

OPENCOCKPITS CDU B-737

DRIVER MANUAL FOR PMDG 737-NG



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## INTRODUCTION

Many cockpitbuilders have been waiting for a simple way of connecting the OpenCockpits B-737 CDU to their PMDG 737 NG aircraft and displaying its information properly on the CDU's screen. Now the time has come where you can do that.

PMDG's 737 NG is a fantastic add-on for both Flight Simulators 2002/2004 (FS9.1) but it has limitations when it is intended to be used for home cockpit purposes. The most important limitation is the missing SDK. Many people who have ever made the attempt to connect an OpenCockpits CDU to the PMDG 737 NG will have noticed that there are two problems:

Concerning the display you have to undock, resize and move PMDG's CDU panel to the display of OpenCockpits' CDU screen. Complicated because PMDG has a size limit and if you don't use an exact relation between width and height of the panel, you will notice that e.g. clicking the 'A' button will cause a 'B' button press or something like that. Also you'll see that the LSK lines of PMDG's CDU panel do not really match the LSK lines of OpenCockpits' CDU...

After – more or less – successfully sizing and positioning the display, you'll to walk through the key definition: you need a SIOC script that transforms the key presses on OpenCockpits' CDU into key combinations; there are 69(!) keys mounted and you cannot use these key combinations for other purposes. Then you have to assign these key combinations to mouse clicks via key2mouse or FSUIPC. Much work to do, isn't it?

Now, OpenCockpit's CDU will work with the PMDG 737 NG aircraft by use of this new driver module which is installed and configured quick & easy – as quick & easy as possible.

Please read this manual very carefully and check out whether your system meets the requirements *before* you buy OpenCockpit's CDU. Then make up your mind and decide to buy OpenCockpit's CDU when you found out that the functionality described herein is that what you need *after* reading this manual.

Michael Delvos, January 2010

## ACKNOWLEDGEMENT

At this point my special thanks are valid to those that have helped me to check and to guarantee the effectiveness and stability of this software by intensive tests.

The beta test team:

- Pedro Bibiloni (OpenCockpits)
- Stéphane de la Calle
- Steve Everson
- Helmut Rubick
- Alexander Weiss

## SYSTEM REQUIREMENTS

This driver module is intended for use with:

- PMDG 737 NG 600-900
- Microsoft Flight Simulator® 2004 (FS9.1), running in windowed mode
- Microsoft Windows® XP Operating Systems or higher (Vista, Windows® 7)
- OpenCockpits CDU B-737
- OpenCockpits SIOC Version 3.52B or above

## FEATURES

Communication between CDU and Flight Simulator is established via SIOC and IOCP protocol. This driver module offers two different ways of displaying the CDU data on screen.

The first display method is the “classic method”. Undock, resize and move PMDG’s CDU panel on OpenCockpits’ screen. It works, but I cannot recommend this, because PMDG’s CDU panel and OpenCockpits’ CDU do not really correspond by default as mentioned in the Introduction.

The second method is the one that driver module was developed for and this method shows exactly what we want – but it has some further requirements:

The CDU data is shown on an external CDU window you can simply drag & drop on OpenCockpit’s CDU screen. Due to the fact that PMDG did (and will) not offer an SDK the only way to enable an external CDU window (in this document called OpenCockpits’ CDU window from now on) for data display, is to copy the contents of the display part of PMDG’s CDU panel into memory and move them in parts to the correct positions on OpenCockpits’ CDU window. **This requires PMDG’s CDU panel to be visible in undocked state, at least the display part of it!** As we don’t want to see PMDG’s CDU panel in our pit you should move the panel to a position where it is covered by the MIP, for example. This will be figured out later, in the Display Setup section.

# INSTALLATION

## General hardware installation

Before installing and configuring this software, please refer to OpenCockpits' Installation and User's manual to ensure a correct hardware installation. Make sure to use a screen resolution of 800 X 600 and extend your Windows desktop to this monitor. Please note that the CDU must be connected to the computer that runs Microsoft Flight Simulator® and the PMDG 737 NG.

Now, check the CDU is connected and working by starting USBCheck.exe. Press some keys on your CDU and if the last key presses are shown in USBCheck's window, your CDU is working.

## Configuring SIOC

Let's configure SIOC now! It is quite simple, because you do not have to create script entries for every key pressed, just copy & past a few lines from the SIOC.TXT file you'll find enclosed in this archive and enabling SIOC to handle the CDU by editing the SIOC.INI file.

