



FMS Software Installation Guide

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FMS Software Installation

Prerequisites:

Operating System (32/64 bit) – Windows XP, Windows Vista, Windows 7, Windows 8.1

Memory – The FMS software will consume up to 200MB while operating in dual FMS mode

CPU – Dual Core 1.6GHz minimum

Graphics – 256MB, dual VGA/DVI, OpenGL 2.0 support required

Microsoft redistributable for VS2008 required: <http://www.microsoft.com/en-us/download/details.aspx?id=29>

Installation procedure:

1. Unzip the package to a directory of your choice. Verify the following directory structure is in place after extraction.

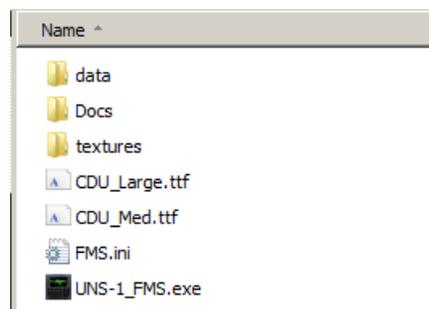


Figure 1 – Installation Directory Structure

- The “data” directory contains the FMS AIRAC database files as well as a folder “Routes” which contains all user saved routes (flight plans).
 - The textures directory contains the FMS graphical textures.
 - FMS.ini is the configuration file for the FMS software.
2. Install the two font files located in the base directory to the Windows\Fonts folder. You can do this by right clicking on the files and selecting install (may require administrator privileges).
 3. In order to make sure the FMS graphics are crisp and readable, set you graphics card properties to Quality over Speed. This setup varies based on the GPU vendor and may require tweaking of settings to achive optimal quality.

- Installation can be on a PC that may or may not be the PC hosting the flight simulation software (i.e. P3D, FSX etc.). However, when using hardware mode (CDU keypad), the FMS should be installed on a PC that is not the P3D host as keystroke conflicts will occur.

A word on display configuration

The FMS has two distinct operating modes, graphical, and hardware. Graphical mode should be used for general familiarization training. In graphical mode, the CDU (keypad) is displayed in a windowed mode. The display can be resized with the mouse, and the window border can be turned on and off. While in graphical mode, the user interacts with the display using the mouse (for key selection) and keyboard (for data input). Conversely, hardware mode only displays the screen portion of the FMS. While in this mode, the user is expected to interact with the FMS using the CDU keypad. The operating mode is selected via a flag in the FMS configuration file described below.



