

# CEM25 with Go2Nova<sup>®</sup> 8408 Hand Controller Firmware Upgrade

The firmware of a CEM25, including Go2Nova<sup>®</sup> 8408 hand controller, R.A. and DEC motor drive boards, can be upgraded by a customer. Please check iOptron's website, [www.iOptron.com](http://www.iOptron.com), under **Support**, for the most up to date firmware.



**DO NOT load standard CEM25 mount R.A. firmware into a CEM25EC (mount with high precision optical encoder) R.A. board. Permanent damage may occur!**

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 1.22 or higher)
- 8408 hand controller firmware for CEM25
- R.A. motor drive firmware for CEM25
- DEC motor drive firmware for CEM25
- iOptron RS232 to RJ9 serial cable #8412 (included with the ZEQ25 mount)
- USB to RS232 converter and driver. If your computer does not equip a RS232 port (9-pin D-shape connector) except the USB port, you need to buy a USB to RS232 converter, form a computer hardware store or on-line. **We recommend using a converter with a FTDI chipset.**

Please manually set the mount to zero position using **MENU=> Zero Position =>Set Zero Position**. Otherwise, the mount may not perform goto properly.

## 1. Prepare the hardware

In order to perform the firmware upgrade, as well as to use planetarium software to control the mount via an 8408 hand controller, the communication between the PC and hand controller has to be established.

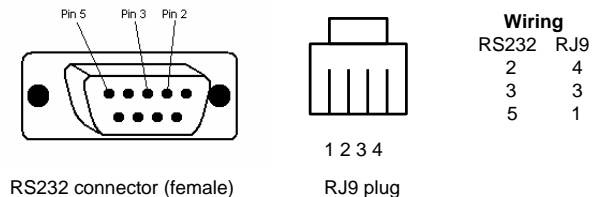
### RS232 to RJ9 serial cable

The firmware upgrade and computer controller is through a RJ9 serial port on a Go2Nova<sup>®</sup> 8408 hand controller. You need a cable to connect this

port to the serial port of a computer. Here is a sample of a RS232 to RJ9 serial cable. **Please do not use other brand cable other than iOptron. They may look exactly same but wired differently.**

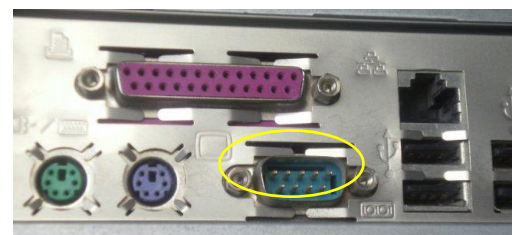


If you are making your own cable, here is the wiring instruction:



### Serial (RS232) Port on a Computer

The first step is to find if your computer has a serial port (or RS232 port). The following photos show a native (built-in) serial port on a laptop (left) and a desk top (right). It is a 9-pin D-shaped (DB9) connector. The assigned port number usually is COM1. Minimum 5.0VDC output power at serial connector is needed to ensure reliable data transmission.



## USB to RS232 converter

If your computer only has USB ports, like most late PC and laptops do, or the native RS232 port does not perform, you need a USB to COM (RS232) converter to convert one USB port to a RS232 port. Here are two examples of USB2COM converters. Here are two examples of USB2COM converters. We recommend having a converter that uses high quality chipset, such as one from FTDI or Silicon Labs, to ensure a reliable operation.



### 2. Find the serial port (COM port) number from your computer:

If your computer has a serial port (9-pin D-shape male connector on the back, the default assigned number is COM1.

If you are using a USB to COM converter to convert one USB port to a COM port, you can find the computer assigned COM port number.

