFD is equipped with the Dynamic Control Loading yoke. Several profiles are included in the interface program and have the capability for creating your own profile.

There are different available yoke styles they are the Mooney, the Saab, the Boeing 737, the real Cessna and the most popular is the Beech. Each of these yokes, have different sets of switches and corresponding function.

Beech / Mooney Yoke				
Left Stem Switch Position	Default Function	Right Stem Switch Position	Default Function	
Left Back (Trigger) Button	Autopilot Disconnect	Right Back (Trigger) Button	Pitch Synch	
Left Rocker Top	Trim Down	Left Rocker Top	Assignable	
Left Rocker Bottom	Trim Up	Left Rocker Bottom	Assignable	

Saab Yoke				
Left Stem Switch Position	Default Function	Right Stem Switch Position	Default Function	
Left Front (Thumb) Button	Autopilot Disconnect	Right Front (Thumb) Button	Pitch Synch	
Left Back (Trigger) Button	Not Assigned	Right Back (Trigger) Button	Assignable	
Left Rocker Top	Trim Down	Left Rocker Top	Assignable	
Left Rocker Bottom	Trim Up	Left Rocker Bottom	Assignable	
Right Rocker Top	Not Assigned	Right Rocker Top	Assignable	
Right Rocker Bottom	Not Assigned	Right Rocker Bottom	Assignable	

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Boeing 737 Yoke				
Left Stem Switch Position	Default Function	Right Stem Switch Position	Default Function	
Left Front (Thumb) Button	Autopilot Disconnect	Right Front (Thumb) Button	Pitch Synch	
Left Back (Trigger) Button	Assignable	Right Back (Trigger) Button	Assignable	
Left and Right Rocker Top pressed simultaneously (Dual Switch Trim)	Trim Down	No Rocker Switch on Right	N/A	
Left and Right Rocker Bottom pressed simultaneously (Dual Switch Trim)	Trim Up	No Rocker Switch on Right	N/A	

Cessna Yoke				
Left Stem Switch Position	Default Function	Right Stem Switch Position	Default Function	
Left Button	Autopilot Disconnect	No Rocker Switch on Right	N/A	
Left and Right Rocker Top pressed simultaneously (Dual Switch Trim)	Trim Down	No Rocker Switch on Right	N/A	
Left and Right Rocker Bottom pressed simultaneously (Dual Switch Trim)	Trim Up	No Rocker Switch on Right	N/A	



Note: The Autopilot Disconnect in all yoke styles can be reassigned as a Push-To-Talk button. See Section 4 for Configuration of Optional Items.

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3.1.23 Flaps and Pressurization Panel

The Flaps and Pressurization Panel is equipped with these switches, knobs and indicators:

Flap Position Indicator:	Indicates the current position of the flaps.
Flaps Switch:	Pressing the switch up or down will incrementally increase or decrease the flaps.
Alternate Air:	Toggle alternate static air. Can be changed to toggle alternate engine air
Rate Knob:	Controls the pressurization rate.
Cabin Alt Knob:	Controls the cabin altitude setting.
Cabin Press Switch:	Toggles cabin pressure to dump or test.

3.1.24 Carb Heat Switch Panel

Located on the center console of the MFD are two Carburetor Heat switches. The carb heat switch located on the pilot side is for the left engine and the carb heat switch located on the copilot side is for the right engine.

3.1.25 Power Quadrant

The Power Quadrant of all PFC devices is interchangeable. There are twenty-four quadrants to choose from that includes single engine piston, twin piston, jets, turbo props and vernier style.

See Section 4 for Configuration of Optional Items for proper procedure on switching the quadrants.

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3.1.26 Aileron Trim Panel

The Aileron Trim is operational on all aircraft regardless if the real aircraft is equipped with aileron trim or not.

3.1.27 Rudder Trim Panel

The Rudder Trim is operational on all aircraft regardless if the real aircraft is equipped with aileron trim or not.

3.1.28 Elevator Trim

The Elevator Trim is operational on all aircraft. The segmented LED trim indicator will be green if the trim is the take-off or T/O position, amber when in the range and red when the full trim up or full trim down position is reached. Though you can continually turn the wheel once the indicator is in red, you will not see additional trim input. The red line means that the trim has reached its limit.

3.1.29 Cowl Flap Levers

The Cowl Flap Lever is a momentary switch. Pressing the switch up or down will incrementally increase or decrease the cowl flaps.

3.1.30 Emergency Landing Gear Extension

This works on retractable gear equipped aircraft. Pulling this switch will force the extension of the landing gear.

3.1.31 Fuel Select

There are two Fuel Select knobs, the one closest to the pilot side is for the left engine and the one on the copilot is for the right engine. There are three positions for each knob.

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3.1.32 Landing Gear Panel

The Landing Gear Panel consists of the Gear switch and knob and the gear position lights. This is a panel for ease of service.

Landing Gear Switch: Toggles the aircraft landing gear up or down if equipped with retractable gear. Gear Light: Show the status of landing gear if aircraft is equipped retractable gear.



