Technical Information Manual

PC 300PL
(Types 6562 and 6592)

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Note

Before using this information and the product it supports, be sure to read the general information under Appendix E, “Notices and Trademarks” on page 59.

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Preface

This *Technical Information Manual* provides information on the IBM PC 300PL (Types 6562 and 6592). The manual, which is intended for developers who want to provide hardware and software products to operate with these computers, provides in-depth information on how the computers work. Users of this publication should have an understanding of computer architecture and programming concepts.

Manual Style

Because the PC 300PL (Type 6562) and (Type 6592) are similar, they will be referred to collectively as *PC 300PL computers* throughout this manual, except in cases where differences between the two computer types must be described.

In this manual, the use of the letter “h” indicates a hexadecimal number. Also, when numerical modifiers such as “K”, “M” and “G” are used, they typically indicate powers of 2, not powers of 10. For example, 1 KB equals 1 024 bytes (2^{10}), 1 MB equals 1 048 576 bytes (2^{20}), and 1 GB equals 1 073 741 824 bytes (2^{30}).

When expressing storage capacity, MB equals 1 000 KB (1 024 000). The value is determined by counting the number of sectors and assuming that every two sectors equals 1 KB. Depending on the operating system and other system requirements, the storage capacity available to the user might vary.

Warning: The term *reserved* describes certain signals, bits, and registers that should not be changed. Use of reserved areas can cause compatibility problems, loss of data, or permanent damage to the hardware. When the contents of a register are changed, the state of the reserved bits must be preserved. When possible, read the register first and change only the bits that must be changed.

Some signals are abbreviated. A minus sign in front of a signal indicates that the signal is active low. No sign in front of a signal indicates that the signal is active high.

Related Publications

In addition to this manual, the following IBM publications provide information about the operation of PC 300PL computers. To order these publications, call 1-800-879-2755 in the U.S. and Puerto Rico. In other countries, contact an IBM reseller or IBM marketing representative.

- *Setting Up Your PC 300PL (Type 6562)*
  Setting Up Your PC 300PL (Type 6592)
  These publications contain instructions on preparing the computer for operation.
- *Using Your PC 300PL (Type 6562)*
  Using Your PC 300PL (Type 6592)
  These publications contain information on configuring, operating, and maintaining the computer. Also included are warranty information, instructions for diagnosing and solving problems, and information on how to obtain help and service.
- *Installing Options in Your PC 300PL (Type 6562)*
  Installing Options in Your PC 300PL (Type 6592)
  These publications contain instructions for installing options in the computer.
- *Understanding Your PC 300PL*
  This publication includes general information about using computers and detailed information about the features of PC 300PL computers.
- *About Your Software*
  This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.
- *Your Ready-to-Configure CD*
  This publication contains information about the *Ready-to-Configure CD* that comes with PC 300PL computers. The publication also contains instructions for starting the CD.
- *Adaptec SCSI Documentation*
  This documentation, which is provided with computer models that have an IBM-installed SCSI adapter, includes information on configuring the adapter and instructions for installing and configuring SCSI devices.
- *Hardware Maintenance Manual*
  This publication contains information on PC 300PL computers for trained service technicians. It can be found on the World Wide Web (http://www.us.pc.ibm.com/cdt/hmm.html), and it can also be ordered from IBM. To purchase a copy, refer to the "Getting Help, Service, and Information" section in *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)*.
- *Compatibility Report*
  This publication contains information about compatible hardware and software for PC 300PL computers. The publication is available on the World Wide Web (http://www.us.pc.ibm.com/cdt).

Chapter 1. System Overview

The PC 300PL (Type 6562) and (Type 6592) are versatile products designed to provide state-of-the-art computing power with room for future growth. The two computers utilize the same system board. They differ in frame assembly design, power supply capacity, and riser card design. (Type 6562 has four drive bays, four expansion slots, and a 145-watt power supply. Type 6592 has six drive bays, six expansion slots, and a 200-watt power supply. Refer to “Riser Card” on page 20 for an illustration of the riser card in each computer.)

Note: Because the two computer types (6562 and 6592) are similar, they will be referred to collectively as *PC 300PL computers* throughout this manual, except in cases where differences between the two types must be described.

Hardware Features

The major features of PC 300PL computers are:

- Intel® Pentium® processor with MMX™ technology
- Single bank, pipeline burst, synchronous L2 cache soldered on the system board
- Support for up to 384 MB of system memory
- Busmaster IDE controller
- EIDE or Ultra Wide SCSI hard disk drive
- CD-ROM drive (some models only)
- 3.5-inch, 1.44 MB diskette drive
- Integrated Matrox MGA-1164SG[1] 3D video controller with 2 MB SGRAM soldered to the system board
  - Support for additional 2 MB of SGRAM
  - Upgrade connectors for VESA interface and Matrox multimedia options
- Integrated 16-bit, stereo audio controller (supports Sound Blaster Pro applications)
  - Built-in, high-quality speaker
- Integrated Intel 10/100 Mbit, PCI Ethernet controller
- System Management
  - RPL (Remote Program Load) and DHCP (Dynamic Host Configuration Protocol)
  - Integrated Wake on LAN controller
  - Automatic power-on startup sequence
  - POST/BIOS update from network
  - DMI (Desktop Management Interface) BIOS and DMI software
  - Integrated system management controller
- Input/Output Features
  - Two serial ports
  - One ECP/EPP parallel port
  - One monitor port
  - Four 3.5 mm audio jacks (line out, line in, headphone, and microphone)
  - One Ethernet RJ-45 port
  - Two USB (universal serial bus) ports
  - One keyboard port (Windows 95-compatible)
  - One mouse port
  - One infrared port (optional)
  - One multimedia port (optional)

[1] The 1164SG controller is equivalent to the 1064SG controller (which is installed in some PC 300PL computers models).

- Expansion
  - PC 300PL (Type 6562): Four drive bays, four expansion slots (one ISA, two PCI, and one shared ISA/PCI)
  - PC 300PL (Type 6592): Six drive bays, six expansion slots (three ISA and three PCI)

Several model variations are available for PC 300PL computers. The following list describes some of the ways in which the models vary:

- Microprocessor speed
- Hard disk type and capacity
- Amount of system memory preinstalled
- Type of operating system software preinstalled

Note also that models are available with or without a CD-ROM drive preinstalled.

Software Features

This section describes the system software, device drivers, and operating system support provided with PC 300PL computers.

