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UltraCOMM+2.LPCIe

User Manual | 7205e and 7205eS



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Introduction

The Sealevel COMM+2.LPCIe (Item# 7205e) provides a PCI Express 1.0a compliant interface adapter with two asynchronous serial ports for industrial automation and control applications. The serial ports are field selectable for RS-232, RS-422, or RS-485 and support data rates to 921.6K bps.

Configure both 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 devices can be connected to each port to automate your data collection. You can even mix the ports in any of the interface combinations to provide maximum flexibility to your application.

In RS-485 mode, the transmitter is automatically enabled in hardware, eliminating the need for application software control. This allows the 7205e 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 software driver and utilities make installation and operation easy XP, Vista, Windows 7, Windows 8, and Linux operating systems.

The 7205e ships with a low profile PC bracket for use in systems with a low profile PCI Express slot. If you need a standard size PC bracket, order the 7205eS.

Features

- PCI Express two-port serial interface adapter
- Each port configurable for RS-232, RS-422, or RS-485
- High performance 16C950 UART with 128-byte FIFOs
- Each port supports data rates to 921.6K bps
- Oscillator and clock prescalar support wide range of baud rates
- Supports 9-bit protocol framing
- PCI Express 1.0a compliant via X1 connector
- Compatible with all low profile and standard size PCI Express slots
- All modem control signals implemented in RS-232 mode
- Includes 36” cable that terminates to two DB9M connectors



Before You Get Started

What's Included

Depending on the PC bracket ordered, the 7205e is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel for replacement.

- COMM+2.LPCIe – Two-Port RS-232/422/485 Serial Interface

  7205e – PCI Express Board with Low Profile PC Bracket

  7205eS – PCI Express Board with Standard Height PC Bracket

- 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.

Hardware Description



PCI Express Board

The 7205e is a low profile PCI Express 1.0a compliant board via single lane x1 slot. It can be used in any single- or multi-lane PCI Express slot. It is available in standard height PCI Express as item# 7205eS.

DB25M Board Connector

The board integrates a DB25 male connector for interfacing the two serial ports via the included cable.

DB9M Serial Connectors

The 7205e ships with a two-port cable (Item# CA203) that includes four DB9 male serial connectors. The pin out for these connectors is detailed in the following Technical Description section.



Hardware Configuration

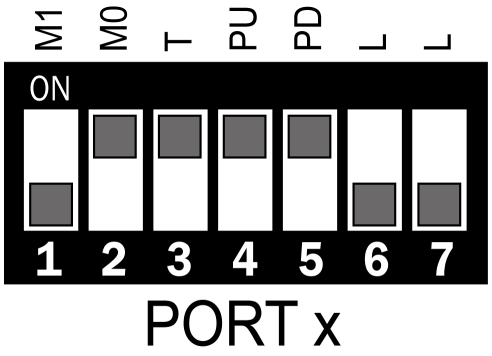
There are two sets of 7-position dipswitches on the board that are used to set the electrical interface, termination, and biasing. The dipswitch located at 'SW1' is labeled 'PORT 1' and configures the first serial port. The dipswitch located at 'SW2' is labeled 'PORT 2' and configures the second serial port. The labels and description of the function for each switch are detailed in the following table.

Dipswitch Settings

Switch	Description
M1	Sets the electrical interface mode (with M0)
M0	Sets the electrical interface mode (with M1)
T	Adds or removes 120 termination
PU	Adds or removes 1K pull-up resistor in RS-422/485 mode
PD	Adds or removes 1K pull-down resistor in RS-422/485 mode
L	Connects TX– to RX– for RS-485 two-wire operation
L	Connects TX+ to RX+ for RS-485 two-wire operation

The location of the dipswitches is outlined in green in the image below. The default configuration settings are shown in drawing.





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Electrical Interface Modes

Each port on the 7205e can be individually configured for RS-232, RS-422, or RS-485 mode. The first two switches labeled 'M1' and 'M0' are used to select the electrical interface. To simplify installation and testing the board is shipped in RS-422 mode. Use the settings in the table below to assist you in configuring the electrical interface.

M1	M0	Interface
OFF	OFF	RS-232
OFF	ON	RS-422 [Default]
ON	OFF	RS-485 ECHO Enabled
ON	ON	RS-485 No ECHO

Termination & Biasing Resistors

Typically, each end of the RS-485 bus must have line terminating resistors enabled (RS-422 should terminate the receive end only). A 120 ohm resistor is across each RS-422/485 input in addition to a 1K ohm pull-up and pull-down combination that biases the receiver inputs. Use the switches detailed in the table below to customize the interface to your specific requirements.

If using the board in an RS-485 two-wire network, enable the two switches labeled 'L', which tie the positive/negative transmit/receive pairs together.

Switch	Default	Description
T	ON	Adds 120Ω termination, OFF to remove
PU	ON	Adds 1K Ω pull-up resistor in RS-422/485 Off to remove
PD	ON	Adds 1K Ω pull-down resistor in RS-422/485 OFF to remove
L	OFF	ON to connect TX– to RX– for RS-485 two-wire
L	OFF	ON to connect TX+ to RX+ for RS-485 two-wire

Software Installation

Windows Installation



Do not install the Adapter in the machine until the software has been fully installed/



Only users running Windows 7 or newer should utilize these instructions for accessing and installing the appropriate driver via Sealevel's website. If you are utilizing an operating system prior to Windows 7, please contact Sealevel by calling 864.843.4343 or emailing support@sealevel.com to receive access to the proper driver download and installation instructions.



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

1. Begin by locating, selecting, and installing the correct software Sealevel SeaCOM Asynchronous Serial Software Suite
2. Select the "SeaCOM for Microsoft Windows" from the listing.
3. Select "Download" for SeaCOM for Windows.
4. The setup files will automatically detect the operating environment and install the proper components. Follow the information presented on the screens that follow.
5. A screen may appear with text similar to: "The publisher cannot be determined due to the problems below: Authenticode signature not found." Please click the 'Yes' button and proceed with the installation. This declaration simply means that the operating system is not aware of the driver being loaded. It will not cause any harm to your system.
6. During setup, the user may specify installation directories and other preferred configurations. This program also adds entries to the system registry that are necessary for specifying the operating parameters for each driver. An uninstall option is also included to remove all registry/INI file entries from the system.
7. The software is now installed, and you can proceed with the hardware installation.