Caution: Gear switch is a latching style switch. As on a real aircraft, you will need to pull out the switch prior to moving it up or down. Failure to follow this procedure will result in damage to the switch.

3.1.33 Lights Panel

The Lights Panel controls the external lighting of the aircraft and includes a panel light dimmer to control the lights on the C2Pro console. The aircraft light switches includes:

- Nav Light: Toggles the aircraft navigation lights.
- Strobe Light: Toggles the aircraft strobe lights.
 - Taxi Light: Toggles the aircraft taxi lights.
 - Ldg Light: Toggles the aircraft landing lights.
- Panel Dimmer: Controls the brightness lampposts, clock backlighting and RIC backlighting.

3.1.34 Pilot Intercom Jack and Parking Brake

3.1.34.1 Pilot Intercom Jack

You can connect your headset to these jacks after you have connected the external connection to an intercom.

3.1.34.2 Parking Brake Switch

The Parking Brake switch is a push – pull switch

Caution: Do not twist Parking Brake switch. Twisting the parking brake switch will damage the switch.

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3.1.35 The Twin Master Panel

The Twin Piston Master Panel is standard on the MFD. It will work for both single and twin-engine piston aircraft models. This panel is equipped with:

- → Battery Master Switch
- → Left Alternator Switch
- ➔ Right Alternator Switch
- ➔ Avionics Master Switch
- → Left Magneto Switch with start position
- → Right Magneto Switch with start position
- ➔ Prop Synch

Note: For single engine operation, use the Left Battery, Left Alternator and Left Magneto switches or you can exchange this panel for the Single Piston Master Panel.



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3.1.35.1 The Turbo Prop Master Panel

The Turbo Prop Master Panel will work for both single and twin-engine turbo prop aircraft models.



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3.1.35.2 The Jet Master Panel

The Jet Master Panel will work the optional jet aircraft models.



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3.2 Flight Line Seats

FlightLine seats can be articulated in three ways:

- → Fore / Aft Adjustment: Forward or backward on the seat track. (Black Lever)
- → Vertical Adjustment: Up and Down (Orange Lever).
- → Tilt Backrest Adjustment: forward and backwards (Yellow Lever).



Caution: Keep fingers and hands clear of the seats mechanisms while operating the seats.

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3.2.1 Fore / Aft Adjustment: Black Pull Handle

Pulling up and holding the pull handle will allow the seat to travel forwards and backwards along the seat track (use your feet against the floor to move the seat forward or aft). Release the handle in the desired position and lightly rock seat to lock it in place.

3.2.2 Vertical Adjustment: Orange Lever

The Orange lever as shown in the previous picture is for seat height adjustment. This will allow you to adjust the seat up or down. Push the lever to the left while seated and it will release the seat from its current position and allow adjustment. To move the seat down push the seat back while sitting in the seat. To move the seat up, lift your weight from the seat slightly and the spring-loaded base will move the seat up

3.2.3 Tilt Backrest Adjustment: Yellow Lever

The yellow lever on the seat as shown in the previous picture allows seat back to tilt forward and back. Push the lever to the left to adjust the back rest and release to lock in desired position.

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3.3 Visual System

The MFD is equipped with five 40-inch television for outside visual displays. It provides a 200 degree visual.



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3.4 Computer Rack

The MFD is equipped with two computer racks.



The computer racks respective functions are as follows:

PC Rack 1	
Master PC1	Controls: all switches, pilot instrument, GPS screens and flight controls.
Left PC2	Drives left visual display.
Right PC3	Drives right visual display.

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PC Rack 2	
Front Left PC4	Drives display 45 degree view on the left (between far left and center visual.)
Center PC5	Drives center view.
Front Right PC6	Drives display 45 degree view on the right (between center and far right visual.)

3.4.1 Operating Systems

Master PC1 runs on Windows 10 LTSC operating system. All visual PCs (PC2, PC3, PC4, PC5 and PC6) runs on Ubuntu OS.

3.4.2 Computer Rack Control Display Monitor

Each computer rack will have a display monitor on top. The PC Rack1 will display the X-Plane Instructor's Station control when PC1 is selected on the Keyboard, Video, Mouse (KVM) switchbox.

Each of the visual PCs has the Ubuntu OS desktop which is purple in color. There are very few instances where operators will need to do work on this desktop unless otherwise directed by PFC Representative no changes or settings should be altered.

3.4.3 KVM Switchbox

Keyboard, Video and Mouse (KVM) Switchbox allows you to select the computer you wish to control. Each computer rack will have its own KVM; pushing the yellow button allows you cycle the selection from 1 to 4.



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3.4.4 Wireless Router for Aviation Apps

There is one wireless router that allows for connection to the aviation apps as listed below. The SSID is PFCSim and password is 12345678.

3.4.4.1 Supported Aviation Apps

This list may change without notice and have been tested only with iPad and iPhone.

