



SINGLE CHANNEL LASER POWER METER

P-LINK

INSTRUCTION MANUAL

200592



Version 7.0

Feb 2010

WARRANTY

The Gentec-EO P-LINK Single Channel Laser Power/Energy Meter carries 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 P-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: info@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, transportation and insurance prepaid, to the nearest Gentec-EO agent. Gentec-EO Inc. assumes no risk for the 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 condition 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 P-LINK if the device or the detector looks damaged, or if you suspect that the P-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 B 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 communications. 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, it is suggested to try to correct the interference by taking one or more of the following steps:

- 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 P-LINK SINGLE CHANNEL LASER POWER METER

1 Introduction

To obtain the full performance from the P-LINK, we recommend that you read this manual carefully.

The P-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 meter, which can provide a statistical analysis of your measurements. Moreover, it can be updated over the internet by connecting the USB or the RS-232 port to a personal computer.

The P-LINK USB version and the RS-232 version have enhanced network capabilities that take further advantage of the USB or RS-232 ports for data acquisition and remote control depending on the P-LINK version. It can transfer data files to a PC for more sophisticated data analysis and respond to commands through the PC interface. Although the default measurement unit is Watt, you may also choose to measure in dBm.

Easy software upgrade

Keep in touch with the latest improvements to our user-friendly software. You can download the latest software version anytime from our website www.gentec-eo.com and install it on your PC.

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 exceeding 80%.

Table 2-1 List of Specifications

Power meter specifications	
Power Range	1nW to 10kW
Physical Scale	2V, 15mV
Virtual Power Scales (photo diode head)	3nW, 10nW, 30nW, 100nW, 300nW, 1μW, 3μW, 10μW, 30μW, 100μW, 300μW, 1mW, 3mW, 10mW, 30mW, 100mW, 300mW, 1W, 3W
Virtual Power Scales (thermal head)	300 μW, 1 mW, 3 mW, 10 mW, 30mW, 100mW, 300mW, 1W, 3W, 10W, 30W, 100W, 300W, 1kW, 3kW, 10kW
Resolution (digital)	Physical scale/8388608
Monitor Accuracy	± 0.5% ± 5μV
Response Time (accelerated)¹	1 sec
Sampling Frequency	10Hz
Statistics	Current value, Max, Min, Average, Std Dev., RMS stability, PTP stability, Time
Energy meter specifications (energy mode)	
Energy Range	3mJ to 20kJ
Virtual Energy Scales	3mJ, 10mJ, 30mJ, 100mJ, 300mJ, 1J, 3J, 10J, 30J, 100J, 300J, 1kJ, 3kJ, 10kJ, 30kJ
Resolution (digital)	2nV
Accuracy²	1.0%
Default Trigger Level	250mJ
Software Trigger Level	User defined in Joules
Repetition Frequency	Support all energy mode power heads
Statistics	Current value, Max, Min, Average, Std Dev., RMS stability, PTP stability, Repetition Rate, Avg Power
General Specifications	
Display Rate	3Hz numeric display

¹ Varies with detector head.

² Including linearity.


	10 Hz graphic displays
Data Displays	Real-time, Histogram, Tuning Needle, Statistics,
User input correction factors	1 multiplier and 1 offset (7 digit floating point)
Analog Output	0 – 2.05 Volt user defined, full scale, $\pm 1\%$
Internet Upgrades	USB or RS-232 model
PC Serial Commands	USB or RS-232 model
Dimensions (without stand)	91 (L) x 57 (W) x 26 max (H) mm
Weight	0.12 kg
<u>External Power Supply for RS-232 version</u>	
Universal	Input: 100/240 VAC 50-60 Hz, Output 9-12 VDC 200mA

3 Front Panel Description : See figure 3-1 below

1- EXTERNAL POWER SUPPLY INPUT JACK:

Input voltage required: 9-12 VDC/200 mA.

Note: The external power supply input is provided **only for the P-LINK with the RS-232** Serial Connection Option.

	<p>CAUTION</p> <p>Permanent damage may occur to the optical meter if an external power supply other than the GENTEC-EO 200130, 200960, SPU15A-105 or 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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2- USB INTERFACE CONNECTOR:

This interface allows remote control and data transfers between the P-LINK and a computer that has a USB communication port. With the RS-232 P-LINK, this connector is use as a RS-232 com port.

3- ANALOG OUTPUT:

For monitoring laser average power or energy by using external equipment such as a chart recorder, a computer with an analog interface, a voltmeter, etc.

The output signal represents a DC analog voltage proportional to the amplified and anticipated power detector response in the case of a power measurement. In the case of an energy measurement (energy mode), the output signal is a DC voltage representing the pulse energy value.

The user must enter the maximum value in the **Settings->SET Max Analog Out Range ...** menu. This value is the value at which the analog output equal 2.05 V. That provides the best signal-to-noise ratio. The measured power or energy is then related to the output voltage and to the selected range according to the following equations:

$$V_{out} = \text{Measurement} * 2.05 / \text{Max Analog Out Range}$$

For example with a 10W max analog range:

2.05 V corresponds to 10 W

1.025 V corresponds to 5 W

Another useful example: To set the analog output so that 1V corresponds to a measurement of 56W, the Max Analog Out Range must be set to 20.5 according to the following equation:

$$\text{Max Analog Out Range} = 56 * 2.05$$

Specifications on the analog output:

Maximum output voltage:	2.05 V
Output impedance:	274Ω
Connector type:	Female 1/8" jack

4- PROBE INPUT JACK:

The **P-LINK** uses a DB-15 female connector to mate with the detector heads (probes).

The **P-LINK** works with all Gentec-EO power detectors. It automatically recognizes every power detector head, which ensures accurate auto-calibration. More importantly, it 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.

The P-LINK may not recognize some of the earlier heads.

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.

