



COBRA Cure™ FX3

with IntelliSense™ Technology

Operations Manual

October 12 2018



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Photobiological Safety

Important Safety Message for COBRA Cure™ FX3 users:

Your COBRA Cure™ FX3 Lamp is a LED-based radiation source, intended to be used as an OEM component. It must only be used inside a system such as, for example, a printing machine, and must never be used as a stand-alone product outside of the intended OEM system without proper safety precautions.

ProPhotonix light sources include protective guards to fully enclose electrical elements that may cause operator harm during normal use. These fixed guards adhere to the appropriate international safety standards.

Caution: Do not operate the light sources or the machine in which they are installed while any safety guards are open, loose, damaged, or missing.

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

ProPhotonix light sources are classified as Risk Group 3 under IEC 62471 at a distance of 200mm.

Risk groups defined in IEC 62471:

Exempt means there is no photo-biological hazard for the end points in this standard.

Risk Group 1 - Low Risk. Does not pose a hazard due to normal behavioral limitations on exposure.

Risk Group 2 - Moderate Risk. Does not pose a hazard due to aversion response to very bright light sources or due to thermal discomfort.

Risk Group 3 - High Risk. May pose a hazard even for momentary or brief exposure.

Warning: DO NOT LOOK DIRECTLY AT THE UV LIGHT SOURCE. ALWAYS WEAR GOGGLES WHEN USING THIS PRODUCT.

ProPhotonix recommends safety goggles with a minimum optical density value of 6 within the wavelength range 200-532nm.

Wavelength	Band
365nm	350-390nm
385nm	370-410nm
395nm	380-420nm
405nm	390-430nm

Caution: Only a portion of the UV light output is visible to the human eye. A light that appears dim can actually be operating at very high intensity.

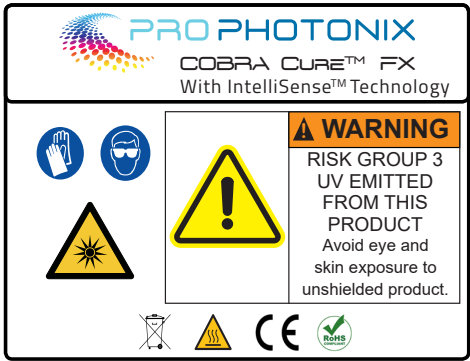
Warning Labels

Below are the contents of warning labels that must be affixed to COBRA Cure™ FX3 Lamp devices.

UV Safety Standards
IEC Class

ANSI Risk Group 3
3B

Warning: UV radiation emitted from this lamp. Skin or eye damage could result. Avoid exposure of eyes and skin to unshielded lamp.



Symbol	Description
	Obey all safety messages that follow this symbol to avoid possible injury or death
	Warning indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury
	Wear protective gloves and use appropriate shielding
	Wear approved ultraviolet resistant eyewear and use appropriate shielding
	ULTRAVIOLET LIGHT hazard
	Hot surface hazard
	Must not be disposed of in the trash

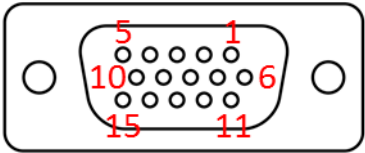
Lamp Characteristics

General Characteristics	Value	Units
Weight (per 75mm lamp)	1.82	kg
Noise	75*	dBA
Maximum Operating Temperature	35	°C

*Value given is for one 77mm module at its maximum intensity setting at 1 meter. For every subsequent module add 3dBA.

Electrical Characteristics (per 75mm lamp)	Value	Units
UV LED Module input Voltage	48V±2	V
UV LED Module Maximum Input Current	20	A
Thermal Safety Switch	Thermal safety sensor is mounted on the substrate. The LED junction is never exposed to over temperature	
Maximum Power Consumption	800	W
Typical Power Consumption	650	W

RS485 is a robust communication protocol solution for transmitting data over long distances and noisy environments. It allows multiple lamps to communicate at distances up to 1200 meters (4000 feet). Both the length of the network and the number of nodes can easily be extended. Lamps are addressable, allowing each node to be communicated to independently. The female HD-DB15 connector is used to control the LED Lamp via PLC or laptop. The RS485 protocols implemented in the COBRA Cure™ FX3 are shown below.



RS485 Protocol	
BAUD Rate	57600
Data Bits	8
Parity	N
Stop Bits	1
Flow Control	None

RS485 Protocol	
RS485 Serial -	Pin 12
RS485 Serial +	Pin 13

If your system is using multiple LED lamps, the serial communication lines (Pins 12 and 13) can be tied together in a daisy-chain formation. Up to 64 LED lamps can be daisy-chained together without loss of signal integrity. No termination resistors are required for low noise environments.

Connector Pin Functions				
Pin	Wire	Function	Type	Detailed Function Description
1	Black	Do Not Use		Do Not Use
2	White	Input power	Input 0.5V to +10.0V Zin=100kΩ	Sets LED Lamp intensity where 1.0V = 10% and 10V = 100% . A minimum voltage of 1.0V is required. If the user inputs a voltage below 0.5V, the intensity defaults to 5%. Connect directly to Pin 6 for constant 100% intensity. Do not use pin 6 for any other purpose. Input is ignored when LED Lamp is under RS485 control.
3	Red	Enable High	Input 0.0V or +24.0V Zin=125kΩ	PLC Compatible Logic Input: 0.0V to +6V = OFF (Open input will default to OFF) +16V to +24V = ON Input is ignored when LED Lamp is under RS485 control.
4	Green	Do not use		Do not use
5	Orange	Lamp Ready	Output 0V or +24V Zout=1.3kΩ	PLC Compatible Logic: 0.0V to +6V (ground) = Not Ready +16V to +24V (open) = Lamp Ready Sink Current Maximum = 6mA. Connect only to high impedance input.
6	Blue	Do not use		Do not use
7	White/ Black	Interlock	Input 0.0V or +24V Zin=20kΩ	For use with external customer defined interlock circuit, if no interlock is present, connect Pin 7 to Ground. If interlock circuit is present, connect interlock to Pin 7. PLC Compatible Logic Input: 0.0V to +6V = UV Emission Allowed +16V to +24V = UV Emission Stopped (Open input will default to UV Emission Stopped)
8	Red/Black		Ground	Ground
9	Green/Black		Ground	Ground
10	Orange/Black		Ground	Ground
14	blue/Black		Ground	Ground
11	Blue/Black	Do Not Use		
12	Black/White	RS485	Serial -	Access to LED Configuration and log via R485.
13	Red/White	RS485	Serial +	Access to LED Configuration and log via R485.
14	Green/White		Ground	Ground
15	Blue/Black	Temp. Monitor	Output 0V to +10.5V	The maximum temperature between the PCB and LED substrate is measured and the output is a voltage proportional to the maximum temperature.

