

---

# ILT1000 Light Meter, Monitor & Data Logger

---



**InternationalLight**  
TECHNOLOGIES

10 Technology Drive  
Peabody, MA 01960  
Ph: 978-818-6180  
Fax: 978-818-6181  
Web: [www.intl-lighttech.com](http://www.intl-lighttech.com)

## Table of Contents

<b>Introduction</b>	
<b>1. Equipment Overview</b>	<b>Page 3</b>
<b>2. Quick Reference Guide</b>	<b>Page 3</b>
<b>3. Saturation</b>	<b>Page 4</b>
<b>4. Response time</b>	<b>Page 4</b>
<b>5. Flash (N/A)</b>	<b>Page 4</b>
<b>6. Dark and Zero settings</b>	<b>Page 5</b>
<b>7. ILT1000 initial set up</b>	<b>Page 5</b>
<b>8. Confirm Device Driver Installation</b>	<b>Page 5</b>
<b>9. Verification</b>	<b>Page 5</b>
<b>10. Loading DataLight II Software</b>	<b>Page 6</b>
<b>11. Using DataLight II Software</b>	<b>Page 7</b>
<b>12. Final Verification</b>	<b>Page 7</b>
<b>13 4-20mA Loop Connection (with warning)</b>	<b>Page 8</b>
<b>14. Care and Handling</b>	<b>Page 9</b>
<b>15. Warranty</b>	<b>Page 9</b>

## Appendix A

<b>1. Windows 7 and 8 Driver installation</b>	<b>Page 10</b>
<b>2. Windows 8.x environments</b>	<b>Page 10</b>
<b>3. Installation for MAC with terminal software use only</b>	<b>Page 11</b>

## ILT1000 Light Meter, Monitor & Data Logger

Thank you for purchasing your ILT1000 Intelligent USB-based Radiometer. The ILT1000 is a precision radiometer that operates via simple USB connection. Features include:

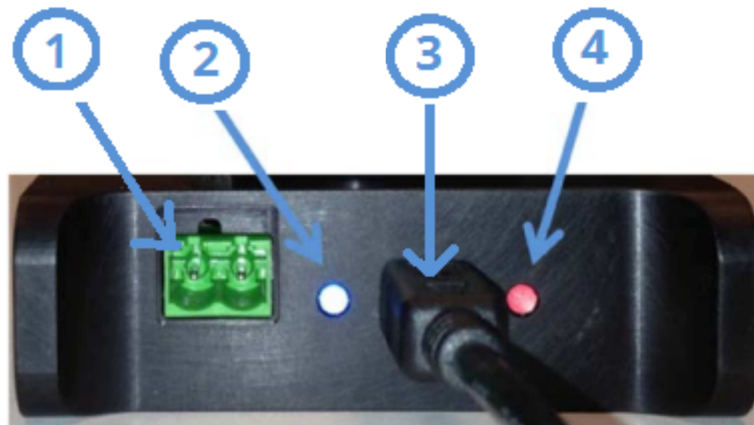
- Simple, cost-effective, fully integrated USB 2.0 design for all your scientific and industrial applications
- N.I.S.T. Traceable, ISO 17025 Accredited Calibrations
- Automatic Gain Control to produce 2% linearity through 6 decades of optical sensitivity
- Low-power operation at 150mA per device, allowing simple design and deployment of multi-device monitoring solutions
- Factory and User-Programmable “Dark Current” functions stored in FLASH memory
- “Headless” data-logging capability with highly accurate Real-Time clock
- Programmable 4-20mA output (log or linear) for interfacing to PLC’s
- FREE Datalight (XP) and Datalight II(Windows 7&8) software covering a range of applications
- Labview basic program, allowing customer designed software applications

**1. Equipment Overview:** The ILT1000 meter does not include Filters, Optics or Optical calibrations

- A. Carrying case** – Contains ILT1000 meter, antenna, USB cable, and detector if applicable.
- B. ILT1000 meter** – Autoranging radiometer.
- C. USB cable** – Used for charging, and software communication.
- D. 4-20mA terminal block** – Wiring terminal for monitoring of PLC current levels.
- E. Additional items** – if applicable, filters and optics may have been attached to the top of the ILT1000, or shipped inside the case. Calibration certificates, for any calibration ordered, will also be included.