- ForeFlight
- Garmin Pilot
- FltPlan Go
- WingX Pro
- SkyDemon
- Aerovie
- XAirports
- iFlightPlanner

3.5 Software

MFD utilizes different software for proper operation and remote service. The main software used are X-Plane 11, CLS2Sim and if equipped with optional ProMotion II, D-Box motion platform software. For service PFC uses Teamviewer or Anydesk

3.5.1 X-Plane 11.xx

X-Plane Professional 11.xx is utilized in our systems as the software platform. It also provides all the instructor's controls such as failures, weather, airport and other important tools for training. The instructors' station is further discussed in detail in section 6.

3.5.1.1 USB HID Plugin64

The PFC USBHidPlugin64 is similar to driver that makes USB devices manufactured by Precision Flight Controls, Inc work with X-Plane 11. This file is located in the Resources/Plugins folder of X-Plane.

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3.5.2 CLS2SIM

The CLS2SIM is the software that controls the control loading yoke and control loading pedals if equipped. There are several profiles you can choose from to match the aircraft you are flying. Each profile provides different weight and sensitivity. Please see Section 4.5 of the manual on how to select a different profile.

3.5.3 D-BOX Motion Software

The ProMotion II motion base utilizes D-Box actuators, controllers, and software. If ProMotion II is purchased at the same time as the MFD, the Master Computer will be pre-installed and configured with the software necessary. There are four softwares for D-Box:

- D-Box Motion Plugin for X-Plane.
- X-Plane Motion Settings
- Motion Players Control Panel
- KCU Actuator Monitor

Further descriptions and usage instructions of the four items above can be found in the Section 4.

3.5.4 Teamviewer / Anydesk

PFC uses Teamviewer and Anydesk which are remote desktop software to provide support remotely. These software requires a minimum of 15 Mbps.

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3.6 **ProMotion II**

One of the most popular add-on for our flight decks is the ProMotion II. The ProMotion II is a 3-DOF cueing system that provides moderate motion to include climbs and descents, turns, turbulence, stall buffet, engine out, ground handling feedback and engine vibration. It uses D-Box actuator system, interface and software.



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SYSTEM DESCRIPTION

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CONFIGURATION OF OPTIONAL ITEMS

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4.1 Introduction

This Configuration of Optional Items section contains steps on how to configure all interchangeable, optional and other peripheral items of the DCX Max.

4.2 PFC Trim Hand Turns

This option allows changing of the sensitivity of the elevator trim by increasing or decreasing the amount of turns to go from full nose up to full nose down.

- 1. Make sure that Master PC is selected on the USB switch.
- 2. Bring up the menu by moving your mouse to the top of the screen.
- 3. From the menu choose Plugins.



- 4. From plugins choose PFC Trim Hand Turns.
- 5. Choose from the values available. 3 hand turn is the most sensitive and 20 is the least. The speed at which the wheel turn also changes based on the selection. On the 3 hand turns the wheel will move very slow and fast on 20 hand turn.

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4.3 Power Quadrant

There are 2 main styles of quadrant used with the device the standard throttle quadrant and Vernier. There are twenty-one in total.

4.3.1 Switching Standard Throttle Quadrants

- 1. Pull all the levers back.
- 2. Remove the thumbscrew on each side.
- 3. Align new quadrant to push rods.
- 4. Reinstall thumbscrews. -



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4.3.2 Switch to Vernier Quadrant

- 1. Install a twin non-vernier quadrant.
- 2. Remove the four (4) screws around the panel. -
- 3. Carefully pull the assembly out.
- 4. Disconnect the RJ-45 Cable.
- 5. Connect the RJ-45 cable to the Vernier unit.
- 6. Carefully insert and then align the screw holes.
- 7. Secure the unit with the screws.
- 8. Store the non vernier unit in a safe place.



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4.3.3 Changing the Standard Throttle Quadrant setting

After changing the quadrant, you will need to change the Standard Quadrant Setting to assure that your quadrant will operate properly. The Multi-Engine: Throttle/Prop/Mixture is set by default from the factory.

To change the setting:

- 1. Make sure that Master PC is selected on the USB switch.
- 2. Bring up the menu by moving your mouse to the top of the screen.
- 3. From the menu choose Plugins.

Developer	Plugins		
	Show Plugin Admin		
<u> </u>	PFC Trim Hand Turns	>	
4	PFC Alt Air Switch	>	5
- <u>-</u>	Al Reference	>	60
-	Airspeed Knob	>	
	Pilot Yoke Button	>	5
£	PFC Standard Throttle Quadrants	>	Single-Engine (Standard or Vernier)
3	PFC Custom Throttle Quadrant	>	
			Fuel-injected
S. & EUEL	· ····································	~~~~	Carbureted

- 4. From plugins choose PFC Standard Throttle Quadrants
- 5. All the different options are as pictured below. A dot mark will indicate the option selected. Once an option has been clicked the box will disappear.