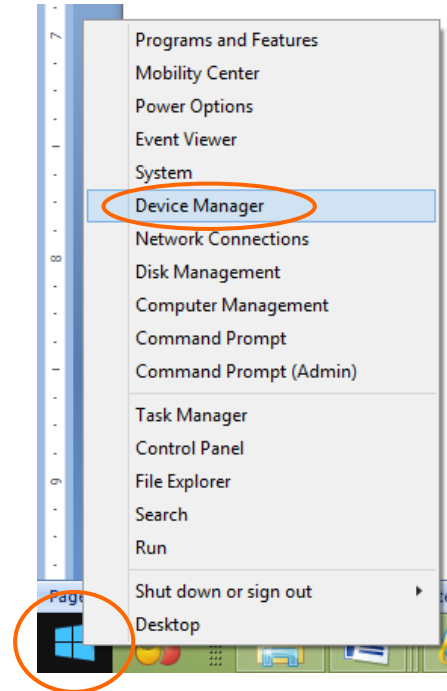
Set up you mount. Connect the hand controller to the HBX socket on the CEM25 mount (**NOT the PORT socket!**)

Plug the USB to RS232 converter into one of available USB port and connect the RS232-RJ9 serial cable onto the serial port of the converter.

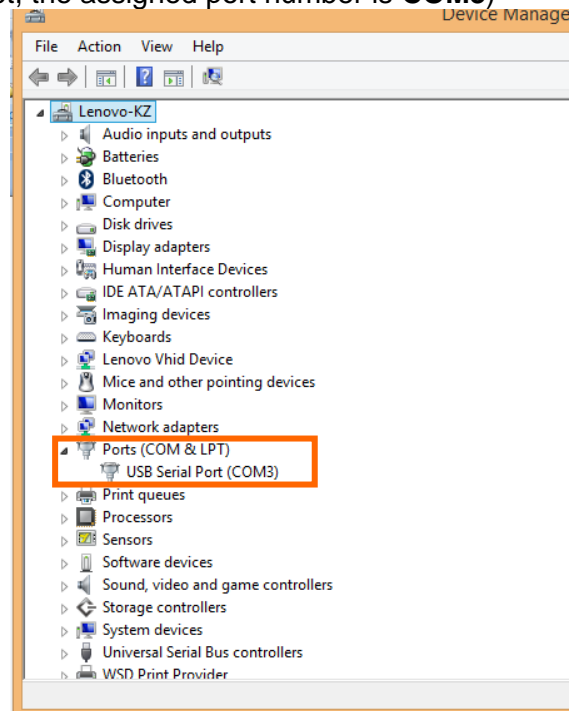


After install the USB2COM driver that comes with the device, use your mouse' right button to click on **Windows** sign located on the left bottom corner of your computer's screen (Windows 8 as an example). This will bring up a list of tasks as

shown in the screen shot below. Move the mouse to **Device Manager** and click onto it.



Click on **Ports (COM & LPT)**, find out the COM number and write it down (in the following screen shot, the assigned port number is **COM3**)



### 3. Download software and firmware from iOptron website:

Go to iOptron website, [www.iOptron.com](http://www.iOptron.com), click on **Support** tab. Locate **CEM25** under **Firmware/Software** catalog and click on it. You

may also find the information in CEM25 product page.

Download and save Upgrade Utility program, CEM25 Hand Controller firmware, CEM25 R.A. motor control firmware and CEM25 DEC motor control firmware.

**Please ignore any prompt or error message displayed on the hand controller during firmware upgrading.**

**If the upgrade process was disrupted, wrong firmware was loaded, or the upgrade was failed, just start this process over again. Make sure a correct COM port is selected and the RJ9 cable is plug into the hand controller serial port.**

#### **4. Upgrade 8408 hand controller firmware:**

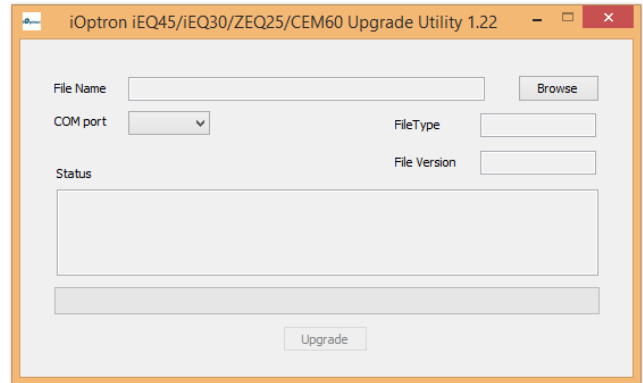
- (1) Connect the 8408 hand controller to the HBX port of a CEM25 mount. Make sure the mount power is OFF;
- (2) Connect 4-pin RJ9 plug into the serial port of a 8408 hand controller and the 9-pin RS232 connector to your computer's RS232 port (or RS232 port of the USB2COM converter);