8. The following dialog box may appear, as shown below. Click the 'OK' button to continue.



All Sealevel Systems software drivers have been fully tested by Sealevel. Clicking 'OK' will not harm your system.

9. The following dialog box may appear, as shown below. Click the 'OK' button to continue.



This is a notification that if you are upgrading from a previous driver version, you should remove the associated Device Manager hardware entries and reinstall the adapter after the installing the SeaCOM software.

10. The setup file will automatically detect the operating environment and install the proper components. Next follow the information presented on the screens that follow.
11. Refer to the Physical (Hardware) Installation section to connect and install your adapter.

Upgrading To The Current SeaCOM Driver

1. Download the current driver using the Instructions from the section above. Please take note of the destination directory it will save to.
2. Uninstall the currently loaded driver SeaCOM driver found in the Control Panel. Prior to Windows Vista SeaCOM will be populated in 'Add/Remove Programs' list. In Vista and newer OSs it will be found in the 'Programs and Features' list.
3. Navigate to the Device Manager and remove the Sealevel adapter by right clicking on the line item choosing 'Uninstall'. Depending on your product, it can be found under either 'Multiport Serial adapters' or 'Universal Serial Bus controllers'.
4. Single port ISA cards and PCMCIA cards will need to be uninstalled under 'Ports (COM & LPT)'.
5. In the Device Manager under 'Action', choose 'Scan for Hardware changes'. This will prompt the installation of the adapter and associate it with the newly installed SeaCOM driver.

Hardware Installation



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

The 7205e is shipped configured for RS-422 mode. If you intend to use RS-232 or RS-485 modes, configure the adapter before installation.

Once you have installed the software, install the 7205e 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.

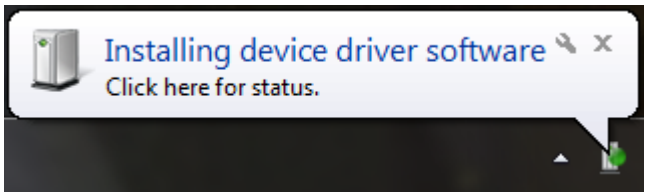


Once the hardware installation begins, the Found New Hardware wizard will appear three times – first for the parent multi-interface, and then two more times for each serial port.

The following instructions are applicable to the Windows XP operating system and may vary depending on your version of Windows.

1. After the software installation is complete, install the 7205e into an available PCI Express slot and boot the computer.

2. A 'Found New Hardware' alert will appear above the system tray.

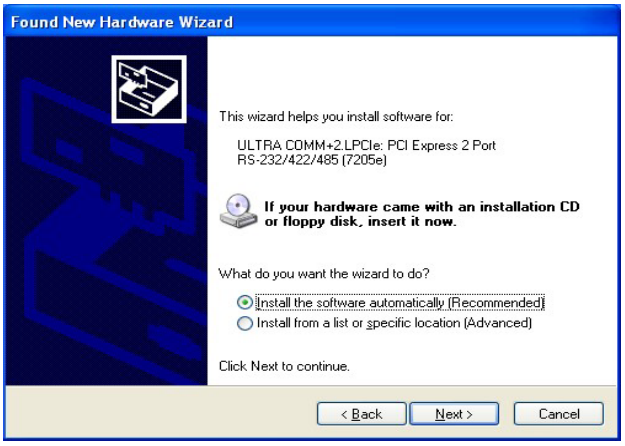


3. The 'Found New Hardware Wizare' will appear.

4. Choose 'No, not this time' and click 'Next' to proceed.

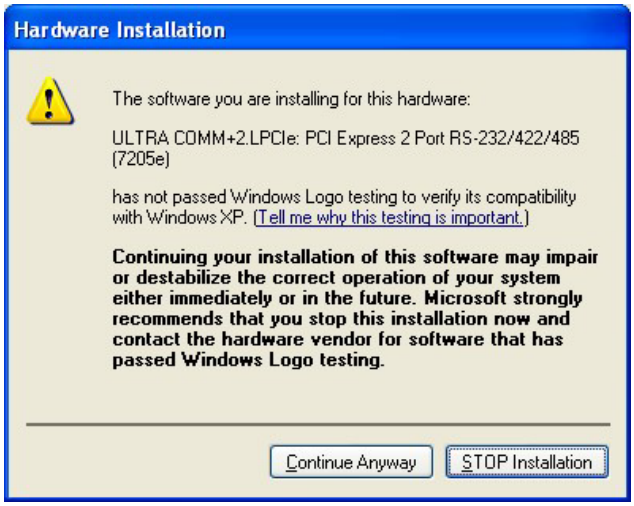


5. Choose 'Install the software automatically' and click 'Next'.

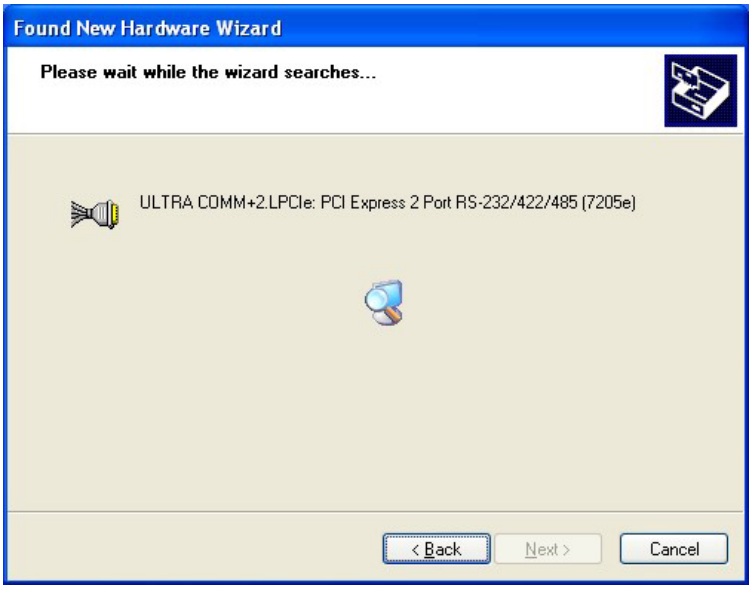


6. The ‘Hardware Wizard’ will search for the proper drivers; however, it may be interrupted by a message stating that the hardware has not passed Windows certification. Click on ‘Continue Anyway’.

