Prizmatix

LED-Ctrl-STBL

Software

User Manual

Software Ver: 11.0
User Manual Ver 1.3

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2 Prizmatix LED-Ctrl-STBL Software Description

The Prizmatix LED-CTRL-STBL (Control) software was developed to enable convenient control and stabilization of output power for UHPTLCC-02-STBL LED controllers on Windows based computers via a USB connection.

The USB enabled Prizmatix LED sources can be also operated by sending a simple text string via serial communication COM port from various software packages such as MicroManager, MetaMorph, LabView, Matlab, HyperTerminal and many other software packages. API and code examples are available upon request.

3 Health and Safety

Prizmatix products are NOT authorized for use as components in life support devices or systems.

The Prizmatix LEDs are intended for use as laboratory equipment only.

It is not cleared or authorized for clinical use.

4 Setup of the Hardware

For setup of the hardware (LED head, LED controller etc.) please refer to the specific LED illuminator User-Manual. In this document only software related aspect will be discussed.

Please ensure that you have received appropriate USB cable to connect the LED controller to the computer.

5 Software Setup

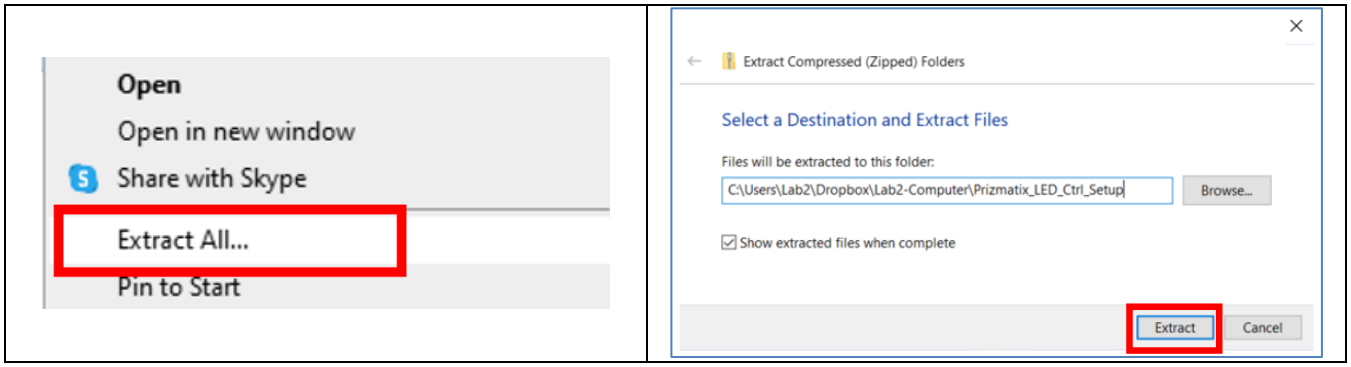
The Prizmatix-LED-CTRL-STBL system setup is performed in following steps:

- Download of the compressed software (ZIP file).
- Setup of Prizmatix-LED-CTRL-STBL software
- Setup of USB device drivers

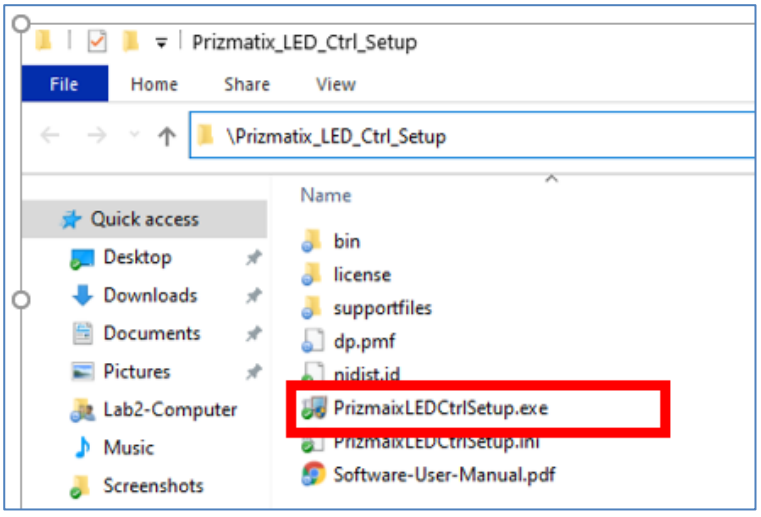
Do not connect the USB cable to the computer until completing the software setup process.

5.1 *Download of the Compressed Software*

The software is available at Prizmatix website:
prizmatix.com/software.htm
Please refer to the software related label on the bottom of the LED controller. The label indicates the specific link that shall be used for download.
Click on the link, you will see the ZIP file inside Dropbox.
Click on the small menu [▪▪▪] at right side of the ZIP file name. As the menu opens chose Download.
The ZIP file will download to your default download folder
Typically: `C:\Users\YourName\Downloads`
Open the download folder and right click on the ZIP file, a popup menu will open.
Chose `Extract All…`



The following dialog box will appear. By default, it will suggest creating a new folder in your `Downloads` folder, which is typically good practice. Press **Extract** button to continue.
The ZIP extraction will create new folder `Prizmatix_LED_Ctrl_Setup` in your `Downloads` directory.



Now we are ready to proceed to the setup of the software on this PC.
Remark: after completion of the setup you can delete the `Downloads\Prizmatix_LED_Ctrl_Setup\*.*` directory.

5.2 Setup of Prizmatix LED-Ctrl-STBL PC Software

Locate the "`PrizmatixLEDCtrlSetup.exe`" file.

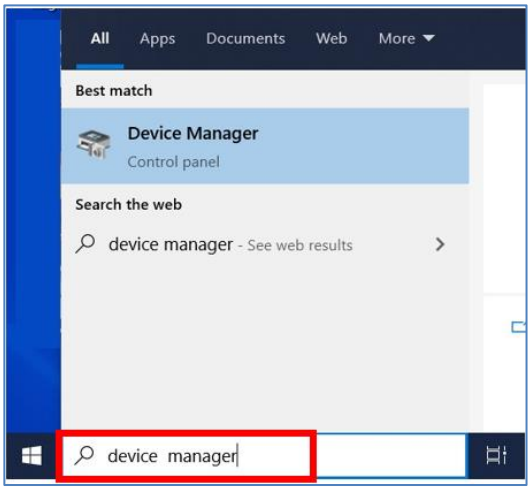
Run the "`PrizmatixLEDCtrlSetup.exe`" file and follow the instructions as they appear during the setup process.
Remark: During the installation you will be asked to accept National Instruments license agreement.
Remark: National Instruments advise to disable Windows Fast Startup feature as it can cause problems with hardware install and remove. During the setup process you will be asked to disable this feature.