### 2. Quick Reference Guide

FRONT PANEL



**1. 4-20mA out:** Output terminal for connection to a PLC. **(Warning: Improper wiring can cause board damage. It is highly recommended that a 4-20mA isolation device be used to ensure the ILT1000 is isolated from the current loop power and programmable-logic-controller. Do not exceed 50V max. Refer to section 15, 4-20mA Loop Configuration for additional instructions).**

**2. Power Indicator:** Generates a continuous blue light to indicate the unit has power.

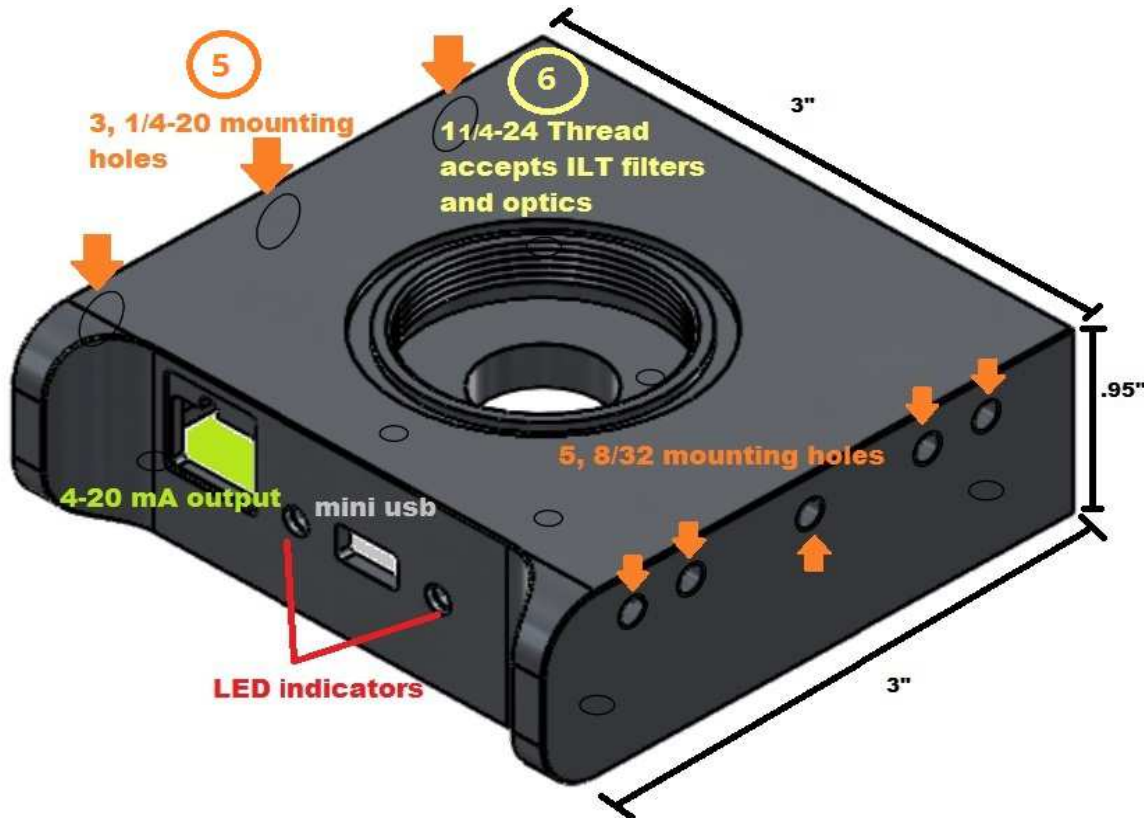
**3. USB:** USB connector for software control, Data logging and power.

