SEALEVEL®

Ultra COMM+2.PCIe

User Manual
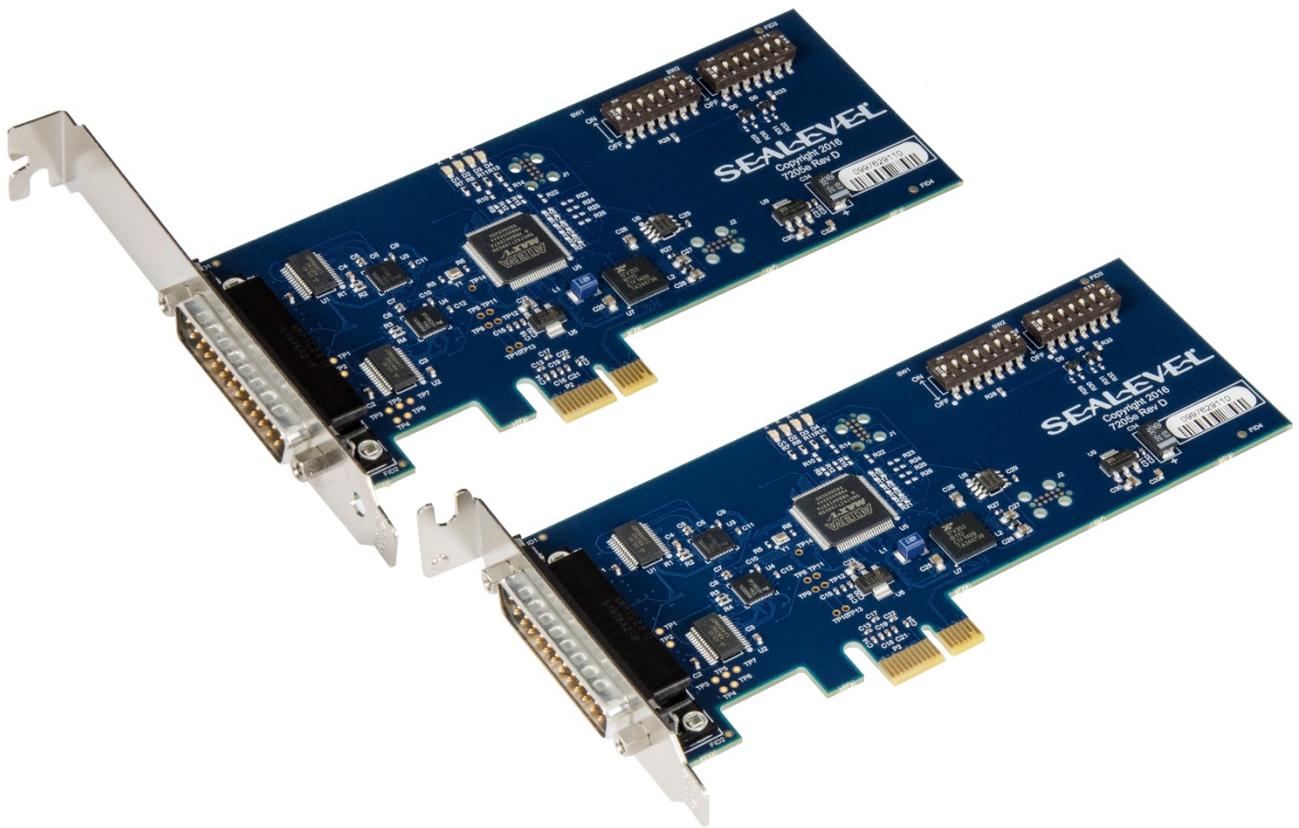
Item# 7205ec & 7205ecS

Contents

Introduction

The Sealevel Ultra COMM+2.PCIe (Item# 7205ec) is a PCI Express 2.0 Gen 1 compliant interface adapter with two field selectable RS-232/422/485 asynchronous serial ports supporting data rates exceeding 1 Mbps for industrial automation and control applications.

Configure the serial ports as RS-232 for standard serial COM port requirements. Choose the RS-422 mode for long distance device connections up to 4000ft. where noise immunity and high data integrity are essential. Select RS-485 and capture data from multiple peripherals in an RS-485 multi-drop network. Up to 31 RS-485 compliant devices can be connected to each port to automate your data collection. You can even mix the ports in any of the electrical interface combinations to provide maximum flexibility in your application.

Under Windows, in RS-485 mode the transmitter is automatically enabled in hardware, eliminating the need for application software control. This allows the 7205ec to be used with standard serial communications applications and removes the risk of bus contention and data corruption. In RS-232 mode, all modem control signals are implemented for maximum compatibility with a wide range of serial peripherals. The Sealevel SeaCOM for Windows software driver and utilities make installation and operation easy in Windows 7/8.1/10.

The Ultra COMM+2.PCIe ships with a Low Profile PCIe bracket that will only work in a Low Profile PCIe slot. If you need a standard size PCIe bracket, please order Item# 7205ecS. The product is RoHS compliant and meets the requirements of RoHS (2011/65/EU) directive.

Features

- Two serial ports configurable for RS-232/422/485

- On board DIP switch configuration with Windows device driver override

- Ultra High-speed UART with 256-byte TX and RX FIFOs

- Asynchronous data rates exceeding 1 Mbps

- Automatic RS-485 enable/disable for Windows applications

- Windows driver selectable 250K slew rate limiting, to minimize electromagnetic interference

- Includes 36" cable that terminates to two DB9M connectors

Before You Get Started

What's Included

The Ultra COMM+2.PCIe is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- **Ultra COMM+2.PCIe Adapter**
- **CA203 – DB25F to (2) DB9M Cable, 36" in Length**

Advisory Conventions

Warning - The highest level of importance used to stress a condition where damage could result to the product or the user could suffer serious injury.

Important– The middle level of importance used to highlight information that might not seem obvious or a situation that could cause the product to fail.

Note – The lowest level of importance used to provide background information, additional tips, or other non-critical facts that will not affect the use of the product.

Optional Items

Depending upon your application, you are likely to find one or more of the following items useful with the 7205ec. All items can be purchased from our website (www.sealevel.com) by calling our sales team at (864) 843-4343.

DB9 to DB25 Serial Cable (Part Number CA177)

The CA177 is a standard AT-style RS-232 modem cable with a DB9 female connector on one end and a DB25 male connector on the other end. Simply connect the DB-9F connector to the DB9 serial port on your computer or host, and then connect the DB-25M connector to your RS-232 serial modem or other compatible RS-232 serial device. The six foot cable is fully shielded with dual thumbscrews at each connector. The molded connectors integrate strain relief to prevent damage to the cable or connectors. All DB9 modem control signals are implemented and the cable is pinned to EIA-232 standards.

