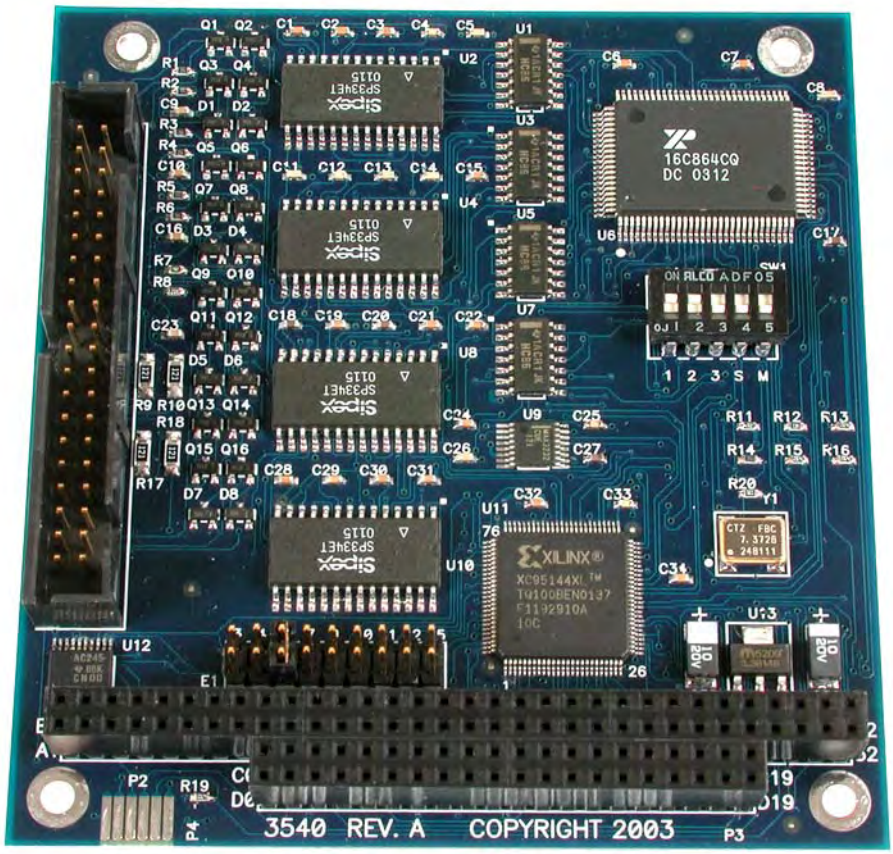
SEALEVEL
SYSTEMS INCORPORATED

C4-104.ULTRA
Users Manual



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Introduction

Overview

The **C4-104.ULTRA** is the first PC/104 serial interface module to provide four software-selectable RS-232/422/485 ports. RS-232, RS-422, or RS-485 mode may be selected independently via software command for each of the four ports, eliminating the need for setting jumpers or DIP switches. The board is designed using the XR16C864 UART, which provides a 128-byte FIFO, 8 times larger than boards designed with 16C550 compatible parts. The larger buffers allow error free operation even in high-speed applications. In RS-485 mode the **C4-104.ULTRA** offers automatic control of the RS-485 driver enable for trouble free network master arbitration. Additionally, the **C4-104.ULTRA** allows RS-485 network termination, critical to robust multi-drop communication, to be selectively added to the circuit via a simple software command.

The RS-232 compatibility allows for connection to devices utilizing the RS-232 electrical interface, such as modems, data-entry terminals, and plotters.

RS-422 provides excellent communications for long distance device connections up to 4000ft., where noise immunity and high data integrity are essential.

RS-485 is optimized for 'Multi-Drop' or 'Party-line' operations selecting data from multiple peripherals (as many as 31 devices can be connected on an RS-485 bus). The **C4-104.ULTRA** is optimized for RS-485 with automatic driver enable, and automatic suppression of RS-485 'Echo' as options, further simplifying integration.

What is Included

The **C4-104.ULTRA** is shipped with the following items. If any of these items is missing or damaged, contact the supplier.