The GENTEC C-300 adaptor can be used in order to connect the power detector heads of PS-310 Series and PS-330 Series Version 1 and 2. Please contact your local Gentec-EO distributor or the nearest Gentec-EO office for further information.

Any attempt to modify connectors of the early version heads to mate with the P-LINK can result in damage to the monitor.

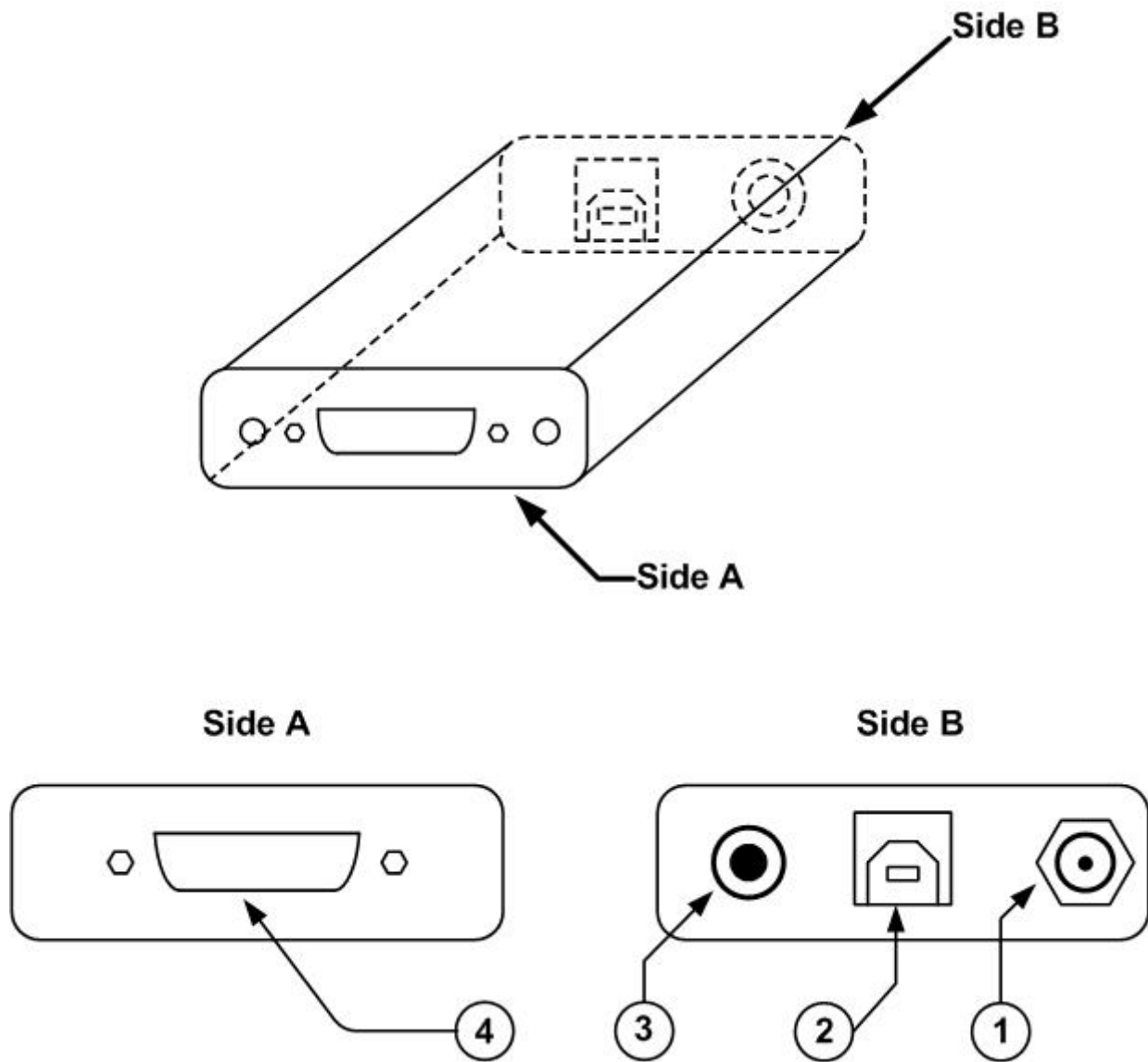


Fig. 3-1 P-LINK Top Panel

4 Getting Started

First you have to install the P-LINK software(PC-LINK) on your computer, along with the USB drivers, They are found on the CD included. Until the COM port is chosen, all the other menu options are grayed out. To start, you must tell PC-LINK which port the P-LINK will use. To link the PC-LINK to the COM port, click **Ctrl / Communication / Connect**. A dialog box appears so that you can select the appropriate serial port (COM 1, COM 2, etc.). Once you have selected a port, click **OK**. Now you are ready to adjust the settings.

4.1 Quick power measurement procedure

This section shows you the fastest way of making a laser power measurement with the P-LINK.

The monitor automatically recognizes all the Gentec-EO power heads of version 4 or higher. 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. In case of a conflict, use the sensitivity on the most recent calibration certificate. The P-LINK must be disconnected from the PC before connecting a new head in order to prevent any lost of data from the detector's head EEPROM.

Quick power and energy measurement procedure:

- 1- Install the power detector head on its optical stand.
- 2- First, slide the connector latch to the right to unlock the connector.
- 3- Connect a version 5 (or higher) power or energy detector head to the P-LINK using the **PROBE INPUT JACK** (see Fig. 3-1) while the P-LINK is disconnected from the PC.
- 4- Slide the latch to the left to lock the connector into place.
- 5- Connect the USB cable to your computer for the USB model or, for model RS-232, plug the RS-232 cable to your computer and then the power supply.
- 6- If you have a photodiode, to obtain measurements in dBm, select Settings / Power Unit / dBm.
- 7- 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 or powers. For the most accurate measurement, spread the beam across 60% to 80% of the sensor area.

