Dual Port RS-232 Serial Interface

FEDERAL COMMUNICATIONS COMMISSION
AND
CANADIAN DEPARTMENT OF COMMUNICATIONS
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 J 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 the Canadian Department of Communications.

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 le ministère des Communications du Canada.

TRADEMARKS USED IN THIS MANUAL

AT and IBM are registered trademarks of International Business Machines Corporation. PC/XT and XT are trademarks of International Business Machines Corporation.

DUAL PORT RS-232 SERIAL INTERFACE

Contents

1. Specifications

Protocol — Asynchronous

Number of Ports — 2

Speed — IC110C: Up to 115.2 Kbps; IC174C: 460.8 kbps and higher

Operation — RS-232

Connectors — (2) DB9M

Maximum Distance — 50 ft. (15.2 m) @ 19.2 Kbps with 2500 pF max. cable capacitance (lower capacitance will allow greater distances)

Communications Chip — IC110C: 16550 UART; IC174C: 16950 UART

MTBF — >150,000 hours

MTTR — <0.25 hours

Materials — Boards are solder mask over bare copper or tin nickel

Operating Temperature — 32° to 122°F (0° to 50°C)

Storage Temperature — -4° to 158°F (-20° to 70°C)

Humidity — 0 to 90% relative humidity, noncondensing

Power — +5 VDC @ 270 mA ±12 V @ 50 mA

Size — 5"W x 5"D (12.7 x 12.7 cm)

Weight — 0.2 lb. (0.1 kg)

2. Introduction

2.1 Overview

The Dual Port RS-232 Serial Interface provides your PC system with two RS-232 asynchronous ports. Connect to any device that uses the RS-232 protocol, such as modems, data-entry terminals, and plotters.

The Serial Interface also includes a serial utility diskette with Seacom, a DOS interrupt and driver package. Seacom allows data to be buffered, eliminating data loss in high-speed data transfers. It also allows more than 4 ports (256 max.) to be configured and utilized under DOS.

The README file on the serial utility diskette contains information about the latest changes and revisions. To view this file, insert the diskette into drive A or B and type `A:TYPE READ.ME|MORE [ENTER]` or `B:TYPE READ.ME¦MORE [ENTER]`.

2.2 What's Included

Your Serial Interface should come with the following items. If any of these items are missing or damaged, contact your supplier.

> (1) Dual Port RS-232 Serial Interface,
> (2) serial utility software diskettes: (1) for 32-bit Windows®,
> (1) for DOS and Windows®3.1x
> This manual

2.3 Features

Listed below are the special features your Serial Interface offers.

- Each port is independently addressable.

- Eight interrupt options, including AT interrupts, for simple integration into existing systems.

- IRQs can be shared or individually set for each port.

- Supports Interrupt Sharing—only one interrupt line required for multiple ports.

- Supports any character set defined by binary notation.

- 16550 UARTs (IC110C) or 16950 UARTs (IC174C) help ensure against data loss.

- Faster baud rates—up to 115.2 Kbps (IC110C) or 460.8 kbps and higher (IC174C).

- Dual DB9 male AT® style connectors.

- Individually selectable address and interrupt (2–5 and 10, 11, 12, or 15 on the AT connector) for each port.

2.4 Technical Description

The Dual Port RS-232 Serial Interface provides the PC/XT™/AT/80X86 computer with two additional serial ports for terminals, modems, printers, etc. The Dual Port RS-232 Serial Interface can be configured as COM1: through COM4:, or any other I/O address.

The Dual Port RS-232 Serial Interface (IC110C) utilizes the same 16550 UART chip found in the IBM® asynchronous adapter. This chip features programmable baud rate, data format, and interrupt control. Refer to the *IBM Technical Reference* for details on programming the chip. The IC174C uses the 16950 UART chip.