**4. Meter:** Status Indicator LED and descriptions for the corresponding LED.

**Saturated:** Steady signal indicates the sensor is saturated (light level too strong)

Consider adding a neutral density filter or increasing the distance from the source.

**Logging:** Slow Flash, Indicates data is being recorded.



**5. Mounting:** Each side of the ILT1000 is threaded to allow easy mounting. On the left are 3, 12/20 holes, on the right are 5, 8/32 holes

**6. Filter and Optics:** On the top of the ILT1000 is the detector port. This port has a .62 inch opening to allow light to reach the diode. The port is threaded with ILT's standard 1/4 24 threads to allow customers to easily screw filters and optic on and off.

**7: Model and Serial Number:** On the rear panel of the ILT1000 the model number and serial number are engraved. There are currently six different diodes used in the ILT1000. Each diode has a different model number engraved. See list below:

ILT1000 Broadband: Silicon diode 200-1100 nm

ILT1010 Lux: Silicon with built in low cost photopic correction filtration 400-700 nm

ILT1254 Narrowband: Si with built in narrow band 254 filter 240-250 nm

ILT1320 UV: GaN diode 200-320 nm

ILT1005 UV-VIS: GaAsp 250-675 nm

ILT1007 IR: InGaAs diode, 770-1400 nm

Other solid state detectors are available. Please contact [lsales@intl-lighttech.com](mailto:lsales@intl-lighttech.com) for information on additional standard or customized configurations.

### **3. Saturation**

The ILT1000 provides an autorange mechanism allowing it to measure over 6 (or 8) decades of light measurement depending on the amplifier board version included in your purchase. While autoranging or using the various fixed current ranges (settable via the various DataLight software offerings), the ILT1000 can experience saturation (light signal too strong, generates too much current). When the ILT circuit becomes saturated, the ILT1000 saturation LED will illuminate with a steady red output. To resolve issues with saturation increase the distance from the source, or consider adding neutral density filters. ILT offers the QNDS1, QNDS2, and QNDS3 for attenuation by a factor of 10, 100 and 1000 respectively.

### **4. Response time:**

The ILT1000 is capable of measuring at 100 readings per second (100 Hz) when saving data to the internal memory using Datalog software or CLI. When using Trend and Bar the ILT1000 software can display and record up to 10 readings per second. At lower light levels it is often best to allow longer measurement times to increase the accuracy.

### **5. Flash: Currently not available.**

The ILT1000 initial release does not include a flash measurement configuration. ILT is currently performing testing of the flash capabilities and the flash software application. (3/2015)

### **6. Dark and Zero settings:**

Each ILT1000 is pre-programmed with the factory dark ("zero") setting in a low noise environment. Because ambient environments differ, ILT software allows the user to program and select the "user dark" or "zero". Using the user dark feature will allow the customer to subtract small amounts of current generated from their environment.

### **7. ILT1000 initial set up using XP, Windows 7 or Windows 8:** (Internet connection may be required to load drivers)

Connect your ILT1000 to a Windows 7 or Windows 8 computer, laptop, or tablet with the included USB cable. As you make the connection the right Status LED should flash once, indicating the connection has been made (this is a very brief flash). The Blue LED on the left should come on and maintain a steady output.

Note: if using XP with the ILT1000 you will need to use the original version of Datalight and perform a firmware upgrade. (See section 10A for additional instructions)

**NOTE:** DataLight II software is not compatible with Macintosh operating systems. The ILT1000 can be accessed on mac via use of terminal applications, such as Terminal. Please refer to Appendix A at the end of this guide for more information on using the ILT1000 with a Macintosh computer.

