

# SeaLINK+16/232.RJ

User Manual | 2161



SEALEVEL®

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# Introduction

## Overview

The Sealevel Systems SeaLINK+16/232.RJ (Item# 2161) is a USB device that equips the PC with 16 RS-232 Asynchronous serial ports that support TX, RX, RTS, and CTS and data rates up to 115.2K baud. The SeaLINK+16/232.RJ also provides two USB 1.1 downstream ports (fully rated at 500 mA per port) for conveniently connecting additional SeaLINK+16/232.RJ devices or other USB peripherals.

The SeaLINK+16/232.RJ is designed to be used with a variety of Operating Systems including Windows 98/ME/2000/XP. The SeaCOM API (Application Programmer Interface), which can be downloaded from the [Sealevel download database](#), provides a variety of useful high-level function calls implemented as a Windows dynamic link library (DLL). In addition to the API, SeaCOM includes sample code and utilities to simplify software development.

## Other Sealevel USB Serial I/O Products

SeaLINK+232	(P/N 2101)	-1 Port RS-232 DB25
SeaLINK+232	(P/N 2105)	- 1-Port RS-232 DB9
SeaLINK+485	(P/N 2102)	- 1-Port RS-422/485/530
SeaLINK+232I	(P/N 2103)	- 1-Port Isolated RS-232
SeaLINK+485I	(P/N 2104)	- 1-Port Isolated RS-422/485/530
SeaLINK+2/232	(P/N 2201)	- 2-Port RS-232
SeaLINK+2/485	(P/N 2202)	- 2-Port RS-422/485
SeaLINK+2	(P/N 2203)	- 2-Port RS-232/422/485
SeaLINK+2/232.PC	(P/N 2208)	- 2-Port RS-232 Box Header
SeaLINK+4/232	(P/N 2401)	- 4-Port RS-232
SeaLINK+4/485	(P/N 2402)	- 4-Port RS-422/485
SeaLINK+4	(P/N 2403)	- 4-Port RS-232/422/485
SeaLINK+8/232	(P/N 2801)	- 8-Port RS-232
SeaLINK+8/485	(P/N 2802)	- 8-Port RS-422/485
SeaLINK+8	(P/N 2803)	- 8-Port RS-232/422/485
SeaLINK+16.VC	(P/N 2167)	- 16-Port RS-232/485 VersaCom

# Before You Get Started

## What's Included

The SeaLINK+16/232.RJ is shipped with the following items. If any of these items is missing or damaged, please contact Sealevel for replacement.

- **Item#2161 – SeaLINK+16/232.RJ USB 16-Port Serial Device**
- **Item# CA179 – 72" USB "A" to 'B' Device Cable**
- **Item# TR101 – 5VDC @ 3A Power Supply**
- **Item# LB116 – RS-232 RJ45 Serial Loopback**

## 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 for interfacing the SeaLINK+16/232.RJ. All items can be purchased from our website

(<http://www.sealevel.com>) or by calling 864-843-4343.

- **DB9 Male to RJ45 Modular Adapter (Item# RJ9P-232)**  
Preconfigured for use with the SeaLINK+16/232.RJ, this modular adapter converts the RJ45 RS-232 pinout from the SeaLINK+16/232.RJ to a DB9 male RS-232 serial port. Standard CAT5 patch cables can be used to extend the serial port up to 50 feet away from the SeaLINK+16/232.RJ.
- **DB25 Male to RJ45 Modular Adapter (Item# RJ25P-232)**  
Preconfigured for use with the SeaLINK+16/232.RJ, this modular adapter converts the RJ45 RS-232 pinout from the SeaLINK+16/232.RJ to a DB25 male RS-232 serial port. Standard CAT5 patch cables can be used to extend the serial port up to 50 feet away from the SeaLINK+16/232.RJ.
- **DB9 Male to RJ45 Modular Adapter (Item# RJ9P8)**  
The RJ9P8 includes an RJ45 connector and converts it to a DB9 Male connector, which allows the use of standard twisted pair cabling. The RJ9P8 ships unassembled and can be configured for virtually any pin out.
- **DB25 Male to RJ45 Modular Adapter (Item# RJ25P8)**  
The RJ25P8 includes an RJ45 connector and converts it to a DB25 Male connector, which allows the use of standard twisted pair cabling. The RJ25P8 ships unassembled and can be configured for virtually any pin out.
- **USB 'A' to 'A' Extension Cable, 3 Meters in Length (Item# CA214)**  
The CA214 is a fully rated USB extension cable that allows adding 3 meters (USB maximum of 5 meters) to any existing USB cable. The cable has a type 'A' male connector on one end and a type 'A' female connector on the other end.
- **RJ45 Patch Cable, 7' in Length (Item# CA246)**  
Standard 7' CAT5 patch cable with one-to-one pinout.
- **RJ45 Patch Cable, 10' in Length (Item# CA247)**  
Standard 10' CAT5 patch cable with one-to-one pinout.