DB9 Serial Extension Cable (Part Number CA127)

The CA127 is a standard DB9F to DB9M serial extension cable. Extend a DB9 cable or locate a piece of hardware where it is needed with this six foot (72 inch) cable. The connectors are pinned one-to-one so the cable is compatible with any device or cable with DB9 connectors. The cable is fully shielded against interference and the connectors are molded to provide strain relief. Dual metal thumbscrews secure the cable connections and prevent accidental disconnection.

RS-422 to RS-530 Cable (Part Number CA176)

DB9 Female (RS-422) to DB25 Male (RS-530) Cable, 10 inch Length. Convert any Sealevel RS-422 DB9 Male Async Adapter to an RS-530 DB25 Male pinout. Useful in situations where RS-530 cabling exists and a multiport Sealevel RS-422 adapter is to be used.

Terminal Block

Terminal Block Kit - (Part Number KT105)

The KT105 terminal block kit breaks out a DB9 connector to 9 screw terminals to simplify field wiring of serial connections. It is ideal for RS-422 and RS-485 networks, yet it will work with any DB9 serial connection, including RS-232. The KT105 includes one DB9 terminal block (part number TB05) and one CA127 extension cable. The TB05 includes holes for board or panel mounting. The TB05 is designed to connect directly to Sealevel DB9 serial cards or any cable with a DB9M connector.

Card Setup

Address and IRQ Selection

The 7205ec is automatically assigned memory addresses and IRQs by your motherboard BIOS or by a "Plug-n-Play" Operating System. Adding or removing other hardware or moving the adapter to another slot may change the assignment of memory addresses and IRQs.

Clock Modes and Baud Rates

The 7205ec derives a 125MHz clock from the PCI express link for the Baud Rate Generator (BRG) which is divided by a clock prescaler (1 or 4) and a 16-bit clock divisor to obtain a sampling clock of 16X, 8X, or 4X the serial data rate. The BRG offers a wide range of possible baud rates. Under Windows and Linux, the best choice of divisor is made automatically by the driver. The bit rate error is within the +/– 2% recommended tolerance for proper serial communication.

Electrical Interface Selection via Hardware

Each serial port on the 7205ec has the ability to be used as RS-232, RS-422, or RS-485. Port 1 is selectable via DIP-switch SW2 configuration, and Port 2 is selectable via DIP-switch SW1 configuration. Please use the following examples to configure your adapter.

Mode selection via hardware (DIP switches)

M1 Switch	M0 Switch	Mode
OFF	OFF	RS-232
OFF	ON	RS-422 (Default)
ON	OFF	RS-485 with Echo
ON	ON	RS-485 without Echo

RS-485 Enable Modes

RS-485 is ideal for multi-drop or network environments. RS-485 requires a tristate driver that will allow the electrical presence of the driver to be removed from the line. The driver is in a tristate or high impedance condition when this occurs. Only one driver may be active at a time and the other driver(s) must be tri-stated. The RS-485 driver of each 7205ec port enters and leaves tristate together with the changes to its output modem control signal Data Terminal Ready (DTR). Under Windows, configuring a 7205ec port to RS-485 configures the port to automatically assert its DTR output at the start of each transmission. This causes the RS-485 data transmission driver to leave tristate allowing it to transmit signals. In RS-485 mode under Windows the port is also set to automatically de-assert its DTR at the end of each transmission. This returns the RS-485 data transmission driver to tristate so that other drivers can transmit on the line.

Line Termination Selection via Hardware

Typically, the device at each end of the RS-485 bus must have line-terminating resistors (RS-422 terminates at the receive end only). When the end device is a 7205ec port, the board DIP switches can be used to connect a built in 120-ohm resistor between each RS-422/485 input pair in addition to a 510-ohm pull-up/pull-down combination that biases the RX+ and RX– receiver inputs. DIP switches SW2 (Port 1) and SW1 (Port 2) allow the user to customize each port individually to their specific requirements. If multiple 7205ec ports are configured in a RS-485 network, only the ports at each end should have switches T, PU, and PD ON.

If using the board in an RS-485 two-wire network, enable the two switches labeled 'L', which electrically connect the TX– and RX– pins together and the TX+ and RX+ pins together.

Switch	Default	Selection if ON
T	ON	Enables RS-422/RS-485 120 ohm termination between RX+ and RX– and between CTS+ and CTS–
PU	ON	Enables RS-422/RS-485 RX+ 510 ohm pull-up to 3.3V (biasing)
PD	ON	Enables RS-422/RS-485RX– 510 ohm pull-down to GND (biasing)
L	OFF	Enables RS-485 two-wire mode, connecting TX– to RX–
L	OFF	Enables RS-485 two-wire mode, connecting TX+ to RX+

Electrical Interface, Line Termination, and Echo Selection via Software

When a 7205ec has been installed under Windows, the DIP switch configuration can be overridden by software settings via the Port Settings tab in Device Manager. Changing one port to be overridden by software will automatically change the other port to also be software overridden. The initial software override configuration of each port is adopted from its DIP switch configuration. Both COM ports of the 7205ec should be closed by applications when the software override option is changed in Port Settings.
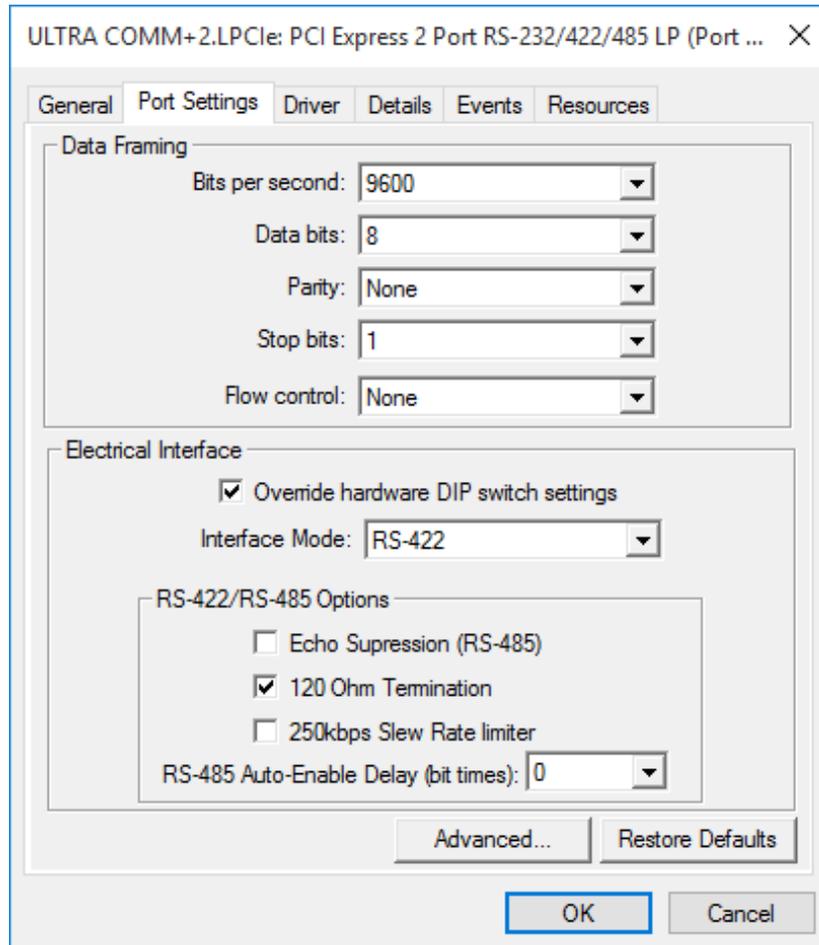
Slew Rate Limiting

Slew Rate Limiting (250kbps) is an additional configuration setting available only via software selection. It helps minimize the generation of electromagnetic interference in applications where higher baud rates are not required.

