

USER MANUAL

S-LINK

PC-Based Power & Energy Monitor



gentec-EO

121-101481

WWW.GENTEC-EO.COM

WARRANTY

The Gentec-EO PC S-Link has a one-year warranty (from date of shipment) against material and/or workmanship defects, when used under normal operating conditions. The warranty does not cover damages related to battery leakage or misuse.

Gentec-EO Inc. will repair or replace, optionally, any PC S-Link that proves to be defective during the warranty period, except in the case of product misuse.

Any attempt by an unauthorized person to alter or repair the product voids the warranty.

The manufacturer is not liable for consequential damages of any kind.

Customers must fill in and mail the warranty card in order to activate the warranty.

In case of malfunction, contact your local Gentec-EO distributor or nearest Gentec-EO Inc. office to obtain a return authorization number. The material should be returned to:

Gentec Electro-Optics, Inc.
445, St-Jean-Baptiste, Suite 160
Québec, QC
Canada G2E 5N7

Tel: (418) 651-8003
Fax: (418) 651-1174
e-mail: service@gentec-eo.com

Website: www.gentec-eo.com

CLAIMS

To obtain warranty service, contact your nearest Gentec-EO agent or send the product, with a description of the problem, and prepaid transportation and insurance, to the nearest Gentec-EO agent. Gentec-EO Inc. assumes no risk for damage in transit. Gentec-EO Inc. will, at its option, repair or replace the defective product free of charge, or refund your purchase price. However, if Gentec-EO Inc. determines that the failure is caused by misuse, alterations, accident or abnormal conditions of operation or handling, you will be billed for the repair and the repaired product will be returned to you, transportation prepaid.

SAFETY INFORMATION

Do not use the PC S-Link with the S-Link if the device or the detector looks damaged, or if you suspect that the S-Link is not operating properly.

Appropriate installation must be done for water-cooled and fan-cooled detectors. Refer to the specific instructions for more information. The user must wait for a while before handling these detectors after power is applied. Surfaces of the detectors get very hot and there is a risk of injury if they are not allowed to cool down.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, we suggest taking one or more of the following steps to correct the interference:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment to an outlet that is on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved in writing by Gentec-EO Inc. may void the user's authority to operate this equipment.

SYMBOLS

The following international symbols are used in this manual:



Refer to the manual for specific Warning or Caution information to avoid any damage to the product.



DC, Direct Current

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THE S-LINK DOUBLE CHANNEL LASER POWER/ENERGY METER



1.1 Introduction

To obtain full performance from the S-Link and the PC S-Link, we recommend that you read this manual carefully.

The PC S-Link software transforms your PC screen into a large S-Link screen enabling you to control and see your information from a distance and transfer data to a PC for sophisticated data analysis.

The S-Link is a microprocessor-based power and energy meter that uses the latest technology to provide a multitude of options in a user-friendly environment. It is a complete power and energy meter that can provide a statistical analysis of your measurements.

There is no need to enter the head specifications when connecting the new Gentec-EO power or energy detector heads, for head version 5 and above. The S-Link is already internally set up to accept all the Gentec-EO Hi power wattmeter and joulemeter heads with a DB-15 connector of head version 5 and 6. The S-Link accepts the QE-xx-x-MT or a XLE-4.

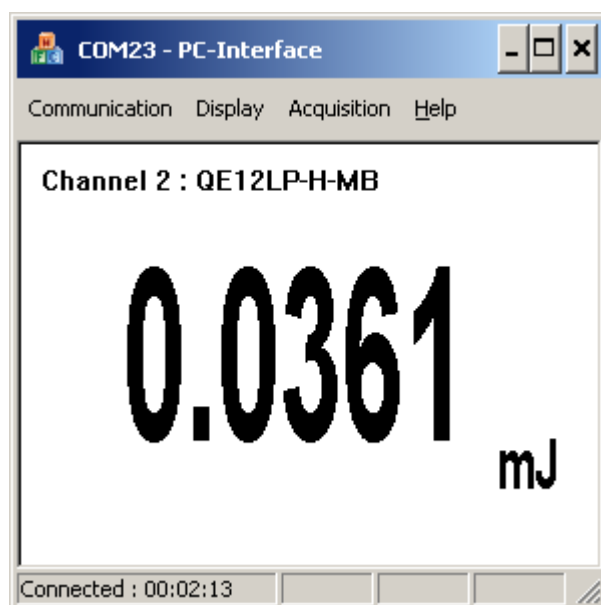


Fig 1.1 PC S-Link user's interface

Unpacking

Each Gentec-EO S-Link is thoroughly tested and calibrated prior to shipment.

Visually inspect every S-Link unit after removing it from the shipping containers. If you see any damage, retain all packaging materials and shipping receipts. Any damage claim should be made promptly to the transportation company. Notify the nearest Gentec-EO representative concerning the claim, so that any repair or replacement can be arranged as soon as possible.

You can download the latest software version for the PC S-Link (and install it on your PC) and for the S-Link (and install it on the S-Link) with the serial interface anytime from our website www.gentec-eo.com.

You can download the PC S-Link program from our website. Go to the **Downloads** section of our website: www.gentec-eo.com. Click on the file name and download it to your PC. The specific actions necessary vary between browser and browser settings. After it is transferred, open the file on your PC and follow the instructions to uncompress and install it. You may also consult the download instructions document that is also in the download section of our website.

1.2 Specifications

The following specifications are based on a one-year calibration cycle, an operating temperature of 18 to 28°C (64 to 82°F) and a relative humidity not to exceed 80%.

Table 1-1 List of Specifications

	<i>Power meter specifications S-Link</i>
Power Range	1 uW to 10 kW
Power Scales (thermal head)	<u>15 scales</u> : 300uW, 1 mW, 3mW, 30mW, 100mW, 300mW, 1W, 3W, 10W, 30W, 100W, 300W, 1kW, 3kW, 10kW
Resolution (digital)	Normal mode: Current scale/2048 Ascii mode: Current scale/32768
Wattmeter mode Accuracy	$\pm 0.75\%$ $\pm 2.5\ \mu\text{V}$ from 10% to full scale ¹
Response Time (accelerated)²	1 sec
Sampling Frequency	100 Hz
Statistics	Current value, Max, Min, Average, Std Dev., RMS stability, PTP stability, Time

¹ The 2.5μV bias can introduce an error into low power measurements with low sensitivity detectors. It is essential to use the Zero Offset to rezero the S-Link before making a measurement in these conditions. It is always good practice to use the Zero Offset. See section 2.2.

² Varies with detector head.

	Energy meter specifications S-Link	
Energy Range	0.08μJ to 20 kJ	
Energy Scales	<u>20 scales:</u> 10uJ, 30uJ, 100μJ, 300μJ, 1mJ, 3mJ, 10mJ, 30mJ, 100mJ, 300mJ, 1J, 3J, 10J, 30J, 100J, 300J, 1kJ, 3kJ, 10kJ, 30kJ	
Resolution (digital)	Normal mode: Current scale/4096 Ascii mode: Current scale/32768	
Accuracy³	1.0 %±50 μV < 500 Hz 2.0 %±50 μV 500 Hz to 1.2 kHz 3%±50 μV 1.2 kHz to 6 kHz 6%±50 μV 6kHz to 10 kHz	
Average Power accuracy	Frequency Accuracy error + Joulemeter accuracy.	
Frequency Accuracy	0.1 to 1000 Hz : 1%±0.1 Hz ⁵ 1000 to 2000 Hz : 2%±0.1 Hz ⁵ 5000 to 10000 Hz : 3%±1 Hz ⁵	
Default Trigger Level	2 %	
Software Trigger Level	0.1% to 99.9%, 0.1% resolution	
Real Time Data Transfer	10 kHz/Channel in Normal mode no missing point with USB 2.0 or Ethernet and recommended PC.	
Statistics	Current value, Max, Min, Average, Std Dev., RMS stability, PTP stability, Pulse #, Repetition Rate, Avg Power	
Data Storage	Limited to PC hard drive free space	
	General Specifications S-Link	
Digital Display	Computer screen	
Display Rate	3 Hz in Real time mode. 15 Hz in Graphic mode.	
Data Displays	Real time, Ratio, Line plot, Histogram, Statistics and 3D Histogram.	
User input correction factors	1 multiplier and 1 offset (7 digits floating point)	

³ Including linearity.

⁵ With the recommended PC, no graphic display, usb latency set to 1ms and no other applications running. The rep rate is much lower over the RS-232 link (5.7 Khz@115200, 480 Hz @9600, the rep rate is divided by 2 if two channel is used).

Positive External trigger	3 to 24 V @ 13 mA, optically isolated.
External trigger pulse width	2 us minimum, no maximum time.
Internet Upgrades	Yes (USB only)
PC Serial Commands	Yes
Dimensions (connectors included)	147 (L) x 106 (W) x 34 (H) mm
Weight	0.424 kg
Power Over USB	Yes
External Power Supply for S-Link –Ethernet and S-Link – RS232	Input: 100/240 VAC 50-60 Hz, Output 9 VDC 1.66 A
S-LINK-2	2 Channels

1.3 Connector Descriptions



Fig. 1-2 S-Link-Ethernet Connectors

1- ETHERNET INTERFACE CONNECTOR (optional on S-Link):

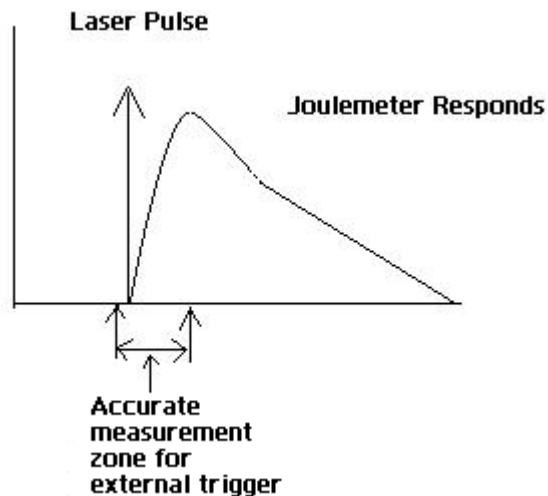
This interface allows remote control and data transfers between the S-Link and a computer via an Ethernet network, a wireless router or a direct connection.

2- External trigger:

The Input connector is a Female BNC. The External trigger is TTL compatible. The monitor detects a trigger on the rising side of the external trigger signal. To measure accurately, the trigger must be just before the laser pulse, or just after. For Example

A QE12SP-S-MT has a 20uS rise time

The External trigger must be 4 us before or 19us after the laser pulse.




3- USB INTERFACE CONNECTOR :

This interface allows remote control and data transfers between the S-Link and a computer that has a USB communication port.

4- EXTERNAL POWER SUPPLY INPUT JACK (S-Link with Ethernet option):

Input voltage required: 5-9 VDC/500 mA. If input voltage is between 15 and 25 volts the monitor will switch to USB power or turn off. If the input power is above 26 volts either the internal fuse will blow, or, depending on voltage level and waveform, it may damage the monitor. When the S-Link is under power the green led will light-up. The S-link will work under all conditions with 1 HP series high power head and all other supported Gentec-eo heads. **When you connect more than one HP series heads, you need to use the USB power or a 5 volts- 500mA AC to DC power adapter to power the HP head.**

	<p style="text-align: center;">CAUTION</p> <p>Permanent damage may occur to the optical meter if an external power supply other than the GENTEC-EO 200960 SPU15A-104 is used. Please call GENTEC-EO or your local distributor if extra power supplies are needed for a particular setup.</p>
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5- PROBE INPUT JACK:

The S-Link uses a DB-15 female connector to mate with the detector heads (probes).

The **S-Link** can take advantage of our *Personal wavelength correction*[™]. It reads the memory in the *Smart Interface* connector (version 5 and higher) to provide a wavelength correction that is based on spectral data measured from that specific detector.

Energy detector heads prior to version 4 have a BNC connector. Contact your vendor for a hardware upgrade.

Power detectors of version V4 and lower and **Energy detectors of version V5 and lower** are not supported . Photodiodes are not supported.

Power detectors of version V5 and higher and Energy detectors of version V6 are equipped with an “intelligent” DB-15 male connector that mates directly with the DB-15 female connector. They do not require an adaptor.

WARNING: This DB-15 connector, though similar to that of the former TPM-310 and TPM-330 monitors, is incompatible with the power detector heads of PS-310 Series Version 1 and PS-330 Series Version 1. These heads used a different technology and do not have the same pin-out configuration.

Any attempt to modify connectors of the early version heads to mate with the S-Link could result in damage to the monitor.

6- RS-232 INTERFACE CONNECTOR (On the SLINK-1-RS-232 only):

This interface allows remote control and data transfers between the S-Link and a computer that has a RS-232 communication port. The speed is factory selected. The connector is a standard mini-USB.

Getting Started



This section contains important information concerning the installation and operation of the S-Link.

The S-Link is delivered ready to use. Just insert a detector head in the DB-15 Detector Input Jack, insert the USB cable into the S-Link and into the PC, and start the software.

1.4 Quick power and energy measurement procedure

This section applies to all S-Link versions. It will show you the fastest way of making a **laser power** and energy measurement with the S-Link and a Gentec-EO power or energy detector.

The monitor automatically recognizes all the Gentec-EO **High power heads of versions ≥4 and** energy heads of versions ≥6. All custom technical data required for optimum operation of the detector will be automatically downloaded from the EEPROM in the DB-15 connector. This data includes sensitivity, model, serial number, version, wavelength correction factors, and time response.

The first 11 steps are for S-Link initialization, steps 12 to 14 refer to the PC S-Link:

- 1- Install the power or energy detector head on its optical stand.
- 2- Turn the S-Link off (unplug it) and connect a version 5 (or higher) power or energy detector head to the S-Link using the **Detector INPUT DB15**. Turn the S-Link off before connecting a new head in order to prevent any loss of information. The S-link only reads the EEPROM head on a power cycle or on a Reset Device command, because the S-link keeps the last head sensibility and configuration. To avoid any loss of information, be sure not to insert a head while the S-link is being powered-up or while you send the Reset Device command.
- 3- Slide the latch to the left to lock the connector into place.

- 4- Switch the S-Link ON (plug it in).
- 5- Power heads will default the S-Link to power measurement; energy heads will default the S-Link to energy measurement.
- 6- Remove the head's protective cover.