- **C4-104.ULTRA** Serial I/O Adapter
- Sealevel Software SeaCOM CD

Optional Accessories

- CA228 - Terminates the **C4-104.ULTRA's** 40 pin header to four DB9M connectors. This termination provides the standard DB9 pin out for RS-232 (EIA/TIA574) in RS-232 mode and the Sealevel Systems' DB9 standard for RS-422/485.

- CA110/CA143 – This combination of cables also terminates the **C4-104.ULTRA's** 40 pin header to four DB9M connectors. The CA110 provides a bulkhead mountable DB37 Male connector and the CA143 provides a DB37 to 4 DB9 male connectors via a 36 inch 'Spider' cable. This combination also provides the standard DB9 pin out for RS-232 (EIA/TIA574) in RS-232 mode and the Sealevel Systems' DB9 standard for RS-422/485.

- CA222/TB10 – This combination of cables also terminates the **C4-104.ULTRA's** 40 pin header to four DB9M connectors via a bulk head mountable terminal block assembly. It provides 4 DB9 male connectors that can easily be integrated into the Sealevel Systems ***Relio*** line of embedded I/O servers. This combination also provides the standard DB9 pin out for RS-232 (EIA/TIA574) in RS-232 mode and the Sealevel Systems' DB9 standard for RS-422/485.

- DB103 - The DB103 is designed to convert a Sealevel DB9 Male connector to a pinout compatible with AC24AT and AC422AT Opto-22 ISA bus cards. This allows Optomux devices to be controlled from any Sealevel RS-422 board with a DB9 Male connector.

- CA190 - This cable allows any Sealevel RS-422 adapter with a DB-9 to connect directly to a Sony (or compatible) 207M "9 Pin" connector.

Card Setup

The **C4-104.ULTRA** contains a single 4 position DIP-Switch that provides the Address selection for the adapter and a jumper strap which provides the IRQ selection for the adapter.

Address Selection

Each port on the **C4-104.ULTRA** occupies sixteen consecutive I/O locations. A DIP-switch is used to set the base address for these locations. The following table shows the addressing options available. If different address options are required, please contact Sealevel Systems Technical Support about a custom PAL option.

SW1-1	SW1-2	SW1-3	Port 1	Port 2	Port 3	Port 4
OFF	OFF	ON	300	310	320	330
OFF	ON	OFF	400	410	420	430
OFF	ON	ON	500	510	520	530
ON	OFF	OFF	600	610	620	630
ON	OFF	ON	1500	1510	1520	1530
ON	ON	OFF	3220	3230	3240	3250
ON	ON	ON	4220	4230	4240	4250

Figure 1 - Address Selection Table

Refer to Appendix A for common address contentions.

Port Enable / Disable

All four ports on the can be enabled or disabled by setting the three switches in the 'Off' position. The port is enabled when a valid I/O selection is made. If the adapter is disabled, be sure to disable the interrupt request by removing the IRQ jumper.

Interrupt Modes

DIP-Switch positions 'S' and 'M' on switch SW1 selects the interrupt mode for the adapter.

With the '**S**' selected, the adapter is in a (**S**)hared interrupt mode, which allows more than one adapter to access a single IRQ. Any two or more PC-104 adapters can share a common IRQ by placing the jumpers on the same IRQ setting and setting the appropriate selections for interrupt mode.

'**M**' indicates the inclusion of a 1K-ohm pull-down resistor required on one adapter when sharing interrupts.

Set the switch to '**S**' for shared interrupt mode on all adapters sharing an IRQ. On one of the adapters sharing an interrupt set the switches for both '**S**' and for '**M**'. This provides the pull-down resistor circuit that makes sharing IRQs possible. If you are using more than one compatible adapter in a bus you should only have one port set to '**M**'.

Header E1 (IRQ Selection)

The **C4-104.ULTRA** has a single interrupt selection jumper for all four of the ports, which should be set prior to use, if an interrupt is required by your application software. Consult the user manual for the application software being used to determine the proper setting.