RS-485 Auto-Enable Delay

RS-485 Auto-Enable Delay is an additional configuration setting available only via software selection. It provides an ability to select a 0 to 15 bit-time delay that is inserted after the end of the last stop-bit of the last transmitted character. This delay controls when to automatically disable the RS-485 transmitter. This delay may be useful in long-cable networks.

On-board LED signal indicators

Driver	D1	D2	D3	D4
Loaded	Heartbeat (1 sec on/off)	M1	M0	T
Not Loaded	Heartbeat	Heartbeat	Heartbeat	Heartbeat

(a) If the driver is not loaded, all four (4) LEDs flash with the heartbeat signal and the serial port remains in tristate mode until the driver loads.

(b) If the driver is loaded, the LEDs reflect the current Port 1 mode and termination state in accordance with the table above, whether the states have been set by DIP switch SW2 or software control.

(c) M1 and M0 are lit if the DIP switch is OFF.

(d) T is lit if the DIP switch is ON meaning termination is enabled.

Software Installation

This section contains helpful information pertaining to the installation of supported Sealevel Systems, Inc. software packages. First, the process of acquiring the software is discussed. Next, the installation is detailed in a step-by-step guide for Windows and Linux operating systems.

Where to Get Sealevel Software

All Sealevel products are shipped with media containing the installers for each software package available. If the media is otherwise unavailable or if desired, the current versions of Sealevel software packages can be obtained from the Sealevel website (see following instructions). If you already have the Sealevel software, proceed to the Windows or Linux installation section.

- Sealevel software for Windows is available at this link:

  o [Software for Windows](#)

- Click on the 'Download File' link to download the current version.
- Proceed to the Manual Software Installation section.

Windows Installation

Do not connect the hardware until the software has been successfully installed.

To install Sealevel software, you must log in as an administrator or have administrator privileges.

1. Insert the Sealevel media into your PC.
2. If the 'AutoRun' feature is enabled for this media the software will automatically launch.
3. Otherwise, navigate to the root directory of the media and double-click the 'autorun.exe' application to launch the installation window.
4. Select 'Install' as demonstrated in the image below.
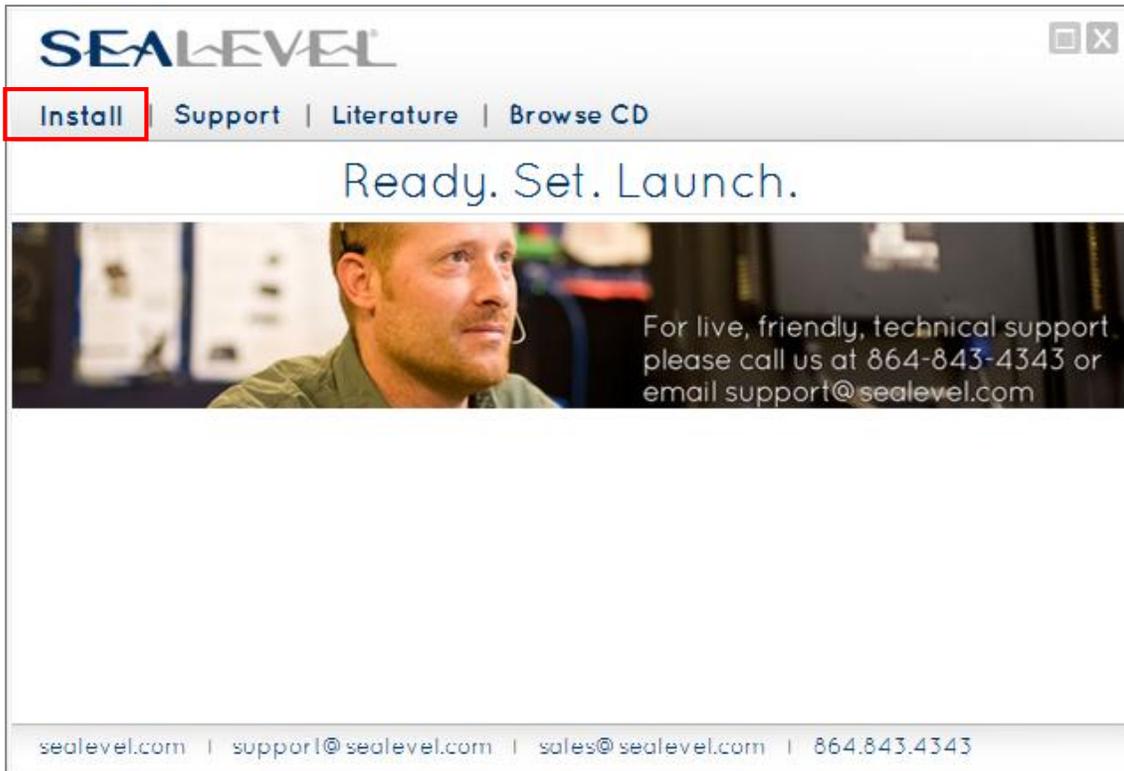
5. Type the part number for your adapter in the text box and press the 'Enter' key, or click on the drop box to scroll from the listing to select your product.
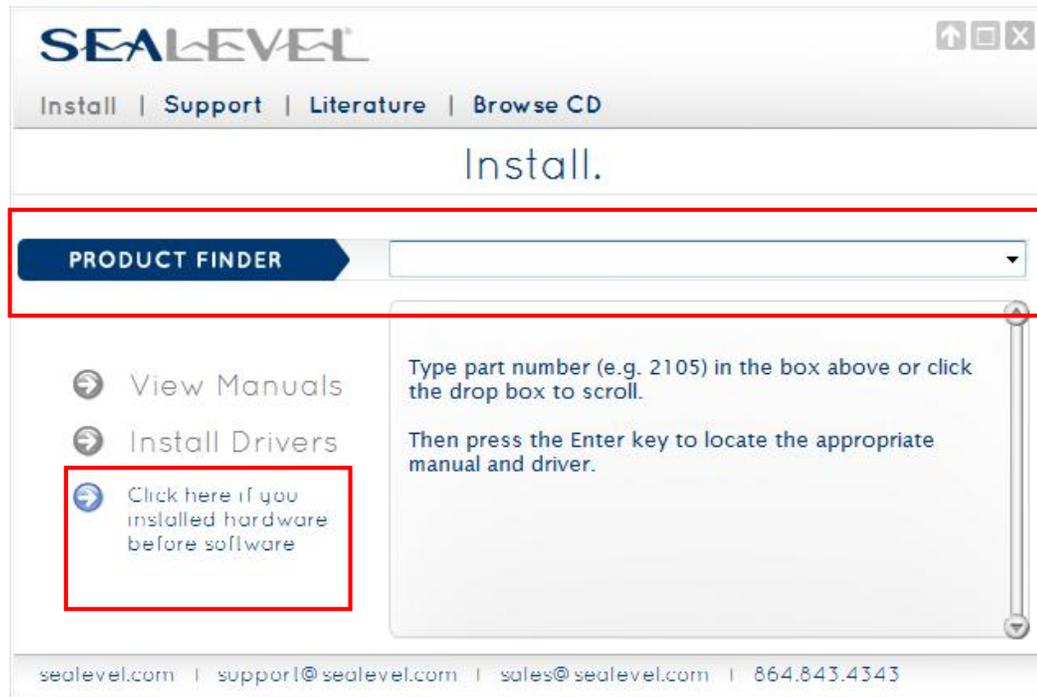
If you installed your hardware prior to loading/installing the software, please click on the 'Click here if you installed hardware before software' link and follow the listed instructions.