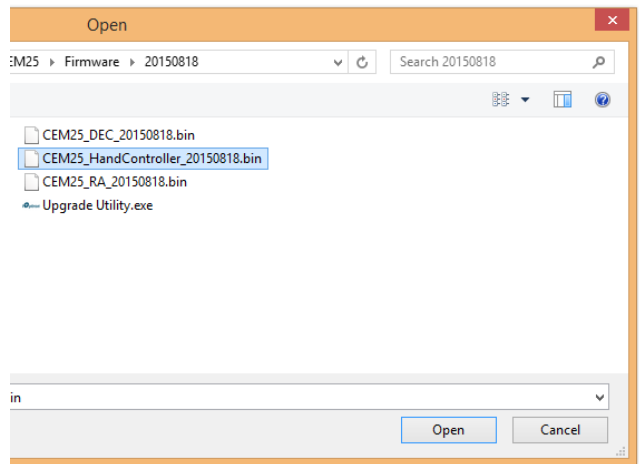
- (3) Hold **ENTER** button of the hand controller while switch the ON/OFF button to turn the mount power on;
- (4) Locate download software and click on **Upgrade Utility.exe**:



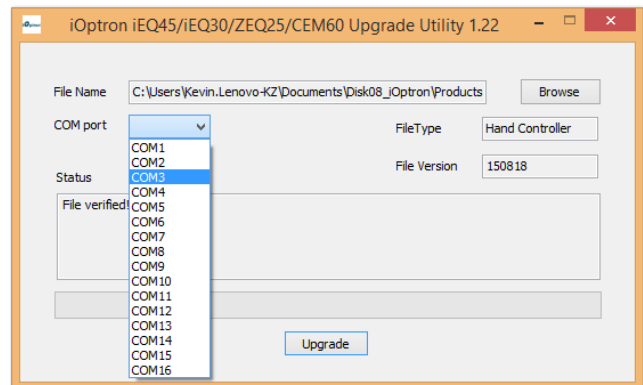
- (5) An iOptron Upgrade Utility window will display. Click on **Browse**:



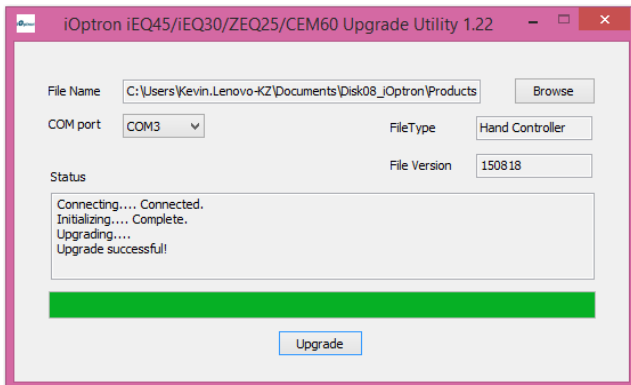
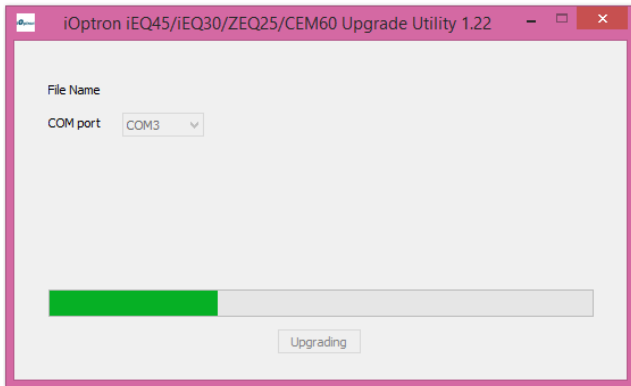
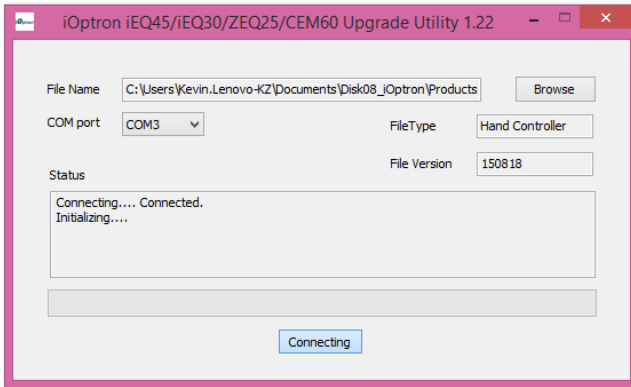
- (5) Select 8408 hand controller firmware CEM25\_HandController\_YYYYMMDD.bin and click **Open**.