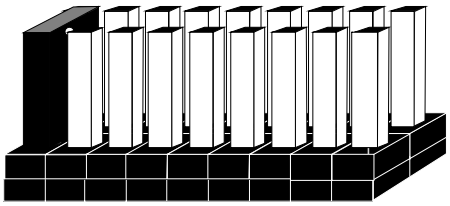


Figure 2 - Header E1, IRQ Selection (IRQ 3 shown selected)

Clock Modes

The **C4-104.ULTRA** utilizes a 14.7456 MHz oscillator. This is eight times faster than the standard COM: port oscillator, which typically is 1.8432 MHz. This allows the adapter to achieve a maximum data rate of 921.6Kbps. The following sections outline the baud rate calculations and instructions for achieving your desired baud rate.

Baud Rates and Oscillator value

The following table shows some common data rates and the rates you should choose to achieve them when using the **C4-104.ULTRA**. If the O/S of choice is Windows 95/98/ME/2000/NT/XP, the oscillator value (14.7456 MHz) should be entered into the 'Advanced Tab' on 95/98/Me/2000/XP Device Manager applet. Typically this is done automatically when the Sealevel Software driver is loaded.

When using Windows NT, the 'Advanced Ports' applet in the Control Panel should be launched and the oscillator value entered manually in the 'Advanced' tab, or all data rates will be eight (8) times the selected rate. For example if a data rate of 19.2Kbps is selected, the actual data rate will be 153.6Kbps.

When using any other OS (i.e. Linux, or QNX) the following table should be used.

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
57.6 K bps	4800 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

If your communications package allows the use of Baud rate divisors, choose the appropriate divisor from the following table:

For this Data Rate	Choose this Divisor
1200 bps	768
2400 bps	384
4800 bps	192
9600 bps	96
19.2K bps	48
38.4K bps	24
57.6K bps	12
115.2K bps	8
230.4K bps	4
460.8K bps	2
921.6K bps	1

Programmable Features

Each of the ports on the **C4-104.ULTRA** can be individually configured as an RS-232, RS-422, or RS-485 interface. This is a software selectable feature. Electrical Interface selection (RS-232/422/485), RS-422/485 termination, and RS-485 'Echo' control are selected via the 'Control' port (Base + 8). If the Sealevel Software Windows drivers are used, this is accomplished as a function of the Device Manager.

Power up default (D3-D0 = 0) = RS-485 without termination.

	D3	D2	D1	D0	Control Word Written to Base +8
	Echo	422/485	Termination	Mode	Hex
RS-232	X	X	X	1	1
RS-422 no termination	X	1	0	0	4
RS-422 with termination	X	1	1	0	6
RS-485 no termination no echo	0	0	0	0	0
RS-485 no termination with echo	1	0	0	0	8
RS-485 with termination no echo	0	0	1	0	2
RS-485 with termination with echo	1	0	1	0	A

Line Termination

Typically, each end of the RS-485 bus must have line-terminating resistors (RS-422 terminates at the receive end only). One of the unique features of the **C4-104.ULTRA** is its ability to select this termination via a control word in the control port. It is completely software selectable, thus reducing the complexity of cabling typically found in RS-485 implementations. Typically a 120-ohm resistor is across each RS-422/485 input in addition to a 1K-ohm pull-up/pull-down combination that biases the receiver inputs. The **C4-104.ULTRA** mimics this typical termination electrically. If multiple **C4-104.ULTRA** adapters are configured in an RS-485 network, only the boards on each end should have the termination in place**.**

RS-485 'Echo'

The RS-485 'Echo' is the result of connecting the receiver inputs to the transmitter outputs. Every time a character is transmitted; it is also received. This can be beneficial if the software can handle echoing (i.e. using received characters to throttle the transmitter) or it can confuse the system if the software does not. An RS-485 'No Echo' option is selected by writing the correct control word to the control port.

Installation

Operating System Installation

Windows 95/98/ME/NT/2000/XP

Do not install the adapter in the machine until the software has been fully installed.

