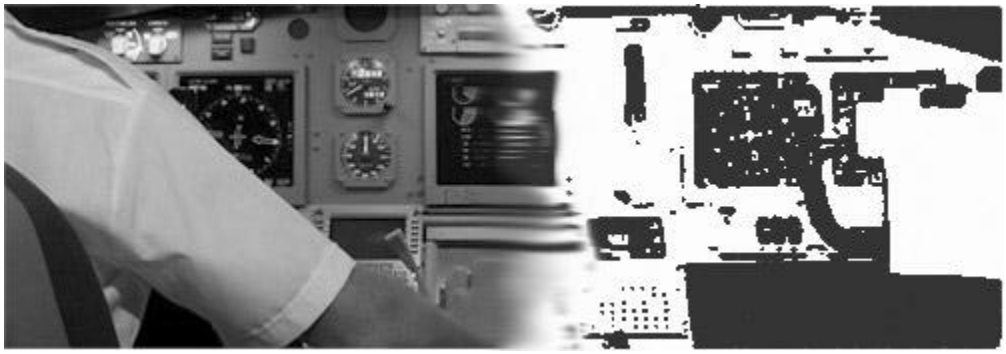
project magenta

USER MANUAL



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CONTENTS

Section **Page**

Introduction....4
Requirements....5
Install & Set-Up....5
Network Set-Up / Optimization....7
pmFileCheck Tool....13
OpenGL....14
General – Common to all Software....15
About INI Files....19
CheckList....20
Boeing-Type Glass Cockpit....21
Boeing-Type CDU & RCDU....29
Boeing-Type MCP....40
Airbus-Type Glass Cockpit....41
Airbus-Type MCDU....46
Airbus-Type FCU....51
pmSystems....52
General Aviation IFR Panels....66
Regional Jet Glass Cockpit....78
Project Magenta Instructor Station....86
General Aviation Glass Cockpit....105
pmSounds....108
SID/STAR/APPR Data....110
Aircraft Configuration Files....114
Terrain Data Files....126
Weather Radar....128
Back-Up....130
Navdata Updates....131
Flight Models....132
Weight & Balance....132
Weight....132
Balance....133

FAQ 133
Notams 136
Project Magenta Internal and Interfacing Offsets 136
FSUIPC Offsets 136
Alphabetical Index 137

Always check the **NOTAMS** pages for important up-to-date changes regarding software issues.

http://www.projectmagenta.com/notams.html

Introduction

Project Magenta produces Flight Simulation software designed to be run across a computer network. The software is not intended to be used on a single computer. Primary usage is for flight simulators or flight training devices. The software is available under two separate license schemes: Professional and Home-User. Please contact Project Magenta sales for any form of professional usage / application. If in any doubt it is better to check first rather than run into a licensing problem at a later date.

All of the Project Magenta software follows very similar install and set-up procedures. In order to use the software some knowledge of flying or appropriate training manuals will be required further to this software set-up manual. This manual will not in anyway discuss aircraft operations or training. It won't (for example) teach you how to operate a CDU or MCP. The software is highly detailed and requires that the user must either have prior knowledge of a specific area or use the software in conjunction with appropriate training manuals.

This manual has been split into various sections with new and advanced users of the software in mind. It covers Install procedures, network and common software operation. In the later sections software function specific to each software type is discussed. It is recommended that special attention is paid by new users to the first sections as it can lead to serious set-up problems later on if these various tasks are not performed and found to be working before the software is put into use.

As a general rule, none of the information herein and none of the software can be used for real world aviation or navigation. The software is by no means to be considered complete concerning any of the respective aircraft's real systems and operation. The software is designed to give familiarization of those a/c modeled.

Unless otherwise stated, the diagrams in this document refer to Windows. Note that depending on your desktop style and theme differences may be apparent in your particular set-up.

Printing Information

This manual has been designed to be printed with a B/W printer. No colour printing is necessary.

If you find technical errors in this manual please e-mail: support@projectmagenta.com

Requirements

- MSFS (various versions are supported but we maintain support for the most current version)
- At time of print we support Prepar3D (v4, v5 and v6), Microsoft Flight Simulator 2020 and 2024, and X-Plane 11 and 12. The older FS2004, FSX and ESP versions are still supported. Please note that for Microsoft Flight Simulator 2024 the flight model we supply has to be updated, so please contact support before you start.
- We currently recommend Windows 11 (64 bit) on the server as well as on all of your client computers
- Fully compliant OpenGL Graphics Card (Typically nVidia Gforce Cards)
- Colour Mode of 16bit and above
- Full registered version of FSUIPC
- Full registered version of WideFS
- Computer Network running TCP/IP (a wired Gigabit network is recommended)
- For X-Plane 11 and 12 please use XPUIPC and XPWideClient (can be downloaded from our website)
- File & Printer sharing Services installed and active for the Network protocol procedure. (Typically this is TCP/IP)

Install & Set-Up

- Software is delivered by download only
- To access the software installers, please register and log in to the website www.projectmagenta.com
- Download the software from the "Your Software" Menu on the site
- You chose which computer you want to install the software on. Every time you install the software on a new PC a new code will be requested.
- Unzip and run the executable install program
- Run the software for the first time
- It will present a code
- Send this code to: **register@projectmagenta.com**
- We will send you an unlock code
- The software will now run, you still have to configure your network, WideFS, Sharing and NetDir to be able to use it. This is covered in the next section.

Windows 11 Set-Up

All of our software installs and runs under Windows 11. The install procedure itself has not changed, but Windows 11 arrives with a number of settings that will stop the network side of things from working, so please go through the following on every one of your computers before you start.

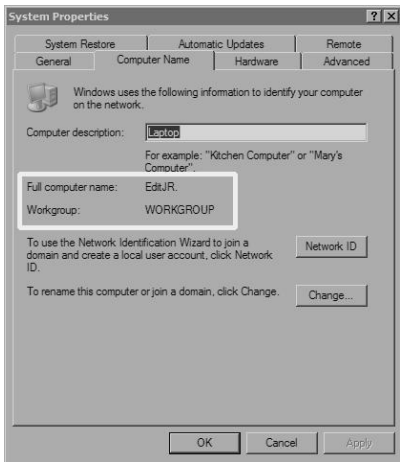
- Please run the installer as Administrator, right click on it and select Run as administrator. Do the same the first time you run each program, otherwise the licence code cannot be written.
- The first time you run a downloaded installer, Windows may show a SmartScreen warning. Select More info and then Run anyway, this is normal for downloaded software.
- Set your network profile to Private. Open Settings, then Network & internet, then the properties of your wired adapter, and select Private network. Sharing will not work at all while the profile is left on Public.

- Turn on network discovery and file and printer sharing. You will find these under Settings, Network & internet, Advanced network settings, Advanced sharing settings. Both have to be enabled for the Private profile.
- Turn off password protected sharing in the same place. If you would rather leave it switched on, then you must create the same user account and password on every computer.
- Leave SMB 1.0 switched off. Windows 11 no longer installs it and neither our software nor WideFS needs it.
- Exclude the Project Magenta program folders and the NetDir folder from the Windows Defender real time scanning, as it really slows down the network file transfer.
- Assign a fixed IP address to the simulator computer, or reserve one for it on your router, so that the ServerIPAddr entry in your wideclient.ini does not have to be changed every time.
- In the Device Manager, open the properties of your network card and turn off the option allowing the computer to switch the device off to save power. If you leave this on, Windows will suspend the card and your WideFS connection will drop.

Network Set-Up / Optimization

The Project Magenta software is designed to be run over a computer network. The software is flexible and has many different applications. No one set-up is the same and as such we will talk in general terms throughout this section.

- Please note, you are responsible for setting up your computer network. File & Printer sharing Services installed and active for the Network protocol procedure. (Typically this is TCP/IP). All computers must "see" each other across the network and be in the same workgroup. You will either have to know your computers Name or static IP address.



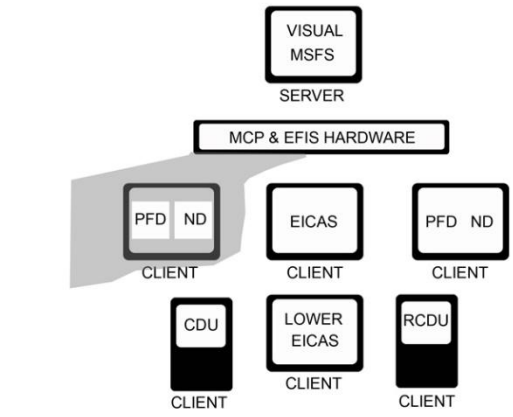
- In Windows 11 you can find out your computer name by opening Settings, then System, then About. It is shown there as the Device name. This will be required unless you intend to use / set a static IP Address.

- Take note of either your SeverName or Server IP Address as it will be required for the WideFS set-up.

Step 1 Set-up your network for Project Magenta

The following is a quick step guide to installing the components necessary for our software to communicate across the network with MSFS. We recommend that you undertake further reading with Peter Dowson's WideFS & FSUIPC documentation which provides details and additional features of his programs that you may well require if not now, but at a later date.

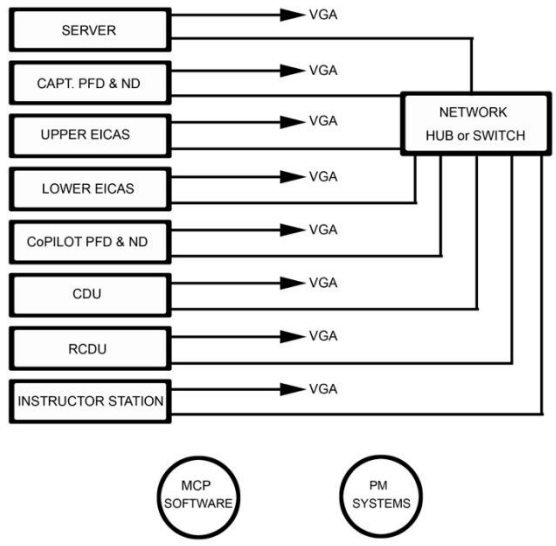
A typical network layout comprises of one Server computer (usually the most powerful) and several Clients as illustrated.



If your computer is able to run all software on one computer, then of course you do not need to spread the software on other PCs.

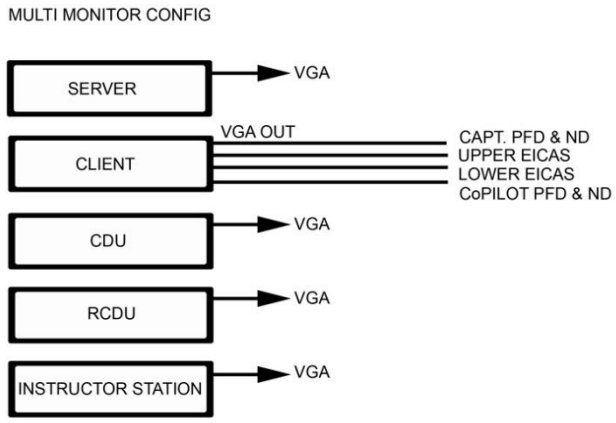
It is however recommended to run the simulator on its own computer.





In the schematics, you can see how each client is connected together via a switch/hub to the Server. Each client has a VGA output to drive respective flight displays. Note how (in this example) pmSystems and the MCP has been left out of the loop, this is simply because you can choose where to run these (as with any of the other pm software), like pmSounds, etc. Generally, the rule of thumb is, if you eventually won't need to actually see the software graphic (as you will have hardware as the main input / output device) then that particular control program can run minimized. You may choose in this example to run the MCP on the Server, or perhaps the EICAS computer. With the CDU program, you still need to see the output of the screen, so if you have CDU hardware then we have an option so that just the full screen output of the CDU is shown.

You should build a schematic of your set-up, the schematic shown here is merely one example. As a further note, with a program like pmSystems, whilst it will control your a/c systems in a minimized state (so you don't have to see it) it will be a requirement to see it full screen during the test phases of your set-up as you connect your hardware (if used in this fashion). Thus you might choose to run it on a laptop or spare PC. Conversely, it may be used as software alone without hardware, then of course you will need a screen to see it.



A Note about Multi-Monitor

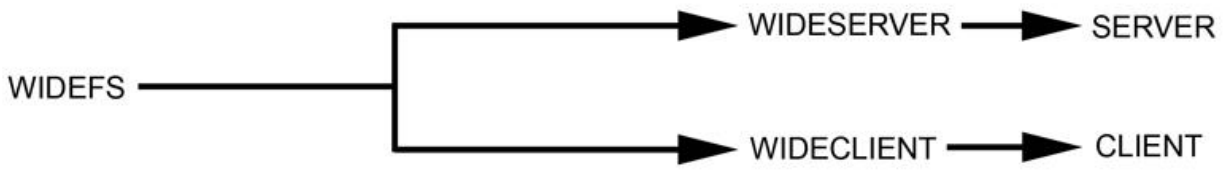
Because multi-monitor is entirely dependent on what particular video hardware you have on your system, we cannot support this type of application. Experimentation is required on your behalf to achieve this. Generally we only recommend networked solutions and thus we can be of little assistance in software set-up in environments that we don't fully support. This applies to all PM programs. Running the simulator on one screen and a PM program on another is possible on current hardware, but the results depend entirely on your graphics card and driver, so we still recommend a networked solution.

Step 2. Installation of WideFS and FSUIPC

To connect MSFS and Project Magenta programs together, across a computer network, you need an intermediary program called WideFS. Full docs are enclosed with these programs and are the most up-to-date and thorough source of information. Below is really just a quick start summary.

A registered version of FSUIPC must be installed in your MSFS Modules folder. Please note that for Microsoft Flight Simulator 2020 and 2024 this works differently, FSUIPC7 is a separate program that you run alongside the simulator and there is no Modules folder to copy it into.

A registered version of WideFS is also required for network communications and the installation is as follows.



WideFS is split into two main components as illustrated above.

The Wideserver component (Wideserver.dll and Wideserver.ini) are placed in your MSFS Modules folder. That is all you need to do for the Sever component installation.

The Wideclient component (Wideclient.exe and Wideclient.ini) are placed on your client computers (computer that you wish to connect to MSFS). You can create a folder perhaps called "WideClient" or copy them into the PM main program folders – it actually does not matter. Each time you want communication across the network with MSFS, Wideclient.exe must be running.

Step 3 Setting Server Name or Static IP

WideFS uses TCP/IP for its communication, this is the standard on all current systems and is what we recommend. There is also a new protocol in use called UDP. This is a faster protocol but there is no error checking. It is purely system dependent as to whether this can be used. As a general rule, most computer systems will run well using TCP/IP.

Generally, after installation (as above) of the various files included in WideFS, as a basic rule you should not actually have to do anything more but we also like to at least edit the wideclient.ini file, use a text editor like Windows Notepad. Add the following entries in the [Config] section of the WideClient.ini file:

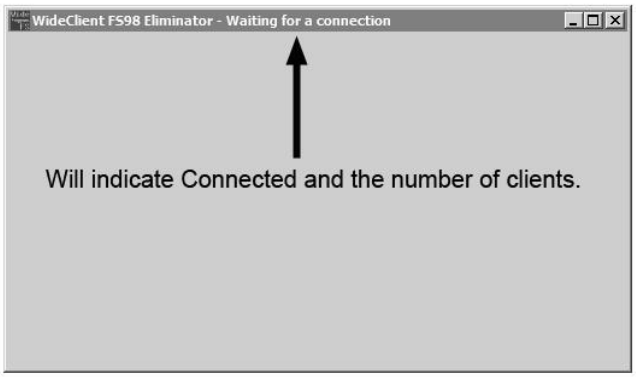
ServerName= (your Server's Name)

Or

ServerIPAddr= (your Server's IP address)

You only need to set either the ServerIPAddr or ServerName (not both). It is recommended that you use the ServerName option. Then add to the same ini file UseProtocol=TCP (or whatever protocol you prefer) we recommend TCP at least to start with.

If you do not know how to find your ServerName or IP address, please contact Project Magenta support or refer to the WideFS documentation.

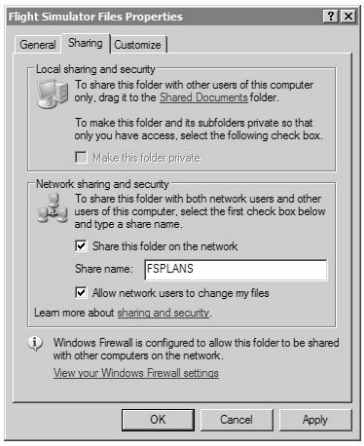


When you first try to "connect" wideclient to MSFS you may need to allow access for this program by any Firewalls you have enabled. Otherwise they may block communication.

To check you have correctly set WideClient to communicate with MSFS, run MSFS on the Server, then start WideClient on your client PC by clicking on wideclient.exe. In the menu bar at the top of the Wideclient program you should see the number of clients that are connected. If it is indicating that nothing is connected, then you need to refer to the network checklist to make sure you have set everything correctly.

Step 4 Additional things to do – Sharing

A) Share your default MSFS folder and give it full read/write access. Right click on your MSFS main program folder, select properties, and then look for the sharing options (typically on the Sharing tab). Select the option to share the folder and give it a share name with full read/write access.



B) For Prepar3D and FSX you need to share the folder where the flight plan files are kept. Go to your Documents folder and find the sub folder that holds them, this is "Flight Simulator Files" for FSX and "Prepar3D v5 Files" or similar for Prepar3D. Right click on this folder and enable full sharing as outlined above. The share name of this folder must be set to FSPLANS. Write in FSPLANS where it indicates the share name. Please also make sure that the folder is not left as a private folder.

Step 5 NetDir

The NetDir setting is required if you own a copy of the PM CDU or MCDU program.

There are various ways to set the NetDir, it is important to ensure it has been set correctly for correct operations between the CDU / MCDU and the Glass Cockpit.

a) Go to the program folder of the CDU or MCDU where you installed this software.
b) Open this folder. There is a subfolder called NetDir. Right click, Properties, and select the "sharing" tab or option. Now allow sharing over the network, and set the share name to NetDir. Make sure you have selected full read/right access and that it is not a private folder. Click OK and close.
c) Now run the CDU program. It will detect automatically the NetDir and should set the software for its use.

d) To check that everything is working, download and install the latest version of the pmFileCheck program from the Project Magenta website. When you run it, with the CDU software running as well, and a connection to MSFS via wideclient, it will produce a test report indicating any problems.

Step 6 Sharing In General

Check that there is no network or firewall restrictions between folders that need full sharing / read and write access.

Typical symptoms of incorrectly set NetDir:

- Red display "FAIL" in the CDU (bottom right of graphic or on your CDU hardware)
- Receiving a "Network Error" message in the CDU scratch pad.
- Seeing no vspeed (once set), flaps, flight plan in the PFD, ND and EICAS respectively when running the Glass Cockpit programs.

If any of the above occur, something is not correctly set. Check:

- File & Printer Sharing Services installed and active for the network
- All computers "see" each other and can exchange files
- You have created and shared the NetDir folder with full read/write access
- When looking at the cdu.ini file (using Notepad text editor) you can see an entry in the file called: NetDir=\\machinename\NetDir

If the entry looks something like this:

NetDir=c:\cdu\NetDir

Then this is incorrect and the folder is not being shared across the network.

Optimization

Here is a list of tips to make sure your network runs as fast as possible.

- avoid any "Auto" settings in the network card properties for the Link Speed / Duplex, e.g. use "1.0 Gbps Full Duplex" rather than "Auto Negotiation"
- Set the "receive Buffer" of your network card as high as possible
- turn off the search indexing on the drive holding your shared folders, in the "Local Disk Properties", as it really slows down network file transfer
- Limit your FS frame rate, avoid "unlimited" 30 FPS should be enough for most, use 50 fps if you must and your hardware can handle it. High or Unlimited settings will leave WideServer very little time to process network traffic and will result in pauses in the connected programs.
- turn off automatic updates
- assign an IP address for every machine, do not use automatic settings for that
- disable network authentication IEEE 802
- if you have control, turn off system restore disable automatic synchronise internet time

A possible side effect of using TCP/IP is "stutters / pauses" across the network. If this is observed on your system, you will have to assign a static IP address rather than just simply using a computer name in the wideclient.ini file setting. Refer to the WideFS documents for further information on setting different network protocols.

Other Required Shares

Other required shares for our programs to communicate properly with FS and display or save FS flight plans:
- share the FS folder with read/write access
- for Prepar3D and FSX share the Documents flight plan folder ("Flight Simulator Files", or "Prepar3D v5 Files") with the share name FSPLANS

Note: share name does not mean renaming an existing folder, this is the name given to the share that you are creating

pmFileCheck Tool

As mentioned before, pmFileCheck is a very helpful tool to check everything is OK with your PM Set-Up. You can find it in the main folder of practically all programs (Glass Cockpit, FMC, IFR Panels etc.)

It will check the connection to flight simulator and its frame rate, show the detected WideFS versions, inspect the NetDir settings and so forth. It will help you identify any problems and will suggest solutions should any issues appear to be the case. It is possible to copy the result to the clipboard and send it to PM support should you need any help.

```
pmFileCheck Build  36
Opening Connections

Local Path: C:\NonSim\pmFileCheck

Checking Computer and User Name
Local Computer Name: FSN
Local User Name: Owner

FSUIPC/WideFS found!
FSUIPC Version 3.53
WideServer Version 6.51
WideClient Version 6.51

Flight Simulator Running
 Testing Framerate
 Avg / Min / Max: 29.6 / 24.5 / 30.7

OK   - GC Detected
GC Build  84
OK   - FMC Detected (CDU or MCDU)
FMC Build  77
OK   - A/P Detected (MCP or FCU)
A/P Build  77

Local DLL Files Found:
   pm.dll dated: 1/17/2006 9:22:27 AM

Checking FS Path
OK   - Reported FS Path \\P3D\Prepar3D v5\

Trying to access FS Path
OK   - Read access to FS Path
OK   - Read/Write access to FS Path
OK   - Read/Write access to FS Path

Wide Server reports:
 788687 Connected to computer "COPILOT" running WideClient version 6.510 (skt=1192)
 788812 Connected to computer "CAPTAIN" running WideClient version 6.510 (skt=1204)

Looking for NETDIR from CDU
Reported NetDir is: \\fmc\netdir\
Checking PMNETDIR Path (FMC Generated Path)
9 File(s) found in NetDir, last date is 3/2/2006 6:52:02 PM

Checking FSPLANS Path (To Load/Save FS Flightplans)
OK   - Read/Write access to FSPLANS Shared Folder
 29 File(s) found in FSPLANS, last date is 3/2/2006 10:23:55 AM
 last flight plan file is IFR Denver Intl to Rapid City Regl.PLN

Closing Everything
```

OpenGL

We have chosen the OpenGL API (Graphics Programming Interface) over DirectX because we see it as "the way to go" with precise high quality graphics. SGI's (Silicon Graphics) OpenGL has been the standard for the high-end applications for many years now, and finally this cross-platform standard has found its way onto our desktop PCs. OpenGL is supported on the Windows platform through the drivers supplied by your graphics card manufacturer. Windows has always been delivered with the OpenGL DLLs (Dynamic Link Libraries).

As the hardware is always ahead of the software (in this particular case the OpenGL drivers for your graphics card) what you have on your PC isn't necessarily the newest implementation of the OpenGL ICD

Any PM program that requires OpenGL will initiate a benchmark cycle and report a benchmark value (anything above the value of 200 is good, depending on your hardware and graphics card) as well as the OpenGL acceleration status. This will happen when you first run the software – you can also turn this test off via the user options discussed later.

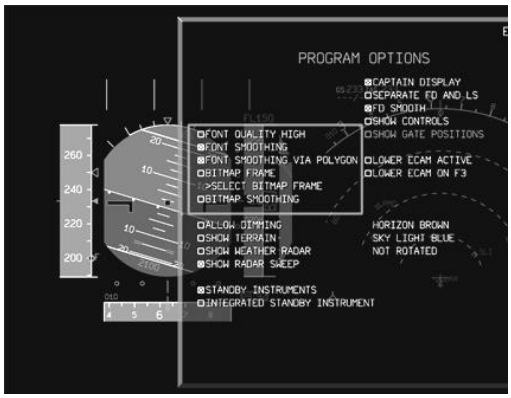
This can be:

- Emulated, No OpenGL Acceleration
- Partial MCD acceleration
- Full ICD Acceleration

What you want is Full ICD Acceleration, and here is how you can get it, if the drivers allegedly support it and the PFD doesn't report it. If a card does not have enough memory and/or will not accelerate certain modes:

- Reduce the colour depth to 16 bit
- Reduce the resolution to 800x600

If the driver has an ICD driver for OpenGL, it should accelerate now. The next step would be to increase the resolution. Please check the PFD.INI entry Quality= for ways of changing your display quality with OpenGL and also these settings can be adjusted via the on screen menu (pressing ESC key) once the software is up and running.





General – Common to all Software

The following section is relevant for the following software: Boeing Glass Cockpit, Airbus Glass Cockpit, RJ Glass Cockpit, pmSystems, Instructor Station, GAIFR…

The CDU / MCDU and MCP type software are discussed at the end of this section

By its nature, the software is designed to be as versatile as possible. We cater for many different types of application. For this reason, it is necessary to spend time familiarizing yourself with the basic concepts of configuration. This section deals with the first level, getting started. From there on, much of the customisation techniques and options that are available to you will become self evident by experimentation. To avoid confusion later, it is important to understand these basics first.

Whether you are running the demo software or the actual software for the first time this still applies. A note about the demo software, it is the same as the actual software only that it is time limited. It can be connected to MSFS but requires the same set-up and configuration as discussed previously.

Generally the software will go into a "demo" mode when it is not connected to anything (whether it is the demo software or full version). It won't revert to a demo mode if it is connected to MSFS. In demo mode, the software will create an artificial situation, the instruments will appear as though they are flying, and screen my change to show all the different modes. This is designed to give an overall impression for pure demo purposes. But for set-up and configuration it is best to turn it off in the following way. Through this you will also get an insight into the software main user interface.

Basics



When the software is up and running, by pressing the ESC key on your keyboard, a default menu will appear superimposed on the screen. This is the main first level user selectable options interface. The second level is the program ini files that reside in the main program folders. A text editor can be used to change these, the ini files are self documented by each option, but generally the options there are for a more advanced stage of use. The Program Options Menu has further pages that you can navigate to by clicking on the various options. Some will simply turn things on or off, whilst other options will take you to another page. To revert back to the software itself, just press the ESC key again.



As an example, switch off the demo mode function of the software. Click with the mouse on OTHER SETTINGS. A new page will appear with a number of other software options.



Uncheck the DEMO FLIGHT MODE. Now the software will never revert into Demo mode. If you want demo mode back again simply reselect it. When positioning instruments and sizing them to fit your displays you may find that having the demo mode off will help you in that the software will no longer switch between display modes allowing you time to configure and set it up. This is true both of the free "demo" software and also the actual full software because the full software will also switch into demo mode *if* not connected to MSFS or this option is not deselected.

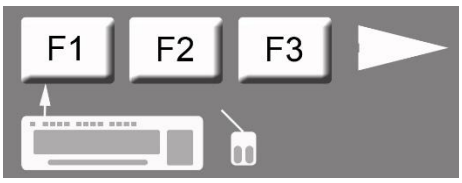
The technique of software configuration applies to many different things that have varying degrees of importance. Try selecting various options and see the results.

Positioning

The software does not know what screen ratio, screen size or resolution you have. We do not limit to any one size. Therefore to avoid us putting in limitations of this nature, you have to set and position the instruments. Once this is done, the software will remember the positioning. If you change monitor, re-install, or alter the resolution then you will have to perform this process again.

First, please navigate through all the various instrument display modes available. This mainly refers to the Glass Cockpit type software. With other software like pmSystems and the GAIFR there are no multiple screens to deal with, but much of the sizing and positioning is common across software platforms.

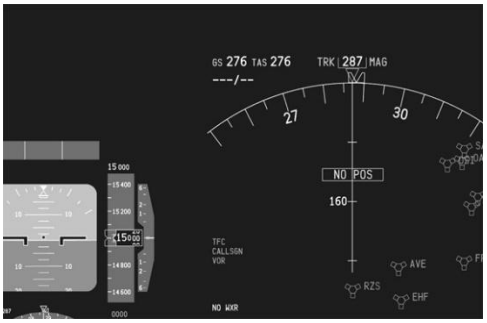
By pressing the Function keys F1 through to F10 you can cycle through each display mode on the Glass Cockpits. Whilst on the selected page, you can position and size the instruments.



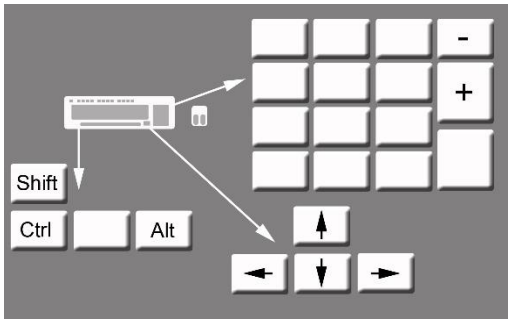
Cycling through the pages will give you different instrument views. The surrounding Bitmap Frames can be turned on / off via the ESC menu options.

