

CHALK RIVER GRAPHICS

CrgSim PFD & EICAS

Installation and User's Guide

Chalk River Graphics

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Primary Flight Display (PFD) - Captain's Side

The image shows a cockpit instrument panel with the following elements:

- Primary Flight Display (PFD):**
 - Altitude:** 26,600 ft (left scale), 11,000 ft (right scale).
 - Airspeed:** 270 knots (top left).
 - Heading:** 335H (bottom center).
 - Engine Parameters:** 335H (bottom center), MAG (bottom center).
 - Radio Frequency:** 29.92 (bottom right).
 - Compass:** 3.4 (top right).
- Multi-Function Display (MFD):**
 - Map:** A terrain map showing a mountain range and a river. The map is overlaid with a grid and various flight data.
 - Labels:** SPD, LOC, G/S, A/P, RADIO 200, MAG.

There is a lot of information displayed on the PFD. From the image above we are able to determine that the autopilot target speed is 270 knots, the current speed as 266 knots, the target autopilot altitude **was** 11,000 feet although the aircraft is about to be engaged in following the glide slope down. The ILS receiver is tuned to 111.10 (Denver ILS). The ILS transmitter is 21.2 knots from the aircraft. The $\frac{3}{4}$ dial just above and to the right of the artificial horizon is the current aircraft attack angle.

Although the vertical speed indicator is positive we can assume that when the glide slope is intersected the vertical speed will become negative as the aircraft follows the glide slope down into the Denver airport.

Similarly we can assume that the aircraft has intersected the localizer center line and will be turning slightly to the right to keep on the center line.

The flight mode annunciator tells us that auto throttle is controlling the speed of the aircraft and that both the localizer and glide slope signals have been recognized and are being used to control the aircraft through the autopilot.

The decision height is 200 feet.

This is a good time to go back to the FSX screen and select an airplane and location. The default 737 is recommended for this startup. The Colorado Springs, Colorado municipal airport is a good airport to start with for this documentation. To verify end-to-end connectivity go the main airplane panel and turn the "Flight Director" switch on and off. If the space just above the artificial horizon on the PFD changes from "OFF" to "F/D" you are good to go.

The PFD will appear in a window with no title bar or border. It will have a small black area in each corner. When placed on a solid black background the black will disappear and the corners of the bezel will be rounded. If you wish, use a windows screen configuration utility to set the screen background to black. In Windows 7 right click on an empty spot on the desktop and select “Personalize” from the drop down menu. The all black background selection is on this menu.

In the center of the display is an artificial horizon. The space just above the artificial horizon display is used for status information during start up. The start of the Captain’s PFD should also be reflected in the Communications Manager display.

The status of the PFD is displayed just above the artificial horizon.

- “NO COM“ indicates that the PFD is running OK but not yet connected to the Communications Manager.
- “NO SIM” means that the PFD is connected to the Communications Manager and that the Communications Manager is not yet connected to the Simulator Interface program (crgfsx.exe or crgr3d.exe).
- Once the PFD, the Communications Manager, and the Simulator Interface are communicating with each other the space above the artificial horizon reverts to prototypical use and shows the status of the display (OFF, FLT DIR, or A/P).

Primary Flight Display (PFD) - First Officer's Side

Since this step is almost identical to the PFD above you may want to move on to other instruments for now or you may need just the pilot's display for your setup. To install, copy the PFDRight folder to the destination computer and proceed to configure as above.

PFD Configuration

To modify the instrument screen location and size select the instrument (click on it) and press F2. This will change the display and it will look like the image below. Use the + and - keys to adjust the instrument size and the direction arrows to move the instrument to the desired location. Press F3 to save the new instrument size and location. You can also select to display or not display the bezel at this time. Pressing the "b" key toggles the bezel display. Be sure to press F3 to save your new bezel selection. Press F2 to go back to the normal instrument display.

The configuration for each instrument is relatively similar.



The number of pixels the window is moved or re-sized with one keystroke can be changed by pressing a number key 1 through 9. For example: to move the window one pixel at a time press 1 before using the direction keys. Then each press of a direction key will move the instrument one pixel. To move the window 9 pixels at a time press 9 before using the direction keys. Each press of a direction key will then move the window 9 pixels.

The instruments were tested within a range of sizes centered around 700 pixels. You should be able to vary this size with the configuration file from 550 pixels to 950 pixels and still have a nice look and feel. Fonts on sizes below 550 pixels will not look as nice. This size range should provide a prototypical physical size when used with many (if not most) displays.

The instruments are expected to be relatively square when viewed on screen. Circles will appear out of round on a display that is not square. This is especially noticeable with the Nav Display. Minor adjustments to the window height and width parameters in the configuration file should allow for deviations of pixel width to pixel height for your specific display.

When F3 is pressed the configuration information is saved in a configuration file in the same directory as the instrument.

On startup **each instrument** reads a configuration file to determine size and location of the display as well as other optional parameters. Parameters are listed in the display configuration file (crgpfdl.cfg, crgpfdr.cfg) as parameter name/parameter value pairs. The parameter names are case insensitive.

