APPENDIX B
I/O Ports and Connectors

This file provides specific information about the input/output (I/O) ports and connectors on the back panel of the computer system.

The I/O ports and connectors on the back panel of the system are the gateways through which the computer system communicates with external devices such as a keyboard, mouse, printer, and monitor. Figure B-1 identifies the I/O ports and connectors for your system.

Serial and Parallel Ports

The two built-in serial ports use 9-pin D-subminiature connectors on the back panel. These ports support devices such as external modems, printers, plotters, and mice that require serial data transmission (the transmission of data one bit at a time over one line).

Most software uses the term COM (for communications) plus a number to designate a serial port (for example, COM1 or COM2). The defaults for your system's built-in serial ports are COM1 and COM2.

The built-in parallel port uses a 25-pin D-subminiature connector on the system's back panel. This I/O port sends data in parallel format (where eight data bits, or one byte, are sent simultaneously over eight separate lines in a single cable). The parallel port is used primarily for printers.

Most software uses the term LPT (for line printer) plus a number to designate a parallel port (for example, LPT1). The default for the system's built-in parallel port is LPT1.

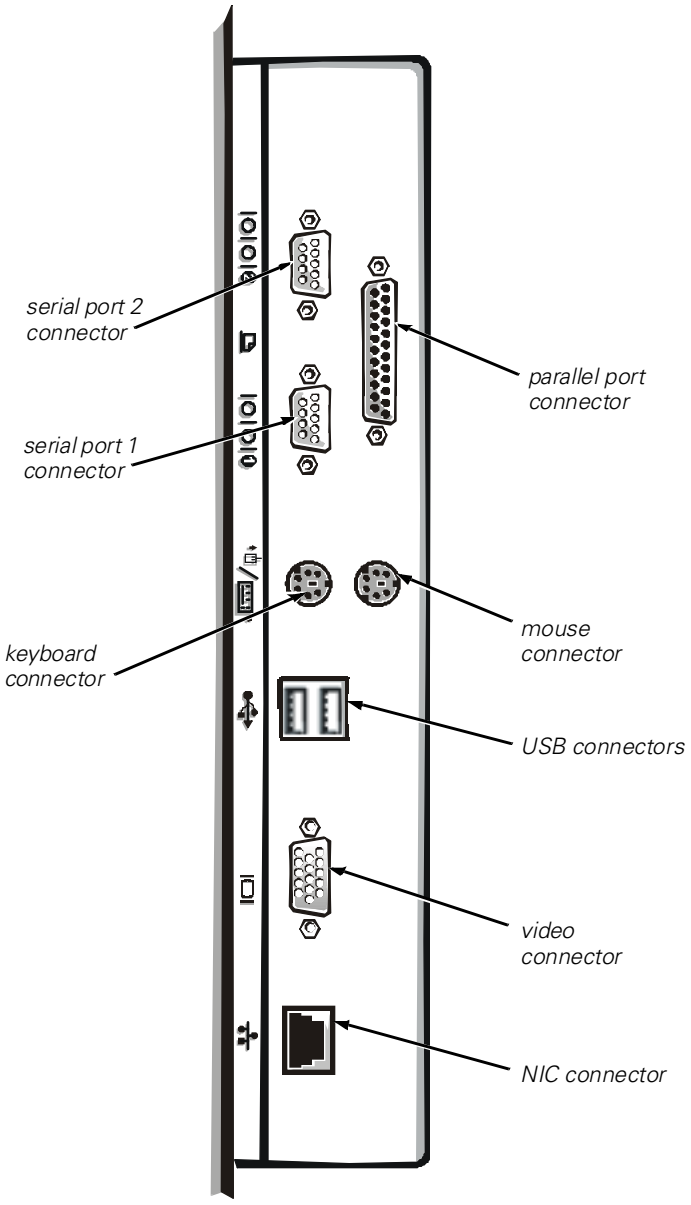

Figure B-1. I/O Ports and Connectors

Port designations are used, for example, in software installation procedures that include a step in which you identify the port to which a printer is attached, thus telling the software where to send its output. An incorrect designation prevents the printer from printing or causes scrambled print.

Adding an Expansion Card Containing Serial or Parallel Ports

The system has an autoconfiguration capability for the serial ports. This feature lets you add an expansion card containing a serial port that has the same designation as one of the built-in ports, without having to reconfigure the card. When the system detects the duplicate serial port on the expansion card, it remaps (reassigns) the built-in port to the next available port designation.

Both the new and the remapped COM ports share the same interrupt request (IRQ) setting, as follows:

COM1, COM3: IRQ4 (shared setting)
COM2, COM4: IRQ3 (shared setting)

These COM ports have the following I/O address settings:

COM1: 3F8h
COM2: 2F8h
COM3: 3E8h
COM4: 2E8h

For example, if you add an internal modem card with a port configured as COM1, the system then sees logical COM1 as the address on the modem card. It automatically remaps the built-in serial port that was designated as COM1 to COM3, which shares the COM1 IRQ setting. (Note that when you have two COM ports sharing an IRQ setting, you can use either port as necessary but you may not be able to use them both at the same time.) If you install one or more expansion cards with serial ports designated as COM1 and COM3, the corresponding built-in serial port is disabled.