# Installation & Configuration

## 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](mailto:support@sealevel.com) to receive access to the proper driver download and installation instructions.

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1. Begin by locating, selecting, and installing the correct software from the [Sealevel software driver database](#).
2. Select the Part Number (2161) for your device from the listing.
3. Click the 'Install Drivers' button.
4. The setup file will automatically detect the operating environment and install the proper components.

To confirm that the SeaCOM driver has been successfully installed, click on the 'Start' button, and then select 'All Programs'. You should see the 'SeaCOM' program folder listed.

You are now ready to proceed with connecting the 2161 to your system. Refer to the Hardware Installation section for details.



Windows NT is not USB aware and thus cannot support this device.

## Third Party Software Support

Third party software support for many HMI/MMI and other process control software is also available from the [Sealevel software database](#). For the most up to date information on third party software support, please visit the [3rd-Party Software Archives - Sealevel](#).

# Hardware Installation

The SeaLINK+16/232.RJ can be connected to any spare USB port.



Do not connect the device to a USB port until the software has been fully installed.

1. Connect the SeaLINK+16/232.RJ to external power using the included TR101 power supply.
2. Connect the SeaLINK+16/232.RJ to a USB port with the supplied CA179 USB device cable.
3. The software drivers installed during setup will automatically recognize and configure the device.
4. You should see one or more “New Hardware Found” windows, indicating the actual device being created.



The installation will repeat twice for each COM port (a total of 32 times on the SeaLINK+16/232.RJ). This is a limitation in the way Windows installs external serial devices.

5. Next, view your system’s Device Manager.
6. You should have new COM: ports in the Ports (COM & LPT) Device Class indicating the installation was successful.
7. You can access your new COM: port by using the assigned COM: identifier. This assignment will vary from system to system.
8. To verify operation use Sealevel Systems supplied WinSSD diagnostic utility. WinSSD can be found in the Start, Programs group.

The SeaLINK+16/232.RJ is now ready for use.

# Technical Description

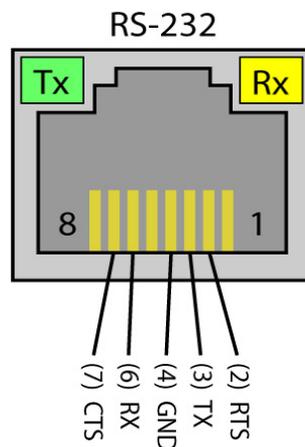
The SeaLINK+16/232.RJ utilizes sixteen USB UARTs. These chips feature programmable baud rate, data format, 128-byte Dual Port TX Buffer, and 384-byte Dual Port RX Buffer. The RS-232 transceivers support data rates up to 115.2K bps.

## Connector Pin Assignments (RJ45)

Signal	Name	Pin #	Mode
NC	No Connect	1	
RTS	Request To Send	2	Output
TX	Transmit Data	3	Output
GND	Ground	4	
NC	No Connect	5	
RX	Receive Data	6	Input
CTS	Clear To Send	7	Input
NC	No Connect	8	



DCD, DSR, and RI are inputs that are not brought out on the RJ45 connector. DSR and DCD are biased active, and RI is biased inactive.

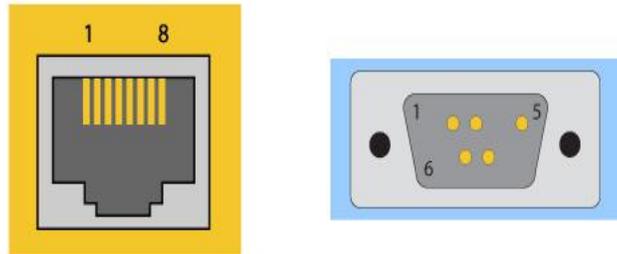


## TECHNICAL DESCRIPTION, CONTINUED

## Optional Items

### RJ45 to DB9 RS-232 Adapter (Item# RJ9P-232)

Preconfigured for use with Sealevel 2161 and 2167 serial devices, the RJ45 to DB9 modular adapter (item# RJ9P-232) converts the RJ45 RS-232 pin out to a DB9 male RS-232 serial port. Standard CAT5 patch cables can be used to extend the serial port up to 50 feet away from the RJ45 port. The pin out for the RJ9P-232 is shown below.