* Colors of wire are applicable to ProPhotonix data cable ((FX2-CAB-F-CD-LL)) only.

Choosing the Correct ProPhotonix Power Supply

All wiring and connections must be implemented before plugging the power supply into the wall. Power supply choice depends on the number of modules required to run simultaneously. Please contact ProPhotonix to discuss options and obtain a power supply datasheet.

Connecting the Wall Plug Leads to the Power Supplies

The flying leads of the power supply cable must be connected to the 3-pole screw terminal block on the power supply. Use a Philips or Pozi head screwdriver. The correct connections are shown in the tables below.

Function	Label on PSU
Live	L
Neutral	N
GND	

Mains or Wall Plug Connection

Power Supply connection
GND (-V)
48 V DC supply (+V)

Power Supply Output Connection

3-Phase Power Supply Connection	
Live 1	L1
Live 2	L2
Live 3	L3
Neutral 1	N1
Neutral 2	N2
Neutral 3	N3
Ground	

3-Phase Power Supply Output Connection

Connection Schemes

COBRA Cure™ FX3 lamps can be used in three basic configurations. All configurations allow the user to control the intensity of the modules.

FX3 Connected to Flying Lead Cables

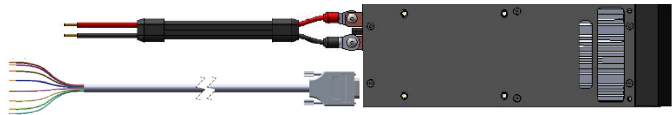
FX3-CAB-F-6R-LLL

Flying Leads Power Cable

OR

FX3-CAB-4-6R-LLL

M4 compatible ring Terminal Power Cable



FX2-CAB-F-CD-LLL

15-way Flying Lead to DB15 Control Cable

This connection scheme allows the user to configure their own power and control scheme and connect to external power supplies and controllers. The FX3 lamp has positive and negative non-treaded Diameter 5mm sized power terminals. Standard power cables are offered in M6 or M8 sized ring terminals for connection to the power supply. These cables can be connected to FX3 power terminals via M5 screws and appropriate nuts. The opposite ends of the cables can be offered in either flying lead or ring terminals for connection to the power supply; see Figure below.

FX3-CAB-F-6R-LLL

Flying Leads Power Cable



FX3-CAB-4-6R-LLL or FX3-CAB-4-8R-LLL

M6 or M8 compatible ring Terminal Power Cable

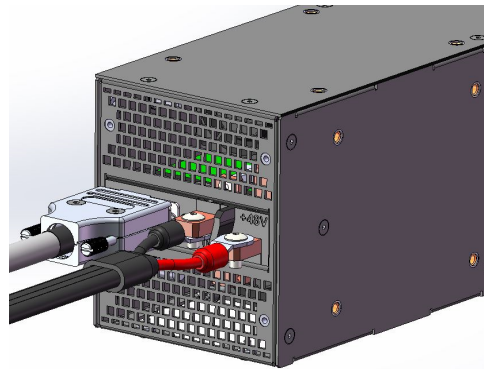


Figure. Power Cable Options for FX3 and 3D Render of connection terminals on FX3

The intensity is adjusted by varying the voltage using a 1-10V control signal on the control wire. Activation/ Enable is achieved by applying a 16-24V signal on the enable wire. This connection configuration also allows the user to monitor the operating status through the lamp ready wire.

Note: 2000mm are the normal stocked lengths for these cables.

FX3 Connected to Flying Lead Power Cables and Intensity Controller with PSU

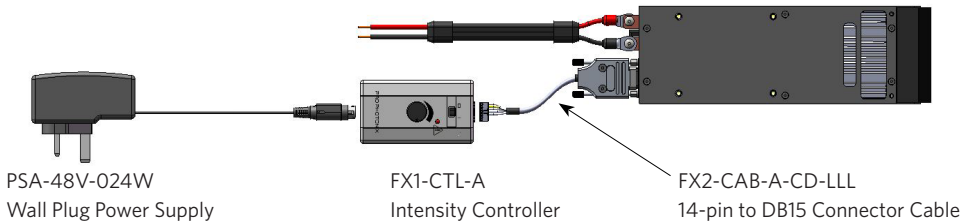
FX3-CAB-F-6R-LLL

Flying Leads Power Cable

OR

FX3-CAB-4-6R-LLL

M4 compatible ring Terminal Power Cable



This Connection scheme allows the user to configure their own power scheme while utilizing ProPhotonix' Intensity Controller to control the intensity of the lamp. The Intensity Controller has 2 manual inputs. The slider switch is used to activate/enable the unit and there is a rotary potentiometer to adjust the intensity. The controller also incorporates a LED light that illuminates a fault when detected. The controller is powered by a wall plug power supply (ProPhotonix Part Number: PSA-48V-024W).

Note: 2000mm are the normal stocked lengths for Flying Lead to Power Connector cables. The Wall Plug Power Supply and 14-pin to DB15 Connector cables are normally stocked in 2000mm lengths.

FX3 Connected to Flying Lead Power Cables and Intensity Controller without Flying Leads

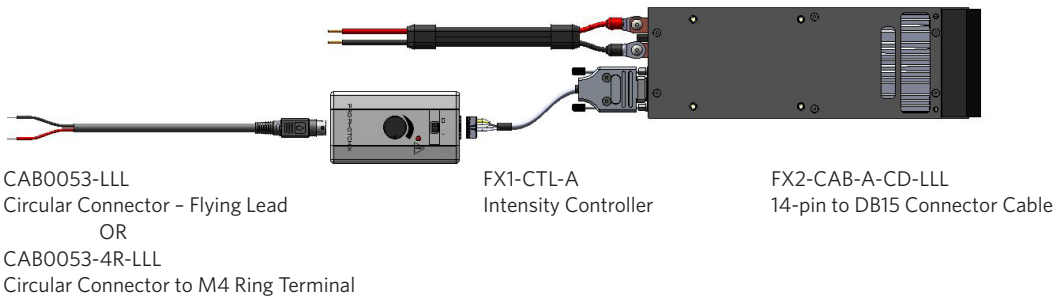
FX3-CAB-F-6R-LLL

Flying Leads Power Cable

OR

FX3-CAB-4-6R-LLL

M4 compatible ring Terminal Power Cable



This Connection scheme allows the user to configure their own power scheme while utilizing ProPhotonix' Intensity Controller to control the intensity of the lamp. The Intensity Controller has two manual inputs. The slider switch is used to activate/enable the unit and there is a rotary potentiometer to adjust the intensity. The controller also incorporates a LED light that illuminates a fault when detected. The controller is connected to a flying lead cable (ProPhotonix Part Number: CAB0053-LLL, where LLL is the length of the cable) allowing the user to configure their own power source.