6. Click the 'Install Drivers' button to launch the Installation Wizard.

7. When the InstallShield Wizard' window appears, click the 'Next' button to initiate the software installation.

8. When the 'License Agreement' window appears, accept the terms and click 'Next' to continue. You can click the 'Print' button to print out a copy of the agreement for your records. If you do not accept the terms of the agreement, the wizard will stop.

9. When the 'Ready to Install the Program' window appears, click the 'Install' button to install the software onto the hard drive of your computer. Some versions of Windows will halt the installation and provide you with a dialog box which will ask you for permission for the installer to make changes to your computer. Click on the button to continue installation of your Sealevel software.

10. If prompted, reboot your computer for changes to take effect.

MANUAL SOFTWARE INSTALLATION

1. If you are installing the software package from the Sealevel media, browse the Sealevel Systems media 'Software' directory. For example: Software\SeaCOM\Windows\SeaCOM Installer.exe

2. If you are using Windows Vista or newer operating systems, right click on the installer executable and choose 'Run as Administrator'. If you are using an operating system prior to Windows Vista, double click on the executable to launch the InstallShield wizard and initiate the driver installation.

3. Please refer to step seven in the section above and follow the remaining installation steps.

Upgrading to the current SeaCOM driver

1. Download the current driver using the instructions from the Where to Get Sealevel Software section above. Please take note of the destination directory for download.
2. Follow the instructions in the subsequent section named Remove Hardware Using Device Manager.
3. Launch the SeaCOM installer executable from the directory where it was downloaded.
4. When the InstallShield Wizard' window appears, click the 'Next' button to initiate the software installation.
5. When the 'License Agreement' window appears, accept the terms and click 'Next' to continue. You can click the 'Print' button to print out a copy of the agreement for your records. If you do not accept the terms of the agreement, the wizard will stop.
6. When the 'Ready to Install the Program' window appears, click the 'Install' button to install the software onto the hard drive of your computer. Some versions of Windows will halt the installation and provide you with a dialog box which will ask you for permission for the installer to make changes to your computer. Click on the button to continue installation of your Sealevel software.
7. If prompted, reboot your computer for changes to take effect.

Linux Support

The 7205ec is supported natively in Linux kernels 3.7.0-rc6 and later.

Hardware Installation

|	Do not install the PCI Express board until the software has been successfully installed.

Once you have installed the software, install the 7205ec into an available PCI Express slot and boot the computer. The drivers that were installed during the software installation process will automatically be used to configure the adapter.

> NOTE: Once the hardware installation completes, you may need to restart the computer to finalize the installation process.

Verifying Installation

To confirm that the serial port has been successfully installed, look in Device Manager under 'Ports (COM &LPT)' and in parentheses should be a COM number assigned to each port number.

> Note: Your system will assign the next available COM number, which will vary by computer (COM7 and COM8 are shown in this example).
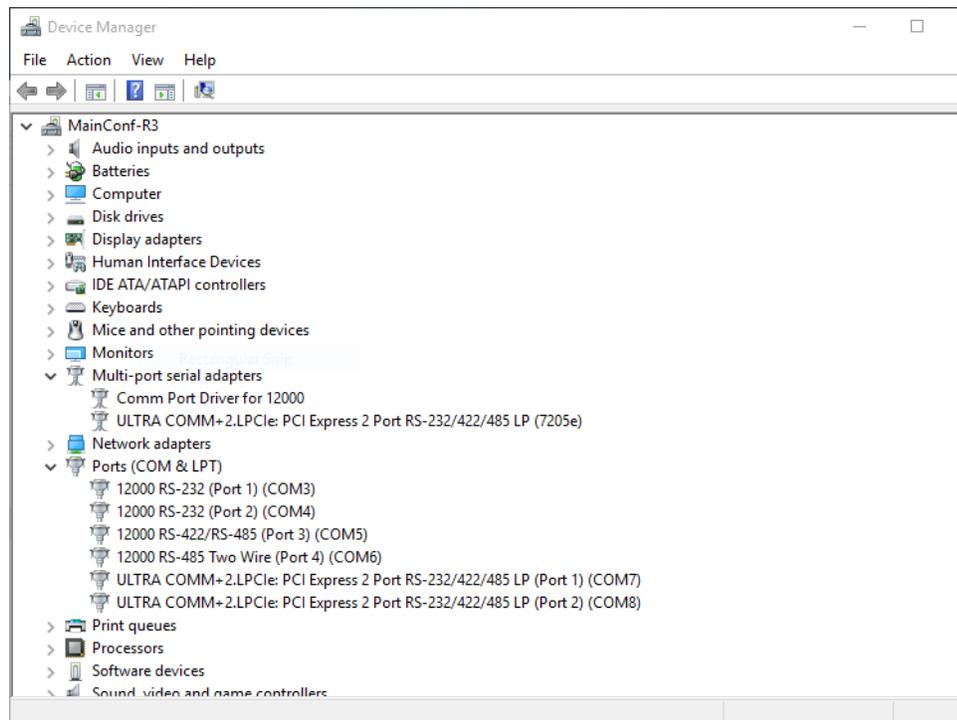
Uninstall Instructions

The SeaCOM software program adds entries to the system registry that are necessary for specifying the operating parameters for your device. To completely remove the hardware and associated software, follow the steps in the order they appear.