All SeaCOM software and drivers have been fully tested by Sealevel. Clicking ‘Continue anyway’ will not harm your system.

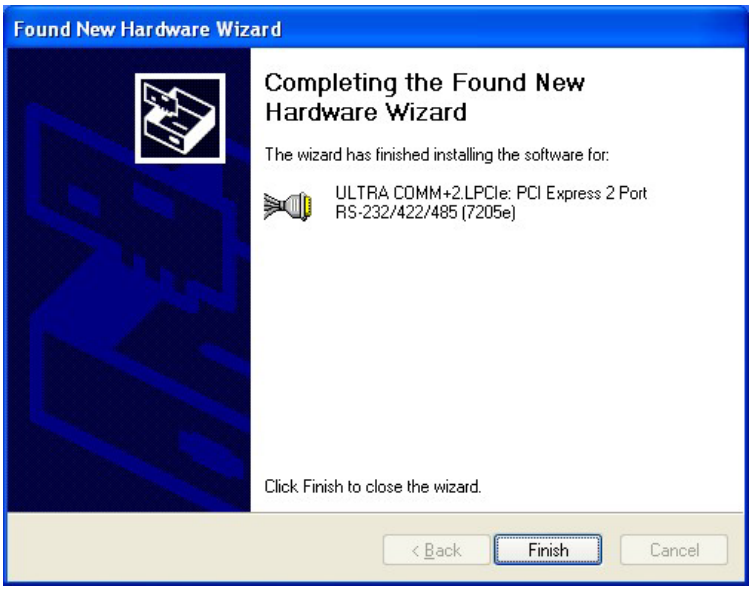


7. The appropriate drivers for your SeaLINK device and version of Windows will be installed as shown.



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8. Click ‘Finish’ to complete the installation of your hardware.



9. The ‘Found New Hardware Wizard’ appears two more times – once for each serial port; repeat steps 4-8.

10. When the ‘Found New Hardware’ alert informs you that your hardware is installed and ready to use, you can proceed with verifying the installation to check functionality and/or locate the COM port assignments, if necessary.



Verifying Installation

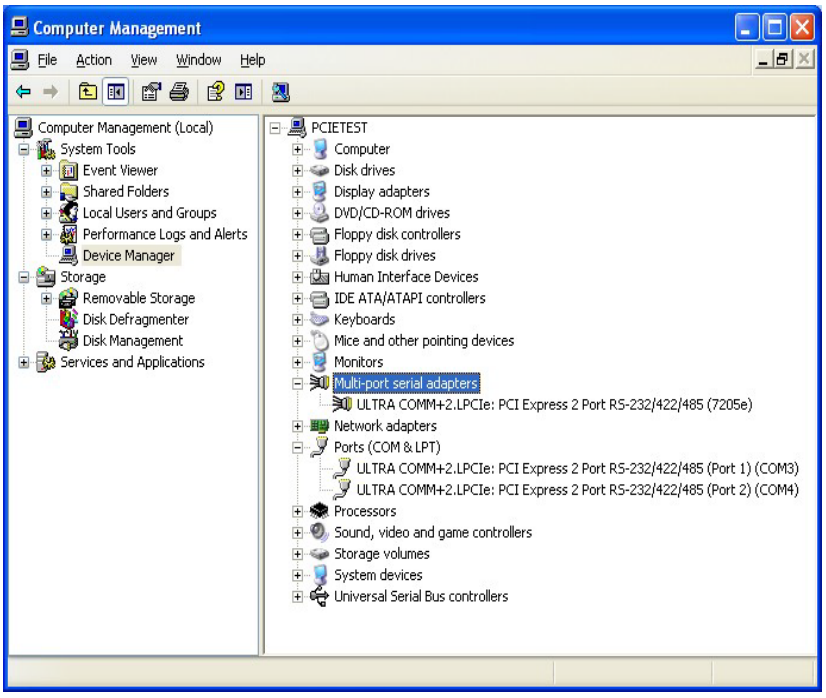
To confirm that the serial port has been successfully installed, look in Device Manager under ‘Ports (COM & LPT’ and the COM assignment will be included with the associated COM number in parentheses.

To access Device Manager, follow the steps below:

1. Right click on ‘My Computer’ icon on your desktop or in the Start menu.
2. Click ‘Manage’ in the fly out menu to launch the ‘Computer Management’ console window.
3. In the left pane under ‘System Tools’, click ‘Device Manager’.
4. In right pane near the bottom, expand the ‘Multi-Port Serial Adapters’ section by clicking the arrow ‘>’ symbol. This shows the parent device is installed correctly.

5. Below that section, expand the 'Ports (COM & LPT)' section.
6. You should now see the COM assignment with the associated COM number in parentheses.

Your system will assign the next available COM numbers, which will vary by computer (COM3 and COM4 as shown in this example).



Uninstall & Upgrade 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.

To upgrade to the latest version of SeaCOM, follow the instructions to uninstall the hardware and software, followed by the upgrade instructions.