At the end of the setup you will be asked to re-boot the system to complete the software installation.

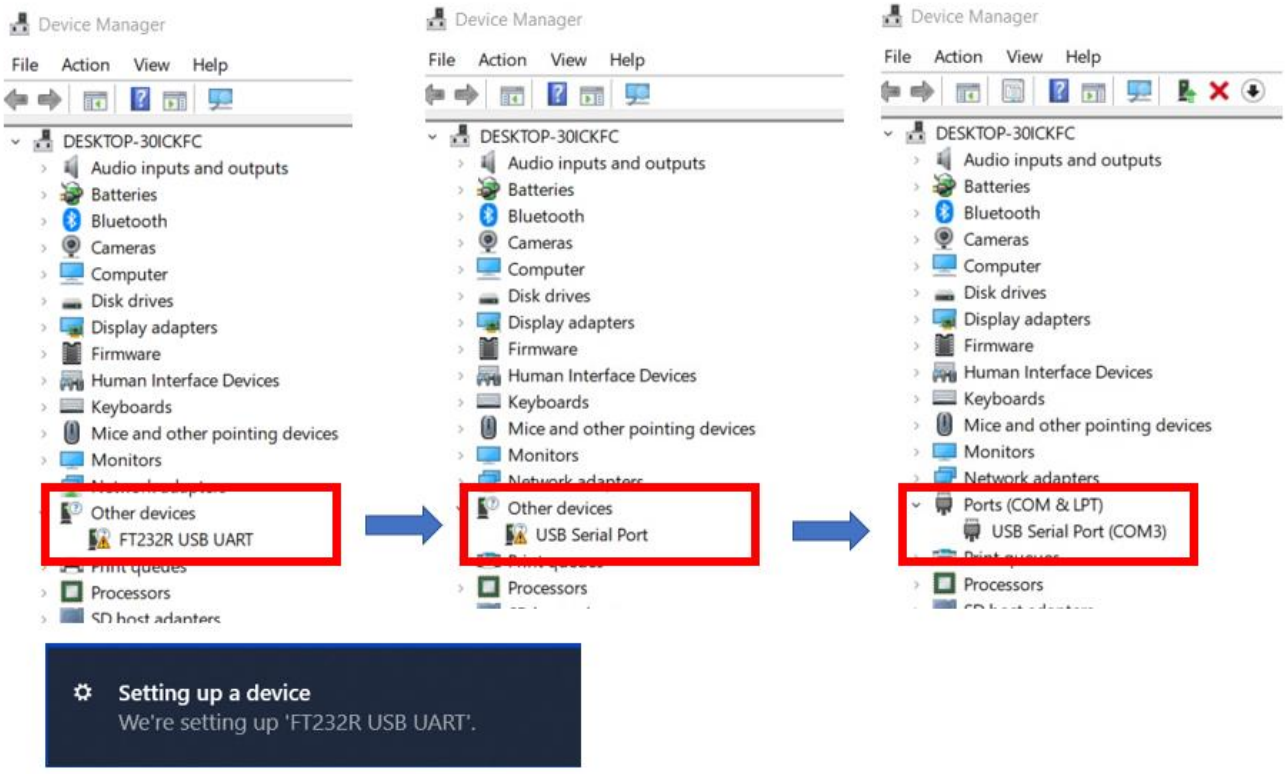
5.3 *Setup of USB Device Drivers*

The following description is for Windows 10 users.
Users of previous versions of Windows shall refer to Appendix B: Setup of USB Device Drivers for Win 7 and Win 8.
The Windows 10 users with updated and Internet connected PC system can experience fully automatic setup of the USB drivers. Please follow these simple steps:

a. Please connect the Prizmatix hardware according the hardware user manual and switch the power switch to ON. If the hardware is LED illuminator decrease the output power to minimum.
b. Type in Search Field: “device manager” and click on it to run this application.
c. Connect the hardware to the computer by the USB cable.



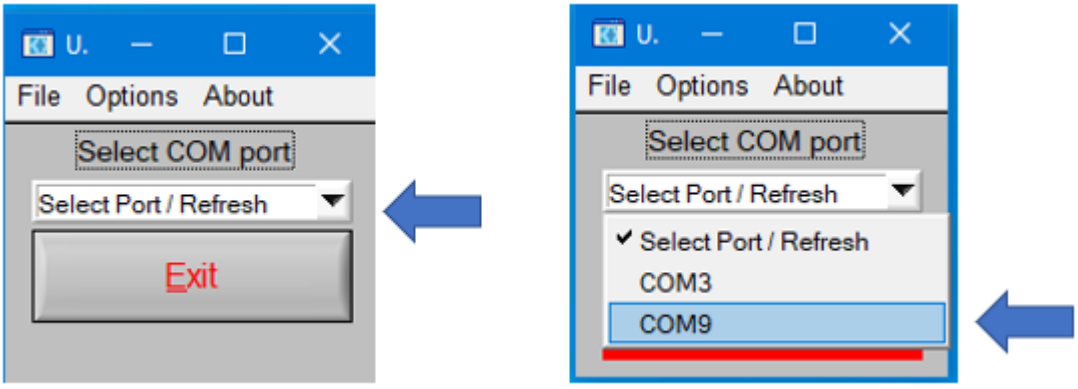
d. Immediately after connecting the USB cable Windows will start the standard driver installation procedure. After few seconds you will see FT232R USB UART device appear in the Device Manager list and a rectangular message “Setting up a device” will appear at lower right corner of the screen. After few additional seconds, this device will be replaced by USB Serial Port then eventually USB Serial Port (COM3) will appear as shown at following picture. Please notice the COM port number (3 in this example). Please remember this COM port number for future use.