> ⚠️ **Important!**
> Start with the hardware installed in a PCI Express slot.
> Do not remove until instructed to do so.

Remove Hardware Using Device Manager

To access Device Manager, follow the steps below:

1. Open Windows Explorer

2. Right click on 'Computer' or 'My Computer' icon.

3. Click 'Manage' in the fly out menu to launch the 'Computer Management' console window.

4. In the left pane under 'System Tools', click 'Device Manager'.

5. In right pane, expand the 'Multi-port serial adapters' section by double clicking it.

6. Locate the Ultra COMM+2.PCIe device in the listing.

7. Right click on the entry for the 'Ultra COMM+2.PCIe' device and click 'Uninstall'

8. Confirm that you want to uninstall the device by clicking the 'OK' button. This will remove the hardware, COM ports and all registry entries from your computer. Keep the device connected.

9. The window will refresh and the entry for the device will no longer appear. Proceed with removing the software via Windows Control Panel.

If you want to completely remove the hardware and software from your computer, power down your computer, remove the device from the PCI Express slot, and then reboot your computer to complete the uninstallation.

Technical Description

The Sealevel Systems 7205ec provides a PCIe interface adapter with two (2) asynchronous serial ports providing versatile, field selectable RS-232 interfaces for modems, printers and plotters, as well as RS-422/485 interfaces for industrial automation and control applications.

The 7205ec provides UARTs with 256 byte TX and RX FIFOs, programmable baud rates, data format, and interrupt control.

DB25 Male Connector Pin Assignments

The 7205ec includes a DB25 male connector for attaching the included cable (Part Number CA203).

Pin#	RS-232	RS-422/485	Pin#	RS-232	RS-422/485
1	Port 1 RD (I)	Port 1 RX– (I)	14	Port 2 TD (O)	Port 2 TX– (O)
2	Port 1 CTS (I)	Port 1 CTS– (I)	15	Port 2 RTS (O)	Port 2 RTS– (O)
3	Port 1 DCD (I)	Port 1 RX+ (I)	16	Port 2 DSR (I)	Port 2 RTS+ (O)
4	Port 1 TD (O)	Port 1 TX– (O)	17	Port 2 DTR (O)	Port 2 TX+ (O)
5	Port 1 RTS (O)	Port 1 RTS– (O)	18	Port 2 RI (I)	Port 2 CTS+ (I)
6	Port 1 DSR (I)	Port 1 RTS+ (O)	19	N/C	N/C
7	Port 1 DTR (O)	Port 1 TX+ (O)	20	N/C	N/C
8	Port 1 RI (I)	Port 1 CTS+ (I)	21	N/C	N/C
9	GND	GND	22	N/C	N/C
10	GND	GND	23	N/C	N/C
11	Port 2 RD (I)	Port 2 RX– (I)	24	N/C	N/C
12	Port 2 CTS (I)	Port 2 CTS– (I)	25	N/C	N/C
13	Port 2 DCD (I)	Port 2 RX+ (I)			

"N/C" = Not Connected (unused)

"–" = Reserved

(I) = Input

(O) = Output

DB9 Male Cable Pin Assignments

The 7205ec includes a cable (Part Number CA203) with a DB25 female connector terminating to a pair of DB9 male connectors. The DB25F connector on the cable plugs into the DB25M connector on the board. The DB9M connectors are compatible with a variety of serial peripherals. Their RS-232 pin assignment meets EIA/TIA/ANSI-574 DTE specifications for DB9 type connectors.

Pin#	RS-232	RS-422/485
1	DCD (I)	RX+ (I)
2	RD (I)	RX– (I)
3	TD (O)	TX– (O)
4	DTR (O)	TX+ (O)
5	GND	GND
6	DSR (I)	RTS+ (O)
7	RTS (O)	RTS– (O)
8	CTS (I)	CTS– (I)
9	RI (I)	CTS+ (I)

(I) = Input

(O) = Output

Note: Please terminate any unused control signals. The most common way to do this in RS-232 mode is to connect RTS to CTS and RI. Also, connect DTR to DCD and DSR. In RS-422/485 mode connect RTS+ to CTS+ and RTS– to CTS–. Terminating these pins, if not used, will help ensure the best performance from the adapter.

Technical Specifications

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0º to 70º C (32º to 158º F)	-50º to 105º C (-58º to 221º F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

MTBF (TELCORDIA SR-332 PREDICTION METHOD)

Mean Time Between Failure	1,300,000 hours	At 25º C ambient

Manufacturing

All Sealevel Systems Printed Circuit boards are built to UL 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Power Consumption

| Typical Power Draw	3W	
Supply voltage	+3.3 VDC	+12 VDC
Rating	300 mA	160mA

Appendix A – Troubleshooting

Once you have confirmed that the serial adapter COM ports are listed in Device Manager, use the Sealevel WinSSD utility to verify communications. Detailed help is included in the WinSSD utility.

Please set the adapters Electrical Interface for either RS-232 or RS-422.

If you have a loopback plug, put it on the adapter connector. If you do not have a loopback plug, you can use female jumper wires to make the connection to verify the functionality.

RS-232 requires pins 2 (Receive) & 3 (Transmit) to be jumpered as shown in this graphic:
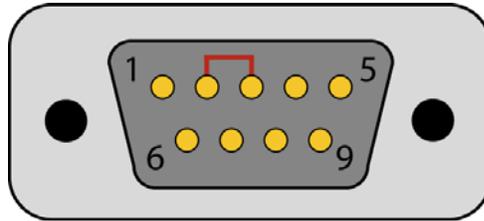
If you do not have a loopback plug or jumper wires handy, you can use a metal device such as a knife, screwdriver, key or paperclip to short pins two and three.

RS-422 requires pins 1 & 4 (Receive + and Transmit +) and also pins 2 & 3 (Receive - and Transmit -) to be jumpered as shown in this graphic:
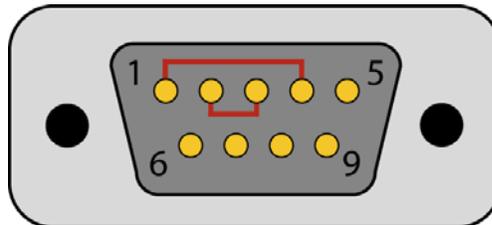
To test communications, launch the WinSSD utility in the SeaCOM folder in the 'Start' menu.

On the 'Port Information' tab, select the associated COM port and click the 'Open' button.