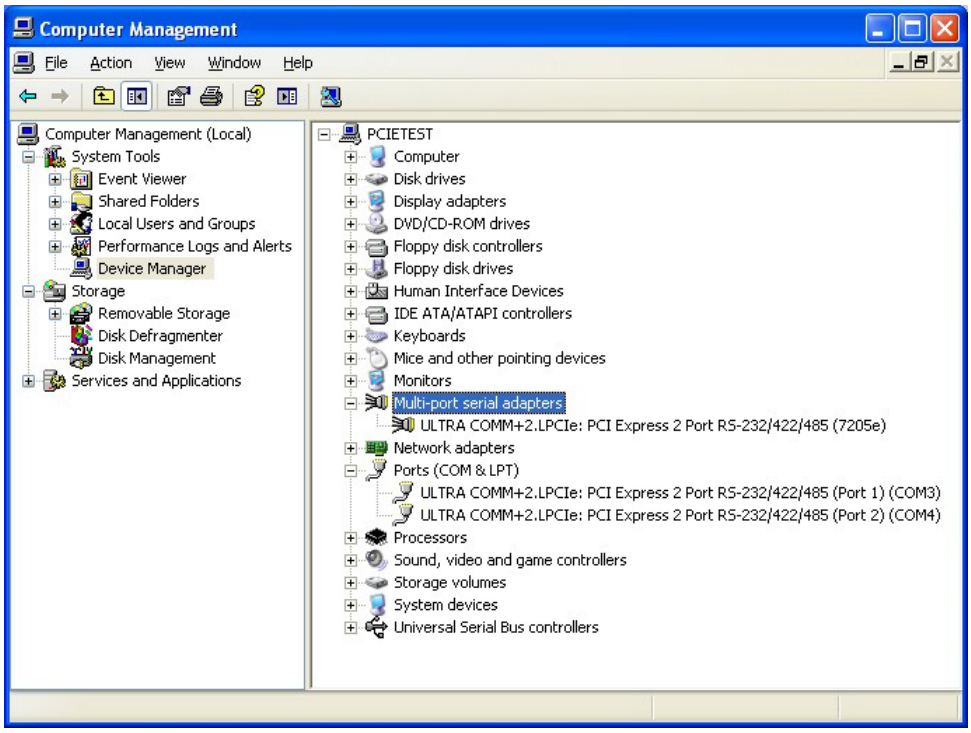
Start with the hardware installed in a PCI Express slot. Do not remove until instructed to do so.

There are two methods for removing the software references from the Windows OS: Device Manager and Control Panel. Each method is described below.

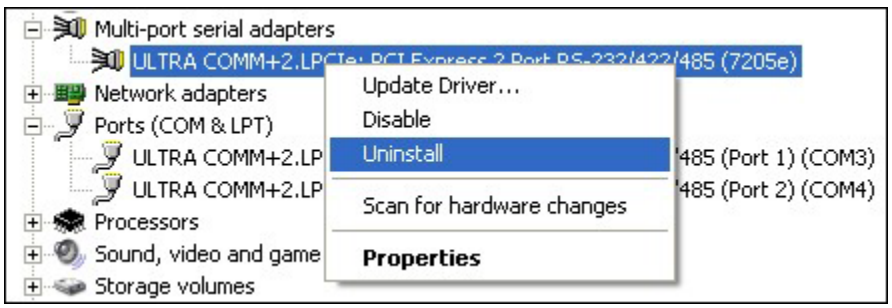
Remove Hardware Using Device Manager

To access Device Manager, follow the steps below:

1. Right click on 'My Computer' icon on your desktop or in the Start menu.
2. Click 'Manage' in the fly out menu to launch the 'Computer Management' console window.
3. In the left pane under 'System Tools', click 'Device Manager'.
4. In right pane near the bottom, expand the 'Multi-port serial adapters' section by clicking the arrow '>' symbol.
5. Locate the ULTRA COMM+2.LPCIe device in the listing.

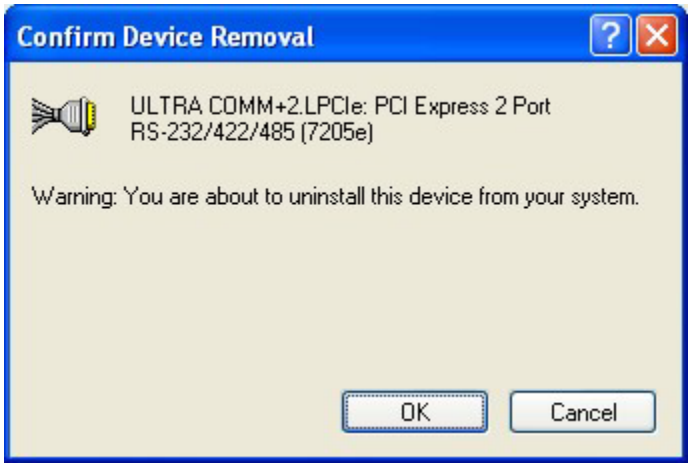


6. Right click on the entry for the 7205e device and click 'Uninstall' in the fly out menu.



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7. 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. Clicking the 'Cancel' button will keep the device installed.



8. The window will refresh and the entry for the device will no longer appear. Proceed with removing the software on the following pages.

Remove Software Using Control Panel

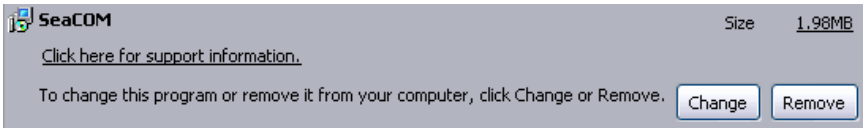
Make sure you have first removed the hardware using the instructions on the previous page before removing the software, otherwise remnants of the configuration settings will be left on your system. Keep the device installed until the software has been completely uninstalled.

1. Access the Control Panel by clicking the 'Start' button, and then 'Control Panel'.

2. In the Control Panel window, double-click the 'Add or Remove Programs' icon (In Windows Vista and 7, it will be labeled 'Programs and Features').

3. The Add or Remove Programs window will list all currently installed software on your system. It may take a while to load all of the software installed. Locate the entry for 'SeaCOM' and click to highlight.