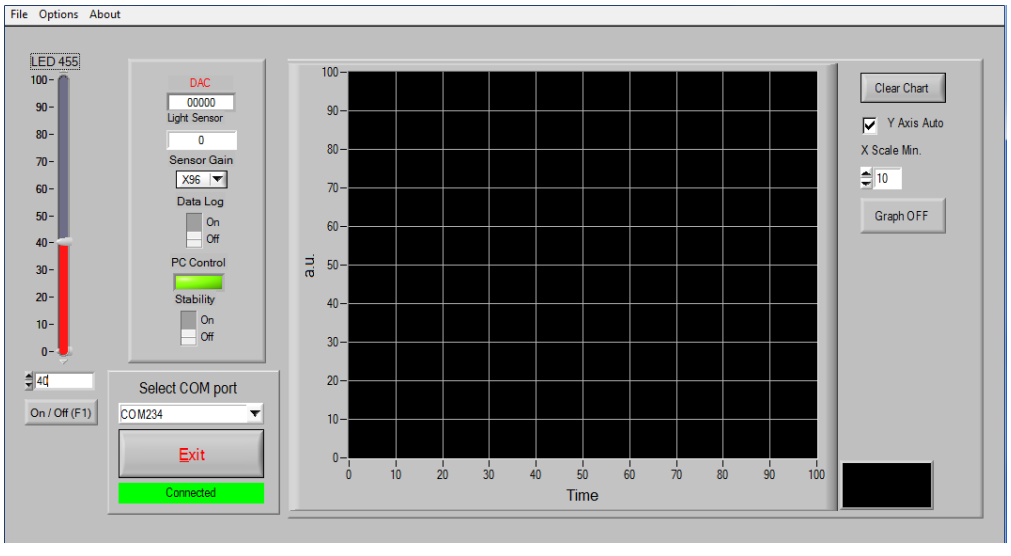
Once the driver installation is complete, please close the Device Manager. Now the Prizmatix LED Ctrl software can be used.

6 System Usage

Choose Prizmatix-LED-CTRL-STBL from Start menu to launch the control software. At the beginning the small dialog will appear and request to indicate the COM Port number. Please select the correct COM Port (in this example COM9). See above on finding the COM port by browsing the Device Manager - If the COM Port does not appear in the list select Refresh (at the top of the list). After few seconds, the software will establish communication with the device and this dialog box will be closed.

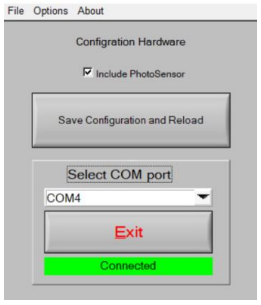


The software has several Graphical User Interfaces (GUI) depending on system specific configuration as shown in following picture:



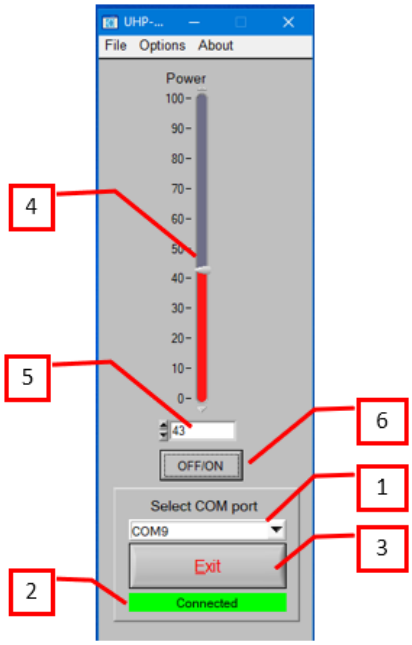
LED-Ctrl-STBL software GUI

If incorrect GUI appear you can change if from menu Options>Configuration. Same menu will appear at first time you run the software:



After first time the software will open with the last settings of COM Port and GUI.

The following picture shows left side of the GUI for LED-Ctrl-STBL software:



Left side of LED-Ctrl-STBL software GUI:

[1] - COM Port select control

[2] - Connection indicator:

Green – connected,
Red – not connected
Blue – some error is detected

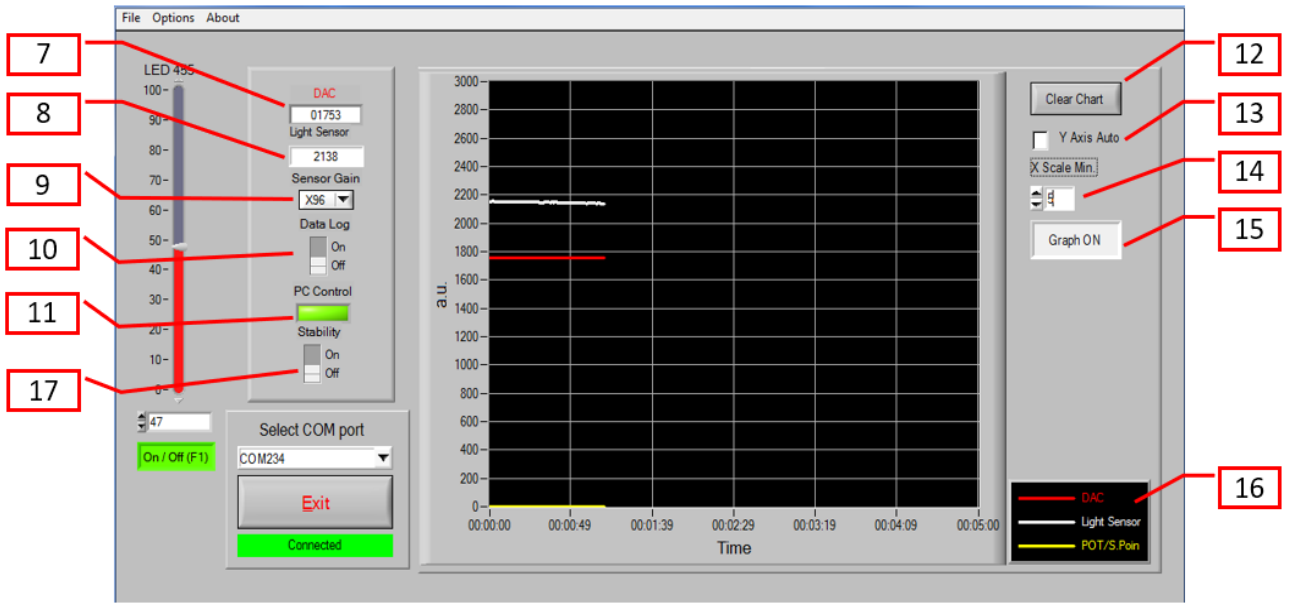
[3] - Exit software button

[4] - LED power slider. The slider range is 0-100%. The Digital to Analog Converter DAC is 12 bit, so this 0-100% is converted to 0-4095. See [7] at next picture.

