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iOptron Firmware Upgrade Installation Guide

CEM70 Firmware Upgrade

The firmware of a CEM70 mount and 8407 hand controller (HC) can be upgraded. The upgrading is only supported by Windows. Please check iOptron's website, **www.iOptron.com**, under **Support**, for the most up-to-date firmware.
The firmware upgrade will be done via:

- Mount: USB port on the mount.
- Hand controller: RS232 serial port on the hand controller.

To upgrade the firmware, you need some or all of the following software/hardware, depends on the upgrading you are performing:

- iOptron Upgrade Utility Program (Version 2.x)
- CEM70 mount firmware package
- 8407 hand controller firmware
- A USB cable (for the mount)
- iOptron RS232 to RJ9 serial cable #8412 (for HC)
- USB to RS232 converter and driver. If your computer does not equip an RS232 port (9-pin D-shape connector) except for the USB port, you need to buy a USB to RS232 converter, from a computer hardware store or online. **We recommend using a converter.**

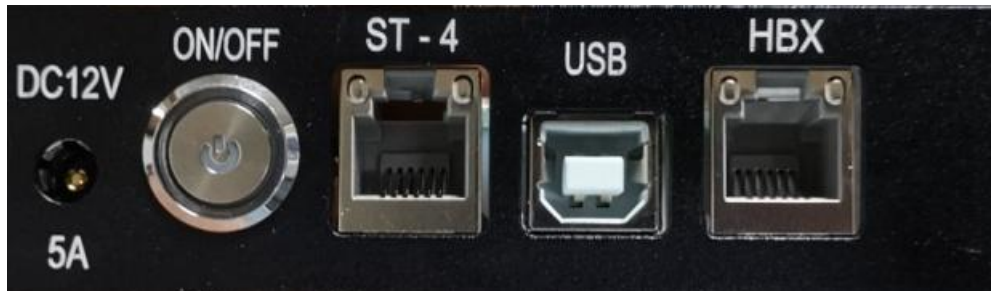**Download software and firmware from the iOptron website**

Go to any CEM70 product page. Click on the **Support Documents** tab to download related firmware. Or go to the iOptron website to locate **CEM70** firmware under **Support > Firmware/Software.**
Download and save the **iOptronUpgradeUtility program**, Hand Controller firmware, and CEM70 mount firmware.

CEM70 mount firmware upgrade
Upgrade mount firmware is straightforward.

1. Connect the mount to a computer via a USB cable through the mount USB port. Turn the mount power on. For a **CEM70** or **CEM70EC** mount, connect the USB cable to the USB port on the main control panel (it may change in the future).

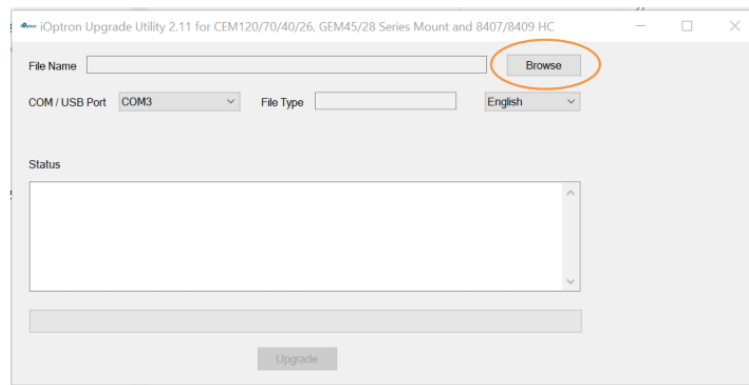For a **CEM70G** mount, connect the USB cable to either the USB3.0 port on the base

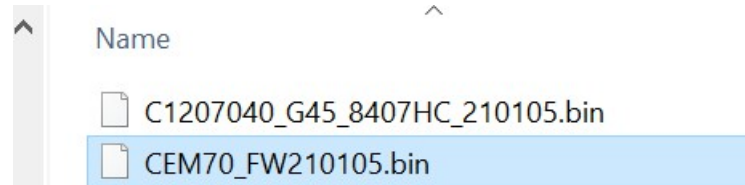OR the USB3.0 port on the rear end of the RA axis.