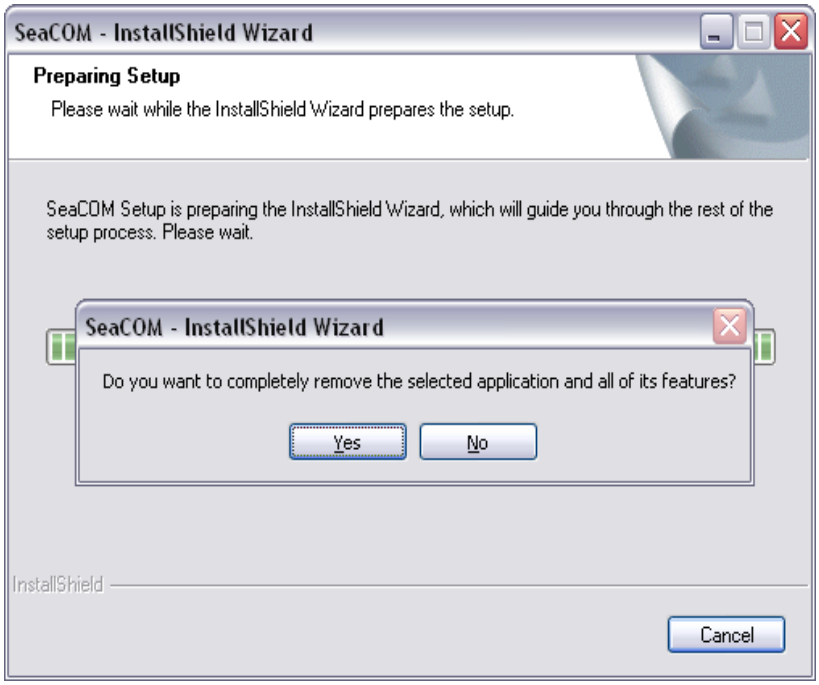
4. Click the 'Remove' button.



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5. The ‘SeaCOM – InstallShield Wizard’ window will appear along with a dialog box asking you to confirm. Click the ‘Yes’ button to continue.

6.



7. When the uninstallation completes, click the ‘Finish’ button to close the window. Click the ‘Ok’ button on the dialog box.

If you are upgrading, leave the device installed and proceed to the Upgrade Instructions section.

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.

Upgrade Instructions

With the device still installed in a PCI Express slot, install the latest version of SeaCOM. You can download the latest version of SeaCOM from the product page on the Sealevel website. Follow the software installation steps detailed in the preceding 'Software Installation' section.

1. Once the SeaCOM software has been installed successfully, access Device Manager.
2. At the top of the 'Device Manager' window, click 'Action', and then click 'Scan for Hardware Changes'.
3. The 'Found New Hardware Wizard' window will appear. Select 'No, not this time', and then click the 'Next' button.
4. Refer to the 'Hardware Installation' instructions in the preceding section to complete the upgrade.
5. When the 'Found New Hardware' alert informs you that your hardware is installed and ready to use, you can proceed with verifying the installation to check functionality and/or locate the COM port assignments, if necessary.

Technical Description

Each serial port utilizes a 16C950 UART featuring programmable baud rates, data format, interrupt control and industry-leading 128-byte transmit and receive FIFOs. This high-

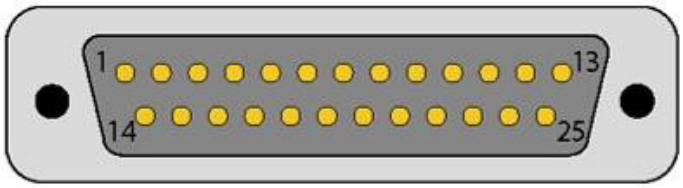
performance UART includes 9-bit framing support and is fully software compatible with legacy 16550 applications. In addition, the 14.7456 oscillator and UART's flexible clock prescaler supports the widest range of standard and non-standard baud rates to 921.6K bps. Refer to Appendix C for cable length limitations.

Connector Pin Assignments

Board Connector (DB25 Male)

The 7205e board includes a DB25 male connector for attaching the included cable (Item# CA203). The pin out for the DB25M connector is shown in the table below.

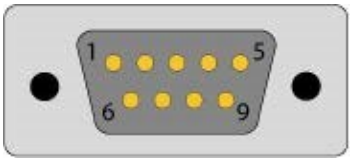
Port 1 Pin#	Port 2 Pin#	RS-232	RS-422/485
1	11	RD	RD –
2	12	CTS	CTS –
3	13	DCD	RD +
4	14	TD	TD –
5	15	RTS	RTS –
6	16	DSR	RTS +
7	17	DTR	TD +
8	18	RI	CTS +
9	10	GND	GND



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Cable Pin Assignments

The 7205e includes a cable (Item# 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 interface board. The DB9M connectors are compatible with a variety of serial peripherals. The pin assignments for the supported electrical interfaces are shown in the tables below.



RS-232 (DB9 Male)

These RS-232 pin assignments meet EIA/TIA/ANSI-574 DTE specifications for DB9 type connectors.

Pin #	Signal	Name	Mode
1	DCD	Data Carrier Detect	Input
2	RD	Receive Data	Input
3	TD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Ground	
6	DSR	Data Set Ready	Input
7	RTS	Request To Send	Output
8	CTS	Clear To Send	Input
9	RI	Ring Indicator	Input

Please terminate any control signals that are not going to be used. The most common way to do this is connect RTS to CTS and RI. Also, connect DCD to DTR and DSR. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

RS-422 & RS-485 (DB9 Male)

Pin #	Signal	Name	Mode
1	RX +	Receive Data Positive	Input
2	RX –	Receive Data Negative	Input
3	TX –	Transmit Data Negative	Output
4	TX +	Transmit Data Positive	Output
5	GND	Ground	
6	RTS +	Request to Send Positive	Output
7	RTS –	Request to Send Negative	Output
8	CTS –	Clear to Send Negative	Input
9	CTS +	Clear to Send Positive	Input

Baud Rates and Oscillator Value

The 7205e utilizes a 14.7456MHz oscillator, which is automatically entered by the SeaCOM driver under Windows 2000/XP/Vista operating systems. The oscillator value can be found in the COM port properties of Device Manager under the 'Advanced Tab'.