Note: 2000mm are the normal stocked lengths for Flying Lead to Power Connector cables and CAB0053 cables. The Circular Connector - Flying Lead and 14-pin to DB15 Connector cables are normally stocked in 500mm lengths.

Addressability

There are 3 levels of control in a COBRA Cure™ FX3 LED Lamp based system for certain commands which are discussed in more detail in the Commands section on page 12.

First, multiple LED Lamps can be controlled simultaneously via Global commands (See figure below). These commands allow the user to carry out basic functions such as poll and enable functions.

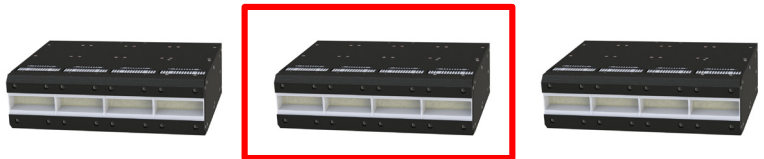
Second, the next level allows the user to control a single LED Lamp which may have a number of FX3 modules. In this case the suffix 'mn' is used in the command syntax, for example, turn on LED Lamp function.

Third, the module level adds a higher-level address indicating a specific module in the LED Lamp.

Global System
Addressability



Lamp
Addressability



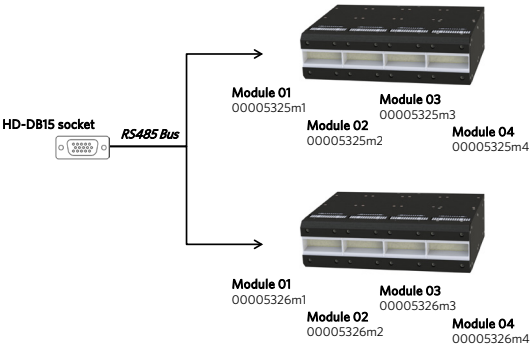
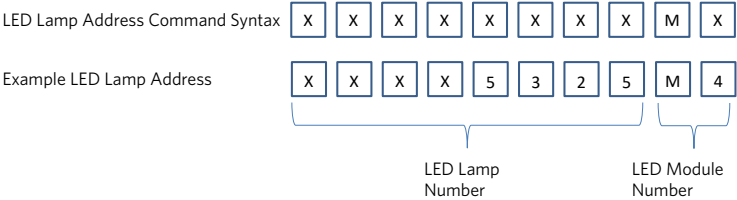
Module
Addressability



Command Syntax

Control Level	Control Level Description	Example	Example Description
Global	Multiple lamps	genable	Enables all the lamps
Lamp	Single lamp	xxxxxxmn 00555325mn	Calls lamp "00555325"
Module	Individual module in a single lamp	xxxxxxmx 00555325m4	Calls Module 4 of lamp "00555325"

RS485 Bus, Lamps, Modules and LED Segments



Version Number

Function	Function Description	Command Syntax	Example Syntax	Example Response
Read Module Firmware Version Number	Query the software version number of a single module.	r xxxxxxxmx version	r 302023m1 version	Response: "0.0.16" → The module uses the software version 0.0.16

System Status

Function	Function Description	Command Syntax	Example Syntax	Example Response
Poll LED Lamp	Serial number which will be repeated 25 times or until given another command. Last entry will display operating mode which should always be "Customer Mode". NOTE: It should only be used when a single lamp is on the RS485 bus.	poll	poll	poll 302023m1 302023m1 ... 302023m1 302023m1 Customer Mode..... ==>ON<==
System Status Control	Turn on all lamps. NOTE: To turn on the light, enable it (e.g. by invoking this command) AND close or bypass the interlock by applying 0V to pin 7. See the table on Page 5 for more information on pin 7 and how to bypass the interlock. NOTE: This command causes RS485 to take control.	genable	genable	Nothing is returned
System Status Control	Turn off ALL LED Lamps in communication chain. NOTE: This command causes RS485 to take control.	gdisable	gdisable	Nothing is returned
Reset Module	Reboots the module.	w xxxxxxxmx reset	w 302023m1 reset	Response: "Ok" → The module has been reset

Function	Function Description	Com- mand Syntax	Example Syntax	Example Response
Display Status	The command outputs status summary for a module. The command response displays: - Product and serial number - Firmware version - Number of events recorded in the log - Status of the individual LED segments in the selected module. - Is interlock is enabled? - Is the module enabled or disabled? - How the LED Lamp is controlled – RS485 or analogue? - What is the intensity set to? - What is the current Heat Sink temperature (°C)? (Highest value from LED substrate thermistors and PCB thermistors in a module) - What is the DC power voltage?	r xxxxxxmx ds Where xxxxxx = product se- rial number And Where mx = module number	r 302023m1 ds	Response: Product: COBRA FX3, s/n 302023m1 Firmware Ver.: 0.0.5 Log Entries: 23 LED Segment Enables.: 1=ON 2=ON 3=ON 4=ON 5=ON, 6=ON, 7=ON, 8=ON SW-Interlock: Enabled SW-Enable High: Disabled Global Control:RS485 Intensity: 200 Temperature: 40 Input volt: 48
Read Module Ready Signal	Returns the state of the Lamp Ready signal (Yes = Ready, No = Not Ready).	r xxxxxxmx ready	r 302023m1 ready	Response: "Yes" → No fault has been detected in the Module Response: "No" → If the software detects a fault in the Module "No" is returned
Check if UV is Enabled	Returns the enable/disable state of the LED Lamp module. (On = UV enabled, Off = UV disabled).	r xxxxxxmx ledenabled	r 302023m1 ledenabled	Response: "On" → The module is enabled Response: "Off" → The module is disabled
Read Intensity Control Setting	Returns the intensity setting of the module if all LED segments are set. The displayed value will have a range of 0-255 of the maximum output intensity.	r xxxxxxmx intensity	r 302023m1 intensity	Response: "056, 031, 031,031, 031, 031, 031, 056" First and last LED segments set to an → intensity of 56/255. The other segments set to 31/255.