2. Locate downloaded software and click on **iOptronUpgradeUtility211.exe:**

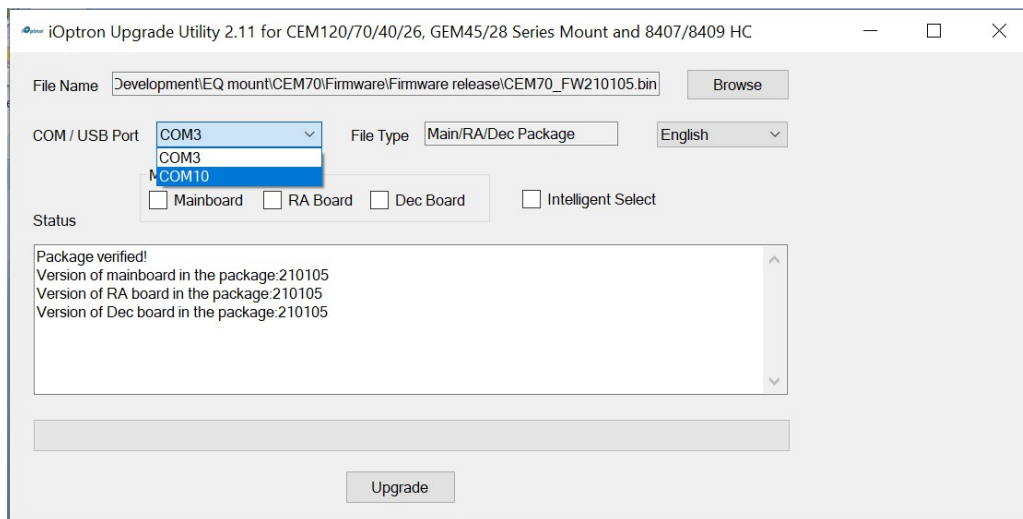| Name	Date modified
C1207040_G45_8407HC_210105.bin	2/12/2021 9:54 AM
CEM70 Firmware Upgrade 1.0.docx	4/2/2021 9:37 AM
CEM70_FW210105.bin	2/10/2021 10:23 PM
iOptronUpgradeUtility211.exe	2/10/2021 10:16 PM