[5] - LED power numerical indicator

[6] - LED On/Off button

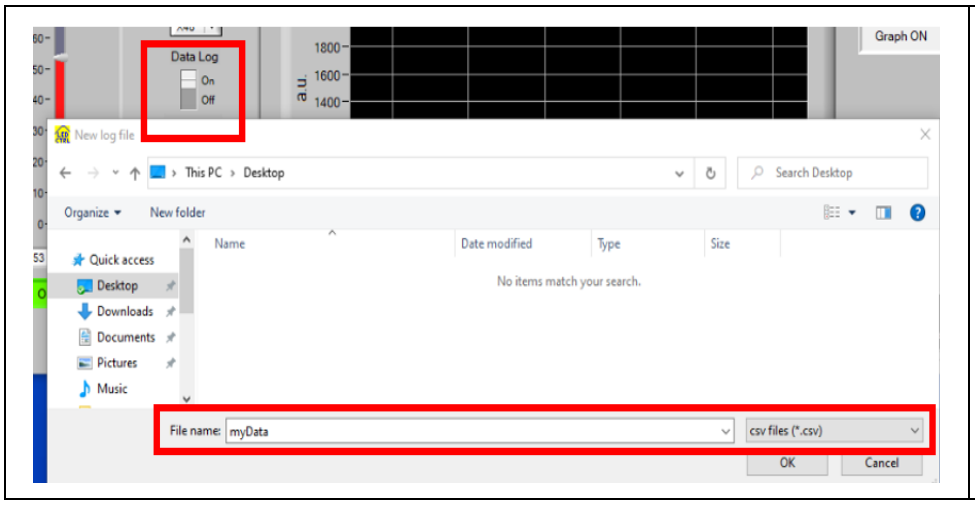
The following picture shows the right side of the GUI for LED-Ctrl-STBL software:

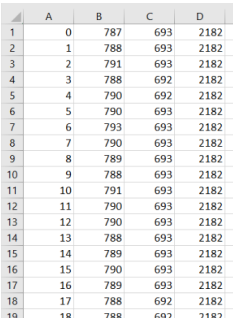


[7] – DAC actual value. Maximum power is at 4095. [8] – Light Sensor value. [9] – Sensor Gain control. [10] – Switch to enable Data Logging. [11] – Indicator that the LED power is controlled by LED-Ctrl-STBL software. [12] – Clear Chart button. [13] – Y-Axis-Auto selector. [14] – Control to set required X-Scale in minutes. [15] – Display the graph button. [16] – Graph legend. [17] – Switch to enable Stabilization (STBL) mode.

6.1 *Manual Mode*

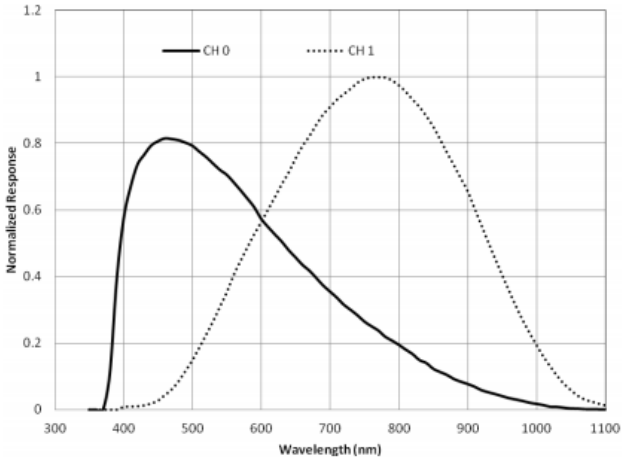
The LED controller can be operated without the software. The LED power can be set by the dial.
If computer is connected and user starts the software it is connecting to the controller and the Connection Indicator [2] shows that the connection is established. In this Manual Mode the user can observe the DAC settings [7] and Photodiode readings [8], see the graph (press Graph ON knob [15]) and even log the data to a file by turning On the Data Log switch [10]. When Data Log switch turned On the user will need to provide file name. The data will be saved in SCV format.





	A	B	C	D
1	0	787	693	2182
2	1	788	693	2182
3	2	791	693	2182
4	3	788	692	2182
5	4	790	692	2182
6	5	790	693	2182
7	6	793	693	2182
8	7	790	693	2182
9	8	789	693	2182
10	9	788	693	2182
11	10	791	693	2182
12	11	790	693	2182
13	12	790	693	2182
14	13	788	693	2182
15	14	789	693	2182
16	15	790	693	2182
17	16	789	693	2182
18	17	788	692	2182

The SCV file can be easily opened by Excel or similar software. The data is arranged in four columns.
Column A – time from start (the points are saved at 1 sec interval)
Column B – Photosensor Visible channel reading 16Bit (0-65536)
Column C – Photosensor NIR channel reading 16Bit (0-65536)
Column D – DAC value 12Bit (0-4095)
The graph shows the spectral response of the photosensor Ch0 is the Visible channel, Ch1 is NIR channel.