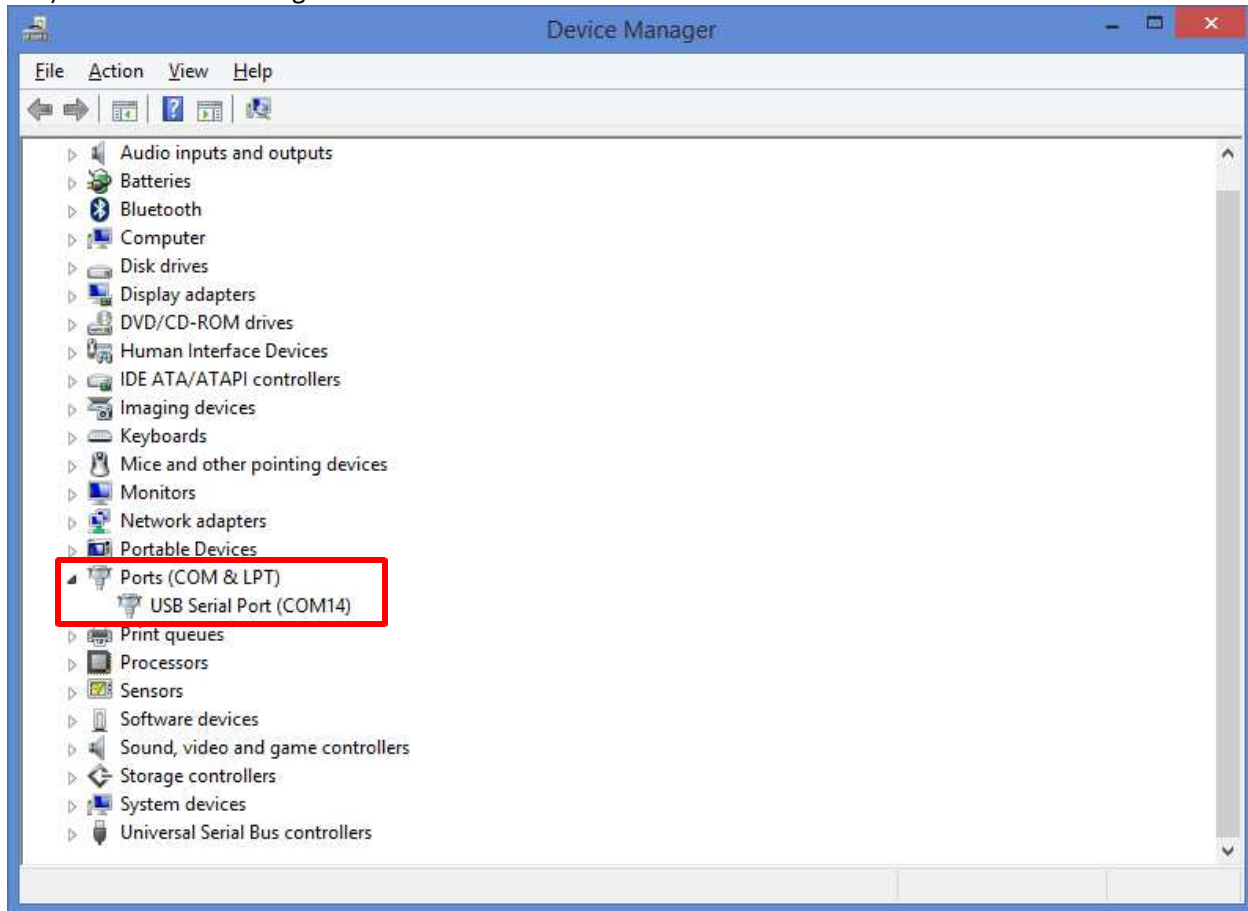
### **8. Confirm device driver installation: (internet access may be required to load drivers)**

If this is the first time connecting the ILT1000 to the particular computer, USB drivers for the device will typically load automatically (internet connection may be required). If the device is not being recognized, please install the drivers found at <http://www.ftdichip.com/Drivers/VCP.htm>.