3. **Click on Browse in the iOptron Upgrade Utility window.**

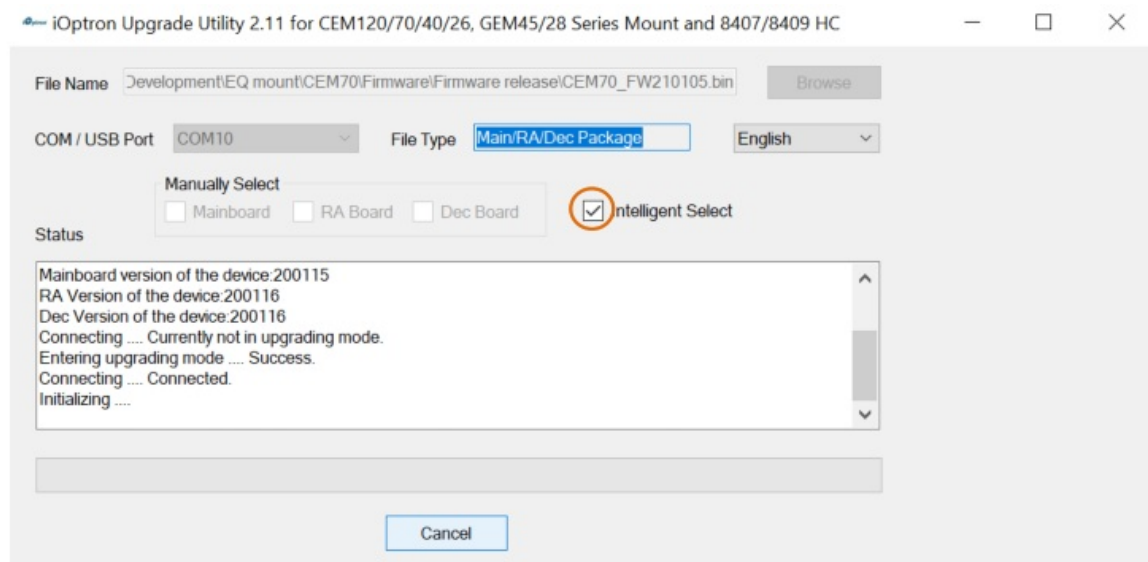4. **Select the mount firmware package CEM70_FWyymmdd.bin, and click Open;**
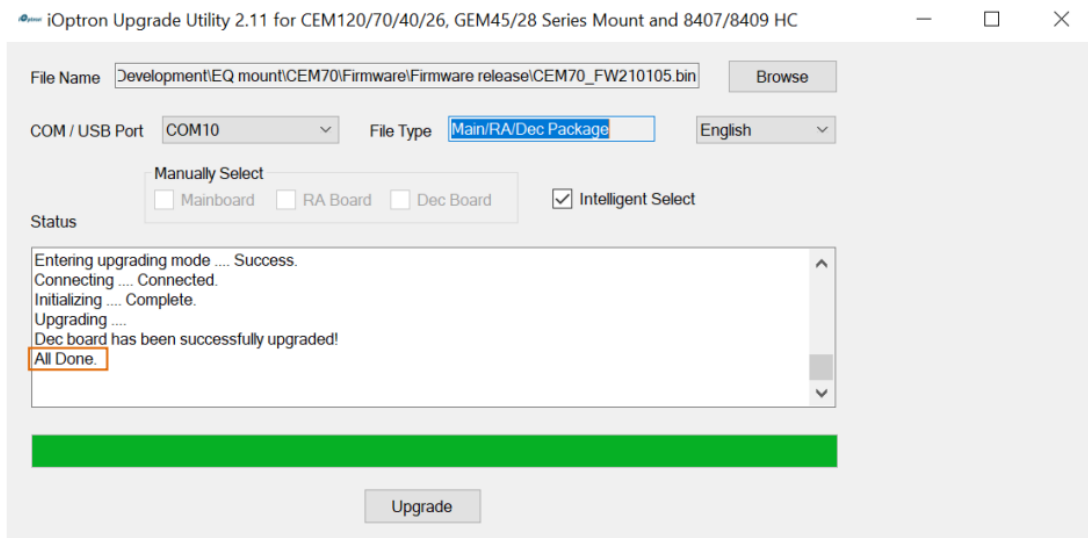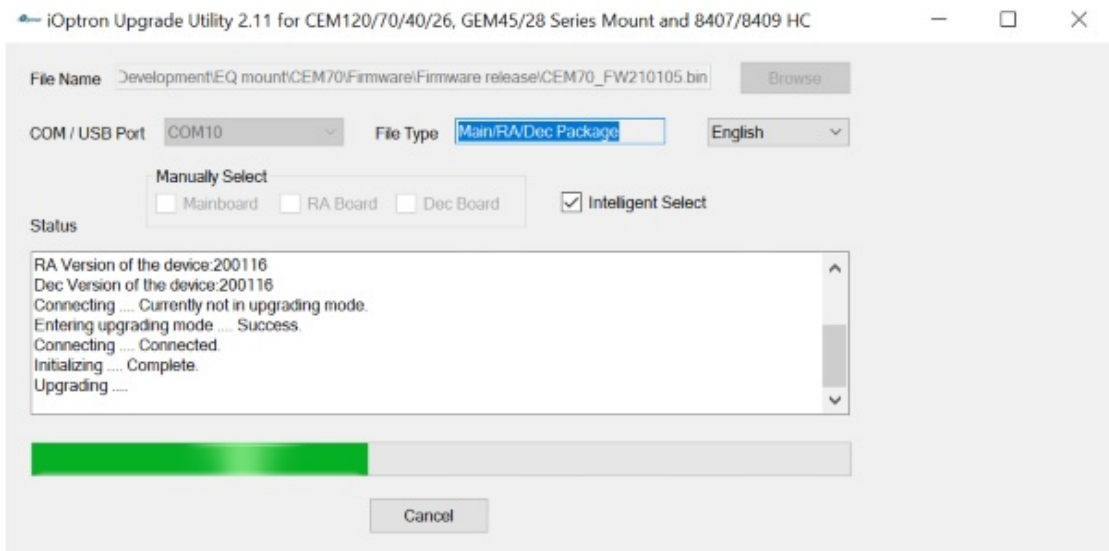