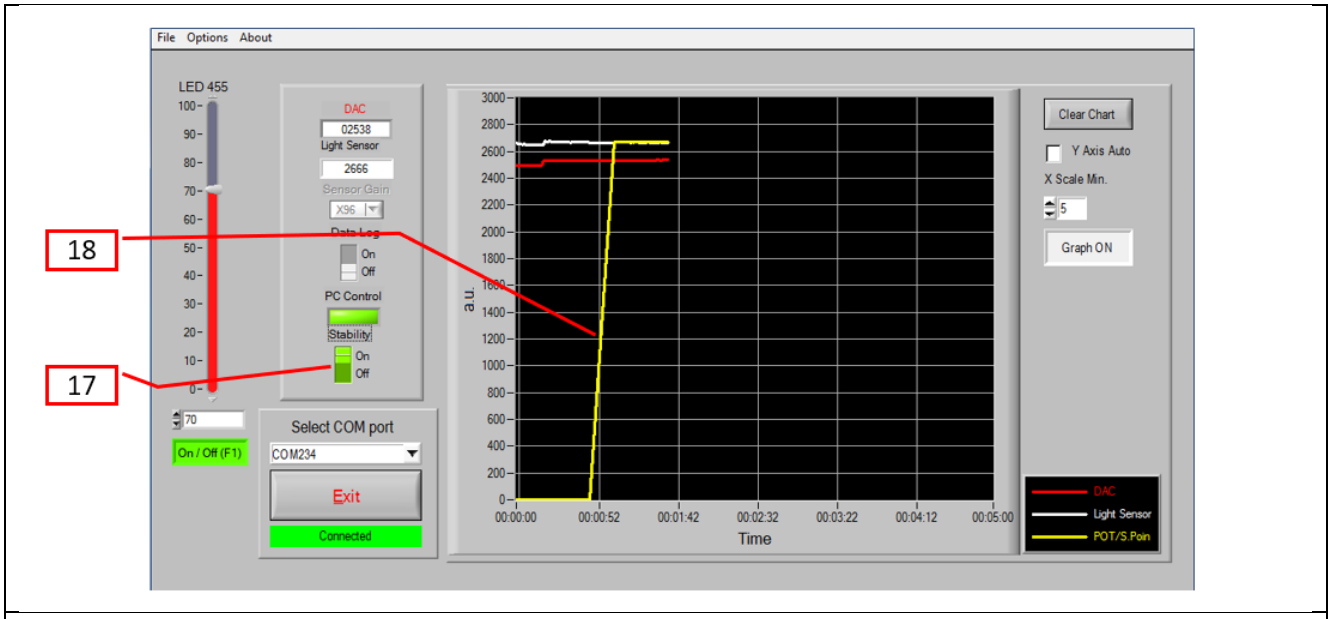


6.2 *Computer Mode*

When user, first time switch the LED on by the ON/OFF button [6], the control is set to the computer. From this time the manual dial on the hardware will no more effect the LED output power. To go back to Manual Mode user needs to switch Off the LED controller and turn it On again.
The Slider [4] enables the user to set the LED output power.
Exit button [3] switches the LED OFF and closes the software.

6.3 *Stabilization Mode*

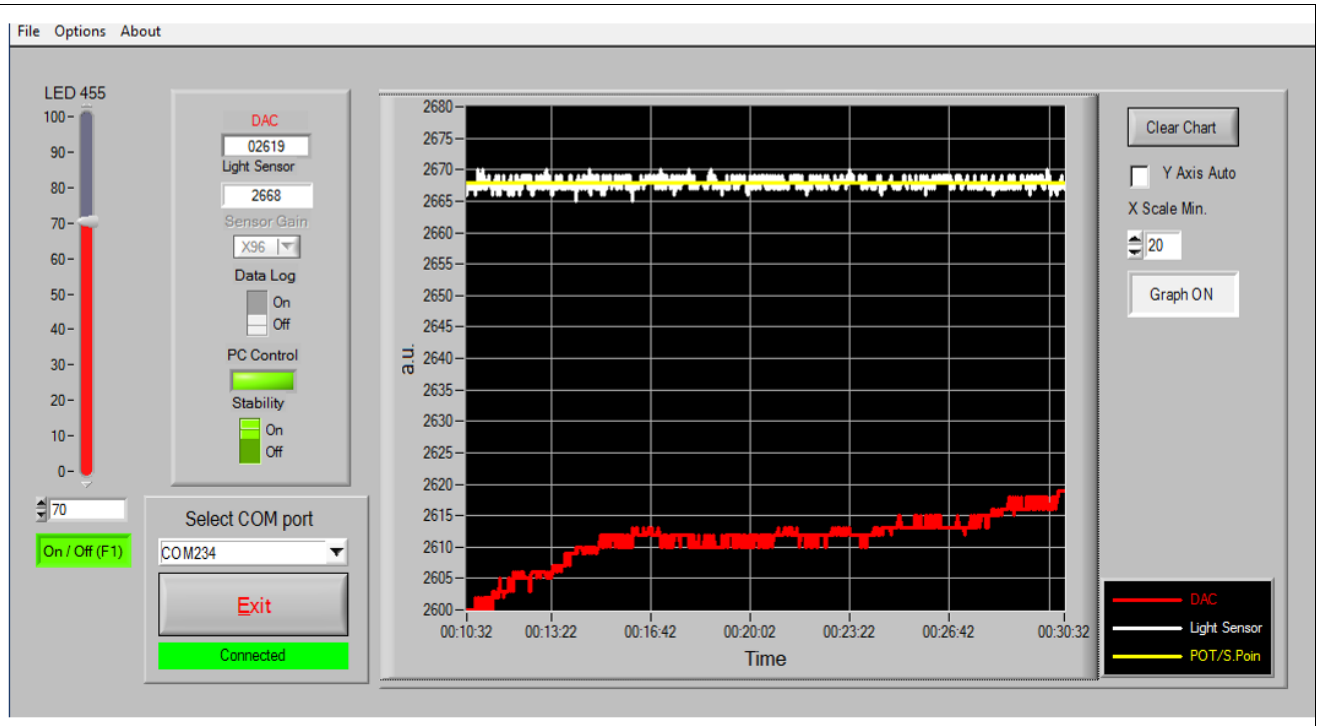
When the LED output power need to be stabilized it can be done either in Manual Mode by pressing the STBL button on the front panel of UHTPLCC-02-STBL controller or Computer Mode by pressing STBL switch [17].



Stability switch [17] and Set Point Yellow graph [18]

When Stability switch [17] is switched to On, the switch color is blinking White/Green until stabilization software take full control of the system (few seconds) and then became Green. The Yellow graph [18] is the Set-Point. Before the enabling of the STBL mode it has a value “0”. When the switch [17] moved to On is rise up to the current Light Sensor value. From this time the light output power (the White graph) will be stabilized around the Set Point (the Yellow graph).

As can be seen on the next picture, the Digital to Analog Converter (DAC) value (the Red graph) will be changing to keep the light power (the White graph) as close as possible to the set point (Yellow graph). From this specific example we see that the power is within 5 Light Sensor units (peak to peak) while the total mean light value is ~2668 which means stability of ~0.2% within the set point.



Stability switch [17] and Set Point Yellow graph [18]

Menu items:

`File>Exit:` switches the LED OFF and closes the software.

`Options>Firmware Update`: enables user to update firmware of the USB device. Do not attempt to update without explicit request from Prizmatix technical support.

`Options>Firmware Messages`: enables user to see system error messages if any exist

`Options>Calibration`: Need to be run once upon connection of new different LED head to the STBL controller.

`Help>Prizmatix Website:` Displays the Prizmatix website in default browser.

`Help>Software User Manual`: Display the software user manual in default PDF Reader.