Each serial port can be set as COM1:, COM2:, or any other I/O address set up to 3FF hex, providing total compatibility with most communications software and languages. Some software packages require the use of the modem handshake signals such as CTS or DCD. Consult your software manual to determine handshake-signal requirements. If no requirements are mentioned, or if you are not sure, a safe configuration is to connect (in your cable hood) DTR to DSR and DCD, and tie RTS to CTS. This usually satisfies the modem signal requirements for most communications software.

The table on page 5 shows the connector pinouts for ports J1 and J2 (DB9). Note that this is the same RS-232 pinout as the DB9 serial AT connector.

Pin Number	Signal Name	Mode
3	Transmit Data (TD)	Output RS-232
7	Request To Send (RTS)	Output RS-232
4	Data Term Ready (DTR)	Output RS-232
5	Ground (GND)	——————
2	Receive Data (RD)	Input RS-232
1	Data Carrier Detect (DCD)	Input RS-232
6	Data Set Ready (DSR)	Input RS-232
8	Clear To Send (CTS)	Input RS-232
9	Ring Indicator (RI)	Input RS-232

3. Address Selection

NOTE

Be sure to set the address selections and jumper options _before_ installation.

Each serial port on the Dual Port RS-232 Serial Interface occupies 8 consecutive I/O locations. A DIP switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing PC ports. The following table shows several examples that usually do not cause a conflict. SW1 sets the I/O address for Port 2 (the upper connector), while SW2 sets the address for Port 1 (the lower connector).

Address	Binary		Switch Position Setting						
Hex	A9	A0	1	2	3	4	5	6	7
280-287	1010000XXX		OFF	ON	OFF	ON	ON	ON	ON
2A0-2A7	1010100XXX		OFF	ON	OFF	ON	OFF	ON	ON
2E8-2EF	1011101XXX		OFF	ON	OFF	OFF	OFF	ON	OFF
2F8-2FF	1011111XXX		OFF	ON	OFF	OFF	OFF	OFF	OFF
3E8-3EF	1111101XXX		OFF	OFF	OFF	OFF	OFF	ON	OFF
300-307	1100000XXX		OFF	OFF	ON	ON	ON	ON	ON
328-32F	1100101XXX		OFF	OFF	ON	ON	OFF	ON	OFF
3F8-3FF	1111111XXX		OFF	OFF	OFF	OFF	OFF	OFF	OFF

Typically COM1:=3F8h; COM2:=2F8h; COM3:=3E8h; COM4:=2E8h

If you do not see an address in the table that is compatible with your software,

you can determine the switch setting for a particular address by using the following illustration. The illustration shows the correlation between the DIP switch setting and the address bits used to determine the base address. In the figure below, the address 300 hex through 307 hex is selected (300 HEX =11 0000 0XXX in binary representation). Note that setting the switch ON (or closed) corresponds to a "0" in the address, while leaving it OFF (or open) corresponds to a "1."

4. Option Selection

NOTE

Be sure to set the address selections and jumper options *before* installation.

The board contains several jumper straps for each port which must be set for proper operation.

Port Enable/Disable

Each port on the Dual Port RS-232 can be enabled or disabled with switch position 8 on the DIP switch. The port is enabled with the switch ON (or closed) and disabled when OFF (or open). Switch 2 (SW2), position 8 enables/disables Port 1, while Switch 1 (SW1), position 8 enables/disables port 2. If either port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper (see Figure 4-1).

Setting the Interrupt Request

Headers E1 and E2 select the interrupt request for each serial port. If COM1: is selected, this jumper must be on the IRQ4 setting. If COM2: is selected, this jumper must be on IRQ3. Both ports can be set to the same IRQ setting. If no interrupt is desired, remove the jumper.

NOTE

Most communications software applications default COM3: to IRQ4 and COM4: to IRQ3. This requires the sharing of interrupts between COM1: and COM3:, and between COM2: and COM4:. While this is the default, it is not always the best setting. Check your software configuration instructions to determine the most appropriate IRQ setting.
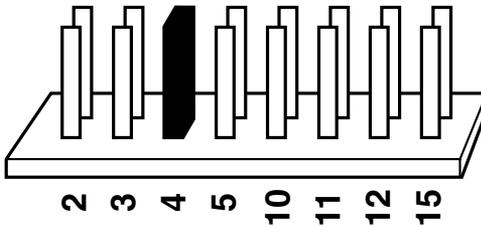
Figure 4-1. Header E1 and E2 (IRQ 4 selected).