Put the detector head into the laser beam path. The entire laser beam must be within the sensor aperture. Do not exceed maximum specified densities, energies or powers. For the most accurate measurement, spread the beam across 60% to 80% of the sensor area.

Attention: Power heads can be used with both CW and pulsed lasers.

- Energy heads can only be used with pulsed lasers.

- 7- For power heads (using the S-Link), go to step 8. For energy heads, go to step 11.

Adjusting the zero (steps 8 to 10)

- 8- Block off laser radiation to the detector.
- 9- The power read by the PC S-Link when no laser beam is incident on the detector may not be exactly zero. The detector is either not thermally stabilized OR there was a heat source in the field of view of the detector when you turned on the S-Link.
- 10- To reset the zero, wait until the reading has stabilized, right click and select **Zero Offset**. You are now ready to make an accurate measurement.

Notes:

- Refer to specific power detector documentation for complete installation and operating instructions.
- The power detectors are thermal sensors sensitive to temperature variations.

For high-precision measurements, we recommend:

- Allowing the power detector temperature to stabilize before zeroing the S-Link.
- Not touching the detector head when handling the power detector. Touch the stand.
- Avoiding forced airflow or drafts around the detector.

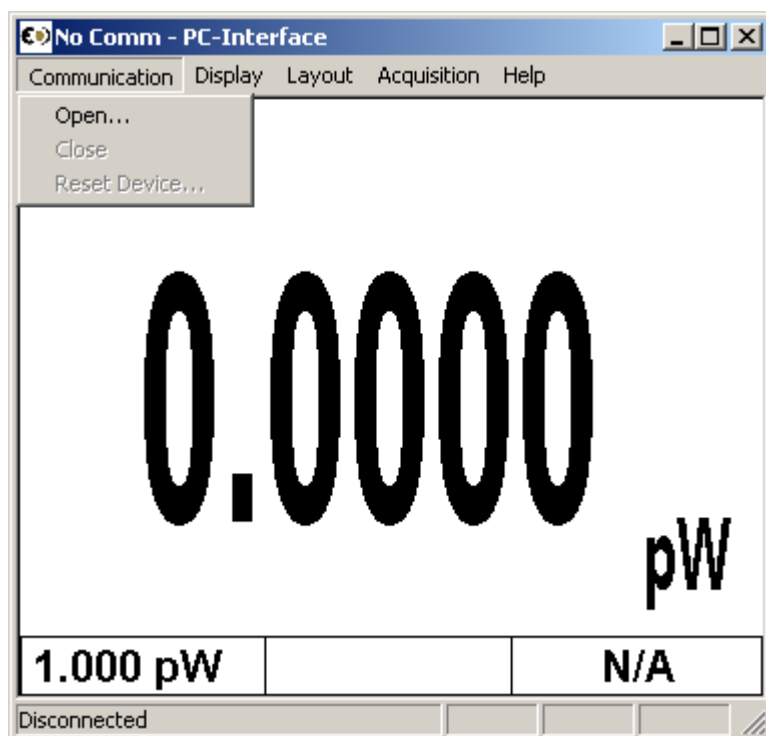
- 11- Apply the laser beam to the detector head. The laser beam average power or energy will be displayed on the computer screen.
- 12- If the USB drivers and/or PC S-Link have not been installed, install the USB drivers (see 3.1.1) then install PC S-Link (self-directed).
- 13- Start the PC S-Link software on the PC. Click Start / Programs /GENTEC-EO/ PC S-Link.
- 14- To connect the PC S-Link to the device, select the correct COM Port (see section 3.2.1) and click Reconnect. You should see values pertaining to the current settings on the PC S-Link.
- 15- To replace a head, turn off the PC S-Link, unplug the S-Link, insert the new head, plug in the S-Link, and restart the PC S-Link.

1.5 USER INTERFACE

1.5.1 Start the PC S-Link software on the PC. Click Start / Programs /GENTEC-EO/ PC S-Link.

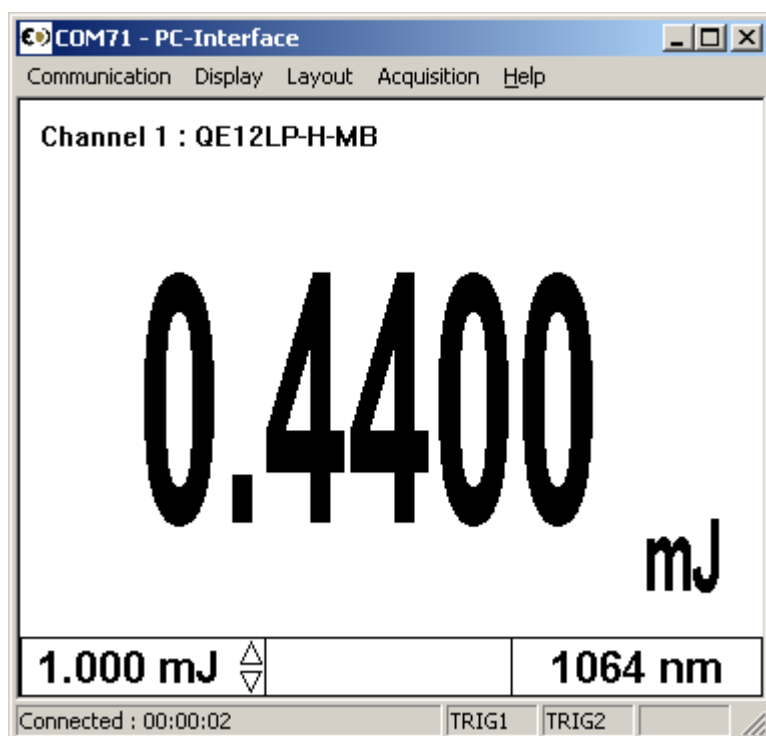
1.5.2 Make a connection with the S-link

Select communication/open and select the com port, see section 1.7.



Communication image

1.5.3 The Real time Display



In Power mode

The Current value is updated at 3Hz.

The lower window shows the Scale, current offset value and wavelength. You can change the scale using the quick arrows beside the scale value. When you change the scale, the acquisition and all display modes will stop for a few milliseconds.

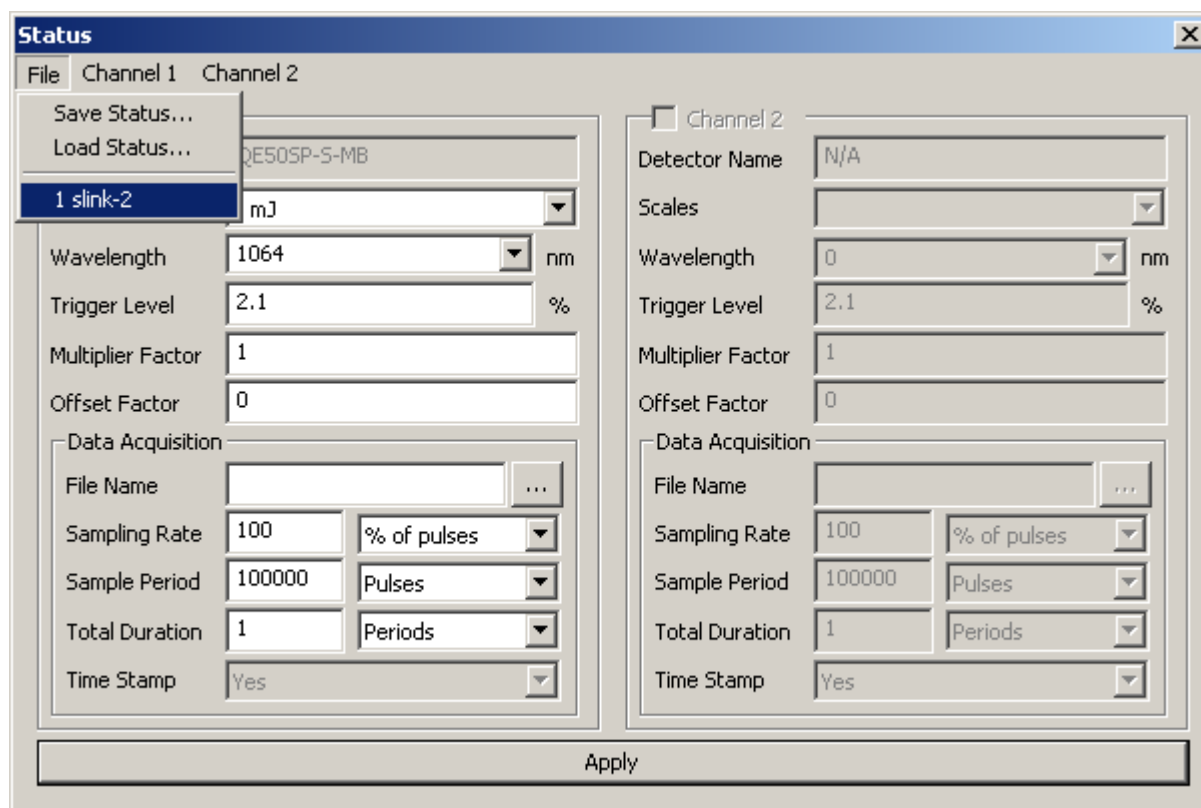
In Energy mode

The Current value is updated at 3Hz. But all data in the statistics are updated at up to 10 kHz in real time. Single shot measurement is always good. When you change the scale you might have a false measurement but the next measurement is accurate. There is no need for "Zero offset" in energy mode because the S-link compensates for an analog drift.

The information bar at the bottom shows the scale and wavelength. The middle box is blank in energy mode. You can change the scale using the quick arrows beside the scale value. When you change the scale, the acquisition and all display modes will stop for a few milliseconds.

1.5.4 The Status Window

In the Status window you can select the channel, scale, wavelength, trigger level, correction factor, file name, data sampling and external trig option. All acquisitions and measurements are stopped while you are in the Status Window. To save your settings, select File/ save status. To load your setting, select File/load status. You must not load a wattmeter status when using an energy detector or a joulemeter status when using a power detector. PC-Slink will remember your last Status setting files under File.



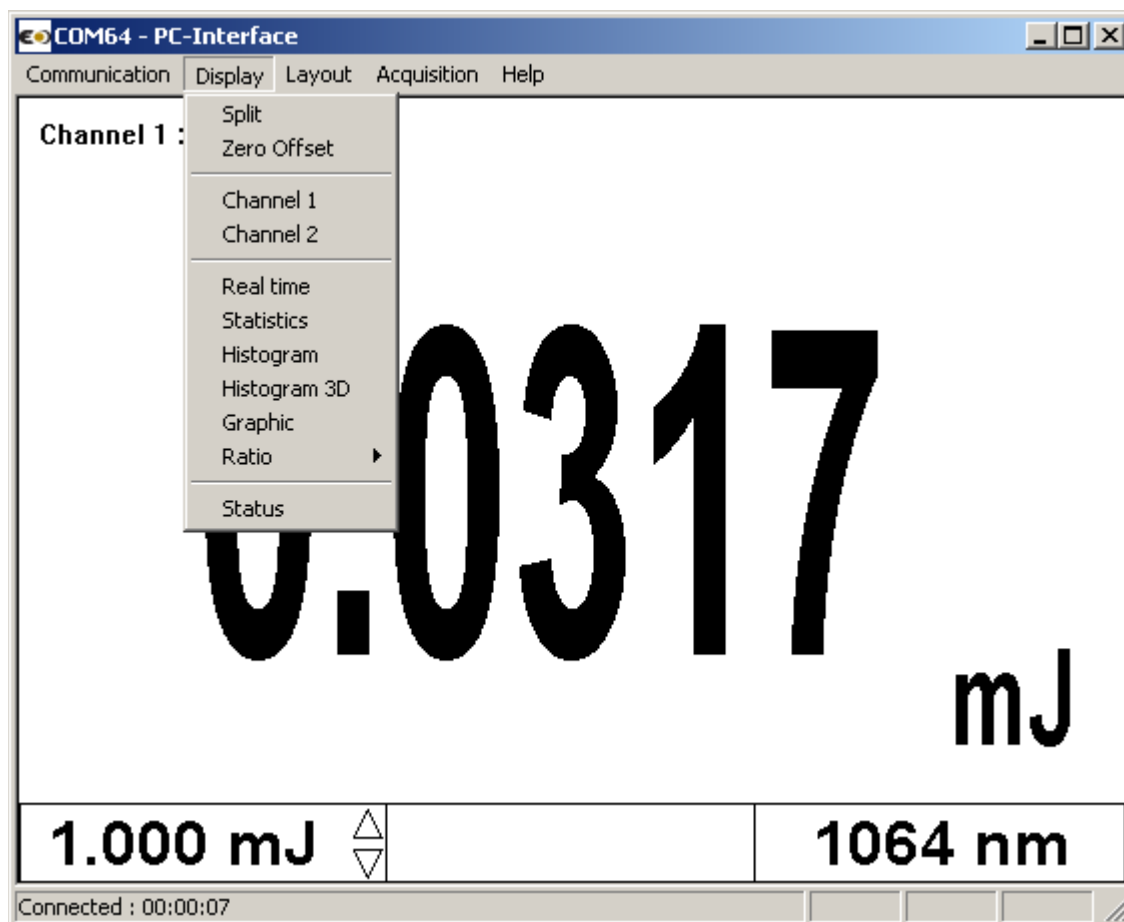
Status image

1.5.5 Selecting the Channel to display

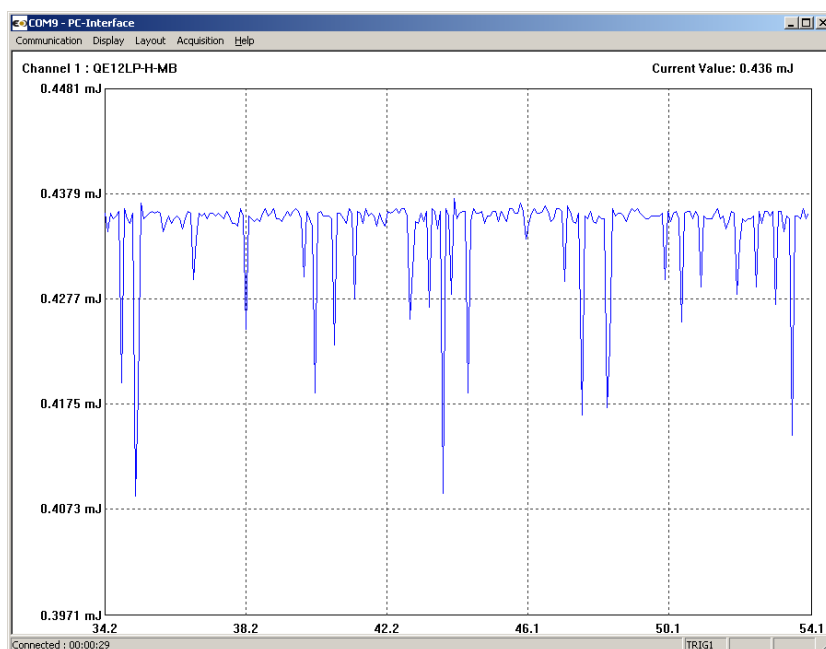
Right click on the display window and select the channel you wish to display.