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

- Adjusting the zero (steps 8 to 10)

- 8- Block off the laser radiation to the detector.
- 9- The power read by the P-LINK when no laser beam is incident on the detector may not be exactly zero. This is because the detector is not thermally stabilized OR there was a heat source in the detector's field of view when you turned on the P-LINK.
- 10- To reset the zero, wait until the reading has stabilized and select **Zero Offset** in the **Ctrl (Control)** menu. Note that the Zero Offset process can take about 20s for a photodiode. It is much quicker for other detectors. 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, it is recommended to:

- Allow the power detector temperature to stabilize before zeroing the P-LINK.
 - Do not touch the detector head when handling the power detector. Touch only the stand.
 - Avoid forced airflow or drafts around the detector.
- 11- Apply the laser beam to the detector head.
- 12- The laser beam average power will be displayed in three ways for your convenience:
- a. Digitally for real time measure.
 - b. On a histogram to allow the laser beam's long-term stability to be evaluated.
 - c. On a digital needle for laser tuning.

5 Description of the PC-LINK menus

This section describes in detail the first group of menus essential to the PC-LINK operation. The menus differ depending on the type of head that is plugged in. The display menu lets you view the status and your measurement in various ways. Use the settings menu during setup to set the best parameters for the measurement task at hand. It provides the flexibility to accommodate a wide variety of measurement conditions. The more active controls you are likely to use during your measurements are in the CTRL menu. They are described in Section 5.3.

5.1 Display menu

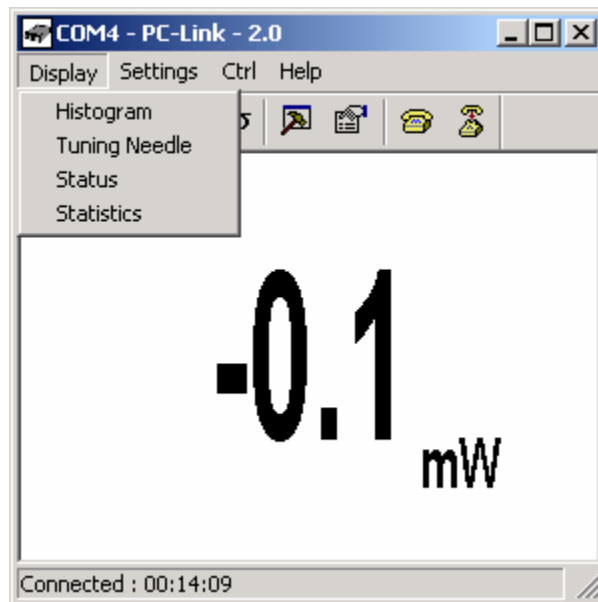


Fig. 5-1 PC-LINK Display menu

5.1.1 Display - Histogram

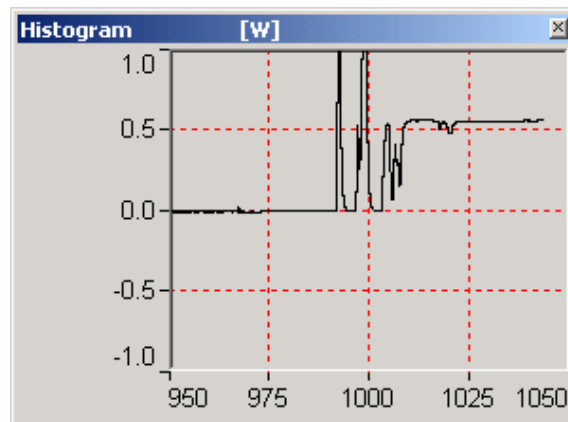


Fig. 5-2 PC-LINK Histogram

Right-click on the histogram to set the time period to view(Set X Axis...), reset the display or select a scale. Note that the Auto-Scale on the histogram starts from the lowest scale and only does scale-ups. This is made to select the best scale for the user without frequent scale oscillations.

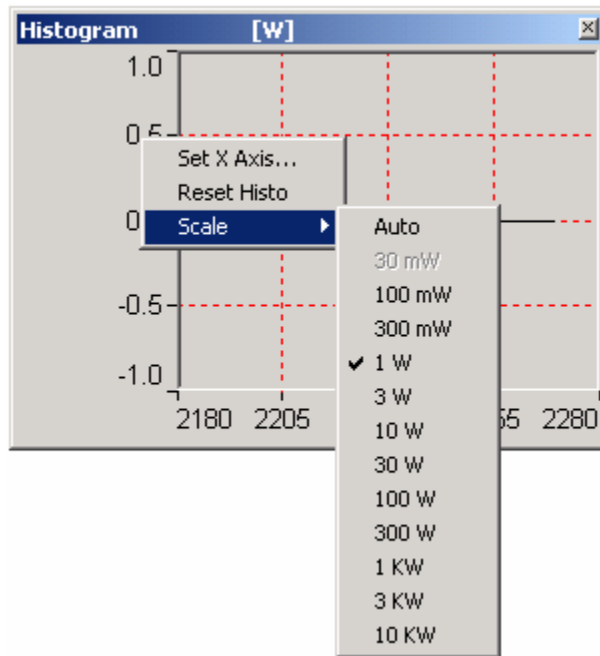


Fig. 5-3 PC-LINK Histogram Settings

5.1.2 Display - Tuning Needle

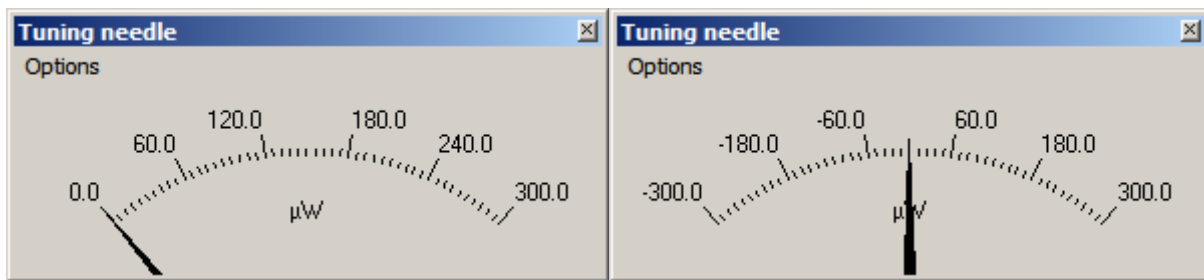


Fig. 5-4 PC-LINK Tuning Needle (two options)

Right-click on the Tuning Needle to select a scale. The autoscale(default) mode is useful when the measurement variations are small, because it will zoom on the best possible scale, but will oscillate with large variations. Use a fixed scale in this case.

