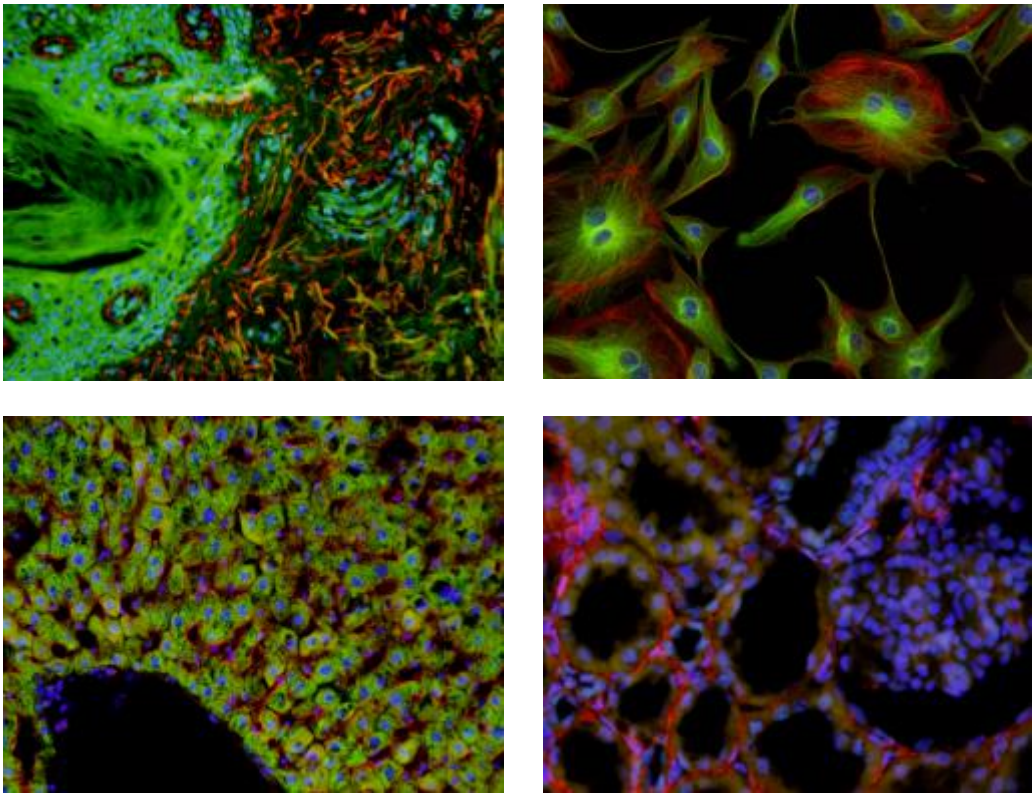
Essential Commands:
pE-400 Series



Rev 1

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1 Overview

1.1 Command Set

The pE-400 Essential Commands Manual contains the command set used to control pE-400 and pE-400^{max} Light Sources via USB.

Each command comprises an ASCII string ending with a Carriage Return (\r) and New Line (\n) characters.

1.2 Operating System

1.2.1 Windows 10 and Later

When connecting a pE-400 Series Light Source to a Windows 10 PC or later Windows version, native Windows USB drivers are supported.

1.2.2 Windows 8 and Earlier

USB driver files must be installed when connecting a pE-400 Series Light Source to a Windows 8 PC or earlier Windows version (see Driver Files Installation Procedure).

1.3 Virtual Comm Port

When connected to a correctly configured Windows PC, a pE-400 Series Light Source initiates a Virtual Comm Port appearing in the *Windows Device Manager* under *Ports (COM & LTP)* as a *USB Serial Device (COMxx)*.

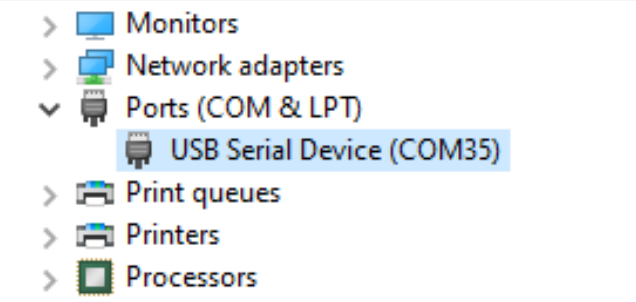

Figure 1

The Comm Port number ('35' in Figure 1) is allocated by the Windows operating system and is subject to change every time a new connection with a Light Source is established.

2 Commands

2.1 Get Light Source Information

2.1.1 Model

This command reports the model of the Light Source.

Command Syntax (TX)

XMODEL\r\n

Command Parameters

None

Reply Syntax (RX)

XMODEL=<*model*>\r\n

Reply Parameters

<*model*>: pE-400 | pE-400max

Example

#	HOST	MESSAGE
1	TX	XMODEL
2	RX	XMODEL=PE-400MAX

2.1.2 Serial Number

This command reports the serial number of the Light Source. pE-400 Light Sources report a serial number with a 'DA' prefix, while pE-400^{max} Light Sources report a serial number with a 'DC' prefix.

Command Syntax (TX)

XSERIAL\r\n

Command Parameters

None

Reply Syntax (RX)

XSERIAL:<*serial number*>\r\n

Reply Parameters

<*serial number*>: DAXXXXX (pE-400) | DCXXXXX (pE-400max)

Example

#	HOST	MESSAGE
1	TX	XSERIAL
2	RX	XSERIAL:DA00018

2.1.3 Firmware Version

This command reports the firmware version of the Light Source.

