

FCU320FULL



This manual is intended for Flight Simulator use only and may not be used in any real world aviation application. The authors are not responsible for any errors or omissions.

FOREWORD

Thank you for purchasing CPflight FCU320 hardware. To optimize the performance of this unit, please read through this manual carefully. This manual contains the latest information at the time of drafting, eventual later information can be found at CPflight website www.cplight.com. This manual gives you the information to connect and use the FCU320 with FSX, Prepar3D, Prosim and/or add-on software. Even if the FCU320 supports the mainly used FS add-on software, it is not possible to assure the full compatibility with all third part add-on. To know more about the compatibility with a specific add-on aircraft please refer to the latest information on the CPflight website, at the section "Technical and documents".

Note: This manual contains the latest information at the time of drafting. Due to the continuous evolving of the product some features could be modified. Eventual later information can be found at CPflight website www.cplight.com.

CPflight modules are produced to meet requirements from the hobby market; the use of our products in professional or commercial environments is not permitted without approval of the CPflight management; please contact us at info@cplight.com if you need to exploit our products in professional or commercial environments.

FCU320 is a full scale replica of the Airbus 320/340 Flight Control Unit, look and functionality are reproduced with high details. FCU320 is equipped with high quality level components; custom made LCD display and Push/pull knobs give high fidelity performances and a never seen kind of realism. It is important to know that the hardware has not its own intelligence on board, it establishes an interface with the software; logics, operating modes and aircraft behavior are managed by the connected software.

HARDWARE INSTALLATION

WARNING! The panels back cover is made with stainless still metal sheet, pay particular attention to the cutting edges while you are handling it.

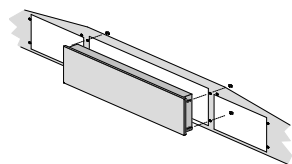


Figure 1: FCU fixing

FCU320 is designed for panel assembly. The FCU320 is intended as a part to be inserted in a cockpit reproduction, CPflight does not produce chassis or other mechanical parts for the cockpit structure, so the panel is intended to be inserted in your own cockpit glare shield. The FCU is provided for "Captain only" configuration (FCU + left EFIS), or in a full configuration (FCU + LEFT efis Captain EFIS + F/O EFIS). In the panel fixing cut-out consider the frontplates overhang to keep enough space to place EFIS. The FCU units has to be fixed before to place the EFIS's, differently you will not able to screw the fixing nuts.

Fix the FCU through the 4 fixing nuts (see figure 1); connect the EFIS's flat cables and place EFIS in their location. EFIS are fixed through 3 nuts.

CONNECTIONS

The FCU320 can be directly powered by the USB (starting from hardware revision 3.0); the USB port must have 500mA current capability (USB 2.0 or higher) or an HUB with its own power is recommended. A standard 500mA USB can power the FCU320 + 2 EFIS (Captain + F/O). If you need to connect further CPflight expansion modules an optional power supply adapter is required. Sockets for connections are on the back of panel (Figure 2). The two 20 pole sockets on sides (Figure 2 E and F) are provided for EFIS connection; connect the flat cable of each EFIS to these sockets.

WARNING! Do not invert the connection of right and left EFIS, the two EFIS have different internal circuit and this could damage both the FCU and EFIS.

Using the FCU320 in a Project Magenta network system, connect the hardware to the computer where the FCU software runs. Even if Project Magenta (and CPflight) FCU may run on a client, mostly the data update result more fast if Project Magenta (and CPflight) FCU runs on the server. Beyond to the EFIS connection and USB connectors the FCU320 has some further sockets: they are provided to allow system expandability. A 16-pin connector "D" allows connection with side panel available at our website, while DIN 5 pole socket "C" is used to link auxiliary CPflight modules. Close to the left EFIS connection socket, there are two jumpers for firmware upgrade and a small 2-pole socket ready for external backlight control.



Figure 2: Connectors (back view)

- A - Power supply socket (option)
- B - USB
- C - 5 poles DIN socket for external module connection
- D - Side panel connectors
- E - Left EFIS connection
- F - Right EFIS connection
- G - External Backlight control
- H - Jumpers for firmware upgrade

USB DRIVER INSTALLATION

When you connect the FCU for the first time you will asked for driver installation, drivers are downloadable at CPflight website. In relation with your OS the driver could be installed automatically and already inside your PC. To install the drivers follows these steps:

- Download the file "usb.zip" at our website www.cplight.com
- Files are in a compressed archive .zip; unzip the files in a temporarily folder...
- Connect the USB cable to the FCU320 USB connector and the other side to a free USB port of your computer. The computer has to be switched on when you connect the FCU for the first time.
- The driver installation procedure will start automatically; follow the instructions on the screen (note that the figure of the following example may be different depending by your operating system).