1.5.6 Adjusting the Windows Display

Select Display/Split with a right click on the window or from the menu bar. To save your layout, select Layout, save layout. To load your saved layout, select Layout, load layout or the filename that appears at the bottom.



1.5.7 The Graphic



To adjust the real time graphic double click on the left side of the y axis. The X-Axis minimum and maximum settings are only available in the Load File option. You can use the mouse wheel to zoom in or out. Left click on the graphic line to change the line position. Double click in the graphic window to pause and get the numerical values in the graphic. The Time setting is in the Graphic display time menu for the X axis.

☒ Auto X

Minimum X: 0

Maximum X: 10

☐ Auto Y

Minimum Y: 0.000397059

Maximum Y: 0.000448118

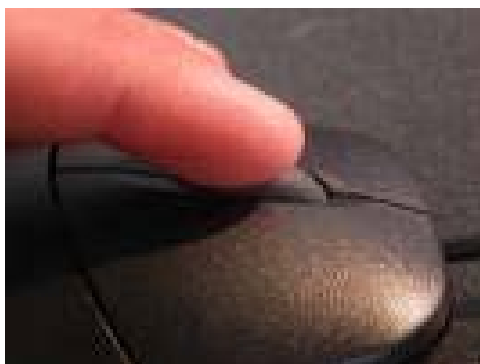
Time: 20 Sec

OK Cancel

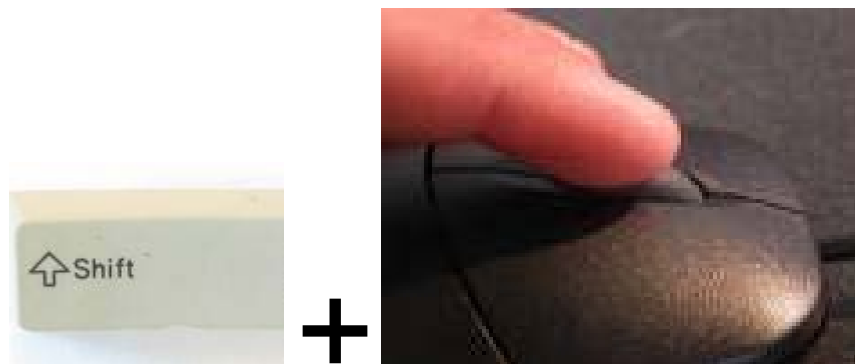
1.5.8 The graphic mode option after a load file

In the Status Menu, Select a file name for the file to save or to view.

To adjust the graphic axis, double click on the left side of the Y axis. Deselect the Auto mode to enter the axis values. You can also use the mouse wheel to zoom in or out. You can zoom the X axis using the mouse wheel while holding the Shift key. Left click on the graphic to change the line Y position. If you are zooming the X axis, you can Left click on the graphic and move the center X position. Double click in the graphic window to get the numerical values in the graphic.



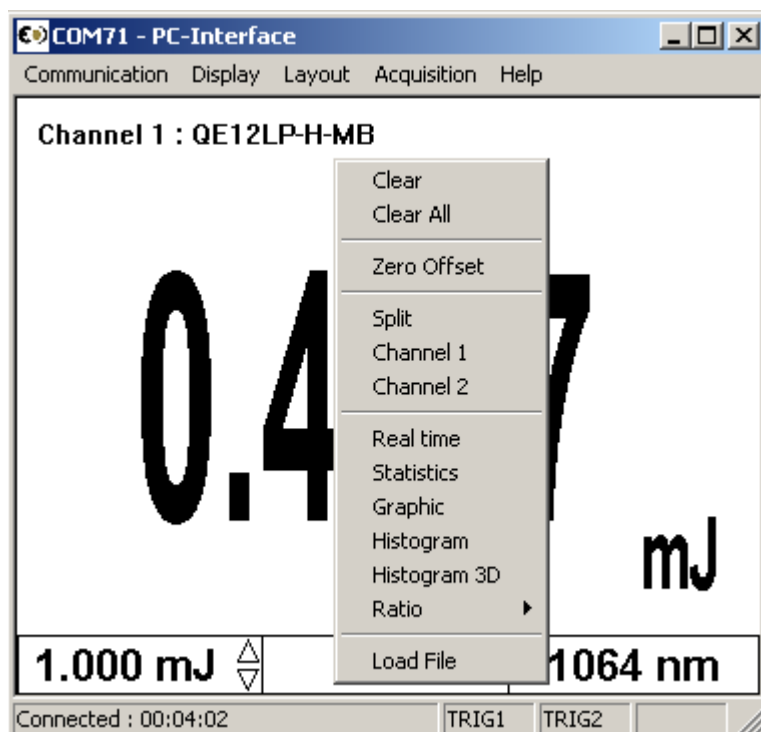
To zoom the Y axis



To zoom the X axis in the Load File option

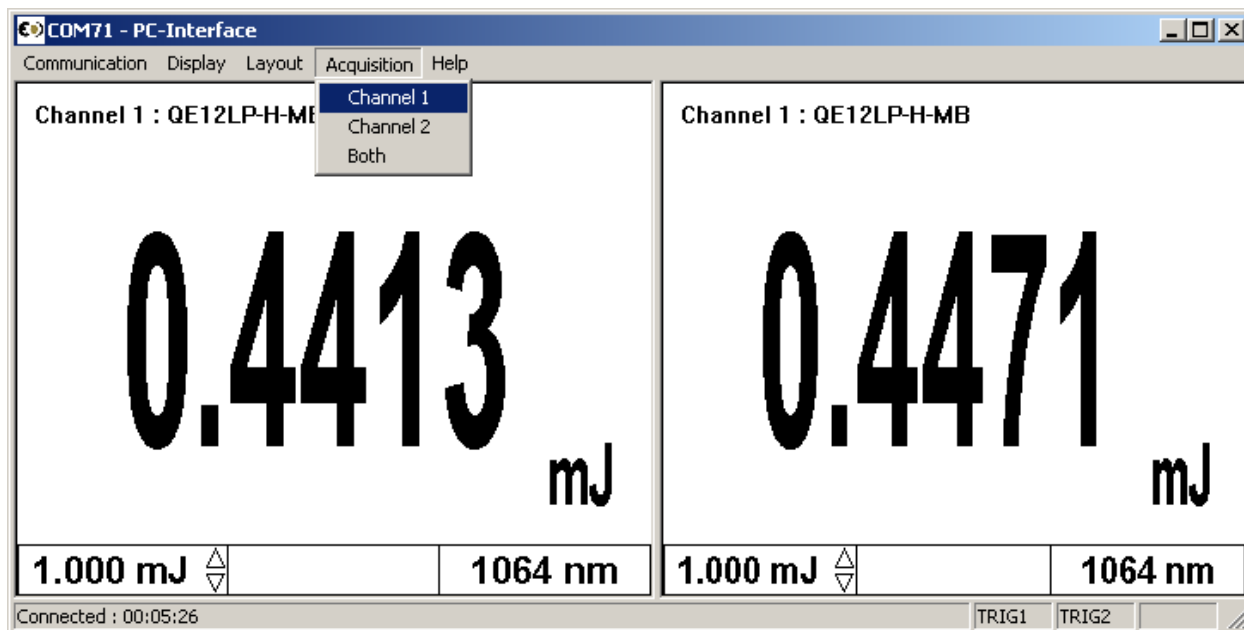
1.5.9 Restarting the Lineplot, statistics and Histogram

Each window is independent. You can clear each window or use the “Clear All” menu. You can use a Right-click in the Window to select “Clear” or “CLEAR ALL”. When you select Clear the Graphic, histogram and statistic restart.



1.5.10 Making an acquisition

To start an acquisition you have to enter the file name in the status menu and select Acquisition/Channel. A recording message will appear on the bottom of the screen while recording. To stop an acquisition, reselect Acquisition/Channel #. The scale's quick arrows on the real time display are unavailable during an acquisition. If you do not select a directory, all save files will be in C:\Program Files\Gentec-EO\S-Link.



1.5.11 Pausing the Statistics and line plot

Click on the Statistics window or line plot.

1.5.12 Making a Zero offset

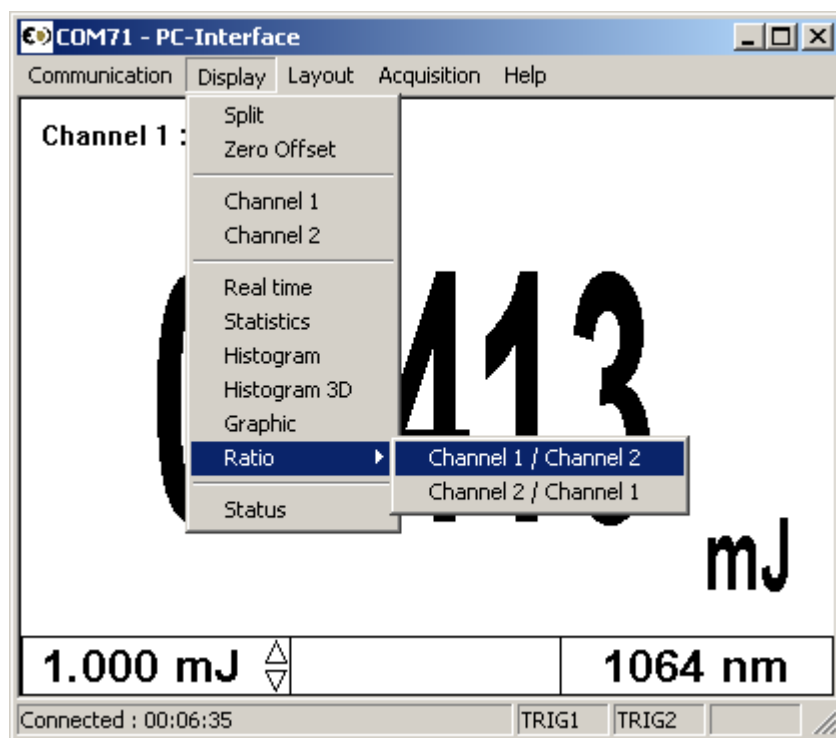
For Power heads only, right click in any window and select "Zero Offset", the offset value will be displayed in the lower center of the Real time display.

1.5.13 Ratio mode

In energy mode, the ratio is made with the last received measure to the S-link. Ratio mode doesn't work if you have a power head and an energy head.

Example:

Laser value channel #1	Laser value channel #2	Results CH1/CH2
10 J	5J	2
No pulse	2J	5
8J	No pulse	4
12J	4J	3

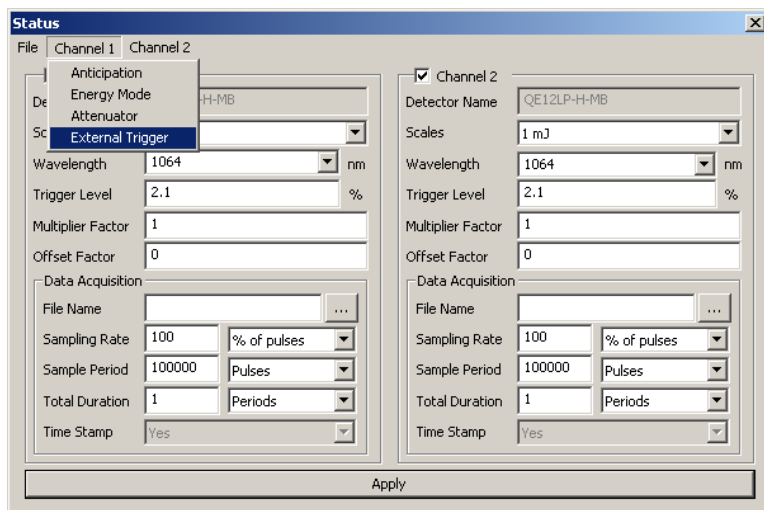


1.5.14 Detecting missing laser pulses.

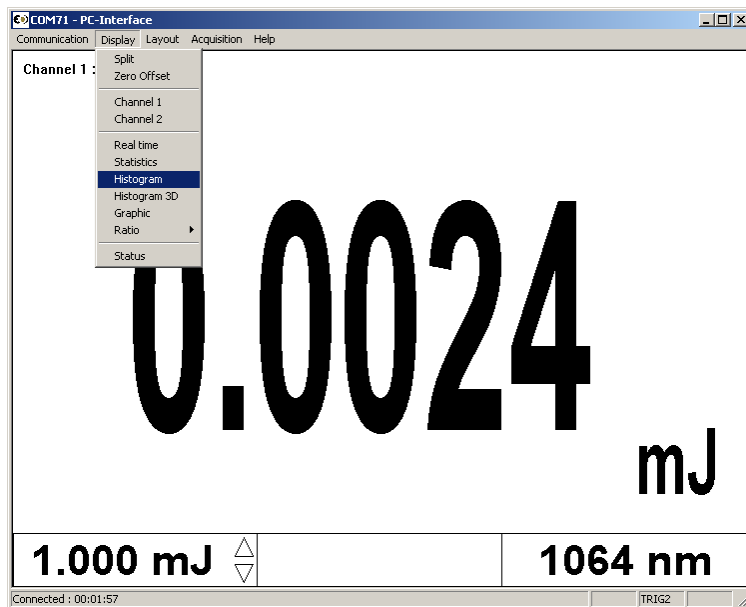
The S-link will detect the missing laser pulses using the External Trigger and the Histogram Display.

Step1: Connect the External trigger of your Laser to the External trigger of the S-link using the BNC connector.