The high-speed oscillator and the UART's flexible clock prescaler support a wide range of standard and non-standard baud rates. You simply need to select the appropriate baud rate in your communications software and the driver will calculate the closest matching baud rate.

When you use the board in other operating systems like Linux, the baud rate you select is multiplied by eight resulting in the actual, faster baud rate. This allows the board to achieve data rates to 921.6K bps.

The following table shows common baud rates, and the baud rates you need to select in your application running on operating systems other than Windows.

For this Data Rate	Choose this Data Rate
1200 bps	150 bps
2400 bps	300 bps
4800 bps	600 bps
9600 bps	1200 bps
19.2K bps	2400 bps
38.4K bps	4800 bps
57.6K bps	7200 bps
115.2 K bps	14.4K bps
230.4K bps	28.8K bps
460.8K bps	57.6 K bps
921.6K bps	115.2 K bps

Technical Specifications

Dimensions

Length	Width
5.75”	2.54”
14.60 cm	6.45 cm

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

Power Consumption

Supply line	12VDC	3.3VDC
Requirements	121 mA (1.4W)	218mA (0.7W)

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.

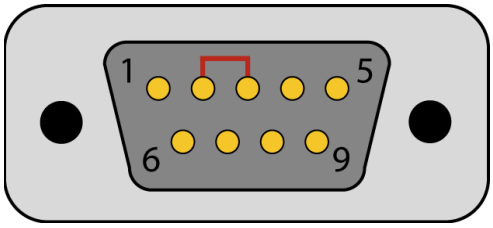
Appendix A – Troubleshooting

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.

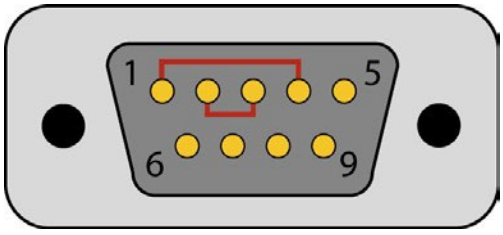
If you have a loopback plug, put it on the adapter connector. If you do not have a loopback plug, you can use female jumper wires to make the connection to verify the functionality.

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.

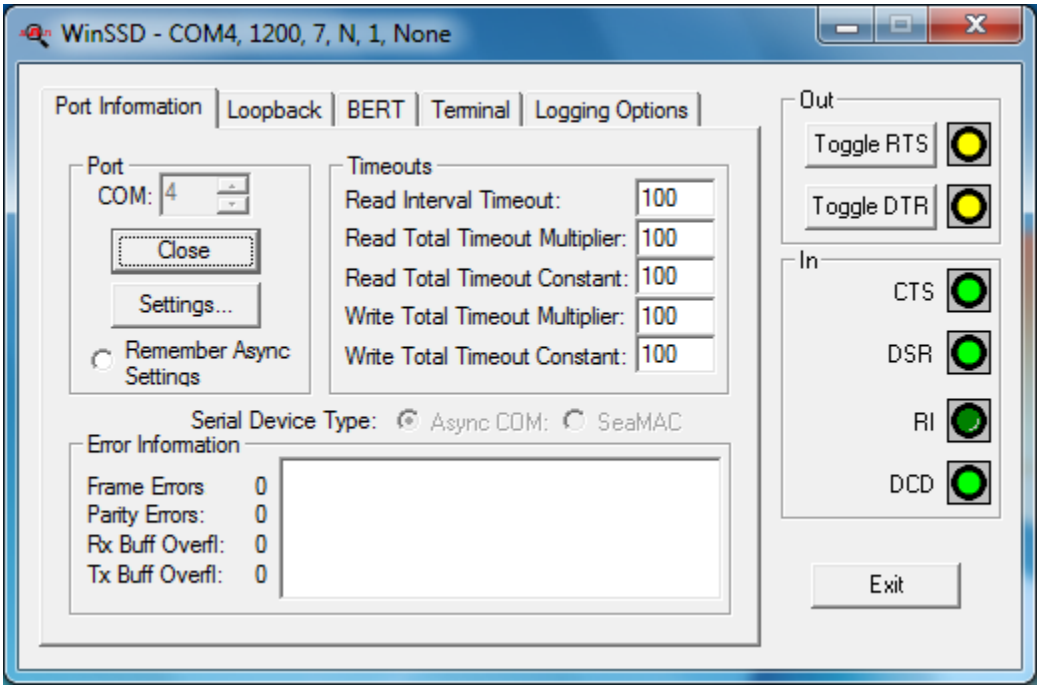


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To test communications, launch the WinSSD utility in the SeaCOM folder in the 'Start' menu.

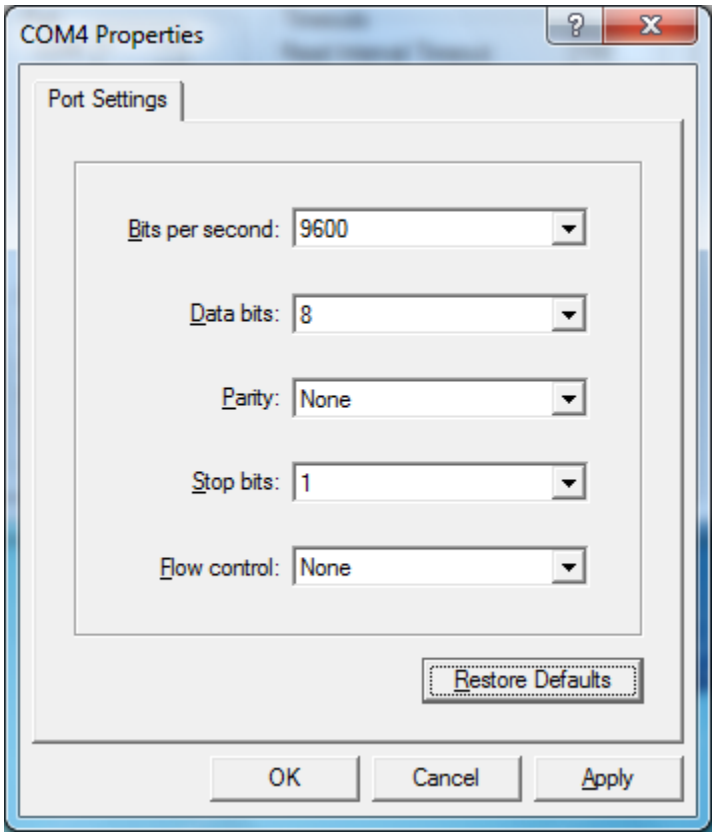
On the 'Port Information' tab, select the associated COM port and click the 'Open' button.