`Help>Hardware User Manual`: Display the hardware user manual in default PDF Reader

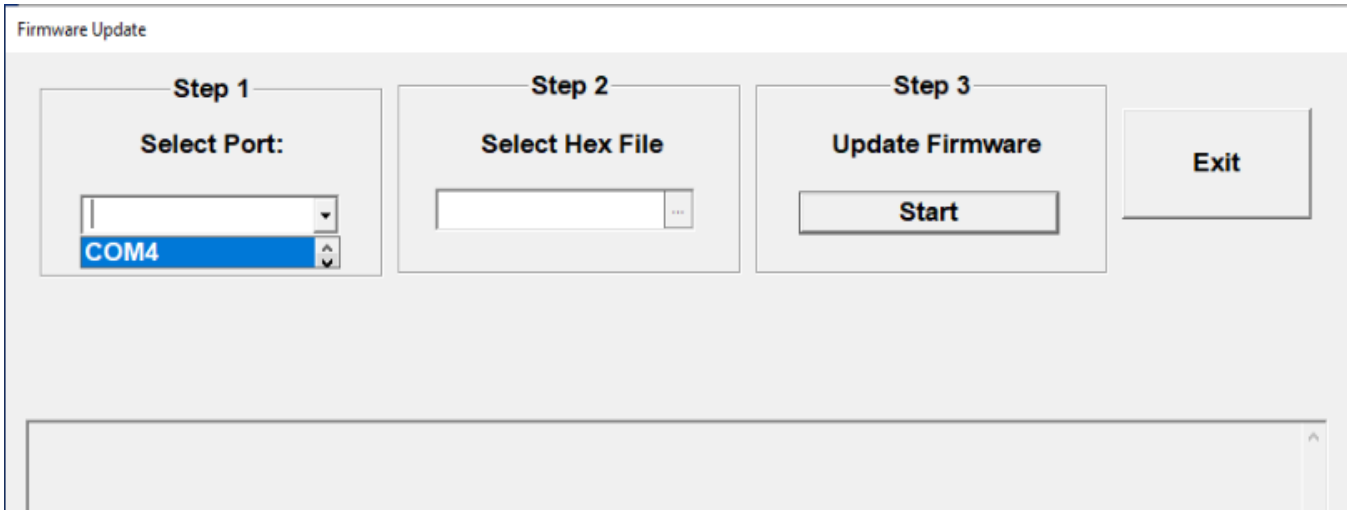
`Help>About Hardware…:` Shows dialog box with information on connected hardware.

`Help>About Software…:` Shows dialog box with information on the software.

Appendix A: Updating LED-Ctrl-STBL Firmware

Don't perform Firmware Update unless you received explicit Instructions from the Prizmatix technical team.

Open the Update Firmware dialog by selecting `File>Update Firmware` from LED-Ctrl-STBL software menu. The firmware updating is three steps procedure:



Step #1: Select the correct COM Port (COM4 in this example). See section "Setup of USB device drivers" in this manual for details how to find the correct COM port.

Step #2: Select firmware update file "Hex File" by browsing. The typical path will be:
`C:\Program Files (x86)\Prizmatix LED CTRL\Firmware\Firmware.hex`
or other appropriate *.hex file.

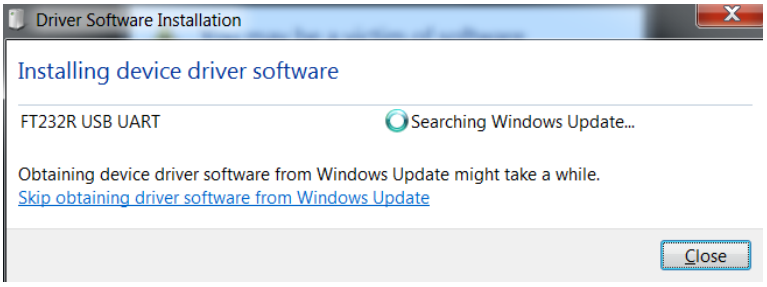
Step #3: Click "Start Update" button to begin update.

You will see many messages running in the window. When the update is completed successfully the "Thank You" message will appear:

Click "Exit" button to close the dialog box.
Your controller is now updated with the latest firmware and ready to go.

Appendix B: Setup of USB Device Drivers for Win 7 and Win 8

Prizmatix USB device uses Virtual COM port (VCP) by FTDI (www.ftdichip.com) to communicate with the computer. VCP drivers cause the USB device to appear as an additional COM port available to the PC.
After successful setup of the Prizmatix PC software, connect the hardware to the computer with the supplied USB cable. If there is an available Internet connection, Windows will connect to the Windows Update website and install any suitable driver it finds for the device.



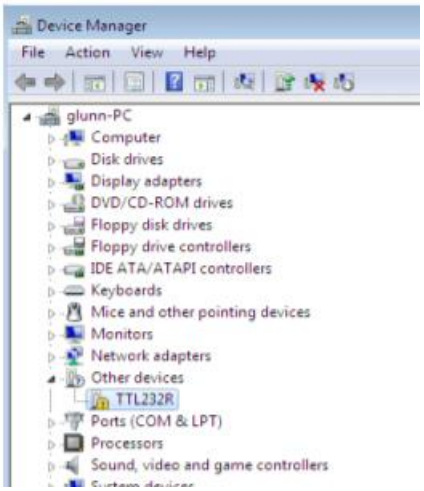
If the automatic installation takes place there is no need to continue with the procedure outlined below.

In case you need to install the drivers manually, please download VCP drivers from:
http://www.ftdichip.com/Drivers/VCP.htm
Chose the correct file version from the table Currently Supported VCP Drivers and download the driver.
The file name of the driver will be like:
CDM v2.12.24 WHQL Certified.zip
Extract the ZIP file to a directory, like:
C:\Users\user\Downloads\CDM v2.12.24 WHQL Certified\

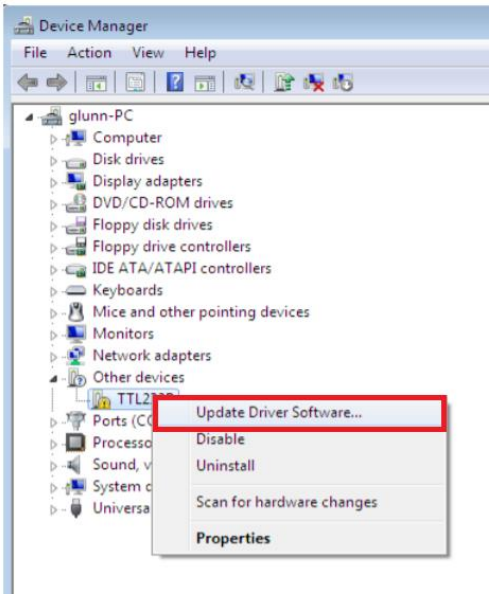
Press the Windows start button to bring up the start menu and select “Control Panel”.