Command Syntax (TX)

XVER\r\n

Command Parameters

None

Reply Syntax (RX)

XFW_VER=<*firmware version*>\r\n

Reply Parameters

<*firmware version*>: X.X.X

Example

#	HOST	MESSAGE
1	TX	XVER
2	RX	XFW_VER=0.5.2

2.1.4 Usages

This command reports the usage of the Light Source and each LED channel in hours.

When the Light Source is powered, the Light Sources usage counter value increases by 0.1 every 6 minutes.

When individual Light Source channels are illuminated, the value of respective channel usage counters increases by 0.1 every 6 minutes.

Command Syntax (TX)

USAGES\r\n

Command Parameters

None

Reply Syntax (RX)

SYSTEM USAGE:<*usage*>HR,LAM USAGE:A=<*usage*>HR,LAM USAGE:B=<*usage*>HR,LAM USAGE:C=<*usage*>HR,LAM USAGE:D=<*usage*>HR\r\n

Reply Parameters

<usage>: X.X (Hours)

Example

#	HOST	MESSAGE
1	TX	USAGES?
2	RX	SYSTEM USAGE:3.7HR,LAM USAGE:A=0.1HR,LAM USAGE:B=0.1HR,LAM USAGE:C=0.1HR,LAM USAGE:D=0.1HR

2.2 Get LAM Information

2.2.1 Wavelengths

This command reports the wavelength of the LED channels, line by line.

Command Syntax (TX)

LAMS\r\n

Command Parameters

None

Reply Syntax (RX)

LAM:*<channel>*:*<wavelength>*\r\n

Reply Parameters

<channel>: A | B | C | D *<wavelength>*: 365 | 400 | 450 | 550 | 635

Example

#	HOST	MESSAGE
1	TX	LAMS
2	RX	LAM:A:635
3	RX	LAM:B:365
4	RX	LAM:C:450
5	RX	LAM:D:550

2.2.2 Serial Numbers

This command reports the serial number of a specified LED channel.

Command Syntax (TX)

LAMSN:*<channel>*?\r\n

Command Parameters

<channel> : A | B | C | D

Reply Syntax (RX)

LAMSN:*<channel>*=*<serial number>*\r\n

Reply Parameters

<channel>: A | B | C | D *<serial number>*: OAXXXXX | OBXXXXX | OCXXXXX | ODXXXXX | OEXXXXX

Example

#	HOST	MESSAGE
1	TX	LAMSN:A?
2	RX	LAMSN:A=OE00066

2.2.3 Temperatures

This command reports a specified LED channel's temperature in degrees Celsius (°C).

Command Syntax (TX)

TEMP:*<channel>*?\r \n

Command Parameters

<channel>: A | B | C | D

Reply Syntax (RX)

TEMP:*<channel>*=*<temperature>*\r\n

Reply Parameters

<channel>: A | B | C | D *<temperature>*: XX

Example

#	HOST	MESSAGE
1	TX	TEMP:A?
2	RX	TEMP:A=25

2.3 Set Modes

2.3.1 Set Light Source Mode

This command sets the Light Source to *normal*, *sequence set-up*, or *sequence runner* modes. The *sequence set-up and runner* modes are only available to the pE-400^{max} Light Source.

Normal mode is enabled by issuing the MODE=0 command.

Sequence Set-Up mode is enabled by issuing the MODE=1 command.

Once a *Sequence Set-Up* mode command is issued the *Sequence Mode - Set All Parameters* command must be issued (see 2.4.5).

Sequence Set-Up mode is escaped by issuing the MODE=0 command.

Sequence Runner mode is enabled by issuing the MODE=2 command.

Sequence Runner mode is escaped by issuing a MODE=0 or MODE=1 command.

Command Syntax (TX)

MODE=*<mode>*

Command Parameters

<mode>: 0 | 1 | 2

Reply Syntax (RX)

<reply>

Reply Parameters

<reply>: OK | INVALID MODE!

Example

#	HOST	MESSAGE
1	TX	MODE=0
2	RX	OK

2.4 Normal Mode

The following commands are available on all pE-400 Series Light Sources when operating in *Normal* mode.

2.4.1 Set Channel Selection

This command sets the selection and deselection of a specified LED channel.

Command Syntax (TX)

C*<channel><select>*\r\n

Command Parameters

<channel>: A | B | C | D

<select>: S (Select) | X (Deselect)

Reply Syntax (RX)

C*<channel><select>*\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected) | X (Deselected)

Example

#	HOST	MESSAGE
1	TX	CAS
2	RX	CAS

2.4.2 Set Channel Intensity

This command sets the intensity of a specified LED channel to an integer value between 0% and 100%.

Command Syntax (TX)

C<*channel*><*intensity*>\r\n

Command Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100

Reply Syntax (RX)

C<*channel*><*intensity*><*on/off*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*on/off*>: N(ON) | F(OFF)

Example

#	HOST	MESSAGE
1	TX	CAI050
2	RX	CA050F

2.4.3 Set Channel ON/OFF

This command sets a specified LED channel on or off.

Command Syntax (TX)

C<channel><on/off>\r\n

Command Parameters

<*channel*>: A | B | C | D
<*on/off*>: N (ON) | F (OFF)

Reply Syntax (RX)

C<*channel*><*intensity*><*on/off*>\r \n

Reply Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*on/off*>: N (ON) | F (OFF)

Example

#	HOST	MESSAGE
1	TX	CAN
2	RX	CA001N

2.4.4 Set All Channels ON/OFF

This command sets all selected LED channels on or off.

