Single-Port PCI Card—
RS-232/422/485/530

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**FEDERAL COMMUNICATIONS COMMISSION
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RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

CE Compliance

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."

- **EN50082-1 —** "Electromagnetic compatibility — Generic immunity standard."

  Part 1: Residential, commercial, and light industry.

- **EN60950 (IEC950) —** "Safety of information technology equipment, including electrical business equipment."

WARNING

This is a Class A Product. In a domestic environment this product may cause radio interference in which case you may be required to take adequate measures.

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.

Contents

1. Specifications

Communications Chip — IC073C: 16550; IC074C-R2: 16850

Number of Ports — Single RS-232/422/485/530

Maximum Data Rate — 460.8 kbps

Maximum Data Distance — 5000 feet (1524 m), RS-422

Connectors — (1) DB25 male

Temperature Range — Operating: 32 to 122°F (0 to 50°C);
Storage: -4 to +158°F (-20 to +70°C)

Humidity Range — 10 to 90%, noncondensing

MTBF — >150,000 hours

Board Construction — Built to UL® 94V0 rating; 100% electrically tested; Boards are solder mask over bare copper or solder mask over tinned nickel

Power Consumption — +5V @ 130 mA, +12V @ 30 mA, -12V @ 40 mA

Size — 3.5"H x 4.9"L (8.9 x 12.4 cm)

Weight — <1 lb. (<0.5 kg)

2. Introduction

2.1 Overview

The Single-Port PCI Card—RS-232/422/485/530 is a one-channel PCI Bus serial I/O adapter for PCs. It provides one field-selectable RS-232/422/485/530 serial port supporting asynchronous data rates up to 460.8 kbps as well as isochronous data rates up to the speed of the supplied clock. With this card, you can use your standard communications software and connect over a clocked digital communications line.

Configure the port as RS-232 for standard serial COM-port requirements. Choose the RS-422 mode for long-distance device connections up to 4000 feet (1219.2 m) where noise immunity and high data integrity are essential. Select RS-485 and capture data from multiple peripherals in a RS-485 multidrop network. Up to 31 RS-485 devices can be connected to each port to automate your data collection.

In both RS-232 and RS-422 modes, the card works seamlessly with the standard operating system serial driver. In RS-485 mode, our special auto-enable feature allows the RS-485 ports to be viewed by the operating system as a COM port. This allows the standard COM driver to be used for RS-485 communications. Our on-board hardware automatically handles the RS-485 driver enable. The standard version (IC073C) has a 64-byte FIFO. A UART upgrade is available (IC074C-R2) providing a 128-byte FIFO.

2.2 What's Included

The Single-Port PCI Card—RS-232/422/485/530 (IC073C) is shipped with the following items. If any items are missing or damaged, call us.

- Single-Port PCI Card—RS-232/422/485/530

- Serial Utility Software on two 3.5" disks

- This User's Manual

The Single-Port PCI Card 16850 UART Upgrade—RS-232/422/485/530 (IC074C-R2) is shipped with the following items. If any items are missing or damaged, call us.

- The UART 16850 chip mounted on the Single-Port PCI Card

- This User's Manual

2.3 Technical Description

The Single-Port PCI Card provides an additional asynchronous serial port that can be set as RS-232 (for modems, printers, and plotters) or RS-422/485/530 for industrial automation and control applications.

The Single-Port PCI Card uses the 16550 UART. This chip features programmable baud rates, data format, interrupt control, and 16-byte input and output FIFO.

An optional upgrade (IC074C-R2) gives the Single-Port PCI Card an Oxford Semiconductor 16850 UART. This chip features a deep FIFO (128 bytes transmit and receive), automatic RS-485 driver enable, and the ability to receive a clock for isochronous communications. For a 16850 UART upgrade, call Black Box at 724-746-5500 and request part number IC074C-R2.

2.3.1 ISOCHRONOUS COMMUNICATIONS

In *synchronous communication,* data transmission depends on both ends being synchronized to a single clock. In *asynchronous communication,* there is no clock; instead, each data bit is surrounded by a frame of start, stop, and parity bits. In *isochronous communication,* the framing bits of asynchronous communication are combined with the synchronized clock of synchronous communication. This scheme allows for much higher data rates and the use of digital lines (such as ISDN or T1) where a clock is supplied for data multiplexing.