From the Control Panel window select Hardware and Sound and at the next screen select Device Manager.

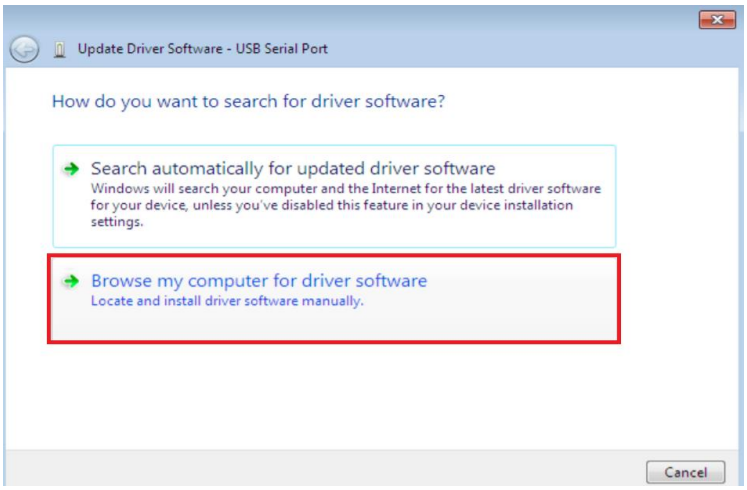
In the Device Manager window there will be a device under Other Devices with a yellow warning symbol to indicate a problem - no driver installed. The text next to the device will be FT232R device.



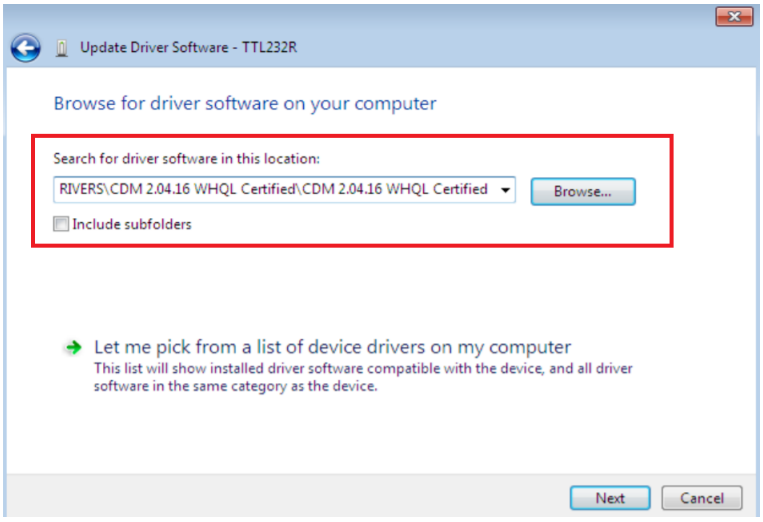
Right click on the other device (TTL232R in this example) to bring up a menu as shown below.



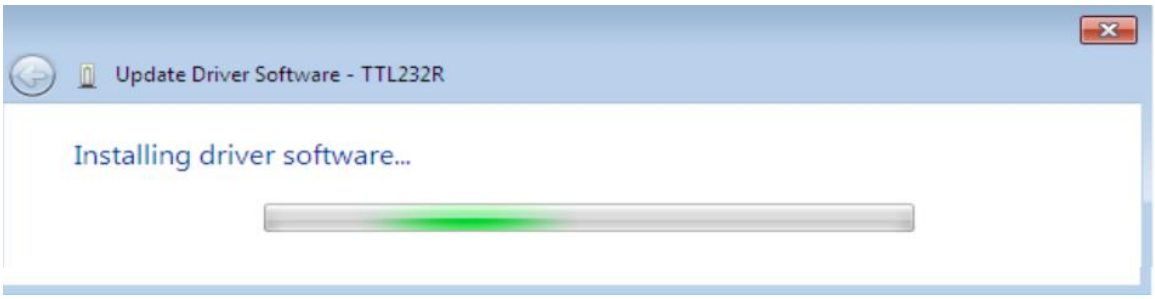
From the displayed menu select “Update Driver Software…” This then displays the option for an automatic search or a manual search.



Select the second option to browse manually.

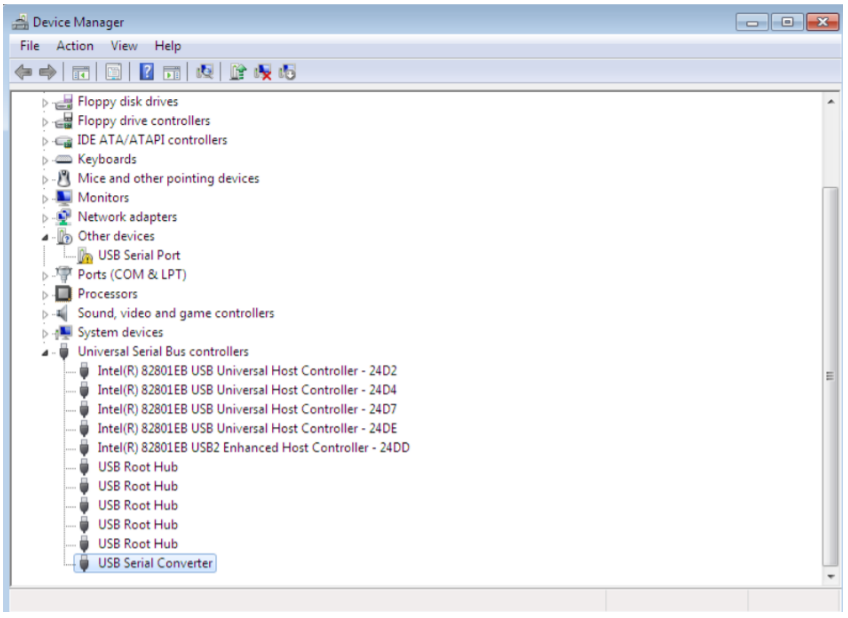


In the address box put the exact location where the drivers have been saved to. This may be on a CD or in a folder on the PC. It is not necessarily the exact same location as shown in the screenshot. The drivers could have been saved anywhere of the users choosing.
After entering the address select “NEXT” to start the installation.



When the installation has finished a completion screen is displayed.