**Note: if the device is not recognized, Please see Appendix A for driver installation instructions.**

## 9. Verification:

When the device is properly loaded, a “USB Serial Port” will show up in Device Manager under “Ports (COM & LPT)” as seen in the image below.



## 10. Loading DataLight II Software:(Internet connection may be required)

The DataLight II software is provided via download on the ILT website: <http://www.intl-lighttech.com/support/software> (see the “DataLight II Software Suite....” link).

### NOTE:

If you are restricted from or have trouble downloading the ILT software, please email: [ilsales@intl-lighttech.com](mailto:ilsales@intl-lighttech.com) and we will gladly email you a copy.

The download will include a Windows Installer file with a .msi extension. When the msi file is executed, you are brought through a simple set of “Next”, “Next”, “Finish” steps.

### NOTE:

The DataLight II Software installer will attempt, if needed, to install the “Visual C++ Redistributable for Visual Studio 2012” from the Internet. If the computer is not Internet connected, these libraries will need to be installed manually from: <http://www.microsoft.com/en-us/download/details.aspx?id=30679>

When the software is successfully installed the ILT DataLight II folder will appear on your desktop.

**10A. Loading DataLight Software and firmware for XP systems:** The DataLight II software is provided via download on the ILT website: <http://www.intl-lighttech.com/support/software> (see the “[DataLight Software Suite for Windows XP](#)” link).

The download will include a Windows Installer file with a .msi extension. When the msi file is executed, you are brought through a simple set of “Next”, “Next”, “Finish” steps. Once the software is installed, you will need to complete a firmware modification. Click on FW update in the Datalight folder on your desktop. This update will actually replace the newer Firmware with the older version of firmware for use with XP.

**11. Using Datalight II:** Open the ILT DataLight II folder and verify the contents:

**(Note:** XP/Datalight users will find not all features included in the trend, bar, datalog and CLI manuals are available for XP. For example, there is no Meter App in Datalight for XP.)

Open the ILT DataLight II folder and verify the contents:

**Trend:** (Recommended for first time users) Records 6 parameters while displaying the data trend over time for the user switchable parameter. Multiple examples of trend can be run simultaneously to allow multi-unit comparisons. Trend also has a user-friendly calibration feature.

**Bar:** Allows multisystem, datalogging and displays the user switchable parameter in a bar graph. The expandable graph can accommodate up to 32 systems simultaneously with use of hub(s). User can enter nicknames for each unit to define the location, application, version, serial number, etc. Customer can program max and min warning levels and use color coded bar responses for easy troubleshooting.

**CLI:** is a basic command line interface program that allows customers to type commands from the API and record readings into the device memory. A full version API is available for CLI users.

**Datalog:** is a user interface that allows remote “set it and forget it” datalogging.

**FW Update:** Used to install firmware on the ILT1000.

**Meter:** Designed to maintain the look and feel of the Industry Standard ILT1700 Research Radiometer. Designed for use with windows 8 tablets and touch screen computers, the larger, user-friendly panel includes buttons for hold, zero, integrate, factor, range, average and units selection.