Command Syntax (TX)

CS<*on/off*>\r\n

Command Parameters

<*on/off*>: N (On) | F (Off)

Reply Syntax (RX)

CSS<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected) | X (Deselected)
<*on/off*>: N (On) | F (Off)
<*Intensity*>: 0 – 100

Example

#	HOST	MESSAGE
1	TX	CSN
2	RX	CSSASN001BXF000CXF000DXF000

2.4.5 Set All Channel Parameters

This command sets one or multiple LED channels' selection status, on/off status, and intensity.

Command Syntax (TX)

One channel

CSS<*channel*><*select*><*on/off*><*intensity*>\r \n

Multiple channels

CSS<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>\r \n

Command Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected) | X (Deselected)
<*on/off*>: N (On) | F (Off)
<*intensity*>: 0 – 100

Reply Syntax (RX)

CSS<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>
<*channel*><*select*><*on/off*><*intensity*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected) | X (Deselected)
<*on/off*>: N (On) | F (Off)
<*intensity*>: 0 – 100

Example

#	HOST	MESSAGE
1	TX	CSSAXF000BSF050CSN040DSF020
2	RX	CSSAXF000BSF050CSN040DSF020

2.4.6 Get Channel Parameters

This command reports the intensity and selection status of the specified LED channel.

Command Syntax (TX)

C<*channel*>?\r\n

Command Parameters

<*channel*>: A | B | C | D

Reply Syntax (RX)

C<*channel*><*intensity*><*select*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*select*>: S (Selected) | X (Deselected)

Example

#	HOST	MESSAGE
1	TX	CA?
2	RX	CA085S

2.4.7 Get All Channel Parameters (Line by Line)

This command reports the intensity and selection status of all LED channels, line by line.

Command Syntax (TX)

C?\r\n

Command Parameters

None

Reply Syntax (RX)

C<*channel*><*intensity*><*select*>\r\n
C<*channel*><*intensity*><*select*>\r\n
C<*channel*><*intensity*><*select*>\r\n
C<*channel*><*intensity*><*select*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*select*>: S (Selected) | X (Deselected)

Example

#	HOST	MESSAGE
1	TX	C?
2	RX	CA000X
3	RX	CB000X
4	RX	CC050S
5	RX	CD000X

2.4.8 Get All Channel Parameters (One Line)

This command reports all LED channels' intensity and selection status in one line.

Command Syntax (TX)

CSS?\r\n

Command Parameters

None

Reply Syntax (RX)

CSS*<channel><select><on/off><intensity>*
<channel><select><on/off><intensity>
<channel><select><on/off><intensity>
<channel><select><on/off<intensity>\r\n

Reply Parameters

<channel> : A | B | C | D
<select> : S (Selected) | X (Deselected)
<on/off> : N (On) | F (Off)
<intensity> : 0 – 100

Example

#	HOST	MESSAGE
1	TX	CSS?
2	RX	CSSASN001BXF080CSF050DXF030

2.5 Sequence Mode

These commands are only available to the pE-400^{max} Light Source when set to *sequence set up* mode or *sequence runner* mode.

To escape *sequence* mode, issue the MODE=0 command to the Light Source.

2.5.1 Set All Parameters

This command sets all LED channels' selection status, sequence position and intensity. Setting the sequence position to 0 deselects the specified LED channel from the sequence.

Warning: While this command is available in the *sequence runner* mode, it is **not recommended**. Pause the running sequence by issuing the MODE=1 command before re-issuing this command. **Failure to do so could result in crashing the running sequence**.

Command Syntax (TX)

CSS*<channel><select><sequence position><intensity>*
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>\r\n

Command Parameters

<*channel*>: A | B | C | D
<*select*>: S (Select)
<*sequence position*>: 0 | 1 | 2 | 3 | 4
<*intensity*>: 0 – 100

Reply Syntax (RX)

Sequence Set-Up Mode

CSS<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>\r\n

Sequence Runner Mode

CSR<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>
<*channel*><*select*><*sequence position*><*intensity*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected)
<*sequence position*>: 0 | 1 | 2 | 3 | 4
<*intensity*>: 0 – 100

Example

#	HOST	MESSAGE
1	TX	CSSAS0000BS2100CS1100DS3050
2	RX	CSRAS0000BS2100CS1100DS3050

2.5.2 Set Channel Intensity

This command sets the intensity of the specified LED channel to an integer value between 0% and 100%.

Command Syntax (TX)

C<*channel*><*intensity*>\r\n

Command Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100

Reply Syntax (RX)

C<*channel*><*intensity*><*sequence position*>\r\n

Command Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*sequence position*>: 0 | 1 | 2 | 3 | 4

Example

#	HOST	MESSAGE
1	TX	CAI002
2	RX	CA0021

2.5.3 Get All Channel Parameters

This command reports all LED channels' intensity and sequence position in one line.

Command Syntax (TX)

CSS?\r\n

Command Parameters

None

Reply Syntax (RX)

Sequence Set-Up Mode

CSS<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>\r\n

Sequence Runner Mode

CSS<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>
<channel><select><sequence position><intensity>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*select*>: S (Selected)
<*sequence position*>: 0 | 1 | 2 | 3 | 4
<*intensity*>: 0 – 100

Example

#	HOST	MESSAGE
1	TX	CSS?
2	RX	CSRAS1001BS2001CS3001DS4001

2.5.4 Get Channel Parameters

This command reports the intensity and sequence position of the specified LED channel.