Headers E3 and E4 select the (normal) single-interrupt-per-board mode or the multi-interrupt mode, which allows you to share both interrupts on this card. The multi-interrupt mode also allows you to share the IRQ signal(s) with other cards that support multiple interrupts.
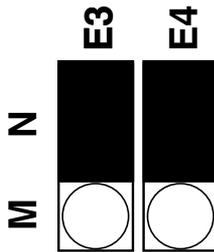

Figure 4-2. Headers E3 and E4 in Normal Mode.

5. Installation

IMPORTANT

You MUST set up the operating system BEFORE you physically install the Card.

5.1 Installing the Adapter in Your Operating System

If you are installing an ISA adapter in DOS, OS/2®, or QNX, please refer to the appropriate directory on one of the Serial Utilities Disks for instructions.

5.1.1 WINDOWS 3.1X

Please refer to the /WINDOWS sub-directory on the Serial Utilities Diskette for help files and current information on the installation of the Card in this operating environment.

5.1.2 WINDOWS 95/98

For the ISA card, run setup the Serial Utilities Diskette before installing the card. Make note of the resources that Windows assigns the adapter and set the adapter to match those resources. Power down the computer and install the adapter.

5.1.3 WINDOWS NT

For the ISA card, run setup on disk two of the Serial Utilities Diskettes before installing the card. After installing the software, refer to the help file that automatically comes up for installation instructions.

5.2 Installing the Hardware

The Dual Port RS-232 can be installed in any of the PC expansion slots, except J8 on the original IBM XT™ and Portable. Follow these steps to install the card:
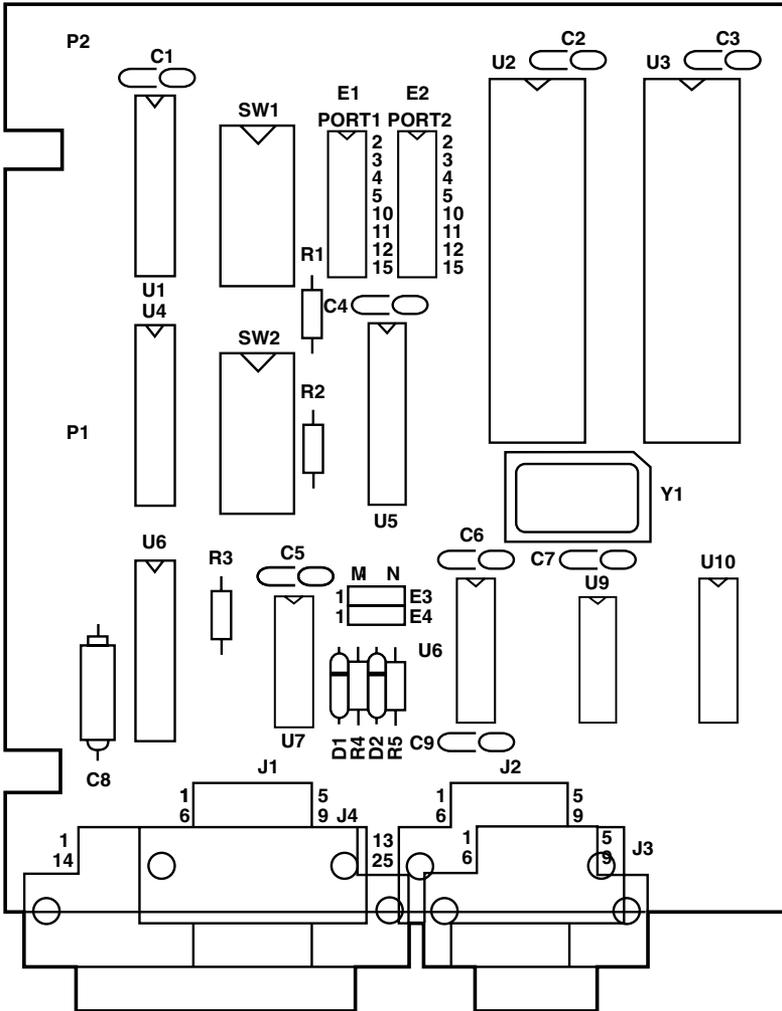
1. Remove the PC case.