As an example, here is the F4 page, most commonly used for the Captains PFD and ND display run on a single TFT display. At present the sizing is not correct. Both the PFD and ND have to be re-positioned and re-sized.

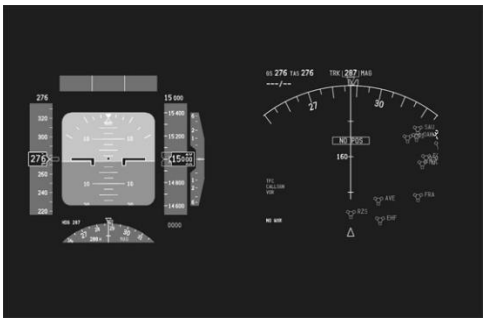
Positioning can be achieved either via the keyboard or the mouse. By placing the mouse over any instrument, the



you can move combination around. To move individual instruments, you can use a combination of the CTRL, SHIFT, ALT and



arrow keys. Please try this. It is first best to get a rough sizing, using the + - keys on the numeric keypad, and from there on introduce the ALT, CTRL and SHIFT keys in combination with the ARROW keys. The more you use the technique the clearer it will become. This process applies to all pages. Additionally on the standby instruments page (F10) you can position single items by either individually selecting them with a RIGHT CLICK of the mouse or you can select each instrument by pressing the TAB key making each instrument "active" for positioning/sizing. To change the spacing between the ND and PFD you can also use the Y and U keys as an alternative option.





The left image shows the result of re-positioning and sizing. The right image represents the end result, a single monitor behind main panel (hardware) cutouts to give you the respective displays running on a single screen. The software can also be rotated if monitors need to be mounted upright for spacing purposes. This is again achieved using the ESC key menu interface.

Once you have positioned your displays, to prevent any inadvertent re-positioning by mistake, you can select from the ESC menu the option to LOCK DISPLAYS. Once this is selected the re-sizing and positioning functions will no longer work.

Differences MCP & CDU

MCP The MCP program has its own interface with options selectable by pressing the ESC key. Here you can also select the specific type of aircraft you will use. This should also match to the type you select in the CDU types IDENT page (see CDU section).



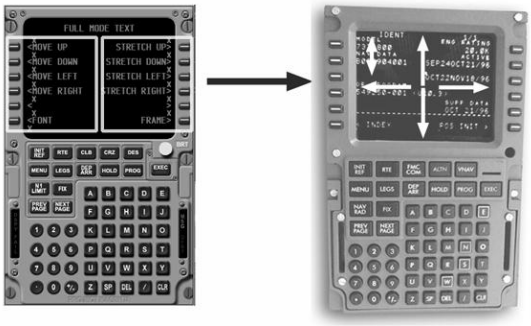
CDU The CDU main user interface is entered by pressing the MENU key twice on the CDU software graphic or your CDU hardware. For the display setting these can be entered here or by editing the ini file.







Press the MENU key twice, now various options are available. If, for example you want the display settings, select the LSK (Line Select Key) by that option. Now a new screen will present the various display modes. By selecting full screen mode, the CDU bitmap will disappear and just the CDU display will be shown. This is usually the option when using hardware. The display can then be resized via your hardware LSK keys as shown or via your keyboard using the sizing / positioning keys.

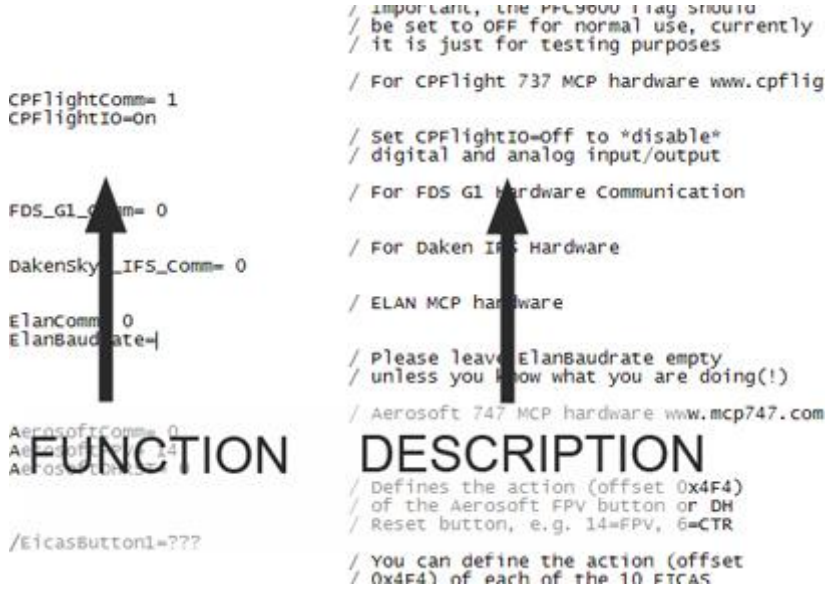


About INI Files

Each Project Magenta program has an ini file. This file resides in the main program directory (for example mcp.ini or GAIFR.ini). The ini file has many of the same options that the ESC menu function offers, but it also has additional ones that are being updated on a more regular basis for different customer requirements.

The ini files can be edited via the normal windows Notepad text editor. The files are self documenting. The function is listed on the left, and a description of the action on the right. You only need to start editing ini files for specific types of application; generally most options are available in the ESC menu.

A common example of ini file editing requirements is when connecting hardware via a serial interface. In the ini file you will see an entry for that specific hardware (if we have supported it) and you may have to enter the specific comm. Port number that your hardware is connected to. In the example below, MCP hardware is connected to the Comm. port number one on the computer.



For further information on specific ini file settings please contact support@projectmagenta.com

CheckList

FS Server

- Install/update and register FSUIPC and WIDEFS (wideserver)
- Check IP settings, file sharing services and network discovery
- Create FS and FSPLANS shares
- Install and run pmcheckver

  For X-Plane 11 and 12 use XPUIPC and XPWideClient

Each of Your Clients

- install/update WideFS (wideclient/xpwideclient)
- configure wideclient
- check IP settings, file sharing service and network discovery
- install latest version of pmfilecheck and pmcheckver
- install and register PM programs
- run pmcheckver, update programs and navdata if needed

CDU

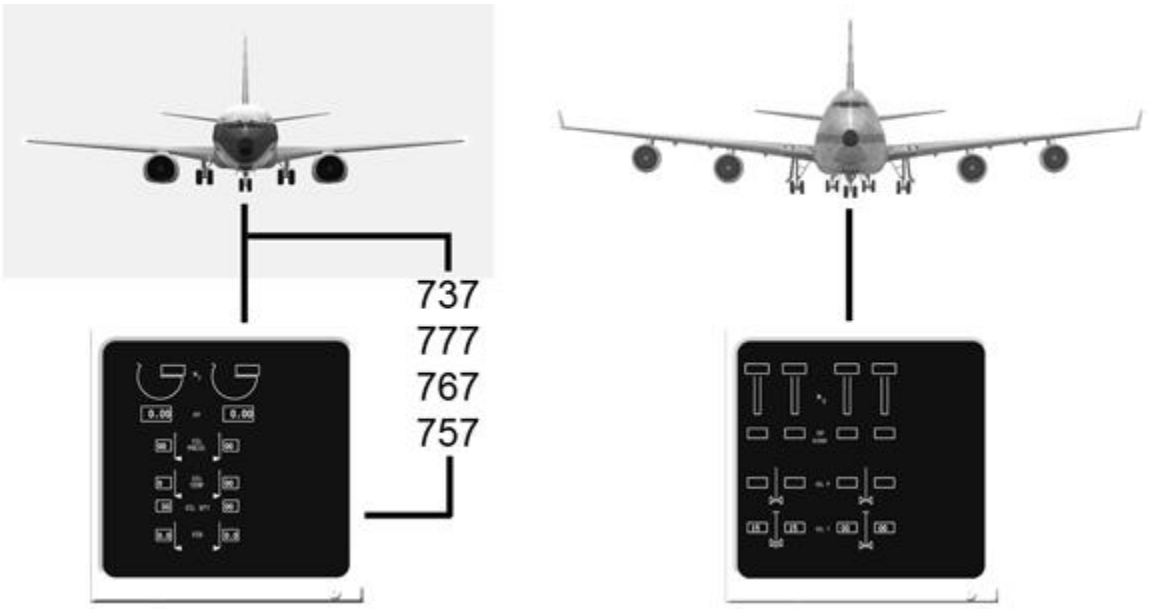
- create NetDir share
- install aircraft type file if needed
- run pmfilecheck with all programs running, check log output and make any corrections

Boeing-Type Glass Cockpit

The Glass Cockpit set-up with regard to positioning and sizing has already been discussed in the GENERAL section of this document. Here, we will discuss a little bit about how the Glass Cockpit functions and what further options are selectable by you and what you must set in order for the Glass Cockpit to function properly.

Step 1 Aircraft Type

The Glass Cockpit will detect from MSFS the number of engines your specific flight Model has. This will automatically change the engine display on the EICAS to the number of engines the flight model has. But the Glass Cockpit still needs more information from you which will be discussed shortly.



If you selected a three engine aircraft (such as the 727) it will also display the appropriate number of engines. This is an automatic function of the Glass Cockpit Software.

Please note that primary development of the Boeing Glass Cockpit is aimed at the 737. Secondary development covers to a slightly lesser degree the 767, 777 and 747 types. This is because due to the generic nature of the Glass Cockpit we can extend features to cover these other aircraft. We also cover the EFIS modes of the 737 and usually this is an airline specific option (examples shown later). These various options are selected by the ESC menu.

Apart from detecting the number of Engines your aircraft has the Glass Cockpit also needs to know a great deal of other parameters. These are generated through text files. These files are associated by aircraft type. Because sometimes the Glass Cockpit is run alone without the CDU software, there are two ways of setting the specific aircraft type so that the Glass Cockpit knows the various performance characteristics and FMA modes to display.

Step 2 Type Selection

Method A – **NO** CDU SOFTWARE

You will need to open the Glass Cockpit ini file (pfd.ini) located in the main program folder (GC). Open this file with NotePad.

Find the following entry:

AircraftType=

As you are not running the CDU software you must specify the aircraft type you want to fly here. In the Glass Cockpit folder are a number of aircraft type files. For example B737700.txt. The files are all in a plain text format and thus have the aircraft type followed by the file extension .txt. You can also download more of these files from the Updates section of the PM website.

If you wanted to fly the 737700 in the above example you would enter the name of that txt file, without the .TXT extension.

Type=B737700

The Glass Cockpit is now set to read the information in the aircraft specific text file.

Method B – **WITH** CDU SOFTWARE

If you have the CDU software as part of your Project Magenta system (highly advisable) then the above entry must be set as follows in the pfd.ini file:

Type=CDU
AircraftType=
(the entry above is intentionally left blank)

This forces the Glass Cockpit not to read aircraft txt files in its own local directory but from the CDU programs "types" subfolder. This has one main advantage, from the CDU program you can select your aircraft type automatically and very quickly without having to manually edit each Glass Cockpit ini file on your system.



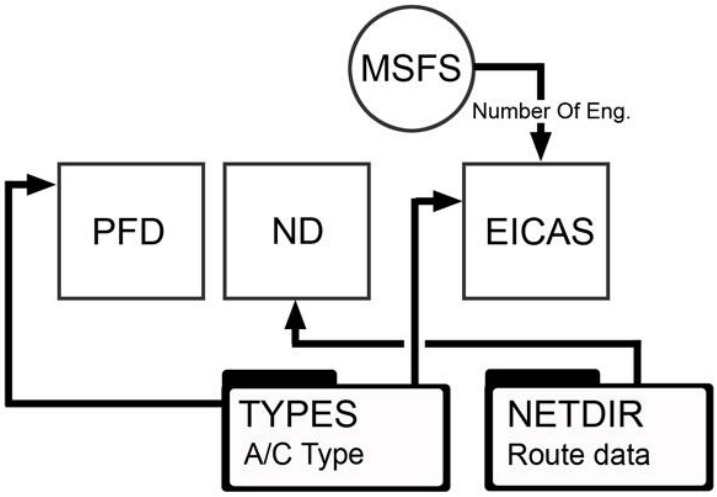


If you are running the CDU software in combination with the GC, select the LSK next to the aircraft Type on the IDENT page (usually the first page you see after the CDU starts) and here after selecting this LSK further aircraft types that are stored in your "Types" subdirectory in the Main CDU program folder are shown as selectable options. Once selected, the new type will be shown on the Ident page.

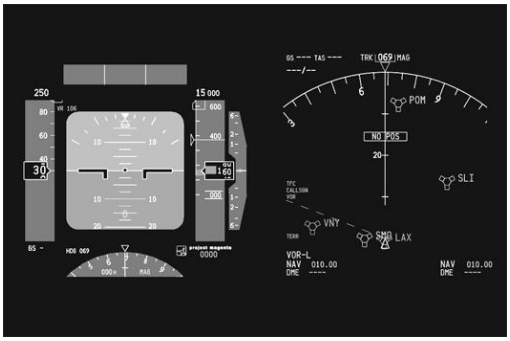
Note, it is not a good idea to select a 747-400 type txt file when you only have a 737 or two engine flight model

connected to MSFS. For obvious reasons you should match the type file to the type of aircraft you intend to fly in MSFS.

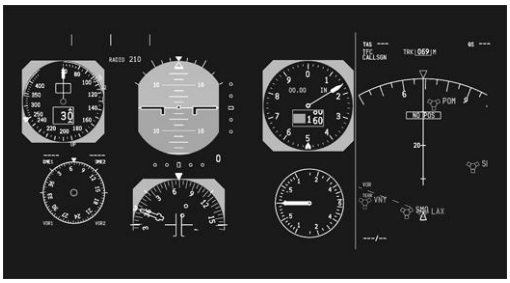
The diagram illustrates the data exchange between the CDU program subfolders and the Glass Cockpit.



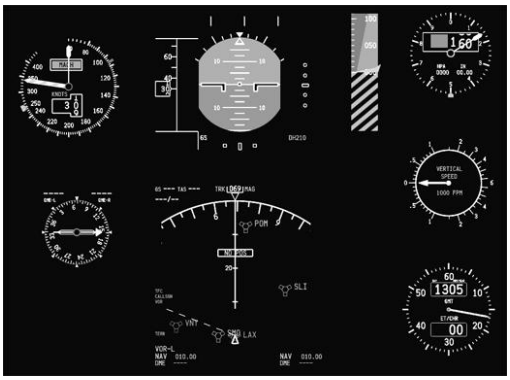
Selecting displays



The normal type of 737 instrument layout. Generally this layout is used for the 777, 747 as well. Specific other settings in the software will make the mode annunciation and indications type specific to the different aircraft types (discussed later).



The 737EFIS mode type displays. This is an airline-specific option. Note that this display is not for use for 737-400 and below types. It is a pure 737EFIS display for 737-600 and above. The mode annunciation on the 737-300 and 400 series is different to that of the later series and follows a different logic on the FMA.



The 767 type display is a secondary development of the Glass Cockpit. It will display the 767 displays with further options that can be select via the ESC menu, such as analogue AI and the additional Radio Altitude Tape that is an airline specific option on the 767. These displays can be used for the 757 although not type specific.

The Glass Cockpit also needs to know whether it is operating as a Captains Display or a Co-Pilots display. This is selected under the user options in the ESC menu. Note that the Co-pilots display requires a special second GC license. If you selected without registering it, the Glass Cockpit will run into communication conflicts on the ND display modes amongst other things.

On some airline 737 aircraft configs only a four type ND mode selection display is possible rather than the full modes. This is selectable as an option in the ESC menu. Generally the norm is to use the full mode selection.

If you fly any aircraft that is reliant to a lesser or greater degree on a lower EICAS display (like the 777 or 747-400) then whilst these displays are available within the Glass Cockpit package, in order to send them valid data you will need to run pmSystems. Without pmSystems the displays will just indicate place holders but no data will be displayed. Note that the 737 does not have system information on the lower EICAS and as such, to display the secondary EICAS information you do not need pmSystems for the 737. Most of the system status on the 737 is indicated to the pilots via the Glare Shield Warning lights and the overhead panel itself.

Glass Cockpit INI Settings

There are various items you can customize both within the program and in the program's INI file, PFD.INI.

Please check the PFD INI itself for the latest entries, they are self-commenting.

Boeing Glass Cockpit Keyboard Commands

This is the set of keyboard commands for the various PFD and ND screens.

	General
Q	Exits Program
F	displays/hides frame rate and OpenGL acceleration type
W	Toggles Title Bar display
Ctrl-M	Toggles Menu display
	Instruments/Pages
Cursor Keys	Move displayed Instruments Left, Right, Up, Down
Ctrl-Cursor Keys	Move displayed Instruments in larger steps
Alt-Cursor Keys	Move **Navigation Display** Left, Right, Up, down (only on 2 Element display PFD, ND) Move Engine Display Left, Right, Up, Down (only in 3 Element Display PFD, ND and Engine) When on the **Standby Gauge** page (F10) you can position the single items by pressing the Tab-Key to select which instrument to move, moving it with Alt-Cursor or Ctrl-Alt keys afterwards. You can also change the **space between the ND and the PFD** by pressing the **Y** and **U** keys.
+(NumPad Plus)	Zoom In (Increase Size)
- (NumPad Minus)	Zoom Out (Decrease Size)
Z/X	Decrease/Increase Blue Component in Background
Ctrl-Z/X	Decrease/Increase Brightness of the Bitmap Frame
F1 to F10	Access modes directly, **F1** PFD, **F2** ND, **F3** Engine, **F4** Captain PFD/ND, **F5** Copilot PFD/ND, **F6** Captain PFD/ND/Eng, **F7** Copilot PFD/ND/ENG, **F8** Captain ND/Eng, **F9** Copilot ND/Eng, **F10** Standby Horizon, Altimeter Speed indication

N/PgDn	Switch to next Mode (PFD, ND, Engine, Captain PFD/ND, Copilot PFD/ND, Captain PFD/ND/ENG, Copilot PFD/ND/ENG)
L/PgUp	Switch to previous mode
,/. or Ctrl-G,H	Decrease/Increase Brightness (Ctrl-Shift-H resets brightness to 100%)
BackSpace	Enable/Disable Bitmap frame around instruments (Ctrl-Backspase to select for positioning)
Ctrl-I	Switches off displays, pressing it a second time makes them light up again
	ND Modes
	Old ND Modes
M	ND MAP Mode
C	ND MAP CTR Mode
R	ND VOR/APP Rose Mode
P	ND MAP PLAN Mode
	8 ND Modes
C	Toggles CTR/ARC mode
A	ND APP Mode
R	ND VOR Mode
M	ND MAP Mode
P	ND PLAN Mode
E	Toggle OFF, VORL, ADFL (inop if MCP is active)
S	Toggle OFF, VORR, ADFR (inop if MCP is active)
Ctrl-5, 6, 7	Distinct OFF, VORL, ADFL (inop if MCP is active)
Ctrl-8, 9, 0	Distinct OFF, VORR, ADFR (inop if MCP is active)
I	Toggles Waypoint information (ETA and Distance) in the ND for flight plan points (DATA)
G, H	Decrease, Increase MAP range
1	VOR toggle On/Off in MAP Mode (Ctrl-1 Off only)
2	NDB toggle On/Off in MAP Mode (Ctrl-2 Off only)
3	WPT toggle On/Off in MAP Mode (Ctrl-3 Off only)
4	ARPT toggle On/Off in MAP Mode (Ctrl-4 Off only)

5, 6, 7, 8, 9, 0	MAP Range 10, 20, 40, 80, 160, 320 NM
J, K	Move to previous, next waypoint in PLAN Mode
T	Toggle TRU/MAG display in ND
Ctrl-C, Ctrl-Shift-Z	Switches TCAS Mode
Ctrl-O	Overview Page
O	Weather Radar On/Off
Ctrl-R	Terrain Display On/Off
Ctrl-G	Terrain Mode Display: Lines, Grid, Triangles
Ctrl-H	Terrain Colour Display: Altitude, Green, Delta Altitude
Alt-G	Terrain Map Size Small/Step2, Large/Step2, Small/Step1, Large/Step2
	Primary Flight Display
V/B	Increase/Decrease Decision Height (DH) (Ctrl-Shift-V resets DH to default)
Insert	Switches display from hPa to Inches and back
Delete	Sets QNH to STD (29.92/1013)
Home/End	Increases/decreases QNH
A	Flight Director Type Switch (Crosshair, Inverted-V)
D	Flight Director On/Off
Ctrl-F	Metric display On/Off
	Engine Page
Ctrl-C	Toggles the display of the controls (Extra Information, Elevator/Aileron position etc.)
Ctrl-V	Toggles MCP value indication above EICAS display
=	Switches from Vertical Gauges to Round Gauges and back
Tab	Switches to the next Engine display page.
Ctrl-S	Toggles "No Smoking" indication
Ctrl-B	Toggles "Fasten Seatbelts" indication
Y, U	To change distance between PFD and ND (ND position)
Ctrl-E	Resets Messages

Flight Plan Display

When you are not using the CDU/FMS, you can use SBP files (based on the Joe Jureckas SquawkBox Flight Plan Format) to display your active route in the Navigation Display's MAP, MAP CTR and PLAN modes.

While the route generated by the CDU/FMS is much more detailed (i.e. SID/STAR curves etc.) and also displays the top of climb and top of descent as well as the vertical path of the VNAV mode, this solution is more rudimentary but gets you up and running.

The Glass Cockpit software loads a file in the local directory with the name **PFD.SBP** and displays it on the ND. This file can change at any time, and can be reloaded by changing the ND mode or the range (with the CDU it is fully automatic).

The current versions of the Glass Cockpit will automatically read any **FS Flight Plan** once it has been saved. The last saved flight plan will then be displayed in the ND. For this, you have to share your FS Flight Plan folder (normally in your Documents folder) for read/write access as FSPLANS and it will be automatically recognized.

Boeing-Type CDU & RCDU

The CDU software's user interface settings are found in the CDU program itself through navigating through the menu and LSK keys. For effective operation of the CDU software you must perform the actions required in the Network and Boeing Glass Cockpit Section first.

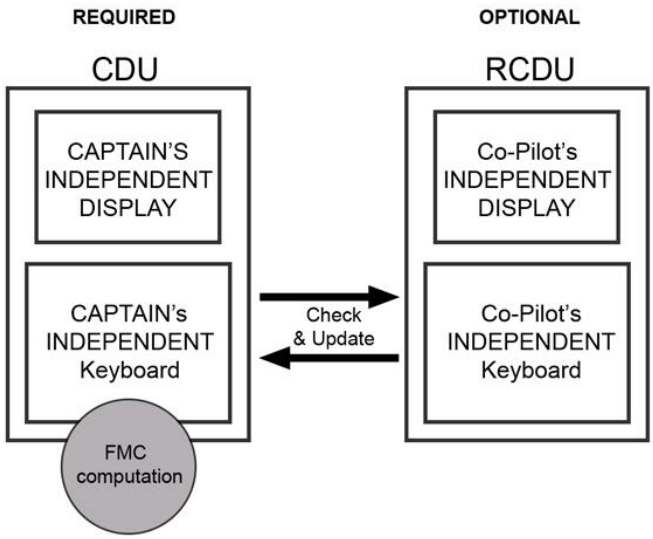
The following only describes specific program options available to you with regard to the CDU selectable User Interface. It is not a guide to the operation of the CDU in its role as a Flight Management Computer.

The Project Magenta CDU operates like its counterpart in the real aircraft. There are a number of user configurable options to make it simulate your particular aircraft type. It is assumed that as the CDU is not of any valued use without an ND display, you have performed the necessary tasks in the Network section and the Boeing Glass Cockpit of this Manual.

To re-cap:

- File Sharing and the NetDir subfolder of the CDU must be shared
- The Glass Cockpit pfd.ini file must be edited and the text entry Type=CDU must be set if using the CDU software.
- No CDU ERROR messages are appearing, NETDIR ERROR in the scratch pad or a FAIL light.

The CDU software effectively is the main Flight Management Computer in the Project Magenta Glass Cockpit System. We do not for simulation purposes at this time employ a redundant system. Within the extended First Officer Glass Cockpit license it is possible to run a Remote CDU (RCDU). The RCDU provides the First Officer with an independent display and input device (exactly like on the real a/c). It operates independently of the Main CDU, but as the Main CDU still performs the actual FMC computations, the Main CDU program must be running for the RCDU to function.



The RCDU is run on a separate client computer to the CDU. This is networked in the same fashion as the rest of the PM software.

The CDU software (and the RCDU) can be run as standalone CDU software solutions or in conjunction with CDU hardware. The only difference to the two types of operation is that with hardware you will need to run the CDU in full screen mode as you will no longer need to see the CDU Bitmap graphic. You can do this in two ways, one by editing the CDU ini file and also through the user menu by pressing the MENU key twice on the CDU graphic (as outlined in the "General" software section). You need to decide how you will use the CDU. For this section we will assume a pure software usage when discussing the user options.

Step 1 CDU connected

Make sure MSFS is running and the CDU is connected to it. No FAIL or ERROR messages are appearing. You have performed the actions in the NETWORK and GLASS COCKPIT sections of the manual.

Step 2 Setting Aircraft Type

When the CDU starts you will be presented with an IDENT page. This gives information about the current status. We will assume that MSFS is running and the Glass Cockpit is also running.

- Set the aircraft type by pressing the LSK next to the type of aircraft listed (top right of the CDU screen).
- From the list shown, select the type of aircraft you will be using (this should match the type you have already selected in MSFS)
- Once you have selected the aircraft type you do not need to do this again, unless you wish to fly a different type with different performance data





This in itself will set the specific performance data in the type txt reference file that is located in the CDU\Types folder of the Main CDU folder.

Step 3 Keyboard layout

Different aircraft have different Keyboard layouts. Despite having changed the aircraft type txt, you may also want to match a specific key layout for that aircrafts CDU keyboard. This can be changed in two ways. There is an automatic function and a manual function. The automatic function will load a typical keyboard layout for the aircraft type you have selected in the IDENT page every time you select a new one. The manual selection will mean that no change will take place until you manually edit the cdu.ini file. For the automatic function to work, you must first set it to auto and then re-select the aircraft type from the IDENT page.

Example:

Press the MENU key twice. This will bring up a special user menu of extra settings. These items are not normally seen on the aircraft by pilots. They would be used in a software maintenance situation and in a similar way we use them to set specific user options for the CDU software. Press the LSK key next to DISPLAY. Then select the LSK key next to the option KEY CONFIG. This will then switch to AUTO from MANUAL or vice versa.



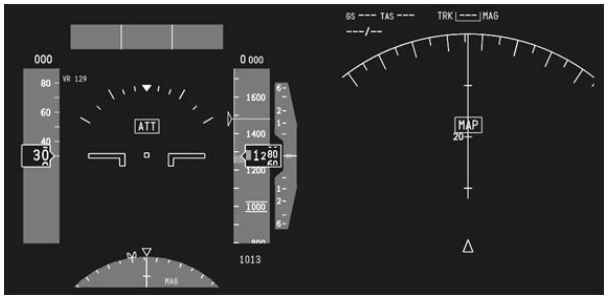






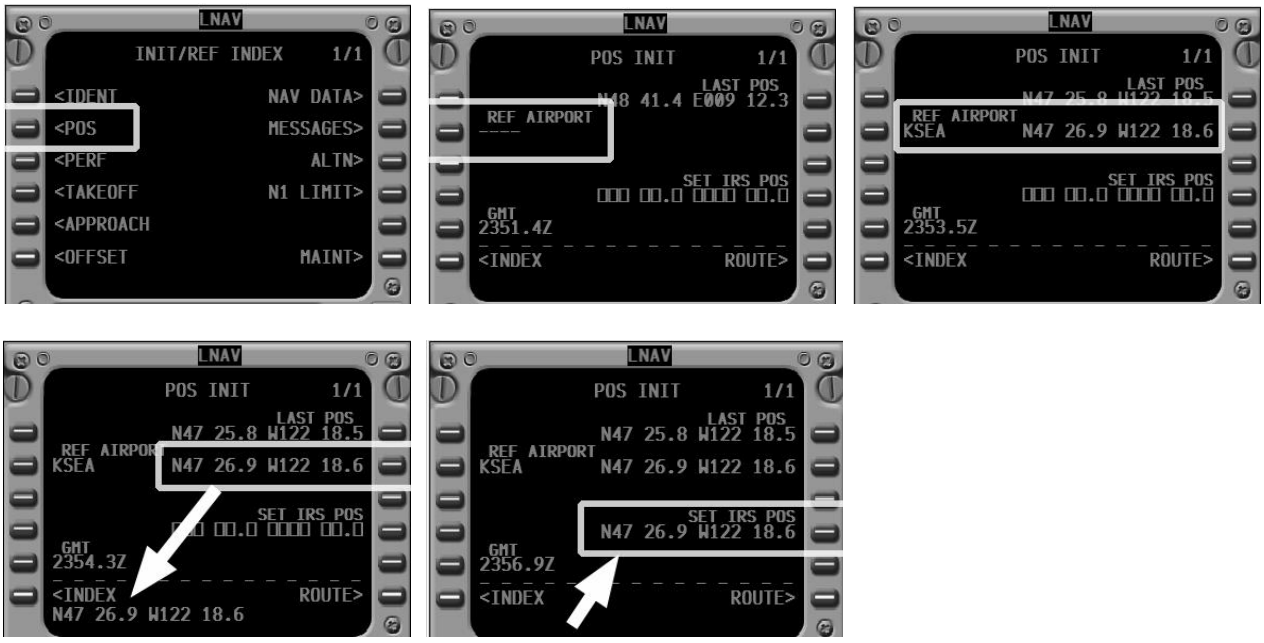
Navigate back to the IDENT page (INIT REF -> INDEX). Now re-select your aircraft type from the Ident LSK option. The CDU will be refreshed and the new keyboard layout will be shown. In this example the 747-400 CDU key layout has been generated. This is more than just a graphical adjustment. Some keys are different and will offer different navigation functions. If you are likely to switch between aircraft types often, you may wish to leave the above display option in AUTO. If you are using hardware with your CDU, and your hardware is unlikely to change then you should set the function to MANUAL again once you have the keyboard layout that you require for your specific layout. This will reduce the chances of a hardware / software keyboard mismatch in the future operation of the CDU.