Function	Function Description	Command Syntax	Example Syntax	Example Response
Read Control Status	Returns communication status (analogue or RS485 control).	r xxxxxxmx analogue	r 302023m1 analogue	Response: "RS485" → The module is RS485 controlled Response: "Analogue" → The module is Analogue controlled
Return Control to Analogue	Use this command to allow control via the analogue interface. Note: There is auto switch over to RS485 but not to analogue. In order to switch back to analogue you need this command.	w xxxxxxmx analogue	w 302023m1 analogue	Response: "ok" → The modules control has been switched to analogue

Function	Function Description	Command Syntax	Example Syntax	Example Response
Turn On LED Lamp (Enable)	Turn on the module. NOTE: To turn on the light, enable it (e.g. by invoking this command) AND close or bypass the interlock by applying 0V to pin 7. See the table on Page 5 for more information on pin 7 on how to bypass the interlock. NOTE: RS485 takes control.	w xxxxxxmx enable w xxxxxxmn enable	w 302023m1 enable	Response: "ok" → The module is enabled
Turn Off LED Lamp (Disable)	Turn Off Module. NOTE: "mn" can be used with the command to address ALL modules within the LED Lamp. NOTE: RS485 takes control.	w xxxxxxmx disable w xxxxxxmn disable	w 302023m1 disable	Response: "ok" → The module is disabled
Write Intensity	Use to set percent intensity. NOTE: "mn" can be used with the command to address ALL modules within the LED Lamp. NOTE: RS485 takes control.	w xxxxxxmn intensity <val> val=26 to 255	w 302023mn intensity 51	The intensities of all the lamps modules are set to 51

Function	Function Description	Command Syntax	Example Syntax	Example Response
Read Counters	Returns a triple value representing: ▪ Number of minutes the light has been activated. ▪ Estimated remaining lifespan of the lights in watt-hours (Wh). ▪ Number of On/Off cycles. On/Off cycles are defined as the number of times light has been emitted by the unit. This number is incremented anytime the unit changes from a state where no light at all is being emitted to one where at least some light is being emitted.	r xxxxxxmx counters	r 302023m1 counters	Response "134,7999984,12" → The module has been active for 134 minutes, the expected remaining lifespan of the light is 7999984 Watt-hours (Wh) and the light has been switched on and off 12 times
Read Fan Speed	Returns the speed of a fan in revolutions per minute. The fan is specified by the <val> argument and should be either 1, 2 3 or 4	r xxxxxxmx fan <val>	r 302023m1 fan 1	Response: "3750"
Read Action Below Low Intensity Threshold	Reports how light will behave when intensity is less than a minimum threshold. Possible responses are sustain, linear or off. ▪ Sustain: When the specified intensity is less than the minimum threshold then the actual intensity will be set to the minimum threshold. ▪ Linear: Intensity below the threshold will be calculated in the same way that intensities are calculated above the threshold. ▪ Off: Light will be switched off when the intensity is below the minimum threshold.	r xxxxxxmx minact	r 302023m1 minact	Response "sustain" Response "linear" Response "off"

Function	Function Description	Command Syntax	Example Syntax	Example Response
Set Action Below Intensity Threshold	Configures behavior of light when intensity is below the minimum threshold. The <arg> argument can be one of the following: ▪ sustain ▪ linear ▪ off The meaning of these values is described above for the "Read action below low intensity threshold" command.	w xxxxxxmx minact <arg>	w 302023m1 minact sustain	Response: If the command succeeds "ok" is returned.
Read Low Intensity Threshold	Reports the extant value for the minimum intensity threshold. The displayed value will have a range of 0-255.	r xxxxxxmx minint	r 302023m1 minint	Response "13"
Write Low Intensity Threshold	Sets the value for the minimum intensity threshold. The <val> argument has a range of 0-255.	w xxxxxxmx minint <val>	w 302023m1 minint 23	Response: "ok "
Read Power	Reports number of mV to the 2 12V pins or 2 48V pins. The provided argument is 12 or 48.	r xxxxxxmx pwr <arg>	r 302023m1 pwr 12	Response: "12955 12941"
Report Interlock State	Reports the interlock state. ▪ If "Interlock On" is returned the interlock is closed. ▪ If "Interlock Off" is returned the interlock is opened and no light will be emitted.	r xxxxxxmx lock	r 302023m1 lock Interlock On	Response: "Interlock On" → Interlock is closed Response: "Interlock Off" → Interlock is open

Log Commands

Function	Function Description	Command Syntax	Example Syntax	Example Response
Download Log	Displays all log entries, in order, from last to first. The time value is the cumulative number of minutes the light source has been powered on. NOTE: The maximum number of log entries is 400. When the maximum is reached, the next log entry will restart at 1. If there are no entries, the Download Log command will return a "Log is empty" statement. For additional information related to the log entry codes, please see Event Recording Table see page 19	r xxxxxxmx dl	r 302023m1 dl	Response → "134,7999984,12" The module has been active for 134 minutes, the expected remaining lifespan of the light is 7999984 Watt-hours (Wh) and the light has been switched on and off 12 times
Read Log Size	Returns number of log entries. If the log <400, returns nnnn/nnnn. If the log > 400, returns nnnn/400.	r xxxxxxmx logsiz r xxxxxxmx logsiz	r 302023m1 logsiz r 302023m1 logsiz	Response: "211/211" Response: "61/400"
Read Log Entry	Read an individual log entry where val is the log entry value to be reported. <val> argument is log entry value. NOTE: If a value of 0 is entered, the most recent log entry and number is displayed. NOTE: If no value or an invalid value is entered, the light source will respond with 'Error' followed by the most recent log entry.	r xxxxxxmx log <val>	r 302023m1 log r 302023m1 log 222	Response: "Log:0211 Time:0000004619 Msg:128 156 EVT-Pow- er_On (POR)" Response: "Error Log:0211 Time:0000004619 Msg:128 156 EVT-Pow- er_On (POR)"