RJ45	Signal	DB-9M
2	RTS	7
3	TD	3
4	GND	5
6	RD	2
7	CTS	8

# Electrical Characteristics

## Features

- Supports front or rear rack mounting or desktop use
- Provides 16 RJ45 serial ports with status LEDs
- Includes two fully rated (500mA) USB 1.1 downstream ports
- Integrates transmit and receive LED indicators on each port
- Includes front and rear status LED to indicate unit power
- 9-30V input power option available for OEM volume opportunities

# Specifications

## Environmental Specifications

Specification	Operating	Storage
Temperature Range	0° to 70° C	-50° to 105° C

## Power Requirements

Supply Line	+5 VDC
Rating	2A

## Physical Dimensions

Package Length	7.0 inches (17.78 cm)
Package Width *	16.8 inches (42.56 cm)
Package Height	1.7 inches (4.32 cm)

\* Width excludes rack-mount ears.

## 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

The adapter should provide years of trouble-free service. However, in the event that it appears to be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

1. If your adapter isn't working, first check to make sure that USB support is enabled in the System BIOS and it is functioning properly in the operating system. This can be done by using either the Windows 98/ME or Windows 2000 Device Manager.
2. Ensure that the Sealevel Systems software has been installed on the machine so that the necessary files are in place to complete the installation.
3. When the SeaLINK+16/232.RJ is configured properly, Sealevel's WinSSD utility and a loopback plug can be used to check communications. You can make a simple Loopback in the field by connecting the TX and RX pins. If you decide to test the Modem Control Signals, a full pin loopback plug will be required. Details on loopback plugs are included within WinSSD. Contact Sealevel Systems if you need further assistance.
4. When testing the SeaLINK+16/232.RJ in loopback mode, you should see both the TD and RD echoed as data on the screen. The loopback test first transmits a HEX pattern, 55AA, and then an ASCII string of data. If this test passes, then the SeaLINK+16/232.RJ is ready for use in your application.
5. Always use the Sealevel Systems diagnostic software when troubleshooting a problem. This will eliminate any software issues from the equation.

If these steps do not solve your problem, please call Sealevel Systems' Technical Support, (864) 843-4343. Our technical support is free and available from 8:00 AM to 5:00 PM Eastern Time Monday through Friday. For email support contact [support@sealevel.com](mailto:support@sealevel.com).

# Appendix B – How To Get Assistance

Please refer to: Appendix A – Troubleshooting Guide prior to calling Technical Support.

Begin by reading through the Trouble Shooting Guide in Appendix A. If assistance is still needed, please see below.

When calling for technical assistance, please have your user manual and current adapter settings. If possible, please have the adapter installed in a computer ready to run diagnostics.

Sealevel Systems provides an FAQ section on its web site. Please refer to this to answer many common questions. This section can be found at <http://www.sealevel.com/faq.asp>.

Sealevel Systems maintains a web page on the Internet. Our home page address is [www.sealevel.com](http://www.sealevel.com). The latest software updates, and newest manuals are available via our web site.

Technical support is available Monday to Friday from 8:00 a.m. to 5:00 p.m. eastern time. Technical support can be reached at (864) 843-4343.

**RETURN AUTHORIZATION MUST BE OBTAINED FROM SEALEVEL SYSTEMS BEFORE RETURNED MERCHANDISE WILL BE ACCEPTED. AUTHORIZATION CAN BE OBTAINED BY CALLING SEALEVEL SYSTEMS AND REQUESTING A RETURN MERCHANDISE AUTHORIZATION (RMA) NUMBER.**

# Appendix C – Electrical Interface

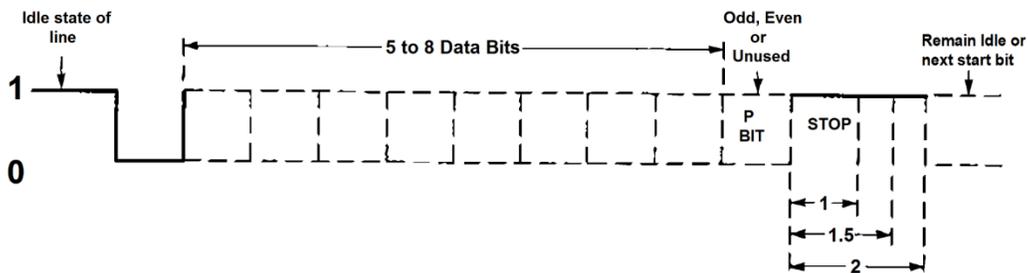
## RS-232

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 20 Kbps 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). The IC485+ is a DCE device.