Step 3 IRS Position



The CDU needs to know where it is in the world just like the CDU on the actual aircraft. If you do not set the CDU position then parts of the Glass Cockpit Displays will be blanked out from view with Amber warning flags ATT and MAP. This is a safety feature of the GC if a position uncertainty occurs whilst the aircraft is on the ground.

To set the CDU position, press the LSK key that is next to the INDEX option (bottom right). Then select the LSK opposite the POS option. Now the position page will appear.



You can either enter a specific airport code in the REF AIRPORT or you can press the LSK next to the REF AIRPORT line and the CDU will detect the current airport from MSFS. The LAT and LONG will appear opposite. Select the LSK to bring the new LAT and LONG into the Scratch Pad. Then press the LSK next to SET IRS POS and the new LAT and LONG will be taken into the IRS position and set. Now the CDU will have a fix and the Glass Cockpit display warning flag indicators ATT and MAP will disappear.

Step 4 Additional Settings CDU

The CDU has additional settings that can be selected from the settings page. The following are required to be set for your own preference. This only needs to be done once unless you decide to change these options at a later date.



- Auto Tune NAVS, this will tune the NAV radios automatically, this can be a ON / OFF selection
- FAF, the range of the Final Approach Fix can be entered here
- MIN AGL LNAV, the minimum altitude for LNAV engagement
- TIME, select either system or MSFS Zulu time
- MESSAGES, this will turn on or off messages that the FMC produces in the Scratch Pad
- QNH, select your preference
- FUEL, select your preference
- PREFLIGHT, if set to on will require a full Pre-Flight Set-up of the CDU
- FLUSH, will flush all data from the CDU after the aircraft has landed or upon each re-start of the CDU.

The CDU is now in a basic configuration for use.

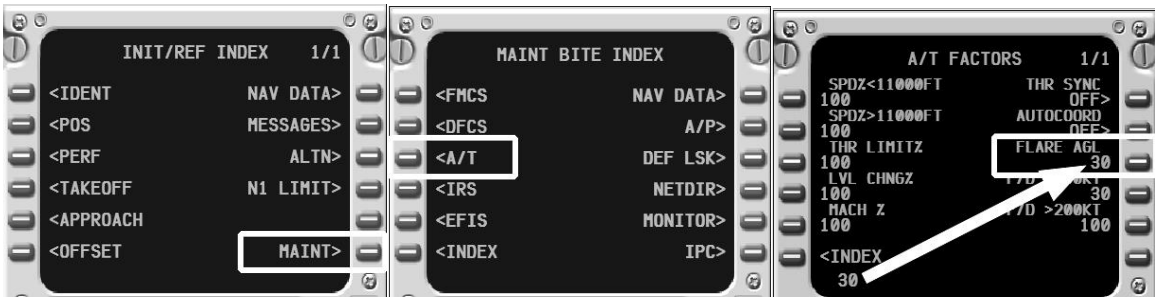
Other user settings that can be select are self explanatory:

- NAV/COM/XPDR, you can enter radio frequencies
- EFIS selectors can alter GC displays via the CDU
- SPD PROTECT, artificial simulated flap and speed protection
- EXTRAS, simulator rate and freeze modes

If you require to reset or gather information about your current NETDIR status, this can be done by going to the INDEX page of the CDU, and selecting MAINT. Then select the NETDIR option.

Step 5 Flare Altitude CDU

If running the CDU the flare altitude must be set. If you do not change a/c types then this only needs to be set once. The flare altitude will determine at what point on an Auto Land the aircraft will start the Flare. The flare altitude will probably be set at 30 by default; you may want to change this value depending on what a/c type you are using.



From the INDEX page select MAINT. From this page select the LSK for A/T. In the A/T page if you want to assign a new flare value, enter it into the scratch pad, and then enter this value by pressing the LSK next to the FLARE AGL setting. The new value will be added.

CDU.INI settings

Update: Please check the CDU.INI file for updated information.

There are various items you can customize both within the program and in the program's Initialization file, CDU.INI; here are some samples of the settings which can be made.

[DISPLAY]	
Title=On	Sets Title Bar Display on Startup On/Off (see Alt-W key below)
WindowName=COMPUTER1	Interesting for EPIC programmers who want to send Keyboard Commands to a specific window...
TopMost=Off	Changing this option to **Topmost=On** will force the system to keep the CDU as the topmost window. You can switch to other tasks, such as FS (if it is running on the same system), but they won't be visible if the PFD is running full screen, or the PFD will "hide" programs behind it. This command can be used when you want to set the focus to another program or when you are running the PFD in a windowed mode and you want to have it always on top. As an example, you can start the simulator, minimize it, and run the PFD maximized and then press Alt-Tab and select the simulator again.You can now run the sim, but the PFD stays on top. You now have a pure IFR simulator.
FSWindow=Off	When you set **FSWindow=On** the CDU Cockpit will look for the Flight Simulator and become part of that window, i.e. it is maximized and minimized together with FS. This is only interesting for One PC operation.
FSFocus=Off	When you use **FSWindow=On** you can force the focus back to FS every time you have clicked on a key within the CDU.
[Network]	
DisableAutoNetDir=	=On disables the automatic creation of the NetDir= entry by the CDU, when it is enabled, you can allow the CDU to force the NetDir onto the other programs by going to the INIT REF : MAINT : NETDIR menu.
NetDir=	Network directory that will be used for the *exchange of files between the PFD/ND, the MCP and the CDU*. Entries could be **NetDir=E:\Data** **NetDir=\\SERVER1\C**, please check the correct path on your system.
SBPPath=	Here you can define a location for your SBP files (SquawkBox flight plans) anywhere on your network or locally. This is for those who use flight planning programs, SBP is a very popular export format.
[Flight]	

LimitMCPSpeed=	Limits the speed that can be selected on the MCP depending on the current flap limiting speeds
AutoFlapRetract=	Automatically retracts flaps according to the flap limiting speeds
AutoFlapExtract=	Automatically extracts flaps according to the flap limiting speeds
[User]	
Serial=0	Sets the communication port if you have hardware which can connect serially to the CDU software.
Font=Arial	Allows you to set the Font used in the CDU. Please note that some fonts may produce strange effects. These will be compensated wherever possible. The default Font is Arial.
FontBold=Off	Sets the font display to normal or bold.
FontFactor=1	Allows you to set the font factor, where the entry 1.2 would be 20% larger font
Text=Default	The CDU can display color text, pure green text or pure white text. To change it set **Text=green** or **Text=White**
Full=Off	Enables full-screen (keyboard-less) CDU display. This is interesting for cockpit builders who have special hardware for the CDU.
InvertFull=Off	Allows you to invert the colors on the full text display. I.e. if you set the Text=Green option, the text will be displayed Black on a Green background.
Log=Off	Enables logging of the route calculation to be made. Slows down operation of the CDU considerably and should only be used for tests. Please keep this option off.
Preflight=Off	When set to On the PERF and TAKEOFF pages are reset, requiring manual entry of weights etc. This option will re-set those values every time the CDU is re-started
Flush=Off	When set to On, the current route is deleted every time you start up the CDU.
Messages=On	Disables the display of messages (Off) in the scratch pad. You have to go to INIT/REF MESSAGES to read them.
KeyboardLights=Off	With this option enabled, when the EXEC light is on then the keyboard CAPS LOCK light comes on, if the MSG light is on then SCROLL LOCK comes on.
Keylayout=NR	Defines the layout of the CDU keys, where NR is NAV/RAD, N1 is N1 LIMIT, DI is DIR/INT... these options can be set in the MENU DISPLAY menu as well.

Case=Brown	Defines the colour of the CDU case, it can be brown or gray

Keyboard Commands CDU

This is the set of keyboard commands for the CDU:

Alt-W	Toggles Title Bar
Alt-Q	Exits Program
A-Z	Corresponds to A-Z on the CDU keyboard
1-0, ., /, +/-	Corresponds to the same keys on the CDU keyboard
F1-F6	LSK (line selection key) 1L to LSK 6L
F7-F12	LSK (line selection key) 1R to LSK 6R
Ctrl-F1	INIT/REF key (1st key top row)
Ctrl-F2	RTE key (2nd key top row)
Ctrl-F3	CLB key (depending on key configuration this can also be DEP/ARR)
Ctrl-F4	CRZ key (ALTN 777 or ATC 747)
Ctrl-F5	DES key (VNAV 777 and 747)
Ctrl-F6	MENU key (1st key second row, also FIX 777 747)
Ctrl-F7	LEGS key
Ctrl-F8	DEP ARR key (HOLD 777 747)
Ctrl-F9	HOLD key (FMC COMM 777 747)
Ctrl-F10	PROG key
Ctrl-F11	N1LIMIT (NAV RAD or MENU 777 747) key
Ctrl-F12	FIX key (NAV RAD 777 747)
PgUp	PREV key
PgDn	NEXT key
Delete	DEL key
Backspace	CLR key

Enter (CR)	EXEC key
Ctrl-R	Resize CDU to default
Ctrl-L	Toggles LNAV On/Off (only available when the MCP isn't running)
Ctrl-A	Toggles FS A/P (only available when the MCP isn't running)
Ctrl-Shift-L, Alt-L	Discreet LNAV switch... Ctrl-Shift-L LNAV On, Alt-L LNAV Off (only available when the MCP isn't running)
Ctrl-X, Ctrl-Z	Brightness Increase/Decrease

Flight Plan Display CDU

When you are not using the CDU/FMS, you can use SBP files (based on the Joe Jureckas SquawkBox Flight Plan Format) to display your active route in the Navigation Display's MAP, MAP CTR and PLAN modes.

It can also automatically read any **FS Flight Plan** once it has been saved. The last saved flight plan will then be displayed in the ND. For this, you have to share your FS Flight Plan folder (normally in your Documents folder) for read/write access as FSPLANS and it will be recognized. To load them into the CDU, press the RTE key twice and select FS Flight Plan

Navaid Database CDU

The CDU includes a world-wide database of navaids, fixes, airports, departures and arrivals. This database has not been extracted from the Flight Simulator database. Some discrepancies are possible.

If you want to add your own data to the database, please edit USERDATA.TXT which you will find in your CDU folder.

You can also find the latest navdata updates on www.projectmagenta.com/navdata.html

Boeing-Type MCP

The Boeing MCP can be run on your system connected to specific MCP hardware and can then reside minimized as a background process, or it can run as a point and click device using the software graphic. If you are intending to run the MCP connected to hardware, you need to set the hardware connection via the mcp.ini file in the main MCP program folder. Please look at the mcp.ini file to see if your hardware is supported or contact Project Magenta for further information about specific connections.

The Boeing MCP currently covers the following aircraft types:

- Boeing 737-600/700/800
- Boeing 777-xxx
- Boeing 747-400



By pressing the ESC key whilst the MCP is the active program, a user Menu of basic options will appear. This includes MCP type and some basic specific mode options. There are other options in the MCP.ini file which is self documenting.

To alter the size of the MCP graphic simply drag at the sides or corners with the mouse. There is an option in the user interface to reset the size or press CTRL R.

Generally, the Glass Cockpit is designed to run as a whole system with every element of the PM software running. For accurate Autoland the AP needs to know the specific Flare altitude. Normally, this is defined by the CDU program if it is running. If it is not going to be used, then you must define your Flare Altitude in the mcp.ini file. Note that if you run the CDU at a later date what is set in the CDU will become valid data. (See CDU section for setting the Flare Altitude).

To set the Flare Altitude in the MCP.ini (if you are not using the CDU software) edit height above ground you wish the AP to commence the flare on an AutoLand (any value, 20, 30, 35, 40 ,52 etc):

Flare=40

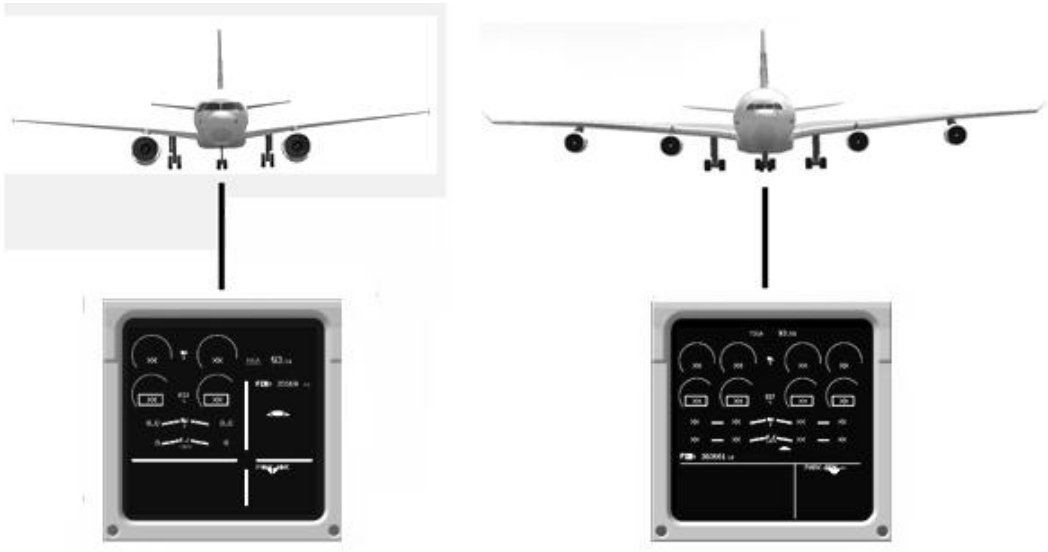
There are many self documenting other settings in the MCP.ini file which can be set by the user if required.

Airbus-Type Glass Cockpit

The Glass Cockpit set-up with regard to positioning and sizing has already been discussed in the GENERAL section of this document; this is the same system as for Boeing and Airbus software. Here, we will discuss a little bit about how the Glass Cockpit functions and what further options are selectable by you and what you must set in order for the Glass Cockpit to function properly.

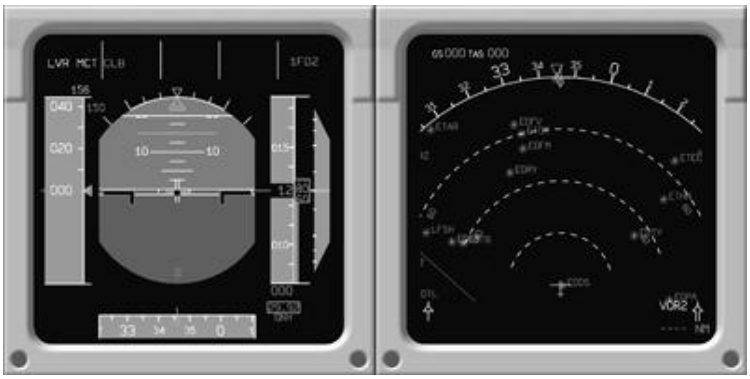
Step 1, Aircraft Type

The Glass Cockpit will detect from MSFS the number of engines your specific flight Model has. This will automatically change the engine display on the upper ECAM to the number of engines the flight model has. But the Glass Cockpit still needs more information from you which will be discussed shortly.



The number of engines is shown on the ECAM display.

Apart from detecting the number of Engines your aircraft has the Airbus Glass Cockpit also needs to know a great deal of other parameters. These are generated through text files developed by Project Magenta and feed the GC with further data. These files are associated by aircraft type. Because the Glass Cockpit is sometimes run without the MCDU, there are two ways of setting the specific aircraft type so that the Glass Cockpit knows the various performance characteristics and FMA modes to display.



Step 2, Aircraft Type Selection

Method A – NO MCDU SOFTWARE

You will need to open the Glass Cockpit ini file (abpfd.ini) located in the main program folder (ABGC). Open this file with Notepad.

Find the following entry:

AircraftType=

As you are not running the MCDU software (in this example) you must specify the aircraft type you want to fly here. In the Glass Cockpit folder are a number of aircraft type files. For example A320.txt. The files are all in a plain text format and thus have the aircraft type followed by the file extension .txt. You can also download more of these files from the Updates section of the PM website.

If you wanted to fly the A320 in the above example you would enter the name of that txt file, without the .TXT extension.

Type=A320

The Glass Cockpit is now set to read the information in the aircraft specific text file.

Method B – WITH MCDU SOFTWARE

If you have the MCDU software as part of your Project Magenta system (highly advisable) then the above entry must be set as follows in the ABGC ini file:

Type=CDU
AircraftType=
(the above entry is intentionally left blank)

This forces the Glass Cockpit not to read aircraft txt files in its own local directory but from the MCDU programs "types" subfolder. This has one main advantage, from the MCDU program you can select your

aircraft type automatically and very quickly without having to manually edit each Glass Cockpit ini file on your system.

If you are running the MCDU software in combination with the GC, select the LSK next to the aircraft Type on the IDENT page. Press the MENU button and then select IDENT. The aircraft types that are stored in your "Types" subdirectory in the Main MCDU program folder are shown as selectable options. Once selected, the new type will be shown on the Ident page.

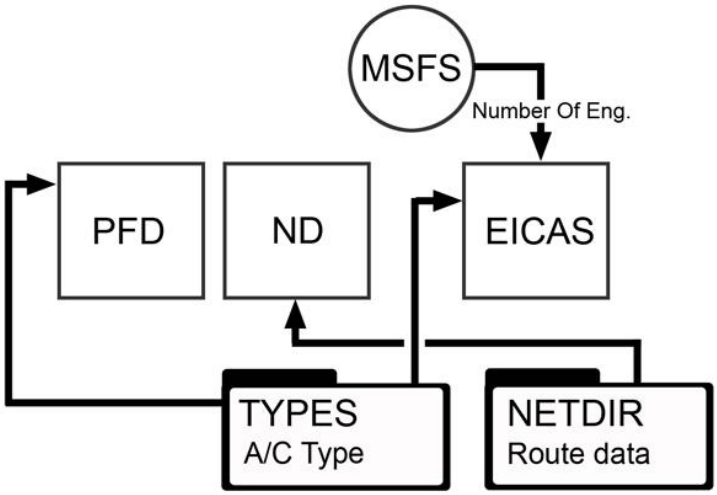






Please note: it is not a good idea to select an A340 type txt file when you only have an A320 or two engine flight model connected to MSFS. For obvious reasons you should match the type file to the type of aircraft you intend to fly in MSFS.

The diagram illustrates the data exchange between the MCDU program subfolders and the Glass Cockpit.

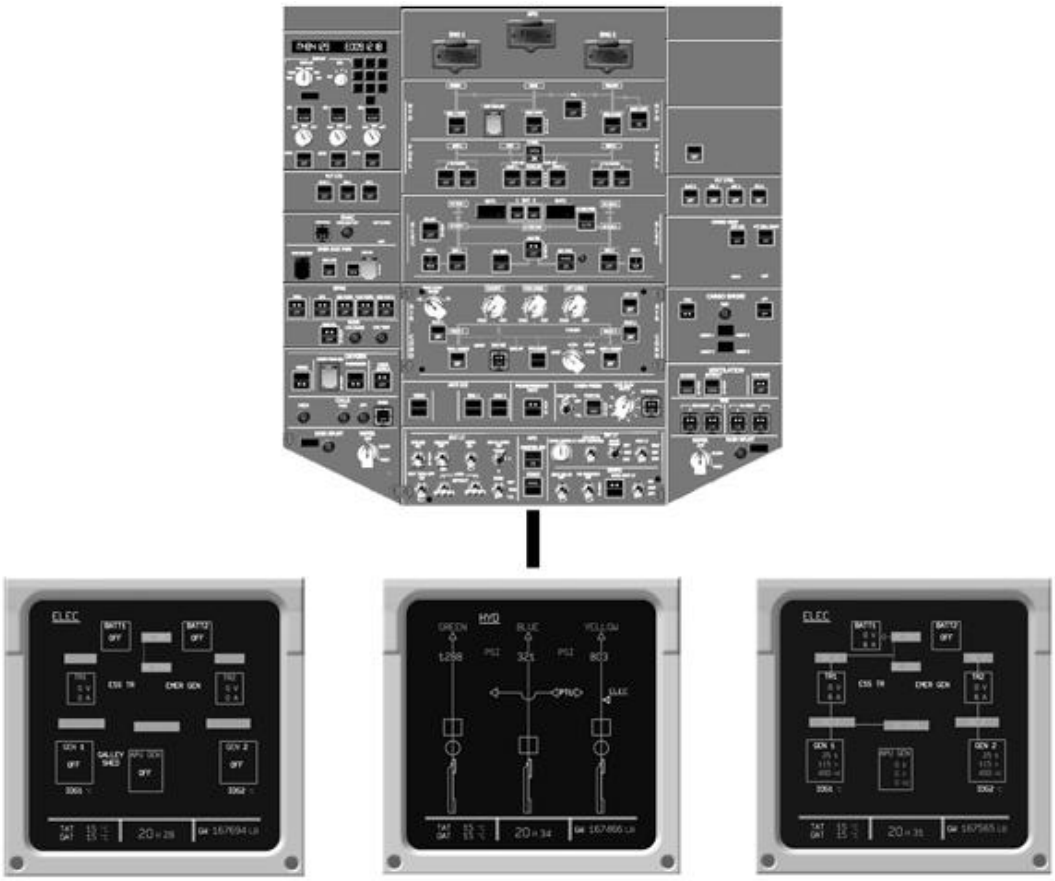


The Glass Cockpit also needs to know whether it is operating as a Captains Display or a Co-Pilots display. This is selected under the user options in the ESC menu. Note that the Co-pilots display requires a special second ABGC license. If you selected without registering it, the Glass Cockpit will run into communication conflicts on the ND display modes amongst other things.

The Airbus Glass Cockpit follows the same general software concept rules all the Project Magenta Glass Cockpit software. The ESC key is used as the main user interface menu to switch and select various options.

Airbus systems

On the Airbus, the lower ECAM is used to display the status of a/c systems. The data is generated only by pmSystems. The pmSystems software must be running and connected to your network before the extra systems data will be displayed on the lower ECAM.



Airbus-Type MCDU

The MCDU software's user interface settings are found in the MCDU program itself through navigating through the menu and LSK keys. For effective operation of the MCDU software you must perform the actions required in the Network and Boeing/Airbus Glass Cockpit Section first.

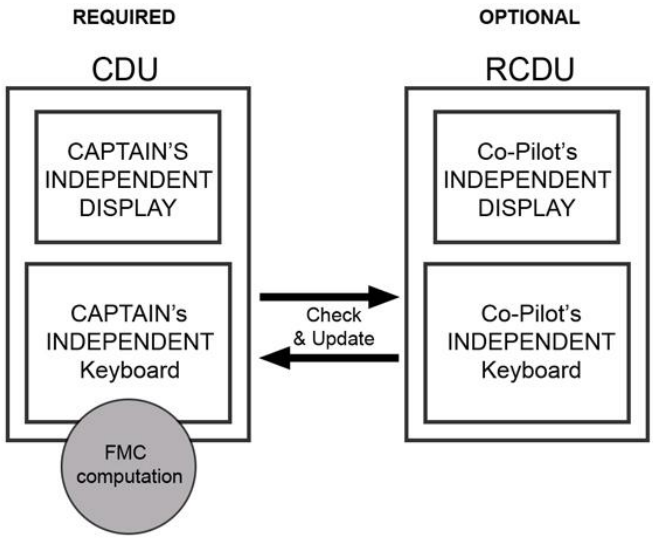
The following only describes specific program options available to you with regard to the MCDU selectable User Interface. It is not a guide to the operation of the MCDU in its role as a Flight Management Computer.

The Project Magenta MCDU operates like its counterpart in the real aircraft. There are a number of user configurable options to make it simulate your particular aircraft type. It is assumed that as the MCDU is not of any valued use without an ND display, you have performed the necessary tasks in the Network section and the Airbus / Boeing Glass Cockpit of this Manual.

To re-cap:

- File Sharing and the NetDir subfolder of the MCDU must be shared
- The Glass Cockpit abpfd.ini file must be edited and the text entry Type=CDU must be set if using the MCDU software.
- No MCDU ERROR messages are appearing, NETDIR ERROR in the scratch pad or a FAIL light.

The MCDU software effectively is the main Flight Management Computer in the Project Magenta Glass Cockpit System. We do not for simulation purposes at this time employ a redundant system. Within the extended First Officer Glass Cockpit license it is possible to run a Remote MCDU (RMCDU). The RMCDU provides the First Officer with an independent display and input device (exactly like on the real a/c). It operates independently of the Main MCDU, but as the Main MCDU still performs the actual FMC computations, the Main MCDU program must be running for the RMCDU to function.



The RMCDU is run on a separate client computer to the MCDU. This is networked in the same fashion as the rest of the PM software.

The MCDU software (and the RMCDU) can be run as standalone MCDU software solutions or in conjunction with MCDU hardware. The only difference to the two types of operation is that with hardware you will need to run the MCDU in full screen mode as you will no longer need to see the MCDU Bitmap graphic. You can do this in two ways, one by editing the MCDU ini file and also through the user menu by pressing the MENU key twice on the MCDU graphic (as outlined in the "General" software section). You need to decide how you will use the MCDU. For this section we will assume a pure software usage when discussing the user options.

Step 1 MCDU connected

Make sure MSFS is running and the MCDU is connected to it. No FAIL or ERROR messages are appearing. You have performed the actions in the NETWORK and GLASS COCKPIT sections of the manual.

Step 2 Airbus Setting Aircraft Type

When the MCDU starts it will default to the MCDU start page.

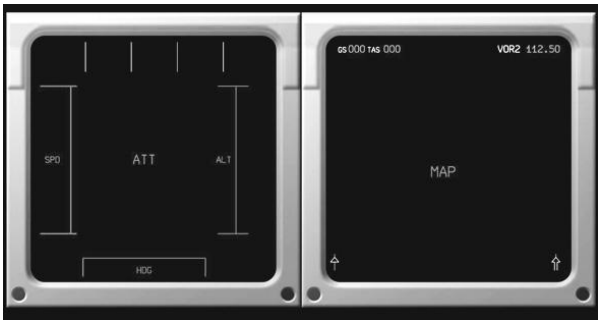
- Set the aircraft type by pressing the LSK next to the MODEL SELECT
- From the list shown, select the type of aircraft you will be using (this should match the type you have already selected in MSFS)
- Once you have selected the aircraft type you do not need to do this again, unless you wish to fly a different type with different performance data





This in itself will set the specific performance data in the type txt reference file that is located in the MCDU\Types folder of the Main MCDU folder.

Step 3 Airbus MCDU IRS Position



The MCDU needs to know where it is in the world just like the MCDU on the actual aircraft. If you do not set the MCDU position then parts of the Glass Cockpit Displays will be blanked out from view with Amber warning flags ATT and MAP.

To set the MCDU position, press the LSK key that is next to the INDEX option (bottom right). Then select the LSK opposite the POS option. Now the position page will appear.



Press the LSK next to the ALIGN IRS and this will set the IRS position and the ABGC displays will display normally.

Step 4 Airbus Additional Settings

The MCDU has additional settings that can be selected from the settings page. The following are required to be set for your own preference. This only needs to be done once unless you decide to change these options at a later date. Press the MENU key twice, and then select the SETTINGS LSK



- Auto Tune NAVS, this will tune the NAV radios automatically, this can be a ON / OFF selection
- FAF, the range of the Final Approach Fix can be entered here
- MIN AGL LNAV, the minimum altitude for LNAV engagement
- TIME, select either system or MSFS Zulu time
- QNH, select your preference
- FUEL, select your preference
- Autobrakes – enables you to set AB from MCDU
- PREFLIGHT, if set to on will require a full Pre-Flight Set-up of the MCDU
- FLUSH, will flush all data from the MCDU after the aircraft has landed or upon each re-start of the MCDU.