**NetConfig:** For configuration of the wireless networking settings within the ILT5000. **Not used for ILT1000.**

## **12. Final Verification:**

A. Plug the ILT1000 into any available USB port. (for small tablets with a MICRO USB port an OTG cable may be required)

B. Assure the red LED flashes once as the USB cord is attached and the blue LED remains steadily illuminated.

C. Wait a few seconds for the ILT1000 to be recognized.

D. Double click Trend software.

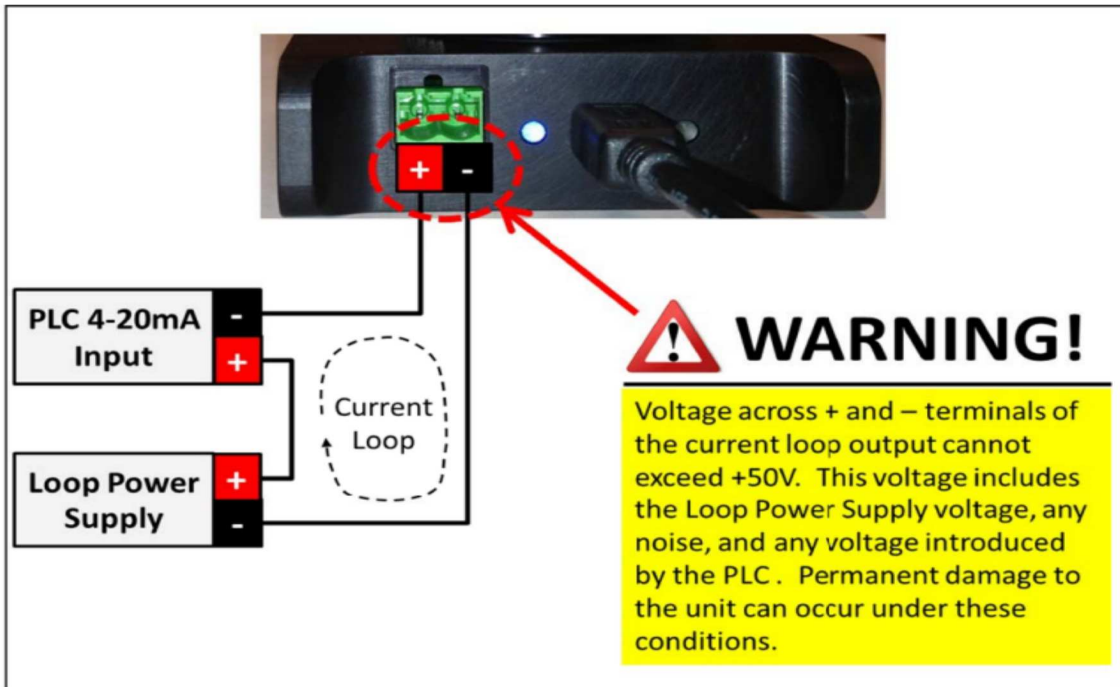
The software should open and the software should immediately begin displaying readings.

You are now ready to take readings in trend or try any of the other software applications provided.



### 13. 4-20mA Loop Configuration:

A. Warning: Please note the warning below when connecting the 4-20mA output to a new or existing current loop. The preferred loop voltage is 15VDC, but can be set as high as 24VDC. While the unit does provide protection against reverse polarity and voltage noise/spikes, voltages above 50V will damage the unit.



B. Connection: The 4-20mA current loop is connects as illustrated above. The Loop Power Supply provides the power for the current loop, and the ILT1000 controls the level of current that flows through the loop.

#### C. 4-20mA Current Loop Modes

There are four modes of output that are supported by the ILT1000, as follows:

#### 13A. 4-20mA Current Loop Modes

There are four modes of output supported by the ILT1000, as follows:

4-20mA Current Loop Mode	"CLI" Command to Invoke Mode	Current Relationship
Log (default mode)	setcurrentloop log	$4\text{-}20\text{mA Current} = (\text{LOG}_{10}(\text{Detector Current}) + 8) * 3 + 5$ $\text{Detector Current} = 10^{((4\text{-}20\text{mA Current}) - 5) / 3 - 8}$
Linear with Min and Max	setcurrentloop [min detector current in picoamps] [max detector current in picoamps]	4-20mA Current = 4mA at [min] Detector Current 4-20mA Current = 20mA at [max] Detector Current 4-20mA Current is linear in between [min] and [max]
Linear with Midpoint	setcurrentloop midpoint	4-20mA Current = 12mA at Detector Current when setcurrentloop command was sent. 4-20mA Current = 4mA at 0 Detector Current 4-20mA Current = 20mA at 2x the Detector Current when setcurrentloop command was sent. 4-20mA Current is linear in between
Manual Current Loop Setting	setcurrentloop [0-24]	No relationship. 4-20mA Current is set to whatever the setcurrentloop command defined, i.e. setcurrentloop 8 sets the 4-20mA Current to 8mA.