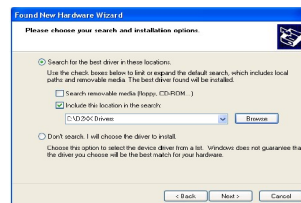
When you will ask to connect to Menus Update to search for software select "No, not this time" and click next to continue...



You will be informed that the driver has not been subordinate to Menus Logo testing click "Continue anyway."



Select "Install from a list or specific location" and click next to continue.



Browse the temporarily folder where you have unzipped the files and click next to continue.

During the USB drivers installation the system assigns a number to the communication port. Check your configuration in the Windows Control panel -> System Property -> Device Manager Tab. On the (COM & LPT) port you will see "CPflight serial adapter (COM n)" where "n" is the assigned communication port number, you will use this number in the First set up (see following).

COMMUNICATION SOFTWARE INSTALLATION

Besides the USB drivers a communication software is needed to use the FCU320 with the default FSX Airbus.

Note: CPflight communication software allows to use the FCU320 with default FSX aircraft only. Do not run the CPflight communication software using the FCU320 with third part software (Project Magenta or other).

To install the communication software:

- Download instfsx_xxx.zip where xxx = revision number at www.cplight.com
- The file is in a compressed (zip) archive. Extract in a temporary folder and run the exe file to install software (start PC as administrator to install software on Windows).
- CPflight communication software requires the popular FSUIPC library. If you do not have FSUIPC in your system download it at <http://www.schiratti.com/dowson.html>.

FIRST SET UP AND START-UP

To start the hardware with default FSX select "Connect" in the FS Add-on menu -> CPflight -> FS-COM. The first time you run FS-COM you will ask to select in the communication port number (Setting COM); set the port number assigned during the USB driver installation.

Project Magenta: To enable communication with Project Magenta you have to set the communication port. In the Project Magenta FCU folder open "FCU.ini" file with a text editor, browse the [Serial Connection] section and set CPflightComm= n where "n" is the communication port assigned by the system during the USB drivers installation (check in your system which is your port number). Save the "FCU.ini" file.

AST: to enable the communication install the AST Interface software for CPflight FCU/EFIS Unit; download the file at Airsimtech website download page. To enable the communication set the communication port number in the enclosed ini file. Open the ini file with a text editor, in the Serial channel section set channel = n where "n" is the communication port assigned by the system during the USB drivers installation.

Run Project Magenta FCU (or CPflightFCUinterface.com if used with AST) software to start-up the FCU. The FCU320 will show on the displays the installed Firmware revision and the device serial number and then synchronize data.

The FCU turns off command come from the computer when you close the software. If you shut-down the computer without exit the program, or a computer block occur, the FCU may stay on or may fail the subsequent turn on. If you find any problem with the FCU start or turn off, it is advisable to reset the unit. To do this, disconnect the USB cable from the FCU, wait few seconds and reconnect.

Important notes! The FCU can extinguish the displays to simulate a "cold and dark" situation depending by the battery, avionics or other aircraft systems status. Be sure to have the right conditions in the cockpit to have the display turned on - The 3 positions toggle switches of EFIS selectors (ADF/OFF/VOR) have lock lever, pull the lever to move in the new position.

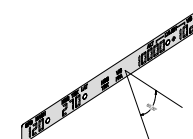


Figure 3: display viewing angle

Display bias angle

The bias angle is the angle from the perpendicular from which an LCD display is best viewed. The bias angle is often stated with reference to a clock face. The better display viewing angle is from the perpendicular to 60° bottom (see Figure 3). The horizontal viewing angle is 140°. These are the better viewing condition for the expected placement in the cockpit.

ON-FLY DISPLAY BRIGHTNESS AND BACKLIGHT REGULATION

When the FCU is normal running (starts with Project Magenta or in test mode using the CPflight software test) you can on-fly set the display brightness and contrast, besides the backlight intensity. This function is not available if the related preferences are settled "On" in the configuration menu (see above "CONFIGURATION MODE" section). To regulate the display and the backlight: hold pushed the SPD/MACH button and rotates knobs as follow:

- **Speed knob:** change the display contrast.
 - **Heading knob:** change the display brightness.
 - **V/S knob:** change the backlight intensity.
- The FCU keep the regulation in its working memory, data are saved in a non-volatile memory when the FCU switch-off (data are not saved if the FCU is disconnected during the normal running).