1. Start Windows.
2. Insert the Sealevel Systems CD in to your CD drive.
3. If 'Auto-Start' is enabled for this drive the software will automatically launch.
4. Otherwise, point your browser to the 'Index.htm' on the root of the CD
5. The next step is to select 'Install Software'.
6. Select the part number for your adapter from the listing.
7. Select 'Windows 95/98/ME/NT/2000/XP' then (depending on the OS version) select the 'Run from current Location' or 'Open' option. Follow the information presented on the screens that follow.
8. Run the Add/Remove Hardware utility located in Control Panel. Double click the icon to launch the Wizard. When the Choose Hardware Task appears choose Add/Troubleshoot a device. At that point Windows will search for Plug and Play devices. Since the ISA board is not Plug and Play it will not be found. If Windows finds something you were not expecting, cancel that install and click Next. When Choose a Hardware Device appears select Add a new device. Windows will then ask if you want it to search and you select No, I want to select the hardware from a list. Then click Next. After choosing Next you will see Hardware Type. If you are installing a single port serial card select Ports (COM & LPT). If you are installing a multiport serial card, (two or more ports), choose Multi-port serial adapters. Click Next. The Select a Device Driver window will appear. On the left side find Sealevel Systems, Inc. and on the right side of the window select the card type you are installing.
9. Windows will now show a warning message that it could not detect the settings of the device and that you must enter the settings manually. Click OK. The Add New Hardware Wizard Properties window will appear. This window will show the default settings for the I/O address and one IRQ. The one IRQ will mean that you will be sharing one IRQ for all ports on the board for a multi port card. You will only need one IRQ if installing a single port card. Since Windows cannot detect the settings there my be a conflict with another device or the settings shown may be not the settings you wish to use. To change the settings choose Basic configuration 0001 next to the heading Setting based on:. When this configuration is chosen the Resources window will appear with all question marks. Simply choose each Input/Output Range and IRQ and change the settings to match the board settings. Make sure there are no conflicts with other devices that would appear at the bottom of the window under Conflicting device list. After you have either accepted the default settings or changed the settings, the Start Hardware Installation window will appear. Click Next.
10. The next window that may appear will be the Digital Signature Not Found. Do not search for digitally signed software and continue with the installation. The Completing the Add/Remove Hardware Wizard window will appear. You will be given a chance to change the resource settings again at this point if necessary. Choose Finish. At this point you will need to restart your computer. After restarting the Found New Hardware window will appear for each port that you are installing. To confirm that the drivers installed you can now look in Device Manager under Ports (COM &LPT) and each of the ports should show with their corresponding COM number.

Linux

Refer to D:\software\seacom\Other\Linux**Linux.serial.readme** (where D: = your CDROM driver letter) found on the Sealevel Systems CD. This file contains valuable information on installing your adapter in the various Linux releases. Also in this sub-directory is the **Linux SerialHOWTO.** This series of files explains typical Linux serial implementations, as well as informing the user to Linux syntax and preferred practices.

QNX

Refer to D:\software\seacom\Other\QNX6**Install.readme** (where D: = your CDROM driver letter) found on the Sealevel Systems CD. This file contains valuable information on installing your adapter in the QNX6 Neutrino OS, as well as the files required to ensure a flawless implementation. Also provided on the Sealevel Systems CD are implementation instructions for QNX4. These are found in D:\software\seacom\Other\QNX4**QNX_COM.txt.**

Physical Installation

Extreme care should be taken when installing the adapter to avoid causing damage to the connectors. After the adapter is installed, connect your I/O cable to P1. Please note these headers are keyed so that pin 1 of the cable matches pin 1 of the connector. Refer to Card Setup for information on setting the address and IRQ before inserting the adapter onto the stack.

1. Turn off PC power. Disconnect the power cord.
2. Remove the case cover (if applicable).
3. Gently insert the adapter noting proper key orientation of the expansion connector on a PC/104 compatible card. The adapter is keyed per the current PC/104 Specification. This will aid in preventing the adapter from being inserted incorrectly.
4. Mounting hardware (nylon stand-offs and screws) is provided to ensure a good mechanical connection. Retain any mounting hardware not used to allow for future expansion.
5. The cables provided are keyed and can be installed before or after the adapter is inserted in the stack.
6. Replace the cover.
7. Connect the power cord and power up the machine.