## **14. Care and Handling**

The ILT1000 internal board is a sensitive electronic device. Due to risk of board damage, only trained personnel should attempt opening the housing on the ILT1000. Opening the ILT1000 by non-ILT personnel voids all warranties and may adversely affect the calibration of the meter.

**Operating Temperature:** -40 to 85°C (Calibrated Irradiance 0-40°C) ILT meters and sensors have a recommended operating range of 0 to 40°C to best assure the accuracy of the calibrated measurements.

**Humidity:** 0-95% non-condensing.

**ESD:** Use basic ESD precautions and practices when handling the device. It is advisable to discharge any static buildup by touching a grounded conductive surface before making contact with devices or its connectors.

**Cleaning:** No chemicals or liquid solution should be used to clean the ILT1000 housing. The ILT1000 housing is made of durable anodized aluminum housing, however, the housing does not provide a sealed barrier to protect the internal components from moisture.

**Submersion:** The ILT1000 housing is not rated for submersion.

**Calibration:** ILT typically recommends an annual calibration for all equipment. Per ISO17025, the customer may, through their own QC process, create their own calibration cycle.

**Service:** Before returning any equipment to ILT for service (including warranty evaluations) customer should visit the ILT website and obtain an RMA:

<http://www.intl-lighttech.com/services/return-material-authorization/rma-form>

## **17. Warranty**

The equipment you have purchased from International Light, Inc. has been expertly designed and was carefully tested and inspected before being shipped. If properly operated in accordance with the instructions furnished, it will provide you with excellent service. The equipment is warranted for a period of twelve (12) months from date of purchase to be free of defects in material or workmanship. This warranty does not apply to damage resulting from improper set up, accident, alteration, abuse, loss of parts or repair by other than International Light Technologies. The equipment will be repaired or replaced, at our option, without charge to the owner for parts or labor incurred in such repair. This warranty shall not apply unless the equipment is returned for our examination with all transportation charges prepaid to International Light Technologies, 10 Technology Drive, Peabody, MA 01960. International Light Technologies has no other obligation or liability in connection with said equipment.

**ILT1000 device firmware is licensed with All Rights Reserved, with the following warranty disclaimer:**

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

## Appendix A:

### 1. Windows 7 and 8 Driver installation (when not automatically installed):

The following is a representative driver matrix from <http://www.ftdichip.com/Drivers/VCP.htm> . In Windows environments it is best to use the “setup executable” shown in the Comments section of the diagram below.

		Processor Architecture							Comments
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	PPC	ARM	MIPSII	MIPSIV	SH4	
Windows*	2014-09-29	Available as <a href="#">setup executable</a> Contact <a href="mailto:support1@ftdichip.com">support1@ftdichip.com</a> if looking to create customized drivers			-	-	-	-	2.12.00 WHQL Certified Available as <a href="#">setup executable</a> <a href="#">Release Notes</a>
Linux	2009-05-14	<a href="#">1.5.0</a>	<a href="#">1.5.0</a>	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19 Refer to <a href="#">TN-101</a> if you need a custom VCP VID/PID in Linux
Mac OS X	2012-08-10	<a href="#">2.2.18</a>	<a href="#">2.2.18</a>	<a href="#">2.2.18</a>	-	-	-	-	Refer to <a href="#">TN-105</a> if you need a custom VCP VID/PID in MAC OS
Windows CE 4.2-5.2**	2012-01-06	<a href="#">1.1.0.20</a>	-	-	<a href="#">1.1.0.20</a>	<a href="#">1.1.0.10</a>	<a href="#">1.1.0.10</a>	<a href="#">1.1.0.10</a>	-
Windows CE 6.0/7.0	2012-01-06	<a href="#">1.1.0.20</a> <a href="#">CE 6.0 CAT</a> <a href="#">CE 7.0 CAT</a>	-	-	<a href="#">1.1.0.20</a> <a href="#">CE 6.0</a> <a href="#">CAT</a> <a href="#">CE 7.0</a> <a href="#">CAT</a>	<a href="#">1.1.0.10</a>	<a href="#">1.1.0.10</a>	<a href="#">1.1.0.10</a>	For use of the CAT files supplied for ARM and x86 builds refer to <a href="#">AN 319</a>
Windows CE 2013	2015-03-06	<a href="#">BETA</a>	-	-	<a href="#">BETA</a>	-	-	-	BETA VCP Driver Support for WinCE2013