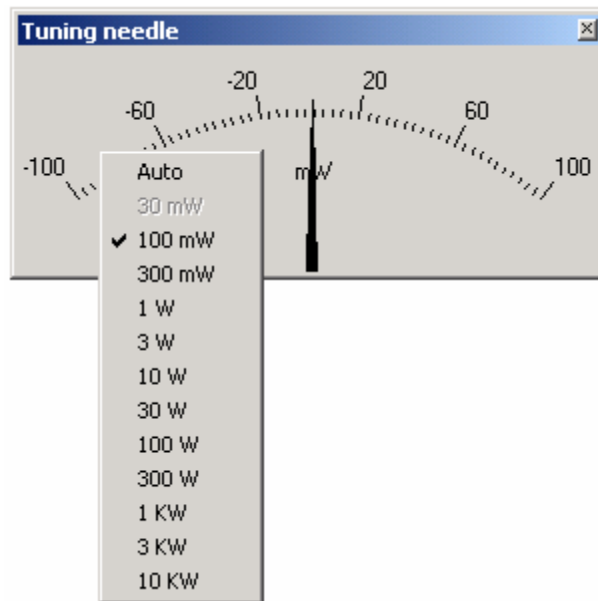


Fig. 5-5 PC-LINK Tuning Needle Settings

5.1.3 Display - Status

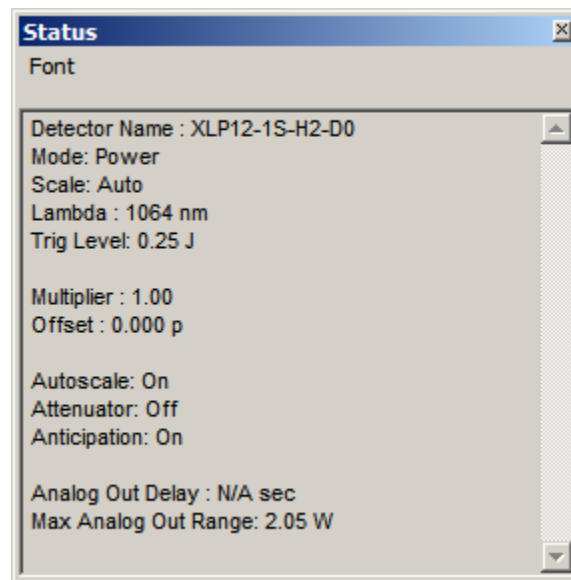


Fig. 5-6 PC-LINK Status Window

The Status window displays the detector name and various settings.

5.1.4 Display - Statistics

The statistics window displays the current statistics. See section 5.2.2 to set the data sampling parameters. See section 5.3.4 to learn how to start and stop the statistics.

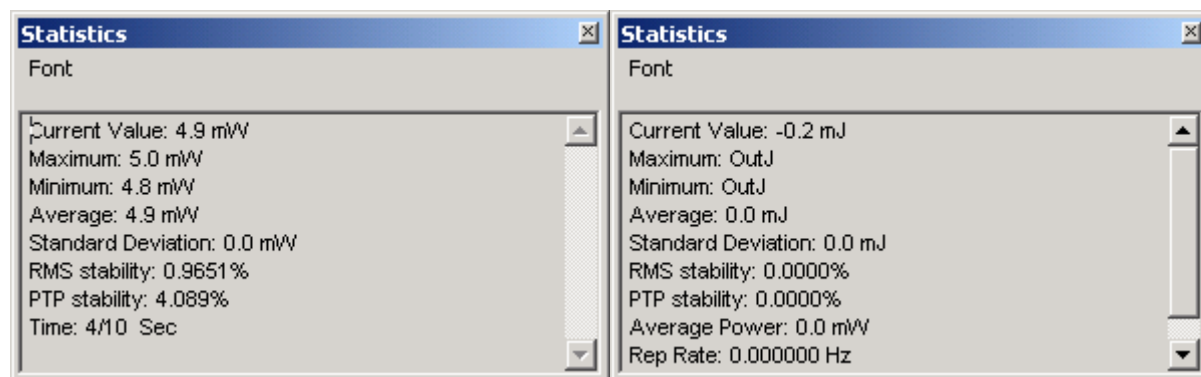


Fig. 5-7 PC-LINK Statistics Window

Table 5.8 Statistical values

Statistical Parameters	Power	Energy	Definition
Maximum value	✓	✓	Highest value in the sample period, E_{max} or P_{max}
Minimum value	✓	✓	Lowest value in the sample period, E_{min} or P_{min}
Average value	✓	✓	Rolling average of values in the sample, E_{avg} or P_{avg}
Standard Deviation	✓	✓	A measure of the spread of the data around the average. $STD = \sqrt{\frac{n \sum x^2 - (\sum x)^2}{n(n-1)}}$
RMS stability	✓	✓	Root mean square stability represents the standard deviation as a percent of the average. $RMS = \frac{STD}{E_{avg}} \times 100, \quad RMS = \frac{STD}{P_{avg}} \times 100$
PTP Stability	✓	✓	Shows the spread between the highest and lowest point in the sample as a percent. $PTP = \frac{E_{max} - E_{min}}{E_{avg}} \times 100, \quad PTP = \frac{P_{max} - P_{min}}{P_{avg}} \times 100$
Time	✓		Time elapsed since beginning the sample.
Repetition Rate		✓	Frequency of pulses coming from the laser.