Technical Description

The **C4-104.ULTRA** provides 4 RS-232/422/485 software programmable ports from a single PC-104 adapter. The **C4-104.ULTRA** utilizes the 16C864 UART. This chip features programmable baud rate, data format, interrupt control and industry leading 128-byte transmit and receive FIFOs.

Connector Pin-outs

RS-232

P1 Pin	Signal Name		P1 Pin	Signal Name
1	DCD4		19	DCD2
2	DSR4		20	DSR2
3	RD4		21	RD2
4	RTS4		22	RTS2
5	TD4		23	TD2
6	CTS4		24	CTS2
7	DTR4		25	DTR2
8	RI4		26	RI2
9	GND4		27	GND2
10	GND3		28	GND1
11	RI3		29	RI1
12	DTR3		30	DTR1
13	CTS3		31	CTS1
14	TD3		32	TD1
15	RTS3		33	RTS1
16	RD3		34	RD1
17	DSR3		35	DSR1
18	DCD3		36	DCD1

RS-422/485

P1 Pin	Signal Name		P1 Pin	Signal Name
1	RD4+		19	RD2+
2	RTS4+		20	RTS2+
3	RD4-		21	RD2-
4	RTS4-		22	RTS2-
5	TD4-		23	TD2-
6	CTS4-		24	CTS2-
7	TD4+		25	TX2+
8	CTS4+		26	CTS2+
9	GND4		27	GND2
10	GND3		28	GND1
11	CTS3+		29	CTS1+
12	TD3+		30	TD1+
13	CTS3-		31	CTS1-
14	TD3-		32	TD1-
15	RTS3-		33	RTS1-
16	RD3-		34	RD1-
17	RTS3+		35	RTS1+
18	RD3+		36	RD1+

Pins 37, 38, 39, 40 on the Box Header are no connects.

Available for use with the **C4-104.ULTRA** is the CA228, the CA110/CA143, and the CA222/TB10 combination cables. These cables terminate the **C4-104.ULTRA's** 40 pin header to four DB9M connectors. This termination provides the standard DB9 pin out for RS-232 (EIA/TIA574) in RS-232 mode and the Sealevel Systems' DB9 standard for RS-422/485. The following table illustrates the DB9 pin out when using any of these optional cables.

RS-232

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

RS-422/485

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

Note: Please terminate any control signals that are not being 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 ensure you get the best performance from your adapter.

If the CA143 is not used and the CA110 DB37 cable is used alone the following pin outs apply.

RS-232

Port #	1	2	3	4
GND	33	14	24	5
TD	35	12	26	3
RTS	17	30	8	21
DTR	34	13	25	4
RD	36	11	27	2
CTS	16	31	7	22
DSR	18	29	9	20
DCD	37	10	28	1
RI	15	32	6	23

RS-422/485

Port #	1	2	3	4
GND	33	14	24	5
TX-	35	12	26	3
RTS-	17	30	8	21
TX+	34	13	25	4
RX-	36	11	27	2
CTS-	16	31	7	22
RTS+	18	29	9	20
RX+	37	10	28	1
CTS+	15	32	6	23

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

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

Supply line	+5VDC
Rating	400 mA

Physical Dimensions

Board Length	3.550 inches	(9.017 cm.)
Board Height	3.775 inches	(9.589 cm.)

Appendix A - Troubleshooting

1. Identify all I/O adapters currently installed in your system. This includes your on-board serial ports, controller cards, sound cards etc. The I/O addresses used by these adapters, as well as the IRQ (if any) should be identified.

2. Configure your Sealevel Systems adapter so that there is no conflict with currently installed adapters. No two adapters can occupy the same I/O address.

3. Try the Sealevel Systems adapter with a unique IRQ. While the Sealevel Systems adapter does allow the sharing of IRQs, many other adapters (i.e. SCSI adapters & on-board serial ports) do not.

4. Make sure the Sealevel Systems adapter is securely installed.

5. For Windows95/98/ME/NT/2000, the diagnostic tool 'WinSSD' is installed in the SeaCOM folder on the Start Menu during the setup process. First find the ports using the Device Manager, then use 'WinSSD' to verify that the ports are functional.