Fuel-injected
Carbureted High-Performance (Throttle/Prop/Mixture) High-Performance (Mixture/Throttle/Prop) DA40 NG
Multi-Engine:
 Throttle/Prop/Mixture Prop/Throttle/Mixture DA42 NG
Turboprop:
Standard Porter PC-12 Caravan Twin
Jet:
Jet Enhanced Two-engine Three-engine Four-engine

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4.4 Control Yoke Switches and Buttons

4.4.1 Assign the Autopilot disconnect to Push To Talk (PTT)

- 6. Make sure that Master PC is selected on the USB switch.
- 7. Bring up the menu by moving your mouse to the top of the screen.
- 8. From the menu choose Plugins.

developer	Plugins			Ŗ
1	Show Plugin Admin			2
<u>}</u>	PFC Trim Hand Turns	>)
	PFC Alt Air Switch	>		ź
\leftarrow	Al Reference	>	60	्र
5	Airspeed Knob	>	00	3
7	Pilot Yoke Button	>	Autopilot Disconnect	ζ
>	PFC Standard Throttle Quadrants	>	Push-to-Talk	3
}	PFC Custom Throttle Quadrant	>		}
		~~~	14 martin when when when when when when when whe	Ś

- 9. From plugins choose Pilot Yoke Button
- 10. Choose from Autopilot Disconnect or Push to talk. A dot mark will indicate the option selection.



**Note:** To disconnect the autopilot after changing the functionality of the autopilot disconnect button on the yoke to PTT you will press the AP ENG button on the autopilot panel in the avionics stack.



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#### 4.5 Control Sensitivity Adjustment in X-Plane 11

The sensitivity of the Elevator, Aileron and Rudders can be adjusted to suit your training needs. There are two adjustments for each of the axes listed above.

#### 4.5.1 Accessing the Control Sensitivity Page

All of the slider to adjust the sensitivity of each axis is found in the Settings>Joystick>Control Sensitivity.

- 1. Make sure that Master PC is selected on the USB switch.
- 2. Bring up the menu by moving your mouse to the top of the screen.
- 3. From the menu choose Settings.



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#### CONFIGURATION OF OPTIONAL ITEMS

4. From the Settings Window choose Joystick.



5. On the bottom of the Joystick Window, click on Control Sensitivity.

Active Profile	User Profile	$\sim$	Manage Profiles	Control Sensitivity	PFC Hardware	

6. This will open the Control Sensitivity Window.

CONTRO	DL RESPONSE	STABILITY AUGME	NTATION
Pitch	50%	Pitch	50%
	Moderately fine-grained control near controls center		Moderate pitch stability augmentation
Roll	50%	Roll	50%
_	Moderately fine-grained control near controls center		Moderate roll stability augmentation
Yaw	50%	Yaw	50%
_	Moderately fine-grained control near controls center		Moderate yaw stability augmentation
These slid when you NOTE: Th basis by a		In reality, aircraft con high displacement-foi when you pull back. T things in the sim, you "auto-control" displac realistic, but may mał	trols have near-infinite resolution, rce, and the plane imparts G on you o help make up for the lack of these can slide these sliders up a bit to add sements to stabilize the plane. It isn't ce the plane feel more realistic.

7. Click on Done to close the window after completing your adjustments.

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#### 4.5.2 Control Response Sliders

The Control Response Sliders alters the response of the inputs of the elevator, aileron and rudder axes.





**Note:** Make sure to note the original values that you have on each sliders prior to making any adjustments. The default value all sliders is 50 percent.



**Note:** It is a good practice to adjust only one slider at a time. This will assure that are able to properly evaluate the result of the change that you have made.

If these sliders are set all the way to the left, the aircraft's response to that axis' input will be linear. This means that a 50% deflection of the joystick will deflect the airplane's flight controls 50% of their travel. As these sliders are moved to the right, the response becomes curved. In this case, a deflection of the joystick from center to its halfway point may only deflect the aircraft's controls by 10%. This will dampen any aircraft movements and desensitize the user's controls.

Keep in mind, however, that in this case, the remaining 90% of the control surface deflection must take place in the last 50% of joystick movement. Thus, the controls will be dampened for the first half or so of their travel and then become hyper-sensitive for the remainder of their throw. This gives the user plenty of fine-tune control near the center of the flight control envelope to hold altitude and roll precisely, but still allows for full control authority at the extremes.