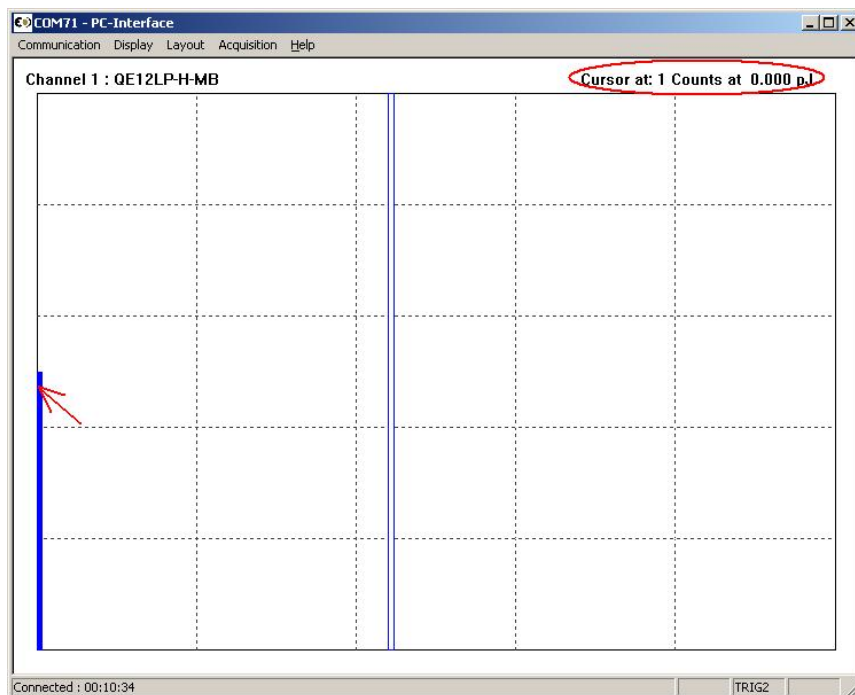
Step2: Select the External trigger from the Status Window.



Step3: Select the Histogram Display in the Display Menu.



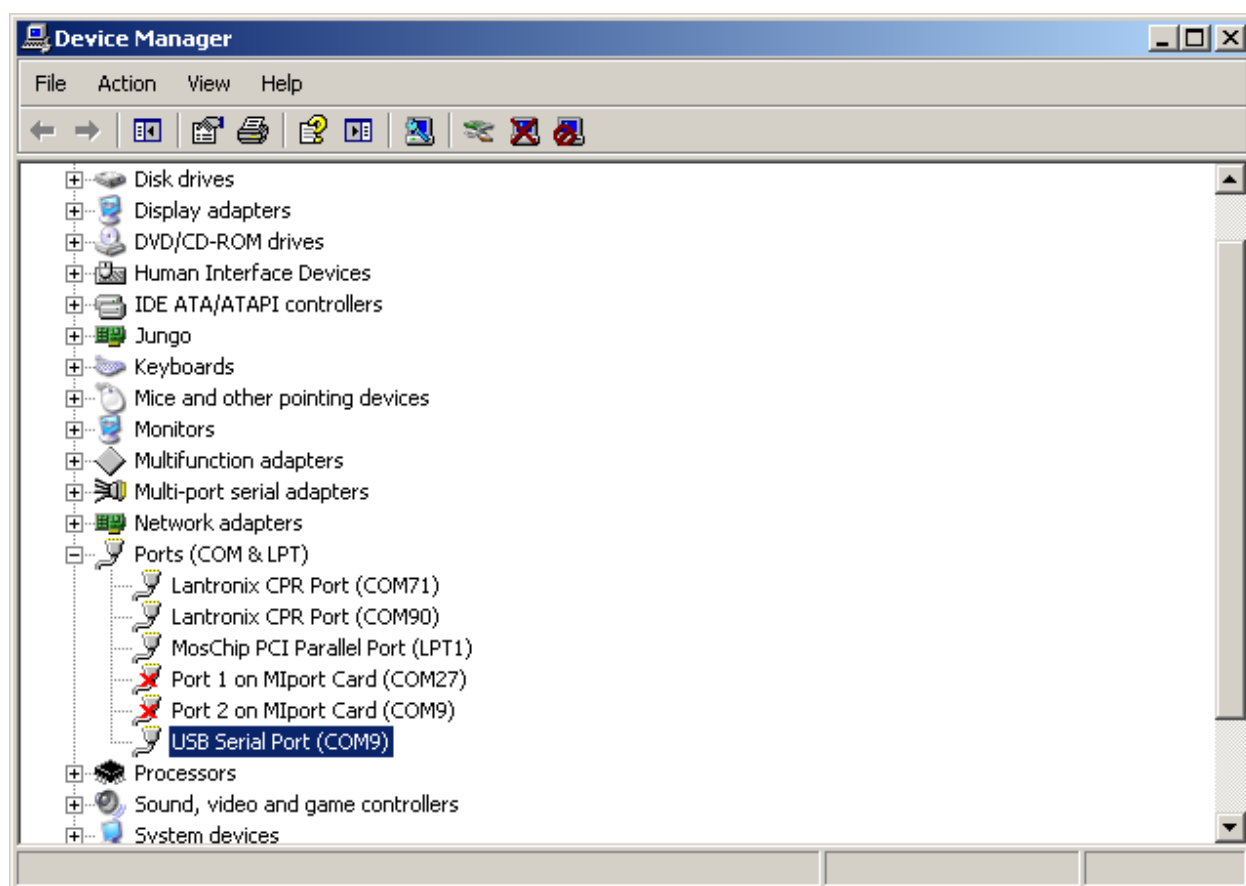
Step4: Start your laser and place you Cursor on the left x-axis, the upper corner of the histogram will show the number of pulse that are missed. You can reset the histogram using the clear command.



1.5.15 Recommended PC

Basic functions work well on PCs dated 2004 and later. If you want to measure higher than 1 kHz and/or display the 3D histogram you have to have a computer and a graphics card like a Intel core 2 CPU 6420 2.13 Ghz, 4 of ram and a Nvidia Geforce 7300 LE or better.. If you want to be sure to get all points and you have a laser frequency above 1 kHz, do not run other programs at the same time. If you want a very accurate frequency measurement and average power in energy mode do not run the 3D graphic display. The supported operating systems are Windows XP and Vista.

In statistics mode the frequency measurement resets itself after the pulse number reaches the number of pulses set in the Status menu. If you want the reset to occur less frequently, set a very large number. In order to have a precise frequency measurement above 1 kHz set the Latency Timer to 1 ms in USB Advanced Settings. To access the Latency timer menu, in the Device Manager click **Start** → **Settings** → **Control Panel** → **System** → **Device Manager**.



Go to USB port properties, Select Port parameters and select Advanced.

Advanced Settings for COM3

COM Port Number: COM3

OK

Cancel

Defaults

USB Transfer Sizes

Select lower settings to correct performance problems at low baud rates.

Select higher settings for faster performance.

Receive (Bytes): 4096

Transmit (Bytes): 4096

BM Options

Select lower settings to correct response problems.

Latency Timer (msec): 1

Timeouts

Minimum Read Timeout (msec): 0

Minimum Write Timeout (msec): 0

Miscellaneous Options

Serial Enumerator ☒

Serial Printer ☐

Cancel If Power Off ☐

Event On Surprise Removal ☐

Set RTS On Close ☐

Disable Modem Ctrl At Startup ☐

Installation and communication



1.6 Installation

The S-Link is not required for the PC S-Link software installation; however, it is fine if it is connected. Ensure that the S-Link is connected to the USB port when you are ready to run the PC S-Link software.

Connect the S-Link USB port, located on the top panel of the instrument (see Figure 1-2), to the host device serial connector using the proper cable. The S-Link comes with a standard USB cable.

You must install the USB drivers.

1.6.1 To Install USB drivers for Windows™:

Plug the S-Link into a USB port on the PC. If the PC supports USB 1.1, Windows detects the new device and prompts you for the software drivers. A window that says **Found New Hardware – USB Device** opens and after several seconds to a minute the Found New Hardware Wizard appears.

Insert the USB driver's CD-ROM if you have not already done so.

Cancel the wizard and execute the Auto installer, "USB driver installer-R2" which can be found in the USB Driver folder on the CD-ROM.

At the end of this process, a new serial COM port is added to the list of communication ports. It may be used as any other serial port. You will need to know the COM port number to set up the serial connection to the S-Link.

1.7 Setting up Communication to the S-Link

1.7.1 Verify COM Port

To verify the USB installation and find the COM port number click:

Start → Settings → Control Panel → System → Device Manager

Scroll down to **Ports (COM & LPT)** and double click that line. One of the options should be

USB-to-Serial (COM#)

Note the COM port number. You need it for the next step.

1.7.2 Connecting the PC S-Link to the S-Link

1.7.2.1 Download the PC S-Link file and execute it

Download PC S-Link from the internet, www.gentec-eo.com, in the Download section. Execute the downloaded file by double-clicking it, or, if the internet browser has the option of executing the file, execute it from the current location on the website. The SLINK-X-RS-232 is not supported in the PC-SLINK (check our web site for updates).

1.7.2.2 Installation

Installation installs the PC S-Link. Press the Next button until it installs itself.

1.7.3 Running PC S-Link

1.7.3.1 Start the PC S-Link

Ensure that the S-Link is connected to the PC S-Link by either using the USB cable port or the 9v external power supply for the Ethernet option. See #1.7.1. Verify the COM port to ensure a proper connection. Start the PC S-Link by clicking Start > Programs > Gentec-eo > PC-interface(S-Link) menu.

1.7.3.2 Ensure that the correct COM port is selected

Ensure that the correct COM port is selected in the Status Info Section of the Front Panel. If the PC_S-Link cannot communicate with the S-Link, an error message such as "Could not communicate with device, please verify connections" is displayed in the Notification section of the Front Panel, right next to the flashing light (indicating an error). You must remake the connection if you change the physical connection or the COM port.

1.7.3.3 Exit the PC S-Link program

To save some important PC S-Link settings, exit using the File > Exit menu or the Ctrl-F4 hotkey. PC S-Link.

1.7.4 Connect to the S-Link

You may use any serial communications software that you are familiar with. Our instructions are for HyperTerminal because it is widely available on PCs with Windows™. Click:

Start → Programs → Accessories → Communications → HyperTerminal

To save communication settings, enter a name for the connection. In the drop down menu "**Connect using**" select the COM port that the USB driver was installed on (Section 3.2.1). Click **OK**.

Input the following settings into the communications parameter window that appears next.

USB & ETHERNET communication

Bits per second	921600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

RS-232 communication

Bits per second	9600 or 115200 (factory adjusted)
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Click **OK** to begin entering serial commands in the HyperTerminal window.

1.7.5 To echo commands

The commands you type do not appear in the HyperTerminal window, unless you set the HyperTerminal up to do so. Only the response from the S-Link is displayed. If you prefer to see the commands you are typing, on the HyperTerminal window click the **File** menu and execute the following sequence:

File → Properties → Settings (tab) → ASCII setup → select "Echo typed characters locally" → OK

1.7.6 Test the connection

In the HyperTerminal window type ***VER**, press ↵ **ENTER**. If the response you receive tells you the version of your S-Link, you are successfully connected and ready for serial command action.

1.7.7 HyperTerminal settings shortcut

When you end the session, HyperTerminal asks you if you want to save your settings. To avoid re-entering the communication parameters, save them by clicking **yes**. The next time you execute the string of commands shown in section 3.2.2 above, the name of your session will appear after HyperTerminal. Clicking on the session name opens the connection using the saved settings. To avoid re-entering the string of commands, put a shortcut to this file on your desktop:

Find the file name, right click on it and select **Shortcut** in the drop down menu.

1.7.8 Serial Commands

1.7 S-Link Serial commands

The star (*) is part of each command.

*AT1x *AT2x	/	<p>To set the Attenuator to Channel 1 or 2</p> <p>x= 0 = disable, x = 1= enable</p> <p>Default value is 0.</p> <p>Example: Enter *AT10 to disable the attenuator for Channel 1. Example: Enter *AT21 to enable the attenuator for Channel 2.</p>
*CA1 *CA2	/	<p>To Send the data points of Channel 1 or 2 through the serial port at the frequency of a laser for an Energy head or at 100Hz for a power head.</p> <p>Output in ASCII mode is:</p> <p>Wattmeter : 6 digit resolution in Watt</p> <p>Example:</p> <p>1:0.001101 : 1.1001 mW on channel 1.</p> <p>2:100.231 : 100.231 Watts on channel 2.</p> <p>Energy Mode: 4 digits in scientific notation.</p> <p>2:8.808e-07 : 0.8808 uJ on channel 2</p> <p>If you have a repetition rate higher than the ASCII specification, the monitor sends you an error message. If it does, try sending the *SS100x command to ignore some laser pulses.</p> <p>By default the monitor is set in binary mode. To set the ASCII mode, send the serial</p>

	commands *SS1001 for channel 1 or *SS2001 for channel 2.
*CS1 *CS2	/ To end/exit the *CA1 or *CA2 mode.
*AN1x *AN2x	/ For Power heads only. To set the Anticipation for Channel 1 or 2. x= 0 = disable, x = 1= enable Default value is 1. Example : Enter *AT10 to disable the anticipation for Channel 1. Example : Enter *AT21 to enable the anticipation for Channel 2.
*RST	To reset the device. The monitor will read the head's EEprom again.
*PW1 *PW2	/ To set the Wavelength for Channel 1 or 2. Wavelength correction command (5+ characters). Example : To select the wavelength 1064 nm, enter *PW101064 . Example : To select the wavelength 10600 nm, enter *PW110600 .
*TL10002 / *TL20002	To modify the trigger level in energy mode *TL1XXXX / *TL2XXXX where XXXX are four characters representing the trigger level (in percent) needed. for example : XXXX = 0002 for a trigger level of 2% XXXX = 00.5 for a trigger level of 0.5 % XXXX = 11.4 for a trigger level of 11.4% XXXX = 0050 for a trigger level of 50% Note : the "." is indeed a character
*VER	To display the version of the software.
*ST1/ *ST2	To display information about current status. See table 1
*SSX000	To set to Binary or ASCII mode. Example: *SS1000: Binary Mode for channel 1