System Software

System software refers to the following:

- Basic input/output system (BIOS)
- Plug and Play
- Power-on self-test (POST)
- Configuration/Setup Utility program
- Advanced Power Management (APM)
- Flash update utility program
- Diagnostic programs

BIOS

PC 300PL computers have an IBM BIOS. Support is provided for the following features:

- PCI bus, according to the PCI BIOS Specification (Version 2.1)
- Plug and Play, according to the ISA Plug and Play BIOS Specification (Version 1.2)
- Advanced Power Management, according to the APM BIOS Interface Specification (Version 1.2)
- Desktop Management BIOS, according to DMI Specification 2.0a
- IDE LBA to allow access to hard disks with a capacity greater than 527 MB
- Intel 82430HX core chipset
- Matrox MGA-1164SG 3D video BIOS
- Intel Ethernet BIOS
- Crystal audio setup BIOS
- National System Management BIOS
- Initialization of National Semiconductor N87307 I/O chip, with Plug and Play support
- Manufacturing hooks
- Bootable CD-ROM
- DBCS code (for Japanese systems only)
- Wake on LAN
- RPL (Remote Program Load) and DHCP (Dynamic Host Configuration Protocol)
- Flash over LAN
- Alternate boot sequence
- CMOS cloning
- Enable/disable of system board Ethernet controller

Plug and Play

PC 300PL computers conform to the following:

- *ISA Plug and Play BIOS Specification (Version 1.2)*
- *ISA Plug and Play BIOS Specification, Errata and Clarifications (Version 1.0)*, as released by Microsoft

PC 300PL computers also conform to the guidelines described in the following:

- *Plug and Play BIOS Extension Design Guide (Version 1.0)*
- *Guide to Integrating the Plug and Play BIOS Extensions with System BIOS (Version 1.1)*
- *Plug and Play Kit for DOS and Windows*

POST

PC 300PL computers use IBM power-on self-test (POST) software with initialization code added for the Intel Pentium processor with MMX technology, the Intel 82430HX core chipset, the National Semiconductor PC87307 I/O chip, the Intel Ethernet chip, and the Matrox MGA-1164SG 3D video chip.

POST software locates any hardware problems or configuration changes. If an error occurs while POST is running, an error code in the form of a text message displays on the screen. For a description of POST error codes, see "POST Error Codes" on page 56. For further information on POST, refer to *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)*.

Configuration/Setup Utility Program

The Configuration/Setup Utility program provides menus for viewing and changing selections for devices and I/O ports, current date and time, start options, system security, advanced setup, ISA legacy resources, and advanced power management. The Configuration/Setup Utility program also provides system summary and product data screens which contain information specific to the computer model being used. Refer to *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)* for further information on the Configuration/Setup Utility program.

Advanced Power Management

PC 300PL computers come with energy-saving software that meets Energy Star requirements. Advanced Power Management (APM) is a feature that reduces power consumption when components of the computer (or the entire computer system) are not in use. When enabled, APM initiates reduced-power modes for the microprocessor, monitor, hard disk drive, or entire system after a specified period of inactivity is reached.[2]

APM is implemented in PC 300PL computers according to the APM BIOS Interface Specification (Version 1.2). For more information on APM, refer to *Understanding Your PC 300PL* and *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)*.

Flash Update Utility Program

A stand-alone utility program is available to support user-initiated flash code updates. This utility program updates the BIOS code in flash memory. PC 300PL computers also support BIOS updating over the LAN (Flash-over-LAN). The Flash-over-LAN function requires the use of the integrated system board Ethernet.

The flash update utility program is available on the World Wide Web (http://www.us.pc.ibm.com/files.html) or through the PC Company Bulletin Board Service in files that can be downloaded onto a diskette. Instructions for using the flash update utility program will be available in a README file included in the downloaded files. Refer to *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)* for further information.

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[2] SCSI hard disk drives do not support APM.

Diagnostic Programs

A diagnostic program (QAPlus/WIN for IBM or QAPlus/PRO for DOS) is provided with each PC 300PL computer. The diagnostic program provided depends on the type of software preinstalled. For more information on diagnostic programs, refer to *Using Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)*.

Device Drivers

PC 300PL computers come with device drivers to support built-in features and several operating systems. The device drivers are preinstalled in models that come with IBM-preinstalled software. In addition, the device drivers are included on the Ready-to-Configure (RTC) CD-ROM that is provided with all PC 300PL models.

Operating System Support

Although a variety of operating systems can be used with PC 300PL computers, full function is provided only with Windows 95 and Windows NT 4.0. When operating systems other than Windows 95 and Windows NT 4.0 are used, PC 300PL computers will work, but without all of the advanced functions (for instance, the USB function is not supported with OS/2.) For a list of operating systems that are compatible with PC 300PL computers, refer to *Using Your PC 300PL (Type 6562)*, *Using Your PC 300PL (Type 6592)*, and the IBM online compatibility report on the World Wide Web at http://www.us.pc.ibm.com/cdt.

Note: An operating system and various support programs are preinstalled in some PC 300PL computers. Refer to *About Your Software* for a detailed description of the preinstallation package. Also, a Ready-to-Configure (RTC) CD-ROM is included with all models. The RTC CD-ROM contains applications and device driver support for the preinstalled operating system (if applicable), and several other operating systems.

Chapter 2. System Board Features

This section provides information about system board features. For an illustration of the PC 300PL system board, refer to “Physical Layout” on page 24.

For a list of features provided with PC 300PL computers, refer to “Hardware Features” on page 1.

Microprocessor

PC 300PL computers have an Intel Pentium processor with MMX technology. This microprocessor has separate core supply (2.8 V) and I/O supply (3.52 V) voltages. A voltage regulator on the system board converts the 3.52 V provided by the power supply to the core voltage (2.8 V) required by the microprocessor.

The Pentium processor with MMX technology features the following:

- Optimization for 32-bit software
- Operation at a lower voltage level than previous microprocessors
- 64-bit data bus
- 32-bit I/O bus
- 32 KB L1 cache (split into 16 KB write-through code cache and 16 KB write-back data cache)
- Fractional bus speed (selectable at 2/7, 2/5, 1/3, or 1/2 bus/core frequency ratio)
- Power management features (stop clock, I/O trap restart, autohalt, system management mode)
- Math coprocessor
- Support for MMX technology (boosts the processing of graphic, video, and audio data)

More information on the Pentium processor with MMX technology can be found on the World Wide Web at http://www.intel.com.

The microprocessor plugs into a 321-pin PGA processor ZIF socket (Socket 7) located on the system board. This socket will accommodate the 320-pin Pentium processor with MMX technology. The ZIF socket defines approximately half of the Vcc pins for core supply and the other half for I/O supply.

For information on replacing a microprocessor or installing an upgrade, refer to *Installing Options in Your PC 300PL (Type 6562)* or *Installing Options in Your PC 300PL (Type 6592)*.

Chip Set Control

PC 300PL computers use the second-generation Intel 82430HX chip set, which consists of two modules. The 324-pin TXC module provides a bridge between the PCI bus and the microprocessor bus. (For information on the PCI bus, see “PCI-to-ISA Bridge” on page 8.) The TXC module also controls the cache and system memory interfaces.

The 208-pin, PIIX3 module provides a bridge between the PCI and ISA buses. The module, which is fully compliant with *PCI Local Bus Specification (Version 2.1)*, also contains the IDE and USB controllers.