5.2 Settings menu

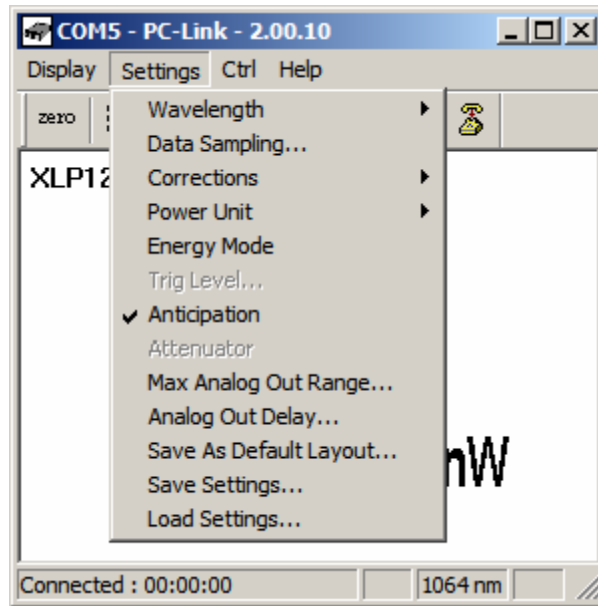


Fig. 5-9 PC-LINK Settings menu

Items in the **Settings menu** define user-adjustable parameters.

5.2.1 Settings - Wavelength

Use The Wavelength menu to select the power wavelength at which the detector is to be used. It applies a correction to adjust for the variation in responsivity at different wavelengths. When a new thermal detector is plugged in, the calibration wavelength is the default selection. Optical detectors(photodiodes) select the minimum available wavelength by default.

The checkmark beside the wavelength clearly shows the current selection. To change the wavelength, select an appropriate wavelength from the Wavelength menu. PC-LINK only allows you to choose values that fall within the detector's range. If you select or enter a value that is not valid, a menu pops up to signal the error and PC-LINK automatically selects the default value. That is the wavelength used for calibration at Gentec-EO during manufacture or subsequent service.

For the version 5 (V5) and higher detector heads, the P-LINK automatically recognizes every power detector, for accurate auto-calibration. More importantly, it takes advantage of our *Personal wavelength correction*[™]: it reads the memory in the *Smart Interface* connector to provide a wavelength correction based on spectral data measured from that specific detector. Your measurements across the band have never been this precise and easy.

When working at a wavelength not available in the Wavelength menu, use the custom option. If you choose custom, a dialog box appears where you can enter a wavelength. The wavelength you enter must be within the range of valid wavelengths. The P-LINK interpolates a wavelength correction factor using the pre-programmed data in the detector's EEPROM.

Personal wavelength correction[™] is automatic only with version 5 and higher detectors. With version 4 (V4) detectors, you need to use the **Corrections menu** to manually enter a multiplier to correct for the wavelength. You will find these multipliers on the *Personal wavelength correction*[™] Certificate shipped with the detector. You can use both the Wavelength menu and the Corrections menu for all V5 and later detectors.

5.2.2 Settings - Data Sampling

The Data Sampling parameters are used for calculating the statistics(see section 5.1.4) and for data acquisition(see section 5.3.3). PC-LINK uses default sampling parameters unless you set them yourself. You can set PC-LINK either to calculate the statistics for a single sample and stop or to repeat continuously. Take data for a few seconds or a few weeks. You have the flexibility to handle any application, from analyzing a single short pulse with high resolution to sampling performance over a period of months.

The statistical parameters that are calculated are listed in Table 2.1.

Figure 5-10 shows the window for setting the data sampling parameters. Table 5-11 describes the parameters. When finished setting them, click save to activate the parameters.

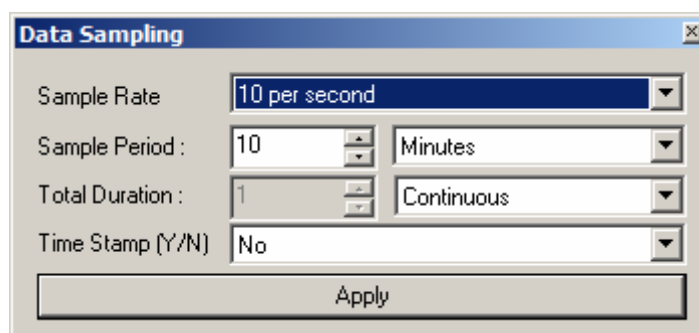


Fig. 5-10 PC-LINK Data Sampling parameter window.

Table 5-11 Data Sampling Parameters

Parameter	Choices	Description
Sample Rate	10Hz to 1 per hour	Sets the number of points (measurements) per second: 10 per second, 1 per second, 1 per 10 seconds, 1 per minute, 1 per 10 minutes, 1 per hour.
Sample Period	Integer 1 to 1000000000	The time over which samples are to be averaged. Sets the number of samples used in the average and standard deviation <i>[for example, for each average to be based on 5 minutes of data, set to 5 minutes..]</i> .
Sample period units	Second Minute Hour Day Week	Sets the time period for the value entered above.
Total Duration	Integer 1 to 1000000000	The time period for which samples are reported (to the display and output). Select a time period or a number of points <i>[for example, report statistics for 24 hours]</i> . Often the total duration and sample period will be the same. PC-LINK automatically clears and recalculates the statistics at

		the end of each sample period unless you manually stop it.
Total Duration units	Continuous Periods	To make the statistics stop after one sample period, select "1" and "Period."
Time Stamp	Yes No	To have a time stamp appear with the acquired data, select "yes" and click "save". This is a relative time stamp that always begins at zero.