	<p>*SS1001: ASCII mode sends All points</p> <p>*SS1002: ASCII mode sends 1 out of 2 points</p> <p>*SS1003: ASCII mode sends 1 out of 3 points</p> <p>*SS1999: ASCII mode sends 1 out of 999 points (999 is the maximum)</p> <p>*SS2001: ASCII mode sends All points for channel 2</p> <p>Default value is 0 (Binary mode)</p> <p>Contact Gentec-eo for Binary mode description.</p> <p>Note: The PC-Slink will not work properly if you set the Slink to ASCII mode.</p>
*SU1 *SU2	<p>/ To make a physical scale up for channel 1 or 2.</p> <p>You must stop the continuous acquisition (*CS1, *CS2), before sending this command.</p>
*SD1 *SD2	<p>/ To make a physical scale down for channel 1 or 2.</p> <p>You must stop the continuous acquisition (*CS1, *CS2), before sending this command.</p>
*ET1x *ET2x	<p>/ To Set the External Trigger for Channel 1 or 2.</p> <p>x= 0 = disable, x = 1= enable</p> <p>Default value is 0.</p> <p>Example : To disable the External trigger for Channel 1 enter *ET10 .</p> <p>Example : To enable the External trigger for Channel 2 enter *ET21 .</p> <p>You must stop the continuous acquisition (*CS1, *CS2), before sending this command.</p>
*EM1x *EM2x	<p>/ For Power heads only. To set the energy Mode to Channel 1 or 2.</p> <p>x= 0 = disable, x = 1= enable</p> <p>Default value is 0.</p> <p>Example : To disable the Energy mode for Channel 1 enter *EM10 .</p> <p>Example : To enable the Energy mode for Channel 2 enter *EM21.</p> <p>You must stop the continuous acquisition (*CS1, *CS2), before sending this command.</p>
*NMV	<p>Active the acknowledge mode</p> <p>This function tells the Slink to send an ACK after each serial commands received</p> <p>The PC-slink will not work if you send this command and don't send the *NMQ, *RST or don't cycle the power before trying to make a connection.</p>

*NMQ	Deactivate the *NMV mode (Default mode)
*NA1 / *NA2	Return the detector name for channel 1 or 2.
*SN1 / *SN2	Return the detector serial number for channel 1 or 2.
*CV1 / *CV2	<p>Return the last Slink measurement for channel 1 or 2. This mode is only available in ASCII mode.</p> <p>For joulemeter mode it will be the last laser pulse value, for wattmeter mode it will be the last measurement taken.</p> <p>Example to get only 1 value</p> <p>Set the ASCII mode for channel 1 or 2.</p> <p>*SS1001 or *SS2001</p> <p>Set the scale for channel 1 or 2.</p> <p>*SC1XX or *SC2XX, where XX is the scale you want in decimal.</p> <p>Set the polling mode</p> <p>* VNM</p> <p>Start the internal acquisition</p> <p>*CA1 or *CA2</p> <p>Request 1 Value for channel 1 or 2.</p> <p>*CV1 or *CV2</p>
*VNM	Activate the *VNP polling mode, This mode is only available in ASCII mode
*VNP	Deactivate the *CV1 and *CV2 mode (Default mode at power up)
*RG1 / *RG2	<p>Return the current minimum and maximum range for channel 1 or 2.</p> <p>The information is coded</p> <p>The first 5 byte is the identifier</p> <p>00000: minimum scale.</p> <p>00001: maximum scale.</p> <p>10000: End of transmission.</p>

	<p>The last 4 bytes are the scale coded in hex value, use the scale table bellow to determine the scale</p> <p>Example</p> <p>After a RG1 you will receive</p> <p>“:000000013</p> <p>:00001001A</p> <p>:100000000”</p> <p>What it means</p> <p>:000000013 : is the minimum scale 13 hex = 19 = 3m</p> <p>:00001001A : is the maximum scale 1A hex=26=10 (Watt or Joule)</p> <p>:100000000 : End of transmission.</p>
*SC1xx / * SC2xx	<p>To set the Scale to Channel 1 or 2.</p> <p>xx = See Table bellow, you send the value for the scale in decimal, but when making a status request the S-link send it in Hexadecimal.</p> <p>You must stop the continuous acquisition (*CS1, *CS2), before sending this command.</p>

Scale	xx	
1p	00	<i>1 picowatt or picojoule</i>
3p	01	<i>3 picowatts or picojoules</i>
10p	02	<i>10 picowatts or picojoules</i>
30p	03	<i>30 picowatts or picojoules</i>
100p	04	<i>100 picowatts or picojoules</i>
300p	05	<i>300 picowatts or picojoules</i>
1n	06	<i>1 nanowatt or nanojoule</i>
3n	07	<i>3 nanowatts or nanojoules</i>
10n	08	<i>10 nanowatts or nanojoules</i>
30n	09	<i>30 nanowatts or nanojoules</i>
100n	10	<i>100 nanowatts or nanojoules</i>
300n	11	<i>300 nanowatts or nanojoules</i>
1u	12	<i>1 microwatt or microjoule</i>

3u	13	3 microwatts or microjoules
10u	14	10 microwatts or microjoules
30u	15	30 microwatts or microjoules
100u	16	100 microwatts or microjoules
300u	17	300 microwatts or microjoules
1m	18	1 milliwatt or millijoule
3m	19	3 milliwatts or millijoules
10m	20	10 milliwatts or millijoules
30m	21	30 milliwatts or millijoules
100m	22	100 milliwatts or millijoules
300m	23	300 milliwatts or millijoules
1	24	1 Watt or Joule
3	25	3 watts or joules
10	26	10 watts or joules
30	27	30 watts or joules
100	28	100 watts or joules
300	29	300 watts or joules
1k	30	1 kilowatt or kilojoule
3k	31	3 kilowatts or kilojoules
10k	32	10 kilowatts or kilojoules
30k	33	30 kilowatts or kilojoules
100k	34	100 kilowatts or kilojoules
300k	35	300 kilowatts or kilojoules
1meg	36	1 megawatt or megajoule
3meg	37	3 megawatts or megajoules
10meg	38	10 megawatts or megajoules
30meg	39	30 megawatts or megajoules
100meg	40	100 megawatts or megajoules
300meg	41	300 megawatts or megajoules

Status definitions

*ST1: Status for Channel #1

*ST2: Status for Channel #2

Table 1

Hex Value	Address (first 5 bytes)	4 last bytes	Definition	in this example
:000000428	0000	0428	Wavelength in hex value	1064
:000010013	00001	0013	Current Scale in hex value	19= 3 mJ
:00002002B	00002	002B	Trig Level in hex value/ 20.48	43/20.48= 2.1%
:000030000	00003	0000	Reserved	
:000040000	00004	0000	Attenuator setting 0000 = no attenuator 0001= with attenuator	No Attenuator
:000050001	00005	00001	External trigger setting 0000 = off 0001 = on	On
:000060000	00006	0000	Anticipation 0000 = off 0001 = on	Off
:000070000	00007	0000	Energy mode for power head 0000 = off 0001 = on	Off
:100000000	End of file	0000		

2 MAINTENANCE



2.1 USB installation for the S-Link

The S-Link has a USB type B port. When it is connected to a PC it emulates a standard serial port. It has a simple interface so that it is easy to design software for. The S-Link can function using only the USB port power.

2.2 Free Software Upgrade

Keep up to date with the latest version of S-Link software, including new features and options. As new and improved versions of the device's firmware are created, it is in your best interest to update your S-Link. The latest device firmware can be downloaded from the Gentec-EO website.

The update must be done using the USB port. An update through the Ethernet port will cause the S-Link to be unusable and will need to be reprogrammed by the manufacturer.

Access our website at www.gentec-eo.com. Go to the **Downloads** section. Click on the name of the S-Link upgrade instructions file to open or download the instructions. You may want to print the instructions. Find the file that corresponds to your S-Link in the Downloads section and follow our simple, easy-to-use instructions.

3 Ethernet Installation Procedure

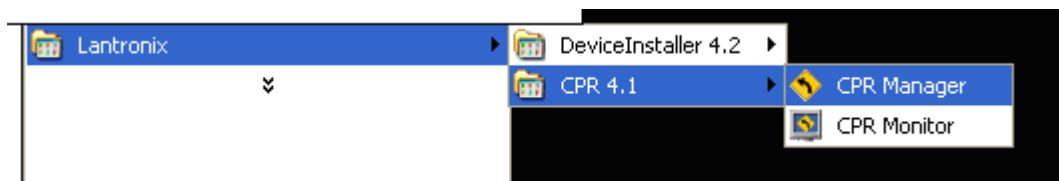
Connect the heads to the S-link, power the S-Link, and connect the S-Link to a Network. Do not connect a USB connector, because the S-Link will switch to USB communication.

3.1 Install these files from the CD.

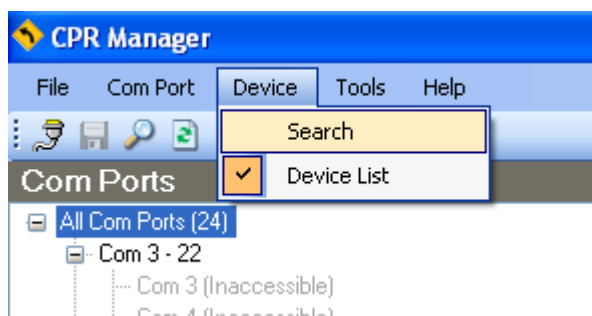
- CprDotNetDL4.1.0.2_Web.exe
- dotnetfx.exe (if you already have dotnetfx installed with a superior version, skip this step)

3.2 Create a Com Port

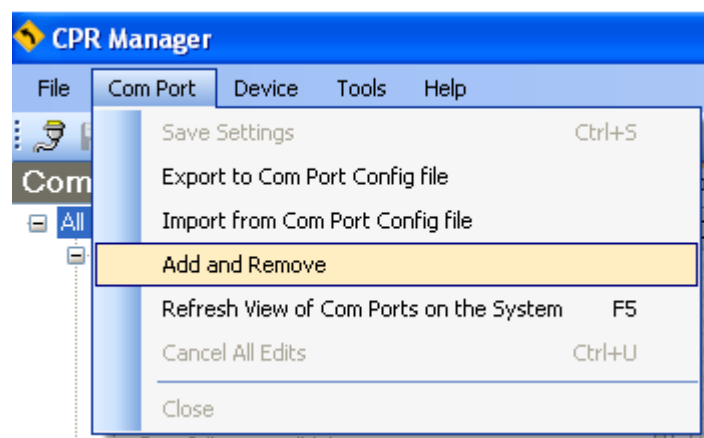
Run CPR Manager



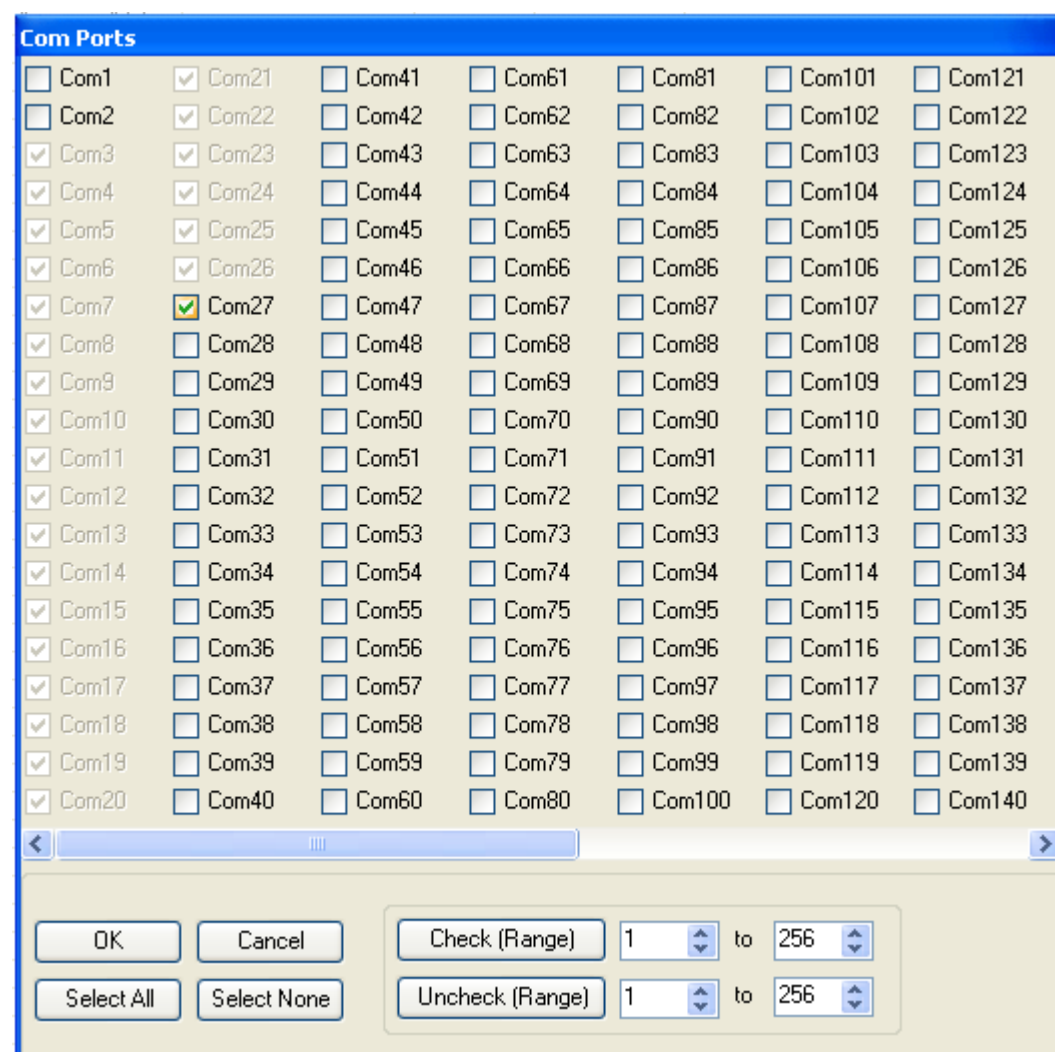
Go to the Device Menu and click Search.



Go to the Com Port Menu and select Add and Remove



Select a new Com Port and click ok.