6. Remember if a "No Echo" mode is selected, a data loopback cannot be accomplished.

7. Always use the Sealevel Systems diagnostic software when troubleshooting a problem. This will eliminate any software issues from the equation.

Appendix B - How To Get Assistance

Please refer to Troubleshooting Guide prior to calling Technical Support.

1. Begin by reading through the Trouble Shooting Guide in Appendix A. If assistance is still needed please see below.
2. 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.
3. 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.
4. Sealevel Systems maintains a web page on the Internet. Our home page address is www.sealevel.com. The latest software updates, and newest manuals are available via our web site.
5. 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-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 **D**ata **T**erminal **E**quipment (**DTE**) and **D**ata **C**ircuit-Terminating **E**quipment (**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.

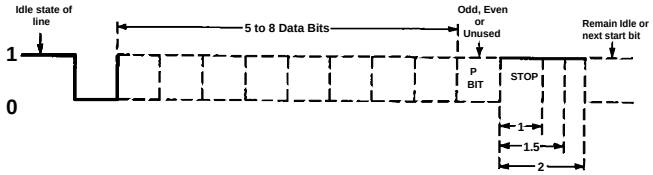
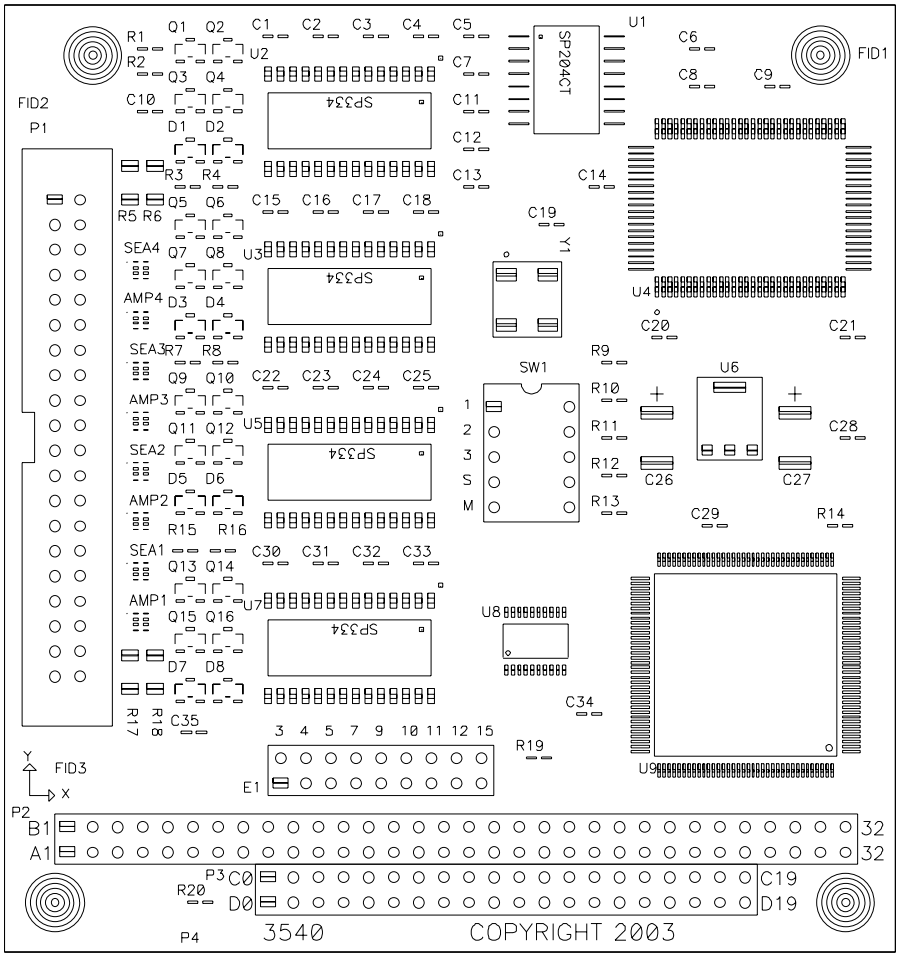


Figure 3 - Asynchronous Communications Bit Diagram

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 refereed 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 - Silk-Screen



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