The MCDU is now in a basic configuration for use.

Other user settings that can be select are self explanatory:

- NAV/COM/XPDR, you can enter radio frequencies
- EFIS selectors can alter GC displays via the MCDU
- SPD PROTECT, artificial simulated flap and speed protection
- EXTRAS, simulator rate and freeze modes

If you require resetting or gathering information about your current NETDIR status, this can be done by going to the INDEX page of the MCDU, and selecting MAINT. Then select the NETDIR option.

Step 5 Airbus MCDU Flare Altitude

If running the MCDU the flare altitude must be set. If you do not change a/c types then this only needs to be set once. The flare altitude will determine at what point on an Auto Land the aircraft will start the Flare. The flare altitude will probably be set at 30 by default; you may want to change this value depending on what a/c type you are using. The flare altitude can be set by entering a new value in the MCDU ini file.

Airbus-Type FCU

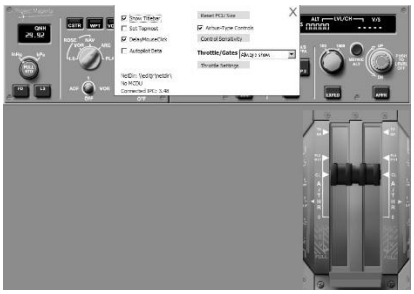
The Airbus FCU can be run on your system connected to specific FCU hardware and can then reside minimized as a background process, or it can run as a point and click device using the software graphic. If you are intending to run the FCU connected to hardware, you need to set the hardware connection via the FCU.ini file in the main FCU program folder. Please look at the FCU.ini file to see if your hardware is supported or contact Project Magenta for further information about specific connections.

The Airbus FCU currently covers the following aircraft types:

- A319
- A320
- A321
- A330
- A340

By pressing the ESC key whilst the FCU is the active program, a user Menu of basic options will appear. This includes FCU type and some basic specific mode options. There are other options in the FCU.ini file which is self documenting.





To alter the size of the FCU graphic simply drag at the sides or corners with the mouse. There is an option in the user interface to reset the size or press CTRL R.

Generally, the Glass Cockpit is designed to run as a whole system with every element of the PM software running. For accurate Autoland the AP needs to know the specific Flare altitude. Normally, this is defined by the MCDU program if it is running. If it is not going to be used, then you must define your Flare Altitude in the FCU.ini file. Note that if you run the MCDU at a later date what is set in the MCDU will become valid data. (See the MCDU section for setting the Flare Altitude).

To set the Flare Altitude in the FCU.ini (if you are not using the MCDU software) edit height above ground you wish the AP to commence the flare on an AutoLand (any value, 20, 30, 35, 40, and 52 etc):

Flare=40

There are many self documenting other settings in the FCU.ini file which can be set by the user if required.

pmSystems

Typical System Requirements

- Any modern Windows PC will do
- Fully compliant OpenGL graphics card, 32 bit colour depth
- WideFS and FSUIPC (full version / Registered)
- Windows Operating System
- MSFS
- Flight Model of your choosing with default MSFS panels

PmSystems Introduction

pmSystems can simulate the complex system logics found in heavy transport aircraft. It can be used both as a pure software interface and / or to provide logics for custom hardware.

Switch positions, indicator lights, are given offsets (and variable names) to give users full flexibility when implementing their hardware requirements. It is also fully expandable and almost anything within the systems can be defined by users themselves.

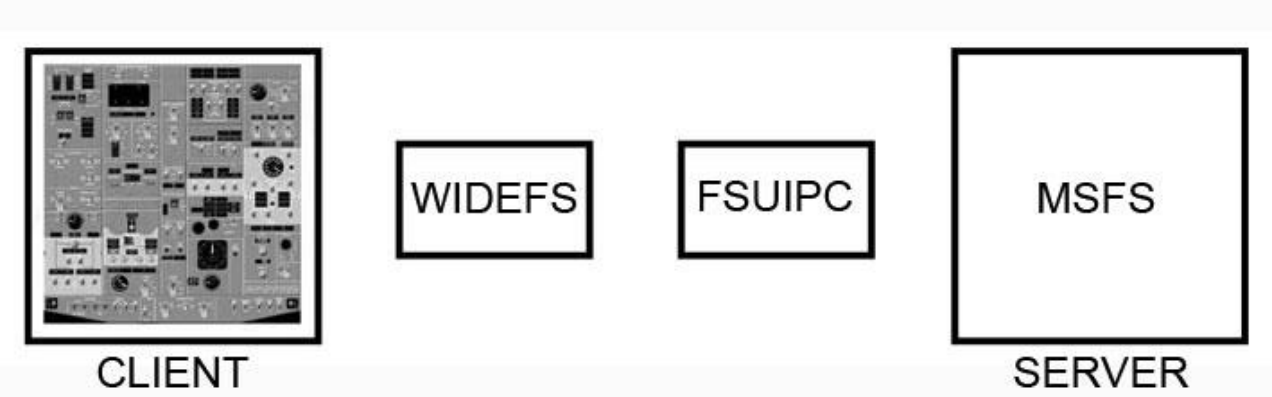
Offsets and variables are listed within the system file sysvar.txt in the main program folder and will allow users to connect and control their own hardware with the appropriate I/O board.

It is important to understand that pmSystems becomes the central interface for control of what aircraft systems there are in FS and not FS itself. Once pmSystems is in the loop you must use it as your central interface to start engines etc and your hardware must be talking directly to pmsystems (if you are using hardware). Otherwise unpredictable results may occur even though pmSystems will try to interpret what MSFS has been set to.

pmSystems requires a reasonably fast PC. Any modern multi-core PC should be adequate. Full openGL compliance is very important. A system with a graphics card that is not fully compliant can effect the processor timing for critical computations inside pmSystems. If you notice slow response times to switches / inputs and outputs, it is likely that either the system is running too slow or you have a problem with your graphics card / drivers.

pmSystems uses FSUIPC to communicate with MSFS. If running pmSystems on a client PC (advisable) then WideFS will also be required. These are two independent programs written by Peter Dowson and full registered versions must be used to run pmSystems. You must also read the documentation for both WideFS set-up and FSUIPC thoroughly if you are not familiar with this software. Please read the FSUIPC, WideFS and also the FSUIPC SDK.

Step 1. pmSystems INSTALL



Install pmSystems on a client PC and run it for the first time. Send in the registration code to Project Magenta and an unlock code will be sent to you. Always send to register@projectmagenta.com to ensure fastest response time to your code requests.

Step 2. pmSystems Check Connections

Once registered, make sure it is connected to MSFS using Peter Dowson's WideFS and FSUIPC. (see GC set-up sections of this manual for WideFS set-up and/or Peter Dowson's documentation). pmSystems needs to be connected to MSFS for it to work.

Step 3. pmSystems Program Options

Upon first boot-up, the default 737 a/c overhead systems panel will appear full screen showing the entire panel. Depending on how good your graphics card driver is, there are a number of options by pressing the ESC key that you can change. Pressing the ESC brings up the user menu.



Select system File - Aircraft type Panel

Development Mode – Use this advanced mode for setting hardware, programming logics and adjusting panel layouts (you need to develop your own knowledge in this area, this is advanced usage of pmsystems, contact Project Magenta support for further information.)

Font Quality - Sets to a High or Lower value

Font Smoothing via Polygons – ON/OFF (Some graphics cards may require that this setting is OFF)

Bitmap Smoothing - ON/OFF (Some graphics cards may require that this setting is OFF)

Smooth Scrolling ON / OFF - Scroll Smooth simply makes the scrolling action smooth rather than in steps when panning and zooming into the panel.

Enable Keyboard Handling – Enables the use of a keyboard or Keyboard Encoder for certain types of application (for example the IRS SET position keyboard on the Aft overhead of the 737 panel)

Slave Mode - Allows you to run x2 copies of PMsystems, one as a master and one as a slave – perhaps for an instructor. Normally this should be set OFF if there is no Master running otherwise in slave mode it will not communicate with MSFS.

Cycle Time - Various program timing options to set the timing of processing logics and cycle times of hardware.

Phidgets Menu – Enables direct setting and set-up of Phidget Controller cards. For all functions you need to be in development mode.

Flight Illusion – Enables direct communication and set-up of Flight Illusion overhead panel gauges.

The Menu functions of the panel will be updated, these are the basic functions. More functions may be added. For example, when connecting specific I/O card hardware you might find options under the Hardware menu and further sub options to select and assign specific hardware.

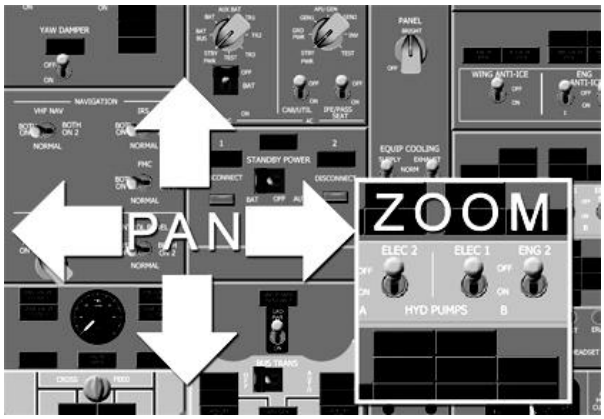
Start Dark Cold – Forces pmsystems to set everything to a cold dark systems cockpit state. If hardware is connected, pmsystem (depending on which type of hardware) will attempt to poll the switch states. The Start Cold Dark option should not be used if you are using hardware as input devices.

Pm systems General

To exit the Menu either press ESC again or select the EXIT txt with the mouse

To exit the program press the "Q" key.

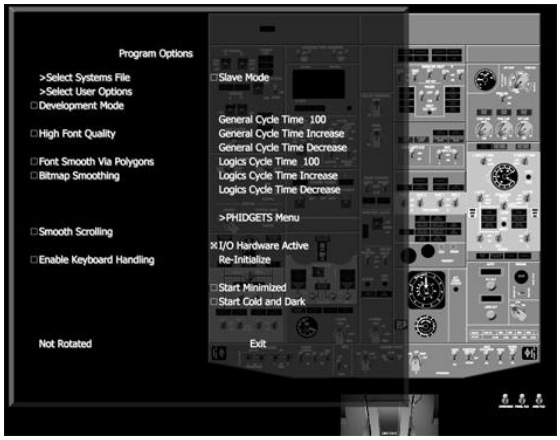
pmSystems Navigating around the panel

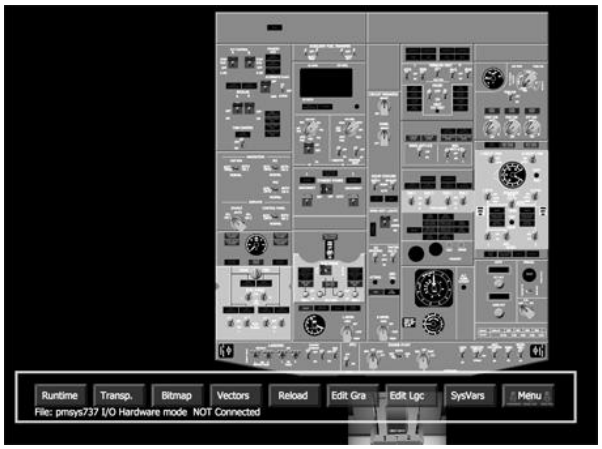


You can zoom into areas of the panel by pressing the + - keys on the numeric keypad. You can scroll across it by either using your RIGHT CLICK & hold your mouse or by the arrow keys.

PMsystems is designed to be used both as a software point and click interface and also to be connected to custom overhead / simulator hardware. It performs both types of operation. For now we are treating pmSystems as a pure software interface with MSFS to get us started. If you did have dedicated hardware connected and running, the primary goal of pmSystems would be to provide the logics, and be a visual reference when testing those logics against your hardware. Once your hardware was up and running, pmSystems could reside on the network as a background program, or perhaps as part of information available to an instructor in training scenarios on a client PC.

pmSystems Runtime & Development Mode





From the user option Menu, by selecting Development Mode, enables a sub menu at the bottom of the pmsystems screen. In development you can call up text menus and directly edit System Logics, assign I/O hardware to specific variable names in pmsystems.

pmSystems Finding Variable Names

Select Show Variable Name from the user interface. The mouse pointer over a specific switch or output and the name of the variable together with the offset and value will be shown.



Variable names are stored in a file within the main pmSystems folder. Sysvar.txt. You can use these names to set specific functions for your hardware.

Runtime Mode

This would be the normal mode of operation in your simulator environment. When pmSystems starts it will load the aircraft configuration file selected in the Menu and begin processing the logics loop.

Keyboard Commands / Mouse

[Esc]	Activates Menu
[Q]	Exit/Quit Program
[I]	Run Variable Initialization (i.e. initialize variables as defined in the configuration file)
[F1 - F6]	Select View (saves upon exit)
[+] and [-]	Zoom in and Out
[Cursor Keys]	Move Image (Ctrl accelerates)
[Right-Click] [Move]	Pans/Moves image
[Left-Click]	Activate switch/button
[MouseWheel]	Zoom

Menu Options

The menu allows you to set the **aircraft configuration file**, the running mode (**Runtime/Development**), the graphics options and the cycle speed of the application.

An important option is **Slave Mode** On/Off. This allows you to run multiple copies of pmSystems over a network, one always has to be set to Slave Mode Off, otherwise the variables will not be processed. If you are running only one copy of pmSystems, the Slave mode should be OFF (i.e. Master Mode). The second, third or any other instance of pmSystems should have this mode set to On. If you have more than one set to Master mode, then there will be conflicts in the handling of the variables and the switches.

Re-Initialize resets the variables to the states described in the INIT section of the configuration file.

Development Mode

This mode would be used to make changes to the currently selected aircraft configuration file.

Important: when reporting a problem with the software, please make sure it is done when the original file is used, or report precisely which changes have been made to the configuration file so we can identify it.

Keyboard Commands

[Esc]	Activates Menu
[Q]	Exit/Quit Program
[I]	Run Variable Initialization (i.e. initialize variables as defined in the configuration file)
In Graphics Mode	
[Ctrl-F]	Find first instance of variable in the [elements] section.
[Ctrl-L]	Find first instance of variable in the [logics] section.
[Ctrl-C]	Copy Graphics Element
[Ctrl-V]	Paste Graphics Element
[Ctrl-X]	Cut Graphics Element

[Ctrl-B][Ctrl-V]	Slide/Move Graphics Element (preferred to Cut & Paste)
[Ctrl-D]	Change text (description)
[R]	Get "radius box" coordinates and place into clipboard (click - move - click)
[D]	Get box coordinates and place into clipboard (click - move - click)
[C]	Get current coordinates and place into clipboard
[Ctrl-X]	Cut Graphics Element
[Ctrl-D]	Change text (description)
[Ctrl-R]	Get "radius box" coordinates and place into clipboard
[Ctrl-A]	Analysis mode... generates a TXT file of the logics section and lists current variable values and the processing of the logics loop

Menu Options

The menu allows you to set the **aircraft configuration file**, the running mode (**Runtime/Development**), the graphics options and the cycle speed of the application.

An important option is **Slave Mode** On/Off. This allows you to run multiple copies of pmSystems over a network, one always has to be set to Slave Mode Off, otherwise the variables will not be processed. If you are running only one copy of pmSystems, the Slave mode should be OFF (i.e. Master Mode). The second, third or any other instance of pmSystems should have this mode set to On. If you have more than one set to Master mode, then there will be conflicts in the handling of the variables and the switches.

Re-Initialize resets the variables to the states described in the INIT section of the configuration file.

Configuration File Sections (General)

The configuration files are located in the main pmSystems Folder and need to have at least one txt file. The naming convention of the file is pmsys????.txt (e.g. pmsys320.txt)

In addition to that, the elements of the file can be split up into several files, the default files that come with pmSystems are pmsys????.txt (graphics base) and pmsys????.lgc (Logics)

You can also include user-defined files by adding the line:

include myfile.txt // this would load myfile.txt to define variables or add logics to the default files

[init]

initialization sequence with variable and offset values (this can be at the beginning of the file)

batt1 1
oilpress3 44

[bitmap]

definition of bitmap images in pmsystems.img

e.g.: bitmap [element name], [position], [x1, y1, x2, y2], [offsetx, offsety], [sizefactor]

[variables]

Any variable you wish to use in addition to those listed in SysVars.txt

e.g. offset variable_size variable_name [factor]

Also, there are system specific variables such as:

elapsed

- will return the number of seconds since the logics loop was called last time

iohardware

- will return true if IOHardware is selected in the Menu/Ini

random

- returns an ever changing value between 0 and 1000

mainpwr

- governs whether lights and light based outputs (like text boxes) are operative (can be based on battery switch position)

basepwr

- governs whether digital texts and gauges are operative (can be based on battery switch position)

[constants]

Any constant that needs to be defined

e.g. UpperLimitTemp 200

[elements]

definition of graphics elements, text, color settings etc.

text HELLO WORLD,-142.4,-170.6
linewidth 4
element tswitch2,-169.1,-161.1,LandLightLOut

[logics]

definition of logics, i.e. how variables react to offsets and user inputs

if batteryon and (batteryrunning < 100) then

batteryrunning = batteryrunning + 1

endif

[script]

user-defined scripts to display texts and movements of the screen

Section [init]

You can set the initialization of variables here.

The first set of variables are applied whenever pmSystems connects to FS, the ones in the Eng1, Eng2, Eng3, Eng4 sections are only applied if the particular engine is running.

[variable name] [value]

To add options that can be changed by the user (via the pmSystems Menu), you can also add the following command:

useroption *[variable name] [description]*

useroption HideSDPanel "Hides System Display Panel from the Overhead"

The On/Off variable HideSDPanel can now be used both in the [elements] and the [logics] section:

e.g.

```
[elements]
if not HideSDPanel
    //draw graphics here
else
    //do nothing
endif
```

The value of this variable is either 1 or 0 and is also reflected in the [logics] section. This allows you to make changes to the display and operation of the panel for various aircraft sub-types or whatever else you see necessary.

These *useroption* commands and values are stored in a pmsysXXXXX.ini file for each selected pmsysXXXXX.txt file.

Section [bitmaps]

pmSystems loads a file called pmsystems.img into memory and extracts the bitmap graphics for single elements or units from it. This part is not documented initially, but examples can be found inside the configuration files themselves.

bitmap [element name], [position], [x1, y1, x2, y2], [offsetx, offsety], [sizefactor]

The element name can be anything like Switch, MySwitch, SmallKnob.

Position defines the various positions the bitmaps reflect of one particular switch, starting from 0. I.e. if you have a knob with three positions, they have to be defined sequentially 0, 1, 2.

The x1,y1,x2,y2 coordinates are used to extract the image from the bitmap file.

The offsetx,offsety can be used to correct possible pixel imprecisions relative to the anchor point of the element.

sizefactor 1.0 for 1:1 size or 0.5 for half size

Section [variables] or [vars] and sysvar.txt

pmSystems can read and write various types of FSUIPC variables, both normal ones used by FS, special ones for pmSystems, and any variables used by other programs. To learn more about FSUIPC please go to www.schiratti.com/dowson.html and check the program itself as well as the FSUIPC SDK.

The [variables] section should be in the file before the variables are actually used in the logics or element section.

The variable names used within pmSystems can be sequences of alphanumeric characters, in one word. The variable offsets themselves are always understood as hex values, i.e. 0x1234.

Various types of variables can be defined. Single bytes, word, double words and bits.

Syntax:

[offset] [length] [variable_name] [factor]

3102 1 fsBattery
// the variable fsBattery is defined by offset 0x3102 and is one byte long... the value can be 0 to 255

04F4 2 pm4F4
// this would be an example for a WORD (2 bytes)

0808 4 fsYawDamper
// this defines a DWORD (4 bytes)

5600 .0 APUMasterFault
// 0x5600 to 0x56FF are internally reserved for pmSystems variables in this case a bit 0 of 0x5600
// bits would be defined .0 .1 .2 ... .7 and would always be 8 maximum... thus no bit 11
// the values are of course 0 and 1

Section [constants]

This section is used to define constants that can be used in the [logics] section.

The syntax is simply [constant_name]=[value]

E.g.:

[constants]
APUEGTLimit=560

[logics]

```
if (APUEGT > APUEGTLimit)
    APUEGTLimitLight = 1
else
    APUEGTLimitLight = 0
endif
```

Or, of course:

```
[logics]
APUEGTLimitLight = (APUEGT > APUEGTLimit)
```

Section [elements]

pmSystems itself is not aircraft type-specific. All the graphics and buttons and switches are defined inside the aircraft configuration files, with the exception of some very particular gauges.

In development mode, you can press Ctrl-F and the element closest to the mouse pointer is highlighted in the configuration file... a text editor will then pop up and show it to you.

section mySection
this is a section name that will later be used for bookmarking or fast access

colour RedComponent, GreenComponent, BlueComponent
colour255 60,113,143
definition of a colour via Red/Green/Blue with values from 0 to 255 (thus white is 255, 255, 255)
(in addition to that, predefined values are there such as colNGnorm, col747 etc.)

white (or red, green, blue, black, orange etc.)
defines the current colour used for simple graphics elements and texts

text String, X, Y, [FontSize]
text hello world, 333, 23.6
will write "hello world" on the coordinates X=333 and Y=23.6

vtext hello world, 333, 23.6, 2, 2.2
will write "hello world" vertically on the coordinates X=333 and Y=23.6 (with corrected spacing of 2 vertical and 2.2 central)... difficult to explain, just try it.

line X1, Y1, X2, Y2
line 10, 20, -44.5, 33
will draw a line from (10,20) to (-44,33)

moveto 10, 20
lineto -44.5, 33
lineto 44.5, 12
will draw a line from (10,20) to (-44,33) and then on to (44.5,12)

box X1, Y1, X2, Y2
box 10, 20, -44.5, 33
rect X1, Y1, X2, Y2
rect 10, 20, -44.5, 33
will draw a box (outline) or rectangle (filled) from (10,20) to (-44,33) ... the sequence of the coordinates is irrelevant

panelbox X1, Y1, X2, Y2
panelbox -122.0,137.0,71.0,53.0
this will draw a box with a light 3D effect, used for overhead panels, they need a colour command before them or the box will be transparent white.

multibutton UpperText, LowerText, X, Y, SizeFactor, Colour, Variable1, Variable2
multibutton ON@,OFF,107.4,-121.1,1.1,wo,Eng1Bleed,Eng1BleedFault

this will draw a "multibutton", i.e. a button with an upper and lower lighting display
the upper shows ON with a circle around it, OFF in the lower. X and Y
colours are o = orange, w = white, g = green, b = blue etc.

multibuttonupper
will have the button push activate the upper variable of the multibutton

multibuttonlower
will have the button push activate the lower variable of the multibutton

textlightbox Text, X, Y, TextFactor, Colour, VariableName, XSize, YSize
textlightbox PRESS,-199.0,-87.8,.8,o,HydEng1Press,8,4

gauge [variable],[x],[y],[radius],[min],[max],[degreestart],[degreeend],[text],[displayvalue]

Section [logics]

Here we do a lot of the background work that makes the elements change state. The language to describe the logical connections between variables is similar to what you would expect in BASIC, and the boolean commands should be easily accessible as well.

Equations:

variable_a = variable_b
variable_a = variable_b + variable_c
variable_a = (variable_b or variable_c) and variable_d
variable_a = variable_b <> variable_c
variable_a = (variable_b < variable_c) and variable_d

Time delayed equations: (sometimes things happen with a slight delay)...

variable_a = variable_b [2]
// this means that the value of variable_b is assigned to the value
// of variable_a 2 (two) seconds after variable_b changed

Conditions:

```
if (variable_a or variable_b)
      variable_c = variable_b and 1
else
      variable_c = 0
endif
```

// you can also use *if ... then*, the *then* is simply ignored

```
if (StartSelect = 2) and (bleed1ref <> 0)
      if (fsstartflag1 = 0) and (fscutoff1 <> 0) then
            if fs1n1 < 10 then fsStarter1 = 1
      else
            fsStarter1 = 2
      endif
else
      fsstarter1 = 0
endif
```

Special Commands:

variablename = counter targetvalue changepersecond
will increment a variable by changepersecond until it reaches targetvalue

variablename = variablename + **elapsed** * 10
will increment the variable by 10 times the elapsed seconds since the last check (logics loop)

General Aviation IFR Panels

GAIFR System Requirements

- Any modern multi-core PC
- Fully compliant OpenGL graphics card
- 32 bit colour depth, 1024x768 and above
- WideFS & FSUIPC (Registered full version)
- Network PC to MSFS
- Windows 11
- MSFS
- Single or Twin Engine Flight model of your choosing
- Default MSFS panels

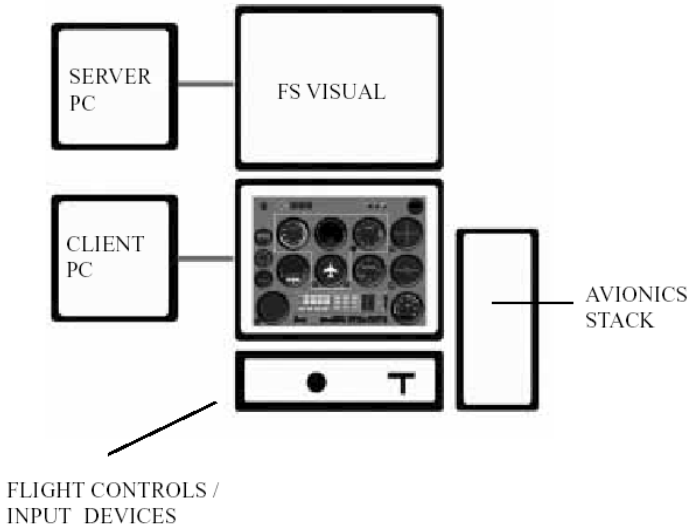
The GAIFR panel has been designed to operate at extremely high screen resolutions as well as lower resolutions. If using the very high resolutions, then system spec may need to be increased considerably.

GAIFR Introduction

The General Aviation Instrument Flight Rules (GAIFR) panel is aimed at instrument rated pilots wishing to maintain proficiency or for pilots undergoing instrument flight Training within a flight school. The panel of course can be used for VFR flight as well.

The panel has been designed with a basic set of instruments which should be sufficient for most IFR procedures. Actual aircraft instruments may differ slightly due to the various manufacturers. The quality and resolution of the instruments is such that pilots should be able to fly accurate approaches, radials and all the necessary instrument procedures with a high degree of accuracy required for this type of training.

Advanced features to aid in training have been implemented such as failure modes. This will enable pilots to practice typical flight procedures like simulated Gyro rundowns or electrical and Pitot/Static Air failures. Other useful direct options are a pause mode and simulation rate alteration. There are short cut keys / commands for these so they can be operated either via keyboard, mouse or by third party hardware professional training hardware, such as avionics stacks, dampened control yokes and throttle systems.



The AP is a basic system found on many GA aircraft with a HDG hold facility linked to the HDG BUG on the HI and a current

Altitude hold mode. This will enable the practicing pilot to drop work loads as and when required and focus on specific learning tasks.

MSFS simulator must be installed to use this software. There are various options with regard to this discussed in the following pages. It is also assumed that the necessary hardware you intend to use has been installed, whether this is a simple Joystick with throttle control or more advanced professional training systems.

The GAIFR software from Project Magenta must be downloaded and installed either on the computer you are running MSFS on or a second Client computer (recommended).

When you run the GAIFR software for the first time it will request a registration code. You have to e-mail Project Magenta the code that the software generates in the top half of the registration box, (the instructions will be found in your original Order Confirmation e-mail). Once we have this code we then send you an Activation Code and the software is activated – but not ready to use just yet. Please read further for how to set-up your systems so that the software can communicate with MSFS.

Step 1 GAIFR Network Set-up

The main advantage of a Networked solution when running the GAIFR panel is that you can maintain an outside visual environment without any loss of computer performance. This solution is ideal for any individual or training organization who decides to have two computers running together with two monitors.

The principle is very simple. One computer usually the SERVER runs MSFS, and the second computer, the CLIENT runs the GAIFR software. In this way, you can run MSFS in Full Screen Mode (just the full scenery screen view) and have the flight instruments displayed in very high resolution on the second display driven by the second computer (CLIENT). The two computers and simulation programs are connected together via a network and a program called WideFS.

For networking you will require that each of your PC's has a Network adaptor card. Every current PC has a Gigabit Ethernet adapter built in. Connect the computers together through a network switch, we do not recommend a direct cable between two machines (if only two computers are to be connected). Please note that some operating systems will not work well together using a crossover cable.

For new Network installations, after installing the Network cards you have to establish that the network is able to see all the computers.

GAIFR Workgroups

Both computers must be in the same Workgroup. In Windows 11 this is set under Settings, System, About, Domain or workgroup, for example FlightTraining. This has to be done on both computers.

GAIFR Computer Names

You can give each computer a different name, one could be called MSFS the other GAIFR – or whatever. Giving the computers names makes it easier to identify them on the network.