Open your SIOC.INI file and search for some thing like `USBKeys=2,110`. Make sure you have the correct index and device id entered. Also enter the following settings:

```
IOCP_port=8092
IOCPclient0_disable=No
IOCPclient0_port=8092
```

Save and close SIOC.INI.

Open your SIOC script file and open the file called SIOC.TXT enclosed in this archive as well. The archive's SIOC.TXT only contains a few lines:

```
Var 1010, name CDUKey, Link USB_KEYS, Device 2
{
    IF &CDUKey > 0
    {
        V1011 = &CDUKey
    }
}

Var 1011, name LastCDUKey, LINK IOCP, OFFSET 9999, Value 0
```

Mark these lines and copy them to clipboard.

---

Now, paste them into your SIOC source file below the section called 'Inicialización variables'

```
..  
// _____  
// Inicialización variables  
// _____  
  
Var 1010, name CDUKey, Link USB_KEYS, Device 2  
{  
    IF &CDUKey > 0  
    {  
        V1011 = &CDUKey  
    }  
}  
  
Var 1011, name LastCDUKey, LINK IOCP, OFFSET 9999, Value 0  
..
```

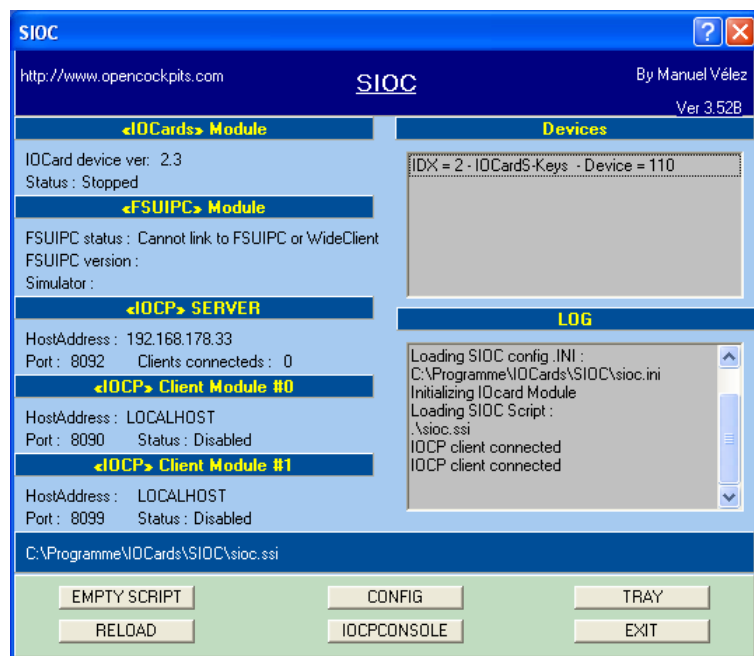
These inserted lines define two variables; by default they are numbered 1010 and 1011. Check out whether these numbers are used elsewhere in your script. If so, you'll have to change the numbers because they must be unique! The last edit you have to do is to enter the correct device number (., Device 2). Now, save your SIOC script, compile it and start SIOC.

## Firewall

Make sure that your firewall settings allow the use TCP port 8092!