5.2.3 Settings - Corrections

The user can apply one multiplier and one offset to the detector reading. Correction factors are most useful when sampling a percentage of a powerful laser beam or correcting for absorption along an optical chain. The Status window displays the values of correction factors that are being applied to the measurements. To activate the correction factor, select **Corrections** in the **Settings Menu** and then select **Multiplier** or **Offset**. A dialog box opens where you enter the correction value in percentage or as an absolute value. This number will then multiply, or add to the actual measured value to calculate the corrected value. PC-LINK will then display the corrected value.

For example, if you are measuring the laser beam passing through the 99.9% back reflector of a laser (giving 1/1000th of the real value), choose **Multiplier** and enter 1000 in the dialog box. PC-LINK will display the laser's power rather than the measured 0.1% sample on the main display.

It is also essential to make sure that the actual measured value complies with the power and energy limits of the detector head.

Note that the **Statistics** are computed for the corrected values only.

To disable the correction factor, do a **Settings – Corrections – None**.

5.2.4 Settings - Power Unit

The **power unit** item lets the user select Watt or dBm as the power measurement unit. The definition of the dBm unit is:

$$\text{dBm} = \text{Log} (\text{power in Watts}/0.001\text{W})$$

5.2.5 Settings - Energy Mode

This feature allows you to measure the energy contained in a single pulse with a Gentec-EO **power detector head**. This mode of operation gives access to the same options as in the case of a pyroelectric joulemeter. The only restriction is that the time delay between pulses, $Delay = \left(\frac{1}{Rep. Rate} \right)$, must be more than three times the constant time of the detector. (Please refer to the instruction manual for the specific power detector you are using.)

This command is a toggle so a checkmark indicates when it is on. Select it again to turn it off. The default is off.

Allow at least 2 laser pulses for the auto scale to select the optimal scale for your measurement.

Keep in mind that the power detectors are optimized to sustain high average power, not high peak energy. Always keep the energy density below the maximum energy density quoted in the manual for that specific detector.

The single pulse energy measured in **Energy Mode** is precise to $\pm 5\%$ of the power measurement calibration. This is larger than the uncertainty in the power measurement (typically $\pm 2.5\%$) because the energy calibration is computed from the power measurement calibration. A precision of $\pm 3\%$ in the single pulse energy measurement can be achieved if the power detector head is specifically calibrated to measure in single pulse energy mode. Please contact your local Gentec-EO distributor or nearest Gentec-EO office for more information on obtaining a single pulse energy measurement calibration.

5.2.6 Settings - Trig Level

The trigger level is only used with a power detector head and PC-LINK is in **Energy mode**. This option allows the user to change the **Trigger Level** in absolute values. This proves to be especially useful in noisy environments.

To change the Trigger Level value, access the dialog box by selecting **Trig Level** from the **Settings** menu and enter the desired number in absolute value. The P-LINK will not detect pulses with a value under the Trig level.

The value of the Trigger level is shown in the status menu confirming that the Trigger level is activated to a specific user level.

Selecting a high value for the trigger level may cause problems with the detection of widely varying energy values in the Autoscale mode. The Autoscale function uses the energy level of the last pulse to set the scale level. Therefore it will not detect the next pulses if they are lower than the trigger level. As a result, the Autoscale may become caught on a high scale value. To solve this problem, select a lower value for the trig level, then send the serial command *SHI. If you want to select the higher Scale, send the serial command *SLO. To select the autoscale, send the serial command *FAS.

Erratic triggering?

For a few detector heads, in electrically noisy environments, it is possible that the P-LINK will inadvertently trigger on the noise. In that case, increase the trigger level..

5.2.7 Settings - Anticipation

Thermal power detectors are inherently slow. The P-LINK uses an algorithm to significantly accelerate the response. This is called "anticipation". By default, this option is enabled. The reasons for disabling the anticipation are to slow down the response and to lower the noise level. Anticipation is not used in energy mode.

5.2.8 Settings - Attenuator

Some low-power detectors come with an attenuator for which there is an attenuation factor programmed in the detector EEPROM. This menu item makes it a simple operation to enable or disable the attenuator correction. Since the calibration wavelengths are often different for the attenuator, the user should always set the wavelength after enabling or disabling the attenuator correction.

5.2.9 Settings - Set Max Analog Out Range

The set max analog out range setting allows to choose the relationship between the power(or energy) measurement and the voltage generated by the analog output. The range of the output is 0 to 2.05 volts.

If the user selects 10 Watts as the maximum output range and if the P-LINK measures 5 Watts, the analog out is 1.025 volt.

To set the max analog out range from the **Settings** menu, click **Set Max Analog Out Range...** A dialog box appears so that you can enter a range.

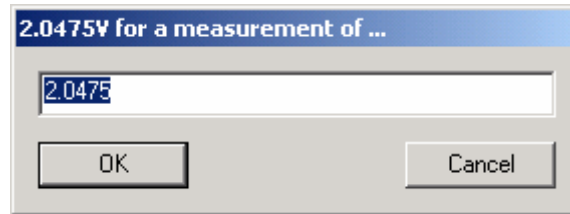


Fig. 5-12 Set Max Analog Out Range dialog box

The equation is :

$$V_{out} = V_{ref} [P_{read}/P_{mao}]$$

Where :

Vout : Output voltage of the P-LINK

Vref : 2.05 Volts

Pread : Power or Energy applied to the head and is read by P-LINK

Pmao : Power or Energy set by the user. (Set Max Analog Out Range)

5.2.10 Settings – Analog Out Delay...

In Energy mode, sets a time (from 1 to 7 seconds), after which the analog output falls back to zero after a measurement. Set to 0 to disable the feature. Disabled by default.