L2 Cache

The L2 cache installed in PC 300PL computers consists of synchronous, pipeline burst, SRAMs installed in a single bank on the system board. There is one 32K x 8 bit, 15 ns, 5 V SRAM tag module and two 64K x 32 bit, 8ns, 3.3 V SRAM modules installed. Features of the L2 cache are as follows:

- Look-aside architecture
- Direct-mapped (one-way associativity) organization
- Operates in write-back mode
- Follows MESI (modified, exclusive, shared, invalid) protocol
- Implemented as a unified cache (cache code and data)

System Memory

The system memory interface in PC 300PL computers is controlled by the Intel TXC chip set module. (Refer to “Chip Set Control” on page 6 for information on the TXC module.) There are three dual inline memory module (DIMM) sockets on the system board. The DIMM sockets are powered by +3.3 volts. This voltage allows for low-power operation and supports 64-Mbit technology. For DIMM socket pin assignments, refer to “System Memory Connectors” on page 43.

The system board supports:

- A total of 384 MB of system memory
- A maximum of 128 MB of system memory in each DIMM socket

Any configuration of DIMMs is acceptable. However, DIMMs must have the following characteristics:

- Must be EDO nonparity (NP) or EDO error correcting code (ECC) DRAMs
- Must be 16, 32, 64, or 128 MB in size
- Must be 168-pin, unbuffered, +3 V, serial PD type
- Must have gold-lead tabs
- Must have 60 ns access speed only

Also, note the following:

- EDO NP modules and EDO ECC modules can be mixed, but they will configure as NP.
- To enable ECC, all installed memory must be of the EDO ECC type.

Note: Single inline memory modules (SIMMs) are not supported in PC 300PL computers.

PCI-to-ISA Bridge

The PIIX3 chipset module provides the bridge between the peripheral component interconnect (PCI) and industry standard architecture (ISA) buses. The chip is used to convert PCI bus cycles to ISA bus cycles.

The PCI bus is compliant with *PCI Local Bus Specification 2.1*. The PCI bus runs synchronously to the host bus and is driven at a frequency of 33 MHz (half the speed of the 66 MHz microprocessor bus). The ISA bus is permanently set to the PCI bus speed divided by four.

The PCI bus shares interrupts with the ISA bus. Free interrupts are automatically assigned to PCI devices during POST. If no interrupts are available for the PCI devices, an 18XX POST error message is generated.

For information on PCI and ISA bus expansion connectors, see “Riser Card” on page 20.

System I/O and Power Management

The Intel PIIX3 chipset module that provides the PCI-to-ISA bridge also provides all the subsystems of the ISA bus. These subsystems are:

- An ISA-compatible interrupt controller that provides the function of two cascaded 82C59 interrupt controllers
- Three counters, equivalent to an 82C54 programmable interval timer
- The function of two 82C37 DMA controllers with seven independent DMA channels (four 8-bit channels and three 16-bit channels)
- Power management features

For further information on the PIIX3 chipset module, refer to “Chip Set Control” on page 6.

IDE Bus Master Interface

The system board incorporates a PCI-to-IDE interface that complies with the *AT Attachment Interface with Extensions*. The Intel PIIX3 chipset module contains the controller for the PCI Bus Master IDE interface. The PIIX3 module allows concurrent operations on the PCI and IDE buses. (Refer to “Chip Set Control” on page 6 for further information on the PIIX3 module.)

The primary and secondary IDE busses are routed to two connectors on the riser card. A total of four IDE devices can be attached to the two IDE riser card connectors using ribbon cables. Note that a total of three IDE devices can be attached to the riser card connectors in the PC 300PL (Type 6562) due to bay limitations. The IDE devices receive their power through separate, four-position power cables containing +5 V, +12 V, and ground (GND) voltage.

On each IDE connector, one IDE device is designated as the primary (master) device, and the other device is designated as the secondary (subordinate) device. These designations are determined by switch or jumper settings on each IDE device. A functional primary device must be present on each IDE connector for a secondary device to be recognized on that same IDE connector. Care must be taken to ensure that the jumpers on the IDE devices installed in the system correctly identify them as either primary or secondary devices. Otherwise, some of the devices might not be recognized by the system. There is no performance impact between a primary device and a secondary device of the same type on the same IDE connector.

A bootable IDE hard disk drive can be installed on either IDE connector. A bootable hard disk is one which has an active partition with an operating system installed on it.

PCI or ISA IDE expansion adapters are not supported.

For a list of devices that can be installed in PC 300PL computers, refer to “Internal Drives” on page 26.

The following table shows the typical system resource assignments for the IDE interface.

Table 1. System Resource Assignments for the IDE Interface

Configuration	ROM	RAM	I/O Address (Hex)	IRQ	DMA
IDE 1	None	None	01F0-01F7, 03F6, 03F7 bits 6:0	14	None
IDE 2	None	None	0170-0177, 0376-0377	15	None

Notes:

1. IDE 1 is the default for the primary channel.
2. IDE 2 is the default for the secondary channel.

When the computer is started, the resource assignments are subject to change during POST.

Two 40-pin connectors are provided on the riser card for the IDE interface. For information on connector pin assignments, see “IDE Connectors” on page 41.

USB Interface

The Intel PIIX3 chipset module contains the controller for the USB interface in PC 300PL computers. (Refer to “Chip Set Control” on page 6 for information on the PIIX3 module.) Two USB ports are provided on the rear connector panel of the computers. A USB-enabled device can be attached to each port, and if that device is a hub, multiple peripheral devices can be attached to the hub and be used by the system. Plug and Play technology is used to recognize installed devices. The USB port functions at speeds of up to 1.5 Mbits per second or 12 Mbits per second. Data is transferred in either asynchronous or isochronous mode. The system does not support a keyboard attached to either of the USB ports as a boot device.

The USB is compliant with *Universal Host Controller Interface Design Guide 1.0*. Features provided by USB technology include:

- Support for up to 127 physical devices
- Connections of up to five meters in length from host to hub or hub to hub
- Support for hot pluggable devices
- Support for concurrent operation of multiple devices
- Support for different device bandwidths
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, etc.
- Wide range of packet sizes
- Eight-signal USB cable

The external interface for the USB ports consists of two, 4-pin connectors. For information on connector pin assignments, see “USB Connectors” on page 46.

Super Input/Output Controller

Control of the integrated input/output (I/O) ports, diskette drive, and real-time clock is provided by the National Semiconductor PC87307 chip. This chip, which is compatible with *Plug and Play ISA Specification 1.0a*, supports and implements the following features:

- Diskette interface
- Parallel port
- Serial ports
- Infrared port
- Keyboard and mouse ports
- General-purpose I/O ports
- Real-time clock

Diskette Interface

The PC 300PL (Type 6562) supports one diskette drive. The PC 300PL (Type 6592) supports a maximum of two diskette drives. (Refer to “Internal Drives” on page 26 for more information). The following is a list of devices that the diskette interface will support:

- 1.44 MB, 3.5-inch diskette drive
- 1.44 MB, 3.5-inch, 3-mode drive for Japan
- 1.2 MB, 5.25-inch diskette drive (PC 300PL, Type 6592 only)
- 1 Mbps, 500 Kbps, or 250 Kbps internal tape drive (PC 300PL, Type 6592 only)

Note: A 2.88 MB, 3.5-inch diskette drive is not supported.

The following table shows the typical system resource assignments for the diskette interface.