2. Remove the blank metal slot cover.

3. Gently insert the board.

4. Replace the screw.
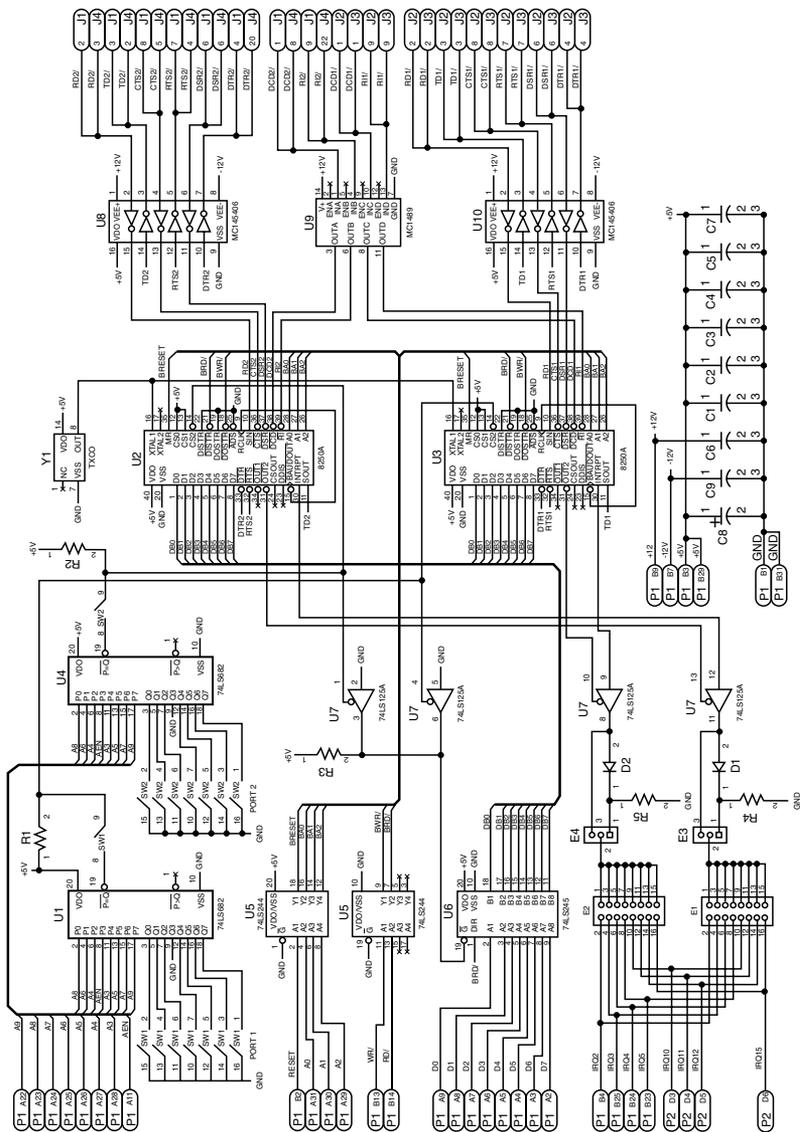
5. Replace the cover.

If you wish to change any resources assigned to the adapter, refer to the help file installed in the Black Box folder in the Start, Programs menu.

Installation is complete.

Appendix: Circuit-Board Design

BLACK BOX®
NETWORK SERVICES

1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746