5. **The File Type and Version will be verified and displayed. Select the correct COM port from the COM/USB Port pull-down menu. Here is COM10.**
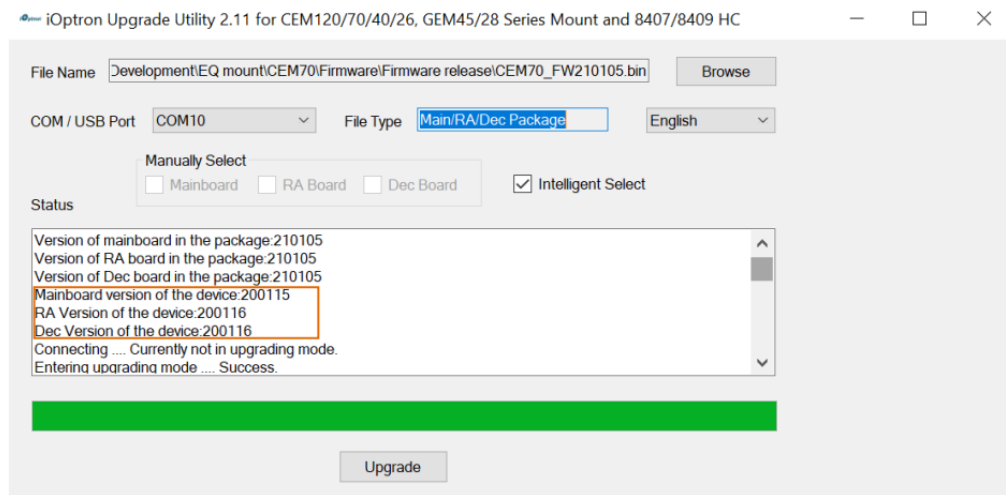

6. **Now you can choose "Intelligent Select" to let the software decided which part of mount firmware needs to be upgraded or use "Manually Select" to select which firmware you want to upgrade.**

   I chose "**Intelligent Select**", check the small box in front of it and click on the **Upgrade** button. If any part of the software Is not up to date, it will be upgraded. You should see the following windows:
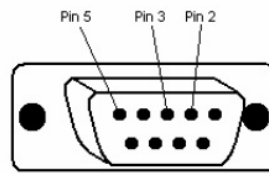
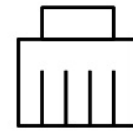After the firmware upgrade is done, move the cursor up to take a record of the previous firmware version.

7. Power cycling the mount. You can check the firmware version via Commander or hand controller.

8. Exit the **Upgrade Utility** program.

8407 hand controller firmware upgrade

8407 hand controller firmware upgrade is via RS232 port on the hand controller. It needs an iOptron RS232 cable (#8412). Here is the cable and a wiring instruction if you want a DIY.