Figure 4: Graphical Mode



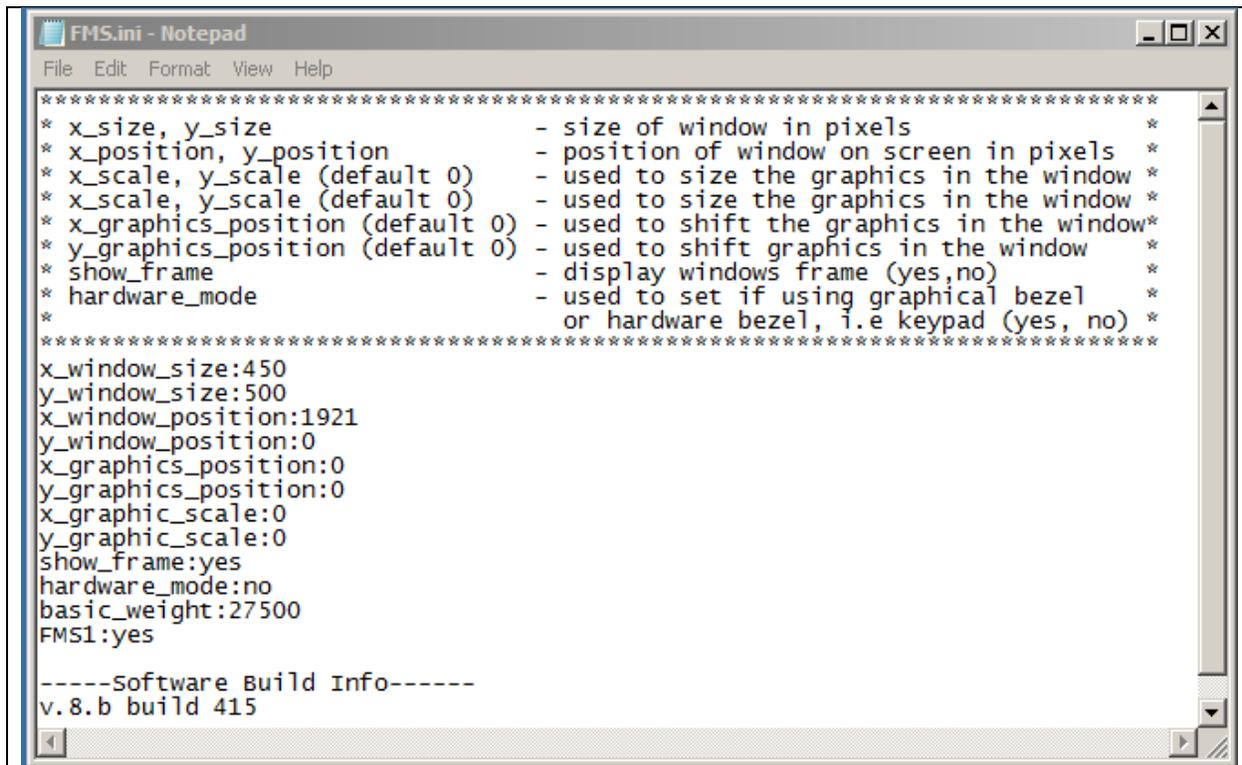
Figure 5: Hardware Mode

If using hardware mode, it is suggested to configure the 2nd display for the FMS. Setting the resolution of the 2nd display to 1024x768 will ensure the graphics are properly scaled for use with the CDU keypad and LCD display. The user must configure the software via the ini file to place it on the 2nd monitor. See below for specific settings.

FMS Configuration

The FMS is configured via a text file CDU.ini located in the installation directory.

CDU.ini contains configuration parameters for size, location, window display and eventually aircraft configuration items. This file can be viewed and edited using notepad.



```
*****
* x_size, y_size           - size of window in pixels          *
* x_position, y_position  - position of window on screen in pixels *
* x_scale, y_scale (default 0) - used to size the graphics in the window *
* x_graphics_position (default 0) - used to shift the graphics in the window *
* y_graphics_position (default 0) - used to shift graphics in the window *
* show_frame              - display windows frame (yes,no)      *
* hardware_mode           - used to set if using graphical bezel *
                        or hardware bezel, i.e keypad (yes, no) *
*****
x_window_size:450
y_window_size:500
x_window_position:1921
y_window_position:0
x_graphics_position:0
y_graphics_position:0
x_graphic_scale:0
y_graphic_scale:0
show_frame:yes
hardware_mode:no
basic_weight:27500
FMS1:yes

-----Software Build Info-----
v.8.b build 415
```

Figure 6: Configuration File (Graphical Mode)

The following describes what each of the parameters in the ini file does.

Display Size

x_window_size

y_window_size

This parameter sets the width and height of the FMS window in pixels. These values are the absolute pixel locations. If a multi-monitor setup is used (recommended configuration), this value can be as high as the combined total width of the display. If the window is resized using the mouse, the software will update the values in the configuration file and use them on subsequent executions. There is no need to reconfigure before each execution.

Display Position

x_window_position:

y_window_position:

This parameter sets the location of the FMS window on the monitor (in pixels) relative to the upper left corner of the display. If the window is moved using the mouse, the software will update the values in the configuration file and use them on subsequent executions. There is no need to reconfigure before each execution.

Graphics Position

x_graphics_position

y_graphics_position

Default (0) – Set this to 0 to reset to default placement.

This parameter sets the position of the graphics within the window. This parameter can be adjusted with the software running by using the numberpad keys (2,4,6,8) on the keyboard. Once the desired position is achieved, the software will record the values in the ini file for future placement.

Graphics Scale

x_graphic_scale

y_graphic_scale

Default (0) – Set this to 0 to reset to default scale.

This parameter sets the horizontal and vertical scale of the graphics within the window. This parameter can be adjusted with the software running by using the arrow keys on the keyboard. This should be used to shrink or stretch the graphics to an LCD which may be partially obstructed by a bezel. Once the desired position is achieved, the software will record the values in the ini file for future placement.

Window Style

show_frame:yes

Options – yes or no

Setting this value to yes will allow the display of the window along with the standard minimize and close buttons. Setting this value to no will remove the frame from the window. Note that you cannot resize, minimize, or close the window using the mouse while in Frameless mode.

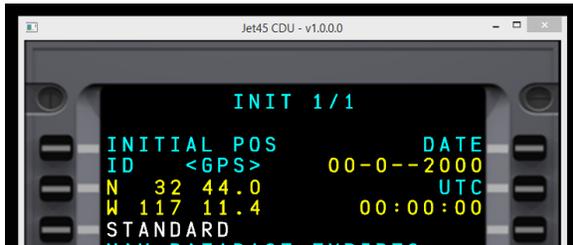


Figure 7: Window with Frame

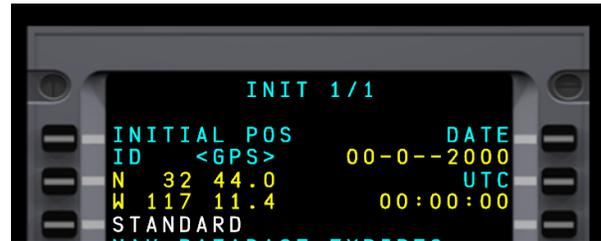


Figure 8: Frameless Window

Hardware Mode

hardware_mode:no

Options – yes or no

Setting this value to yes will enable hardware mode. In this mode, it is assumed the user will interact with the FMS software via the CDU keypad. No graphical keypad will be displayed and the screen graphics will be scaled to fit the `x_window_size` and `y_window_size` parameters. Reference figures 2 and 3 for visual examples of hardware vs graphical mode.