3.3 Route the IP address to the new Com Port.

Step1: Double Click on the new Com Port

Step2: Double Click the IP Address. Select the "Add Rx Port" to set the firewall's exclusion list if needed.

Step3: Click on the blue disk icon to Save the settings. This will add a new Com Port to your computer. You can now run the PC-interface (S-link) to connect to your S-Link.

Com Ports

All Com Ports (25)

Com 3 - 22

Com 3 (Inaccessible)

Com 4 (Inaccessible)

Com 5 (Inaccessible)

Com 6 (Inaccessible)

Com 7 (Inaccessible)

Com 8 (Inaccessible)

Com 9 (Inaccessible)

Com 10 (Inaccessible)

Com 11 (Inaccessible)

Com 12 (Inaccessible)

Com 13 (Inaccessible)

Com 14 (Inaccessible)

Com 15 (Inaccessible)

Com 16 (Inaccessible)

Com 17 (Inaccessible)

Com 18 (Inaccessible)

Com 19 (Inaccessible)

Com 20 (Inaccessible)

Com 21 (Inaccessible)

Com 22 (Inaccessible)

Com 23 - 27

Com 23 (Inaccessible)

Com 24 (Inaccessible)

Com 25 (Inaccessible)

Com 26 (Inaccessible)

Com 27 (New)

Settings

Com 27 (New)

Window's Port Name:

Window's Device Name:

Window's Service Name:

Com Status: Error

Network Status: Disc

Reset to Defaults

Cancel Edits

☒ Buffer Writes (Keep checked for better write performance)

☐ Server Reconnect

☐ No Net Close

☐ Listen Mode

Normal - port closed after disconnect

TCP Port

☐ TCP KeepAlive

7200000

KeepAlive Time (msec)

1000

KeepAlive I

☐ RFC 2217 (TruPort)

DTR (In): Tie DTR to DCD, DSR always active

Tx Empty: CPR Transmit Buffer Empty

Service	Host	TCP Port
1	192.168.1.14	10001
2		
3		
4		
5		
6		
7		
8		

WARNING! If the Host is on the other then UDP ports 30718, 43282 and 43283 firewall's exclusion list. You may exper these UDP ports are not excluded.

Also, some legacy device servers respc unable to connect to a device server, c this machine is blocking this port. Pres port to the Firewall. If the button capt port has already been added and can b

Add Rx Port

Devices

IP Address	TCP Port	Device Name	Port Name	HW Address	ID	Product
192.168.1.14 (1)	10001			00:20:4A:97:6A:D9	X8	Unknown (X8)

3.4 Setting up a 2-node network with a Windows-based computer and S-Link

For portable applications, or a bench top application where your S-link does not need to be wired into a larger network, you can directly connect your computer to the S-link with a **crossover network cable**. This special type of cable eliminates the need for a network hub. As an alternative you can use normal cables and a small network hub box.

You need a crossed 10baseT (Twisted Pair/UTP cable) Ethernet Cable. Generally the cable color is orange or red.

You will have to set your network settings.

3.4.1 Configure TCP/IP protocol on your computer.

Open the Windows control panel (Start/Settings/Control Panel) and double-click on the Network icon. If you already have TCP/IP installed just double-click on it.

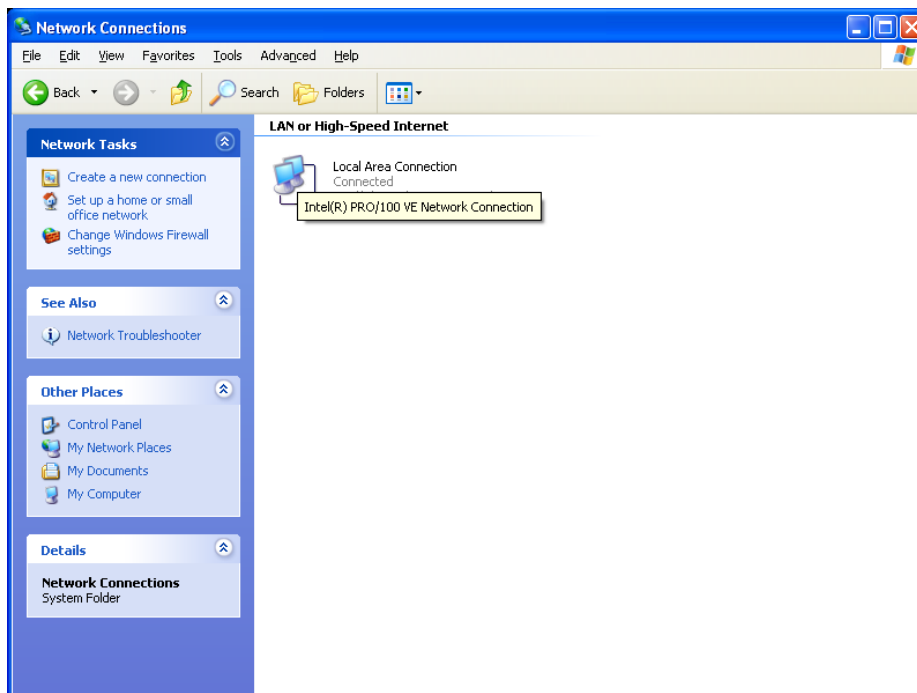
To install TCP/IP, push the "Add" button, select "protocol", "Microsoft", and "TCP/IP".

Enter an IP address for your computer. Since this is a private network, you can use 192.168.0.1.

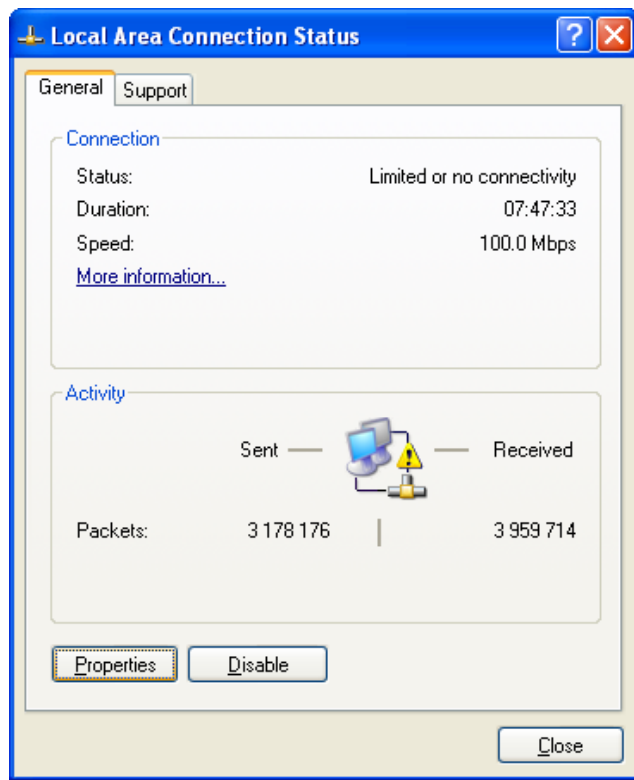
Enter the subnet mask. Use 255.255.255.0.

There is no need to configure any "gateway" or "DNS" servers, since you will not be connecting to other networks.

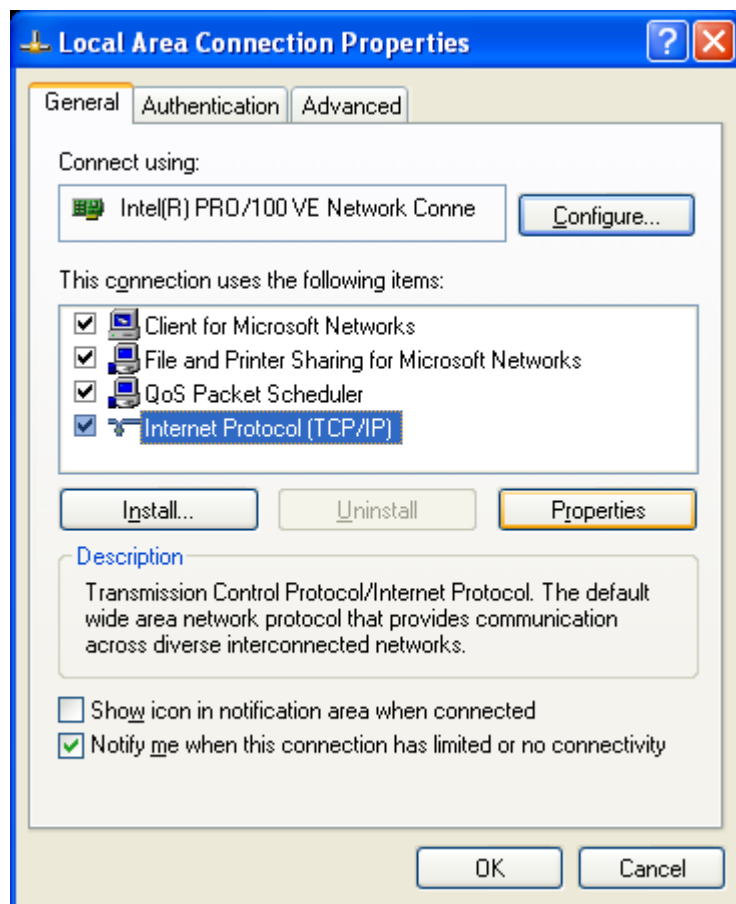
Go to Network Connections



Go to Properties



Go to TCP/IP Properties



Select "Use the Following IP Address"

Enter the following Numbers

IP: 192.168.0.1

Mask: 255.255.255.0

The screenshot shows the "Internet Protocol (TCP/IP) Properties" dialog box with the "General" tab selected. The dialog box has a blue title bar with a question mark icon and a close button. The main content area is white with a light gray border. It contains a text box with the following text: "You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings." Below this text are two radio buttons. The first radio button is labeled "Obtain an IP address automatically" and is unselected. The second radio button is labeled "Use the following IP address:" and is selected. Below the second radio button are three text boxes: "IP address:" with the value "192 . 168 . 0 . 1", "Subnet mask:" with the value "255 . 255 . 255 . 0", and "Default gateway:" with the value ". . .". Below these text boxes are two more radio buttons. The first radio button is labeled "Obtain DNS server address automatically" and is unselected. The second radio button is labeled "Use the following DNS server addresses:" and is selected. Below the second radio button are two text boxes: "Preferred DNS server:" with the value "67 . 69 . 184 . 7" and "Alternate DNS server:" with the value "67 . 69 . 184 . 199". At the bottom right of the dialog box is a button labeled "Advanced...". At the bottom of the dialog box are two buttons: "OK" and "Cancel".

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 0 . 1

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 67 . 69 . 184 . 7

Alternate DNS server: 67 . 69 . 184 . 199

Advanced...

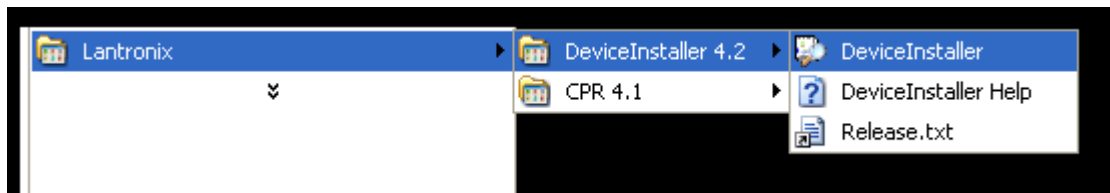
OK Cancel

3.4.2 Setting the IP address in the S-Link

We recommend changing the S-link Setting (the IP address) only when you want to make a 2-node network. Do not set the IP address up in the S-link on a Network unless you known that the IP address is available. Ask your network manager to reserve you a fixed IP address if you do not want to reassign the IP to the Com Port each time the S-link asks for an IP in the dynamic IP settings.

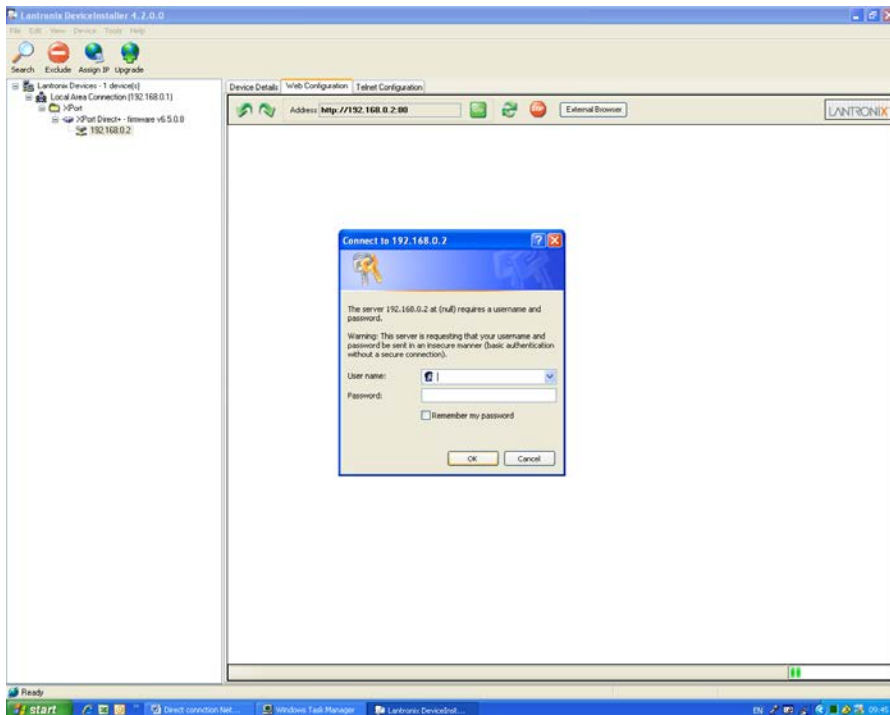
Install the DI_4.2.0.0_Web file from the CD.

Load the Device Installer from Lantronix.