RS232 connector (female)   RJ9 plug

Wiring

RS232	RJ9
2	4
3	3
5	1

Most new computers, especially laptops, do not have a native D9 serial port anymore. A USB to COM/RS232 port converter is needed to convert a USB port to a virtual COM port. Here are two examples of USB2COM converters.
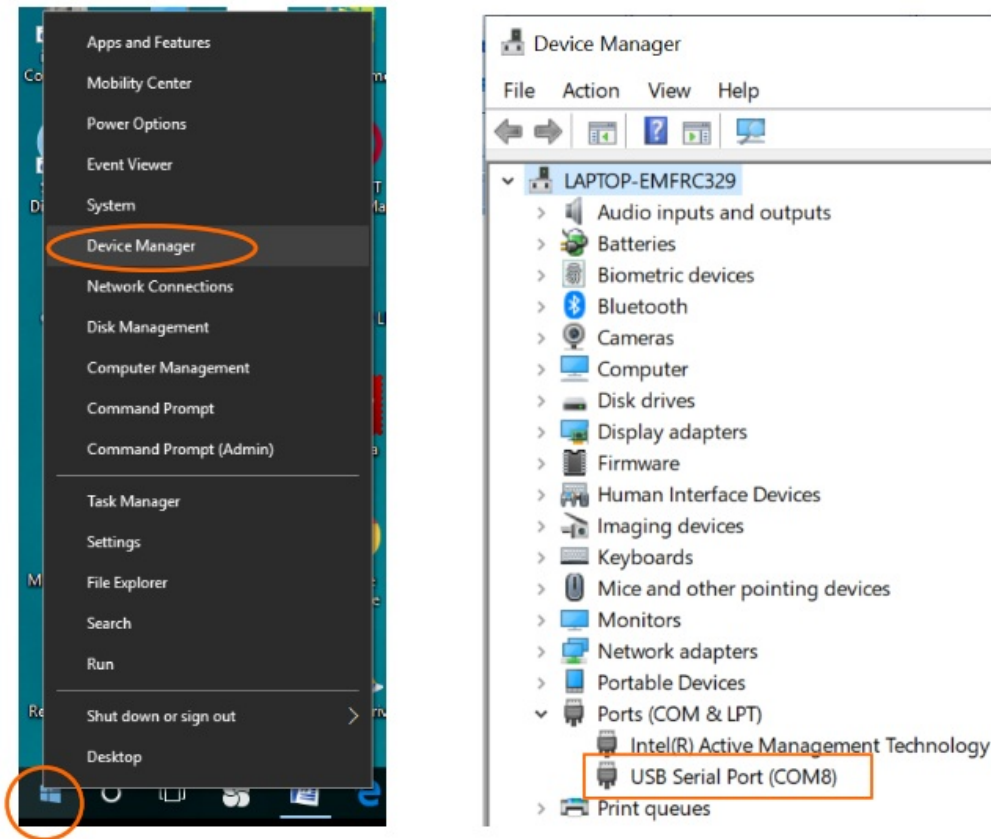

We **recommend** using a USB to RS232 converter even your computer has a native RS232 port. A converter with an FTDI chipset is preferred to ensure a reliable operation. Install the VCP (Virtual COM Port) driver that comes with the converter. Plug the USB to RS232 converter into one available computer USB port.