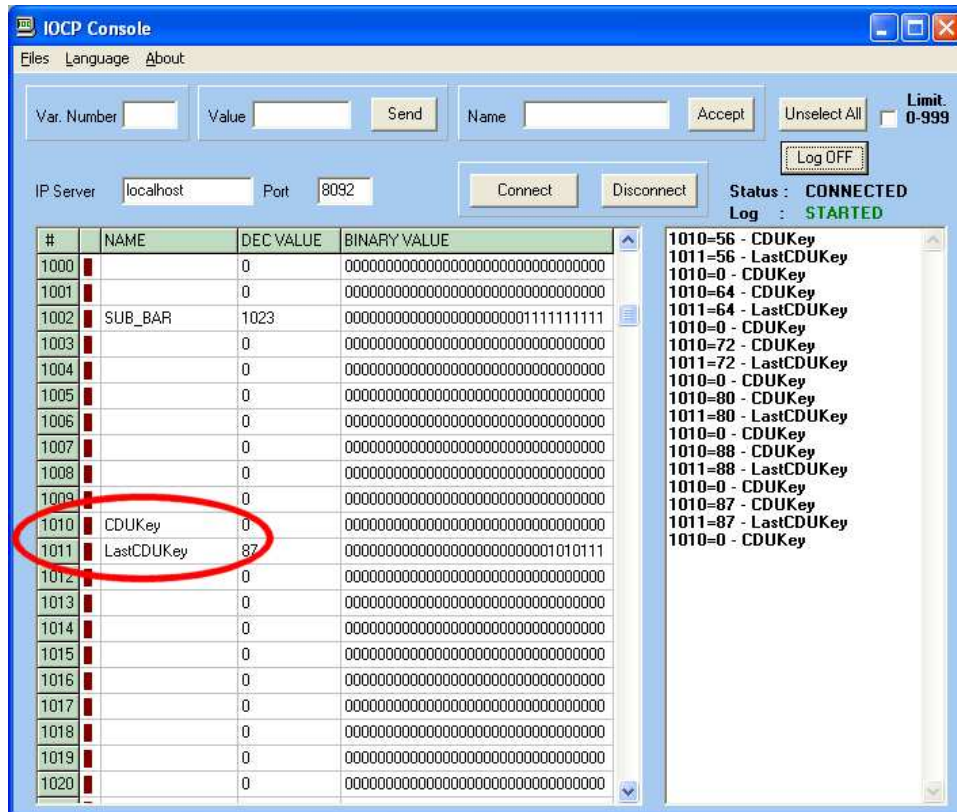
## Checking data transfer between SIOC and OpenCockpits' CDU

We're now going to check if SIOC retrieves the key presses on your CDU. After loading, your SIOC main window should look like this:





Now, press the Button labelled IOCPCONSOLE...



Scroll down the data grid until you see the variables defined in your SIOC script, labelled CDUKey and LastCDUKey. Then press the button Log ON and start pressing some keys on your OpenCockpits CDU. The box at the right side should show the presses as seen above. If you see neither the variables in the datagrid, nor the key presses in the box at the right side, something went wrong; check the steps before. If you see the variables and the key presses, your keyboard interfaces works well and we can continue with the next steps, installing the driver module and display setup...

## Installing/configuring the driver module

The driver itself consists of the following files:

- OCLibs.dll - common library module
- OC73pcdu.gau - driver module
- OC73pcdu.ini - initialization file

Copy OCLibs.dll to your main FS folder (e.g. C:\Program files\Microsoft Games\FS9), OC73pcdu.gau to FS' GAUGES folder (e.g. C:\Program files\Microsoft Games\FS9\GAUGES) and OC73pcdu.ini to PMDG's aircraft folder (e.g. C:\Program files\Microsoft Games\FS9\PMDG).

Open OC73pcdu.ini now. It looks like this:

```
[ExternalCDU]
X=0
Y=0
CX=742
CY=626
Display=true
[SIOC]
VarNo=1011
```

The first section, named External CDU, controls whether OpenCockpits' CDU window is displayed or not and its size and position are stored herein. Size and position are stored by the driver module. If you change your monitor setup and need to reposition OpenCockpits' CDU window, edit the OC73pcdu.ini file and set X and Y to 0. Start FS and OpenCockpits' CDU window is displayed in the top left corner of your monitor #1, ready to be moved to the screen of your OpenCockpits CDU. If the value of Display is set to true, OpenCockpits' CDU window is in use (this is recommended if you remember the introduction), other values will cause OpenCockpits' CDU window not to be displayed.

The second section, named SIOC, stores the number of the SIOC variable we have defined in our SIOC script before. Enter the number of the variable called LastCDUKey. Save your modifications.

## Starting Flight Simulator

Make sure that SIOC is already running when you start Flight Simulator!

## Modifying PANELS.CFG

Open your explorer and navigate to your FS' aircraft subfolder (e.g. C:\Program files\Microsoft Games\FS9\AIRCRAFT). Below you'll find a subfolder for every add-on aircraft installed on your system. Several subfolders concern the PMDG 737 aircraft. Each of the aircraft's subfolders have to additional subfolders for the panel configuration (PANEL for the model w/o virtual cockpit, PANEL.VC for the model with virtual cockpit). If there is only a file named 'PANEL.CFG' in this folder, it contains a link to the real panel folder. This may look like this: `alias=PMDG737-700\panel`