Fault Status

Function	Function Description	Command Syntax	Example Syntax	Example Response
Write Fault Status	The <val> argument: - Val=0 Clears fault status. NOTE: Will not clear if fault still exists. - Val=1, 2 or 3. Asserts an module fault status. The status <val> is captured in the log.	w xxxxxmx ledfault <val>	w 302023m1 ledfault 0 ok	Response: "ok"
Read Last Status	The Read Last Status command returns two numbers. The first number returns the last fault status: 0 - No fault 2 - FLT-PCB_Temp 3 - FLT-Substrate_Temp 4 - FLT-False_I 5 - FLT-InputV_Hi 6 - FLT-InputV_Lo 7 - FLT-Cmd_Asserted 8 - FLT-VLED 9 - FLT-Incorrect_I 11 - FLT-Flexi 13 - FLT-Power V 128 - EVT-Power_On (POR) 132 - EVT-Substrate_Temp_Recovery 133 - EVT-Cmd_Clr_Faults Each of the fault codes is followed by a status code that provides additional information: 0,0 - no status info applicable 2,0 - no status info applicable 3,0 - no status info applicable 4,n - the segment number at fault 5,n - if n=1 or 2 this corresponds to one of the 2 12V pins and if n=3 or 4 it corresponds to one of the 48V pins. 6,n - n=1 is 12V pin and n=2 is 48V pin 6,n - if n=1 or 2 this corresponds to one of the 2 12V pins and if n=3 or 4 it corresponds to one of the 48V pins. 7,n - the value of n depends on the <val> argument passed in the previous Write Fault Status command. A <val> of 1 will result in 2 log entries with n assuming a value of 1 and 4 respectively. A <val> of 2 results in 2 entries where n is 2 and 5 and a <val> of 3 results in entries where n is 3 and 6. 8,n - n is the segment number at fault 9,n - n is the segment number at fault 11,0- Flexi Cable disconnected 13,0- 12V pin is not high. 128, 156 - Every time the module is switched on 132,0 - LED Lamp Recovered 133,0 - Fault Status has been cleared by the Write Fault Status Command. The example on the right shows that one of the 48V supply voltages has been found to be too high. See Event Recording Table for additional event code information that is captured in the log file.	r xxxxxmx ledfault	r 302023m1 ledfault	Response: "5,3"

Substrate Temperature

Function	Function Description	Command Syntax	Example Syntax	Example Response
Module Temperature Value Query	Query the temperature of a specific module taking the value from 4 sensors located on the LED substrate and PCB board respectively. For each 75mm module 5 possible values can be reported: Temp=0: reports the larger value from 2 sensors located on the LED substrate and PCB board respectively. Temp=1: reports the LED substrate temperature on top PCB board. Temp=2: reports the PCB board temperature on top PCB board. Temp=3: reports the LED substrate temperature on bottom PCB board. Temp=4: reports the PCB board temperature on bottom PCB board.	r xxxxxxmx temp <0-4>	r 3020234m1 temp 0	Response: → "77.00" The highest temperature detected by the LED substrate and PCB thermistors is 77°C. Response: → "Error" The substrate temperature could not be read

Event Recording

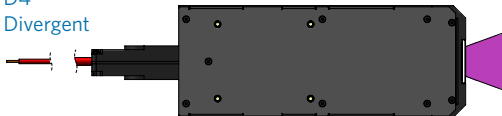
Event Code (Msg)	Event Code Log Text	Notes	Action
1	FLT-Transition sss	The software has encountered an unexpected set of conditions. sss is an internal code describing the state of the firmware when the problem occurred.	Contact ProPhotonix
2	FLT-PCB_Temp ttt	Thermal fault triggered by PCB board thermal switch, ttt=thermal switch temperature with units of °C*10. NOTE: For temperatures of 100.0°C and above, ttt will show only the last three digits. Examples: ttt = 894 = 89.4°C. ttt = 105 = 110.5°C.	Unit will recover after it has cooled down. Check clearance for air inlet and exhaust and ambient air <50°C.
3	FLT-Substrate_Temp ttt	Thermal fault triggered by LED substrate thermal sensor, ttt=thermal sensor temperature with units of °C*10. NOTE: For temperatures of 100.0°C and above, ttt will show only the last three digits. Examples: ttt = 894 = 89.4°C. ttt = 105 = 110.5°C.	Unit will recover after it has cooled down. Check clearance for air inlet and exhaust and ambient air < 50°C.
4	FLT-False_I ttt	Current detected when unit is disabled, ttt=current at time of fault with units of 100mA. Example: ttt = 065 = 6.5A.	Contact ProPhotonix.
5	FLT-InputV_Hi vvv	DC input voltage over maximum limit vvv=input voltage in V*10. Example: vvv = 535 = 53.5Vdc.	Check input voltage and adjust it so that it is within spec.

Event Recording

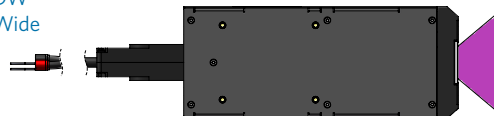
Event Code (Msg)	Event Code Log Text	Notes	Action
6	FLT-InputV_Lo vvv	DC input voltage under minimum limit vvv=input voltage in V*10. Example: vvv = 408 = 40.8Vdc NOTE: This fault may occur when the DC power supply is turned on, due to the time it takes to reach full voltage output. A clear fault status command will clear the buffer	Check input voltage and adjust it so that it is within spec.
7	FLT-Cmd_Asserted	Fault forced through RS485 for testing purposes when fault <1, 2 or 3> command is sent through RS485	No action required
8	FLT-VLED vvv	A short or open circuit has been detected across a LED segment. vvv=voltage across LED segment in V*10	Contact ProPhotonix
9	FLT-Incorrect_I	Feedback current is not within the expected range	Contact ProPhotonix
11	FLT-Flexi	Flexi cable connecting head to PCB is disconnected	Contact ProPhotonix
12	FLT-FAN rrr	Fan was found to be running at the incorrect speed Fan rrr is the recorded RPM of the lamp	Contact ProPhotonix
13	FLT-Power V	12V pin is not high	Contact ProPhotonix
128	EVT-Power_On (POR)	DC Power turned on	No action required
132	EVT-Substrate_temp_Recovery	LED Lamp recovered from thermal fault when temperature dropped below recovery threshold	Check clearance for air inlet and exhaust and ambient air < 35°C
133	EVT-Cmd_Clr_Faults	Faults cleared through RS485	No action required