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.



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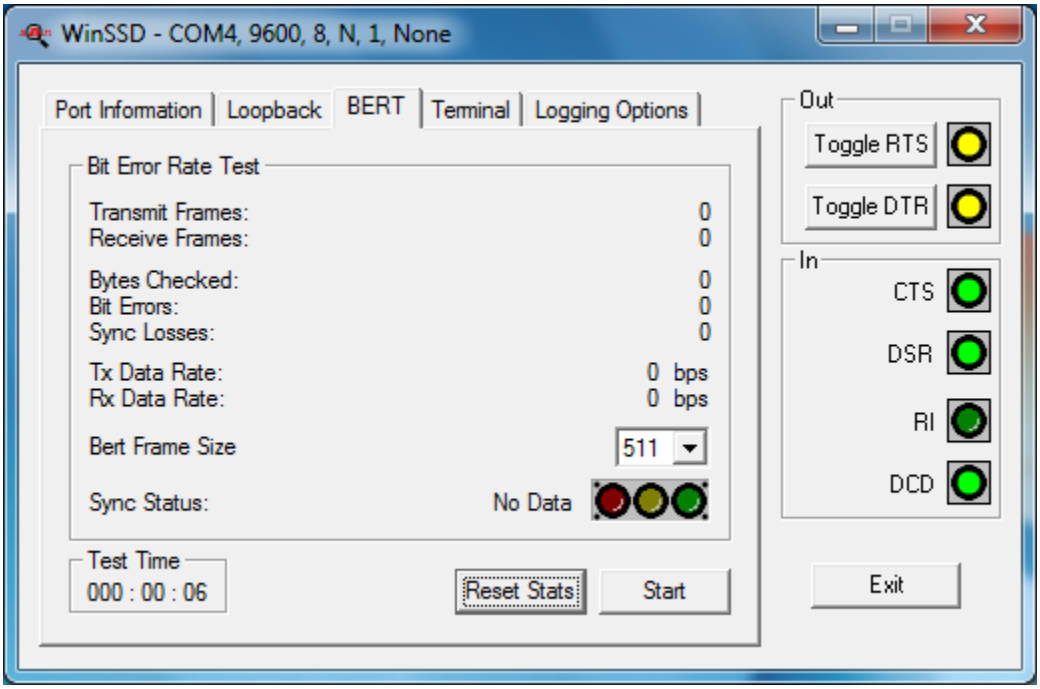
Change your parameters to 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control, as pictured below.



Click ‘Apply’ and ‘OK’.

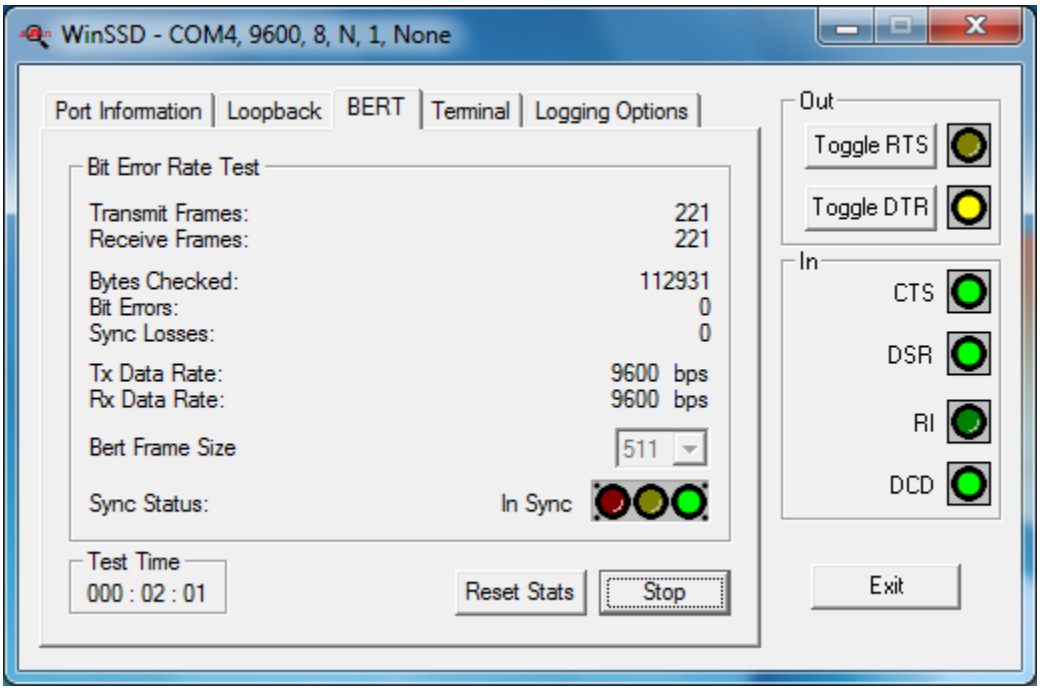
In the main WinSSD window, click on the ‘BERT’ tab (Bit Error Rate test).

Click on the ‘Start’ button.



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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:
Transport boards and cards in electrostatically secure containers or bags.

1. Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
2. Only touch electrostatically sensitive components when you are properly grounded.
3. 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:

4. Cover workstations with approved antistatic material. Always wear a wrist strap connected to a properly grounded workplace.
5. Use antistatic mats, heel straps, and/or air ionizers for more protection.
6. Always handle electrostatically sensitive components by their edge or by their casing.
7. Avoid contact with pins, leads, or circuitry.
8. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
9. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
10. 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 or EIA/TIA-232. 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 is 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 widespread 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 at distances less than 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. 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. 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).

