RS-232 HS4

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.

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Windows is a registered trademark of Microsoft Corporation.

Contents

1. Specifications

Protocol — Asynchronous

Number of Ports — 4

Speed — Up to 115.2 Kbps

Operation — RS-232

Connectors — DB37F on card; (1) 3-ft. (0.9-m) DB37M-to-4x DB25M octopus cable, included

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

Communications Chip — 16650 UART

MTBF — >150,000 hours

MTTR — <0.25 hours

Materials — Boards are built to UL® 94V0 rating and are 100% electrically tested. Boards are solder mask over bare copper or tin nickel

Manufacturing — IPC 610-A Class-III standards are adhered to with a 0.1 visual A.Q.L. and 100% functional testing

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

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

Humidity — 10 to 90% relative humidity, noncondensing

Power — +5 VDC @ 200 mA ±12 V @ 50 mA

Size — 4.2"W x 8.6"D (10.7 x 21.9 cm)

Weight — 0.4 lb. (0.2 kg)

2. Introduction

2.1 Overview

The Four Port RS-232 Serial Interface provides your PC system with four 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) Four Port RS-232 Serial Interface with 1x DB37F,
> (1) Octopus cable, (1) 3-ft. (0.9-m) to 4x DB25M,
> (1) 3.5" serial utility diskette,
> This manual

2.3 Features

Listed below are the special features your Serial Interface offers.

- Each port is independently addressable.

- Eleven 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.

- 16650 UARTs with a 32-byte FIFO buffer to help ensure against data loss.

- Faster baud rates—up to 115.2 Kbps.

- Provides COM1: through COM4: Turnkey Solution.

- Individually selectable address and interrupts (IRQs 2[9]–7 and 10, 11, 12, and 15).

- Four DB25 male connectors provided using the octopus cable.

2.4 Technical Description

The Four Port RS-232 Serial Interface provides four additional serial ports for terminals, modems, printers, etc. The Serial Interface can be configured as COM1: through COM4:, or as any other I/O address (up to 3FF Hex), providing total compatibility with most communications software and languages. The Four Port RS-232 Serial Interface utilizes the 16650 UART chip, which features programmable baud rate, data format, interrupt control, and a 32-byte FIFO.

Modem Control Signal Considerations
Some software packages require the use of the modem handshake signals such as CTS or DCD. Consult your software manual to determine the requirements of your modem control signals. If no requirements are mentioned, or if you are not sure, a safe configuration is to tie DTR to DSR and DCD (6-8-20), and tie RTS to CTS (4-5). This will typically satisfy the modem control-signal requirements for most communications software.

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

Table 2-1. P1 through P4 pinouts as found on the octopus cable (standard RS-232C DTE)

3. Address Selection

NOTE

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

Each serial port on the Four Port RS-232 Serial Interface occupies 8 consecutive I/O locations. DIP switch SW4 sets the base address for Port 1, SW3 for Port 2, SW2 for Port 3, and SW1 for Port 4. 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.

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

The following 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, where X is a non-selectable address bit). 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.

4.1 Port Enable/Disable

Each port on the Four 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). If any port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper.

Headers E1–E4 select the IRQ 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.

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.

Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ setting, and setting the appropriate selections at E5. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper. For users of Windows®, OS/2®, and other protected-mode operating systems, make sure to set each port to a unique IRQ.

NOTE

IRQ 2 on AT class machines is not available. IRQ 9 is substituted in place of IRQ 2. To select IRQ 9, place jumper in the IRQ 2 position.
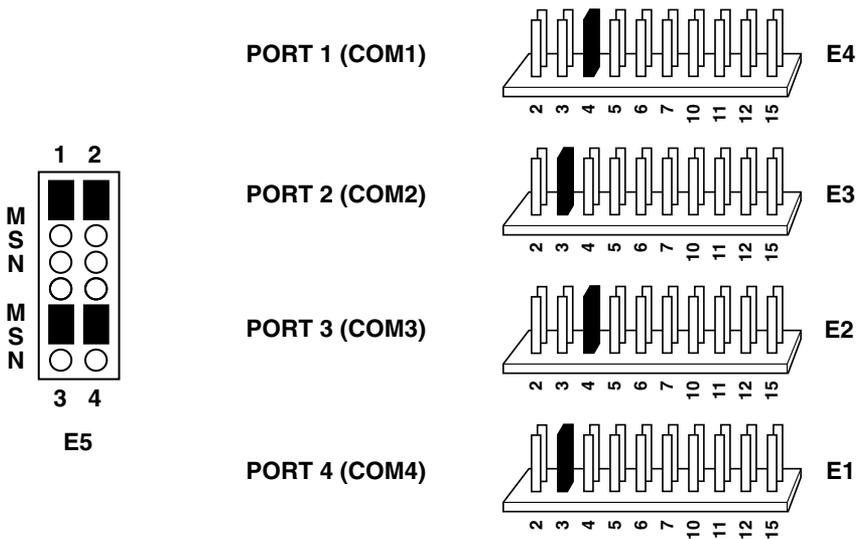
Figure 4-1. IRQ Selection.

Figure 4-1 shows the correlation between jumper block E5 and the interrupt jumpers (E1–E4). This example shows the Four Port RS-232 Serial Interface shipping configuration with COM1: and COM3: sharing interrupt 4 and COM2: and COM4: sharing interrupt 3. See **Section 4.2** for more information on the different configuration options available with Jumper E5.

4.2 Interrupt-Mode Options

Jumper E5 selects the interrupt mode for each port. Each port must be set in the correct mode to ensure proper installation.