Table 2. System Resource Assignments for the Diskette Interface

Resource	Resource Assignment
ROM	None
RAM	None
I/O Address (Hex)	03F0–03F5 (diskette channel 0) 03F7, bit 7 (diskette change)
IRQ	6
DMA	2

When the computer is started, the resource assignments are subject to change during POST.

One shrouded, 34-pin, berg-strip connector is provided on the PC 300PL riser card for the diskette drive. For information on connector pin assignments, see “Diskette Drive Connector” on page 42.

Parallel Port

One parallel port is integrated into the system board. Support for extended capabilities port (ECP), enhanced parallel port (EPP), and standard parallel port (SPP) modes is provided. These modes are selected through the Configuration/Setup Utility program, with the default mode set to SPP. The ECP and EPP modes are compliant with IEEE 1284.

The following table shows the typical system resource assignments for the parallel port.

Table 3. System Resource Assignments for the Parallel Port

Configuration	ROM	RAM	I/O Address (Hex)	IRQ	DMA
LPT1	None	None	03BC–03BE	7	3[3]
LPT2	None	None	0378-037F	5	3[3]
LPT3	None	None	0278-027F		3[3]

Note: The default setting for the parallel port is LPT1. When the computer is started, the resource assignments are subject to change during POST.

The external interface for the parallel port is a 25-pin, female, D-shell connector. For information on connector pin assignments, see “Parallel Port Connector” on page 46.

Serial Ports

The serial port subsystem consists of two universal asynchronous receiver/transmitters (UARTs) that are PC16550A- and NS16450-compatible. The serial ports include a 16-byte data first-in first-out (FIFO) buffer and have programmable baud rate generators. The UARTs function independently of one another, and both can be used in normal mode, which is inclusive of modem control circuitry. UART2 can be used as an infrared serial interface. UART2 function is determined at boot time via the Configuration/Setup Utility program and can only be altered by changing setup and rebooting the computer. If UART2 is set to the infrared function, serial port 2 will be disabled.

The following table shows the typical system resource assignments for the serial ports.

Table 4. System Resource Assignments for the Serial Ports

Configuration	ROM	RAM	I/O Address (Hex)	IRQ	DMA
COM1	None	None	03F8-03FF	4	None
COM2	None	None	02F8-02FF	3	None
COM3	None	None	0220-0227, 02E8-02EF, 0338-033F, 03E8-03EF	4	None
COM4	None	None	0220-0227, 02E8-02EF, 0338-033F, 03E8-03EF	3	None

The default setting for serial port 1 is COM1. For serial port 2, the default setting is COM2. When the computer is started, the resource assignments are subject to change during POST.

The external interface for the serial ports consists of two, 9-pin, male, D-shell connectors (in a stacked configuration). For information on connector pin assignments, see “Serial Port Connectors” on page 47.

[3] ECP/EPP mode only.

Infrared Port

An optional infrared port can be added to PC 300PL computers. To do this, an internal cable/connector assembly must be attached to the infrared header provided on the system board. This assembly provides a female, 9-pin, D-shell connector to be located in the knockout area at the rear of the computer. An infrared module (which contains the infrared optics) attaches to the female connector via a shielded cable with a standard 9-pin, male, D-shell connector. The internal cable/connector assembly and the infrared module/shielded cable do not come standard with PC 300PL computers. They can be purchased from IBM or an IBM reseller as a single option package (referred to as the 4.0 MBit IR Transceiver Option).

Once the infrared option is installed, the infrared function must be enabled by configuring UART2 to infrared mode, rather than normal mode. (Note that UART2 can be used as either an infrared port *or* a second serial port; it cannot be used for both purposes.) The infrared port uses any of the same four system resource assignments as the serial port.

The software required for infrared communication is available on the *Ready-to-Configure CD* that comes with PC 300PL computers.

Note: For Windows 95, an infrared device driver must be installed. The device driver can be downloaded from the Microsoft Windows 95 Updates World Wide Web site.

The infrared module is capable of establishing a link of up to one meter (3.3 ft.) at a rate of 115 kilobits-per-second (Kbps). The infrared interface complies with HP-SIR, SHARP-IR and IrDA-2.

For information on connector pin assignments for the infrared port, refer to “Infrared Port Connector (Optional)” on page 47.

Keyboard and Mouse Ports

The keyboard-and-mouse subsystem is controlled by a general purpose, 8-bit microcontroller. The controller consists of 256 bytes of data memory and 2 KB of read-only memory (ROM).

The controller has two logical devices; one controls the keyboard, and the other controls the mouse. The keyboard has two fixed I/O addresses and a fixed IRQ line (IRQ1). The keyboard can operate without a companion mouse, but the mouse can only operate with its companion keyboard. The mouse has a fixed IRQ line (IRQ12), but it does not have its own I/O address; it relies on the addresses used by the keyboard.

The following table shows the typical system resource assignments for the keyboard and mouse.

Table 5. System Resource Assignments for the Keyboard and Mouse

Configuration	ROM	RAM	I/O Address (Hex)	IRQ	DMA
Keyboard & mouse	None	None	0060, 0064	1 (keyboard) 12 (mouse)	None
Keyboard only	None	None	0060, 0064	1	None
Mouse only	None	None	0060, 0064	12	None

Note: Keyboard & mouse is the default.

When the computer is started, the resource assignments are subject to change during POST.

For an external interface, the keyboard and mouse each have a 6-pin connector. For information on connector pin assignments, see “Keyboard and Mouse Port Connectors” on page 48.

General-Purpose I/O Ports

The National Semiconductor PC87307 chip on the system board has up to 16 general-purpose input/output (GPIO) pins which are supported by 2 GPIO ports. The port pins are used for specific functions and are not configurable by the user.

The GPIO ports use I/O addresses 0078-007F. Each GPIO port occupies a 4-byte I/O address.

Real-Time Clock

The low-power, real-time clock provides a time-of-day clock and a calendar. The clock is accurate to +/– 12 minutes per year. The clock settings are maintained by an external battery source at +2.4 volts. The life expectancy of the battery is approximately 2.25 years.

An external crystal is used to drive the real-time clock, and the battery is used to maintain the state of the CMOS RAM when the power to the computer is turned off. (The system has 242 bytes of battery-backed CMOS RAM in two banks.) If the CMOS RAM becomes corrupted and the system will not boot, a jumper is included on the system board to clear CMOS RAM so that POST can set CMOS RAM to factory default values.

The following table shows the typical system resource assignments for the real-time clock.

Table 6. System Resource Assignments for the Real-Time Clock

Resource	Resource Assignment
ROM	None
RAM	None
I/O Address (Hex)	0070, bits 6:0 (address) 0071 (data)
IRQ	8
DMA	None

When the computer is started, the resource assignments are subject to change during POST.

Audio

The system board has a Crystal 4236B, 16-bit, stereo audio subsystem that provides all the digital audio and analog mixing functions required for recording and playing high-quality sound from PC 300PL computers. The audio subsystem provides the following functions:

- ISA bus interface
- Digital audio processor that supports Sound Blaster Pro, Adlib, and Microsoft Windows Sound System applications
- MIDI UART
- Windows Sound System interface
- FM synthesizer interface
- 16-bit codec/mixer

PC 300PL computers have a built-in, high-quality speaker and four audio jacks (ports). The jacks are industry-standard, 3.5 mm (1/8") mini-jacks. A description of these jacks follows.