Use your mouse's right button to click on **the Window**s sign located on the left bottom corner of your computer's screen (Windows 10 as an example). This will bring up a list of tasks as shown in the screenshot below. Move the mouse to **Device Manager** and click on it.
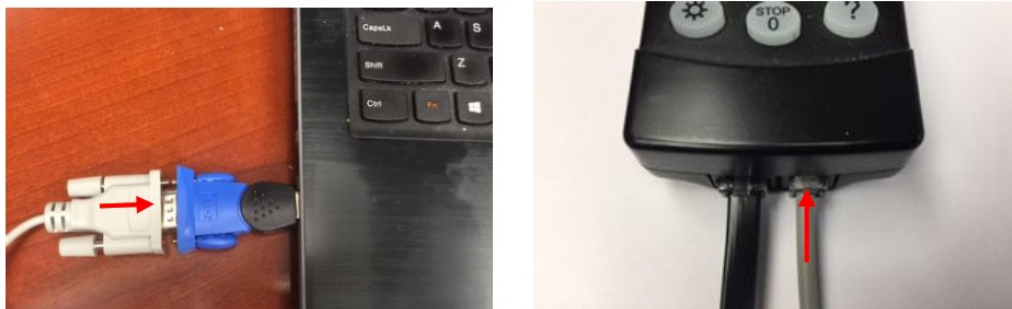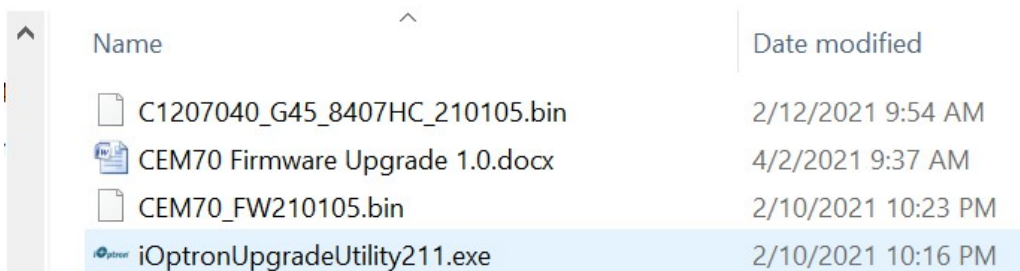
Click on **Ports (COM & LPT**) to find the assigned COM port number and write it down. Here is **COM8.**
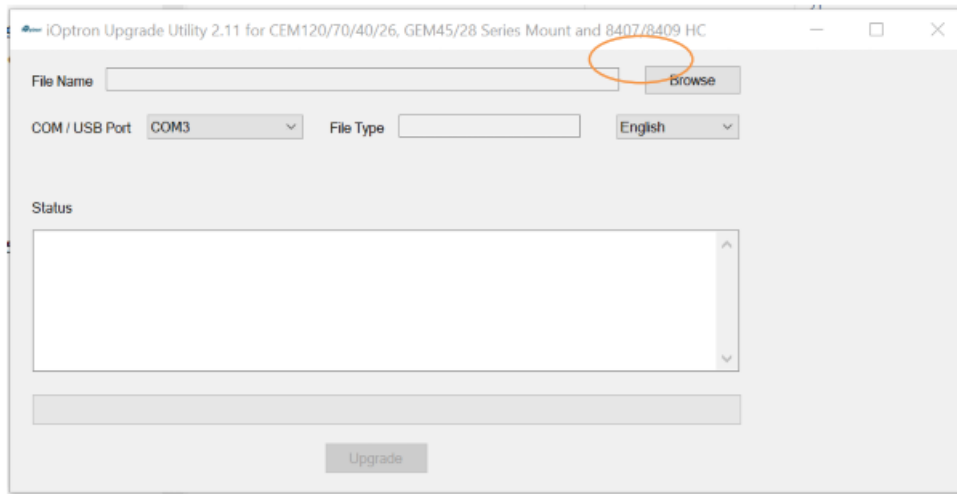
To upgrade the HC firmware

1. Connect the 8407 hand controller to the HBX port on the CEM70 mount. Make sure the mount power is OFF;
2. Connect 4-pin RJ9 plug into the serial port of an 8407 hand controller and the 9-pin RS232 connector to converter
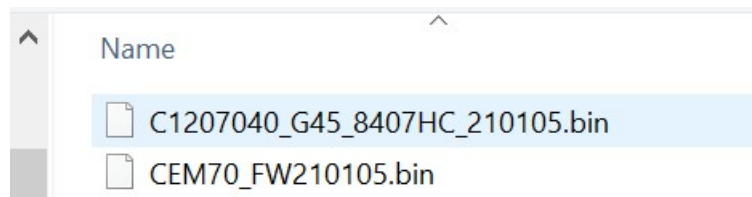