Now, with a simple communications interface that responds to standard communication calls, high-speed communications can be accomplished. For example, say Company A wishes to send daily reports from the London office to its New York office via an established satellite link. These links typically require a clock to synchronize data. In the past, more expensive synchronous interface adapters and custom software would be required. Now, using the Single-Port PCI Card (IC073C) with the 16850 UART upgrade (IC074C-R2), you can use any ordinary PC communications software at much higher data rates than are possible via dialup services.

2.3.2 CONNECTOR PIN ASSIGNMENTS

Table 2-1. RS-232 Signals (DB25 Male).

Signal	Name	Pin #	Mode
GND	Ground	7	
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
DSR	Data Set Ready	6	Input
TXC	Transmit Clock	15	Input
RXC	Receive Clock	17	Input
DCD	Data Carrier Detect	8	Input
RI	Ring Indicator	22	Input
TD	Transmit Data	2	Output
RTS	Request to Send	4	Output
TSET	Transmit Signal Element Timing	24	Output
DTR	Data Terminal Ready	20	Output

Note: These assignments meet EIA/TIA/ANSI-232E DTE specifications.

Table 2-2. RS-422/485/530 Pin Assignments (DB25 Male).

Signal		Name	Pin #	Mode
GND		Ground	7	
RDB	RX+	Receive Data Positive	16	Input
RDA	RX-	Receive Data Negative	3	Input
CTSB	CTS+	Clear To Send Positive	13	Input
CTSA	CTS-	Clear To Send Negative	5	Input
TXCB	TXC+	Transmit Clock Positive	12	Input
TXCA	TXC-	Transmit Clock Negative	15	Input
RXCB	RXC+	Receive Clock Positive	9	Input
RXCA	RXC-	Receive Clock Negative	17	Input
RIB	RI+	Ring Indicator Positive	25	Input
RIA	RI-	Ring Indicator Negative	21	Input
TDB	TX+	Transmit Data Positive	14	Output
TDA	TX-	Transmit Data Negative	2	Output
RTSB	RTS+	Request To Send Positive	19	Output
RTSA	RTS-	Request To Send Negative	4	Output
DTRB	DTR+	Data Terminal Ready Positive	23	Output
DTRA	DTR-	Data Terminal Ready Negative	20	Output
TSETB	TSET+	Terminal Timing Positive	11	Output
TSETA	TSET-	Terminal Timing Negative	24	Output

Note: These assignments meet the EIA/TIA/ANSI-530 DTE specification with the exception of Ring Indicator, which is not specified. It has been included here for compatibility with systems requiring Ring Indicator.

3. Card Setup

3.1 RS-485 Enable Modes

RS-485 is ideal for multidrop or network environments. It requires a tri-state driver that will allow the electrical presence of the driver to be removed from the line. The driver is in a tri-state or high-impedance condition when this occurs. Only one driver may be active at a time and the other drivers must be tri-stated. The output modem control signal Request To Send (RTS) is typically used to control the state of the driver. Some communication software packages refer to RS-485 as RTS enable or RTS block-mode transfer.

One of the unique features of the Single-Port PCI Card is the ability to be RS-485 compatible without the need for special software or drivers. This ability is especially useful in Windows®, Windows NT®, and OS/2® environments, where the lower-level I/O control is abstracted from the application program. This ability means that you can effectively use the Single-Port PCI Card in an RS-485 application with existing (standard RS-232) software drivers.

Header E4 is used to control the RS-485 mode functions for the driver circuit. The selections are:

Auto enable (marked "AT"). The Auto enable feature automatically enables/disables the RS-485 interface via on-board circuitry.

RTS enable (marked "RT"). The RTS mode uses the RTS modem-control signal to enable the RS-485 interface and provides backward compatibility with existing software problems.

DTR enable (marked "DT"). The DTR mode uses the DTR modem-control signal to enable the RS-485 interface, provides backward compatibility with existing software products and with the Oxford Semiconductor 16850 RS-485 enable feature.

Output One enable (marked "OP"). This mode uses the OP1 control signal to enable the RS-485 interface and provides backward compatibility with existing software products and with the 16C850 RS-485 enable feature.