Before adding a card that remaps the COM ports, check the documentation that accompanied your software to make sure that the software can be mapped to the new COM port designation.

To avoid autoconfiguration, you may be able to reset jumpers on the expansion card so that the card's port designation changes to the next available COM number, leaving the designation for the built-in port as is. Alternatively, you can disable the built-in ports through the System Setup program. The documentation for your expansion card should provide the card's default I/O address and allowable IRQ settings. It should also provide instructions for readdressing the port and changing the IRQ setting, if necessary.

The built-in parallel port has autoconfiguration capability through the System Setup program; that is, if you set the parallel port to its automatic configuration and add an expansion card containing a port configured as LPT1 (IRQ7, I/O address 378h), the system automatically remaps the built-in parallel port to its secondary address (IRQ5, I/O address 278h). If the secondary port address is already being used, the built-in parallel port is turned off.

For general information on how your operating system handles serial and parallel ports, and for more detailed command procedures, see your operating system documentation.

Serial Port Connectors

If you reconfigure your hardware, you may need pin number and signal information for the serial port connectors. Figure B-2 illustrates the pin numbers for the serial port connectors, and Table B-1 lists and defines the pin assignments and interface signals for the serial port connectors.

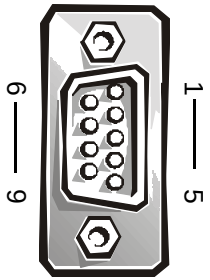

Figure B-2. Pin Numbers for the Serial Port Connectors

Table B-1. Pin Assignments for the Serial Port Connectors

Pin	Signal	I/O	Definition
1	DCD	I	Data carrier detect
2	SIN	I	Serial input
3	SOUT	O	Serial output
4	DTR	O	Data terminal ready
5	GND	—	Signal ground
6	DSR	I	Data set ready
7	RTS	O	Request to send
8	CTS	I	Clear to send
9	RI	I	Ring indicator
Shell	—	—	Chassis ground

Parallel Port Connector

If you reconfigure your hardware, you may need pin number and signal information for the parallel port connector. Figure B-3 illustrates the pin numbers for the parallel port connector, and Table B-2 lists and defines the pin assignments and interface signals for the parallel port connector.

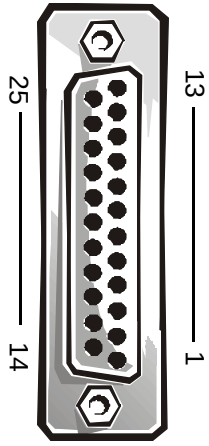

Figure B-3. Pin Numbers for the Parallel Port Connector

Table B-2. Pin Assignments for the Parallel Port Connector

Pin	Signal	I/O	Definition
1	STB#	I/O	Strobe
2	PD0	I/O	Printer data bit 0
3	PD1	I/O	Printer data bit 1
4	PD2	I/O	Printer data bit 2
5	PD3	I/O	Printer data bit 3
6	PD4	I/O	Printer data bit 4
7	PD5	I/O	Printer data bit 5
8	PD6	I/O	Printer data bit 6
9	PD7	I/O	Printer data bit 7
10	ACK#	I	Acknowledge
11	BUSY	I	Busy
12	PE	I	Paper end
13	SLCT	I	Select
14	AFD#	O	Automatic feed
15	ERR#	I	Error

Table B-2. Pin Assignments for the Parallel Port Connector *(continued)*

Pin	Signal	I/O	Definition
16	INIT#	O	Initialize printer
17	SLIN#	O	Select in
18-25	GND	—	Signal ground

Keyboard and Mouse Connectors

The system uses a Personal System/2 (PS/2)-style keyboard and supports a PS/2-compatible mouse. Cables from both devices attach to 6-pin, miniature Deutsche Industrie Norm (DIN) connectors on the back panel of your system.

A PS/2-compatible mouse works identically to an industry-standard serial mouse or bus mouse except that it has its own dedicated connector, which frees up both serial ports and does not require an expansion card. Circuitry inside the mouse detects the movement of a small ball and relays the direction to the system.

Mouse driver software can give the mouse priority with the microprocessor by issuing IRQ12 whenever new mouse movement is detected. The driver software also passes along the mouse data to the application program that is in control.

Keyboard Connector

If you reconfigure your hardware, you may need pin number and signal information for the keyboard connector. Figure B-4 illustrates the pin numbers for the keyboard connector, and Table B-3, lists and defines the pin assignments and interface signals for the keyboard connector.