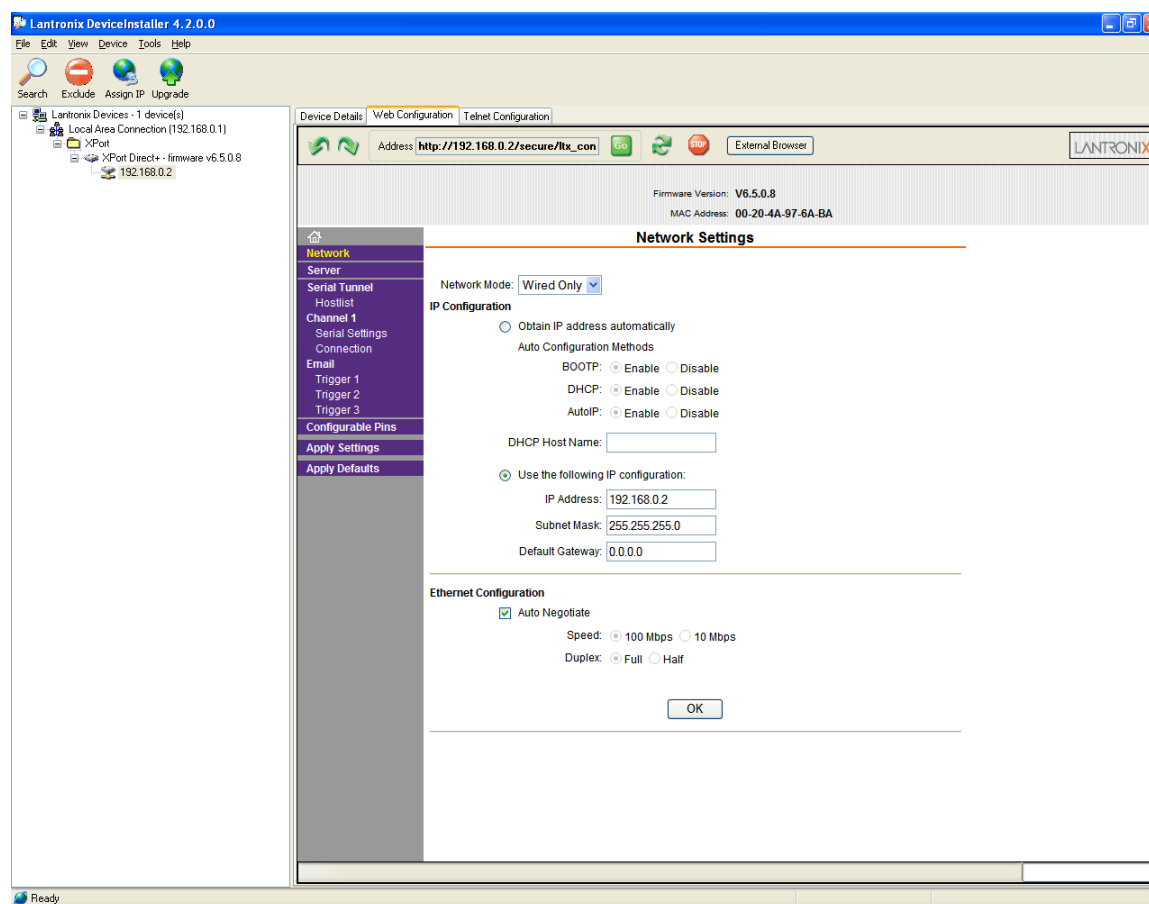
Select The Xport direct+ - firmware and click on the available IP.

Select the Web Configuration tab. Click go.



Click OK for the Username and password (leave them blank)

Select the “Network” option, do not change any other settings.



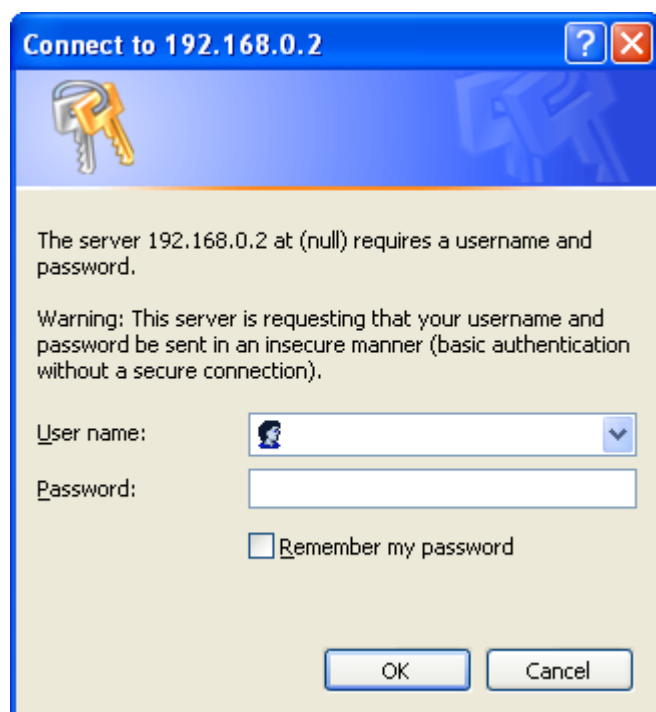
Click on “Use the following IP configuration”

Set the IP address to: 192.168.0.2

Set the subnet Mask to: 255.255.255.0

Click OK, then Click on Apply Setting

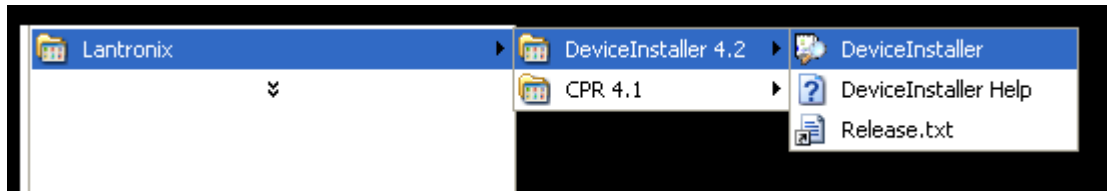
The S-link will reboot itself. Since the IP has changed, the Web configuration will lose its connection. Close the Device installer if the Web configuration doesn't stop trying to make a connection. To test your configuration you can open a web browser at 192.168.0.2. You should see the login window. Go to section 6.2. to create a COM PORT. If you wish to change the IP again, or set it to get an IP automatically, you will have to use a 2-node network again.



3.4.3 Setting the Ethernet undefault values in the S-Link

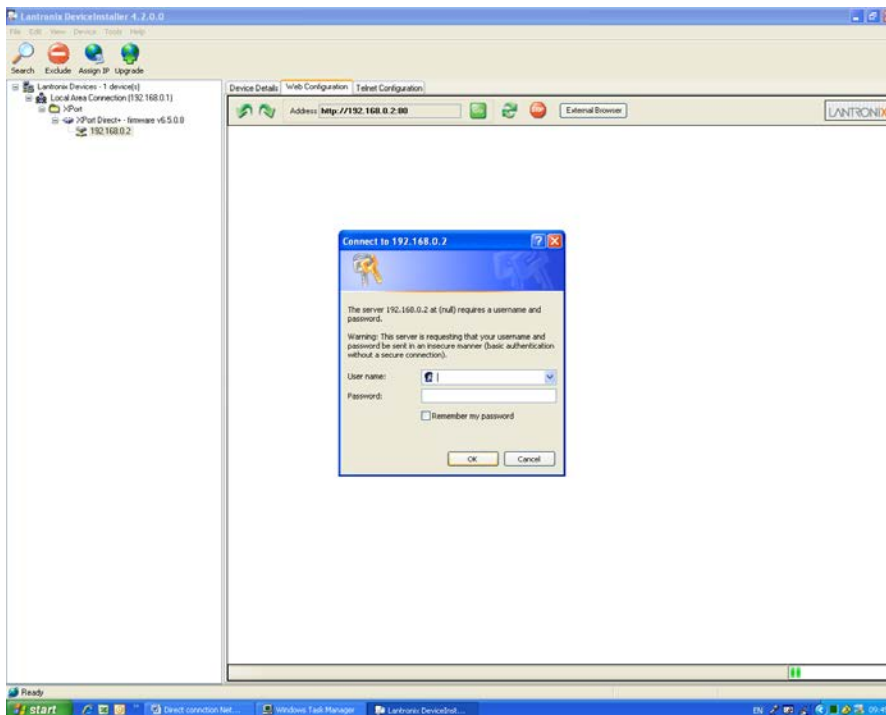
The PC-S-link uses the high performance Ethernet circuit and communicates at 921600 bps. If you change this value, set it back again.

Load the Device Installer from Lantronix.



Select The Xport direct+ - firmware IP

Select the Web Configuration tab. Click GO




Click OK for the Username and password (leave them blank)

Select "Server" option, set the CPU performance to high, and click OK

Firmware Version: **V6.5.0.8**

MAC Address: **00-20-4A-97-6A-BA**

 **Network**

Server

Serial Tunnel
Hostlist

Channel 1
Serial Settings
Connection

Email
Trigger 1
Trigger 2
Trigger 3

Configurable Pins

Apply Settings

Apply Defaults

Server Settings

Server Configuration

Telnet Password:

Retype Password:

Advanced

ARP Cache Timeout (secs):

TCP Keepalive (secs):

Monitor Mode @ Bootup: ☒ Enable ☐ Disable

CPU Performance Mode: ☐ Low ☐ Regular ☒ High


HTTP Server Port:

Config Server Port:

MTU Size:

Select “Serial Settings”, set the baudrate to 921600, click OK then “Apply Settings”.

Firmware Version: **V6.5.0.8**
MAC Address: **00-20-4A-97-6A-BA**



Network

Server

Serial Tunnel

Hostlist

Channel 1

Serial Settings

Connection

Email

Trigger 1

Trigger 2

Trigger 3

Configurable Pins

Apply Settings

Apply Defaults

Serial Settings

Channel 1

☐ Disable Serial Port

Port Settings

Protocol: RS232

Flow Control: None

Baud Rate: 921600

Data Bits: 8

Parity: None

Stop Bits: 1

Pack Control

☐ Enable Packing

Idle Gap Time: 12 msec

Match 2 Byte Sequence: ☐ Yes ☒ No

Send Frame Immediate: ☐ Yes ☒ No

Match Bytes: 0x00 0x00
(Hex)

Send Trailing Bytes: ☒ None ☐ One ☐ Two

Flush Mode

Flush Input Buffer

With Active Connect: ☐ Yes ☒ No

With Passive Connect: ☐ Yes ☒ No

At Time of Disconnect: ☐ Yes ☒ No

Flush Output Buffer

With Active Connect: ☐ Yes ☒ No

With Passive Connect: ☐ Yes ☒ No

At Time of Disconnect: ☐ Yes ☒ No

OK

4 Troubleshooting.

!TRIG Message: The repetition rate of your laser is too high for you PC performance, or you are triggering on noise. Set the trigger to a higher level or upgrade your PC.

The Application is not responding when I select Status or when I want to change the Graphic settings: Press the ALT key, your status window may be behind the PCS-Link application. This happens when you set the time stamp of the graphic to a high value on certain PCs.

Cannot Connect to the Ethernet Port.

1_) Reboot the computer when you change the IP address if you have a direct connection. 2) One possible cause is the Firewall on this machine is blocking this port. Press the 'Add Rx Port' button to add this port to the Firewall. If the button caption reads 'Remove Rx Port' then the port has already been added and can be removed by pressing this button.

3) Disable your local Firewall.

4) Read the Lantronix FAQ.

http://ltxfac.custhelp.com/cgi-bin/ltxfac.cfg/php/enduser/std_alp.php

DECLARATION OF CONFORMITY

Application of Council Directive(s): 2004/108/EC EMC Directive

Manufacturer's Name: Gentec Electro Optics, Inc.
 Manufacturer's Address: 445 St-Jean Baptiste, suite 160
 (Québec), Canada G2E 5N7

European Representative Name: Laser Components S.A.S.
 Representative's Address: 45 bis Route des Gardes
 92190 Meudon (France)

Type of Equipment: Laser Power/Energy Meter
 Model No.: S-Link
 Year of test & manufacture: 2011

Standard(s) to which Conformity is declared:
 EN 61326-1: 2006 Emission generic standard

Standard	Description	Performance Criteria
CISPR 11 :2009 A1 :2010	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	Class A
EN 61000-4-2 2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques- Electrostatic discharge.	Class B
EN61000-4-3 2006+A2:2010	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques- Radiated, Radio Frequency, electromagnetic field immunity test.	Class A
EN61000-4-4 2004+A1:2010	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques- Electrical fast transient/burst immunity test.	Class B
EN 61000-4-5 2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques- Surge immunity test.	Class B
EN 61000-4-6 2009	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurements techniques- Immunity to conducted Radio Frequency.	Class A
EN 61000-4-11 2004	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques- Voltage dips, short interruptions and voltage variations immunity tests	Class B Class B Class C Class C
EN 61000-3-2:2006 +A1:2009	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)	Class A

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place: Québec (Québec)

Date : May 4, 2011



(President)

5 Appendix A

5.1 Attenuator/Diffuser Calibration Procedure

Introduction;

These “Attenuator/Diffusers” must be user calibrated for wavelengths other than the calibration wavelength (typically 1.064 μ m).

The calibration procedure is relatively easy. First measure without the attenuator, then with the attenuator. The ratio of these measurements will be your correction.

When using an oscilloscope;

Divide the joulemeter voltage output by the calibration sensitivity we provide to calculate the energy reading (see joulemeter manual).

*To use this procedure at a wavelength other than the wavelength stated on the calibration certificate, manually adjust the sensitivity value (of the cal. certificate) with the wavelength **correction multiplier** from the Personal Wavelength Correction certificate. Use this wavelength-adjusted sensitivity to calculate the energy readings used in the procedure that follows.*

When using a Gentec-EO S-Link;

In the *Control* menu there should be **no check mark** in the *Attenuator* setting. It must be off to access the wavelength correction (*Settings* → *Corrections menu*). You need this to input the wavelength that you are calibrating at (see monitor manual). The *Attenuator* setting should be checked off if you are redoing a calibration at the same wavelength as stated on the joulemeter calibration certificate.

Procedure:

Step 1: Setup your joulemeter to measure the energy of your pulsed laser. If you are working at a wavelength other than the calibrated wavelength, adjust the sensitivity of your joulemeter for that wavelength; see *When using an oscilloscope* or *When using a Gentec-EO S-Link or Duo monitor*, above. Ensure that the energy level is below the detector's damage threshold and your laser is still stable.

Step 2: Apply energy for a few minutes to warm up the detector. This will reduce any thermal bias.