This will first open the COM port. From this tab the port can also be closed (See image below). Click the 'Settings' button to open the COM Port Properties dialog box. This will allow the Port Settings to be altered.
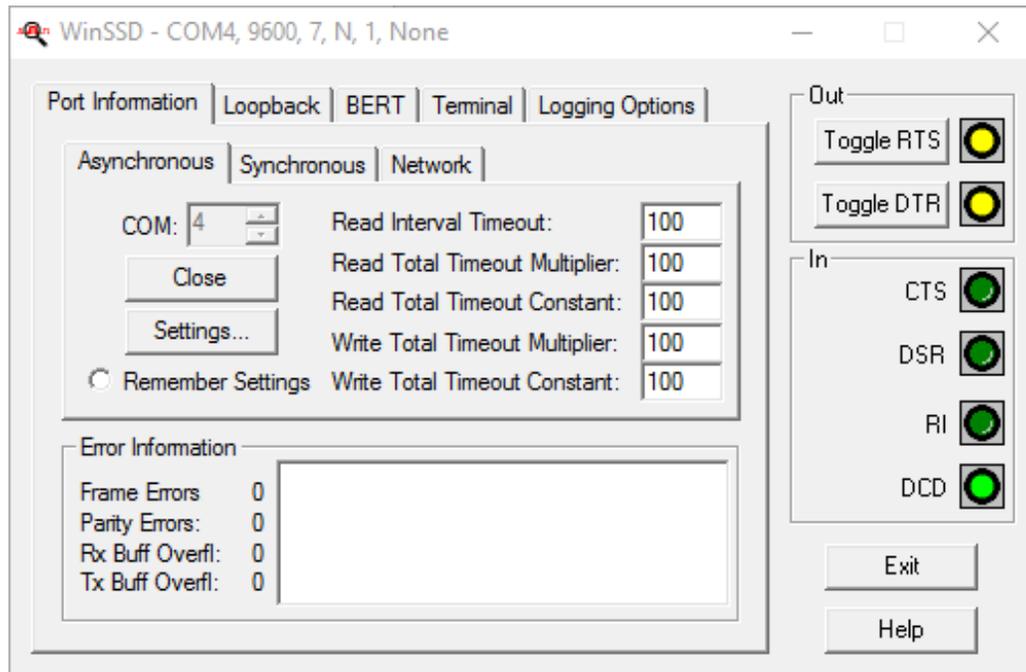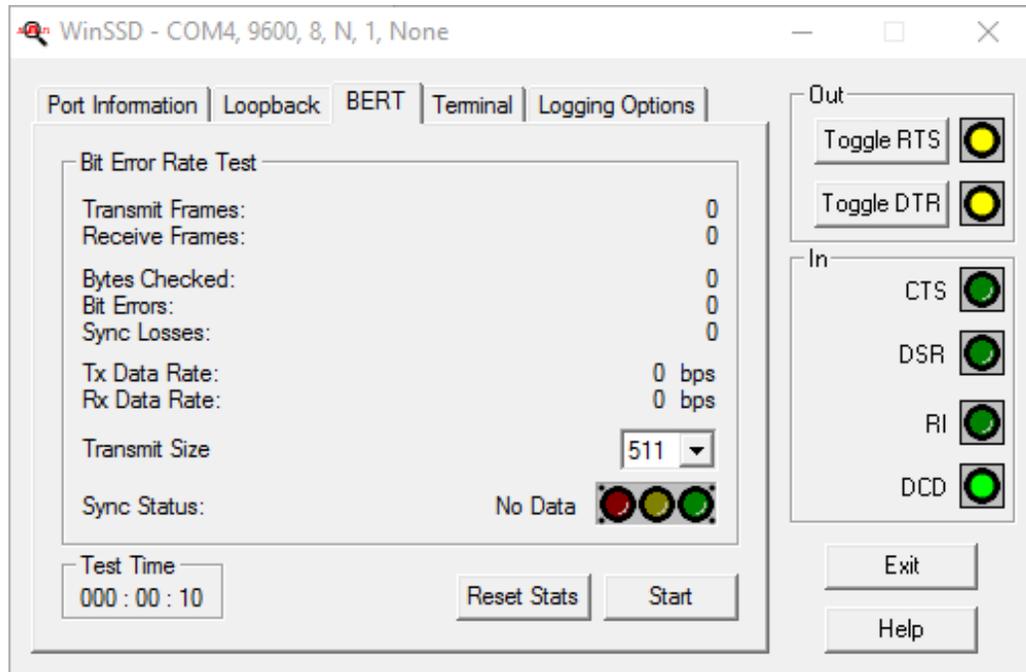
Change your parameters to 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control, as pictured below.
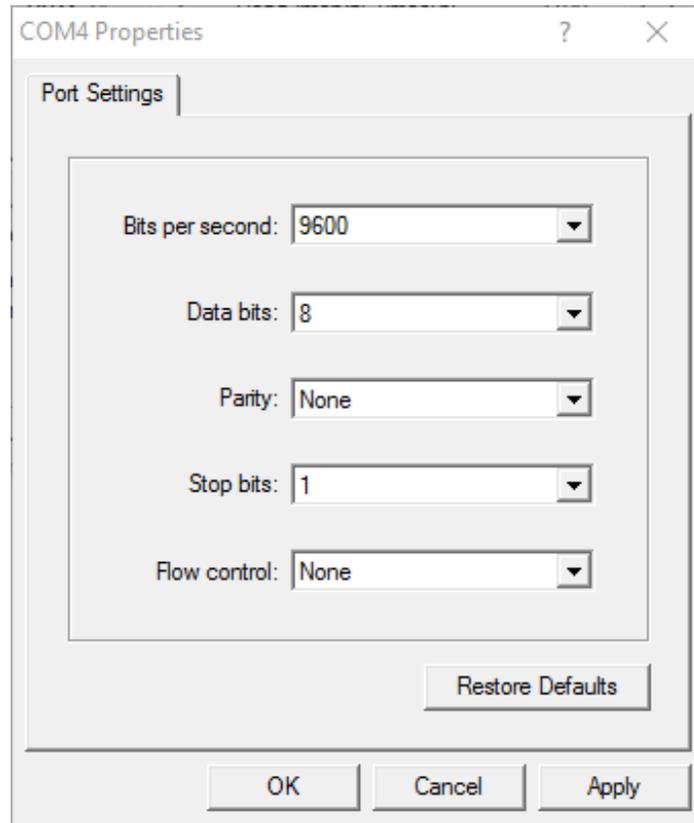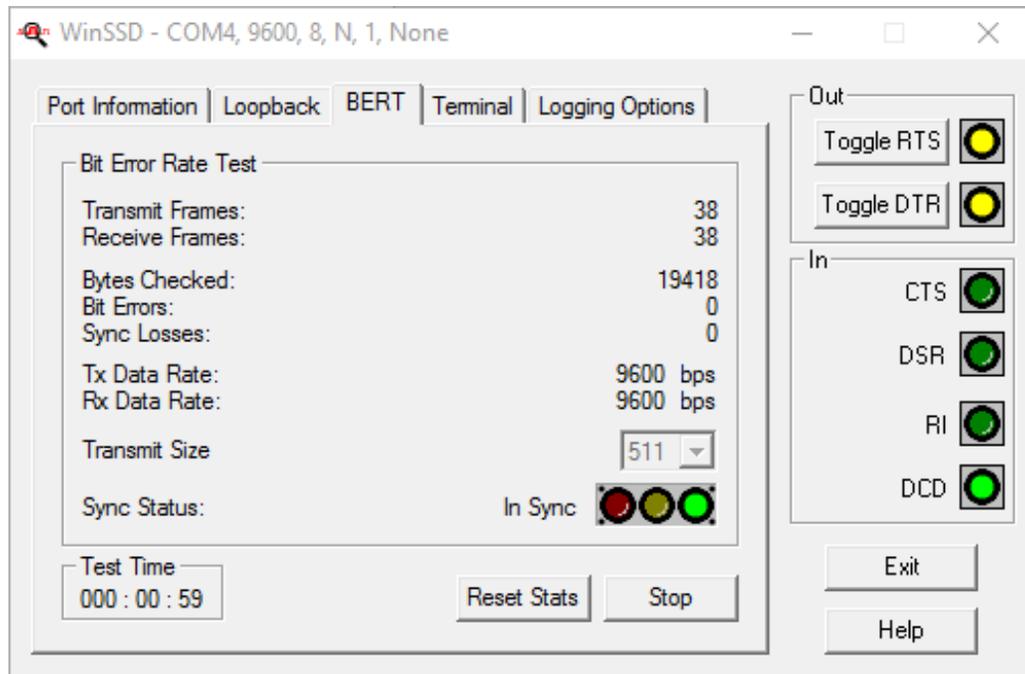