Optical Configuration

D4
Divergent

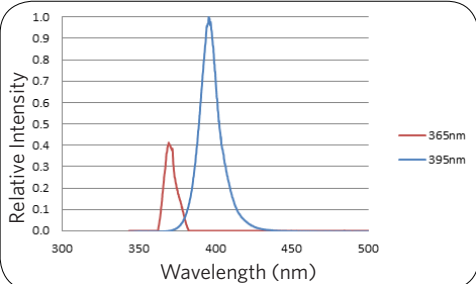


DW
Wide

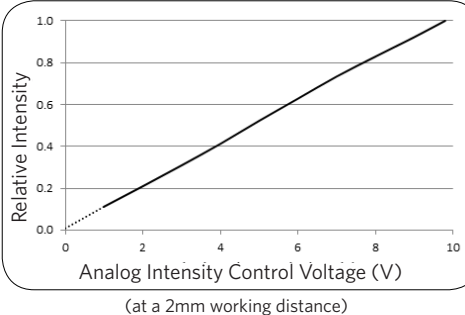


Optical Characteristics

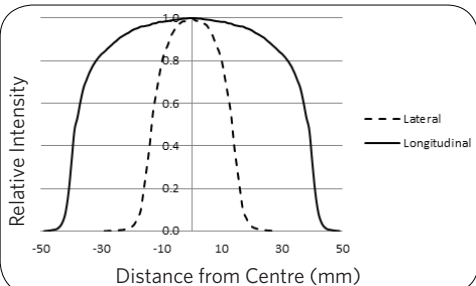
Relative Intensity vs Wavelength Spectrum



Intensity response to analog intensity control

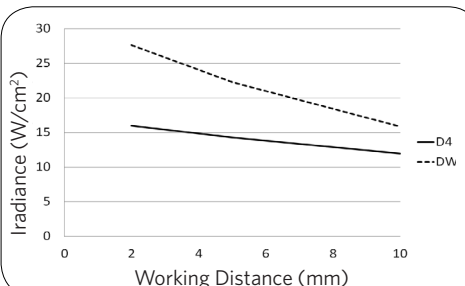


Lateral and Longitudinal Intensity Profile



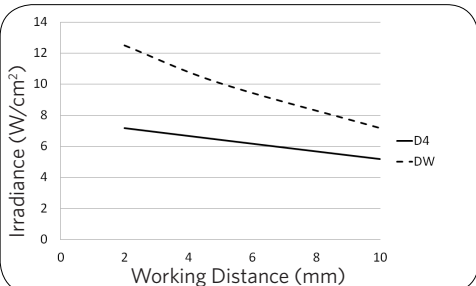
Measured at 2mm. Lateral linewidth (FWHM) approx. ~ 27mm.
Longitudinal linewidth (FWHM) approx.. ~ mm.

Intensity Versus Working Distance - 395nm



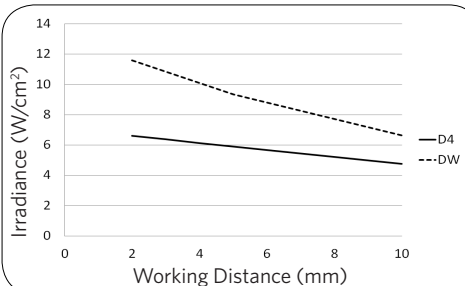
Measured at 2mm.
Linewidth (FWHM) approx. ~ 20mm

Intensity Versus Working Distance - 385nm



at a 2mm working distance

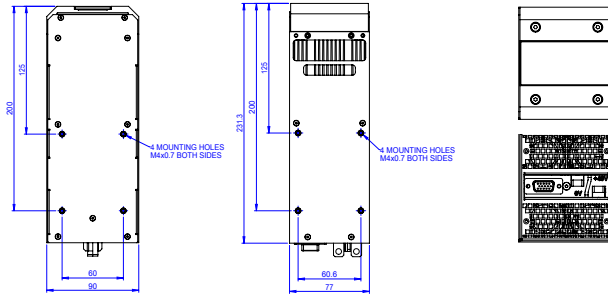
Intensity Versus Working Distance - 365nm



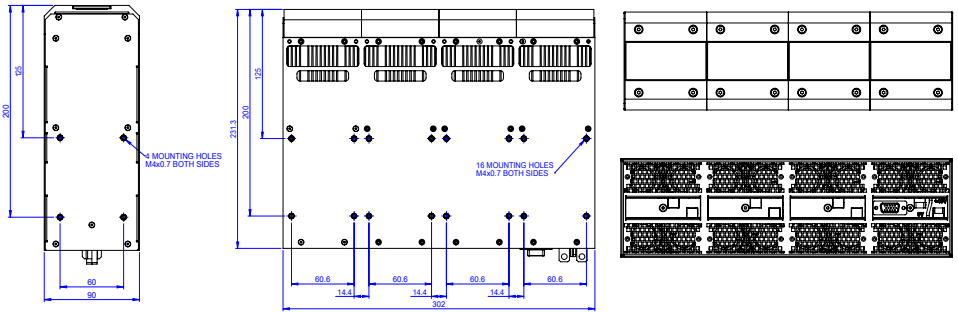
at a 2mm working distance

Dimensional Diagram - DW

077mm



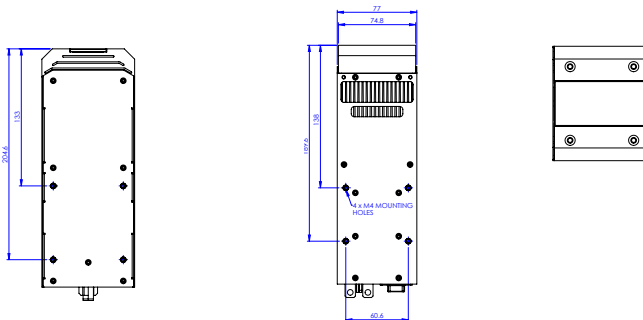
302mm



Available in multi-module formats in 75mm segments up to 600mm in single mechanical housings.