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#### 4.5.3 Stability Sliders

The Stability Sliders adjusts X-Plane's Stability Augmentation mode by dampening the predicted forces acting on the aircraft flight control surfaces.



**Note:** Make sure to note the original values that you have on each sliders prior to making any adjustments. The default value all sliders is 50 percent.



**Note:** It is a good practice to adjust only one slider at a time. This will assure that are able to properly evaluate the result of the change that you have made.

If these sliders are all the way to the left, then there is no stability augmentation of the aircraft. As the sliders are moved to the right, X-Plane will automatically add some stability augmentation to the aircraft, adding some elevator input to level the nose, some aileron input to minimize the roll rate, and some rudder input to counter any aircraft yaw rates.

This means that X-Plane will try to make the plane easier to fly by adding control inputs for the user. As a result however the aircraft becomes less responsive.



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## 4.6 CLS2SIM Dynamic Control Loading Profiles

The control loading will have some preconfigured profiles included. You may change the profile the clicking on the drop down arrow and then selecting the profile, you wish to use on the Active Profile box.

CLS2Sim v4.9.1 - Brunner Elektronik AG CH 8335 Hittnau	_ <b>D</b> X
File Tools About Help Check for new version	
Active profile: Twins	Profile manager
Elevator(En) Aileron(En) Rudder(Dis) Collective(Dis) Nosewheel(Dis)	Brake left(Dis)
Elevator Trim(Dis) Aileron Trim(Dis) Rudder Trim(Dis)	Brake right(Dis)
Throttle 1(Dis) Throttle 2(Dis) Throttle 3(Dis) Throttle 4(Dis)	Speedbrake(Dis)
Legend       Disconnected/not in bus       Connected, but not init       Ready       Fault         (Dis) Disconnected (Sht) Shutdown (Off) Switched off (On) Switched on (En) Operation enabled (Hom) Homing error (Fit) General       Hardware         Disconnect       Init       Stop       47 updates/s (0)         Connection type: USB HID       Status:       Not Connected	Error 🗌 No updates

Two profiles have been created at this time they single and twin respectively.

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#### 4.6.1 Change the profile prior to starting X-Plane

- 1. Start the CLS2Sim interface program.
- 2. Click on the drop down arrow on the profile manager.
- 3. Choose between single or twin.
- 4. Changing the profile is complete.

#### 4.6.2 Change the profile while X-Plane is running.

- 1. With the mouse in the instructor's station, press ALT+TAB on the keyboard until you have highlighted the CLS2Sim.
- 2. Click on the drop down arrow on the profile manager.
- 3. Choose between single or twin.
- 4. Changing the profile is complete.

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#### 4.7 D-Box Motion Softwares

#### 4.7.1 D-Box Motion Plug-in for X-Plane 11

The D-Box Motion Plugin for X-Plane 11 is the software that allows communication between X-Plane 11 and the ProMotion II. This is located in the Resources / Plugins folder of X-Plane.

							x
Coord We Local	l Disk	c (C:) → X-Plane 9.68 → Re	esources 🕨 pl	lugins 🕨 👻 🍫	Search plugins		Q
Organize 🔻 Inclue	de in	library 👻 Share with 👻	Burn	New folder		≣ ▼ 🔳	0
☆ Favorites	-	Name		Date modified	Туре	Size	-
📃 Desktop		퉬 Gizmo.plugin		9/27/2011 4:55 PM	File folder		
\rm Downloads		PluginAdmin		9/19/2011 12:42 PM	File folder		
🕮 Recent Places		VSPro Resources		9/19/2011 12:42 PM	File folder		
		Commands.txt		10/28/2010 10:33	Text Document	66 KB	
🥽 Libraries		DataRefEditorWin.xpl	I	7/20/2006 10:39 AM	XPL File	36 KB	
Documents		📄 DataRefs.txt		2/1/2011 12:27 PM	Text Document	349 KB	
🁌 Music		dbxMotionPlugin.xpl	l	10/29/2010 11:24	XPL File	135 KB	
Pictures		🚳 fmodex.dll		2/16/2011 4:00 PM	Application extens	388 KB	E
📑 Videos	=	📄 ipdef.txt		1/20/2010 9:37 PM	Text Document	1 KB	
		🚳 libpng12.dll		2/16/2011 4:00 PM	Application extens	254 KB	
🤣 Homegroup		🚳 msvcp100.dll		3/18/2010 6:15 AM	Application extens	412 KB	
		🚳 msvcr100.dll		2/16/2011 4:00 PM	Application extens	753 KB	
👰 Computer		🚳 ts3client_win32.dll		2/16/2011 4:00 PM	Application extens	1,429 KB	
🚢 Local Disk (C:)		📄 udpdata.txt		2/1/2011 4:30 PM	Text Document	139 KB	
		USBHidPlugin 170.sp	I	3/2/2011 5:40 PM	SPL File	240 KB	
📬 Network		USBHidPlugin 213.op	bl	6/15/2011 11:49 AM	OPL File	256 KB	
		USBHidPlugin.xpl		9/1/2011 1:30 PM	XPL File	356 KB	
		VSProPlugin.xpl		2/21/2011 11:16 AM	XPL File	274 KB	
		🚳 XPLM.dll		10/28/2010 10:33	Application extens	200 KB	