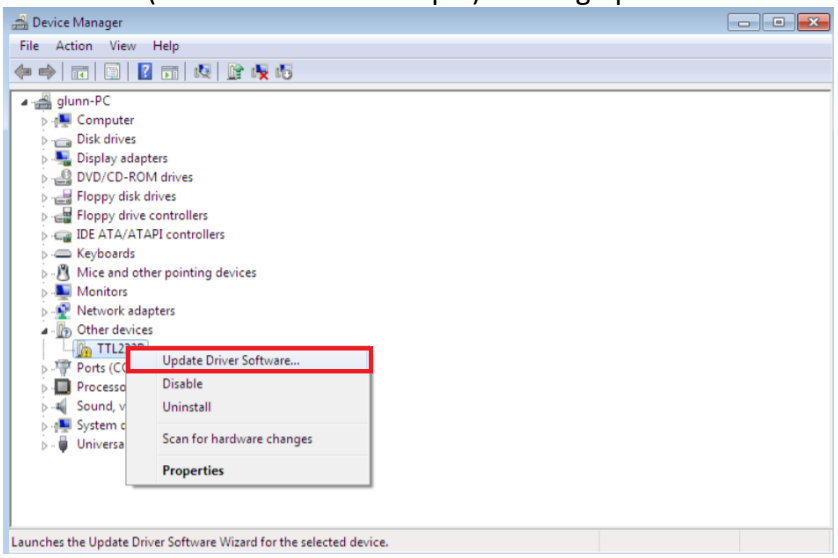
Press Close to close this window and go back to the Device Manager Window.



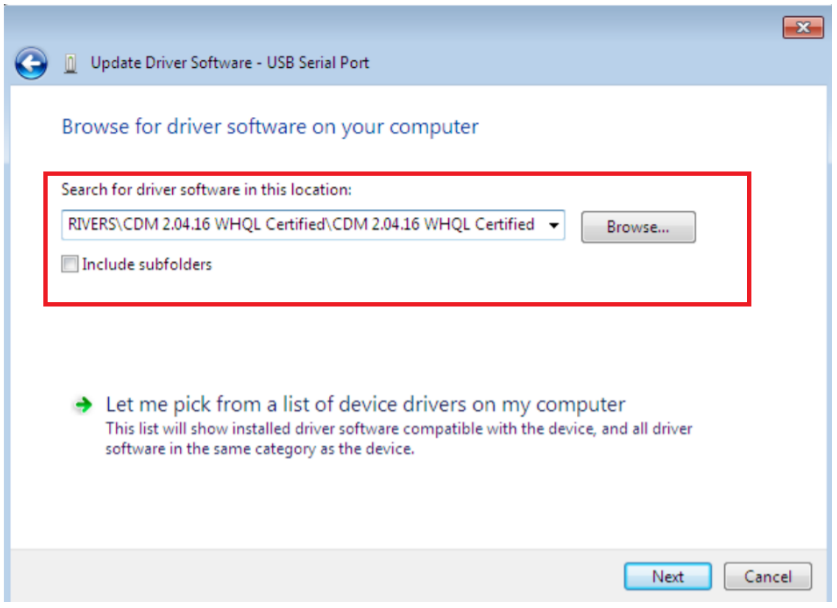
The Device Manager will still show a device under Other Devices but in addition to this there is a new entry under Universal Serial Bus Controllers indicated in the screenshot above as the USB Serial

Converter. This indicates the bus layer of the driver is installed. Installing the Virtual Com Port layer of the driver is almost a repeat of the last few steps.

Right click on the other device (TTL232R in this example) to bring up a menu as shown below.

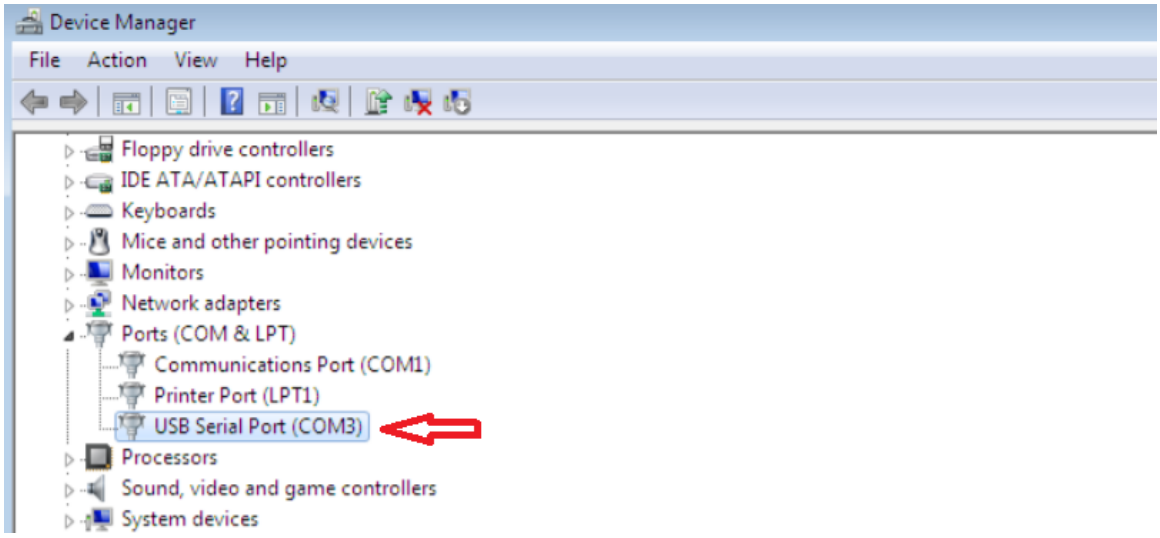


From the displayed menu select “Update Driver Software…” This then displays the option for an automatic search or a manual search.
Select the second option to browse manually.
In the address box put the exact location where the drivers have been saved to. This may be on a CD or in a folder on the PC. It is not necessarily the exact same location as shown in the screenshot. The drivers could have been saved anywhere of the users choosing.



After entering the address select “NEXT” to start the installation.
When the installation is finished a completion screen is displayed.

Note this screen also displays the COM port assigned to the device. Press Close to close this window and go back to the Device Manager Window.



This time the Device Manager does not have a FT232R entry under Other Devices but does show entries under Universal Serial Bus Controllers and Ports (COM & LPT). The above screen shot displays a correct installation. The device is now ready to use on COM3.

Note: Not all devices will install to COM3. The COM port allocation is determined by the installation wizard on the basis of the next free com port as designated in the PC registry

Note: the full installation instructions can be found at AN_119_FTDI_Drivers_Installation_Guide_for_Windows7.pdf on www.ftdichip.com website.