CONFIGURATION MODE

FCU320 firmware provides an internal program mode to configure some preferences in the hardware functionality. With the FCU in stand-by (software not running) push and hold the A/THR key for more than 1 second; this start the hardware in configuration mode. This is the only way to access to the configuration mode; no PC software program is required to configure the FCU320 hardware. In program mode only some keys are operating; the HDG, ALT and V/S display area show the program title and option as following:

HDG display Function to be settled	ALT display Parameter	V/S display Setting
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- A/THR key (push and hold for more than 1 second): enter the configuration mode
- AP1 key: scroll to the next program menu.
- AP2 key: toggle the preference setting (ON/OFF).
- A/THR key: save changes and exit the configuration mode

Settings are saved in a non-volatile memory when you exit the configuration menu and the FCU go in stand-by. Following a description of the menu available in Configuration Mode:

CONFIGURATION MENU	HDG display	ALT display	V/S display
<p>BACKLIGHT CONTROL: allows to select how to manage the backlight control. Setting this function to "OFF" (default) the backlight is related to the status of FS NAV lights, so the backlight will light-up when the NAV lights in FS are ON. Setting this function to "ON" the NAV lights status will be ignored and the backlight can be controlled through the related auxiliary input.</p> <p><i>Note: this setting does not modify the backlight brightness, it selects the way to control this variable.</i></p>	EbL	Ctrl	OFF/On
<p>DISPLAY BRIGHTNESS CONTROL (advanced information): allow selecting how to manage the display brightness. Setting this function to "OFF" (default) the display brightness can be regulated during the normal functioning as described above (see "ON-FLY DISPLAY BRIGHTNESS AND BACKLIGHT REGULATION"). Setting this function to "ON" the display brightness can be regulated through a potentiometer connected to the 16 pole connector (future developments).</p> <p><i>Note: this setting does not modify the display brightness, it selects the way to control this variable.</i></p>	dSP	briG	OFF/On
<p>FAST INCREMENT: this menu allows setting the fast increment functions to the knobs. Setting this function to "ON" (default) allows the value increase/decrease to be amplified when knobs are rotated fast to rapidly approach the desired value.</p>	FFI	---	OFF/On
<p>SERIAL NUMBER: This menu displays the device serial number. It is a read only location and is not modifiable.</p>	Sn	xxxx	xxx
<p>FIRMWARE RELEASE: This menu displays the installed firmware release. The number is not modifiable in this menu, but it is updated when you load a new firmware in the FCU internal memory (see "FIRMWARE UPDATE" section).</p>	Rel	xxxx	xxx
<p>ROTATION'S DIRECTION OF THE ENCODERS: Depending on the used encoders' version the rotation's direction could be anticlockwise/clockwise.</p>	Rot Rot	FCU ECP EFO	Left/right

EXPANSIONS

FCU320 is supplied with expansion capability through the DIN 5 pole auxiliary socket. This allows you to connect and interface CPflight plug&play expansion modules (Future developments).

EXTERNAL BACKLIGHT CONTROL

WARNING! The use of auxiliary connector is intended for expertise.

External backlight control accepts input from steady position switch (ON/OFF) or potentiometer. Connecting a potentiometer you can regulate the backlight brightness directly from this input. Note that the FCU backlight also affects the backlight of the connected modules (if any). The suitable value for the potentiometer is affected by the number of connected expansion modules; a 1000 ohm (0,5W minimum) potentiometer is suitable for a typical setup. To allow the external backlight inputs to work the related preference has to be settled "ON" in the preferences setting (see "CONFIGURATION MODE" section).

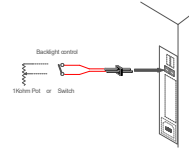


Figure 4: connection diagram for external backlight control wiring.

WARNING! To connect wires to the 2 pole socket use the provided 2 pole pin strip; do not weld the wires directly to the FCU connector. Weld wires to the provided pin strip and place thermo-retractile isolation tube on each connection to avoid short-circuit between poles. Do not weld wires to the pin strip when it is inserted in the FCU socket, insert in only after welding the wires.

FIRMWARE UPDATE

The FCU hardware is based on a microprocessor; on this device run a special program called "firmware". The firmware manages all the hardware functions besides the communication with the computer.