GAIFR Protocols

Project Magenta software uses the TCP/IP network protocol as standard. In Windows 11 this is always installed and there is nothing for you to add.

GAIFR Sharing

The last thing to do is to make sure that network discovery and file sharing are enabled on both of your computers, as described in the Windows 11 Set-Up section of this manual.

GAIFR Step 2 Installation of WideFS and FSUIPC

FSUIPC
FSUIPC is a powerful program which has been developed by Peter Dowson over many years for MSFS. Please see his extensive documentation for the more advanced features. For the GAIFR panel to operate and communicate with MSFS a fully registered version of this software must be installed.

a) Download and unzip FSUIPC from the author's website.

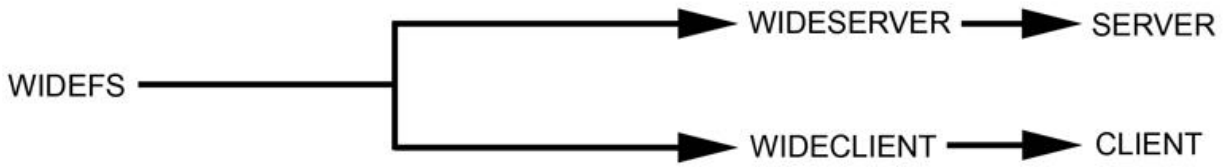
b) Copy the FSUIPC.dll file into MSFS Modules folder. For Microsoft Flight Simulator 2020 and 2024, FSUIPC7 is instead a separate program that you run alongside the simulator and there is no Modules folder to copy it into.

WIDEFS
Like FSUIPC you also need to download and install a fully registered version of WideFS. WideFS is a program that allows the GAIFR panel and MSFS to communicate over the network. The program itself comes with further detailed documentation, but for the most part installation should be very simple:

a) Download and Unzip WideFS. In your unzipped folder you will see a number of files.
b) Copy the Wideserver.dll & Wideserver.ini files into the MSFS Modules folder.
c) Copy the WideClient.exe and the WideClient.ini files into your GAIFR panel directory.

A registered version of FSUIPC must be installed in your MSFS Modules folder.

A registered version of WideFS is also required for network communications and the installation is as follows.



WideFS is split into two main components as illustrated above.

The Wideserver component (Wideserver.dll and Wideserver.ini) are placed in your MSFS Modules folder. That is all you need to do for the Sever component installation.

The Wideclient component (Wideclient.exe and Wideclient.ini) are placed on your client computers (computer that you wish to connect to MSFS). You can create a folder perhaps called "WideClient" or copy them into the PM main program folders – it actually does not matter. Each time you want communication across the network with MSFS, Wideclient.exe must be running.

Step. 3 GAIFR Setting Server Name or Static IP

WideFS uses TCP/IP for its communication, this is the standard on all current systems and is what we recommend.

Generally, after installation (as above) of the various files included in WideFS, as a basic rule you should not actually have to do anything more but we also like to at least edit the wideclient.ini file, use a text editor like Windows Notepad. Add the following entries in the[Config] section of the WideClient.ini file:

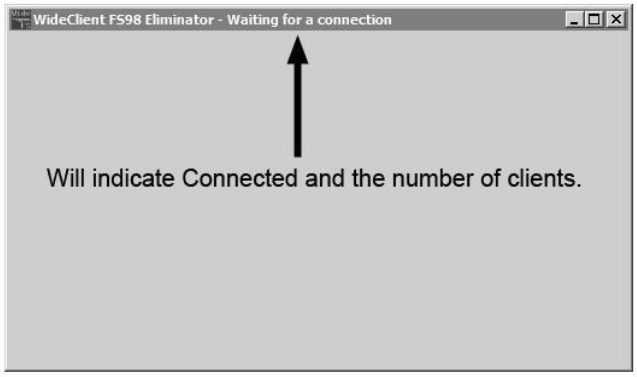
ServerName= (your Server's Name)

Or

ServerIPAddr= (your Server's IP address)

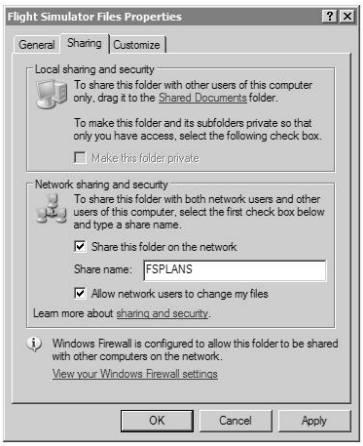
You only need to set either the ServerIPAddr or ServerName (not both). It is recommended that you use the ServerName option. Then add to the same ini file UseProtocol=TCP (or whatever protocol you prefer) we recommend TCP at least to start with.

If you do not know how to find your ServerName or IP address please contact Project Magenta support or refer to the WideFS documentation.



When you first try to "connect" wideclient to MSFS you may need to allow access for this program by any Firewalls you have enabled. Otherwise they may block communication.

To check you have correctly set WideClient to communicate with MSFS, run MSFS on the Server, and then start Wideclient on your client PC by clicking on wideclient.exe. In the menu bar at the top of the Wideclient program you should see the number of clients that are connected. If it is indicating that nothing is connected, then you need to refer to the network checklist to make sure you have set everything correctly.



Testing

Provided your network is set-up correctly, as a test you may now want to run MSFS on your server. When MSFS is fully running, click on the WideClient.exe file in the GAIFR panel directory and the WideClient program will launch. If Wideclient is able to "see" MSFS across the network, on the top of the bar it will say "Connected" if not it will say "Waiting For Connection".

If Wideclient is not able to connect to MSFS then you will have to check that everything has been set correctly as per these instructions, and also consult Peter Dowson's detailed instructions. Further help can be obtained from Project Magenta e-mail: support@projectmagenta.com

GAIFR Normal Start-Up procedures

The normal process to go through to get the software running is as follows.

On your SERVER computer

1) Run MSFS. Use an appropriate aircraft for the GAIFR panel.

On your CLIENT computer

2) Click on the wideclient.exe Icon to launch Wideclient. You should see "Connected" in the menu bar.

3) Click on the GAIFR icon and the GAIFR panel will start initializing. Select the a/c type panel you wish to Fly.

- PA28 – Piper Warrior
- Cessna
- Twin Panel (selectable between Seneca and Baron once program is running by pressing ESC menu)
- Black Panel (For use in cockpits and thus requiring no bitmaps)



GAIFR User Options

By pressing the ESC key various user options that pertain to the graphics quality can be set. Also in the EXTRA OPTIONS setting you can select either the Piper Seneca or Engine Baron Instrument and various options for type of instruments.



GAIFR – Positioning 'Black Panel'

When using the 'black panel' option, to position each gauge, right click it with the mouse and move it to your required position, and use the + - keys to re-size the gauges. Pressing CTRL – R will reset all gauges to default.

Keyboard Commands GAIFR

Please Note: Some commands will not work with some panels, especially the "Black" panel.

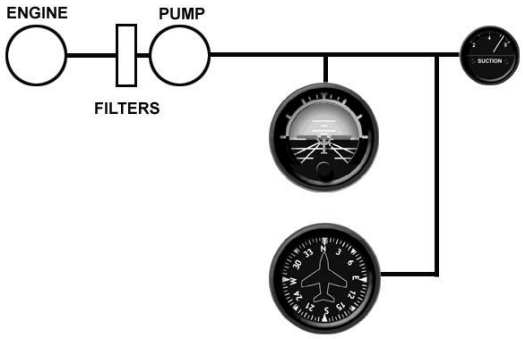
	General
Q	Exits Program
F	displays/hides frame rate and OpenGL acceleration type
W	Toggles Title Bar display / Full Screen
	Instruments/Pages
Cursor Keys	Move displayed Instruments Left, Right, Up, Down
Ctrl-Cursor Keys	Move displayed Instruments in larger steps
+(NumPad Plus)	Zoom In (Increase Size)
- (NumPad Minus)	Zoom Out (Decrease Size)
F1 to F10	Access view modes directly, these are saved on program exits. This way you can define various views of the panels for your convenience
Ctrl-R	Resets positions of "Black Panel" Gauges
	Modes
Esc, Ctrl-M	Menu
P	Displays the position of the aircraft with regard to the currently selected navaids.
1	Displays a list of Available VORs... click on them to select a given VOR for NAV1
2	Displays a list of Available VORs... click on them to select a given VOR for NAV2
3	Displays a list of Available NDBs... click on them to select a navaid for the ADF
	Actions
4, 5, 6	Stopwatch Mode Select, Start/Stop, Reset
R	Show/Hide Radio Stack
Num Keypad 7 & 1	Trim Up/Down
G	Gear Up/Down
Home/End	Increase/Decrease selected altimeter pressure
Z/X	Decrease/Increase Panel Brightness

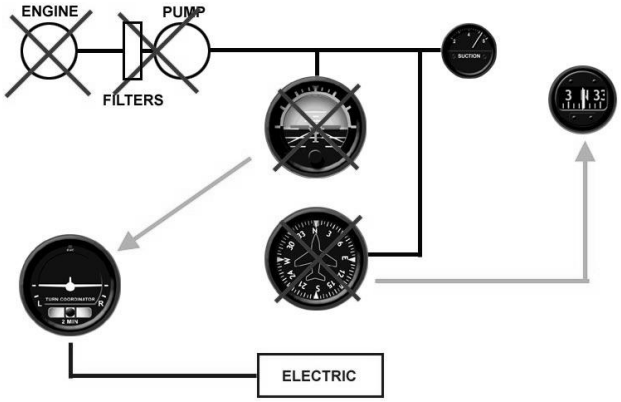
Shift Z/X	Decrease/Increase Instrument Lighting
Ctrl X	Instrument Lighting Red

GAIFR SYSTEMS & FAILURES

Various system failures are possible with the GAIFR panels. The following below *only* refers to the PA28 – Piper Warrior. Different a/c models will have different systems and thus effects of failures could be different. The following is only to illustrate the concept and should *not* be treated as any form of official / type specific guide whatsoever.

By pressing the VAC button the "VAC" fail light will illuminate on the indicator panel indicating a fault in the vacuum system. This is the first clue to the pilot that there is a fault. Soon afterwards the AI and HI will run down and the pilot must switch to the correct limited panel flying procedures as laid down by his instructor or instrument flying course book.

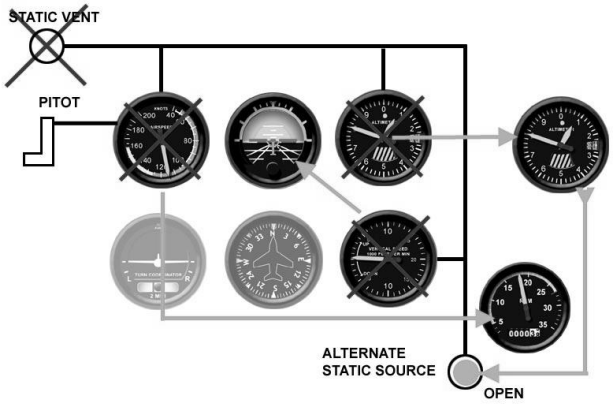


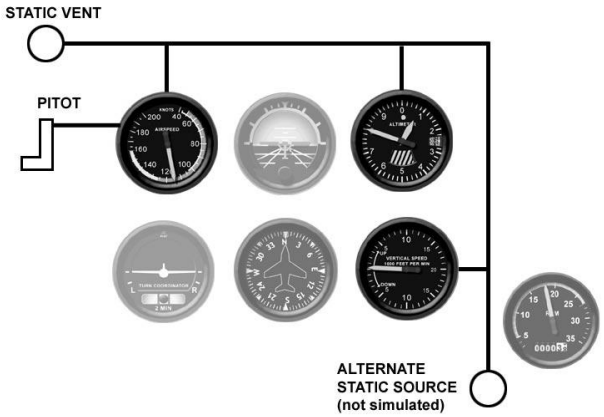


PITOT and STATIC PRESSURE SYSTEM

The pitot supplies dynamic pressure to the ASI. The VSI and ALT measure changes in static pressure.

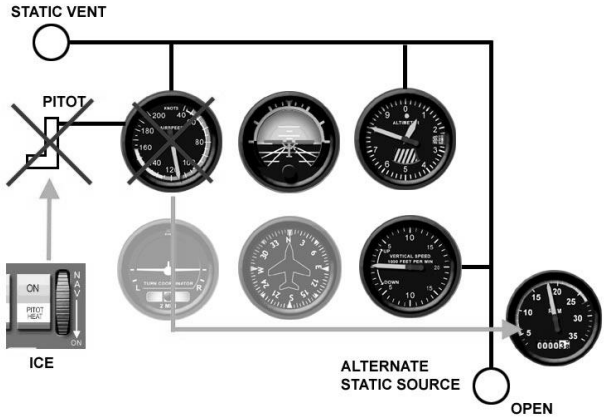
STATIC FAIL





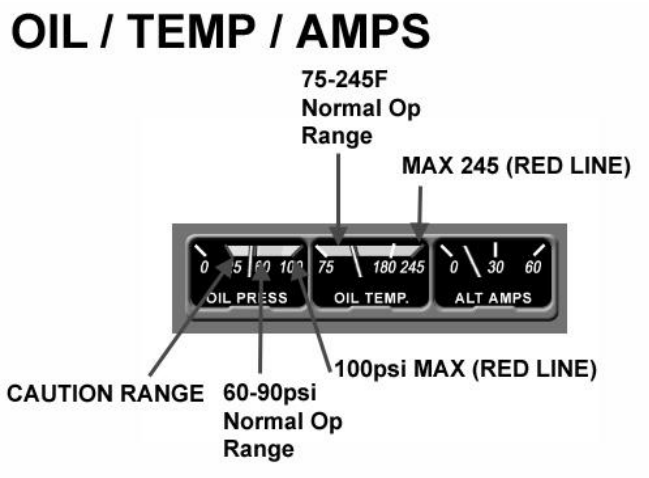
On this a/c there is no warning indication that supplies information directly to the pilot on the integrity of the Pitot or static system. In normal operations the Pitot tube and static vents should be checked prior to flight that they are clear of ice and debris. If possible icing conditions are encountered (note that the PA28 is not licensed to fly in known icing conditions) the Pitot Head is fitted with a heating element which can be activated by the pilot via the Pitot Heat switch. Note when operating it that on the Amps meter at the bottom of the panel you should see a gain in the amps being drain – this is a good pre-flight check, perhaps prior to take-off to ensure that both the Pitot heater is in working order and that indeed the ammeter is charging and operating.

PITOT FAIL



On the simulator, by pressing the Pitot fail button the pitot static system will fail and the ASI will read zero. However, if icing is encountered during flight, regardless of whether the failure mode is active or not) then the pitot might become blocked with ice if the Pitot heat is not used. In which case the ASI will remain static and not move until the ice has been cleared relieving the system of the blocked pressure. In both scenarios the pilot can practice the relevant limited panel operations. In such an instance, in straight and level flight, perhaps in the cruise, if the pitot becomes blocked the AIS indicator will give constant inaccurate information to the pilot. The a/c could in fact be going much faster than indicator or worse, much slower. Constant reference to the temperature gauge with a period airframe ice check are essential to ensure that pitot icing is avoided.

LOWER PANEL GAUGE INDICATORS – PA28



The fuel tank you are using and the position of the throttle and mixture can be selected via the Sub Panel. Although not type specific we have added an option for retractable Gear here as well but for obvious reasons this option should not be selected when operating fixed gear a/c. On the PA28 there are only two fuel tanks in each wing. There is not cross feed or "Both" option. However, again in the Options menu we have added an additional switch position marked Both for people wishing to use the panel with different a/c types.



PRIMER

The PA28 is fitted with a fuel primer. We have simulated the primer option for this type of a/c. It should be noted that there are different techniques used to start a/c engines (and it is possible to start them without any primer) we offer this as a guide only.

Winter time cold start in temperatures below 15 degrees c x6 Primes Summer time start in temperatures above 15 degrees x4 Primes Hot start after engine has been recently run – priming may not be necessary.

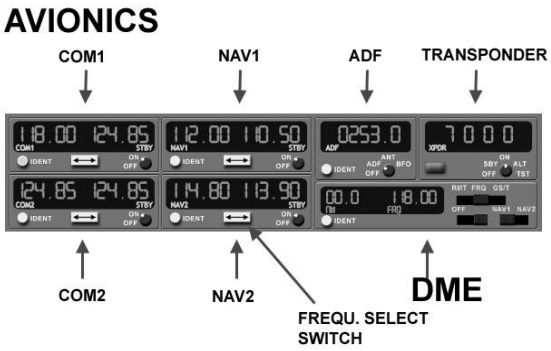
Battery & Alternator

The Battery switch and alternator switch are usually operated as one single switch. The battery switch is required for all electrical services and to operate the engine starter motor. The alternator is required to ensure the constant charging of the battery when the engine is running.

AVIONICS – PA28

We have provided a set of radios which are on by default at the top of the GAIFR panel. Ideally, to get realistic use of complex communication and navigation radios the panel should be used with appropriate hardware. If hardware is being used the graphic radios can be switched off via the Options menu.

The radios in graphical form have been positioned in such a way that maintains adequate size of the IFR instruments. To position them in their correct physical place would make the instruments as much as 20% smaller.



We have developed a number of ways to select and change frequencies on the radios. The first, and most common (if a little fiddly) is with the mouse, positioning it over the actual numbers themselves. The second and what we would recommend for those without hardware is to use one of the predefined keyboard hot keys:

1 = Comms
2 = Navs
3 = ADF

In this fashion, a menu pops up indicating the current navaids or com stations in your immediate locality. These can be selected by pressing the corresponding key next to the station. The frequency in the standby box will be updated ready for use.

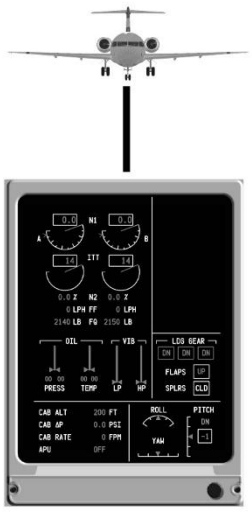
All of the avionics have separate on/off switches. There is no Master Avionics switch in the PA28, thus each radio must be switched on according to the checklists. All radios have an IDENT button on the radio itself and there is no separate audio panel on this version of the GAIFR

Regional Jet Glass Cockpit

The Glass Cockpit set-up with regard to positioning and sizing has already been discussed in the GENERAL section of this document. Here, we will discuss a little bit about how the Glass Cockpit functions and what further options are selectable by you and what you must set in order for the Glass Cockpit to function properly.

RJ - Step 1, Aircraft Type

The Glass Cockpit will detect from MSFS the number of engines your specific flight Model has. This will automatically change the engine display on the EICAS to the number of engines the flight model has. But the Glass Cockpit still needs more information from you which will be discussed shortly. For Regional Jet Type a/c then two engines will be the typical engine display mode.



Apart from detecting the number of Engines your aircraft has the Glass Cockpit also needs to know a great deal of other parameters. These are generated through text files. These files are associated by aircraft type. Because sometimes the Glass Cockpit is run alone without the CDU software, there are two ways of setting the specific aircraft type so that the Glass Cockpit knows the various performance characteristics and FMA modes to display.

RJ - Step 2. Type Selection

Method A – **NO** CDU SOFTWARE

You will need to open the Glass Cockpit .ini file (pfd.ini) located in the main program folder (GC). Open this file with NotePad.

Find the following entry:

AircraftType=

As you are not running the CDU software you must specify the aircraft type you want to fly here. In the Glass Cockpit folder are a number of aircraft type files. For example "type.txt". The files are all in a plain text format and thus have the aircraft type followed by the file extension .txt. You can also download more of these files from the Updates section of the PM website.

Type=RJ

The Glass Cockpit is now set to read the information in the aircraft specific text file.

Method B – **WITH** CDU SOFTWARE

If you have the CDU software as part of your Project Magenta system (highly advisable) then the above entry must be set as follows in the pfd.ini file:

AircraftType=CDU

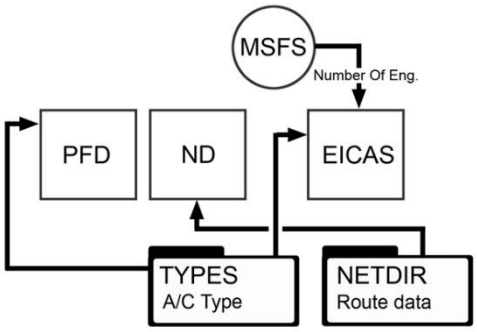
This forces the Glass Cockpit not to read aircraft txt files in its own local directory but from the CDU programs "types" subfolder. This has one main advantage, from the CDU program you can select your aircraft type automatically and very quickly without having to manually edit each Glass Cockpit ini file on your system.





If you are running the CDU software in combination with the GC, select the LSK next to the aircraft Type on the IDENT page (usually the first page you see after the CDU starts) and here after selecting this LSK further aircraft types that are stored in your "Types" subdirectory in the Main CDU program folder are shown as selectable options. Once selected, the new type will be shown on the Ident page.

The CDU program diagram



illustrates the data exchange between the subfolders and the Glass Cockpit.

RJ - Selecting displays



The Glass Cockpit also needs to know whether it is operating as a Captains Display or a Co-Pilots display. This is selected under the user options in the ESC menu. Note that the Co-pilots display requires a special second GC license. If you selected without registering it, the Glass Cockpit will run into communication conflicts on the ND display modes amongst other things.

Keyboard Commands – RJ

	General Options
Ctrl-M or Esc	Opens Options Menu Screen
Q	Exits Program
F	displays/hides frame rate and OpenGL acceleration type
W	Toggles Title Bar display
Z or X	Toggles Background Grey
	Moving of Instruments and Pages
Cursor Keys	Move displayed Instruments Left, Right, Up, Down
Ctrl-Cursor Keys	Move displayed Instruments in larger steps
Alt-Cursor Keys	Move **Navigation Display** Left, Right, Up, down (only on 2 Element display PFD, ND) Move Engine Display Left, Right, Up, Down (only in 3 Element Display PFD, ND and Engine) When on the **Standby Gauge** page (F10) you can position the single items by pressing the Tab-Key to select which instrument to move, moving it with Alt-Cursor or Ctrl-Alt keys afterwards. You can also change the **space between the ND and the PFD** by pressing the **Y** and **U** keys.
Alt-Shift-cursor Keys	Move Engine Display Left, Right, Up, down (only on 2 Element display PFD, Engine Display)
Y, U	To change distance between PFD and ND (ND position)

+(NumPad Plus)	Zoom In (Increase Size)
- (NumPad Minus)	Zoom Out (Decrease Size)
BackSpace	Enable/Disable Bitmap frame around instruments (Ctrl-Backspase to select for positioning)
	Accessing Page Modes
F1 to F10	Access modes directly, **F1** PFD, **F2** ND, **F3** Engine, **F4** Captain PFD/ND, **F5** PFD/ND/Engine **F10** Standby Instruments
N/PgDn	Switch to next Mode (PFD, ND, Engine, Captain PFD/ND, Copilot PFD/ND, Captain PFD/ND/ENG, Copilot PFD/ND/ENG)
L/PgUp	Switch to previous mode
BackSpace	Enable/Disable Bitmap frame around instruments (Ctrl-Backspase to select for positioning)
Ctrl-I	Switches off displays, pressing it a second time makes them light up again
	Primary Flight Display
V/B	Increase/Decrease Decision Height (DH) (Ctrl-Shift-V resets DH to default)
Insert	Switches display from hPa to Inches and back
Delete	Sets QNH to STD (29.92/1013)
Home/End	Increases/decreases QNH
D	Flight Director On/Off **Shift-A =** Flight Director bar toggle
	ND Modes
Ctrl-5, 6, 7	Distinct OFF, VORL, ADFL (inop if MCP is active)
Ctrl-8, 9, 0	Distinct OFF, VORR, ADFR (inop if MCP is active)
I	Toggles Waypoint information (ETA and Distance) in the ND for flight plan points (DATA)
G, H	Decrease, Increase MAP range
1	VOR toggle On/Off in MAP Mode (Ctrl-1 Off only)
2	NDB toggle On/Off in MAP Mode (Ctrl-2 Off only)

3	WPT toggle On/Off in MAP Mode (Ctrl-3 Off only)
4	ARPT toggle On/Off in MAP Mode (Ctrl-4 Off only)
5, 6, 7, 8, 9, 0	MAP Range 7.5, 12.5, 25, 50, 100, 200 NM
Ctrl-C, Ctrl-Shift-Z	Switches TCAS Mode
Ctrl-O	Overview Page
O	Weather Radar On/Off
Ctrl-R	Terrain Display On/Off
Ctrl-G	Terrain Mode Display: Lines, Grid, Triangles
Ctrl-H	Terrain Colour Display: Altitude, Green, Delta Altitude
Alt-G	Terrain Map Size Small/Step2, Large/Step2, Small/Step1, Large/Step2
T	Changes the bottom of the ND from Fuel to Controls and vice versa
	Engine Page
Ctrl-C	Toggles the display of the controls (Extra Information, Elevator/Aileron position etc.)
Ctrl-V	Toggles MCP value indication left of Engine display (If MCP is present)
Tab	Switches to the next Engine display page.
Ctrl-S	Toggles "No Smoking" indication
Ctrl-B	Toggles "Fasten Seatbelts" indication

Settings RJ.INI

There are various items you can customize both within the program and in the program's INI file, RJ.INI.

Please check the RJ INI itself for the latest entries, they are self-commenting.

Project Magenta Instructor Station



The Instructor Station software is based on our experience with several of our other products and particular requirements we would have to such an application.

The system requirements are identical to our Glass Cockpit software and the software can be used on a single or dual monitor configuration, as well as networked on several computers. The network interfacing is provided via WideFS/FSUIPC. The Project Magenta instructor station is compatible with the simulator versions listed in the Requirements section of this manual, some features may not work with older versions of flight simulator.

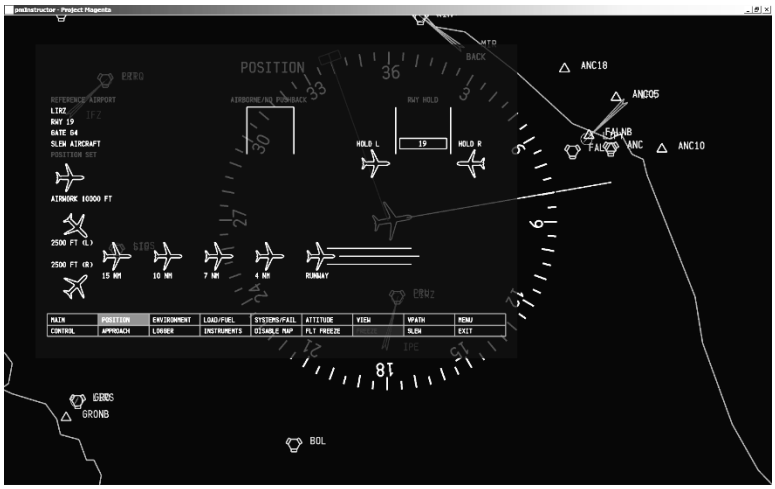
We do rely on feedback from our customers regarding this and other products, please do not hesitate to contact us with your questions or requirements. support@projectmagenta.com

There are two core modes of operation, full screen (with a map menu) or in map mode with the instructor interface as an inset. To allow the map to be discernable, the interface is made transparent.



Instructor Station Full Screen Mode

Map Screen Mode is accessed via the command on the Main Instructor Menu page. The operation of the Instructor Interface is identical in both modes, although some options might not be available in one or the other mode.



Instructor Station Map Screen Mode

Instructor Station Connectivity

The instructor station talks to the flight simulator via WideFS/FSUIPC. Once the connection is made, it can be verified with the pmFileCheck Program in the root folder of the Instructor Station (pmInst).

Some conventions which are also applicable to our other software are shared folders which allow the communication to the other software.

NetDir – Communication with the Project Magenta FMC
FSPLANS – Main FS Flight Plan Folder (if no FMC is used)

Please use pmFileCheck to verify the connection is as expected, make sure FS as well as any other programs (FMC, Autopilot) are running when you make this test. The program will report and suggest changes, if necessary.

Instructor Station Conventions

Both the Options Menu screen [Esc]-key and the INI file (pmInst.ini) are subject to change and will most probably be expanded. The INI-File is self documenting, thus you should find a description of each setting next to the particular entry. If something is unclear, please let us know and it will be changed accordingly.

The Options menu is accessible at all times, it allows you to control both map and instructor station options as well as the appearance of the software.



When you see the startup Project Magenta logo and the Instructor Station text, you can click with the mouse to make it go away faster.