Command Syntax (TX)

C<*channel*>?\r\n

Command Parameters

<*channel*>: A | B | C | D

Reply Syntax (RX)

C<*channel*><*intensity*><*sequence position*>\r\n

Reply Parameters

<*channel*>: A | B | C | D
<*intensity*>: 0 – 100
<*sequence position*>: 0 | 1 | 2 | 3 | 4

Example

#	HOST	MESSAGE
1	TX	CA?
2	RX	CA0011

2.5.5 Get Intensity and Sequence (Line by Line)

This command reports all LED channels' intensity and sequence position, line by line.

Command Syntax (TX)

C?\r\n

Command Parameters

None

Reply Syntax (RX)

C<*channel*><*intensity*><*sequence position*>\r\n
C<*channel*><*intensity*><*sequence position*>\r\n
C<*channel*><*intensity*><*sequence position*>\r\n
C<*channel*><*intensity*><*sequence position*>\r\n

Parameters

<*channel*>: A | B | C | D
<*Intensity*>: 0 – 100
<*sequence position*>: 0 | 1 | 2 | 3 | 4

Example

#	HOST	MESSAGE
1	TX	C?
2	RX	CA0011
3	RX	CB0252
4	RX	CC1003
5	RX	CD0504

2.6 Set POD ON/OFF

2.6.1 Set POD ON

This command switches the Control Pod on.

Command Syntax (TX)

PORT:P=ON\r\n

Command Parameters

None

Reply Syntax (RX)

OK\r\n

Reply Parameters

None

Example

#	HOST	MESSAGE
1	TX	PORT:P=ON
2	RX	OK

2.6.2 Set POD OFF

This command switches the Control Pod off.

Command Syntax (TX)

PORT:P=OFF\r\n

Command Parameters

None

Reply Syntax (RX)

OK\r\n

Reply Parameters

None

Example

#	HOST	MESSAGE
1	TX	PORT:P=OFF
2	RX	OK

3 Driver Installation

All PCs running operating systems older (earlier) than Windows 10 will require the use of a driver file.

3.1 Driver Installation Procedure

3.1.1 Download the CoolLED-pE Driver

The CoolLED pE Driver files must be downloaded from the CoolLED website. The required files are located at https://www.coolled.com/support/imaging-software/

3.1.2 Install the CoolLED-pE Driver

1. Plug a CoolLED Light Source into the destination Windows PC and power the unit.
2. Navigate to the Windows *Device Manager*.
3. CoolLED Light Source will be listed under the heading *Other Devices* as *USB Virtual Serial Port.* The yellow exclamation mark icon indicates the absence of the CoolLED-pE driver.
4. Right-click on *USB Virtual Serial Port* and select the *Update Driver Software…* from the dropdown menu (see Figure 2).

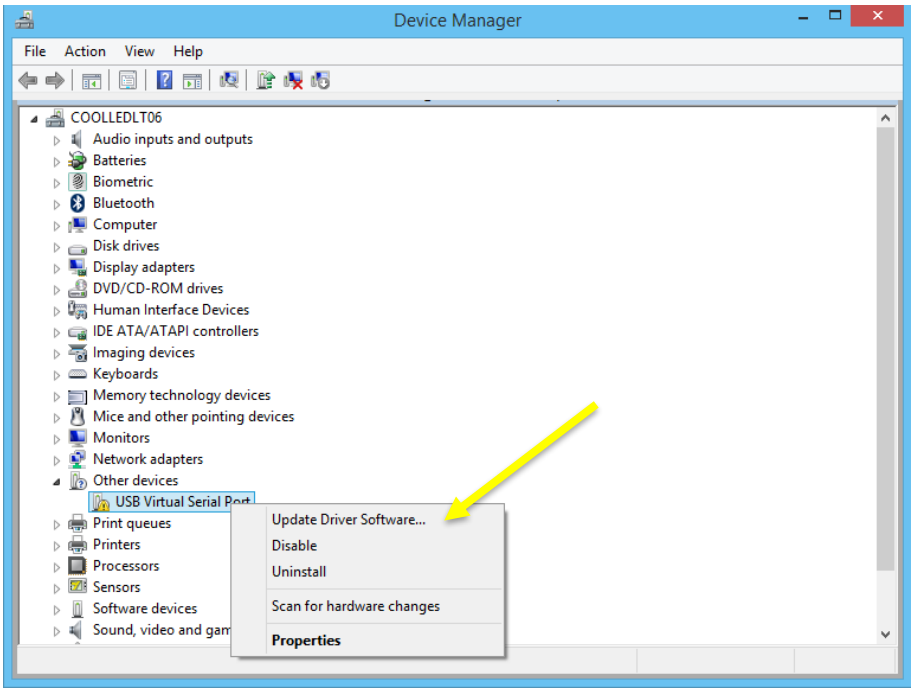

Figure 2

5. In the *Update Driver Software – USB Virtual Serial Port* window, select the *Browse my computer for driver software* option.