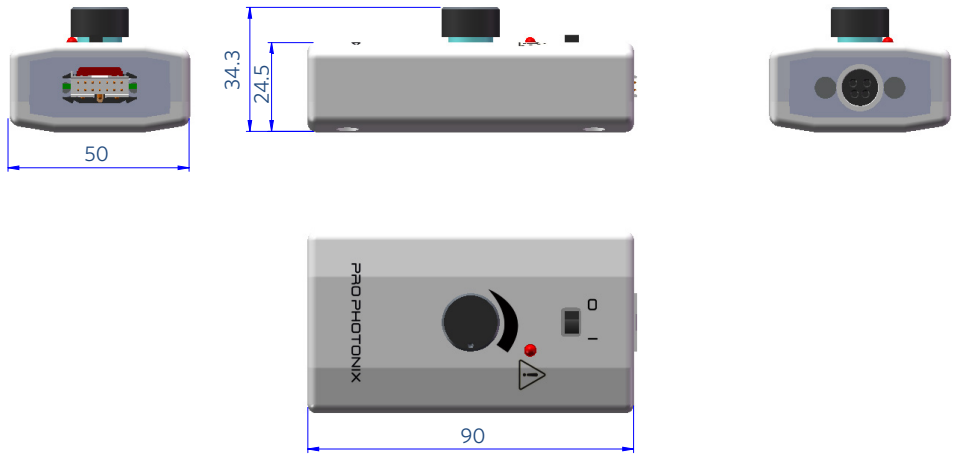
Dimensional Diagram - D4

077mm

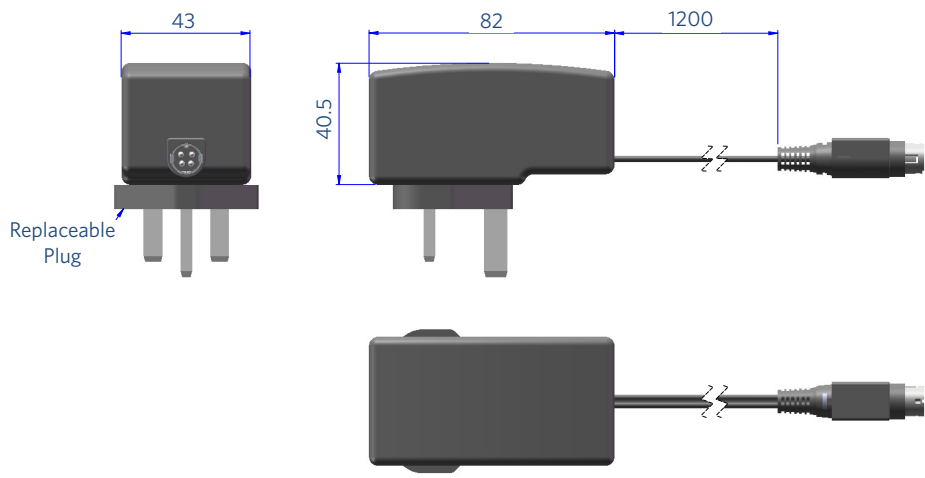


The COBRA Cure™ FX3 has two mounting hole options. It can be mounted using M3 x 0.5 metric threaded holes on one side or M4 x 0.5 metric threaded holes on the other side. The positions of these holes are shown in the drawings. There are different mounting hole position configurations on both sides of the units. One mounting hole configuration is positioned towards the front of the module head. The alternative mounting hole configuration is located on the opposite face toward the back end of the module. All dimensions are given in millimetres.

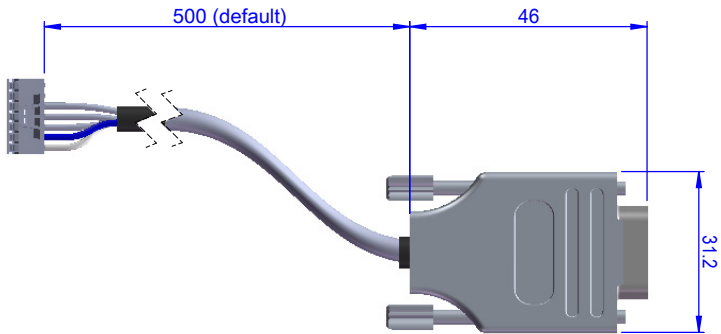
Intensity Controller (FX-CTL-A)



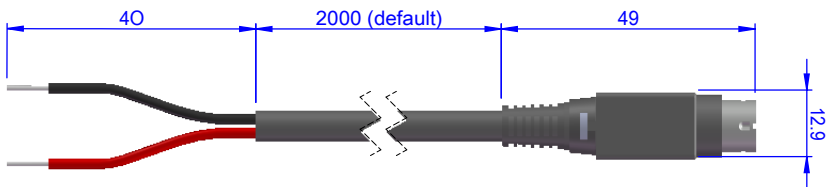
Wall Plug Power Supply (PSA-48V-024W)



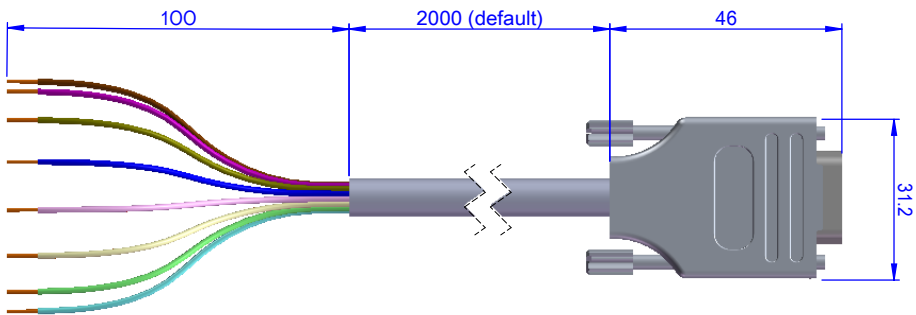
14-pin to DB15 Connector (FX2-CAB-A-CD-LL)



2-way Flying Lead to Circular Connector (CAB0053-LL)



15-way Flying Lead to DB15 Connector (FX2-CAB-F-CD-LL)



Warranty

Do not attempt to disassemble your COBRA Cure™ FX3 Lamp. Any such action will void the warranty.

COBRA Cure™ FX3 Lamps and accessories are guaranteed by ProPhotonix to be free from material and manufacturing defects for a period of 12 months from the date of shipment. Should a product fail during this period, ProPhotonix will, at its discretion, either repair or replace the damaged unit. Repaired units or replacement units will be covered for the remainder of the original warranty period. The warranty does not apply to units that have failed due to abuse, acts of God, mishandling, alteration, improper installation, or negligence.

Declaration

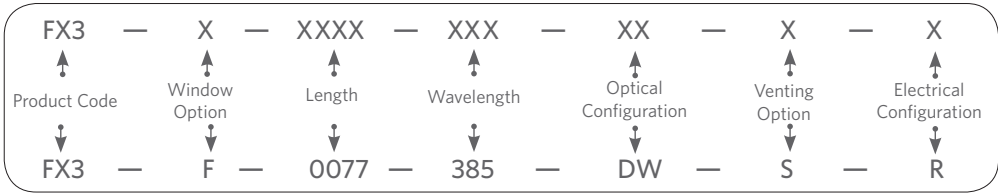
All COBRA Cure™ FX lamps are shipped with a Declaration of Conformity.