- Audio Line Out: This jack, which is located on the rear connector panel, is used to send audio signals from the computer to external devices, such as stereo-powered speakers with built-in amplifiers, multimedia keyboards, or the Audio Line In jack on a stereo system.
- Audio Line In: This jack, which is located on the rear connector panel, is used to send audio signals from an external device (such as a CD player or stereo) to the computer so that the signals can be recorded on the hard disk. (However, the input level must be reduced accordingly using the mixer provided in the computer operating system.)
- Microphone: This jack, which is located on the front panel, is used to connect a microphone to the computer so that voice or other sounds can be recorded on the hard disk. This jack can also be used by speech-recognition software.
- Headphone: This jack, which is located on the front panel, is used to connect headphones or small bookshelf speakers to the computer. The speakers must have built-in amplifiers. If headphones are inserted in the jack, the computer's built-in speaker is muted (except for system beeps).

PC 300PL computers also have a volume control knob on the front panel that adjusts the sound level for the headphone jack and built-in speaker.

The following table shows the system resource assignments for the audio controller.

Table 7. System Resource Assignments for the Audio Controller

Resource	**Resource Assignment**
ROM	None
RAM	None
I/O Address (Hex)	Required[4]
IRQ	Required[4]
DMA	Required[4]

When the computer is started, the resource assignments are subject to change during POST.

[4] Assigned by Plug and Play BIOS or operating system.

Video

The video subsystem in PC 300PL computers consists of the following system board components:

- Matrox MGA-1164SG 3D video controller
- 2 MB of SGRAM (expandable to 4 MB SGRAM)
- Upgrade connector for the VESA interface option
- Upgrade connector for the Matrox multimedia option

The MGA-1164SG 3D video controller is a high-performance, next-generation 3D graphics, multimedia, and windows accelerator that provides the following:

- Superior Windows performance (+35 Winmarks)
- Acceleration of 3D texture-mapped multimedia applications
- Full DirectDraw compliance
- Acceleration of digital video, including software MPEG
- Integrated RAMDAC (190 MHz)
- Fully-featured 3D rendering engine
- Integrated digital video scaling, filtering, and color space conversion engine
- Shared frame buffer and split frame buffer modes of operation
- Support for all VGA modes; fully compatible superset of the VGA function
- VESA (Version 1.2)-compliant for SVGA modes
- Complete Plug and Play support
- DDC2B and I_2C support
- Local peripheral bus (LPB)

In PC 300PL computers, the video subsystem connects to the monitor through a 15-pin, female, D-shell, DDC2B-compliant connector located on the rear connector panel of the computer. If a DDC2B/DDC1 monitor is attached to the computer, the monitor will automatically be detected during POST and the refresh rates will be set to the optimal values (in the Configuration/Setup Utility program) supported by the DDC2B/DDC1 monitor.

The following table shows the typical system resource assignments for the video controller.

Table 8. System Resource Assignments for the Video Controller

Resource	Resource Assignment
ROM (Hex)	C0000 to C7FFF (32 KB)
RAM (Hex)	A0000 to BFFFF MGABASE1 to (MGABASE1+3FFF), (MGA control aperture) MGABASE2 to (MGABASE2+7FFFFF) (8 MB linear frame buffer) MGABASE3 to (MGABASE3+7FFFFF) (8 MB pseudo-DMA window) MGABASE1 is specified in the Matrox PCI configuration register offsets 10h–13h (default = 41000000h). MGABASE2 is specified in the Matrox PCI configuration register offsets 14h–17h (default = 40800000h – prefetchable). MGABASE3 is specified in the Matrox PCI configuration register offsets 18h–1Bh (default = 40000000h).
I/O Address (Hex)	3B4-3B5, 3BA, 3C0-3C2, 3C4–3CA, 3CC, 3CE–3CF, 3D4-3D5, 3DA, 3DE–3DF
IRQ	The video IRQ can be enabled or disabled in the Configuration/Setup Utility program. If enabled, it is assigned PCI INT 2 and is automatically assigned an ISA IRQ by the Plug and Play BIOS or operating system.
DMA	None

When the computer is started, the resource assignments are subject to change during POST.

Video Device Drivers

Video device drivers for the Matrox MGA-1164SG 3D controller are provided on the *Ready-to-Configure CD* that comes with PC 300PL computers. Instructions for installing the device drivers are provided on the *Ready-to-Configure CD* in Matrox README files that correspond to the operating system being used. (If a prompt appears requesting specification of Mystique or Millennium, specify Mystique.)

Note: Video device drivers have already been installed in computers that come with IBM-preinstalled software.

Video Upgrade Options

The Matrox MGA-1164SG 3D video subsystem provides support for several types of upgrade options. These options are standard Matrox upgrades that can be purchased directly from Matrox Graphics Inc. Descriptions of the upgrades follow.

Note: The Matrox MGA-1164SG 3D video subsystem supports a maximum of one Matrox upgrade module. This means that a memory upgrade module cannot be used in conjunction with a multimedia upgrade module.

Memory Upgrade

PC 300PL computers come standard with 2 MB (2 chips) of video memory. A memory upgrade that provides an additional 2 MB of SGRAM memory can be purchased from Matrox. The upgrade provides more flexibility in terms of resolution and 3D support.

The memory upgrade is a daughtercard that plugs into two parallel, 70-pin connectors on the system board. The system board connectors provide all of the control, address, data, and power signals required by the upgrade daughtercard. The connectors incorporate keying and protection features.

Multimedia Upgrade

The other supported upgrades are the Matrox Rainbow Runner Studio multimedia upgrade modules. These upgrades are available in several configurations. Refer to *Using Your PC 300PL (Type 6562)* and *Using Your PC 300PL (Type 6592)* for a description of the upgrades available.

Rainbow Runner Studio upgrade modules plug into the Matrox Rainbow Runner Studio system board connectors. An optional cable and connector (containing audio/video inputs for Rainbow Runner Studio) is cabled from the Rainbow Runner Studio upgrade module to the knockout area at the rear of the computer.

Video Adapters

The video subsystem supports video adapters that are installed in either a PCI or an ISA expansion slot. No jumpers need to be changed when an upgrade video adapter is installed, because the system BIOS automatically detects that the adapter has been added. If an ISA or PCI adapter is detected by the system BIOS, the adapter video is enabled, and the system board video is disabled. If no ISA or PCI video adapters are found, the system board video is then enabled.

Special Function Video Adapters

The system board has a VGA VESA feature connector that supports special function video adapters, such as the ReelMagic TV tuner and MPEG decoder adapters.

Ethernet

The system board of PC 300PL computers contains an Intel 82557 10/100 Mbit Ethernet controller that provides a high-performance network connection. The Ethernet controller, which is a Plug and Play device and a PCI 2.1 Bus Master, features the following:

- IEEE 802.3 compliance, 10 and 100 Mbps
- Support for 100BaseTx and 10BaseT with PCI bus interface
- Viewable media access control (MAC) address
- Single RJ-45 port
- 3 Kbyte transmit FIFO and 3 Kbyte receive FIFO
- Auto-negotiation
- Full duplex capability
- Full NOS support

The Ethernet controller interfaces directly with the ICS 1890 Tx physical layer on the system board, which contains all of the analog transmit and receive circuits.