5.2.11 Settings – Save As Default Layout...

Save the current state of PC-LINK windows so that they will appear the same way on subsequent PC-LINK startups.

5.2.12 Settings - Save and Load User Settings

PC-LINK can remember and recall the settings of any number of users. You can share the P-LINK without the hassle of having to re-enter your settings. As an alternative, you can program it so that you can easily switch between different measurement applications without having to re-enter your settings. This option is activated under the **Save Settings or Load settings** menu items.

When you select settings, a dialog box appears so that you can save your settings to a file. Give the settings a file name and type. To use established settings, select **Load Settings**, a dialog appears. Select the file.

5.3 Ctrl menu

This section gives a complete description of the Control menu available on PC-LINK.

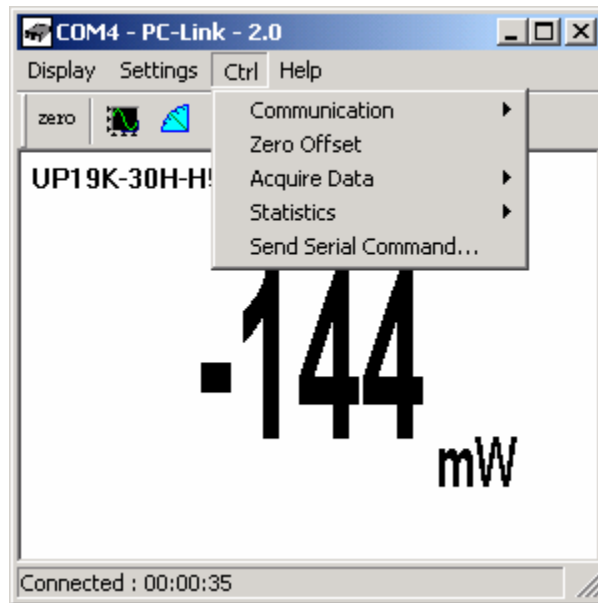


Fig 5.13 PC-LINK Ctrl Menu

5.3.1 Ctrl - Communication

The communication item is mostly used to **Connect** to the P-LINK after starting PC-LINK. To use the COM port for another application without closing PC-LINK, click **Ctrl / Communication / Disconnect**.

5.3.2 Ctrl - Zero Offset

This feature resets the zero reading level to compensate for electronic offsets in the P-LINK and thermal noise in the environment of the detector. When the P-LINK receives the associated command, it subtracts the power reading on all its internal hardware scales. Subsequent measurements will be relative to this zero power level. Use this function once your power meter has achieved thermal equilibrium to ensure accurate measurements.

For instructions on the proper way to adjust the offset to zero your detector see section 4.1 (Quick power and energy measurement procedure).

5.3.3 Ctrl - Acquire Data

This item is used to save raw data (only), statistics (only), or both raw data and statistics in an output file. When you select **Start Saving Raw Data**, a dialog box appears. Type in the filename that you choose, then select save. PC-LINK begins storing raw data according to your Data Sampling settings (see section 5.2.2). If you will be putting the information into a spreadsheet, use the **Save Both** option. All the raw data will be at the top of the file, while all the statistical information will be at the bottom of each period. The **Stop Saving** command stops the data recording but the P-LINK will continue to provide measurements to the display.

5.3.4 Ctrl - Statistics

-Select **Start** to start collecting statistics(when stopped) or to restart them when already in progress.

-Select **Stop** to freeze the statistics.

5.3.5 Ctrl – Send Serial Command

This item opens a dialog box. Enter a command and click OK to send it to the P-LINK. Only certain commands will work with the software; the other ones are there for the user who builds his own application. The commands are listed in **Appendix A** and should only be used by an experienced user. This item is rarely used.

5.4 Help - About

These two items are helpful to check the software version (About Application...) and the P-LINK embedded firmware version (About Device...). If you should need help or additional information on the P-LINK or any Gentec-EO products, do not hesitate to contact us. We will be glad to help you.

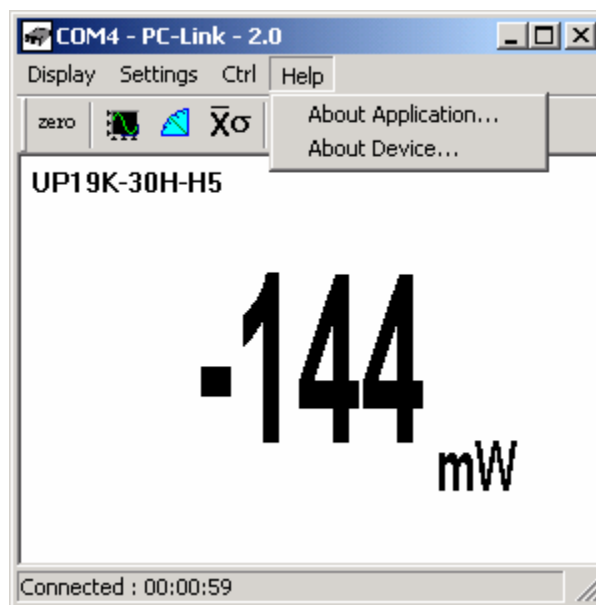


Fig. 5-14 PC-LINK Help menu

5.5 PC-LINK Shortcut Buttons

To access certain features with a single click instead of having to enter the menus, PC-LINK has 8 shortcut buttons on its main window. From left to right, those buttons access: Ctrl - Zero Offset, Display - Histogram, Display - Tuning Needle, Display - Statistics, Display - Status, Settings - Data Sampling, Ctrl - Communication - Connect, Ctrl - Communication-Disconnect.

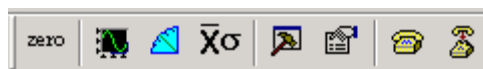


Fig. 5-15 PC-LINK Shortcut Buttons

6 USB driver Installation

Plug the P-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 will open that says **Found New Hardware – USB Device** and after several seconds to a minute, the Found New Hardware Wizard will appear.