	Ŧ	XPI M so		2/18/2009 4·44 PM	SO File	621 KB	Ŧ
23 items							

The above picture may not be exactly representative of the system you have, but it is important to see the dbxMotionPlugin.xpl file in this folder.

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## 4.7.2 D-Box X-Plane motion settings

The X-Plane motion settings allow you to change the parameters of the ProMotion II. You can adjust the amount of vibration, intensity of movement and other parameters.

ilobal Parameters		
	Motion Profile	Editor
Information		
X-Plane Motion Cod	le	DDOV
Version:	1.6	DBUX
Build:	3759	MOTION CODE™
Automatically of	check for updates	
Motion Code		
Main Level (%):		
Motion / Vibration	Balance (%):	
Motion Profile:		501 test
		Save All Beload Close

#### 4.7.3 Global Parameters

The Global Parameters is used to decrease the overall performance of the ProMotion II II.

#### 4.7.3.1 Main Level (%)

The Main Level in percent affects the overall intensity of your motion experience. It can be lowered if you find it too intense.

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#### 4.7.3.2 Motion / Vibration Balance

The overall ProMotion II experience consists of combined Motion (wide or slow moves) and Vibration (harsh or fast oscillations). Adjusting the Motion / Vibration Balance scale to the right (positive values) will only cut Motion (wide or slow moves) effects. Alternatively, adjusting the Motion / Vibration Balance to the left (negative values) will only cut Vibration (harsh or fast oscillations) effects.

#### 4.7.3.3 Motion Profile

Allow the user to create and select other profiles. Creating other profile is discussed below.

#### 4.7.4 Motion Profile Editor

The Motion Profile Editor contains all the adjustable motion parameters for flight. You may try to experiment with these settings to get the most out of your experience. We strongly suggest that a new profile is created when you make changes to the Default Profile. To create a new profile:

- 1. In the Profile Name box, type in a new name.
- 2. Make the adjustments you prefer.
- 3. Click on Save All.

#### 4.7.5 Motion Players Control Panel

D-BOX Motion Players		
Control Panel		
Motion Players		(@ Help
Device Priority List	Configuration Settings	
🗲 Defaults	Global Level (%):	100
	Motion / Vibration Balance (%):	
	Output Buffer Latency (ms):	
	Platform Optimization:	None (standard)
	Multiple Device Mode:	Use top priority device only
Refresh Add Remove Up Down	Reset V Test	
Version: 2.1 (2670) Copyright © 2009 D-BOX Technologies Inc.		OK Cancel Apply

The Motion Players Control Panel is used to test the ProMotion II. By clicking on the Test button, you can run the ProMotion II without running X-Plane.

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#### 4.7.5.1 Platform Optimization

The ProMotion II has four actuators because of this you should leave the Platform Optimization setting to None (standard) to maximize your experience.

#### 4.7.5.2 Test Button

The Test will initialize the selected Motion Player and start sending motion signals to the platform. The following motion sequence will be repeated until the Test button is clicked again:

- 1. Up Down
- 2. Rear Front
- 3. Left Right
- 4. Vibration

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# Section 5

# System Startup and Shutdown

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SYSTEM STARTUP AND SHUTDOWN

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#### 5.1 Introduction

This System Startup is for MFD that has X-Plane 11 and two 3-Computer Rack system. The computers are configured as follows:

COMPUTER RACK# 1	COMPUTER RACK #2
Master PC	Front Left View PC
Left View PC	Center View PC
Right View PC	Front Right View PC

#### 5.2 Initial Startup

Make sure that all components are connected according to the colored and numbered tags on each cable. This will assure that all factory configurations will remain.

#### 5.3 Startup and Shutdown Checklists

There are four different checklists for the MFD and they are for different combinations of Instrument Panel and Aircraft. The combinations are as follows:

- Standard Instrument Panel & Piston Single / Twin Aircraft
- Standard Instrument Panel & Turbo Prop Aircraft
- PFC1000 Panel & Piston Single / Twin Aircraft
- PFC1000 Panel & Turbo Prop Aircraft

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## 5.4 Startup For Standard Instrument Panel & Piston Single / Twin Aircraft



1.	Flight Deck	UNOCCUPIED
2.	Yoke unobstructed	CONFIRMED
3.	Pedals unobstructed	CONFIRMED
4.	Power to System (press ON button on remote)	ON