The system board also includes a discrete Wake on LAN controller (MagPack). This controller can be disabled in the Configuration/Setup Utility program.

A switch is provided on the system board for disconnecting the Ethernet subsystem from AUX5 power. This disconnection is required if a Wake on LAN adapter is installed. (The power supply does not provide enough AUX5 current to power both the system board Ethernet and a Wake on LAN adapter simultaneously.)

Note: For compliance with FCC Class B radiation limits, all Ethernet cabling attached to PC 300PL computers must be Class 5, regardless of the speed (10 Mbit or 100 Mbit).

The following table shows the system resource assignments for the Ethernet controller.

Table 9. System Resource Assignments for the Ethernet Controller

Resource	Resource Assignment
ROM	None
RAM	None
I/O Address (Hex)	Required[5]
IRQ	Required[5]
DMA	None

When the computer is started, the resource assignments are subject to change during POST.

The external interface for the Ethernet feature is an 8-pin, RJ-45 connector. For information on connector pin assignments, see “Ethernet Connector” on page 49.

[5] Assigned by Plug and Play BIOS or operating system.

System Management Controller

The system board contains a National System Management chip (LM78) that monitors the computer at all times looking for potential hardware failures. The LM78 is programmed with predetermined threshold values for the following:

- System temperature
- Fan speed
- Power supply voltages (+5, +12, −12, +3.52, Vcore)
- Intrusion detect for security (detects when chassis lid has been removed, even if power is off)

During system operation, Desktop Management Interface (DMI) code polls the LM78 chip and generates an alert if the measured value is outside of the programmed minimum and maximum range. The alert can be provided to a network administrator across a LAN.

Note: DMI is software used to gather information about the hardware and software in a computer. It allows network administrators to remotely monitor and control the computer. DMI can be used to remotely track many types of information about networked PCs. This information can be accessed using a DMI browser. DMI browsers are provided by all major operating system and all major LAN management packages.

The following table shows the typical system resource assignments for the system management controller.

Table 10. System Resource Assignments for the System Management Controller

Resource	Resource Assignment
ROM	None
RAM	None
I/O Address (Hex)	0290, 0295, 0296
IRQ	None
DMA	None

When the computer is started, the resource assignments are subject to change during POST.

Riser Card

The riser card in PC 300PL computers contains all the cable connectors for the system. The following illustrations show the physical layout of the riser card in each computer:

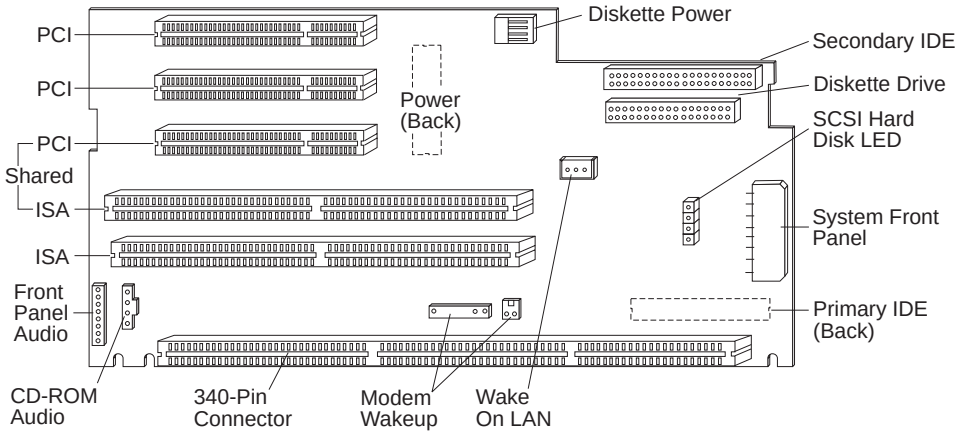

Figure 1. Riser Card for PC 300PL (Type 6562)

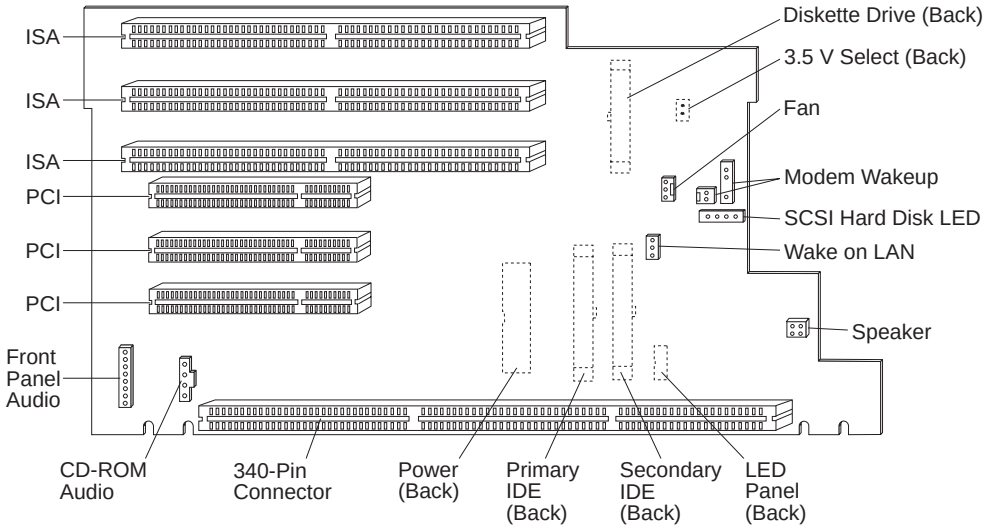

Figure 2. Riser Card for PC 300PL (Type 6592)

The riser card plugs into the system board via a 340-pin connector. Adapters plug into the ISA- or PCI-expansion connectors (slots) on the riser card. Signals from adapters are routed to the ISA or PCI buses. Each ISA-expansion connector provides a 16-bit-wide data path, and each PCI-expansion connector provides a 32-bit-wide data path.

The following table shows the number of ISA, PCI, and shared ISA/PCI expansion slots provided with each type of PC 300PL computer. Shared slots will accommodate either an ISA adapter installed in the

ISA connector, or a PCI adapter installed into the PCI connector. Shared slots cannot accommodate ISA and PCI adapters at the same time.

Table 11. Riser Card Expansion Characteristics

Expansion Slot Type	Type 6562	Type 6592
Shared ISA/PCI	1	0
Dedicated ISA	1	3
Dedicated PCI	2	3

Each PCI-expansion connector is capable of driving one, low-power Schottky load. Each ISA-expansion connector is capable of driving two, low-power Schottky loads. The ISA bus is permanently set to the PCI bus speed divided by four.

The PCI bus shares interrupts with the ISA bus. Free interrupts are automatically assigned to PCI devices during POST. If no interrupts are available for the PCI devices, an 18xx POST error message is generated.