- (6) The **FileType** and **Version** will be verified and displayed. Click on pull down menu of the COM port and select the COM port number. Here is **COM3**.



- (7) Click on **Upgrade** button to start the process;



(8) After the firmware upgraded successfully, power cycle the mount. If no other firmware upgrade is needed, exit the Upgrade Utility program by click on . **Ignore any error message displayed on the hand controller if you need to upgrade R.A. and DEC control board firmware.** It will disappear after all firmware are upgraded.

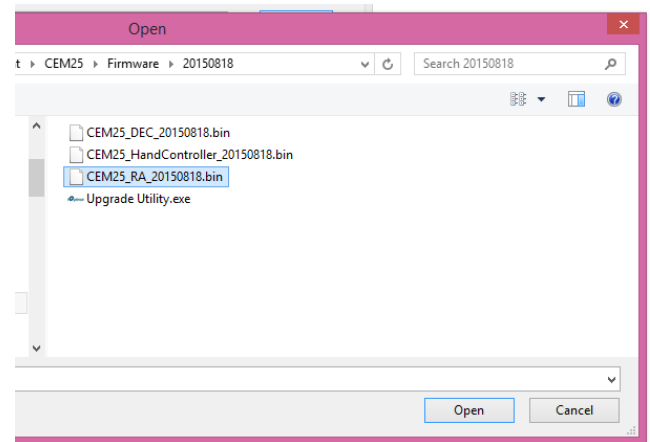
### **5. Upgrade CEM25 R.A. or DEC motor control board firmware:**

You can only upgrade either R.A. or DEC control board firmware at a time. You have to power cycle the mount before upgrading the other board.

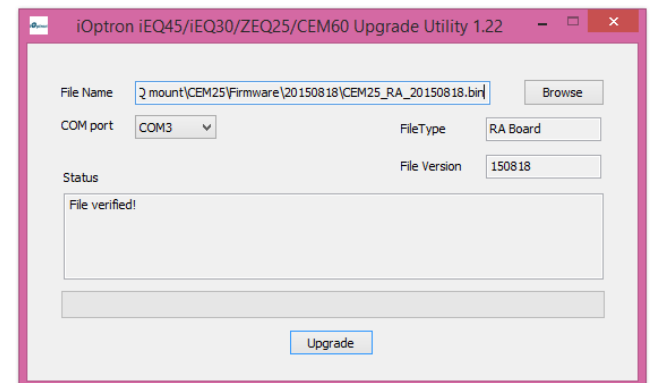
- (1) Connect 8408 hand controller to the HBX port of a CEM25 mount. Make sure the mount power is OFF;
- (2) Connect 4-pin RJ9 plug into the serial port of an 8408 hand controller and the 9-pin RS232 connector to your computer's RS232 port (or RS232 port of the USB2COM converter);
- (3) Locate download software and click on **Upgrade Utility.exe**;