Aircraft Configuration Parameters

basic_weight:13500

Options – Aircraft basic weight (lbs)

Basic weight of the aircraft, loaded into the fuel configuration pages. Updating this value in the FMS will save to the ini file for later recall.

Dual FMS Settings

FMS1:yes

Options – yes or no

This value sets whether the instance of the FMS will be the pilot side (FMS1) or the copilot side (FMS2). This should be used to setup dual FMS installations using the AutoHotKey program to send unique keystrokes to either FMS.

Hardware Mode Configuration

In order for the graphics to be displayed properly on the CDU LCD, the user must configure the software according to the monitor configurations in use. For example, if the PC is configured with 2 monitors with the 2nd monitor being the CDU LCD, we want the graphics to only display on the 2nd monitor and fully cover the display. We accomplish this by noting the resolution of monitor 1. Here is an example:

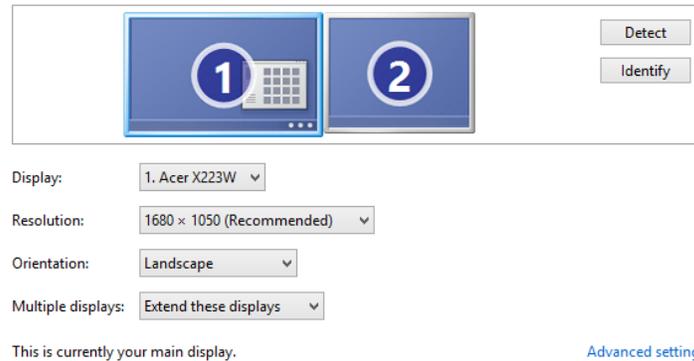


Figure 9: Example Monitor 1 Configuration

Change the appearance of your displays

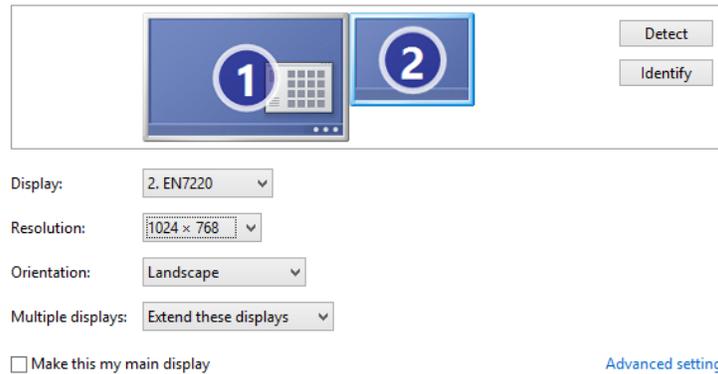


Figure 10: Example Monitor 2 Configuration (CDU LCD)

Now that we have the two displays configured, setup the FMS to display full screen on the 2nd monitor as follows:

```
x_window_size:450
y_window_size:500
x_window_position:1681
y_window_position:0
```

Note that we place the `x_window_position` at 1 pixel more than the 1st monitor horizontal resolution (1600+1). This ensures that the display will only show on the 2nd monitor. We also set the `y_window_position` to 0 to ensure it is placed at the top of the LCD. `x_window_position` should always be 0 for hardware mode.

x_window_size and y_window_size should always match the resolution of the CDU LCD screen, in this example 1024x768.

We set show_frame to 1 so that we don't see the window frame on the CDU screen. We also must set hardware_mode to 1 while using the CDU keypad/LCD.

Once configured properly, the display will always startup and fill the CDU LCD screen. No further user inputs or changes should be required.

Hardware Mode Key Mapping (Single FMS)

While operating in hardware mode, the Hagstrom encoder that takes inputs from the CDU keypad should be configured according to the keymap provided in the docs directory ("Hardware Key Mapping.pdf")

Notes on aircraft setup (P3D)

In order for the FMS to be able to perform LNAV and VNAV properly, make sure the following two lines are in the aircraft.cfg file:

```
use_no_default_bank=1  
use_no_default_pitch=1
```

The FMS does not use the default GPS/FMS autopilot modes within the flight model in FSX/P3D. Instead, it operates externally by manipulating the control surfaces directly through FSUIPC. If the above lines are in the configuration file for the aircraft and set to 0, or they are not present at all in the file, when the autopilot is engaged without a lateral mode active (as will be the case when the FMS is navigating), the autopilot within the simulator will level the wings. This will prevent the FMS from navigating the lateral waypoint plan.