No Echo (marked "NE") is used to control the RS-485 enable/disable functions for the receiver circuit and determine the state of the RS-422/485 driver. 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 (using received characters to throttle the

transmitter) but it can confuse the system if the software does not. To select the No Echo mode, select the position marked "NE."
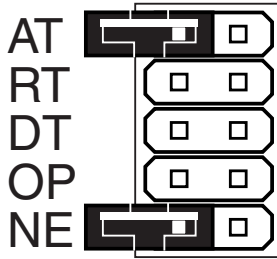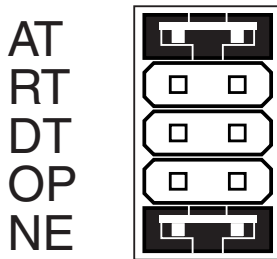
RS-485 MODE EXAMPLES (HEADER E4)

AT
RT
DT
OP
NE

Figure 3-1. Header E4, RS-422.

AT
RT
DT
OP
NE

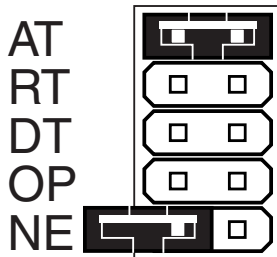**Figure 3-2. Header E4, RS-485 Auto Enabled, with No Echo.**

AT
RT
DT
OP
NE

Figure 3-3. Header E4, RS-485 Auto Enabled with Echo.
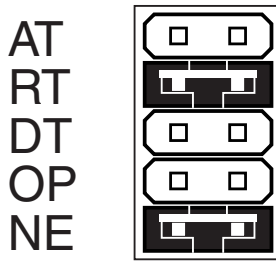
Figure 3-4. Header E4, RS-485 RTS Enabled with No Echo.
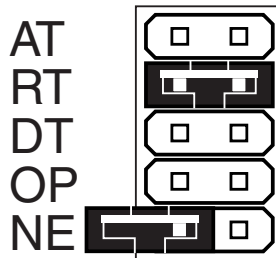

Figure 3-5. Header E4, RS-485 RTS Enabled with Echo.
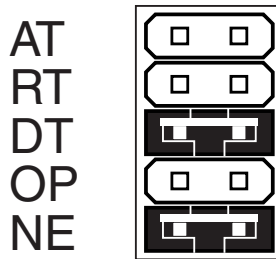

Figure 3-6. Header E4, RS-485 DTR Enabled with No Echo.

3.2 Address and IRQ Selection

The Single-Port PCI Card is automatically assigned I/O addresses and IRQs by your motherboard BIOS. Only the I/O address may be modified by the user.

Adding or removing other hardware may change the assignment of I/O addresses and IRQs.

3.3 Line Termination

Typically, each end of the RS-485 bus must have line-terminating resistors (RS-422 terminates at the receive end only). 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. Header E3 allows customization of this interface to specific requirements. Each jumper position corresponds to a specific portion of the interface. If multiple Single-Port PCI Cards are configured in a RS-485 network, only the boards on each end should have jumpers T, P, and P On. Refer to the table below for each position's function.

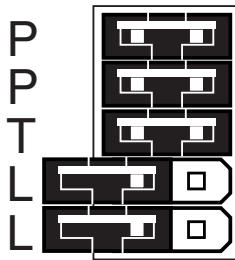| Name	Function
P	Adds or removes the 1K ohm pull-down resistor in the RS-422/RS-485 receiver circuit (Receive data only).
P	Adds or removes the 1K ohm pull-up resistor in the RS-422/RS-485 receiver circuit (Receive data only).
T	Adds or removes the 120-ohm termination.
L	Connects the TX+ to RX+ for RS-485 two-wire operation.
L	Connects the TX- to RX- for RS-485 two-wire operation.

Figure 3-7. Header E3, Line Termination.

3.4 Electrical Interface Selection

Each port on the Single-Port PCI Card can be used in either RS-232 or RS-422/485/530. This is selectable via two 24-pin DIP-shunts at E1 and E2. Use the following illustrations to help you configure your electrical interface.
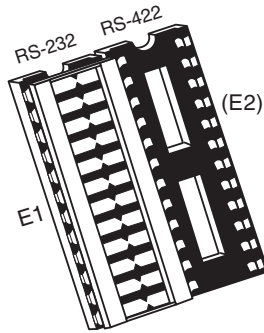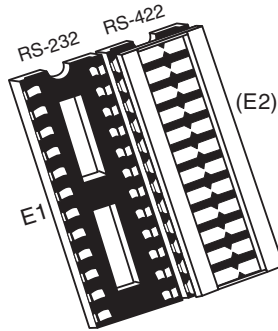

Figure 3-8. Headers E1 & E2, RS-232 Selected.