For information on connector pin assignments, see “ISA Bus Connectors” on page 37 and “PCI Bus Connectors” on page 39.

System Board Switches

Switches are provided on the system board to allow for custom configuration. The switches, which are contained in an eight-position switch block on the system board, are rocker switches. The side of the rocker that is pushed down is the active side.

Switches 1 through 4 determine the speed of the microprocessor (CPU) and local processor bus. Switch settings for the Intel microprocessors supported by PC 300PL computers are shown in the following table. Note that the two speeds shown for each microprocessor are the microprocessor core speed followed by the local processor bus speed (for example, 166/66 MHz).

Table 12. Microprocessor Speed (Switches 1-4)

Microprocessor	Switch 1 (BF0)	Switch 2 (BF1)	Switch 3 (CLK0)	Switch 4 (CLK1)
166/66 MHz	On	On	On	Off
200/66 MHz	Off	On	On	Off
233/66 MHz	Off	Off	On	Off

PC 300PL computers are designed to support other microprocessors. Switches 1 and 2 determine the local processor bus/microprocessor core ratio. (For instance, 166/66 is a 2/5 ratio.) Switches 3 and 4 control the local processor bus speed. (For instance, the 166/66 has a 66 MHz local processor bus speed.)

Note: Only the switch values shown in the preceding table are supported. Using unsupported switch settings will cause unpredictable results.

Switch 5 is reserved and should remain in the factory default *Off* position.

Table 13. Reserved (Switch 5)

Reserved	Off (factory default)

Switch 6 enables or disables the system board Ethernet. When the Ethernet disable switch is *On*, the system board Ethernet is disabled. This switch must be on when a Wake on LAN adapter is installed. (Note that only one Wake on LAN device can be used.)

Table 14. System Board Ethernet Control (Switch 6)

Disable	On
Enable (factory default)	Off

Switch 7 enables or disables the privileged access password (PAP). Note that this password is also referred to as the *administrator password*. Refer to *Using Your PC 300PL (Type 6562)* and *Installing Options in Your PC 300PL (Type 6562)* or *Using Your PC 300PL (Type 6592)* and *Installing Options in Your PC 300PL (Type 6592)* for important information on erasing lost or forgotten passwords.

Table 15. Privileged Access Password Control (Switch 7)

Disable (factory default)	Off
Enable	On

Switch 8 controls writes to the diskette drive.

Table 16. Floppy Device Access (Switch 8)	
Write enabled (factory default)	Off
Write protected	On

System Board Jumper

A jumper is provided on the system board for clearing CMOS memory. Refer to *Installing Options in Your PC 300PL (Type 6562)* and *Using Your PC 300PL (Type 6562)* or *Installing Options in Your PC 300PL (Type 6592)* and *Using Your PC 300PL (Type 6592)* for important information on clearing CMOS.

Table 17. CMOS Operation	
Function	**Jumper Position**
Normal operation (factory default)	1-2
Clear CMOS	2-3

Physical Layout

PC 300PL computers incorporate a new system board and riser card design. There are no cables on the system board; all cables are on the riser card. The system board is on a sliding mechanism so that the board can be moved in and out of the computer without removing any cables. The new design eliminates cable clutter on the system board, allows for shorter cable lengths, simplifies peripheral upgrades, and provides better cooling for system components.

The system board has gold-edge tabs that contain all signals to the riser card. The gold-edge tabs insert into a 340-pin connector on the riser card.

The following is an illustration of the PC 300PL system board. Note that, in various PC 300PL computers, the system board might look slightly different from the one shown here. A diagram of the system board, including switch and jumper settings, is attached to the underside of the top cover of the computer.

Note: For other system connectors, refer to “Riser Card” on page 20.

1. Monitor connector
2. Mouse/keyboard connectors (top=mouse, bottom=keyboard)
3. Serial connectors (top=serial port 2, bottom=serial port 1)
4. USB connectors (top=USB2, bottom=USB1)
5. Parallel connector
6. Ethernet RJ45 connector
7. Audio line in jack
8. Audio line out jack
9. Matrox Rainbow Runner Studio upgrade connector
10. VESA feature connector
11. Infrared connector
12. Video memory or Rainbow Runner Studio upgrade connector
13. Battery
14. SW1 (8-position rocker switch)
15. Microprocessor socket
16. DIMM socket 0
17. DIMM socket 1
18. DIMM socket 2
19. CMOS clear jumper
20. System board latch
21. Video memory or Rainbow Runner Studio upgrade connector

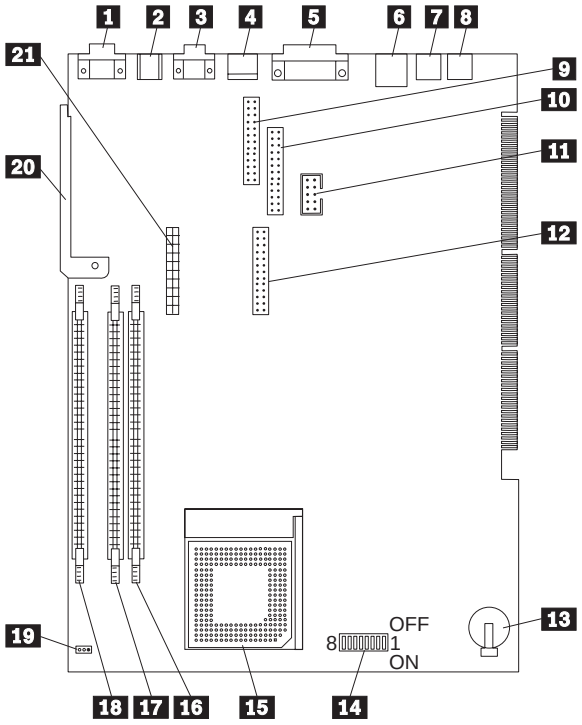

Figure 3. System Board

Chapter 3. Adapters and Internal Drives

This chapter provides information on adapters and internal drives supported by PC 300PL computers.

Adapters

This section provides information on the adapters preinstalled in some PC 300PL computers, as well as cabling requirements for Wake on LAN adapters.

Note: PC 300PL computers do not support IDE expansion adapters or the IBM PCMCIA adapter for PCI.

SCSI Adapter

Some PC 300PL computers come with an Adaptec SCSI-II Ultra Wide adapter installed in one of the expansion slots. This adapter provides an interface between the PCI bus and SCSI devices. SCSI technology is useful with multitasking operating environments because instructions can be sent concurrently to every drive in the system, and the drives can then execute these instructions simultaneously.

An extra cable is provided with SCSI models. The cable included with the PC 300PL (Type 6562) has four connectors: one connector for attaching the cable to the SCSI adapter and three connectors for attaching optional SCSI devices. The cable included with the PC 300PL (Type 6592) has five connectors: one connector for attaching the cable to the SCSI adapter and four connectors for attaching optional SCSI devices.

For information on the adapter and connecting SCSI devices, refer to the SCSI documentation that comes with PC 300PL computers.