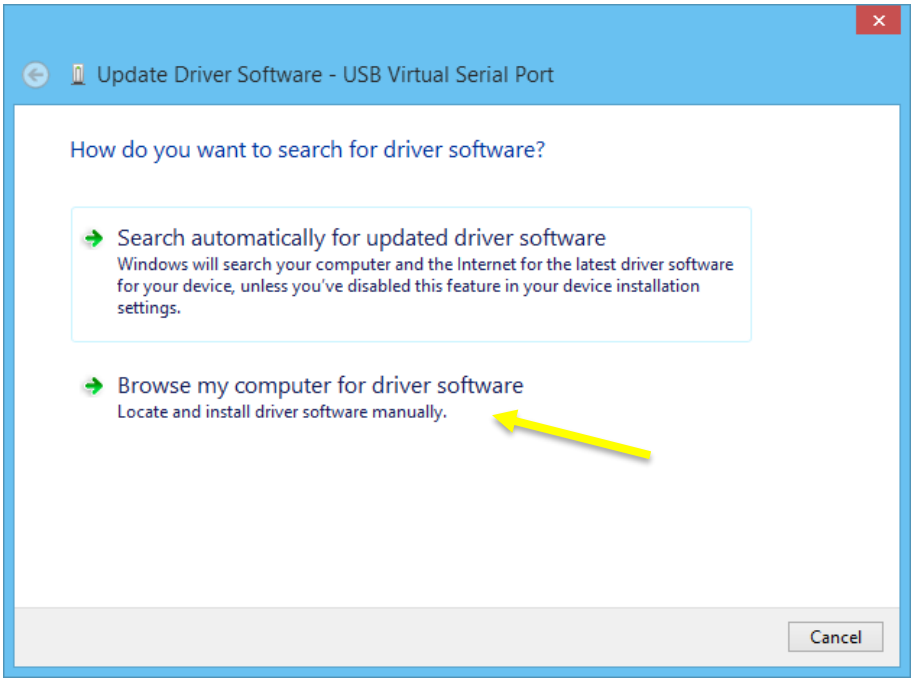

Figure 3

6. Select the *Let me pick from a list of device drivers on my computer* option.

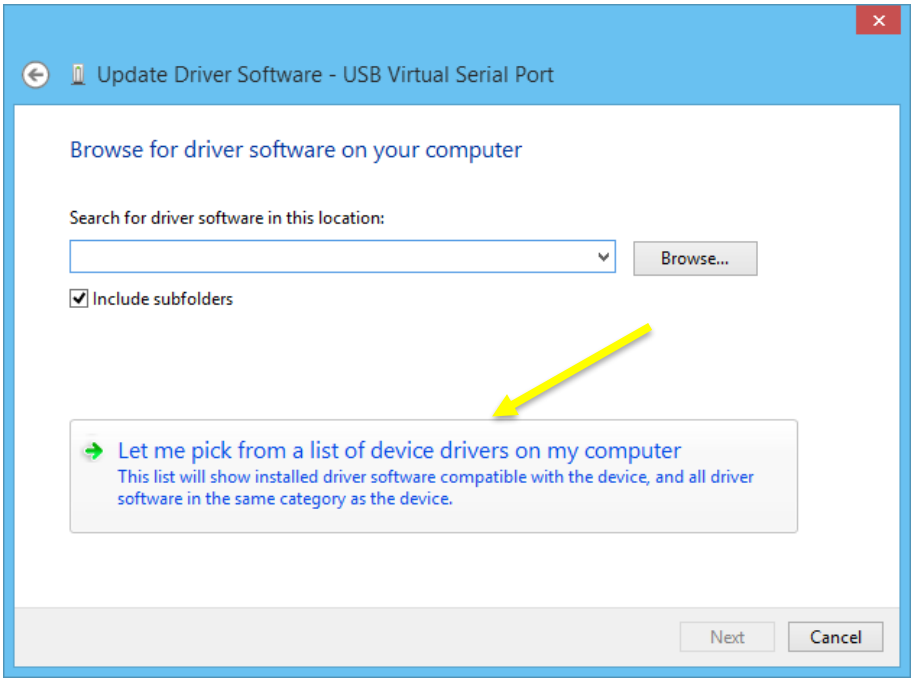

Figure 4

7. Select *Port (COM & LPT*' and click the *Next*.

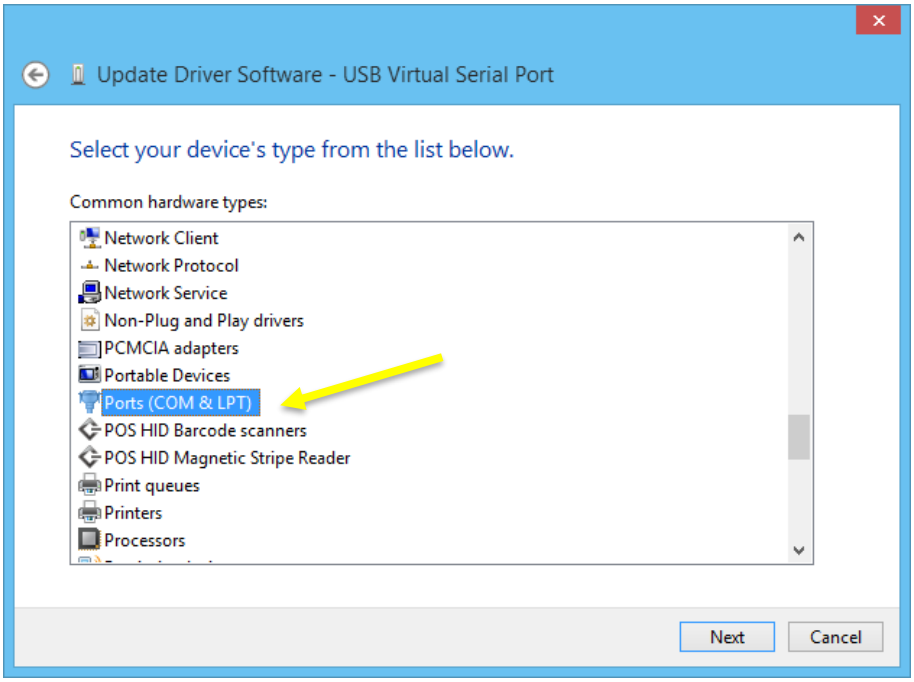

Figure 5

8. In the *Update Driver Software – USB Virtual Serial Port* window select *(Standard port types)* from the *Manufacturer* list.