Figure 3-9. Headers E1 & E2, RS-422/485 Selected.

3.5 Clock Modes

The Single-Port PCI Card employs a unique clocking option that allows you to select from divide-by-4 and divide-by-1 clocking modes. These modes are selected at Header E8.

To select the baud rates commonly associated with COM ports (2400, 4800, 9600, 19.2...115.2 kbps), place the jumper in the divide-by-4 mode (marked DIV4).

Figure 3-10. Clocking Mode Divide By 4.

To select the maximum data rate (460.8 kbps), place the jumper in the divide-by-1 (marked DIV1) position.

Figure 3-11. Clocking Mode Divide By 1.

3.6 Baud Rates and Divisors for the "Div1" Mode

The following table shows some common data rates and the rates you should choose to match them if using the adapter in the "Div1" mode.

For this data rate...	choose this data rate
1200 bps	300 bps
2400 bps	600 bps
4800 bps	1200 bps
9600 bps	2400 bps
19.2 kbps	4800 bps
57.6 kbps	14.4 kbps
115.2 kbps	28.8 kbps
230.4 kbps	57.6 kbps
460.8 kbps	115.2 kbps

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	384
2400 bps	192
4800 bps	96
9600 bps	48
19.2 kbps	24
38.4 kbps	12
57.6 kbps	8
115.2 kbps	4
230.4 kbps	2
460.8 kbps	1

3.7 Isochronous Clocking Jumpers

The Oxford Semiconductor 16850 allows for the reception of both the transmit and the receive clocks for isochronous communications (for a discussion of isochronous clocking, refer to **Section 2.3.1**) The three headers that allow the selection of either a modem control signal or the clock option are E5, E6, and E7. The following examples describe each setting:
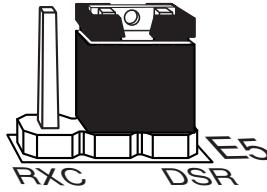

Figure 3-12. Header E5, Modem Control Signal DSR Selected as Input.
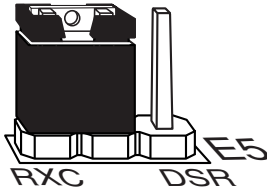

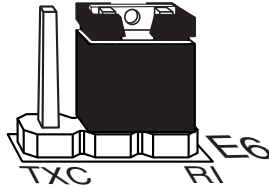**Figure 3-13. Header E5, Clock Signal RXC Selected as Input.**

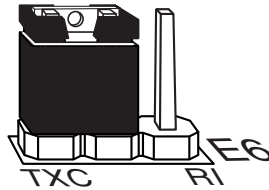**Figure 3-14. Header E6, Modem Control Signal RI Selected as Input.**

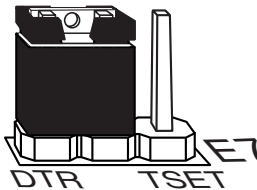**Figure 3-15. Header E6, Clock Signal TXC Selected as Input.**

Figure 3-16. Header E7, Modem Control Signal DTR Selected as Output.
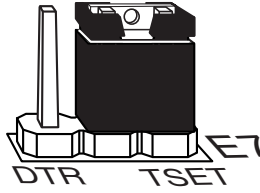
Figure 3-17. Header E7, Clock Signal TSET Selected as Output.

4. Installation

4.1 Operating System Installation

Install the proper software for your Card before installing the hardware. For the IC073C, refer to the Serial Utility software for instructions.

4.2 System Installation

The Single-Port PCI Card can be installed in any PCI expansion slot and contains several jumper straps for each port that must be set for proper operation.

1. Turn off PC power. Disconnect the power cord.

2. Remove the cover of the PC case.

3. Locate an available PCI slot and remove the blank metal slot cover.

4. Gently insert the Single-Port PCI Card into the slot. Make sure that the card is seated properly.

5. Replace the screw.

6. Replace the cover.

7. Connect the power cord.

Installation is complete.

Appendix A. Troubleshooting

A.1 Using Serial Utility Software

Serial Utility test software is supplied with the card and will be used in the troubleshooting procedures. By using this software and following these simple steps, most common problems can be eliminated without calling Technical Support.

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 IRQs (if any), should be identified.

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

3. Make sure the card is using a unique IRQ. If it is not, you will have to change the IRQ of some other I/O adapter. (The IRQ is typically selected via an on-board header block.) The IRQ should rarely be the problem, since the Single-Port PCI Card's IRQ is assigned automatically.