Insert the GENTEC-EO Software CD-ROM if not done already.

For Windows 2000, XP or Vista: Cancel the wizard and execute the Auto installer “USB driver installer-r2” in the USB Driver folder from the CD-ROM.

Please note that old monitors without the (R2) at the end of the product name need a different USB drivers which are available on our web site. They do not support Windows VISTA, unless noted on the web site.

At the end of this process, a new serial COM port will be 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 P-LINK.

Verify COM Port

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

Start → Settings → Control Panel → System → Device Manager

(Instructions may vary a bit by operating system and version. For Win2000/XP there is an additional step (is there an extra step – if so what is it – or an extra click?- on my system it's an extra click) between Control Panel and System.)

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

USB-to-Serial Port (COM#)

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

7 Appendix A

7.1 P-LINK Serial commands

The star(*) is part of each command

Commands	Description	Return
*ATT	Turns the attenuator correction ON when available for the detector	"ACK"
*ATF	Turns the attenuator correction OFF. OFF by default.	"ACK"
*CAU	Sends the data points through the serial port at a frequency of 10 Hz	Data points
*CSU	Ends the *CAU mode	"ACK"
*CVU	Returns a single measurement (the current measurement) through the serial port.	"ACK" + Measure
*ANT	Turns the anticipation ON. ON by default & return characters « ACK »	"ACK"
*ANF	Turns the anticipation OFF	"ACK"
*CFT	Turns the power correction ON. ON by default.	"ACK"
*CFF	Turns the power correction OFF	"ACK"
*AOB	Modifies the analog output voltage value (*AOB + 8 characters) Example : *AOB1.00E+01 The maximum value of the analog display (2.05 volts) is 10 watts	"ACK"
*AOD	Sets an analog output delay from 1s to 7s for a return to 0V after an energy measurement. Default 0 (no return to zero after an energy measurement). Example : *AOD2.00E+00 The delay is 2 seconds.	"ACK"
*RST	Resets the device	None
*SOU	Sets the zero offset	"ACK"
*KPA	Returns the character string « ACK »	"ACK"
*PWC	Wavelength correction value (+ 5 characters) Example : *PWC01064 selects the wavelength 1064 nm	"ACK"
*TLC	Modifies the trigger level in energy mode (+ 8 characters)	"ACK"

	Example : *TLC2.00E-02 selects a Trig Level of 0.002 Joules	
*NAM	Returns the model of the head to the serial port	Head model
*VER	Returns the name of the software to the serial port	Firmware version
*F01	Returns information about current status	Status
*F02	Returns more information about current status	Status
*MUL	Modifies the multiplication factor (+ 8 characters) Example : *MUL1.00E+01 selects a multiplication factor of 10	"ACK"
*OFF	Modifies the offset (8 characters) Example : *OFF-2. 0E-00 selects a user offset of two watts	"ACK"
*CMW	Turns the Energy Mode ON	"ACK"
*CMX	Turns the Energy Mode OFF. OFF by default.	"ACK"
*SHI	Make a physical scale down.	"ACK"
*SLO	Make a physical scale up.	"ACK"
*FAS	Turns the autoscale mode on.	"ACK"

Please note that you must type the exact number of characters or numerical values required.

Example: *AOB1.00E+01 has 8 characters/numerical values. Don't put any space between characters or numerical values.

7.2 P-LINK Error Messages

E01	Bad Command
E02	Energy Mode is not available
E03	N/A
E04	The selected wavelength correction factor is not valid
E05	The connector is not connected
E06	Attenuator not available

7.3 Communication Settings

Bits per second	57600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Declaration of Conformity

Application of Council Directive(s): 89/336/EEC The EMC Directive
73/23/EEC Low Voltage 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: Optical Power meter
Model No.: PLINK
Year of test & manufacture: 2004

Standard(s) to which Conformity is declared:
EN 61326: 1997 Emission generic standard

Standard	Description	Performance Criteria
EN 61326 :1997	Limits and methods of measurement of radio interference characteristics of information technology equipment. Testing and measurements of conducted emission	Class A
EN 61326 : 1997	Limits and methods of measurement of radio interference characteristics of information technology equipment. Testing and measurements of radiated emission	Class A
EN 61000-4-2:1995	Electromagnetic compatibility (EMC) – Part 4: Testing and measurements techniques- Section 4.2: Electrostatic discharge.	Class B
EN 61000-4-3:1996	Electromagnetic compatibility (EMC) – Part 4: Testing and measurements techniques- Section 3: Radiated, Radio Frequency immunity.	Class A
ENV 50204: 1995	Radiated Electromagnetic field from digital radio telephones-immunity test 900MHz pulsed	Class A
EN 61000-4-4:1995	Electromagnetic compatibility (EMC) – Part 4: Testing and measurements techniques- Section 4: Electrical fast transient/burst immunity.	Class B
EN 61000-4-6:1996	Electromagnetic compatibility (EMC) – Part 4: Testing and measurements techniques- Section 6: Immunity to conducted Radio Frequency.	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 : Novembre 11, 2008

(President)

8 Appendix B

8.1.1 Recycling and separation procedure

This section is used by the recycling center when the monitor reaches its end of life. Breaking the calibration seal or opening the monitor will void the solo warranty.

The complete Monitor contains

1 Monitor

1 power supply for RS-232 option (not made by Gentec-EO).

1 USB cable for USB option.

1 instruction manual

1 calibration certificate

1 software cdrom

8.2 Separation

Paper: Manual and certificate

Plastic: Monitor side enclosure.

Wires: USB cable and power supply plug.

Printed circuit board: inside the monitor.

Aluminum: Monitor enclosure

8.3 Opening the monitor