Instructor Station Keyboard Commands

Q – Quit Program
Esc – Menu
Ctrl-W – Full Screen Mode

Instructor Station - Instructor Mode

Cursor Keys – Screen Position
Numeric +/- - Screen Size

Instructor Station - Map Mode

Cursor Keys – Lat/Lon Position
Numeric +/- - Zoom Level
Shift-Cursor Keys – Command Bar Position
Ctrl-F – Find Navaid/Airport
V – VOR Toggle
N – NDB Toggle
I – ILS Toggle
W – Fix/Waypoints Toggle
A – Airport Toggle
F - Frequency Toggle

Instructor Main Screen

This page gives you an overview of the connections pmInst can make to the simulator and other software. As a general rule, white text items can be clicked on, blue or magenta text is for information only. The following screenshots are made in full screen instructor mode (to set the program in a Windows full screen mode, press [W])



Instructor Main Menu

Clicking on items such as the latitude, longitude, altitude etc. will take you from this to the POSITION page. SLEW and FLIGHT CONTROLS will take you to the respective pages.

MAP SCREEN MODE will switch to that setting, BLACK display will allow you to change the background appearance of the full screen mode.



pmInst will also list the programs it detects in the network, together with some basic information as well as the reference airport. This airport can be set in the POSITION menu and will automatically be the nearest airport once the program starts up.

In the bottom row of the instructor screen you will find a list of the main screens that can be accessed in this program, as well as some options for pausing or positioning the screen. The currently selected page is highlighted in green, the current pause mode is highlighted in red. The three pause modes that can be selected are:

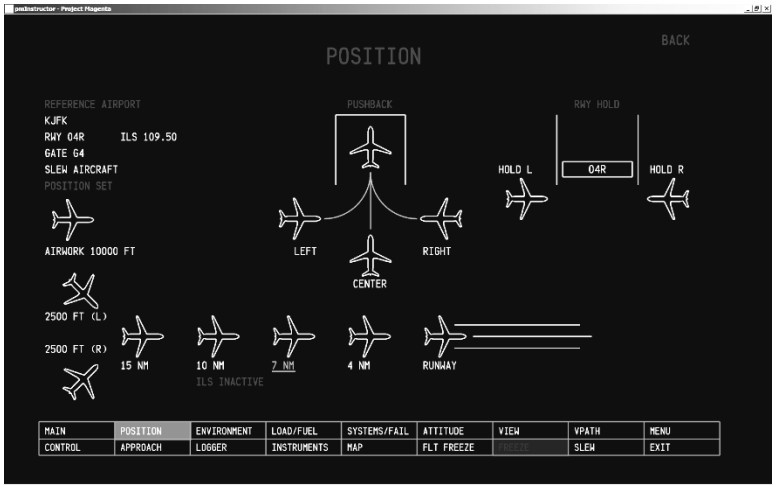
SLEW – Flight Simulator Re-Positioning mode
FREEZE – Flight Simulator Pause Mode
FLIGHT FREEZE – Pause Mode where the Lat/Lon position is fixed, but the aircraft can be flown



These items can be selected on all Instructor Screens. Clicking on them activates the page/function.

The position of the screen and the menu itself can be changed by pressing the cursor keys (up/down/left/right) and can be re-sized using the Numeric Keypad + and – keys.

Instructor POSITION Screen



The positioning of the aircraft can be performed on this screen. Clicking on the ICAO code of the reference airport allows you to change it. This can be done by entering the code directly or finding it in a list.

Pushback is only available when the aircraft is on the ground, ideally, the pause mode should be disabled for this feature.

The reference airport is important to understand the operation of this page. All subsequent actions performed on the aircraft are made based on the selected airport and runway. Thus, clicking on HOLD L will now position the aircraft holding left of runway 04R at John F Kennedy airport in New York.



For instance, to position the aircraft 7 NM from the touchdown zone of runway 31R at KJFK, click on the runway text, then select it from the list that is presented to you. As an option, you can also force the setting of the ILS frequency by clicking on it. If the ILS for a given runway is not active, it will be indicated by a blinking text.

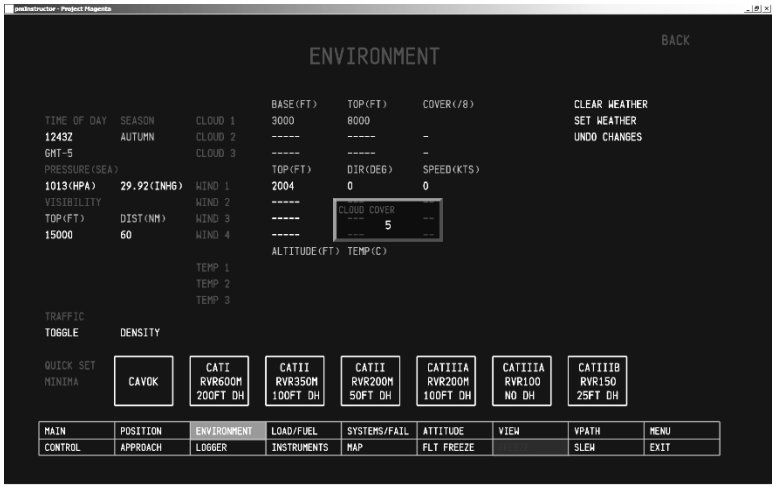
Once the runway has been selected, click on the text 7 NM. This will instruct the flight simulator to position itself at the given distance and respective altitude for the current reference runway. Depending on how far

the new position is from the present location of the flight simulator and the speed of the main FS computer, this action may take several seconds. You should see the text SETTING POSITION in the center of the screen. Once the re-positioning is completed, the scenery is re-loaded and the simulator is paused. The precise type of pause, FREEZE or FLIGHT FREEZE, can be set in the options menu.

The message POSITION SET (FREEZE ON) appears if FREEZE is selected as a mode.

Please note that depending on the settings of your flight simulator, the continuation of a flight may be unstable after re-positioning. For this, the flight freeze mode can be used to set the desired configuration and speeds. Under some circumstances you may have to force another repositioning command. Normally, positioning the aircraft on the ground will force the gear to be extracted.

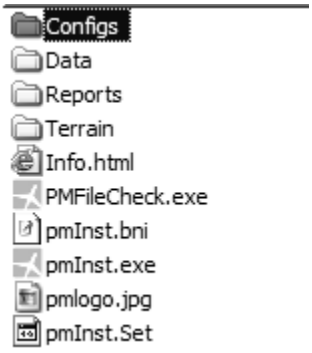
Instructor ENVIRONMENT Screen



The ENVIRONMENT screen is used to set weather and other options that affect the simulator. All these options are always to be used within the limitations of Flight Simulator.

White text items such as TIME, PRESSURE and TRAFFIC allow you to set those options by clicking on them. Some settings are not immediate, after entering the desired values, SET WEATHER has to be selected. The entries that differ from the current flight simulator setting are shown in blue, once SET WEATHER is clicked, pmInst will negotiate with FS which settings can be performed. If a setting is not possible, it will either remain blue or change to another setting dictated by FS. Some values may also be rounded up or down, depending on the constraints and you might also see additional cloud or wind layers that you didn't enter. This may also be influenced by your FSUIPC weather settings such as "Extend Top Wind Layer Upwards" (check FSUIPC documentation for more details).

Traffic density and setting can be changed here as well as the time setting. The season and GMT time is only being reported.



The quick set minima can be edited and expanded by the user. These settings can be found in the weather.txt file – it is located in the Configs submenu of the main pmInst folder.




```
[buttons]
CAVOK,VD60,VT15000
CATI/RVR600M/200FT DH,VD.5,VT1500
CATII/RVR350M/100FT DH,VD.3,VT1500
CATIIIA/RVR200M/50FT DH,VD.1,VT1500
CATIIIA/RVR200M/100FT DH,VD.1,VT1500
CATIIIA/RVR100/NO DH,VD.1,VT1500
CATIIIB/RVR150/25FT DH,VD.1,VT1500
```

The entries are to be understood as follows, for the CATII entry above:

```
CATII/RVR350M/100FT DH – text of the button
VD.3 – visibility distance approximated to .3 of a mile
VT1500 – visibility top
```

This file structure will also be used in future versions to add preset weather features. The conventions and extensions such as CTXXX WDXXX (cloud top, wind direction) etc. will be documented accordingly.

Currently, the following commands are supported:

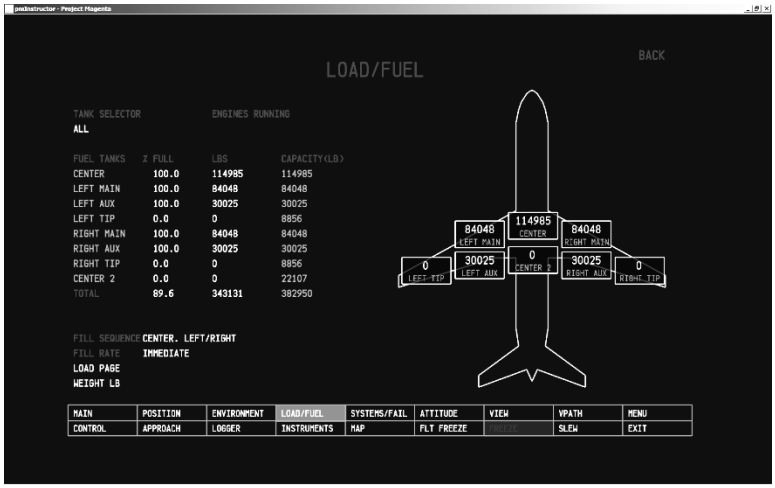
CB – cloud base (e.g. CB5000 – for 5000 ft)
CT – cloud tops (e.g. CT17000)
CC – cloud cover (e.g. 7 for 7/8)

The first layer is defined by the first CB command, thus the logical sequence would be CB CT CC

WT – wind tops (e.g. WT5000)
WD – wind direction (e.g. WD270 or WD90)
WS – wind speed (e.g. WS80)

Instructor LOAD/FUEL Screen

This page is used to set the individual or general fuel load for the selected aircraft. The values are displayed depending on the fuel tanks available for the current aircraft within FS.



The display of the unit for the fuel/load weight can be set by clicking on WEIGHT LB (or KG) and it will be reflected in the tables. To select the LOAD page (passenger and cargo weights) click on the command in white.

Fuel can be set in percentage or absolute amounts, per tank or as a total value. When selecting the total percentage entry, the fuel will be evenly spread amongst the tanks. You can also enter a total amount of fuel and have the Instructor station fill the tanks according to your preference…. Center tanks first or Left/Right tanks first. If a fill rate is entered, this will be used to fill the tanks at a gradual rate, but only if you enter a total fuel amount. The filling of individual tanks is immediate.

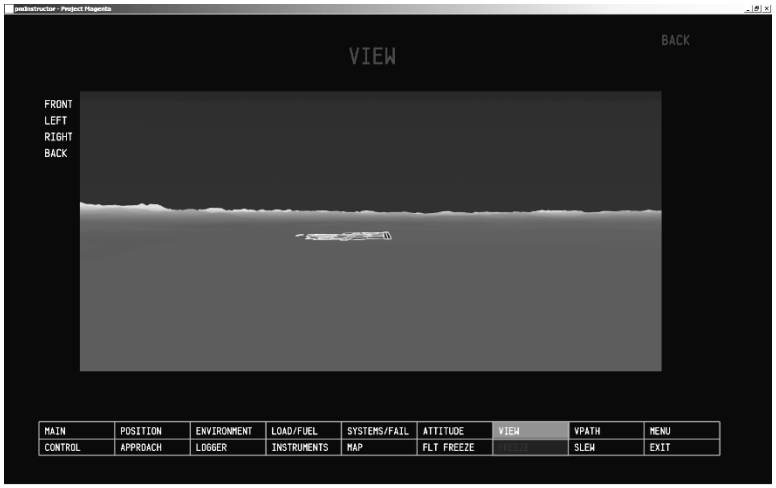
Additional features for this page will be added depending on user requests.



Instructor ATTITUDE, VIEW and INSTRUMENTS Screens

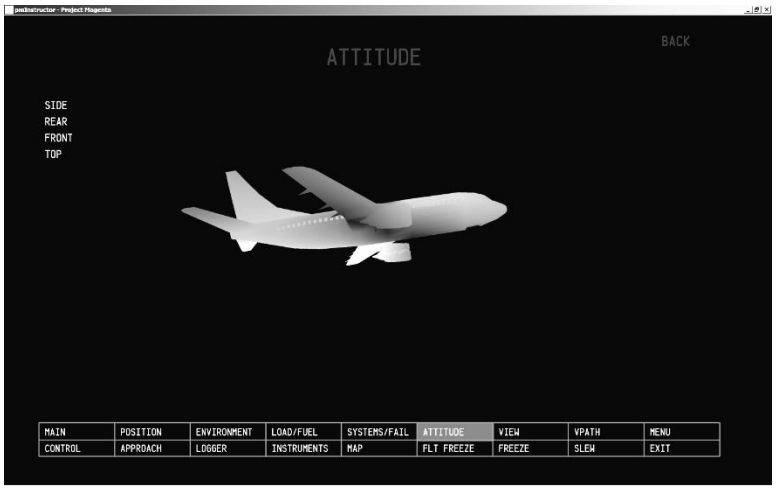
These pages can be seen as experimental but already have a very practical use depending on your simulator. The Attitude screen allows you to view the current aircraft's behaviour in real-time from four different angles.

The view screen can be seen as a simple real-time outside view if the instructor's direct view to the pilot's display is obstructed. If available (in the Terrain subfolder) terrain data will be displayed together with runways and taxiways. We are open to suggestions for additional features for these screens, in any case, they have all proven very useful on the Instructor's position.



Instructor Approach in the View Screen

The View Screen can display general airport layout as well as terrain files (these can be found on our website, in the Documentation section). It is intended for approach and landing, not as an enroute display as this point.



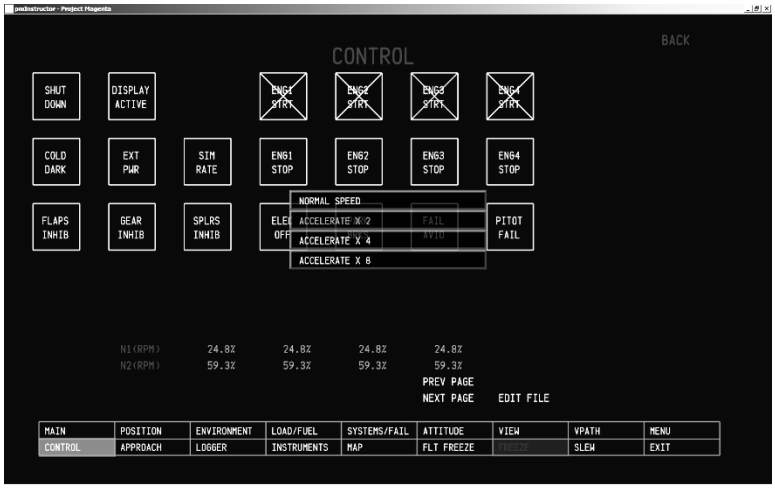
Instructor Aircraft Attitude



Instructor Instrument Screen

Instructor CONTROLS and SYSTEMS/FAIL Screen

The CONTROLS screen, much like the SYSTEMS/FAIL screen allows for several changes by the user, depending on the needs. First, the basic options on the main page:



SHUTDOWN – Opens the EXIT page, allowing you to shutdown the simulator and connected programs (for this option, the INI parameter AllowShutdown=Yes must be added to your WideClient.INI files in the [User] section)
DISPLAY ACTIVE – Allows the enabling/disabling of individual screens of the PM Glass Cockpits, depending on how your pmSystems file is programmed, these may be overridden by that program
ENGX/START or STOP – allows a quick-start of the engines (the number of engines is defined by the currently loaded flight model in FS)
COLD/DARK, EXT PWR – can be linked to your pmSystems set-up
SIM RATE – opens a menu which allows you to set the simulation rate within FS

From here on, user-defined commands are added on the first and following pages. These definitions can be found in the controls.txt file in the pmInst Sub-Folder Configs. The structure is as follows:

```
[text_upper/text_lower], [offset], [length], [value on], [value off]
FLAPS/INHIB, 32F8, .0, 1, 0
GEAR/INHIB, 32F8, .1, 1, 0
SPLRS/INHIB, 32F8, .2, 1, 0
ELEC/OFF, 510, 2, 1, 0
PARK/BRKS, BC8, 2, 32767, 0
FAIL/AVIO, 2E80, 4, 0, 1
PITOT/FAIL, B71, 1, 1, 0
```

The buttons added in this way must always contain a text for identification, the format is, for instance YAW/DAMPER, which creates a box with YAW in the upper part, DAMPER in the lower part.

The "offsets" for these features can be found on www.projectmagenta.com/pmoffsets.html (for the Project Magenta offsets), the FSUIPC SDK (for the FS offsets) and sysvar.txt (pmSystems offsets).

An offset is a memory location for a given variable, option or feature that can be changed to have an effect on any of the connected programs. These offsets can have various lengths… bits, bytes, words, dwords. To find out what the length of a given offset is, check it in the documentation.

Offsets are always to be understood as a hexadecimal value. For instance, from the FSUIPC SDK the FS Yaw Damper is defined as offset 0x808 and as a DWORD has a length of 4 bytes. It is 1 when it is on and 0 when it is off.

A new button would thus look as follows:

```
YAW/DAMPER, 808, 4, 1, 0
```

When the defined value is switched on, a box is drawn around the text.

To display a value, you can use this format:

```
YD/####, 808, 4
```

Then no action will be performed, as no on/off value is defined.

Bits are defined as a period sign (.) follow by the number of the bit you want to manipulate – thus an offset you want to use e.g. 0x5627 bit 4 is defined as:

```
MY/OFFSET, 5627, .4, 1, 0
```

Bytes have a length of 1, WORDs of 2 and DWORDs of 4.

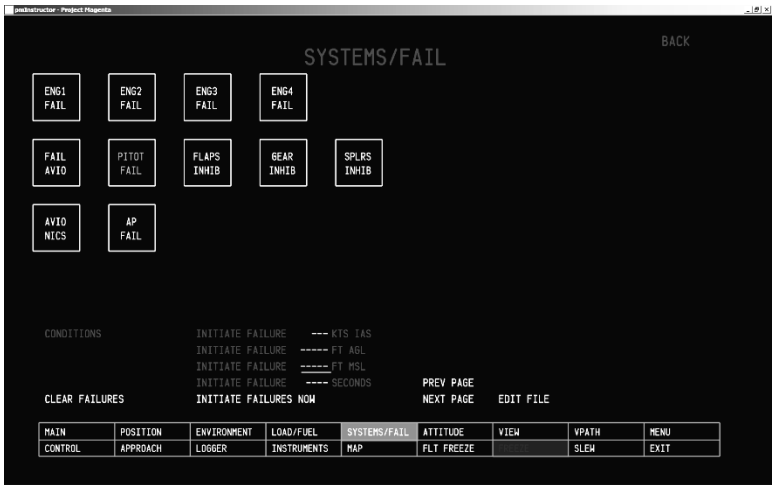
The positioning of these commands can be controlled by additional entries such as:

```
page,TEST PAGE
1ST/COMM, 56F8, .0, 1, 0
2ND/COMM, 56F8, .1, 1, 0
space
3RD/COMM, 56A3, 1, 5, 0
return
4TH/COMM, 56A4, 1, 7, 2
```

In this case, on the page with the name TEST PAGE you would have a first row with the 1st and 2nd commands, an empty space and then the third command… followed by a fourth one on the next line.

Editing the controls.txt file from within the program is disabled by default. If you want to enable the option, thus getting an EDIT FILE prompt, you have to edit the pmInst.INI file and change AllowEdit from Off to On.

The SYSTEMS/FAIL screen operates in a very similar fashion, the most important difference is that in the CONTROLS screen, the activation of the particular command takes place immediately, a failure is controlled by a condition such as a time delay or others…



In this example, you can click on PITOT fail, and make it depend on an altitude or speed or a given delay in seconds.



The failure then becomes active and changes its colour in the screen. To clear a failure or several failures at the same time, you can click on CLEAR FAILURES.

You have the option to force the system to only initiate a failure when all conditions are met, i.e. the aircraft is above a given altitude and faster than a certain speed.

The file for these commands is also in the Configs folder, called fail.txt.

Instructor DATA LOGGER



The instructor station allows logging of data of various composition and in various intervals. The logged data can be saved and loaded for later review. A wide array of data is logged as soon as you click on the PAUSE command, it will switch into logging mode. The data is logged whether it is visible or not.

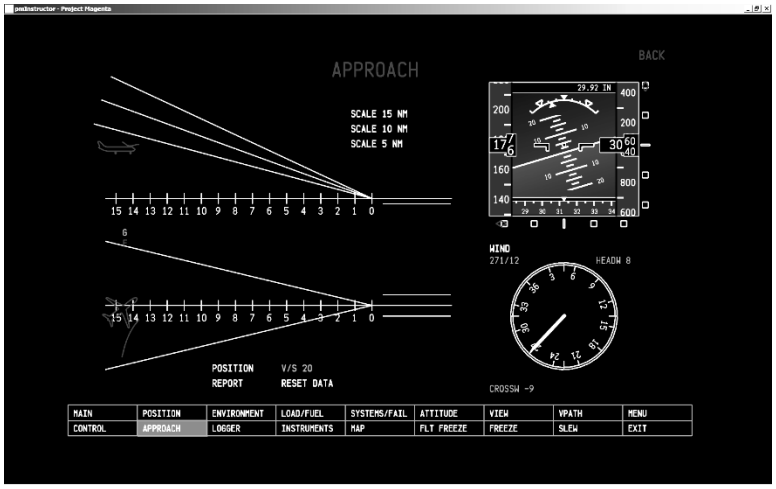
To select which colour coded data is displayed, click on the NONE entry on the left side of the graph and select which value you want to be assigned to a particular colour. You can re-assign the value at all times. The first three selected values are also displayed in their absolute value to the left and right of the graphs. In some cases, such as current speed, altitude etc. the target value is shown as a dotted line (e.g. 243 knots current speed, 250 selected speed).

The sampling time can be changed by clicking on SAMPLE TIME… the choices are 5 seconds, 2s, 1s, 500 ms, 250 ms, 200 ms. You can display the complete data over time, or the last 60, 120, 180 or 300 seconds. Please note that a large period with a high data rate may slow your system down.

Data can be saved and re-loaded via the commands, you will also be able to RESET the DATA.

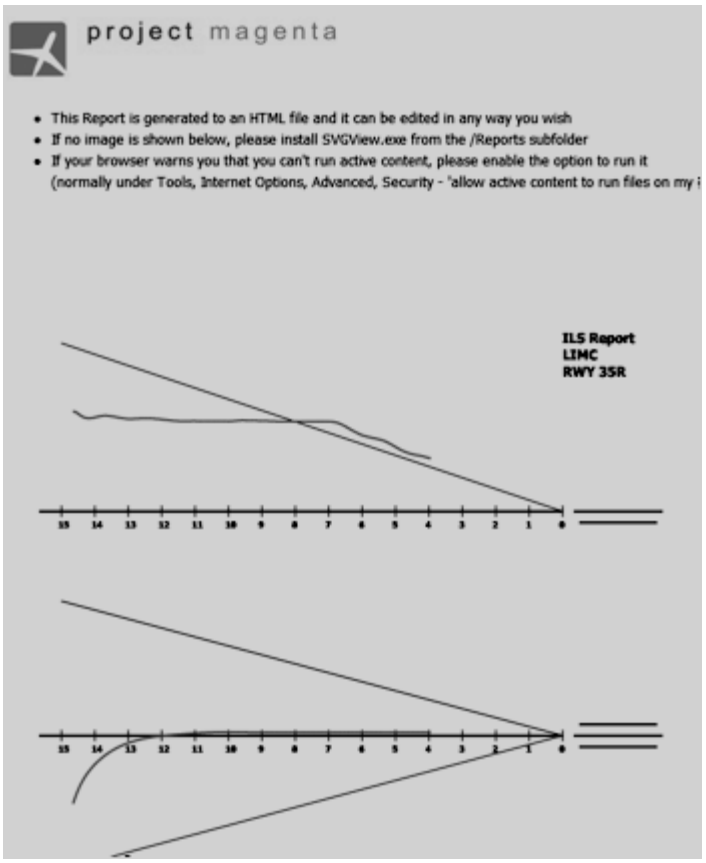
The vertical line inside the graph can be seen as a cursor, the momentary value at the position of the cursor is then shown below the graph. The X-Axis is always shows the elapsed time in seconds.

Instructor APPROACH Screen



This screen will display the path during an approach, with an inset instrument display, wind speed and component information as well as some other basic values.

A report of the approach can be generated by clicking on REPORT. To use this feature, the report is written as an HTML file into the /Reports subfolder and will be opened in your default web browser, the HTML file contains the graphics of the approach. The HTML file is only a background, it can be changed in any way you wish using an HTML editor.


project magenta
This Report is generated to an HTML file and it can be edited in any way you wish
If no image is shown below, please install SVGView.exe from the /Reports subfolder
If your browser warns you that you can't run active content, please enable the option to run it
(normally under Tools, Internet Options, Advanced, Security - 'allow active content to run files on my
ILS Report
LIMC
RWY 35R
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Instructor MAP Mode

The map display has a variety of options which should be as intuitive as possible. In the Menu (Esc) you have the option to hide the command bar when you are in pure map mode, the command bar is fixed if you are using the instructor interface full screen.

Zoom – You can zoom by clicking on the ZOOM+/- icon, by pressing + or – on the numeric keypad or by moving the mousewheel.

Position/Reposition – Latitude/Longitude by default follows the position of the aircraft. If you want to move away from it, you can do this by using the cursor keys or by right-clicking and dragging to a new position. To return to the present position of the aircraft, simply press the space key or double-right click. The position of the aircraft and its altitude can be set by right-clicking twice and then selecting the respective option from the option list.

Find Location – To find an airport or Navaid, click on FIND in the command bar or press Ctrl-F

AIRCR – Sets the map orientation to North or the current aircraft heading.

FONT+/- - Allows you to set the font size in the MAP display.

NAVID, NAMES, FREQS – Sets the navaid information ID, Name, Frequency

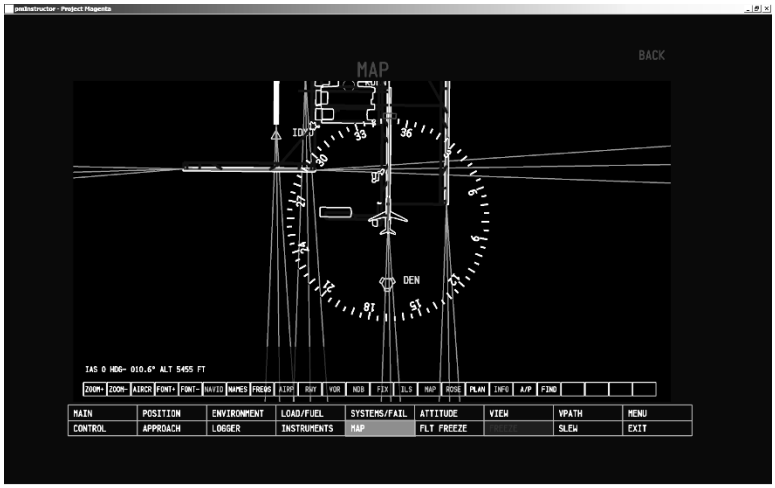
AIRP/RWY/VOR/NDB/FIX/ILS – Toggles the display of the current navaids.

MAP – Toggles the world map display

ROSE – Toggles the display of the compass rose

PLAN – Toggles the display of the flight plan (FMC or last saved FS flightplan)

INFO – Toggles the display of the info bar, which shows the aircraft's current distance from the last navaid you clicked on.



General Aviation Glass Cockpit

Please send an e-mail (support@projectmagenta.com) with your unanswered questions or any hints you think may be useful to others. Thank you.

Note: A very good manual for the G1000 Glass Cockpit can be found on Garmin's website.

Introduction

This is not a gauge-based FS panel to be used within Microsoft Flight simulator, it connects to MSFS.

The panel has been designed with a basic set of instruments which should be sufficient for most IFR procedures. It does not attempt nor will it attempt to cover the vast number of different types of GA instruments. Actual aircraft instruments may differ slightly due to the various manufacturers. The quality and resolution of the instruments is such that pilots should be able to fly accurate approaches, radials and all the necessary instrument procedures with a high degree of accuracy required for this type of training.

OpenGL

First of all some words about OpenGL. We have chosen the OpenGL API (Graphics Programming Interface) over DirectX because we see it as "the way to go" with precise high quality graphics. SGI's (Silicon Graphics) OpenGL has been the standard for the high-end applications for many years now, and finally this cross-platform standard has found its way onto our desktop PCs. OpenGL is supported on the Windows platform through the drivers supplied by your graphics card manufacturer. Windows has always been delivered with the OpenGL DLLs (Dynamic Link Libraries) and you can see both the serious CAD world and the more "enthusiastic" gaming world has been forcing the graphics card vendors to develop good implementations of the OpenGL drivers (ICD). So far they mainly concentrated on DirectX.