9. Select *Communications Port* from the *Model* list.

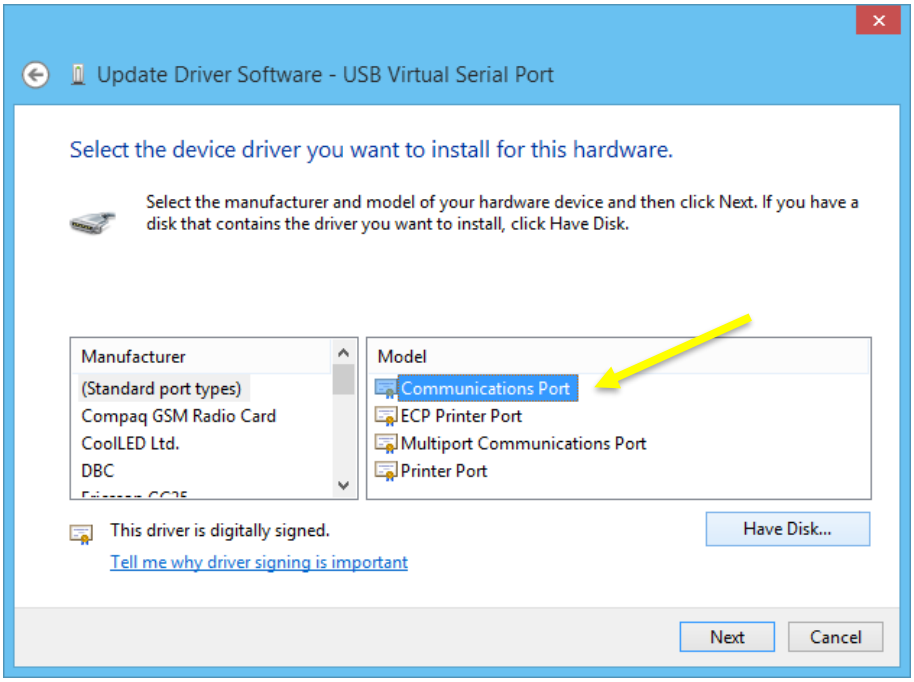

Figure 6

10. Click *Have Disk*.
11. In the *Install From Disk* window, click *Browse…*

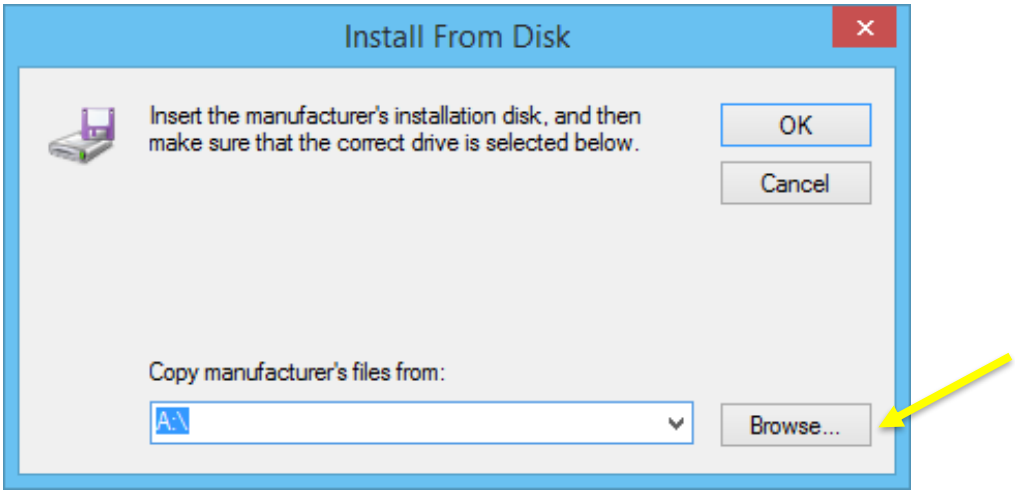

Figure 7

12. Using the controls in the *Locate File* dialogue box, locate the downloaded *CoolLED-pE.inf* driver file.

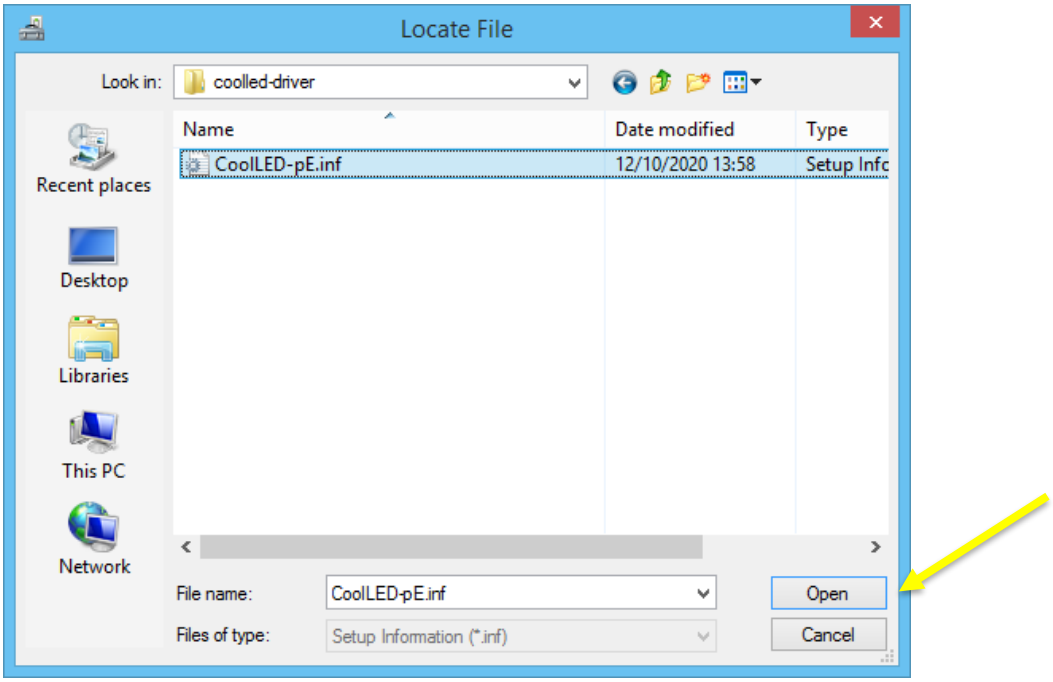

Figure 8

13. Click *Open*.
14. Check that the *Copy manufacturer's files from:* field in the *Install From Disk* window (see Figure 7) is populated with the location (path) of the *CoolLED-pE.inf* file.
15. Click *OK*.
16. Select *CoolLED USB Virtual Serial Port A* from the *Model* list.

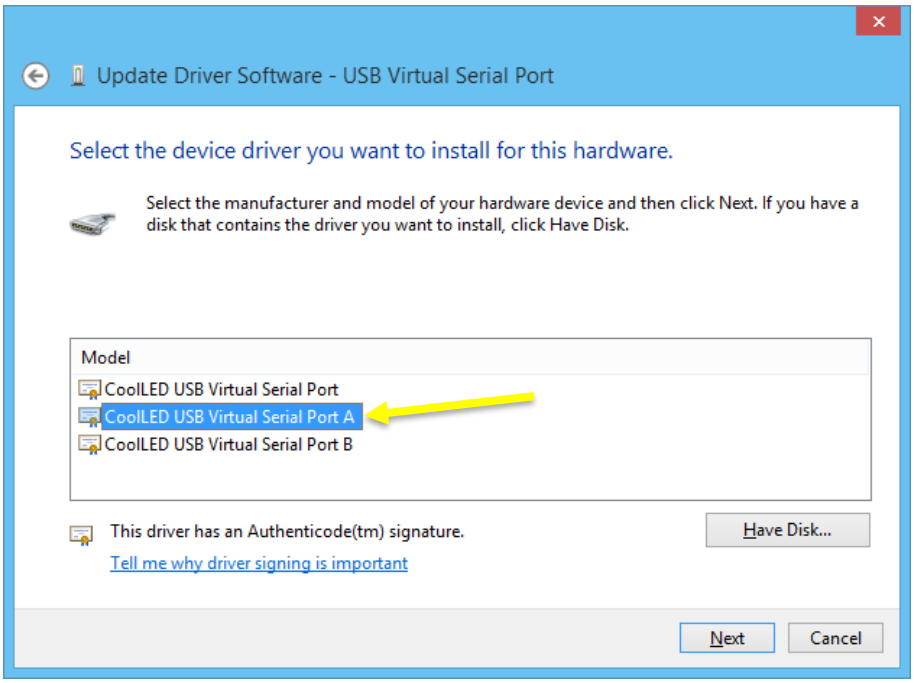

Figure 9

17. Click *Next*.
18. In the *Update Driver Warning* window, click *Yes*.

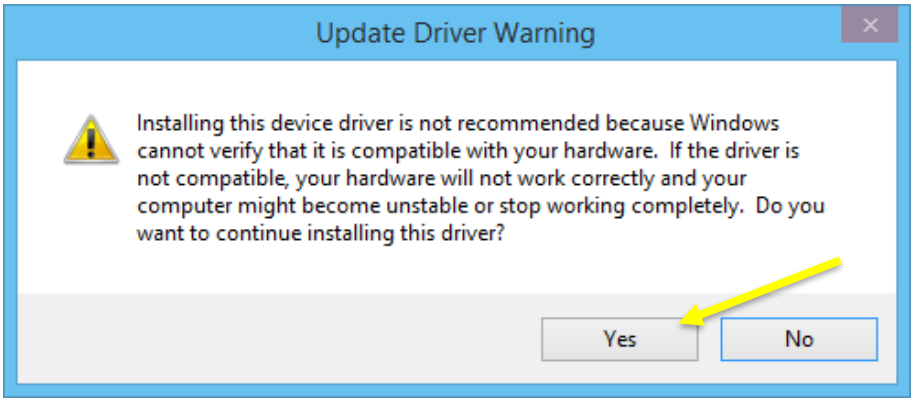

Figure 10

19. A *Windows Security* window may appear. In the event of the window appearing check the *Always trust software from "CoolLED Ltd"* checkbox
20. Click *Install*.