Common parameters are:

- **Winx** - the X location of the left side of the window.
- **Winy** - the Y location of the top of the instrument window.
- **Width** - the width of the instrument window
- **Height** - the height of the instrument window.
- **Bezel** - Include or exclude the bezel around the instrument (yes or no). If you integrate the instruments into your forward instrument panel behind your own physical bezel you may want to exclude the displayed bezel to give you more flexibility in integrating the instruments into your panel.
- **Ip** - override IP address (see communications)
- **Mask** - override IP mask (see communications)

For example an instrument 10 pixels from the left on your screen, 10 pixels from the top of the screen with a height and width of 740 and 747 respectively would have the following parameters in the configuration file:

```
winx      10
winy      10
width     740
height    747
```

Bezel is an optional parameter, the default is to display the bezel. To exclude the bezel add the following line to the instrument configuration file:

```
bezel no
```

Comment lines may be used in the configuration file, they are started with the characters **//** followed by a space before the comment:

```
// This is a comment.
```

The lab computer with the instrument displays has two small 15 inch LCD screen connected to the computer with a VGA cables. The screen background is set to BLACK using the windows Control Panel, personalization function. The PFD occupies the left side of the one screen, the right side of the screen is occupied by the ND display. The location parameters in the configuration file for our PFD look like:

```
winx 1610
winy 13
width 740
height 740
bezel no
```

PFD OMI Style

The PFD will show when the aircraft is over either the outer marker, middle marker, or inner marker with an indicator in the upper right part of the artificial horizon.

There are two styles available for the markers. To select a style add the following optional line to the PFD configuration file:

```
mkrtype t1
```

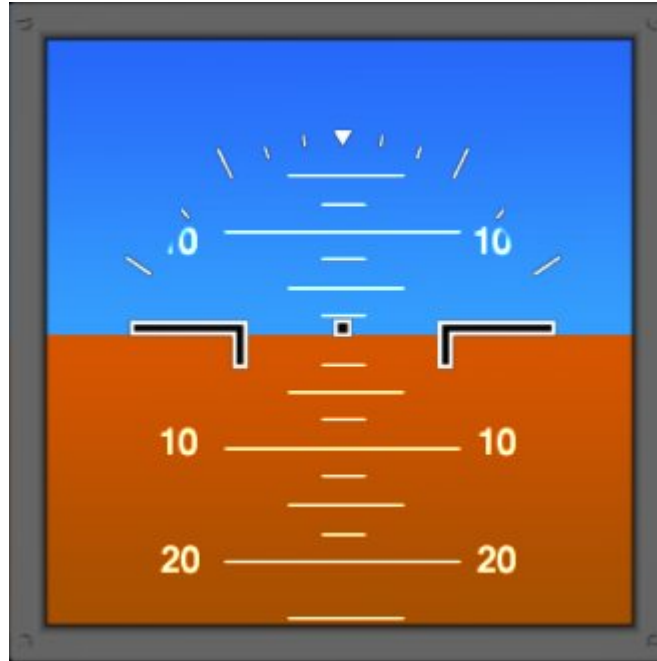
or

```
mkrtype t2
```

The t2 markers are styled after the 737 NGX OMI markers.

Standby PFD Instruments

Each PFD also has an optional standby gauge. The standby gauge comes in two varieties:



This style of PFD standby gauge above is appropriate for the 777. To display the gauge in the PFD configuration file add the line:

stby mode0

Like all of the CrgSim instruments this standby gauge has it's own configuration file containing the usual parameters./

Captain's side	crgpfdlstby.cfg
First Officer's side	crgpfdrstby.cfg



This style of PFD standby gauge above is appropriate for the 737. To display the gauge in the PFD configuration file add the line:

stby mode1

Like all of the CrgSim instruments this standby gauge has it's own configuration file containing the usual parameters./

Captain's side	crgpfdlstby.cfg
First Officer's side	crgpfdrstby.cfg

EICAS

Installation

Copy the EICAS folder from the CrgSim distribution to its destination and start crgeicas1.exe from within the folder. Try moving the throttle on the FSX aircraft and make sure the EICAS instruments change as you do so. Then move the flaps up and down on the simulator main panel, the flaps indicator on the EICAS should follow the changes.



The EICAS instrument also works with aircraft that have 3 or 4 engines (image below). To make room for the additional gauges the gear up/down indication is now text to the right of the screen under the gauges. The EICAS below is connected to the default 747. It does not display a prototypical 747 EICAS but will still display expected values on the gauges.





If you fly the default 737 the EICAS shown above will be used. All other aircraft (with this release) will use the 777 style EICAS.

EICAS Configuration

The EICAS size and screen position is configured the same as the PFD discussed above. Also please read the following section on EICAS configuration if you intend to fly more than the default 737.

EICAS notes:

- The display will determine how many engines your current FSX aircraft contains and configure accordingly.
- Since up to 4 engines may be accommodated the area to the right of the instrument gauges will be blank for two turbine aircraft but will be filled if your airplane has 4 engines.
- If you start at a high altitude airport such as Denver or Colorado Springs it will take a few minutes for the cabin pressure to catch up to the airfield altitude. The value displayed on the CrgSim EICAS has no effect on the simulation and may be ignored if you don't want to wait for the pressure to equalize. While you are flying it will stop increasing cabin altitude at 7,500 feet.
- Fuel supply is listed in pounds of fuel X 1000.
- Duct pressure is static at 18
- The aircraft profile (loaded by Utilities) will provide EICAS with flap position details.

The EICAS instrument has the same configuration file format for location and size as described for the PFD above.

Contact

You can contact us at sim30@[crgsim.com](mailto:sim30@crgsim.com). We are especially interested in your comments, any problems you might have with the programs, and things that you like (or don't like) about them.

After spending a large amount of time removing non-flight sim posts (drugs, counterfeit boots, ... for sale) we reluctantly had to convert the web site to read only.