3. Hold **ENTER** button of the hand controller while switch the ON/OFF button to turn the mount power on. The HC will enter **Upgrading Mode.**
4. Locate downloaded software and click on **iOptronUpgradeUtility211.exe**

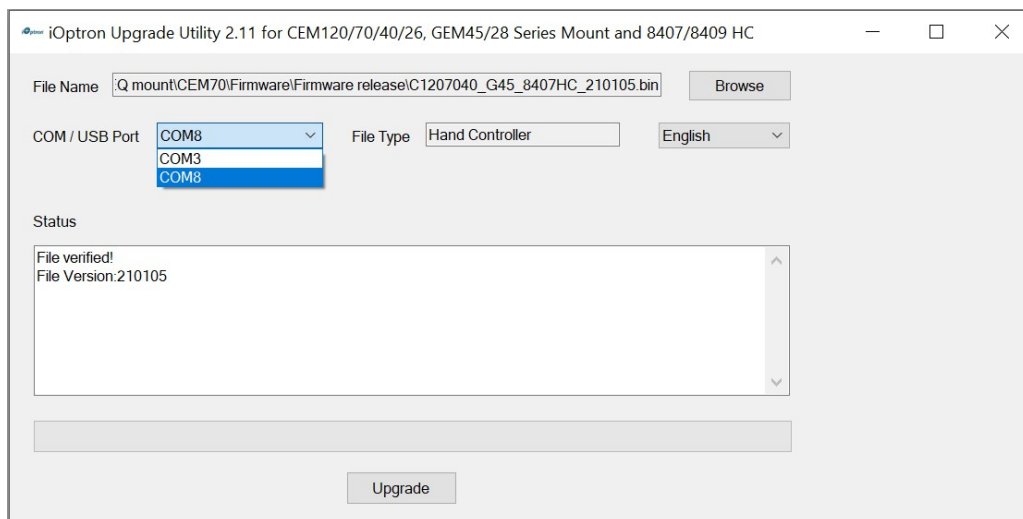| Name	Date modified
C1207040_G45_8407HC_210105.bin	2/12/2021 9:54 AM
CEM70 Firmware Upgrade 1.0.docx	4/2/2021 9:37 AM
CEM70_FW210105.bin	2/10/2021 10:23 PM
iOptronUpgradeUtility211.exe	2/10/2021 10:16 PM

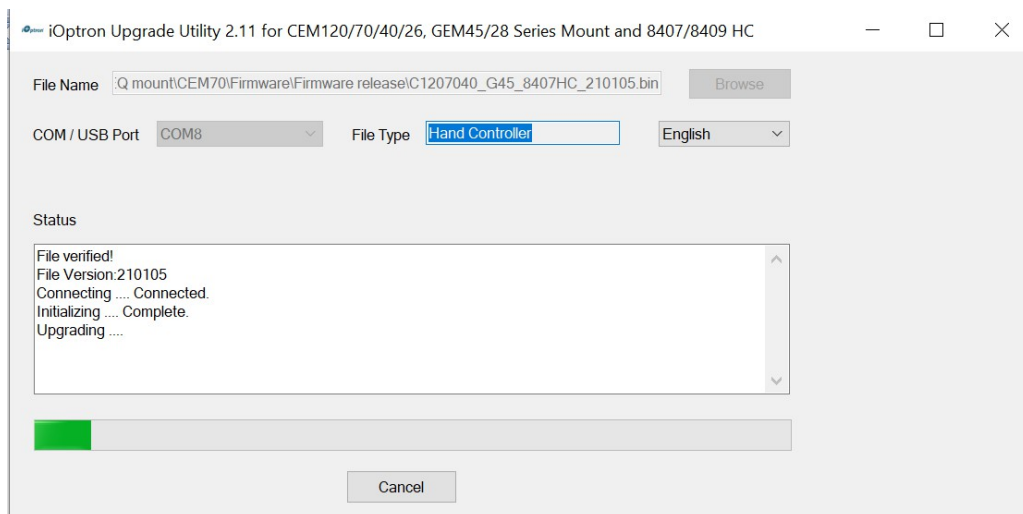5. **Click on Browse in the iOptron Upgrade Utility window**