# 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.

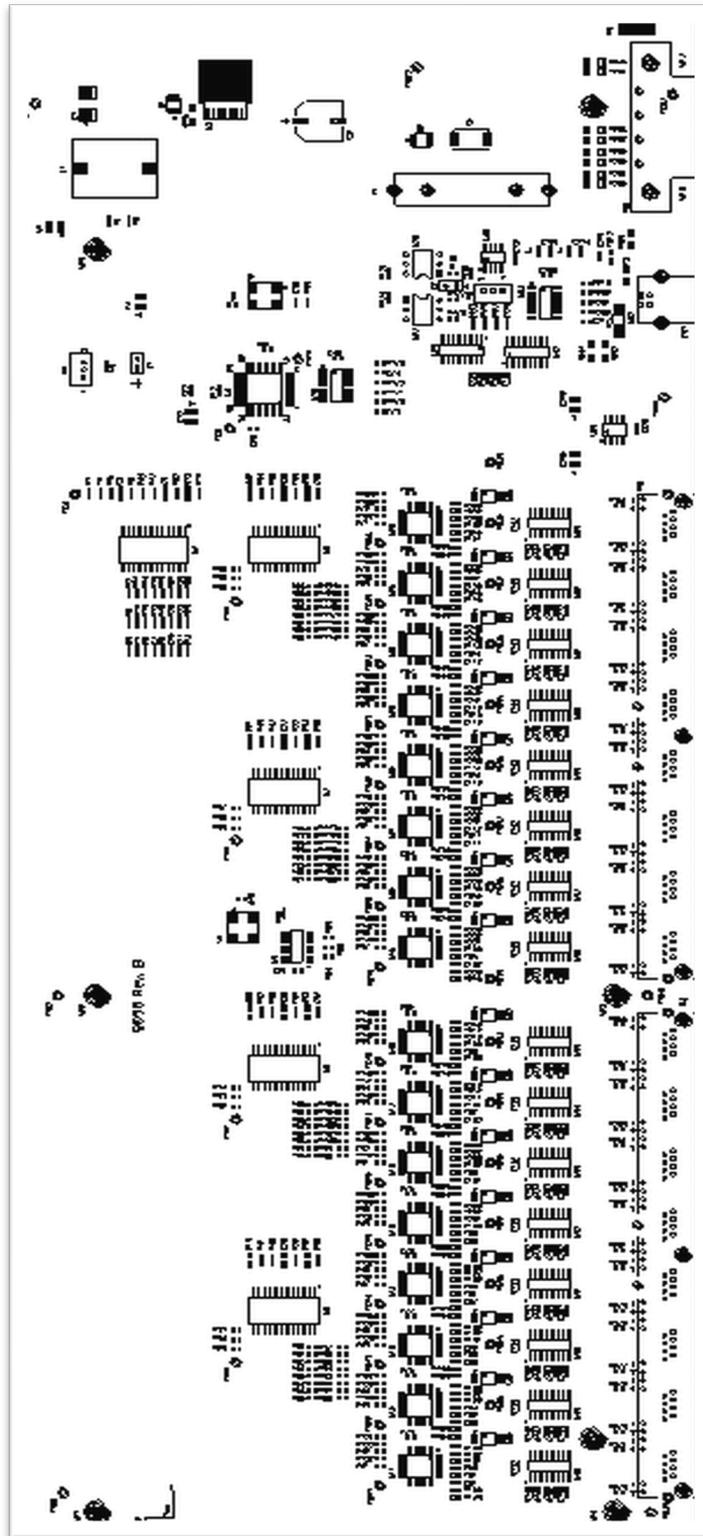
Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. A start 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 must 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 – Silk-Screen



# 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".



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	<a href="mailto:support@sealevel.com">support@sealevel.com</a>

## Trademarks

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