## *** YOKE AND PEDALS MAY SUDDENLY MOVE, DO NOT INTERFERE WITH ITS MOVEMENT ***

5.	Turn on outside view displays	CONFIRMED
6.	Outside view displays show no signal	CONFIRMED
7.	KVM Switchbox on both PC Rack set to PC1	CONFIRMED

## **TURNING COMPUTERS ON & BOOT UP**

8. Press	power button on all computers	COMPLETE
9. Outsid	de view displays shows X-Plane 11 load screen	CONFIRMED
10. Outsid	de view displays showing runway	CONFIRMED

## **BEFORE STARTING SIMULATION**

11.	Parking Brake	ON
12.	Batterv	ON
13.	Left Alternator	ON
14.	Right Alternator	ON
15.	Avionics Master	.ON

STARTING SIMULATION	
16. On Instructor's Station display, double click on Start Simulation	COMPLETE
17. Control Loading Software (CLS2SIM)	LOADING

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18. X-Plane 11 load screen is showing	CONFIRMED
19. X-Plane 11 "Flight Training Approved" box shows on Instructor's Station Display	CONFIRMED
20. Understood on X-Plane Advisory	CLICKED
21. Pilot Seat	OK TO OCCUPY
22. Copilot Seat	OK TO OCCUPY
23. Aircraft in the same location on instructor's map and visual displays	CONFIRMED
24. Battery Master	AS REQUIRED
25. Left Alternator	AS REQUIRED
26. Right Alternator	AS REQUIRED
27. Avionics Master	AS REQUIRED

### END OF START UP CHECKLIST

### 5.4.1 Shutdown For Standard Instrument Panel & Piston Single / Twin Aircraft

### **BEFORE SYSTEM SHUTDOWN**

1. Parking Brake	SET
2. Battery	OFF
3. Left Alternator	OFF
4 Right Alternator	OFF
5 Avionics Master	
6 Elight Dock	חשומו וי

### SYSTEM SHUTDOWN

7. Shutdown All on Instructor's Station	CLICKED
8. Shutdown All Networked Machine	CLICKED
9. Outside Visual Displays shows no signal	CONFIRMED
10. Computer Power Light on all computers are off	CONFIRMED
11. Power to system (Press OFF button on remote)	OFF

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# 5.5 Startup For Standard Instrument Panel & Turbo Prop Aircraft





1.	Flight Deck	UNOCCUPIED
2.	Yoke unobstructed	CONFIRMED
3.	Pedals unobstructed	CONFIRMED
4.	Power to System (press ON button on remote)	ON
	*** YOKE AND PEDALS MAY SUDDENLY MOVE, DO NOT INTERFERE N	WITH ITS MOVEMENT ***
5.	Turn on outside view displays	CONFIRMED
6.	Outside view displays show no signal	CONFIRMED
7.	KVM Switchbox on both PC Rack set to PC1	CONFIRMED

### **TURNING COMPUTERS ON & BOOT UP**

8. Press power button on all computers	COMPLETE
9. Outside view displays shows X-Plane 11 load screen	
10. Outside view displays showing runway	CONFIRMED

# **BEFORE STARTING SIMULATION**

11. Parking Brake	ON
12. Avionics Master	ON
13. Inverter	NO.1
14. Batt	ON
15. Gen1	ON
16. Gen2	ON

#### CONTINUED ON NEXT PAGE

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### 5.5.1 Startup For Standard Instrument Panel & Turbo Prop Aircraft Continued

STARTING SIMULATION

17.	On Instructor's Station display, double click on Start Simulation	COMPLETE
18.	Control Loading Software (CLS2SIM)	LOADING
19.	X-Plane 11 load screen is showing	CONFIRMED
20.	X-Plane 11 "Flight Training Approved" box shows on Instructor's Station Display	CONFIRMED
21.	Understood on X-Plane Advisory	CLICKED
22.	Pilot Seat & Copilot Seat	OK TO OCCUPY
23.	Aircraft is at same location on instructor's map and visual displays	CONFIRMED
24.	Avionics Master	AS REQUIRED
25.	Inverter	AS REQUIRED
26.	Batt	AS REQUIRED
27.	Gen1	AS REQUIRED
28.	Gen2	AS REQUIRED

END OF STARTUP CHECKLIST

#### 5.5.2 Shutdown For Standard Instrument Panel & Turbo Prop Aircraft

### **BEFORE SYSTEM SHUTDOWN**

12.	Parking Brake	SET
13.	Battery	OFF
14.	Left Alternator	OFF
15.	Right Alternator	OFF
16.	Avionics Master	
17.	Flight Deck	UNOCCUPIED

#### SYSTEM SHUTDOWN

18.	Shutdown All on Instructor's Station	CLICKED
19.	Shutdown All Networked Machine	CLICKED
20.	Outside Visual Displays shows no signal	CONFIRMED
21.	Computer Power Light on all computers are off	CONFIRMED
22.	Power to system (Press OFF button on remote)	OFF

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### 5.6 Startup Checklist For PFC1000 & Piston Single / Twin Aircraft

#### **BEFORE TURNING COMPUTERS ON**

- 1. Flight deck ..... UNOCCUPIED
- 2. Yoke unobstructed.....CONFIRMED
- 3. Pedals unobstructed .....CONFIRMED
- 4. Power to System (press ON button on remote)... ON

### *** YOKE AND PEDALS MAY SUDDENLY MOVE DO NOT INTERFERE WITH ITS MOVEMENT ***

- 5. Turn on outside view displays ...... CONFIRMED
- 6. Outside view displays show no signal ......CONFIRMED
- 7. KVM Switchbox on both PC Rack set to PC1 ..... CONFIRMED

#### **TURNING COMPUTERS ON & BOOT UP**

- Press power button on all computers ......COMPLETE
   Outside view displays shows X-Plane 11 load screen.....CONFIRMED