6. Select the hand controller firmware C1207040_G45_8407HC_210105.bin, and click **open.**
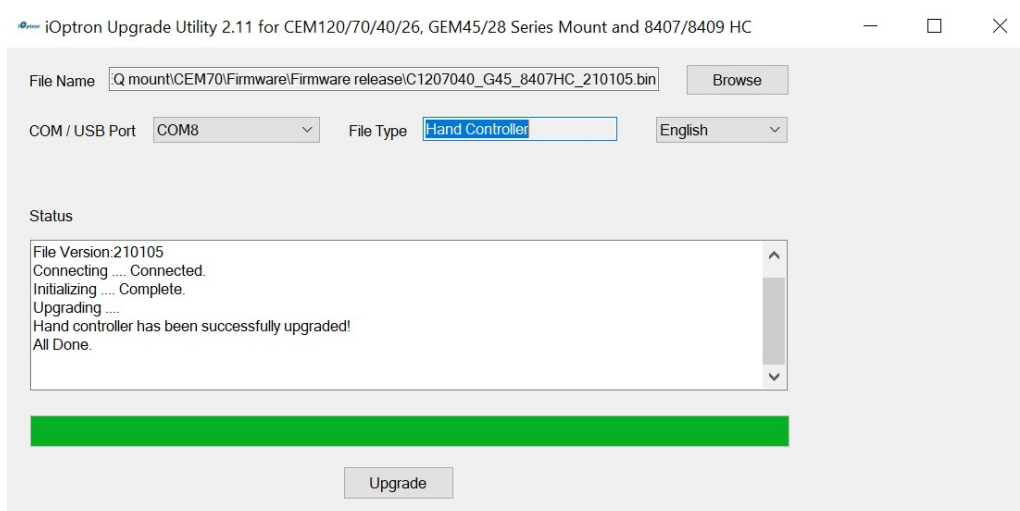

7. The **File Type** and **Version** will be verified and displayed. Select the correct COM port from **COM/USB Port** pull-down menu. Here is COM8

8. Click on the **Upgrade** button to start the process

9.

After the firmware is upgraded successfully, power cycle the mount.

Calibration CEM70 EC high precision encoder

CEM70EC version needs to perform encoder calibration after the firmware upgrade to ensure precise tracking.
To calibrate the encoder:

1. Turn off the mount;
2. Hold number "2" on the hand controller, then turn the mount power on. Keep holding the #2 key until the calibration started automatically;
   The calibration mode will search the mount zero position first. Next, the mount will swing to the eastern side quickly. Then the mount will slowly move from the eastern side to the western side to calibrate the encoder. It will return to Zero Position after the calibration is finished. The total procedure may take a few minutes.
3. After the mount stopped, turn off the mount, and turn it on again.
4. Perform **Search Zero Position or Set Zero Position.**

Common errors during firmware upgrade:
(1) Cannot open COM port:

- Broken cable
- The wrong COM port is selected;
- A mount is not connected;
- A USB to RS232 converter driver is not installed or corrupted;
- A USB to RS232 converter does not work properly.

(2) Connection failed:

- Cable plugged into a wrong port;
- Mount power is not turned on;
- The cable is not plugged in firmly;
- Broken RS232 or USB cable;
- A USB to RS232 converter does not work properly;
- Malfunctioned control board.

(3) Upgrade stopped in the middle or failed:

- The cable is not plugged in firmly;
- Cable is moved during the process;
- Broken RJ9 or RS232 cable;
- A USB to RS232 converter does not work properly,
- Wrong firmware selected.

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Contents

Documents / Resources

	iOptron Firmware Upgrade [pdf] Installation Guide Firmware Upgrade, CEM70

References

- 🌐 **iOptron.com**
- 🌐 **ioptron.com/**