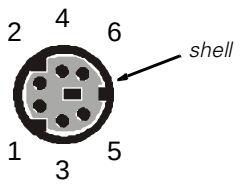

Figure B-4. Pin Numbers for the Keyboard Connector

Table B-3. Pin Assignments for the Keyboard Connector

Pin	Signal	I/O	Definition
1	KBDATA	I/O	Keyboard data
2	NC	—	No connection
3	GND	—	Signal ground
4	FVcc	—	Fused supply voltage
5	KBCLK	I/O	Keyboard clock
6	NC	—	No connection
Shell	—	—	Chassis ground

Mouse Connector

If you reconfigure your hardware, you may need pin number and signal information for the mouse connector. Figure B-5 illustrates the pin numbers for the mouse connector, and Table B-4, lists and defines the pin assignments and interface signals for the mouse connector.

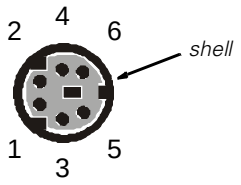

Figure B-5. Pin Numbers for the Mouse Connector

Table B-4. Pin Assignments for the Mouse Connector

Pin	Signal	I/O	Definition
1	MFDATA	I/O	Mouse data
2	NC	—	No connection
3	GND	—	Signal ground
4	FVcc	—	Fused supply voltage
5	MFCLK	I/O	Mouse clock
6	NC	—	No connection
Shell	—	—	Chassis ground

Video Connector

The system uses a 15-pin high-density D-subminiature connector on the back panel for attaching a video graphics array (VGA)-compatible monitor to your system. The video circuitry on the system board synchronizes the signals that drive the red, green, and blue electron guns in the monitor.

NOTE: Installing a video card automatically disables the system's built-in video subsystem.

If you reconfigure your hardware, you may need pin number and signal information for the video connector. Figure B-6 illustrates the pin numbers for the video connector, and Table B-5 lists and defines the pin assignments and interface signals for the video connector.

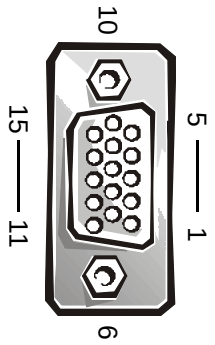

Figure B-6. Pin Numbers for the Video Connector

Table B-5. Pin Assignments for the Video Connector

Pin	Signal	I/O	Definition
1	RED	O	Red video
2	GREEN	O	Green video
3	BLUE	O	Blue video
4	NC	—	No connection
5-8, 10	GND	—	Signal ground
9	VCC	—	Vcc
11	NC	—	No connection
12	DDC data out	O	Monitor detect data
13	HSYNC	O	Horizontal synchronization
14	VSYNC	O	Vertical synchronization
15	DDC clock out	O	Monitor detect clock
Shell	—	—	Chassis ground

Integrated Network Interface Controller Connector

Your system has an integrated 10/100–megabit-per-second (Mbps) network interface controller (NIC). The NIC provides all the functions of a separate network expansion card and supports both the 10BASE-T and 100BASE-TX Ethernet standards.

The NIC includes a Wakeup On LAN feature that enables the computer to be started by a special local area network (LAN) signal from a server management console. Wakeup On LAN provides remote computer setup, software downloading and installation, file updates, and asset tracking after hours and on weekends when LAN traffic is typically at a minimum.

Network Cable Requirements

Your computer's RJ45 NIC connector is designed for attaching an unshielded twisted pair (UTP) Ethernet cable equipped with standard RJ45-compatible plugs. Press one end of the UTP cable into the NIC connector until the plug snaps securely into place. Connect the other end of the cable to an RJ45 jack wall plate or to an RJ45 port on a UTP concentrator or hub, depending on your network configuration. Observe the following cabling restrictions for 10BASE-T and 100BASE-TX networks.

NOTICE: To avoid line interference, voice and data lines must be in separate sheaths.

- For 10BASE-T networks, use Category 3 or greater wiring and connectors.
- For 100BASE-TX networks, use Category 5 or greater wiring and connectors.
- The maximum cable run length (from a workstation to a concentrator) is 328 feet (ft) (100 meters [m]).
- For 10BASE-T networks, the maximum number of daisy-chained concentrators on one network segment is four.

USB Connectors

Your system contains two Universal Serial Bus (USB) connectors for attaching USB-compliant devices. USB devices are typically peripherals such as keyboards, mice, printers, and computer speakers.

NOTICE: Do not attach a USB device or a combination of USB devices that draw a maximum current over 500 milliamperes (mA) per channel or +5 volts (V). Attaching devices that exceed this threshold may cause the USB ports to shut down. See the documentation that accompanied the USB devices for their maximum current ratings.

If you reconfigure your hardware, you may need pin number and signal information for the USB connectors. Figure B-7 illustrates the pin numbers for the USB connectors, and Table B-6 lists and defines the pin assignments and interface signals for the USB connectors.

Figure B-7. Pin Numbers for the USB Connectors

Table B-6. Pin Assignments for the USB Connectors

Pin	Signal	I/O	Definition
1	Vcc	N/A	Supply voltage
2	DATA	I	Data in
3	+DATA	O	Data out
4	GND	N/A	Signal ground