4. Make sure the card is securely installed in a motherboard slot.

5. When running DOS, Windows 3.x, or other operating systems, refer to the Serial Utilities software for that operating system and the user manual to verify that the card is configured correctly. The supplied software contains a diagnostic program (SSD) that runs under DOS and will verify if an adapter is configured properly. Refer to the DIAG.TXT file in the DOS/DIAG directory for detailed instructions on using SSD.

6. For Windows 95/98 and Windows NT, the diagnostic tool "WinSSD" is installed in the Black Box 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.

7. Always use the Serial Utility diagnostic software when troubleshooting a problem. This will help eliminate any software issues and identify any hardware conflicts.

A.2 PCI COM Number Selection in Windows 95/98

When you install the Single-Port PCI Card in a Windows 95 or 98 system, Windows will assign the port number COM5 to it if no other COM5 exists. If you want the Card to use another COM number, you can change the setting in the Windows Control Panel.

For example, to change the port number to COM3, press the **Start** button, choose **Settings,** and choose **Control Panel.** Double-click on the **System** icon. In the **System Properties** box, choose the **Device Manager** tab and double-click on the **Multi-Function Adapter** heading. Uncheck the **Use Automatic Settings** box.

Two I/O ranges will be listed. The first should *not* be changed; it's for the PCI bus. Double-click on the second I/O range. Highlight the entire range and type `03e8-03ef` for COM3. Click **OK.** Windows will inform you that you have made modifications that may affect other devices. Click **OK.** The address has been changed to COM3.

A.3 Calling Black Box

If you determine that your Single-Port PCI Card is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.

- when the problem occurs.

- the components involved in the problem.

- any particular application that, when used, appears to create the problem or make it worse.

A.4 Shipping and Packaging

If you need to transport or ship your Single-Port PCI Card:

- Package it carefully. We recommend that you use the original container.

- If you are shipping the Single-Port PCI Card for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.

Appendix B. Electrical Interface

B.1 RS-232

The standard PC serial port is an RS-232 port with either a DB25 or a DB9 connector. Basic RS-232 is capable of data rates up to 20 kbps at distances up to 50 feet (about 15 meters). Various improvements allow faster speeds on PC serial ports, but only over short distances.

The standard defines two types of RS-232 interfaces: DTE (Data Terminal Equipment) and DCE (Data Circuit-Terminating Equipment). Most computers' serial ports (including your Single-Port PCI Card) are DTE; most modems and other peripherals are DCE. Normally, an RS-232 connection is between a DTE and a DCE; any other connection requires a special cross-pinned cable.

RS-232 is an *unbalanced* interface, which means that there is a single signal ground for all the electrical signals. That limits the possible speed and distance.

B.2 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 Mbps and can have cabling 4000 feet long (about 1200 meters). RS-422 also defines driver and receiver electrical characteristics that will allow one driver and up to 32 receivers on the line at once. The signal levels range from 0 to +5 volts. RS-422 does not define a physical connector.

B.3 RS-485

RS-485 is backward-compatible with RS-422; however, it is optimized for party-line or multidrop applications. The output of the RS-422/485 driver can be Active (enabled) or Tri-State (disabled). This capability allows multiple ports to be connected in a multidrop bus and selectively polled.

RS-485 allows cable lengths up to 4000 feet (about 1200 meters) and data rates up to 10 Mbps. 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, which makes it ideal for multidrop or network environments. Its tri-state driver (not dual-state) allows the electrical presence of the driver to be removed from the line. Only one driver may be active at a time; the other drivers 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 or a set of modem control signals.

B.4 RS-530

RS-530 (EIA-530) compatibility means that RS-422 signal levels are met, and the pinout for the DB25 connector is specified. The EIA (Electronic Industry Association) created the RS-530 specification to detail the pinout and define a full set of modem control signals that can be used for regulating flow control and line status. Like RS-232, the RS-530 specification defines two types of interface circuits: Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). The Single-Port PCI Card is a DTE interface.