- 10. Outside view displays showing runway ......CONFIRMED

#### **BEFORE STARTING SIMULATION**

- 11. Parking Brake .....ON
- Battery Master .....ON
   Left Alternator .....ON
- 14. Right Alternator ......ON
- 15. Avionics Master .....ON
  - CONTINUED OF NEXT COLUMN

### STARTING SIMULATION

- 16. On Instructor's Station display, double click on Start Simulation......COMPLETE
- 17. Control Loading Software (CLS2SIM)...... LOADING
- 18. X-Plane 11 load screen is showing...... CONFIRMED
- 19. X-Plane 11 "Flight Training Approved" box shows on Instructor's Station DisplayCONFIRMED
- 20. Understood on X-Plane Advisory...... CLICKED

#### **SELECTING AIRFRAME**

- 21. Pilot Seat..... OK TO OCCUPY
- 22. Copilot Seat..... OK TO OCCUPY
- 23. "Select G1000...Aircraft Model" on PFD.....

..... CONFIRMED



 Softkey to "green highlight" aircraft.....PRESSED
 Softkey under "Load".....PRESSED
 "Loading...Please Wait" Screen shows on PFD... CONFIRMED
 Appropriate aircraft loaded in X-Plane Instructor's Station....CONFIRMED
 Aircraft is at same location on instructor's map and visual displays .....CONFIRMED
 Battery Master ......AS REQUIRED
 Left Alternator ......AS REQUIRED
 Right Alternator ......AS REQUIRED
 Avionics Master ......AS REQUIRED

END OF STARTUP CHECKLIST

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# 5.6.1 Shutdown Checklist For PFC1000 & Piston Single / Twin Aircraft

### **BEFORE SYSTEM SHUTDOWN**

1. Parki	ng Brake	SET
2. Batte	ry Master	OFF
3. Left /	Alternator	OFF
4. Right	t Alternator	OFF
5. Avior	nics Master	OFF
6. Fligh	t Deck	UNOCCUPIED

# SYSTEM SHUTDOWN

7. Shutdown All on Instructor's Station	CLICKED
8. Shutdown All Networked Machine	CLICKED
9. Outside Visual Displays shows no signal	CONFIRMED
10. Computer Power Light on all computers are off	CONFIRMED
11. Power to system (Press OFF button on remote)	OFF

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#### 5.7 Startup Checklist For PFC1000 & Turbo Prop Aircraft

#### BEFORE TURNING COMPUTERS ON

- 1. Flight deck ..... UNOCCUPIED
- 2. Yoke unobstructed ......CONFIRMED
- Pedals unobstructed .....CONFIRMED
   Power to System (press ON button on remote)
  - .....ON

### *** YOKE AND PEDALS MAY SUDDENLY MOVE, DO NOT INTERFERE WITH ITS MOVEMENT ***

- 5. Turn on outside view displays ..... CONFIRMED
- 6. Outside view displays show no signal .....
  - i. CONFIRMED
- 7. KVM Switchbox on both PC Rack set to PC1...
- 8. CONFIRMED

#### **TURNING COMPUTERS ON & BOOT UP**

- 1. Press power button on all computers ......COMPLETE
- 2. Outside view displays shows X-Plane 11 load screen.....CONFIRMED
- 3. Outside view displays showing runway ......CONFIRMED

#### **BEFORE STARTING SIMULATION**

4.	Parking Brake	ON
5.	Avionics Master	ON
6.	Inverter	NO.1
7.	Batt	ON
8.	Gen1	ON
9.	Gen2	ON

#### CONTINUED OF NEXT COLUMN

#### **STARTING SIMULATION**

- 10. On Instructor's Station display, double click on Start Simulation.....COMPLETE
- 11. Control Loading Software (CLS2SIM)...... LOADING
- 12. X-Plane 11 load screen is showing...... CONFIRMED
- X-Plane 11 "Flight Training Approved" box shows on Instructor's Station DisplayCONFIRMED
- 14. Understood on X-Plane Advisory...... CLICKED

#### SELECTING AIRFRAME

- 15. Pilot Seat..... OK TO OCCUPY
- 16. Copilot Seat..... OK TO OCCUPY
- 17. "Select G1000...Aircraft Model" on PFD.....

..... CONFIRMED



- 18. Softkey to "green highlight" aircraft ..... PRESSED
- 19. Softkey under "Load".....PRESSED
- 20. "Loading...Please Wait" Screen shows on PFD..
- CONFIRMED
  21. Appropriate aircraft loaded in X-Plane Instructor's Station.....CONFIRMED
  22. Aircraft is at same location on instructor's map and visual displays .....CONFIRMED
  23. Avionics Master .....AS REQUIRED
  24. Inverter .....AS REQUIRED
- 25. Batt.....AS REQUIRED 26. Gen1 .....AS REQUIRED
- 27. Gen2 ...... AS REQUIRED

END OF STARTUP CHECKLIST

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# 5.7.1 Shutdown Checklist For PFC1000 & Turbo Prop Aircraft

### **BEFORE SYSTEM SHUTDOWN**

12. Parking Brake	
13. Avionics Master	
14. Inverter	OFF
15. Gen2	
16. Gen1	OFF
17. Batt	OFF
18. Avionics Master	OFF
19. Flight Deck	UNOCCUPIED

# SYSTEM SHUTDOWN

20. Shutdown All on Instructor's Station	CLICKED
21. Shutdown All Networked Machine	CLICKED
22. Outside Visual Displays shows no signal	CONFIRMED
23. Computer Power Light on all computers are off	CONFIRMED
24. Power to system (Press OFF button on remote)	OFF

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SYSTEM STARTUP AND SHUTDOWN

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