Click 'Apply' and 'OK'.

In the main WinSSD window, click on the 'BERT' tab (Bit Error Rate test).

Click on the 'Start' button.

If the COM port is properly working, the Sync Status green light will glow and the Transmit Frames and Receive Frames will increase. The Tx and Rx Data Rates will show the calculated data rate.

This verifies that the adapter is working properly. You can continue testing this port with different configurations or proceed with testing other ports, if necessary.

Appendix B - Handling Instructions

ESD Warnings

Electrostatic Discharges (ESD)

A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must therefore be observed. Always take the following precautions:

1. Transport boards and cards in electrostatically secure containers or bags.
2. Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
3. Only touch electrostatically sensitive components when you are properly grounded.
4. Store electrostatically sensitive components in protective packaging or on anti-static mats.

Grounding Methods

The following measures help to avoid electrostatic damages to the device:

5. Cover workstations with approved antistatic material. Always wear a wrist strap connected to a properly grounded workplace.
6. Use antistatic mats, heel straps, and/or air ionizers for more protection.
7. Always handle electrostatically sensitive components by their edge or by their casing.
8. Avoid contact with pins, leads, or circuitry.
9. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
10. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
11. Use field service tools such as cutters, screwdrivers, and vacuum cleaners that are conductive.

Appendix C - Electrical Interface

RS-232

Quite possibly the most widely used communication standard is RS-232. This implementation has been defined and revised several times and is often referred to as RS-232-C/D/E or EIA/TIA-232-C/D/E. It is defined as "Interface between Data Terminal Equipment and Data Circuit- Terminating Equipment Employing Serial Binary Data Interchange". The mechanical implementation of RS-232 is on a 25-pin D sub connector. The IBM PC computer defined the RS-232 port on a 9 pin D sub connector and subsequently the EIA/TIA approved this implementation as the EIA/TIA-574 standard. This standard has defined as the "9-Position Non-Synchronous Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange". Both implementations are in wide spread use and will be referred to as RS-232 in this document. RS-232 is capable of operating at data rates up to 20K bps / 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 often operates at 38.4K bps over very short distances. The voltage levels defined by RS-232 range from -12 to +12 volts. RS-232 is a single ended or unbalanced interface, meaning that a single electrical signal is compared to a common signal (ground) to determine binary logic states. A voltage of +12 volts (usually +3 to +10 volts) represents a binary 0 (space) and -12 volts (-3 to -10 volts) denote a binary 1 (mark). The RS-232 and the EIA/TIA-574 specification define two types of interface circuits Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). The Sealevel Systems Adapter is a DTE interface.

RS-422

The RS-422 specification defines the electrical characteristics of balanced voltage digital interface circuits. RS-422 is a differential interface that defines voltage levels and driver/receiver electrical specifications. On a differential interface, logic levels are defined by the difference in voltage between a pair of outputs or inputs. In contrast, a single ended interface, for example RS-232, defines the logic levels as the difference in voltage between a single signal and a common ground connection. Differential interfaces are typically more immune to noise or voltage spikes that may occur on the communication lines. Differential interfaces also have greater drive capabilities that allow for longer cable lengths. RS-422 is rated up to 10 Megabits per second and can have cabling 4000 feet long. RS-422 also defines driver and receiver electrical characteristics that will allow 1 driver and up to 32 receivers on the line at once. RS-422 signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

RS-485

RS-485 is backwardly compatible with RS-422; however, it is optimized for party line or multi-drop applications. The output of the RS-422/485 driver is capable of being Active (enabled) or Tri-State (disabled). This capability allows multiple ports to be connected in a multi-drop bus and selectively polled. RS-485 allows cable lengths up to 4000 feet and data rates up to 10 Megabits per second. The signal levels for RS-485 are the same as those defined by RS-422. RS-485 has electrical characteristics that allow for 32 drivers and 32 receivers to be connected to one line. This interface is ideal for multi-drop or network environments. RS-485 tri-state driver (not dual-state) will allow the electrical presence of the driver to be removed from the line. Only one driver may be active at a time and the other driver(s) must be tri-stated. RS-485 can be cabled in two ways, two wire and four wire mode. Two-wire mode does not allow for full duplex communication, and requires that data be transferred in only one direction at a time. For half-duplex operation, the two transmit pins should be connected to the two receive pins (Tx+ to Rx+ and Tx- to Rx-). Four wire mode allows full duplex data transfers. RS-485 does not define a connector pin-out or a set of modem control signals. RS-485 does not define a physical connector.

Appendix D - Asynchronous Communications

Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver that assembles the bits back into a character. Data rate, error checking, handshaking, and character framing (start/stop bits) are pre-defined and must correspond at both the transmitting and receiving ends.

Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. A starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8) defines character boundaries for asynchronous communications. The end of the character is defined by the transmission of a pre-defined number of stop bits (usually 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits.
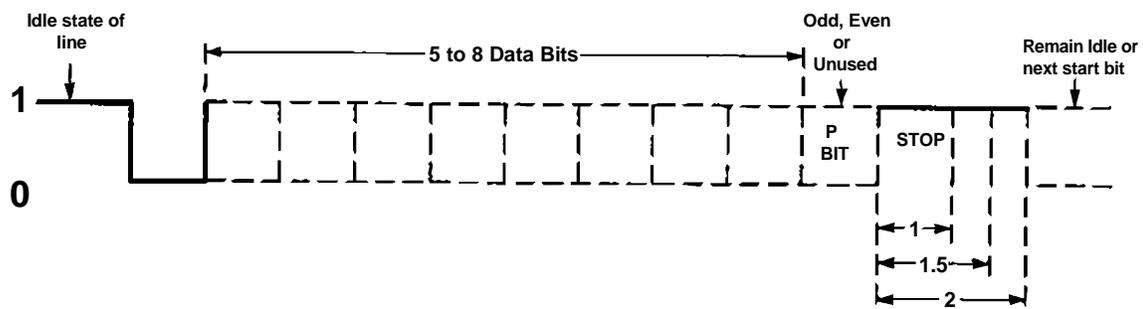

Figure 1 - Asynchronous Communications Bit Diagram

This special bit is called the parity bit. Parity is a simple method of determining if a data bit has been lost or corrupted during transmission. There are several methods for implementing a parity check to guard against data corruption. Common methods are called (E)ven Parity or (O)dd Parity. Sometimes parity is not used to detect errors on the data stream. This is referred to as (N)o parity. Because each bit in asynchronous communications is sent consecutively, it is easy to generalize asynchronous communications by stating that each character is wrapped (framed) by pre-defined bits to mark the beginning and end of the serial transmission of the character. The data rate and communication parameters for asynchronous communications have to be the same at both the transmitting and receiving ends. The communication parameters are baud rate, parity, number of data bits per character, and stop bits (i.e. 9600,N,8,1).

Appendix E – Ground loop Phenomenon

What is Ground Loop?

Ground loop Phenomenon occurs when two (or more) pieces of equipment are connected together with a common ground and a different ground potential exists at each location. This current can cause the connected equipment to experience noise that in turn causes data transmission errors. In the extreme this ground current can cause equipment malfunction or even destruction.

Cabling Recommendations

When connecting the 7205ec in a RS-485 network, care should be taken that both ends of the network are not isolated from ground (see Figure 8). This "floating" ground condition could cause the capacitive or inductive coupling of voltages that will cause a break down in the DC to DC converter circuit or in the opto-isolator circuit. This condition will cause data errors and possibly destruction of the receiver circuit.
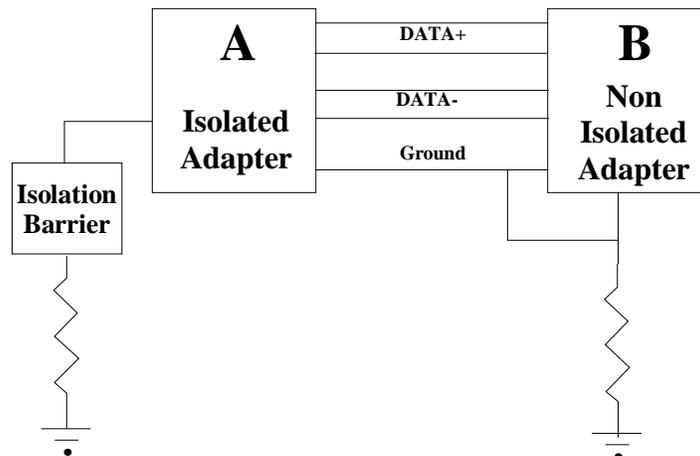
Appendix F – Mechanical Drawing
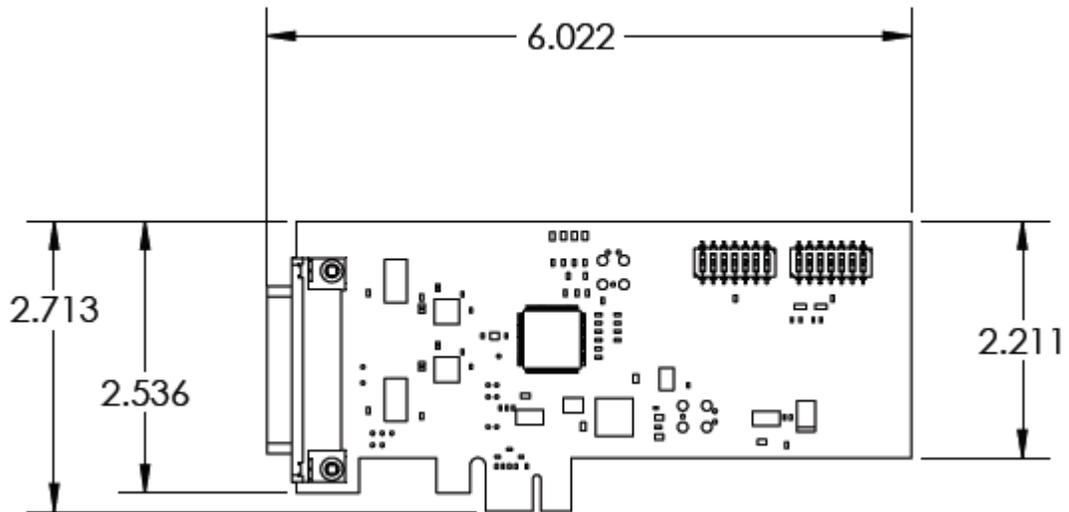
Warranty

Sealevel's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured I/O products. Relio™ industrial computers are warranted for a period of two years and the R9 family is warranted for a five-year period from date of purchase. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at its Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing. Sealevel achieved ISO-9001:2008 certification in 2011.

Warranty Policy

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for the warranty period. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect, abuse, accidents, or acts of nature are not covered under this warranty.

Warranty service may be obtained by delivering the Product to Sealevel and providing proof of purchase. Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Sealevel, and to use the original shipping container or equivalent. Warranty is valid only for original purchaser and is not transferable.

This warranty applies to Sealevel manufactured Product. Product purchased through Sealevel but manufactured by a third party will retain the original manufacturer's warranty.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found are subject to repair/retest charges. A purchase order or credit card number and authorization must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

How to obtain an RMA (Return Merchandise Authorization)

If you need to return a product for warranty or non-warranty repair, you must first obtain an RMA number. Please contact Sealevel Systems, Inc. Technical Support for assistance:

Available   Monday – Friday, 8:00AM to 5:00PM EST
Phone   864-843-4343
Email   support@sealevel.com

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Regulatory

FCC STATEMENT

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. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EUROPEAN COMMUNITY

This equipment has been evaluated or tested and found in compliance with the requirements of the following directives issued by the European Commission:

- EMC Directive **2004/108/EC**
- RoHS Directive **2011/65/EU**