Appendix C. Asynchronous Communication

In serial data communication, 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 communication 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 predefined 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 predefined number of stop bits (usually 1, 1.5, or 2).
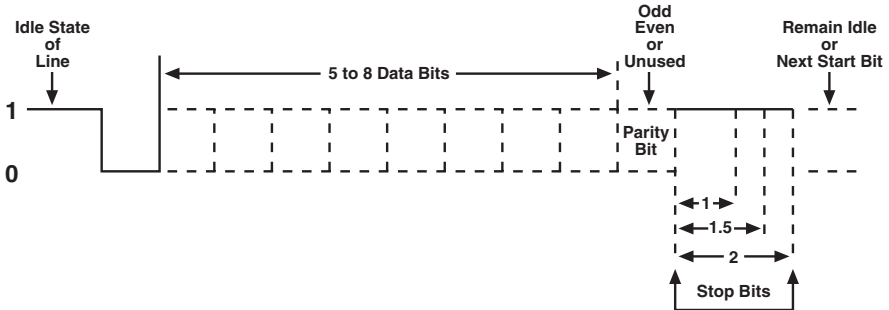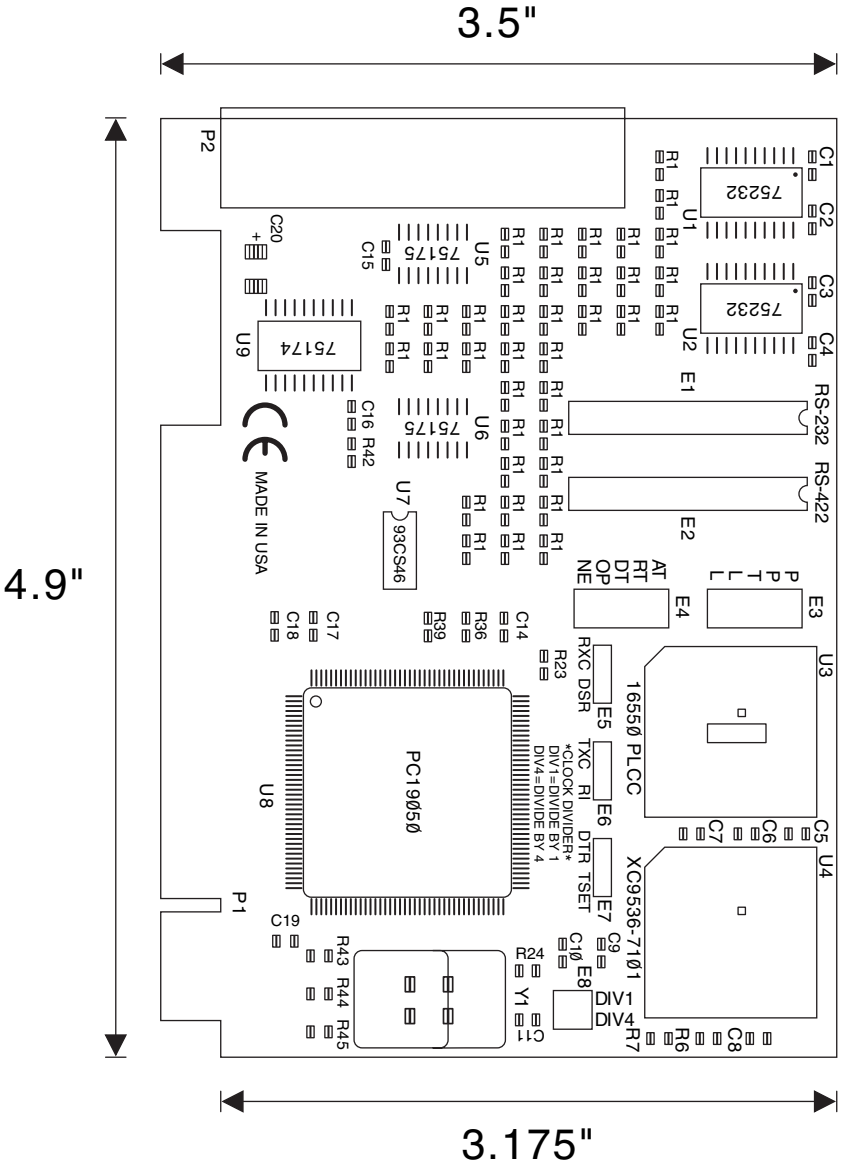

Figure C-1. Asynchronous Communications Bit Diagram.

An extra bit used for error detection is often appended before the stop bits. 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 Even Parity or Odd Parity. Sometimes parity is not used to detect errors on the data stream. This is referred to as No parity.

Appendix D. Block Diagram

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