"N" indicates the normal, single interrupt per port mode (Figure 4-2). "S" indicates the shared interrupt mode, which allows more than one port to access a single IRQ (Figure 4-4). "M" indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts (Figure 4-3).
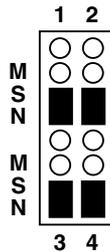
Figure 4-2. E5 in normal mode.

Set jumpers to "S" for shared interrupt mode on all blocks sharing an IRQ except one. Set that port block for "M." This provides the pull-down resistor circuit that makes sharing of IRQs possible. If you are using more than one Four Port RS-232 Serial Interface or a compatible card in a bus, you should have only one port set to "M." Figure 4-3 shows all four ports sharing a single IRQ.
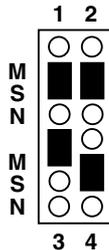
Figure 4-3. E5, sharing a single IRQ.

Set jumper to "S" if you are using more than one Four Port RS-232 Serial Interface in a bus or you wish to remove the pull-down resistor completely for hardware compatibility.

NOTE

Setting the board in this configuration when it is not accompanied by a pull-down resistor will prevent the ports from triggering an interrupt. The factory default for this board is COM1: and COM3: sharing IRQ4, and COM2: and COM4: sharing IRQ3.

Figure 4- 4. E5, sharing multiple serial interface cards.

5. Installation

NOTE

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

The Four Port RS-232 can be installed in any of the PC expansion slots, but to access the AT or (E)ISA IRQs (10, 11, 12, 15), it must be installed in one of the 16 bit slots.

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

2. Remove the PC case cover.

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

4. Gently insert the board into the slot. Make sure that it's seated properly.

5. Replace the screw.

6. Install the octopus cable.

7. Replace the cover.

8. Reconnect the power cord.

Installation is complete.

Appendix A: Circuit-Board Design

= **User Configurable**
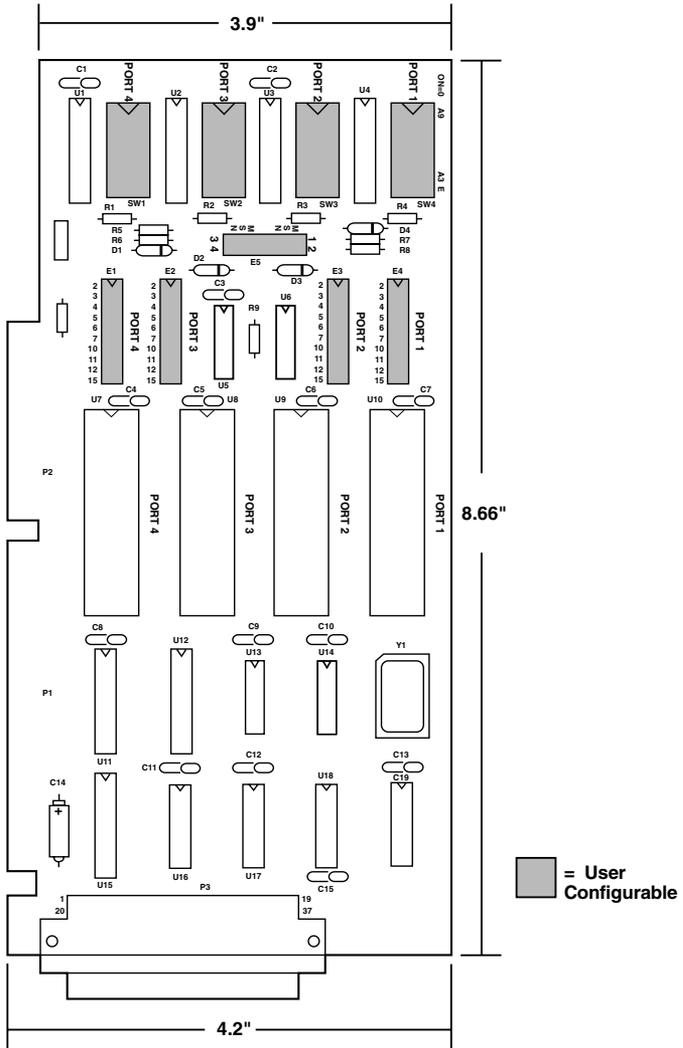
Appendix B. Troubleshooting

By using the supplied serial utility diskette and following these simple steps, most common problems can be eliminated.

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

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

3) Make sure the Serial Interface is using a unique IRQ. While the Interface does allow the sharing of IRQs, many other adapters (such as SCSI adapters and onboard serial ports) do not. The IRQ is typically selected via an onboard header block. Refer to **Chapters 3** and **4** for help in choosing an I/O address and IRQ.

4) Make sure the Four Port RS-232 Serial Interface is securely installed in a motherboard slot.

5) Use the supplied diskette and this manual to verify that the Serial Interface is configured correctly. The supplied diskette contains a diagnostic program (SSD) that will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use. Refer to the README file on the diskette for detailed instructions on how to use the SSD program.

6) These are know I/O conflicts:

   • The 278 and 378 settings may conflict with your printer I/O adapter.

   • 3B0 cannot be used if a monochrome adapter is installed.

   • 3F8-3FF is typically reserved for COM1:.

   • 2F8-2FF is typically reserved for COM2:.

   • 3E8-3EF is typically reserved for COM3:.

   • 2E8-2EF is typically reserved for COM4:.

7) Refer to the diskette for any post-production manual updates and application-specific information.

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