In this case you have to go the folder „...FS9\AIRCRAFT\PMDG737-700\PANEL“ and open the 'PANEL.CFG' file in this folder with a text editor. Add the following entry to the list of gauges in the section [Window00]:

```
gauge10=oc737pdcdu!PMDG737_OC_CDU,0,0
```

**If necessary, correct the number 10 behind 'gauge' in such a way that a sequential numeric order is given. Store the file and close the editor.**

The whole section should look like this:

```

////////////////////////////////////
////////////////////////////////////
//
// Main Window definitions
//
////////////////////////////////////
////////////////////////////////////

[Window00] // Dummy Panel - DO NOT CLOSE THIS - BAD THINGS WILL HAPPEN!!!
file=main.bmp
file_1024=main.bmp
size_mm=1280,10
position=1
visible=1
ident=MAIN_PANEL

gauge00=PMDG_737NG_Main!SoundProcessor,0,0
gauge01=PMDG_737NG_Main!SimLibUpdater,0,0
gauge02=PMDG_737NG_Main!PANEL_SYNC!PMDG_737NG_Main!PANEL_SYNC,0,0,0,0
gauge05=PMDG_737NG_Main!PanelSwitcher,0,0,1,1,YES
gauge06=PMDG_737NG_Main!AFS,0,0
gauge07=PMDG_737NG_Main!FMS,0,0,0,0,0
gauge08=PMDG_ACS!AutoThrottle,0,0
gauge09=PMDG_ACS!AutoPilot,0,0
gauge10=oc737pdcdu!PMDG737_OC_CDU,0,0

```

## DISPLAY SETUP

Start Flight Simulator and – if not the aircraft of your default flight - load the PMDG 737 NG aircraft. *Your Simulator must be running in windowed mode.* The display setup now depends on your choice whether to use OpenCockpits' CDU window or not...

### Display CDU data using PMDG's CDU panel

This method of data display is not recommended but maybe your hardware does not allow making use of OpenCockpits' CDU window ... If so, we're going to setup your PMDG CDU panel now. Open the CDU panel, right-click on the CDU panel and choose "Undock window". Now the panel should have a border and can be moved out of Flight Simulator's main window.

Sizing this panel is quite complicated because:

- the panel has a maximum limited height and this value is a little bit too small
- you have to make sure that there is a factor of ~1.5 between height and width; otherwise you get wrong key commands!
- PMDG's CDU display doesn't fit to OpenCockpits' CDU layout

Now, the only thing you have to do is to resize and move the panel to the screen of OpenCockpits' CDU. If everything works as desired, you should create a flight, because the modified panel states will not be saved unless you create/overwrite a flight.

But, see the poor result:



Note that the capabilities of sizing PMDG's CDU panel are quite different, depending on the screen resolution and the ratio of width and height, so the photo on the previous page is a sample, taken on my machine – your own results may be quite different, maybe even better!

### **Storing changes of PMDG panel sizes and positions**

It is much work to move and size the different panels of the PMDG 737 NG aircraft to make them usable in a homecockpit. The only way to save these changes is to create a flight! PMDG does not change these modifications, so they are gone if your modifications are not saved in flight in Flight Simulator itself. Any further panel modification should be saved by rewriting your flight, otherwise they are lost!

Your CDU is now ready for use, just check whether the key presses on the CDU show the desired results.