### Windows 8.x environments:

In the initial release of Windows 8, and this may be true in subsequent releases, some customers have found they had to load FTDI drivers as documented above. Windows 8, however, is considerably more stringent when it comes to drivers. Its default behavior is to only allow “signed” drivers to be loaded. While FTDI indicates their drivers are signed for Windows 8, sometimes the operating system is requiring configuration to allow unsigned drivers. This is well documented on the Internet, and summarized as follows (exact sequence and wording may differ depending on the version of Windows 8):

- a. Enter the Settings screen. This can be accomplished with Win+I or right-to-left swipe from the right side of a touch screen and selecting "Settings"
- b. At the very bottom of the Settings screen, select the link for "Change PC Settings"
- c. Select "General"
- d. Select "Advanced Startup"
- e. Select "Restart"
- f. Select "Troubleshoot"
- g. Select "Advanced Options"
- h. Select "Startup Settings"
- i. Select "Restart"
- j. Select "Disable driver signature enforcement". Note that this is only active for this power cycle, but this will allow the new drivers to be used for all subsequent power cycles, including plugging in new devices.

## 2. Installation for MAC with terminal software use only

The ILT1000 is based on a standard FTDI interface that provides a USB-to-Serial connection to a MAC OS X system. To interact on a MAC, perform the following steps:

1. Plug the ILT1000 into an available USB slot.
2. If the device is not being recognized automatically, please install the drivers for the Mac OS found at <http://www.ftdichip.com/Drivers/VCP.htm> please refer to the diagram on page 5 of this guide

### NOTE:

Once the file is downloaded, typically to the desktop, the downloaded file has to be run to install the drivers. Upon attempting to install the drivers, the system may report an error related to only allowing the execution of applications from the "Mac App Store" or the "Mac App Store and Identified developers". To resolve this, modify the setting within System Preferences > Security & Privacy dialog. Note the lock in the lower left-hand corner of this dialog box. This will need to be unlocked, by an administrator, to change this setting. After installation of the drivers, this setting can be reverted.

3. Open a Terminal window on the MAC.
  - a. The Terminal program is found at: Applications > Utilities > Terminal
4. From within Terminal, type **ls /dev**
  - a. This will list all the devices found on the system.
5. Locate **tty.usbserial[.....]A** and **tty.usbserial[.....]B**
  - a. Note that, due to the large amount of tty devices typically available, the tty.usbserial[...] device may scroll off the screen. If it is not seen, simply scroll up to find it.
  - b. The device with the 'B' is the correct tty device.
  - c. The [...] will be a device specific string that needs to be inserted in the next line.
6. From within Terminal, type **screen /dev/tty.usbserial[.....]B 115200**
  - a. Example: **screen /dev/tty.usbserial-TIWNK5JQB 115200**
  - b. 115200 is the baud rate to be used. This value is 9600 for firmware versions earlier than 1.1.0.0.
7. Type **echoon** followed by pressing Enter.
  - a. The screen will not display the characters while typing the above command
  - b. Once entered, this command instructs the ILT1000 to echo all characters to the Terminal program.
8. Type **help** to display the ILT1000 commands.
  - a. These commands can now be executed within the Terminal program.