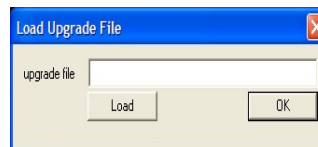
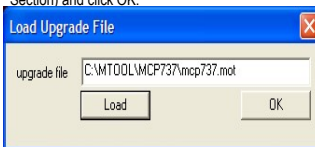
The firmware is stored in a "flash" memory, this allows the program to be updated at any time in case of improvements or functions addition. The firmware is available at CPflight website on FCU section page (except the first released version); the revision number is progressive, so a higher number corresponds to a latest version. Before to proceed with the upgrade check the installed firmware revision number. You can see the installed version in configuration mode (see related section) or at the FCU startup.

In some circumstances a firmware upgrade may require an updating of the software too (Project Magenta or AST), if you encounter any malfunction after a firmware update, check software version and update the software if required. To update the firmware follows these steps:

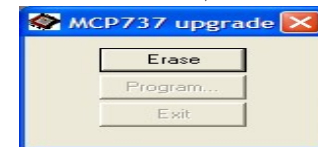
- Download the firmware at www.cplight.com; pay attention to the relation between the firmware and the device as on the product page you may find firmware for different devices. The firmware for the FCU is named "fcufwxxx.zip" (where xxx act for the revision number)...
- Files are in a compressed archive .zip; unzip the files in a temporarily folder...
- Disconnect supply from the FCU (USB cable); disconnect external modules (EFIS) if any...
- Insert the two jumpers (provided) on the pins located on the back of the FCU as indicated in the below figure...
- Connect the USB to the FCU, a small flash on the backlight indicate that the FCU has started in firmware program mode...
- Close any application on the computer, browse the temporary folder that contains the downloaded firmware and run UPGRADE.EXE program. The following dialog will prompt...



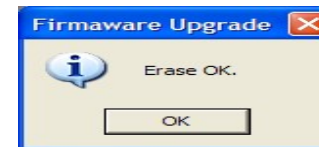
Select the port number assigned during the driver installation (see driver installation Section) and click OK.



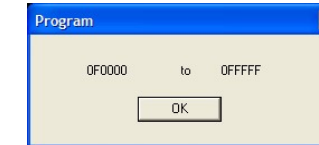
FCU320xxx.mot file (where xxx represent the release number) in the folder where you have extracted the firmware files; select it and



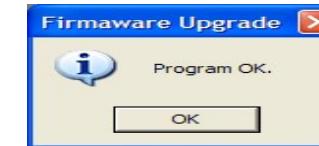
the file name will be shown into "upgrade file" field click OK to proceed...



At the end of the erase phase the dialog will prompt, click OK.

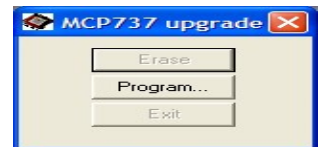


The program shows the info about the memory area to be programmed, click OK.

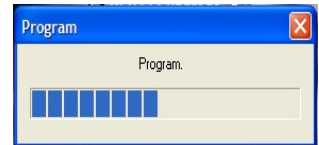


At the end of program click ok to continue

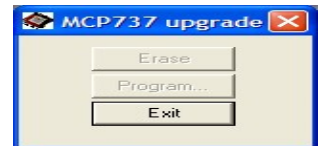
click on the Erase button to clear the memory for programming.



Now click on program button



The memory programming will take some time, during the programming the FCU backlight will flash.



Click to exit button and wait until the dialog will close.

MAIN CHARACTERISTICS

Common characteristics for FCU320 and EFI320 (Left & Right)

- Backlighting frontplate.
- Backlight color: Warm White
- Backlighted pushbuttons.
- Pushbuttons legend backlight color: White
- Pushbuttons active status LED color: Green
- Encoders characteristics: mechanical with PUSH/PULL function, 20 increment for rotation (with detent).
- Knobs: aluminum dust-coated (with symbols)
- External or internal display brightness regulation.
- External or internal backlight brightness regulation.

Characteristics for FCU320

- Display: Custom made back lighted LCD
- Display color: Warm white
- 4 digital encoders: SPD/MACH, HDG/TRK/LAT, ALT, V/S
- Dual concentric ALT Knob (external knob for x100 / x1000 exchange)
- 16 bit Flash microcontroller.
- DIN 5 pole socket for plug&play CPflight modules interface.
- USB Interface (USB cable provided).
- Supply: 6Vdc 1A (option)

Characteristics for EFI320 (Left & Right)

- Display: 4 digit + BARO/QNH legends
- Display characteristics: LED 7 segments. Digit height: 0,3" (7,6mm), Display color: white
- Dual concentric Altimeter setting Knob (external knob for inHg / hPa exchange)