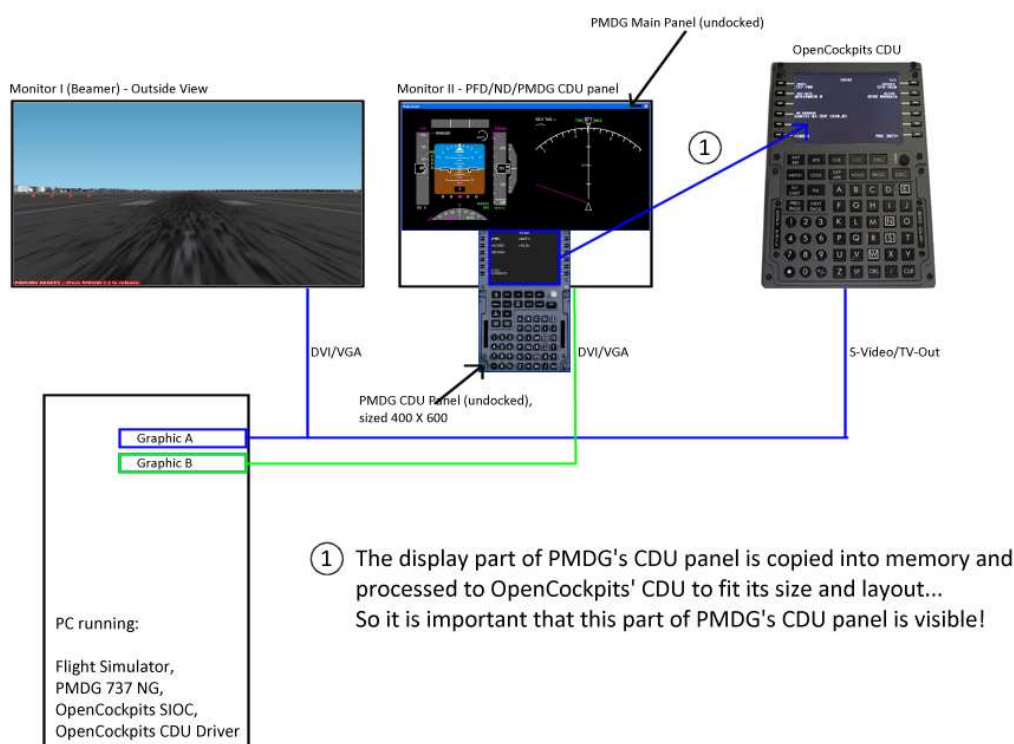
Have fun with your OpenCockpits CDU and your PMDG 737 NG aircraft and  
always three greens!

If you intend to use OpenCockpits' CDU window, continue on the next page

## Display CDU data using OpenCockpits' CDU window

This is the recommended method of displaying CDU data, because OpenCockpits' CDU window is created to fit the screen of the OpenCockpits CDU! Here is how to set up your cockpit for use with OpenCockpits' CDU:

Homecockpit Setup using PMDG 737 NG and OpenCockpits CDU





This is the result when using OpenCockpits' CDU window; much better:



Make sure that the X and Y values in OC73PCDU.INI are set to 0 and the value of Display is set to true before starting Flight Simulator. If so, start Flight Simulator now and – if not the aircraft of your default flight - load the PMDG 737 NG aircraft. *Your Simulator must be running in windowed mode.* Whilst loading you see an OpenCockpits splash screen in the top left corner of your screen. This will become OpenCockpits' CDU window after the loading processes is finished. It is sized exactly to fit OpenCockpits CDU screen at a resolution of 800 X 600.

When PMDG 737 NG is loaded, the first step is to open PMDG's CDU panel and undock it. In undocked state the panel is automatically resized to a fixed size that can't be modified.

As mentioned in the introduction section, the display part of PMDG's CDU panel must be completely visible (refer to image Homecockpit Setup using PMDG 737 NG and OpenCockpits CDU on the previous page). As you could see, in my setup PMDG's CDU panel is positioned below the main panel with PFD and ND gauges, because only PFD and ND can be seen through the cut-outs in the MIP, the rest is covered by the MIP. So, you should find a position where the display part of the panel is visible. Note that the keyboard part can be placed out-of-screen, so you do not need much space. Move PMDG's CDU panel to the desired position now.

OpenCockpits' CDU window which showed the OpenCockpits splash screen whilst loading Flight Simulator should have changed after PMDG's B737 has loaded and its CDU panel is visible. If you do not see PMDG's CDU data in OpenCockpits' CDU window, just close and re-open PMDG's CDU panel and you will see the CDU data displayed on OpenCockpits' CDU window.

OpenCockpits' CDU window does not have a border in normal state. But it is movable and sizeable as well. If you click on top of the window you will see its border and you can drag & drop the window. Move it to your OpenCockpits CDU screen. Every position change or changes to the width and/or height is stored in the OC73PCDU.INI file, so the next time you load Flight Simulator, you'll find OpenCockpits' CDU window at its stored position.

Changing your screen setup may cause OpenCockpits' CDU window not to be displayed any more if the X and Y coordinates are no longer valid. If so, edit the OC73PCDU.INI and set the X and Y values to 0. Reload Flight Simulator and you'll find OpenCockpits' CDU window at the top left corner of your screen and it can be moved back to your OpenCockpits CDU.

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Have fun with your OpenCockpits CDU and your PMDG 737 NG aircraft and

always three greens!