As the hardware is always ahead of the software (in this particular case the OpenGL drivers for your graphics card) what you have on your PC isn't necessarily the newest implementation of the OpenGL ICD. As the true driver situation is changing daily, we suggest you visit the site of your graphics card vendor (sometimes, even better, check with the chipset manufacturer) and search explicitly for the OpenGL ICD drivers. Important: Look for the ICD drivers, miniGL drivers won't do, they are developed only for certain games.

The driver people are catching up rapidly. To see how your card is performing with the current drivers, run WPFD.EXE or PFD.EXE and make sure the flight simulator is not running and the PFD.INI file has the entry Benchmark=Yes.

The program will initiate a benchmark cycle and report a benchmark value (anything above the value of 200 is good, depending on your hardware and graphics card) as well as the OpenGL acceleration status.

This can be:

- Emulated, No OpenGL Acceleration
- Partial MCD acceleration
- Full ICD Acceleration

What you want is Full ICD Acceleration, and here is how you can get it, if the drivers allegedly support it and the PFD doesn't report it. Some cards don't have enough memory and/or won't accelerate certain modes:

- Reduce the color depth to 16 bit
- Reduce the resolution to 800x600

If the driver has an ICD driver for OpenGL, it should accelerate now. The next step would be to increase the resolution...

Please check the PFD.INI entry Quality= for ways of changing your display quality with OpenGL.

Settings

GAGC.INI

There are various items you can customize both within the program and in the program's INItialization file, gagc.INI.

The GAGC.INI file is self-documenting, please check it for comments of all settings.

Keyboard Commands

This is the set of keyboard commands for the various panels.

Please Note: Some commands will not work with some panels, especially the "Black" panel.

	General
Q	Exits Program
F	displays/hides frame rate and OpenGL acceleration type
W	Toggles Title Bar display / Full Screen
	Instruments/Pages
Cursor Keys	Move displayed Instruments Left, Right, Up, Down
Ctrl-Cursor Keys	Move displayed Instruments in larger steps
+(NumPad Plus)	Zoom In (Increase Size)
- (NumPad Minus)	Zoom Out (Decrease Size)
F1 to F12	Bottom row function keys
	Modes
Esc	Menu

	Actions
Num Keypad 7 & 1	Trim Up/Down
Num Keypad 9 & 3	Flaps Up/Down
G	Gear Up/Down
Home/End	Increase/Decrease selected altimeter pressure
Ctrl-Z/X	Decrease/Increase Panel Brightness
E/R, Ctrl-R	Decrease/Increase Heading, Heading Set
T/Y, ShiftT/Y	Decrease/Increase Altitude, 100s, 1000s
U/I	Decrease/Increase Selected OBS - CRS
O/P, ShiftO/P	Decrease/Increase VOR1/VOR2 Frequency, decimals
J/K	Toggle/Swap VOR/COM standby frequencies
G/H	Decrease/Increase Map Display Range
Z/X, ShiftZ/X	Decrease/Increase COM1/COM2 Frequency, decimals
A,S	Select NAV1/NAV2 and Select Com1/Com2

pmSounds

Freeware program, delivered "as is".

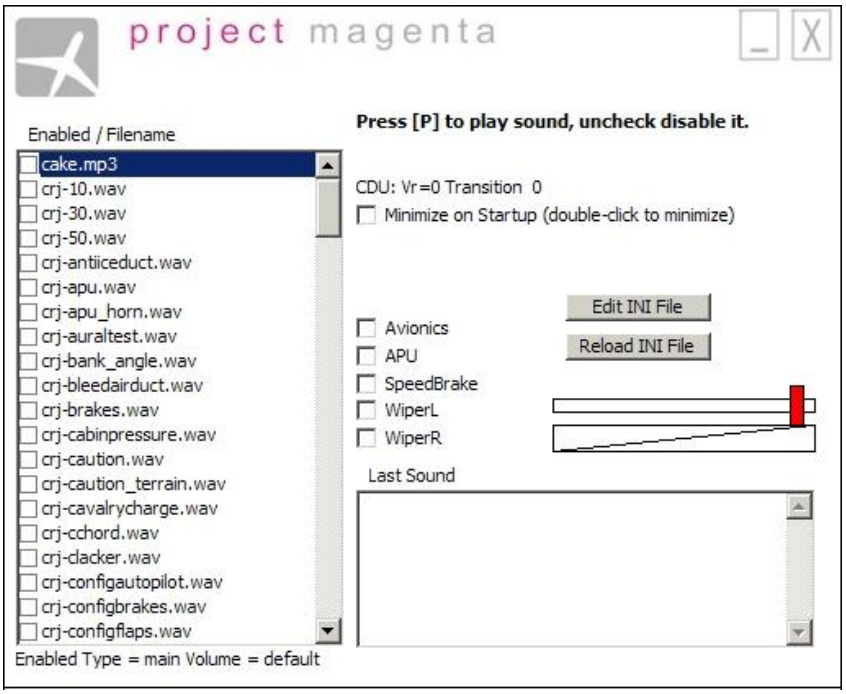
pmSounds is a program that generates sounds and callouts depending on various flight situations. This software was made to run with our other flight management software, but it can also be used without other Project Magenta components. This is not an adventure, not an FS module... it can be run in parallel to FS on the same PC or on a networked system. You can switch certain sounds on and off at any time. More Project Magenta Products can be found here.

This software was written for Microsoft FS2004, FSX, ESP, Prepar3D, Microsoft Flight Simulator 2020 / 2024 and X-Plane 11 / 12.

Please make sure you have **FSUIPC** installed, to run this software in a network you also need **WideFS**. Both can be found on **www.schiratti.com/dowson**

Features

- **Co-Pilot callouts:** 80 knots, Vr, Transition Altitude (from PM Software), flap and gear position, 10000 ft
- **GPWS Warnings, Announcements, Callouts**
- **Waypoint Switching, Altitude alerts** (in connection with PM FMS software)
- Sounds can be selectively disabled at any time.
- **A good number of sounds is by Wilco Van Deijl,** with his permission of course.



Please note:

- to install pmSounds simply run the install program and follow the steps you see on the screen, the program will create its own folder and a subfolder containing the sound files.
- pmSounds might not run with some sound cards when used on the same PC as FS
- pmSounds should not be installed within any of the FS folders, it runs independently from FS, on the FS computer or on a computer in a network using WideFS
- pmSounds requires FSUIPC

Make sure any additional WAV files are unzipped to a subfolder called "Sounds". This is *not* the FS Sounds subfolder... but a folder within the folder in which you have placed PMSounds.EXE. E.g. C:\PMSounds\Sounds

This program can be run on any computer on the network, using WideFS.

You can replace all the sounds in the subfolder with other such as the ones from GPWS98 (can be found on www.flightsim.com)

If you want to remove a sound, uncheck it from the left hand menu or delete the sound from the \Sounds subfolder.

Custom sounds can be inserted and edited using entries in the soundslist.txt file. They can be triggered by offsets and by some other programs like the GPWS callouts generated by the Glass Cockpit.

Additional Information Section

SID/STAR/APPR Data

Sid/Star Introduction

This document will explain the system with which you can build your own SID/STAR entries for the Project Magenta CDU.

The CDU comes with two very large files, SIDDATA.TXT and STARDATA.TXT. Those files include a world-wide set of departure and arrival procedures which have been created for you. To add your own procedures, the CDU is able to read two other files which will obviously be smaller. SIDDATA2.TXT and STARDATA2.TXT.

The approach procedures are described in the same way as the SID/STAR and they can be saved in APPDATA.TXT (or APPDATA2 / 3 etc).

Flying a procedure can be quite complicated, explaining it to a computer is at least as difficult. This means that trying certain combinations may result in a very confusing line on your ND and may even generate strange results in the CDU itself.

Sid/Star Structure

Both the SID and the STAR lists follow this general structure:

[{ICAO Code}**]**
{procedure name} {runway(s) used}
{part indication}**>** {description of waypoints}
{procedure name} {runway used}
{part indication}**>** {description of waypoints}
{procedure name} {runway used}
{part indication}**>** {description of waypoints}
{procedure name} {runway used}
{part indication}**>** {description of waypoints}
[{ICAO Code}**]**
{procedure name} {runway used}
{part indication}**>** {description of waypoints}

Example:

[LGMK]
TEST1 16
1> +500 MIL @7000 KEA DDM
TEST2 34
1> +500 +INTC090 MIL @7000 KEA DDM
TEST3 ALL
1> +800 KEA

meaning:

[Mykonos Airport in Greece]
Procedure TEST1, Runway 16
part 1 > maintain present heading until 500 ft, fly to VOR MIL at 7000 ft then on to VORs KEA and DDM
Procedure TEST2, Runway 34
part 1 > maintain present heading until 500 ft, turn to intercept heading 090 fly to VOR MIL at 7000 ft then on to VORs KEA and DDM
Procedure TEST3, All runways
part 1 > maintain present heading until 800 ft, then direct KEA

{ICAO Code} 4 letter ICAO code of the Airport
{procedure name} Name of the procedure
{runway used} Runway Number (e.g. 33R, 33L, 33C), ALL (all runways) or 33B (for runways 33L and 33R)
{part indication} indicates what portion of the procedure is being described
{description of waypoints/commands} List of waypoints/commands to be flown.

{part indication}

- 1> initial (e.g. starting from runway)
- 2> or 3> continuation of that procedure
- A> approach
- I> ILS approach
- N> NDB approach
- V> VOR approach

Waypoints

{altitude} indicates an altitude in feet or a flight level (FL!) is required
{navaid} indicates a navaid name is required
{course} indicates a course is required (always course TO the waypoint)
{heading} indicated an aircraft heading is required (magnetic)

{waypoint name} e.g. VOG, BAMBI etc.

{waypoint radial/distance} e.g. VOG270/15
Defines a point on radial XXX, YY NM from the waypoint (will create the waypoint VOG1 etc.)

{waypoint radial/waypoint radial} e.g. VOG180/LIN280
Defines a point on the intersection of radial XXX from waypoint 1 with radial YYY from waypoint 2

{latitude/longitude} e.g. N13E020, S1530W01545 etc.

.ARC command

The .ARC command defines an ARC over a series of radial/distance waypoints based on a VOR, beginning radial, ending radial and distance:

e.g. .ARC090180/005ABC draws an arc from 090 degrees to 180 degrees / distance 5 NM around the ABC VOR.

Subsequent operations are made on these waypoints. I.e. to set a speed, course to a waypoint, it has to be defined first.

Conditional Waypoints

+{altitude}
e.g. 1> **+500** +INTC090 MIL @7000 KEA DDM

This command sets a condition to step to the next waypoint only when the aircraft is above 500 ft (in the example). Normally used right after take off... but it can be used enroute as well. This waypoint would be displayed as (500)in the CDU.

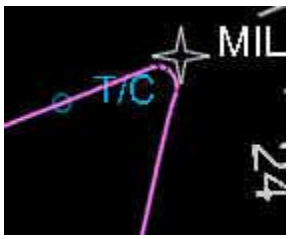
+INTC{heading}
e.g. 1> +500 **+INTC050** ABC

This condition means that after passing 500 feet the aircraft should turn to the heading of 050 degrees. Assuming you are on runway 36, taking off heading 360, the +INTC050 would force a right turn to waypoint ABC, which would lie to the south of the runway. The aircraft won't fly to ABC unless it reaches the heading of 50 degrees. To force a left turn to ABC you would have to use +INTC340.

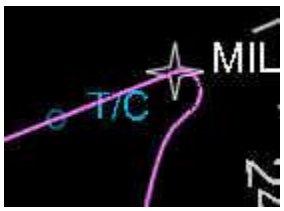
Other Settings/Restrictions

@O (the letter 'O', *not* the digit '0')
e.g. 1> +500 +INTC050 ABC DEF **@O** GHI

Sets/cancels flyover waypoint. By default, all waypoints read from the SID/STAR are flyover waypoints, i.e. ABC would be flown over, the turn to the next waypoint would not be initiated until the aircraft has reached that waypoint, ABC @O would allow the aircraft to fly to the next waypoint as soon as it has to turn to be able to intercept the proper inbound course.



... MIL @220/ **@O** KEA ...



... MIL @220/ KEA ...

@{speed}/
e.g. 1> +500 +INTC050 ABC **@220/** DEF @O GHI

Sets the speed restriction for the waypoint ABC, in this case 200 knots. Important: speed has to be followed by a slash '/'!

@{altitude}
e.g. 1> +500 +INTC050 ABC @220/ **@7000** DEF @O GHI
Sets the altitude restriction for the waypoint ABC, in this case 7000 feet.

@{flight level}
e.g. 1> +500 +INTC050 ABC @220/ @7000 DEF @O **@FL220** GHI
Sets the altitude restriction for the waypoint DEF, in this case flight level 220.

.DIS{distance}

To describe a distance from the previously defined waypoint.

.CRS{course}

To describe a course from the previously defined waypoint. (e.g. DUMBA .CRS070)

+V

Radar vector (shown as (VECTOR) in the LEGS page)

Aircraft Configuration Files

Basics

The Aircraft Configuration Files are used by the CDU/FMS and the Glass Cockpit. They have the extension .TXT for your convenience, and they can be edited with any text editor.

Glass Cockpit Only

If you do **not** have the CDU/FMS software, the Aircraft Configuration file is referenced within PFD.INI. I.e. you would have an entry Type=B737400 to reference the file B737400.TXT for the B737-400. Both entries are in the [Network] section of the ini file. This file is loaded only once, when the Glass Cockpit is started.

Glass Cockpit with CDU/FMS

If you use the CDU/FMS software, things are different.

First of all, edit PFD.INI and enter Type=CDU, instead of Type=B737400.This will load the aircraft type file that is provided by the CDU. The file will be retrieved from the NetDir Folder. For more information about that, please check the Glass Cockpit instructions.

The Aircraft Configuration Files go into a Folder ("Types") within the main CDU folder, you should find several .TXT files there. If you want to create your own TXT file, just copy one of the existing ones and use it as a template.

The Aircraft Type used by the CDU (and subsequently by the Glass Cockpit) can be selected on startup, pressing LSK 1L, or later on by going to the INIT/REF, IDENT page.

Every time you select a new aircraft type, the data is re-loaded, put into the NetDir folder and the Glass Cockpit is instructed to load it as well. The name of the selected aircraft should show up in the Engine Page.

To see a sample TXT file please go here: www.projectmagenta.com/downloads/aircraft.html

Aircraft Configuration File

Each aircraft type has its own set of data which can be currently set via entries in a file which is referenced in the **PFD.INI** (see above) entry Type=FILENAME (e.g. Type=B737400 for B737400.TXT). In the default Set-Up of the Glass Cockpit software you will find B737400.TXT and B747400.TXT

In this particular example are some annotations for the **B737400.TXT** file if you want to change the settings, but you will surely soon find more aircraft types made by us or others online.

These files will be transferred from the CDU/FMS to all other client PCs at a later stage, allowing you to change the type you are using "on the fly". To use the aircraft type selected in the CDU, edit your PFD.INI and set **Type=CDU.**

General Data

Type=CDU
AircraftType=

This overrides the type name taken from the aircraft configuration file, it can be set to B737NG for instance. This value can be empty if you don't want it to appear on the Engine page.

TOGAPitch=15

The TOGAPitch entry defines the fixed pitch the Flight Director goes to when the throttles are in TOGA mode (either via the MCP/Autopilot or the default simulator TOGA mode)

N1ref = 93

When you are not using the CDU and the MCP/Autopilot, the reference N1 value is fixed and is more of an optical thing than a real feature. The N1 limit can be set via the CDU and is then sent to the MCP/Autopilot program limiting the throttles according to the particular phase of flight as wet in the CDU or in the MCP.INI file.

Flare = 20

AGL in feet where you want the flare to be initiated for this particular aircraft

RadioAlt = 18

When you have a non-zero indication for the radio altimeter in the PFD and enter this value for the radio altimeter on the ground, it will display 00.

EFIS=On

Will switch to EFIS mode if a 737 / 757 or 767 is in the AircraftType= entry, but not for the 767-400 as it has a PFD/ND layout

EADI=On

With the 75/767 it will switch to the more modern horizon with the speed tape instead of the fast slow indication

RAGauge=On

With the 75/767 it will display the radio altimeter gauge to the right of the horizon and move the altimeter further to the right if EFIS=On

HideN2=On

With the 747-400 inhibits the display of N2 on the upper EICAS

RunwayLength=6000

Will force the Glass Cockpit (ND) and FMC (Alternates) to load only airports with runways longer than that value.

EGT = On

Indicates whether you want EGT to be displayed in the Engine page of this aircraft (vertical instruments only)

NetWeight=88000
Payload = 20000
Fuelmax = 40000

These weights are in pounds, where the payload is a fixed value which should be taken into account within the AIR file of the type flown (please check the flight model's documentation) as well as the weight. The setting Fuelmax is only used when FS is not connected.

Engines=CFM56-7B20

The name of the engine type used, this is for display in the IDENT page.

EnginesRate=20K

The rating of the engines... which is used on some pages of the CDU.

FFFactor=1.1

You can change the actual fuel flow display by entering a factor for each type of aircraft. The fuel flow displayed in this case will be 10% higher than the one calculated by FS.

FFMax=15

The maximum expected fuel flow in 1000s of pounds (per engine).

N1StartupDelay=25

Delay in seconds for N1 to reach full spool time upon starting up. In FS, this N1 value jumps far too drastically far too soon, this will make it "climb" slowly.

N2StartupDelay=27

Same as N1startupdelay, just for N2.

N1Init=3.2
N1Stable=23.4
N2Stable=55.5

The three values above *have* to be set for the Startup Delay sequence... N1Init is the N1 value at which the Startup delaying sequence is started, i.e. when on startup N1 passes 3.2 it will switch into the startup sequence. N1 Stable and N2 Stable are the target values after completion of the spooling up and both values are stabilized. This will get rid of the discontinuity of the values, as both N1 and N2 "jump" quite a lot in FS.

MaxMach=0.84
or
MaxMach=84

The cruise mach limit for barber pole.

```
Ceiling=45000
or
Ceiling=450
```

Maximum cruise altitude, defaults to 45000 ft/FL450

```
TrimMin=6
TrimMax=16
TrimScaleMin=40
TrimScaleMax=40
```

Min/Max values for trim value (for takeoff) and maximum/minimum value of trim scale.

Flap Definitions

The next blocks of entries (in this particular case) represent the nine flap positions of the default B737-400. These are 0 (translated to UP), 1, 3, 5, 15, 20, 25, 30, 40 in this particular case. The values are to be understood as follows

- **flppos** (FS flap setting, scaled from 0 to 40, where 0 is flaps up, 40 is full flaps. Note: in this example, the real flap setting of 25 is equal to flppos=30, but only because it is defined that way in the aircraft.cfg file).
- **flpset** (Real flap setting, i.e. what the current flap setting's denomination is next to the flap lever in the cockpit)
- **vmax** (Maximum speed for the particular flap position, in this case, for flaps up 340 IAS. This is where the upper part of the barber pole in the PFD speed tape will end. It will be translated to mach at high altitudes)... you can also use values such as vref40+70 (meaning the Vref for flaps 40 plus 70 knots).
- **vret** (Flap retraction speed for the flap bugs in the speed tape. At this speed, the flaps must be retracted to the next higher setting, not possible when flaps are up, thus 0 for flpset=0, but set to 190 IAS for flpset=1, i.e. flaps should be retracted when passing this bug)
- **vext** (Speed at which the flaps have to be set to the next lower setting. For flpset=0 it is 210 IAS, thus we have to extract flaps 1 when we are about to pass the bug)
- **vmin** (Minimum manoeuvering speed for the particular flap setting)

```
flppos=0
flpset=0
vmax=340
vret=0
vext=210
vmin=190

flppos=5
flpset =1
vmax = 230
vret = 190
vext = vref40+60
vmin= 170

flppos=10
flpset = 3
vmax = 227
```

```
vret = 180
vext = 180
vmin = 165

flppos=15
flpset = 5
vmax = 225
vret = 170
vext = 170
vmin = 160

flppos=20
flpset=15
vmax = 195
vret = 160
vext = 150
vmin = 140

flppos=25
flpset=20
vmax=190
vret=150
vext=140
vmin=135

flppos=30
flpset=25
vmax=190
vret=150
vext=140
vmin=130

flppos=35
flpset=30
vmax=185
vret=140
vext=125
vmin=120

flppos=40
flpset=40
vmax=158
vret=120
vext=0
vmin=120
```

Note: Any flap speeds can also be defined in reference to a vref speed of a given flap setting plus a value, e.g. vext=vref30+20 (i.e. vref of flaps 30 for a particular weight plus 20 knots.

The following two entries add the respective speed (in the first case 10 knots) to the speeds for the flap settings above, when the gross weight of the aircraft passed the value specified in flpadd1. I.e. the vmin of 120 IAS for flpset=40 is increased to 130 when the gross weight is above 116700 lbs.

```
flpadd1=116700
flpkts1=+10
```

```
flpadd2=138200
flpkts2=+20
```

V-Speeds

The table for the V1, V2 and VR speeds that follows is interpreted for a take-off at flaps 10 (vr=10). If no other flap values are specified, then they are applied to the present flap setting. Each line starts with a weight in pounds, the V1 speed, VR and finally V2. You can have as many entries as you wish, the values are calculated linearly from one weight to the next. The table must be concluded with the line "vrend". The values have to go from the smalles weight to the highest.

```
;v1,vr,v2 for flaps 10
vr=10
88200 113 114 130
93700 117 119 133
99200 121 123 136
104700 125 127 139
110200 129 131 142
115800 133 135 146
121300 137 139 149
126800 141 144 152
132300 144 148 155
137800 148 152 158
143300 151 155 161
148800 155 159 165
154300 158 163 168
vrend
```

The table for the Vref is similar to the table above. In this case the flap setting is 40 (vref=40). If no other flap values are specified, then they are applied to the present flap setting. Each line starts with a weight in pounds, followed by the Vref. You can have as many entries as you wish, the values are calculated linearly from one weight to the next. The table must be concluded with the line "vrefend".

```
;vref for flaps 40
vref=40
77200 109
82700 113
88200 116
93700 120
99200 124
104700 127
110200 130
115800 134
121300 137
126800 140
132300 143
137800 146
143300 149
```

```
148800 152
154300 155
vrefend
```

The stick shaker speeds can be set as well... using the same system as the other speeds.

```
;stick shaker speeds for flaps up
vss=0
90000 137
100000 144
110000 152
120000 157
130000 165
132500 167
vssend

vss=1
vss30 1.12
vssend
```

N1 Takeoff Table

The following is a table for the takeoff thrust N1% limit. The table goes from the highest to the lowest temperature in the first column, then the various N1 settings are listed in columns according to the airport's pressure altitude (OAT).

```
n1totable
C -2000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000
60 84.0 84.7 86.1 87.3 88.1 89.1 89.3 89.5 88.8 88.2 87.9
55 84.8 85.8 87.0 88.1 89.0 90.0 90.1 90.3 89.6 88.8 88.1
50 85.8 86.8 87.9 88.9 89.8 90.8 90.9 91.0 90.3 89.6 88.7
45 86.8 87.7 88.8 89.7 90.7 91.7 91.7 91.7 91.1 90.4 89.5
40 87.7 88.6 89.7 90.6 91.6 92.5 92.4 92.4 91.8 91.2 90.3
35 88.4 89.5 90.6 91.5 92.4 93.4 93.3 93.2 92.6 91.9 91.0
30 88.2 90.1 91.1 92.1 93.0 94.0 94.0 94.0 93.4 92.7 91.8
25 87.5 89.7 90.7 91.8 92.7 93.7 94.2 94.3 94.1 93.5 92.6
20 86.8 89.0 90.0 91.1 91.9 93.0 93.4 93.9 94.5 94.2 93.4
15 86.0 88.3 89.3 90.3 91.2 92.2 92.6 93.1 93.7 94.2 94.0
10 85.3 87.5 88.5 89.6 90.4 91.4 91.9 92.3 92.9 93.4 93.7
5 84.6 86.8 87.7 88.8 89.6 90.7 91.1 91.6 92.1 92.6 92.9
0 83.8 86.0 87.0 88.0 88.9 89.9 90.3 90.8 91.3 91.8 92.1
-5 83.1 85.2 86.2 87.2 88.1 89.1 89.5 90.0 90.5 91.0 91.3
-10 82.3 84.5 85.4 86.4 87.3 88.3 88.7 89.2 89.7 90.2 90.5
-15 81.6 83.7 84.6 85.6 86.5 87.5 87.9 88.3 88.9 89.3 89.7
-20 80.8 82.9 83.8 84.8 85.7 86.7 87.0 87.5 88.1 88.5 88.8
-25 80.0 82.1 83.0 84.0 84.8 85.8 86.2 86.7 87.2 87.7 88.0
-30 79.2 81.3 82.2 83.2 84.0 85.0 85.4 85.8 86.4 86.8 87.2
-35 78.4 80.5 81.4 82.4 83.2 84.1 84.5 85.0 85.6 86.0 86.3
-40 77.6 79.6 80.5 81.5 82.3 83.3 83.7 84.1 84.7 85.1 85.4
-45 76.8 78.8 79.7 80.7 81.5 82.4 82.8 83.3 83.8 84.2 84.5
-50 76.0 78.0 78.9 79.8 80.6 81.5 81.9 82.4 82.9 83.3 83.7
-55 75.2 77.1 78.0 79.0 79.8 80.7 81.1 81.5 82.1 82.5 82.8
end
```

N1 Climb Table

Similarly, a table for N1 Climb values, again, it has to be from the highest to the lowest temperature:

```
n1clbtable
C 0 5000 10000 15000 20000 25000 30000 35000 37000 41000
60 83.7 83.8 83.7 83.7 86.9 91.3 92.9 94.3 94.4 92.7
55 84.7 84.6 84.6 87.3 90.6 92.3 93.6 93.7 92.0 84.5
50 85.2 85.5 85.5 85.5 88.2 90.7 91.6 92.9 93.0 91.3
45 86.0 86.3 86.3 86.3 89.1 91.6 91.6 92.2 92.3 90.6
40 86.9 87.0 87.1 87.1 89.9 92.4 92.4 91.5 91.6 89.9
35 87.8 87.9 87.9 90.7 93.2 93.2 92.3 91.6 90.0 87.5
30 86.8 88.5 88.6 88.7 91.5 94.0 93.9 93.1 92.5 91.0
25 86.1 88.6 89.4 89.4 92.3 94.8 94.6 93.9 93.3 92.0
20 85.4 87.9 90.2 90.1 93.0 95.5 95.3 94.6 94.1 92.9
15 84.7 87.1 89.6 90.9 93.8 96.2 96.0 95.4 94.9 93.9
10 84.0 86.4 88.8 91.1 94.6 96.9 96.6 96.1 95.7 94.8
5 83.2 85.7 88.1 90.3 95.5 97.8 97.3 96.9 96.5 95.7
0 82.5 84.9 87.3 89.5 94.8 98.9 98.3 97.8 97.4 96.6
-5 81.8 84.1 86.5 88.7 94.0 98.8 99.3 98.5 98.2 97.7
-10 81.0 83.4 85.7 87.9 93.2 98.0 99.6 99.4 99.1 98.6
-15 80.3 82.6 85.0 87.1 92.4 97.3 98.8 100.4 100.1 99.6
-20 79.5 81.8 84.2 86.3 91.5 96.5 98.0 100.1 100.6 100.2
-25 78.7 81.0 83.3 85.5 90.7 95.7 97.2 99.2 99.8 99.4
-30 78.0 80.2 82.5 84.7 89.9 94.9 96.4 98.4 98.9 98.6
-35 77.2 79.4 81.7 83.8 89.0 94.0 95.5 97.6 98.1 97.7
-40 76.4 78.6 80.9 83.0 88.2 93.2 94.7 96.7 97.2 96.9
end
```

Climb 1 and 2 thrust reduction sequence E.g.: reducing by 3% N1 until 10000 ft, gradually increasing to full climb N1 until 15000 ft:

```
clb1-reduction
3, 10000, 15000

clb2-reduction
6, 5000, 15000
```

For Take-Off thrust reduction use the following:

```
to1-reduction
10, 10000, 15000

to2-reduction
15, 10000, 15000
```

Note: The reduction entries should be made after the tables.