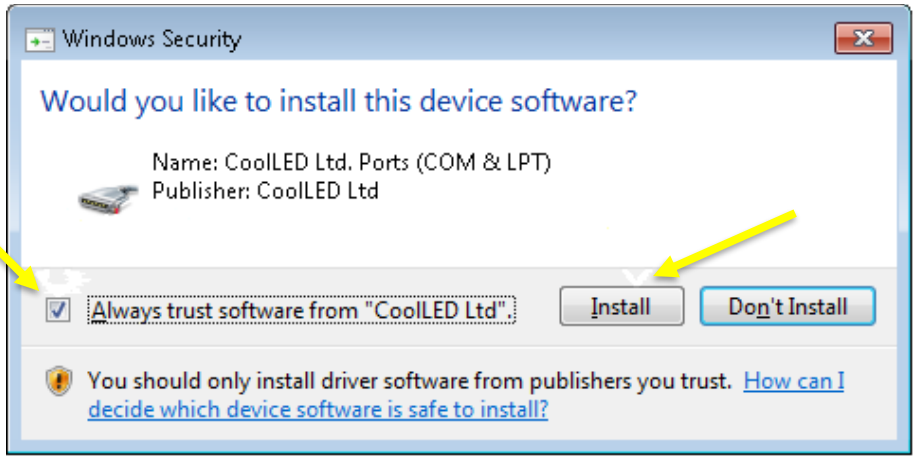

Figure 11

21. Check that the *Update Driver Software* window indicate a successful installation.
22. Click *Close*.
23. The CoolLED Light Source is ready to operate via USB.

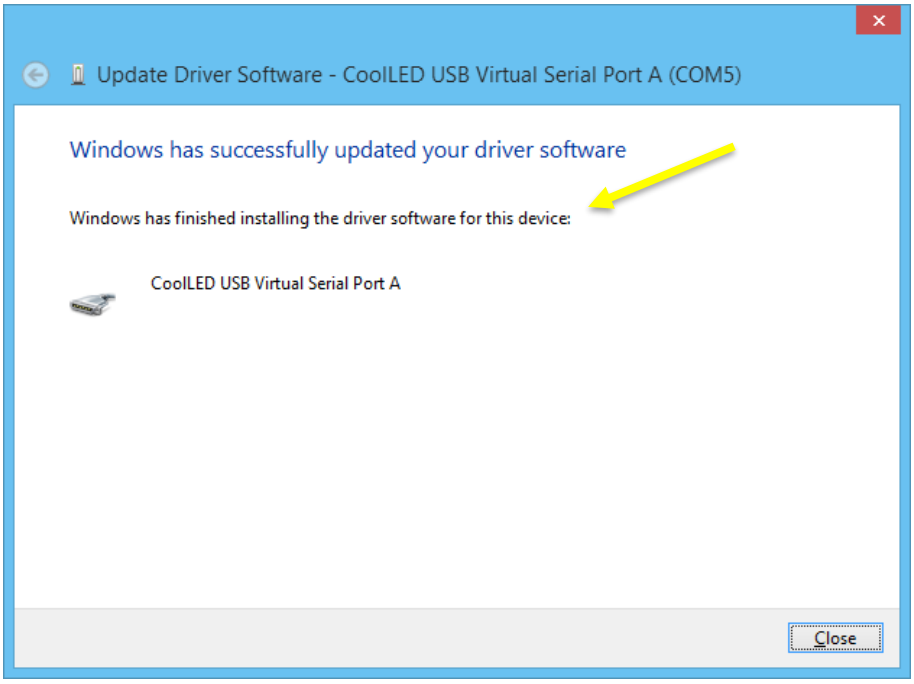

Figure 12

3.2 Virtual Serial Port Identification

With the CoolLED Light Source connected and CoolLED-pE driver installed, the port number allocated to the Light Source can be found in the Windows *Device Manger*.

1. Open the Windows Device Manager.
2. Expanding the 'Ports (COM & LPT)' field.
3. Find the CoolLED USB Virtual Serial Port A.
4. Read the port number from with the brackets.

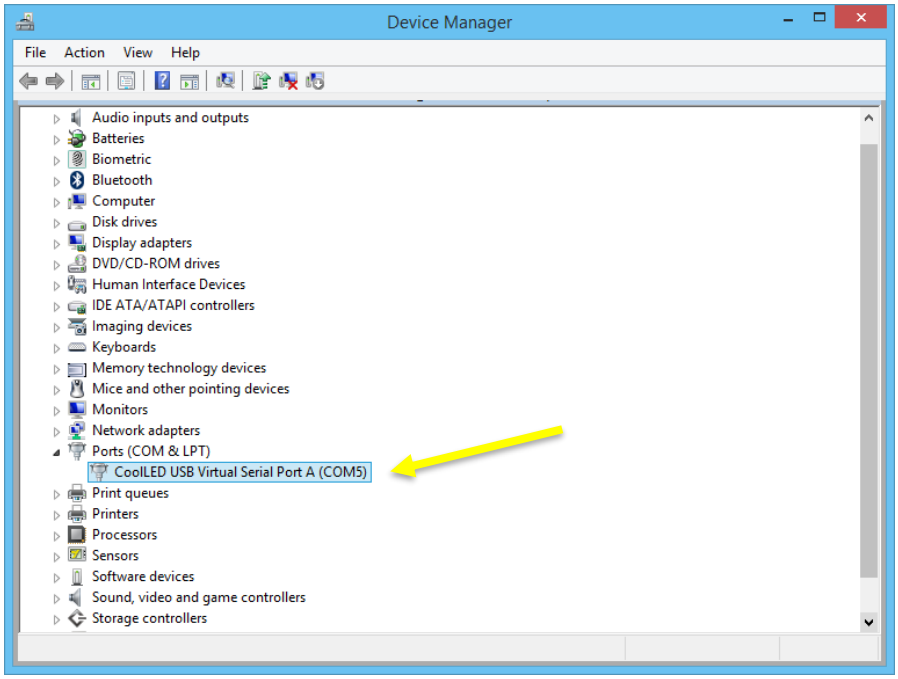

Figure 13