Step 3: Measure the energy level without the attenuator. To reduce random uncertainty, average a number of shots. We recommend at least one hundred shots. This should reduce random errors by a factor of 10. (Square root of “n” assuming Gaussian distribution)

Step 4: Install the attenuator. Without changing the laser settings, measure the energy level by averaging the same number of shots. All laser settings must be the same as Step 3 (including beam size and position on the detector).

Step 5: Repeat the first measurement (Step 3) to make sure that nothing has changed during the procedure to invalidate the calibration. A change larger than the uncertainty of your measurements means that something has changed in the laser or in the environment. Add this to your \pm uncertainty when you use the attenuator or try to stabilize the laser and the environment. Go back to Step 3.

The correction multiplier for the S-Link and an Oscilloscope is calculated:

$$T_f = \frac{\text{Reading without attenuator}}{\text{Reading with attenuator}} \quad (\text{no unit})$$

Use this calibration factor for the "Attenuator/Diffuser" at the wavelength established in Step 1.

6 Appendix B

6.1 Recycling and separation procedure.

This section is used by the recycling center when the monitor is at the end of its life. Breaking the calibration seal or opening the monitor will void the S-Link warranty.

The complete Monitor contains

1 Monitor

1 USB cable

1 Instruction manual

1 Calibration certificate

1 Software cdrom

The Ethernet option contains:

1 power supply (ordered separately) (not manufactured by Gentec-eo)

2 Ethernet Cables.

6.2 Separation:

Paper: Manual and certificate

Aluminum: Monitor enclosure.

Printed circuit board: inside the monitor.

6.3 Dismantling procedure:

To open the monitor:

Remove all the screws on both sides of the monitor:

Remove the PCB by sliding it out of the enclosure.

7 Appendix C

7.1 Fix com port procedure

This procedure is to avoid the COM port to keep incrementing for new devices. Please note that the com port will change if you plug the USB cable in a different location on your PC, but it will not increment with another Slink-2 in the same USB port.

Procedure

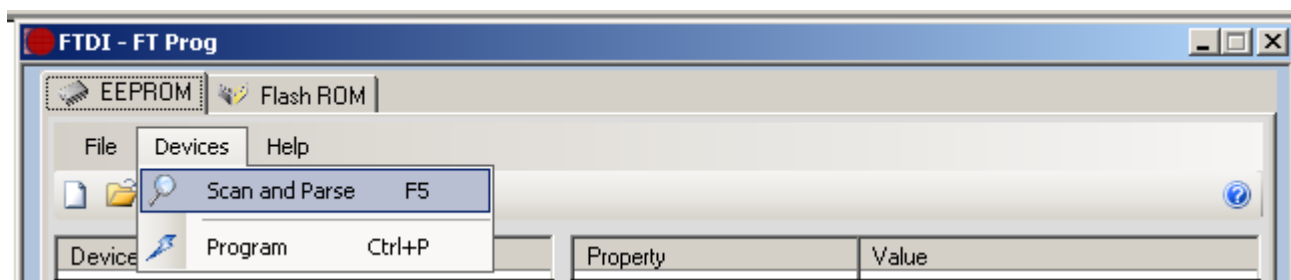
Connect only 1 device at a time.

Start the FT_PROG.exe program.

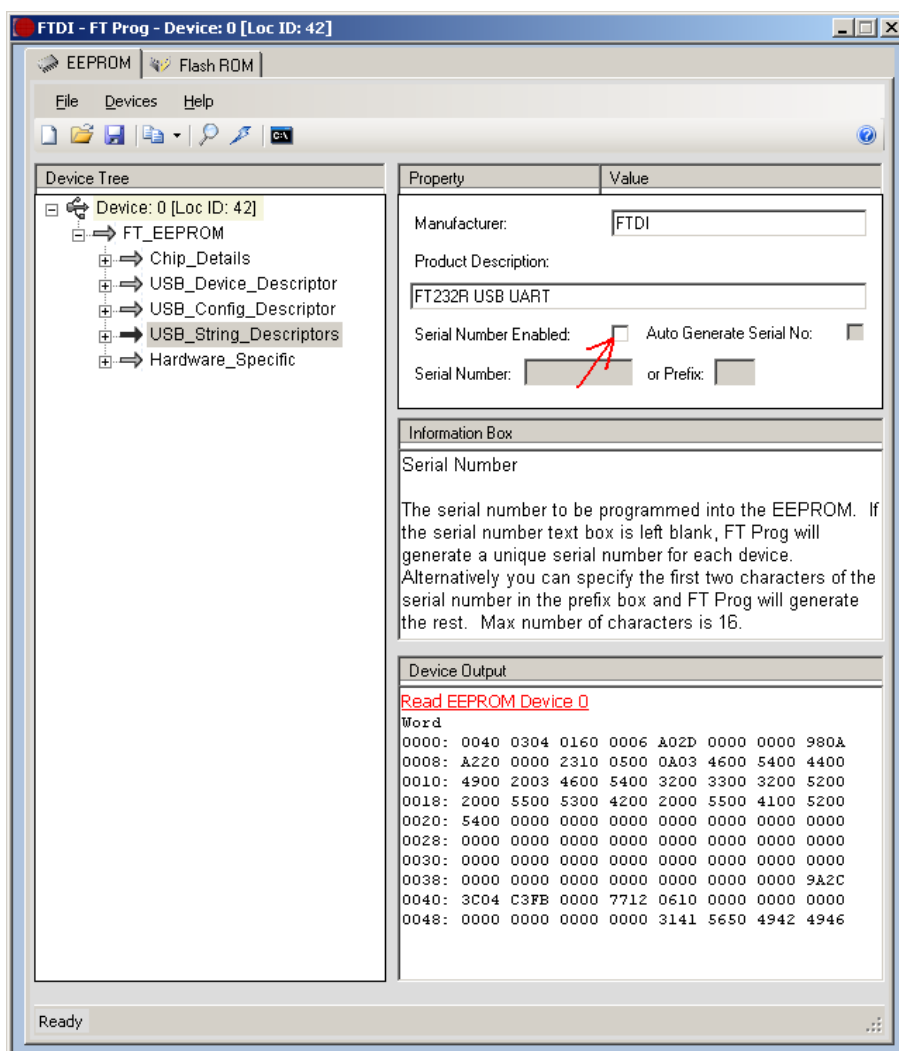
To run the FT_PROG application.

1. Install the USB drivers from the Gentec-eo web site.
<http://www.gentec-eo.com/en/downloads.htm>
2. Download the latest version of FT_PROG from the Utilites section of the FTDI website.
<http://www.ftdichip.com/Resources/Utilities.htm>
3. Unzip all files from the .zip folder that you have downloaded.
4. FT_PROG requires Microsoft .NET Framework 2.0 installed on your system to run. This can be obtained from the Microsoft website:
<http://www.microsoft.com/downloads/details.aspx?FamilyID=0856EACB-4362-4B0D-8EDD-AAB15C5E04F5&displaylang=en>
Download and follow the wizard for installing .NET 2.0 if you do not have this already installed on your system.
5. To run the application double click on the FT_PROG.exe icon.

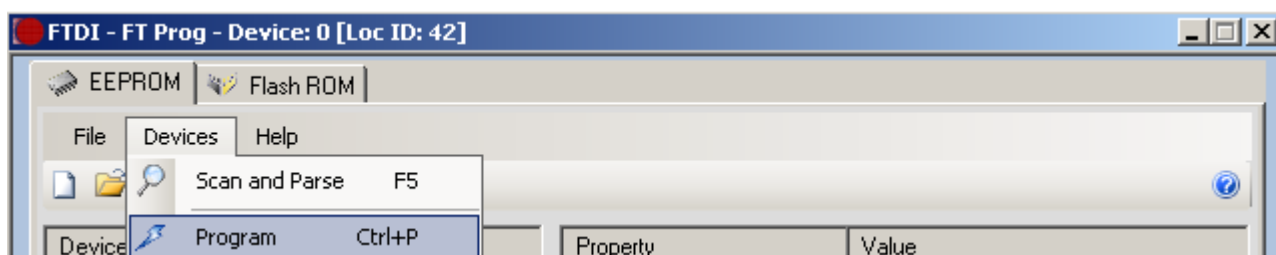
Step#1 Click Scan and Parse in Devices



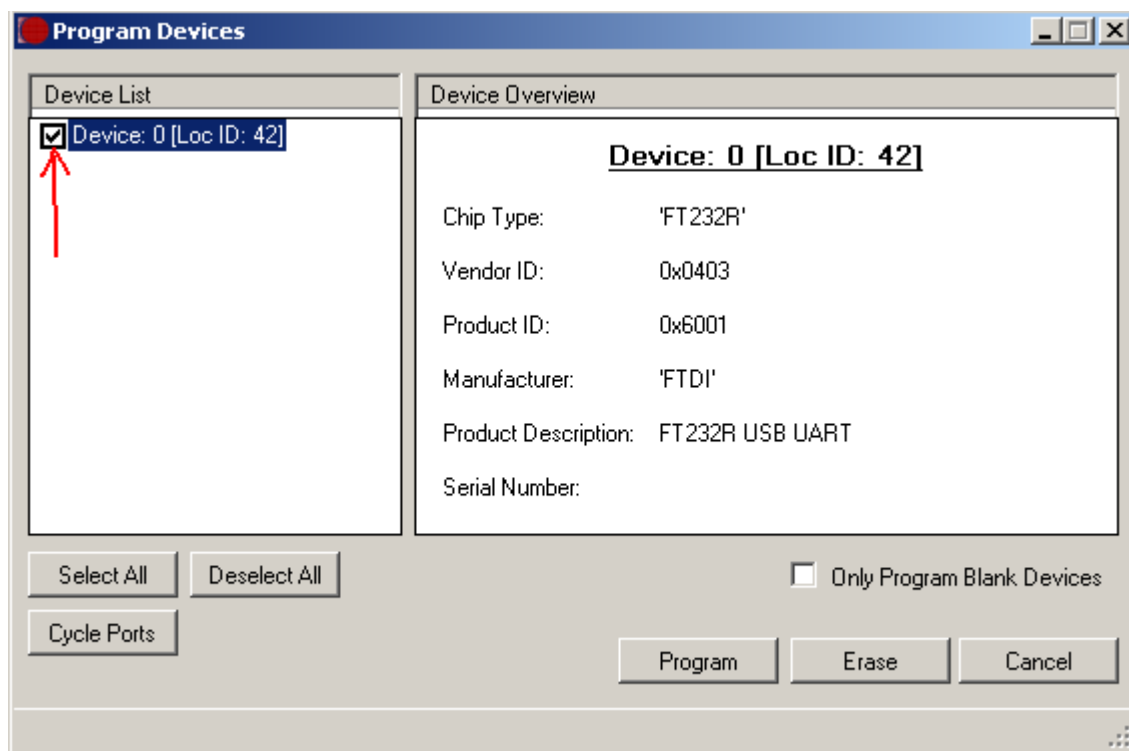
Step#2 Unselect the Serial USB UART in the USB_String_Descriptor



Step#3 Select Program in Devices



Step #4 Select the Device in the Device list, Click on Program and close the FT_PROG software. Unplug and replug the USB device.



8 Appendix D

8.1 S-LINK-2 BINARY MODE DESCRIPTION

8.1.1 DESCRIPTION

The S-LINK-2 has two Communication Modes: the Binary Mode for FAST data acquire and the ASCII mode for slow and high resolution values. The resolution of the Wattmeter Mode is 11-bit, the resolution of the Joulemeter Mode is 12-bit. The resolution in ASCII mode is 15 bits.

The value in binary mode is coded in two bytes

JOULEMETER MODE

Byte #1

C	O	2	X	X	X	X	X
---	---	---	---	---	---	---	---

Byte #2

C	O	X	X	X	X	X	X
---	---	---	---	---	---	---	---

2 = The MSB of the 12 bit codification for the Joulemeter Mode.

X = Bits of the Codification.

WATTMETER MODE

Byte #1

C	O	2	Y	X	X	X	X
---	---	---	---	---	---	---	---

Byte #2

C	O	X	X	X	X	X	X
---	---	---	---	---	---	---	---

2 = The sign.

Y = The MSB for the Wattmeter Mode.

X = Bits of the Codification.

FOR ALL MODES

C = Channel number

0 = Channel #1

1 = Channel #2

O = Order

0 = First byte

1 = Second Byte

8.1.2 CODIFICATION

JOULEMETER MODE

In Joulemeter Mode, the codification is unsigned. To get the measurement in Joules, apply this formula:

$$\text{Measurement in Joules} = \text{Current Scale} * \text{Codification in Decimal} / 4096$$

Example: For 151 mJ on the 300 mJ scale on Channel 1
The S-LINK will send you: 2040 HEX VALUE, where:

20 = 00100000

The first bit (0) is for Channel #1

The second bit (0) is the order of the MSB

100000 is the MSB of the codification

40 = 01001101

The first bit (0) is for Channel #1

The second bit (1) is for the order so this is the LSB of the codification

The Total Codification is 100000001101, which is 2061 in decimal ($2061/4096 * 300\text{mJ} = 150.989 \text{ mJ}$)

WATTMETER MODE

In Wattmeter Mode, the codification is signed, so the third bit of the first byte is the sign. To get the measurement in Watts, apply this formula:

$$\text{Measurement in Watt} = \text{Current Scale} * \text{Value in Decimal} / 2048$$

Example 1: For 151 mW on the 300 mW scale on Channel 1
The S-LINK will send you: 1046 HEX VALUE, where:

10 = 00010000

The first bit (0) is for Channel #1

The second bit (0) is the order of the MSB

The third bit is the sign

10000 is the MSB of the codification

46 = 01000110

The first bit (0) is for Channel #1

The second bit (1) is for the order so this is the LSB of the codification

The Total Codification is 10000000110, which is 1030 in decimal ($1030/2048 * 300\text{mJ} = 150.878 \text{ mJ}$)

Example 2: For -151 mW on the 300 mW scale off Channel 1
The S-LINK will send you: 3046 HEX VALUE, where:

30 = 00110000

The first bit (0) is for Channel #1

The second bit (0) is the order of the MSB

The third bit is the sign

10000 is the MSB of the codification

46 = 01000110

The first bit (0) is for Channel #1

The second bit (1) is for the order so this is the LSB of the codification

The Total Codification is -10000000110, which is -1030 in decimal ($-1030/2048 * 300\text{mJ} = -150.878\text{mJ}$)

GENTEC-EO WORLDWIDE



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