Cost Index Data (Experimental)

```
costindex
0 271/.72 270/.71 330/.78 3.2
```

```
20 283/.74 282/.74 266/.73 2.7
200 335/.78 320/.78 330/.78 2.1
end
```

Example: 20 is cost index clbias/clbmach crzias/crzmach desias/desmach (descent angle in degrees)

(**Note:** Descent, IAS first, then MACH, normally it is spoken/written as mach/ias, (high cost index should have a higher descent angle for path descent)

Flight Mode Annunciators

Most Aircraft types follow the same "rules" as far as the FMA (Flight Mode Anunciators) are concerned, but the texts can differ greatly. These Texts can be changed in every single TXT file, and you only have to enter the ones you want to change. The following is a listing of the DEFAULT settings:

Speed Modes:

Boeing-Type

```
ASPD1=ARM
ASPD2=THR
ASPD3=SPD
ASPD4=RETARD
ASPD5=THR HLD
ASPD6=FMC SPD
ASPD7=MCP SPD
ASPD8=IDLE
ASPD9=SPD (VNAV SPD)
ASPD10=THR REF
```

Heading Modes:

```
AHDG1=HDG SEL
AHDG2=LOC ARM
AHDG3=VOR/LOC
AHDG4=APP LOC
AHDG5=LOC ARM
AHDG8=LNAV
AHDG9=ROLLOUT
AHDG10=HDG HOLD
```

Altitude Modes:

```
AALT1=GS LOCK
AALT2=ALT
AALT3=MCP SPD
AALT4=V/S
AALT5=ALT ACQ
AALT6=GS ARM
AALT7=TO/GA
```

```
AALT8=TO/GA
AALT9=VNAV SPD
AALT10=VNAV PTH
AALT11=VNAV ALT
AALT12=FLARE
```

Command (A/P) Modes:

```
ACMD1=CMD
ACMD2=F/D
ACMD3=LAND 2
ACMD4=LAND 3
ACMD5=NO AUTOLAND
```

Standby Modes:

```
SSPD1=ARM

SHDG1=LNAV
SHDG2=VOR/LOC
SHDG3=VOR/LOC
SHDG4=ROLLOUT

SALT1=VNAV
SALT2=GS
SALT3=FLARE
SALT4=V/S
```

Thus, if you wanted to change the anunciator of the Autopilot main mode to A/P from CMD, you would have to enter:

```
ACMD1=A/P
ACMD2=F/D
ACMD3=LAND 2
ACMD4=LAND 3
```

Flap Definition

We have to define proper flap position names in relation to their flap setting inside of FS. This largely depends on the flight model used and what you want the flap names to be. Here we are changing an existing file to accommodate for our flight model's or cockpit's flap positions which we want to be UP - 1 - 5 - 10 - 20 - 25 - 30

In the CDU, please go to INDEX, MAINT, MONITOR, then check the flap settings in the lower right half of the screen. Please make sure you re-load the aircraft when you make changes to the aircraft configuration file.

See the value under "CURR.FLAPS" and "FLAP REL. POS" in the right side of the MONITOR page.

You press F5 in FS (flaps up) it will say 0 under curr flaps and 0 () under flap rel pos. The first entry is what the NAME of the flap setting is, the second is the one retrieved from the aircraft configuration table as a reference, the actual value is in brackets.

flpset (FLAP RELATIVE POSITION) =0 is Flaps UP, = 40 is Flaps Full.

If you press F7 (flaps one notch down) It might say the following (depends on the flight model, here the default 747-400):

Position The actual flap sequence	**CURR FLAPS (flppos) the text in the Glass Cockpit**	**FLAP REL POS (flpset) the value from FS**	**Comment**
1st notch (UP)	**0**	0 ()	Flaps Up, would display UP in the Glass Cockpit
2nd	**1 (!!!)**	7 (1) (!!!)	Here we want the flap text to be 1, and something is undefined in the configuration file, FS reports a flpset of 1, but 7 is defined and looked up, the intermediate (1) is missing. We need to insert a flap block to cover this!
3rd	**1**	7 (7)	Here we would want a flap text of 5, not 1... you see the 1 is doubled, so something is wrong.
4th	**5**	13 (13)	Here I want a flap text of 10 for instance...
5th	**20**	27 (27)	The rest is OK...
6th	**25**	33 (33)	
7th notch (FULL)	**30**	40 (40)	40 is the maximum position, and this should be shown as 40

Current (please note that the vmax, vret, vext and vmin are unchanged, refer to the description at the beginning of the document) Important: note that there are seven flap positions, but only 6 blocks of information!	**Changed** (according to the comments above) We have to add a block for the flpset 1 and need to change the entries for the following flap positions.
flppos=0 flpset=0 vmax=340 vret=0 vext=210 vmin=190	flppos=0 flpset=0 vmax=340 vret=0 vext=210 vmin=190

flppos=1 flpset=7 vmax = 227 vret = 180 vext = 180 vmin = 165 flppos=5 flpset=13 vmax = 225 vret = 170 vext = 170 vmin = 160 flppos=20 flpset=27 vmax = 195 vret = 160 vext = 150 vmin = 140 flppos=25 flpset=33 vmax=190 vret=150 vext=140 vmin=135 flppos=30 flpset=40 vmax=190 vret=150 vext=140 vmin=130	***flppos=1*** ***flpset=1*** *vmax = 227* *vret = 180* *vext = 180* *vmin = 165* ***flppos=5*** ***flpset=7*** vmax = 227 vret = 180 vext = 180 vmin = 165 ***flppos=10*** ***flpset=13*** vmax = 225 vret = 170 vext = 170 vmin = 160 flppos=20 flpset=27 vmax = 195 vret = 160 vext = 150 vmin = 140 flppos=25 flpset=33 vmax=190 vret=150 vext=140 vmin=135 flppos=30 flpset=40 vmax=190 vret=150 vext=140 vmin=120

Terrain Data Files

Last Update:

terrain1.zip PAJN, LIRN, LSZH, KLAX, HAAB
terrain2.zip MMAA, MMMX, KSLC, MTPP, KLAS
terrain3.zip LGAV, LFMN, EDDS, LIRF, LEMD
terrain4.zip BGSF, LOWI, LOWS, SKBO, SBSP
terrain5.zip BIRK, ENGM, ESSA, EDDM, CYVR, RJBB
terrain6.zip KDEN, EGPH, OLBA, VHHH, SPIM, ENBO
terrain7.zip LTBA, KPDX, NWWW, KSFO, LSGG, YSSY
terrain8.zip CYYC, EDDF, MMMY, LIPZ, LIMM, LGZA, HTKJ, GMFF, FACT

(just put the .de1 files into the glass cockpit folder and it will move them to the /terrain subfolder. If it is not there, then that folder will be created)

In addition to these files, you can also **create your own files** using WhazzUp Plus... (see Products Page)

Ctrl-R switches the display ON or OFF (one keystroke)

Ctrl-G switches the various modes (Off, Lines, Grid, Triangles)

Ctrl-H the colour modes (altitude colours, plain green, "delta altitude")

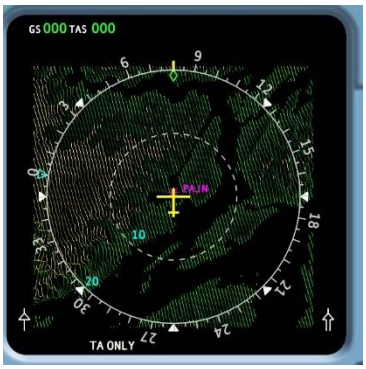
Ctrl-A will enable/disable the 3D display of elevations

Alt-G will select the large, small map

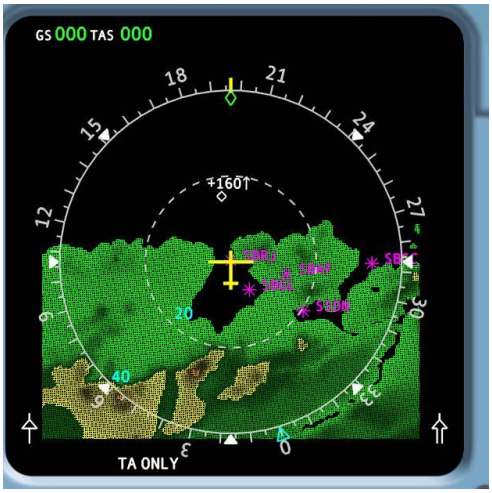
Normally on a slower PC you would use Lines, small map... on a faster one triangles... and then it is a matter of taste anyway.



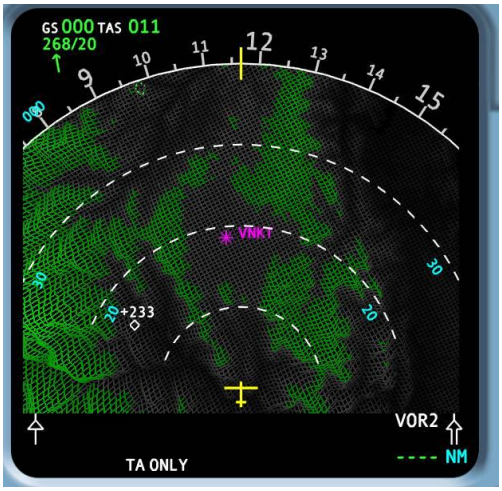
Green Grid display - Hong Kong

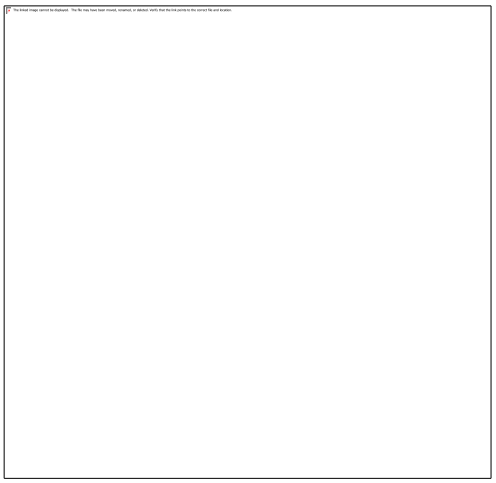


Juneau, Alaska, Line Display with altitude colours



Rio de Janeiro, Grid display, altitude colours





Grid display, Kathmandu, Nepal, green are obstacles above the aircraft's altitude, grey below it.

Triangle display around Kathmandu

Weather Radar

General

Our weather radar handling was implemented quite some time ago, it was first implemented using WhazzUp.

FS

- the weather generated within FS has nothing to do with WhazzUp, the weather radar in the ND and what is displayed. If there is major downpour that you set FS sitting in Port-Au-Prince and in real world the skies are blue, you won't see anything in the ND.
- the main FS folder has to be shared for read and write access

WhazzUp

- it needs an internet connection to download the weather data
- you can run it minimized if you feel it is taking performance away from your computer (if you see OpenGL problems on the FS computer, try a different graphics driver version)
- you can add the line AskConnect=On to the WhazzUp.INI file, then a message box will come up in WhazzUp, asking you whether you want to connect and you say "no" - then it will not connect to VATSIM or IVAO
- it doesn't generate winds, rain etc. for that you still need specialized programs or the FS weather download option, for the time being
- the NetDir can be empty for the time being
- if the WXR is enabled in the Glass Cockpit, then WhazzUp should be downloading weather data every 10 minutes or every time the FS reports a position which is more than 500 NM away from the last download
- WhazzUp needs to be connected to FS in order to inform the Glass Cockpit that it has downloaded data... for that it has to be either on the FS computer or on a WideClient Computer and you should see a magenta symbol for the positons of FS in the world map

pmGetweather

- pmGetWeather replaces WhazzUp for the weather bitmap generation
- it is easy to use, you essentially run it on any computer in the network which has internet access

Glass Cockpit weather

- if there is no "weather" in the area you are in, then nothing will be displayed in the ND
- if the WXR text in the ND is barely readable (i.e. grey), that means that either no weather file has been found or that it isn't valid for the area, i.e. the communication to WhazzUp isn't working
- What you see is a processed infrared sat image, i.e. the lighter the colour, the cooler the weather system is. Grey would be your run of the mill overcast, blue slightly cooler systems at lower altitudes going all the way to red which would be tall and very cold clouds, possibly thunderstorms.

Weather All other programs

- yes, the WXR button in the MCPs will activate the weather in the Glass Cockpit
- yes, the CDU/MCDU will allow to set it as well
- yes, an option to display METAR reports has been added to the FMCs

Back-Up

Reasons for backing up

It is important to back up all important files in relation to your simulator or Project Magenta software. There are certain user files within the program folders that are (or become) user specific, meaning you are entering information into them that is specific to your system, as such it is highly advisable to develop a methodical system of back-up for these files.

Typical User files that should be backed up: pfd.ini, cdu.ini, mcp.ini and all files where you have entered specific information – usually with the file ending .ini or .txt, for example in pmSystems you might have file like: phidget.txt and flightillusion.txt these txt files hold specific information regarding your set-up, if lost then you will have to re-define those entries which might lead to simulator / FTD downtime.

Because of the way Windows works, it is possible for some files to be held in the disk cache and if a system failure happens or a shutdown of a computer whilst a program is still not fully closed then it is also possible (even though very unlikely) for windows to drop a file from your system. This can cause particular problems if it happens especially in relation to the main program ini files which hold not only user entered information but also specific information about your install.

For this reason we advise two key things that should help to prevent problems:

- You can disable the disk cache in the device manager, HD properties, policies tab, this will help prevent files being lost in the cache.

- On regular intervals, copy the contents of your (for example mcp.ini file) into the special BNI file which resides in your main program folder.

    - To do this open your (for example mcp.ini) file with the windows notepad editor
    - Copy the contents of the file
    - Open the mcp.bni file again with the windows notepad editor (you may have to select it as the program of choice to edit/open this file)
    - Past in the information that you copied from the original mcp.ini file.
    - Close and save the mcp.bni file

- Now the information is saved as a back-up in the BNI file. If for whatever reason your system should drop or delete the main program ini file then the MCP program will automatically search for the BNI file and create a new main program ini file using the back-up information in the BNI file.

The reason why the BNI file is a useful tool is that it will help to avoid an interruption of your software usage if the ini file is for some reason lost. You need to remember to perform the above process regularly especially if you are making changes to the ini files on a regular basis and making program updates.

Navdata Updates

Navdata is available for update from the website usually on monthly cycles. Please see the website for specific details of how to update and how to obtain new data.

http://www.projectmagenta.com/downloads/navdata.html

The navdata "latest" updates are not free of charge, you will be directed to the company providing the source and you need to follow their instructions to download them.

Generally, once you have downloaded the new data you have to unzip/install the file contents of that data into the main program folders of either the CDU or GC. Once that is done, start the respective programs, and the program itself will sort the new navdata and put the files in the correct folders.

Note that when the CDU / MCDU starts, you need to navigate to the IDENT page and select the new nav data using the LSK keys. You will see the current cycle indicated, and either the new one or previous cycle available in the IDENT page. You must select which cycle you want to use. It is important that the cycle also matches the cycle that you have downloaded and installed in the GC. It may be required that you are "connected" to MSFS for the update to take place properly.

Please note, that if you update navdata then you will also need to update your respective paper charts. They also need to match or at least to be checked against your new navdata.

Flight Models

This is a supplementary article. The reason for which is to stress the importance of correct loading and balance of your flight models.

For successful and controlled flight using Project Magenta software it is important that you have a good flight model. To some degree the software will try to learn the characteristics of your particular chosen flight model but this can only go so far.

Flight models that are made and have internal characteristics that are outside the realistic flight envelopes may present problems. These range from difficult to follow FD's (because perhaps the aircraft is out of balance) to unstable approaches with the AP engaged and inaccurate altitude captures. The problems stemming from very inaccurate flight models can have a detrimental effect on what is perceived to the pilot. Project Magenta does not provide flight models and it is good practice to find good models for use with MSFS and spend considerable time researching and testing in this area to fully realize the potential of the simulation. It should be stressed, this is not a limitation of MSFS, in fact, the simulation platform has a very powerful flight model engine, it is more that this needs to be fully realized by the end user, whether the end user is editing these characteristics themselves, or has chosen third party add-on flight models.

Having found a good flight model, the second and equally important factor to effective and realistic operation of your simulation platform is weight & balance.

Weight & Balance

The weight and balance of your flight model is fundamental to effective performance and operation of your simulator. An overweight or a flight model that has a Centre of Gravity outside the flight model limitations is inefficient and possibly will degrade all sorts of flight performance characteristics relating to effective simulated flight.

Weight

Overweight aircraft will have many side effects some of which are:

- Higher Vspeeds, inaccurate take-off distances and landing
- Stalling speeds affected
- Rate and angle of climb
- Engine performance
- Maneuvering impaired in both automatic and manual flight

So, when establishing the 'load' of your air-file, pay attention to the station loads and also the fuel load. The 'actual' airfile weight is read by the CDU and shown in brackets (xxx). The pilot entered weight (via LSK CDU entry) and resultant GW should generally match the bracketed actual air model weight. Note that a common error is not to allow for the differences of lbs and weights in kgs. Once you are certain that you are happy with your weights then you can (as an option) removed the secondary bracketed weight indication (ini file option). This is not an indication seen on the real a/c and is there as a cross reference – you should consider removing it if it is likely to cause confusion to pilots operating your simulator. To re-cap, and for the avoidance of doubt, the bracketed (xxx) weight after the indicated weight is measuring the actual weight of the MSFS airfile. But the computations of the FMC are not based on the bracketed weight, they are based on weights entered into the CDU.

Balance

At the same time that overall weight is considered, the balance of the load is also to be considered and is equally important.

The centre of lift will effect the flight characteristics and the normal Centre of Gravity is usually 25% aft of the leading edge of the wing (it is more complex than this for swept wing a/c but it is enough to work on this theory in the bounds of MSFS at this time). This should provide good longitudinal stability. If the CofG is too far aft or too far forward, then you can end up with a flight model that is difficult to control, especially with the elevator, this can result in having to apply larger than normal trim inputs, and in worst case scenarios, even running out of elevator and elevator trim authority. So, making turns with an out of balance a/c can result in abnormal pitch tendencies, making flight in instrument conditions, perhaps trying to follow the FD much more difficult due to the induced instability. So, the longitudinal stability mainly refers to the 'station loads' of your selected flight model – you should aim to get the CofG within the limits. If you're a/c has fuel loading capability in the main a/c fuselage – this should also be considered.

Lateral Stability can be affected by incorrect loading of fuel in the wing tanks. If you have a fuel imbalance your flight model may tend to fly wing down on the heavy side. Again, this can effect many things, like instability in level flight and in turns. If the balance is sufficiently great, it may even no longer be possible to maintain lateral control of your aircraft.

FAQ

can't find an answer to my question?
Just write an e-mail to **support@projectmagenta.com** or go to the support resources listed **here**

Testing our Software

Will the Glass Cockpit and the other programs be compatible to Microsoft Flight Simulator?
Absolutely yes! We have been compatible with every version of Microsoft Flight Simulator so far and any new release is considered to be our current version.

Can I try before I buy? Where is the Demo?
Yes, please try our software first, you can find it on our Demos page. And you can find the current version of the instructions in our documentation section.

The demo doesn't work. What can I do?
Easy fix: send us an e-mail (support@projectmagenta.com) with the problem and we will help, as if you were already our customer. A more interesting solution: go to our documentation section and check our PDF-Format User Manual.

What hardware do I need for the Glass Cockpit?
A difficult question to answer... it depends on the performance you expect. Some might be happy with one solution, others would never accept it. Please check out our Demo to see whether the hardware you want to use is acceptable to YOU. As a general advice we would like to see the Demo Benchmark test to score better than 120 and the graphics card on your system to be able to accelerate OpenGL (the Demo will tell you if it does).

Still, what are your Hardware Requirements?
For the ***Glass Cockpits*** we recommend any current multi-core PC with a graphics card that properly accelerates OpenGL (nVidia and AMD cards are both fine) ... the ***CDU/MCDU, MCP/FCU*** do not need OpenGL acceleration, the CDU might need a computer with more than 64 MB RAM because Windows doesn't leave a lot of free memory... for the ***NetWork***, a standard wired Gigabit network is more than sufficient.

Will your software run under Windows 11?
Yes, it will, we monitor our customer's feedback and so far no problems were reported. Setting up the network, especially with a mixed Operating System can be tricky though. If you are using WideFS, please make sure you read WideFS.TXT and apply all the necessary changes it describes for your version of Windows.

Must I use a network?
No, you don't have to. For best performance and functionality, the ancillary software should be run on a networked system, with the Glass Cockpit Full Screen, the Flight Simulator with only the outside view and full frame rate... some users run all of our software on one computer, they are happy, other people wouldn't be. It is a matter of what you want to do and what you expect.

I am not building a cockpit, is this software still interesting for me?
Yes, it certainly is. You know how small the instruments are in a normal Flight Simulator Panel. Well, we allow you to size the things as they are in a real cockpit, so if you want to boost the realism of your flying experience, this is the way to go. Ever tried flying the correct pitch, following a really good flight director, a proper flap retraction schecule?

Can I run the Glass Cockpit on a second monitor?
Yes, you can, but it depends on the operating system and the hardware you are using, please check your Operating System and Graphics Card manufacturer software for *Multiple Monitor Set-up* with Accelerated Graphics. Our Demos should also be able to tell you whether your hardware can handle it.

Why on earth are you doing this?
I have become very heavily involved with a great project, building a cockpit from scratch, learning more each day and still not seeing limits of what can be done using PCs... check out the Cockpit Page for more information. We're in the same boat.

Buying our Software

Do you have References?
Yes... and good ones too! We have found our customers to be very satisfied and cooperative with the development of the many features of this project. It is a joint effort and very enjoyable for all sides. Please check some of our user's set-ups on the User Pages and feel free to contact them if an e-mail address is listed.

How does the Registration Process work?
Once you have ordered the software, you download and install it, it generates a specific Computer ID which you send to us, you will then receive a registration key which we send back to you. If you change computers or certain components of your PC, may get a new computer ID and you will get a new registration key free of charge. The Computer ID is generated by us, it does not contain any unique information about you. There is no way we can trace the ID back to the original computer.

I am using the PFD, the ND and the Engine Display on three different computers, do I need to buy the software three times?
Certainly not! If you buy the full glass cockpit, you will get all the registration keys you need, but if you use the PFD and ND twice (Captain and Copilot display), you should register it twice. All modules of the Glass Cockpit can be used stand-alone, they don't have to run all at once on one computer.

I have really "special" needs... can you help?
Yes, certainly. If you have a specific problem you would like to see solved, you can count on our flexibility. What can be done will be done as quickly as humanly possible. Some custom development may be subject to additional cost, it depends on the extent and the usability by others.

Are the CDU/MCDU/FMS and the MCP/FCU/Enhanced Autopilot part of the Glass Cockpit Package?
No. The Glass Cockpit is one thing, the CDU and the MCP/Autopilot are another. With the exception of the Regional Jet Glass Cockpit, we currently only sell packages which include all components for the flight management part. This is then separated into the Captain Side and the First Officer Side components.

General Software Questions

FS pauses when I set focus to one of the Project Magenta Programs, why?
Go to the FS Menu Options:Settings:General and set "Pause On Task Switch" off... and it will continue running.

How do I install the updates?
The updates on www.projectmagenta.com/updates.html contain the EXE and DLL file of the respective program, not all files. They have to be unzipped and copied into the existing program folder. They will not work by themselves. To update from any Build to a newer one, you only have to install

I have Build 123 of one program. Do I have to install 124, 125 and 126 before I install the newest one, 127?
No, all you need to do is install the files within the 127 zip, and you will have the newest version.

Specific Questions - Glass Cockpits

My flaps settings in FS don't match with what is displayed in the EICAS/ECAM (Engine Display)?
Please go here and check the Flap Setting configuration, i.e. compare the notches in your FS set-up with the one specified in the aircraft configuration file.

Specific Questions - CDU/MCDU

What is a NetDir and why do I need it?
The NetDir is only required when you use our CDU/MCDU software... i.e. when you are using the Flight Management System. It is needed to have a reference for the files created by the CDU so the other programs can read and use them. You don't need to set it up if you are not using the CDU.

What is the easiest way/best place to set up the NetDir?
The best place seems to be to have it on the CDU computer... the easiest way to set it up is going into the CDU page INIT/REF:MAINT:NETDIR and press the LSK next to the recommended solution (LSK 3L)

The MCP/FCU doesn't follow the lateral path, what is wrong?
This is a known issue on *some* systems, to fix it, please exit the CDU/MCDU program and delete the CDU.SET file. Then start the program again.

Specific Questions - MCP/FCU

I want to use the 777 (747/737) MCP, where do I download it?
The Boeing-Type MCP includes the interface for all three versions of the MCP, just download the MCP software and select the one you want to use in the MCP menu.

I have additional questions?
Please contact support@projectmagenta.com and we will do our best to help you.

Notams

We regularly post NOTAMS to our website (www.projectmagenta.com/notams.html) about particular new features or program updates.

Project Magenta Internal and Interfacing Offsets

A list of Project Magenta offsets you can use or interface to in your system can be found on www.projectmagenta.com/pmoffsets.html

FSUIPC Offsets

A list of FSUIPC offsets can be found on in the FSUIPC SDK or on our web site under the link www.projectmagenta.com/FSUIPCOffsets.html

Alphabetical Index

ABOUT INI FILES 19
ADDITIONAL INFORMATION SECTION 110
Additional Settings CDU 33
Additional things to do – Sharing 10
Airbus Additional Settings 48
AIRBUS FCU 51
AIRBUS GLASS COCKPIT 41
AIRBUS MCDU 46
Airbus MCDU IRS Position 48
Airbus MCDU Flare Altitude 49
Airbus Setting Aircraft Type 47
Airbus systems 44
AIRCRAFT CONFIGURATION FILES 114
Aircraft Type 21, 41
AVIONICS – PA28 76
Battery & Alternator 76
BOEING CDU & RCDU 29
Boeing Glass Cockpit Keyboard Commands 25
BOEING MCP 40
CDU 20
CDU.INI settings 35
Conditional Waypoints 112
Cost Index Data (Experimental) 121
Differences 17
Differences MCP & CDU 17
ECAM display 41
FAQ 133
Flap Definition 123
Flap Definitions 117
Flare 40
Flare Altitude CDU 34
Flight Mode Annunciators 122
Flight Models 132
Flight Plan Display 28
Flight Plan Display CDU 38
FSUIPC 136
FSUIPC OFFSETS 136
GAIFR 66
GAIFR Computer Names 68
GAIFR Introduction 66
GAIFR Network Set-up 68
GAIFR Normal Start-Up procedures 70
GAIFR Positioning 'Black Panel' 71
GAIFR Protocols 68
GAIFR Setting Server Name or Static IP 69
GAIFR Sharing 68
GAIFR Step 2 Installation of WideFS and FSUIPC 68
GAIFR System Requirements 66
GAIFR SYSTEMS & FAILURES 73
GAIFR User Options 71
GAIFR Workgroups 68
GENERAL – Common to all Software 15
Glass Cockpit INI Settings 25
Glass Cockpit Keyboard Commands 25
Glass Cockpit weather 128
incorrectly set NetDir: 11
INSTALL & SET-UP 5
Instructor Aircraft Attitude 96
Instructor Approach in the View Screen 96
Instructor APPROACH Screen 102
Instructor ATTITUDE, VIEW and INSTRUMENTS Screens 96
Instructor CONTROLS and SYSTEMS/FAIL Screen 98
Instructor DATA LOGGER 101
Instructor ENVIRONMENT Screen 93
Instructor LOAD/FUEL Screen 95
Instructor Main Menu 89
Instructor Main Screen 89
Instructor MAP Mode 104
Instructor POSITION Screen 91
Instructor Station - Instructor Mode 88
Instructor Station - Map Mode 88
Instructor Station Connectivity 87
Instructor Station Conventions 87
Instructor Station Full Screen Mode 86
INSTRUCTOR STATION INTRODUCTION 86
Instructor Station Keyboard Commands 88
IRS Position 32
Keyboard Commands - RJ 83
Keyboard Commands CDU 37
Keyboard Commands GAIFR 72
Keyboard layout 31
LOWER PANEL GAUGE INDICATORS – PA28 75
MCDU connected 47

Method A – **NO** CDU SOFTWARE 22
Method B – **WITH** CDU SOFTWARE..... 22
Multi-Monitor 8
N1 Climb Table 121
Navaid Database CDU 38
NAVDATA UPDATES 131
NetDir 10
Network Setup / Optimization 7
NO MCDU SOFTWARE 42
Notams 136
OPENGL 14
Optimization 11
Other Required Shares 12
Other Settings/Restrictions 112
PITOT and STATIC PRESSURE SYSTEM 74
PITOT FAIL 74
Pm systems General..... 55
pmFileCheck 13
pmGetweather 128
pmSystems 52
pmSystems Check Connections..... 53
pmSystems Finding Variable Names 56
pmSystems INSTALL..... 53
PmSystems Introduction..... 52
pmSystems Navigating around the panel. 55
pmSystems Program Options..... 53
pmSystems Runtime & Development Mode 55
Positioning 16
Positioning 'Black Panel' ***GAIFR*** 71
PRIMER 75
PROJECT MAGENTA OFFSETS 136
REQUIREMENTS 5
RJ - Selecting displays..... 80
RJ - Step 1, Aircraft Type..... 78
RJ - Step 2. Type Selection 79
Selecting displays..... 23
Setting Server Name or Static IP 9
Settings RJ.INI 83
Sharing In General 11
Sid/Star Structure..... 110
SID/STAR/APPROACH DATA..... 110
STATIC FAIL..... 74
Step 1 CDU connected..... 30
Step 2 Setting Aircraft Type 30
Terrain Data Files 126
Type Selection..... 22
V-Speeds 119
Waypoints..... 111
Weather All other programs 129
Weather Radar 128, 131
WhazzUp 128
WideFS and FSUIPC..... 9
WITH MCDU SOFTWARE..... 42