Ordering Part Numbers

FX3 - Window - Length - Wavelength - Optical Configuration - Venting - Electrical

Product Code	Window Option	Length (mm)	Wavelength (nm)	Optical Configuration	Venting Option	Electrical Configuration
FX3	F - Fixed	0077	405	D4 - Divergent	S-Side Vented	R
			395	DW - Widest	B-Back Vented	
			385			
			365			

To order your COBRA Cure™ FX3- Use product code (FX3) - Select Window Option (X) - Select Length (XXXX) - Select Wavelength (XXX) - Select Optical configuration (XX) - Select Venting Option (X) - Select Electrical Configuration (X)



Accessories Part Number	
Accessories	Part Number
48V Power Supply - 077mm FX3	PSU-48V-960W-XX
48V Power Supply - 152mm FX3	PSU-48V-02KW-XX
48V Power Supply - 227mm FX3	PSU-48V-03KW-XX
48V Power Supply - 302mm FX3	PSU-48V-05KW-XX
48V Power Supply - 602 mm FX3	PSU-48V-10KW-XX
Intensity Controller Power Supply	PSA-48V-024W
Flying Lead to M6 Ring Terminal Power Cable	FX3-CAB-F-6R-LLL
M4 Compatible Ring Terminal to Power Cable	FX3-CAB-4-6R-LLL
15-way Flying Lead to DB15 Control Cable	FX2-CAB-F-CD-LLL
14-pin to DB15 Connector Cable	FX2-CAB-A-CD-LLL
Intensity Controller	FX1-CTL-A
Circular Connector to Flying Lead Cable	CAB0053-LLL
Circular Connector to M4 Terminal Rings	CAB0053-4R-LLL

XX represents the country code. Region Code: US, EU, UK. LL represents the length of the cable; see table below for nomenclature. Note that standard lengths are listed on pages 8 and 9.

LL	Length
01	1m
02	02m
10	10m

Hyper Terminal

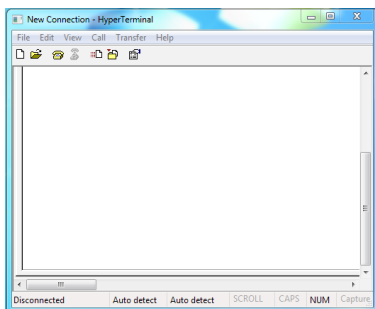
In order to communicate with the COBRA Cure™ FX3 LED Lamp, a USB-based HyperTerminal is used. It is available in most PCs running the Windows operating system. Virtual COM port (VCP) drivers cause the USB device to become visible as an additional COM port available to the PC. HyperTerminal can access the USB device in the same way as it would access a standard COM port. Drivers for the different operating systems can be downloaded from this link:

<http://www.ftdichip.com/Drivers/VCP.htm>

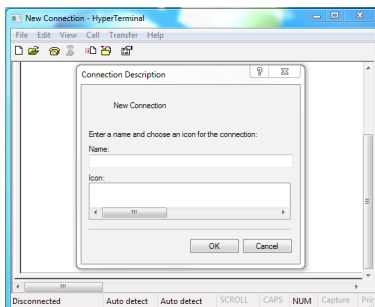
1. Connect PSU and RS485 to the LED Lamp.
 - a. RS485 Serial + wire has to be connected between the RS485 USB adapter and Pin 13 on the LED Lamp.
 - b. RS485 Serial - wire has to be connected between the RS485 USB adapter and Pin 12 on the LED Lamp.

Note: Pins 13 and 12 are labelled in the RS485 USB adapter with '+' and '-'.

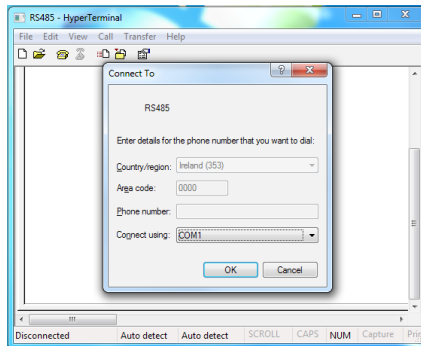
2. Plug in the RS485 USB adapter into your PC. (if your computer has a RS485 Card the USB adapter is not necessary)
3. Launch HyperTerminal: Windows Vista, 7, 8 or 10 does not include this application by default. HyperTerminal 6.3 is the last free version which can be found on many download sites.



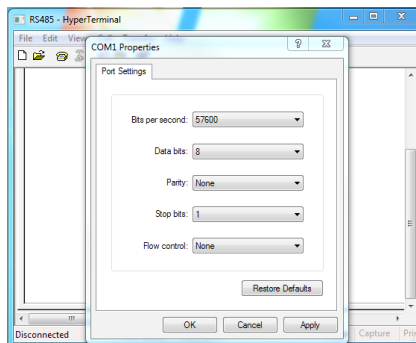
4. In the first window, HyperTerminal will prompt you to set up the connection under a file name so the file can be user later. Enter a name for your connection and click 'OK'.



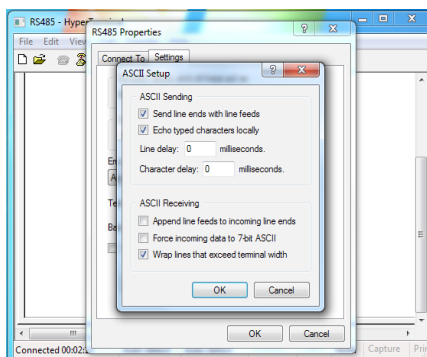
5. In the next window select the communication port where the RS485 USB adapter is connected. To check the communication port go to: 'Control Panel->System and Security->System->Device Manager'. Expand the Ports (COM & LPT) and find your RS485 USB adapter on the list.



6. The last window shows the port settings. Fill the values into the tabs and click 'OK'.



7. Next configure the ASCII options. To do this go to 'File->Properties', select the settings tab inside 'Properties' and click the ASCII Setup.
8. Activate the check box 'Send line ends with line feeds'.
9. Activate the check box 'Echo typed characters locally'.



10. HyperTerminal is set up to communicate with the LED Lamp. Every time you open the HyperTerminal, close the 'Connection Description' window and go to 'File->Open...' and select the name of your connection to load the required settings of the LED Lamp. The connection description is saved in 'Start->Programs->Accessories->communications->HyperTerminal'.

RS485 USB Adaptor

Any FTDI based RS485 USB adaptor can be used to communicate between the PC and the LED Lamp. This adaptor requires a FTDI USB driver in order to appear as a virtual COM port. The FTDI USB driver is available at:

<http://www.ftdichip.com/Drivers/VCP.htm>



The pins in the RS485 USB adaptor are labelled with '+' and '-' which correspond respectively to 'RS485 Serial +' and 'RS485 Serial -' in the serial communications line.



For more information contact us at sales@prophotonix.com or visit us at www.prophotonix.com

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