- (4) Click on **Browse** in iOptron Upgrade Utility window. Select the R.A. or DEC board firmware, CEM25\_RA\_YYYYMMDD.bin, and click **Open**;

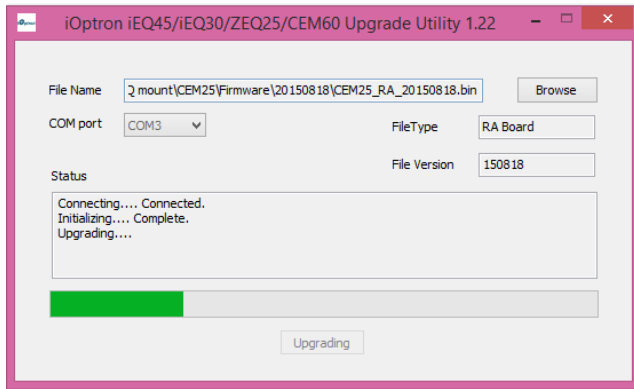


- (5) Click on pull down menu of the COM port and select the COM port number. Here is **COM3**.

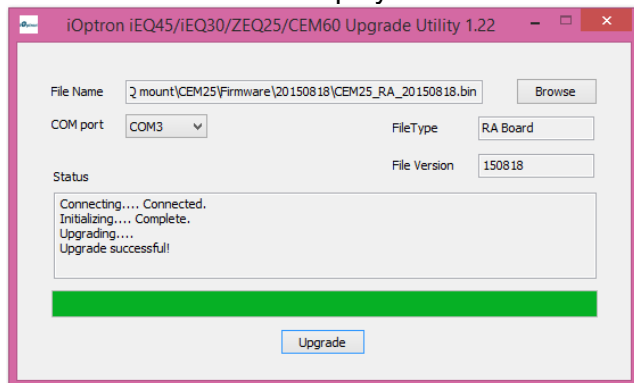


- (6) Switch the ON/OFF button to turn the mount power on. Click on **Upgrade** button after hearing the “beep”, if the hand controller beep is turned on. Otherwise wait 1~3 seconds after power is turned on (**please pay attention to the operation sequence**). The upgrading process will begin. If the upgrade does not

start, you may try it again with different waiting time.



(7) After the firmware upgrade finished, “Upgrade successful!” will be displayed.



(8) Power cycling the hand controller. Upgrade the DEC motor control board.

(9) Power cycling the mount. Check your firmware version after all four firmware upgrade is finished by press **MENU→Firmware Information**.

(10) Exit the **Upgrade Utility** program.

## **6. Calibration CEM25EC High Precision Encoder:**

CEM25EC mount needs to perform encoder calibration after the RA firmware upgrade to ensure precise tracking. To calibrate the encoder:

- (1) Use MENU=>Zero Position =>GOTO Zero Position to set the mount to Zero Position. Loosen the RA and DEC clutches to adjust the mount Zero Position by eyeballing;
- (2) Hold number "2" on the hand controller, then turn the mount power on, keep holding the #2 key until the calibration started automatically;
- (3) After the mount stopped, turn off the mount, and turn it on again.

## **7. Common Errors During Firmware Upgrade:**

(1) Can not open COM port:

- 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:

- Mount power is not turned on;
- COM port conflict or used by other program. Close other program and try it again;
- Serial cable is not connected to the hand controller;
- Broken RJ9 to RS232 cable;
- A USB to RS232 converter does not work properly;
- Hand controller not plugged in properly;
- Malfunctioned control board;

(3) Upgrade stopped in the middle or failed:

- Cable not plugged in firmly;
- Broken RJ9 or RS232 cable;
- A USB to RS232 converter does not work properly.

(4) Hand controller. But R.A. and DEC boards upgrade stopped in the middle or failed:

- Native COM port does not work properly. Use a USB to RS232 converter and try again;
- A USB to RS232 converter does not work properly.