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. RS422 signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

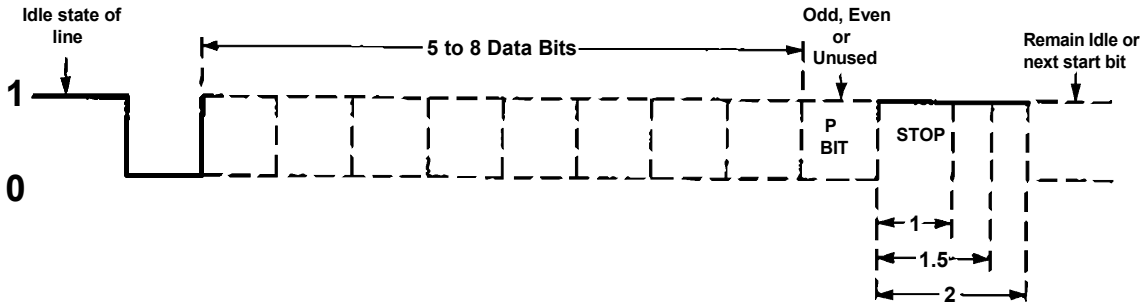
RS-485

RS-485 is backwardly compatible with RS-422; however, it is optimized for party line or multidrop 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. RS485 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.

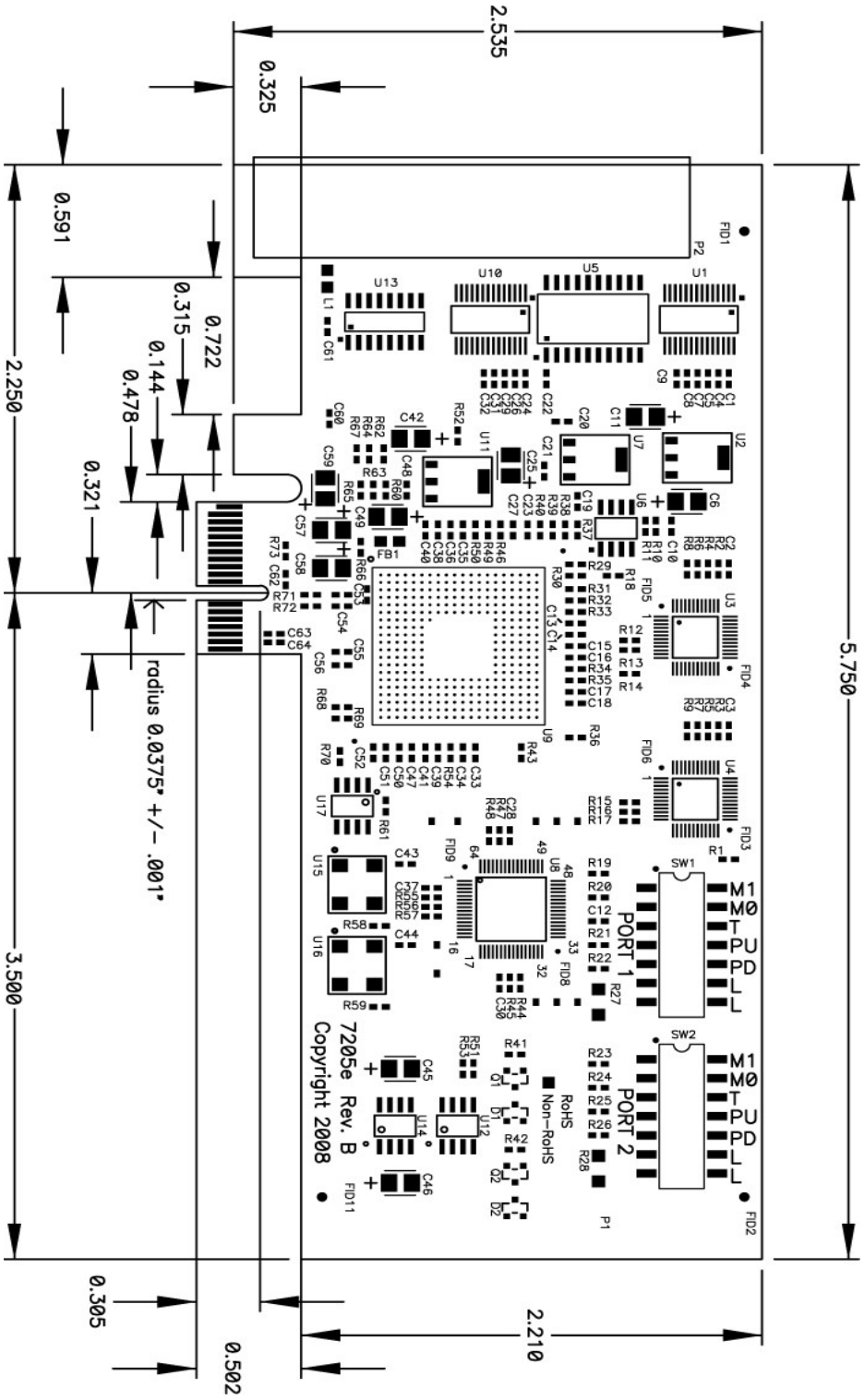
Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Unil Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data 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.



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 – Mechanical Drawing



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Appendix F – Compliance Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in such case the user will be required to correct the interference at the user's expense.

EMC Directive Statement

Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) issued by the European Commission. To obey these directives, the following European standards must be met:

- **EN55022 Class A** - "Limits and methods of measurement of radio interference characteristics of information technology equipment"
- **EN55024** – "Information technology equipment Immunity characteristics Limits and methods of measurement".

United Kingdom Directive Statement

This is a Class A Product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures to prevent or correct the interference.

Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high quality shielded cabling to maintain compliance with FCC/EMC directives.

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. 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-9001:2015 certification in 2018.

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 ensure 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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