Cabling Requirements for Wake on LAN Adapters

Wake on LAN adapters have two headers: a 3-pin, right-angle header for providing AUX5 (Auxiliary 5 volts), and a 2-pin straight header for connecting the wakeup signal to the system board (or riser card). PC 300PL computers have a 3-pin header on the riser card that provides the AUX5 and wakeup signal connections. The Wake on LAN adapter option will provide a Y-cable that has the 3-pin riser card connector on one end and splits into the 3-pin and 2-pin connectors required to interface the card. When a Wake on LAN adapter is installed in the system and attached to the AUX5 power, the system board Ethernet function must be disabled via switch 6 on the system board (refer to “System Board Switches” on page 22 for switch information).

Internal Drives

The IDE, SCSI (some models only), and diskette interfaces provide connectors for attaching internal drives.

PC 300PL computers come standard with an internal diskette drive and an internal EIDE or SCSI hard disk drive. Some models also have an internal CD-ROM drive.

The following tables show the characteristics of internal drives that come standard with or are available for PC 300PL computers.

Table 18. Diskette Drives

Characteristics	**Number/Size**
Standard	One 3.5-inch, 1.44 MB diskette drive
Maximum	One diskette drive

Table 19. IDE and SCSI Devices

Characteristics	**Number/Size or Speed**
Standard	One EIDE or Ultra Wide SCSI hard disk drive (size varies by model)
Standard (some models only)	One IDE CD/ROM drive
Optional	IDE or SCSI hard disk drives and tape backup drives
Maximum IDE Devices	Three total (Type 6562) Four total (Type 6592)
Maximum SCSI Devices	Refer to the SCSI documentation shipped with the computer.

Note: The actual number of internal devices that can be installed in PC 300PL computers is limited by the number of available drive bays in the computers.

Chapter 4. Power Supply

Power requirements are supplied by a 145-watt power supply in the PC 300PL (Type 6562), and a 200-watt supply in the PC 300PL (Type 6592). The power supply provides 3.52-volt power for the Pentium microprocessor and core chip sets, as well as 5-volt power for ISA and PCI adapters. Also included is an auxiliary 5-volt (AUX 5) supply to provide power to power management circuitry and the system board Ethernet function, or a Wake on LAN adapter.

The power supply, which has EnergyStar and Extended LAN Wakeup features, converts ac input voltages into dc output voltages. The power supply operates at either 115 V ac or 230 V ac. The voltage setting is manually selected with a switch on the rear of the computer.

The power supply provides power for the following components:

- System board
- ISA and PCI adapters
- Internal drives
- Keyboard and auxiliary devices
- USB devices

A logic signal on the power connector controls the power supply. (The front panel switch is not directly connected to the power supply.)

The power supply connects to the riser card with a 2 x 10 connector.

Power Input

For power input specifications, refer to Table 36 on page 32.

Power Output

The following tables show the power supply capacity per voltage for the PC 300PL (Type 6562) and PC 300PL (Type 6592). In the tables, amperes are designated with an *A*, and milliamperes with an *mA*.

Table 20. Power Output for 145-Watt Power Supply (PC 300PL, Type 6562)

Output Voltage	Minimum to Maximum	Regulation Limits
+5 V dc	1.5 to 18.0 A[6]	+5% to –4%
+12 V dc	0.2 to 4.2 A	+5% to –5%
–12 V dc	0.0 to 0.4 A	+10% to –9%
–5 V dc	0.0 to 0.3 A	+10% to –10%
+3.52 V dc	0.0 to 10.0 A[6]	±2%
+5 V dc (auxiliary)	5 mA to 0.72 A	±5% to –10%

Table 21. Power Output for 200-Watt Power Supply (PC 300PL, Type 6592)

Output Voltage	Minimum to Maximum	Regulation Limits
+5 V dc	1.5 to 20.0 A[7]	+5% to –4%
+12 V dc	0.2 to 8.0 A	+5% to –5%
–12 V dc	0.0 to 0.4 A	+10% to –9%
–5 V dc	0.0 to 0.3 A	+10% to –10%
+3.52 V dc	0.0 to 20.0 A[7]	±2%
+5 V dc (auxiliary)	5 mA to 0.72 A	±5% to –10%

The power supply provides separate voltage sources for the system board and internal storage devices. The following tables show the maximum power that specific system components can draw. In normal operation, components draw less current than the maximum shown.

Table 22. System Board Power Connectors

Supply Voltage	Maximum Current	Regulation Limits
+3.52 V dc	8520 mA	±2%
+5.0 V dc	2000 mA	+5.0% to –4.0%
+12.0 V dc	25.0 mA	+5.0% to –5.0%
–12.0 V dc	25.0 mA	+10.0% to –9.0%

6 Simultaneous loading of +3.52 V dc and +5 V dc must not exceed 90 watts.

7 Simultaneous loading of +3.52 V dc and +5 V dc must not exceed 120 watts.

Table 23. ISA-Bus Adapters (Per Slot)		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	2000 mA	+5.0% to –4.0%
–5.0 V dc	100 mA	±10.0%
+12.0 V dc	175 mA	+5.0% to –5.0%
–12.0 V dc	100 mA	+10.0% to –9.0%

Table 24. PCI-Bus Adapters (Per Slot)		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	5000 mA	+5.0% to –4.0%
+3.52 V dc	7600 mA	±2.0%
+12 V dc	500 mA	±5.0%
–12 V dc	100 mA	±10.0%

Notes:

1. For each PCI connector, the maximum power consumption is rated at 25 watts for +5 V and +3.52 V combined.
2. Maximum current cannot be supplied to all components at all times. System power and cooling are designed to support the statistical RMS power load and typical combinations of adapters.

Table 25. Internal Devices (DASD)		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	900 mA	+5.0% to –5.0%
+12.0 V dc	1400 mA startup; 400 mA active	+5.0% to –5.0%

Note: Some adapters and hard disk drives draw more current than the recommended limits. These adapters and drives can be installed in the system; however, the power supply will shut down if the total power used exceeds the maximum power that is available.

Table 26. Keyboard Port		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	275 mA	+5.0% to –4.0%

Table 27. Auxiliary Device Port		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	300 mA	+5.0% to –4.0%

Table 28. USB Port		
Supply Voltage	**Maximum Current**	**Regulation Limits**
+5.0 V dc	500 mA	+5.0% to –4.0%

Output Protection

The power supply protects against output overcurrent, overvoltage, and short circuits.

A short circuit that is placed on any dc output (between outputs or between an output and dc return) latches all dc outputs into a shutdown state, with no damage to the power supply. If this shutdown state occurs, the power supply returns to normal operation only after the fault has been removed and the ac input voltage has been turned off for at least five seconds.

If an overvoltage fault occurs (in the power supply), the power supply latches all dc outputs into a shutdown state before any output exceeds 130% of the nominal value of the power supply.

Power Connectors

The power supply connects to the riser card via a single 2 x 10 connector.

The power supply provides 4-pin connectors for attaching internal devices. The PC 300PL (Type 6562) has three DASD connectors, and the PC 300PL (Type 6592) has one diskette and four DASD connectors. The following tables list the pin assignments for these connectors.

Note: The total power used by the any of following connectors must not exceed the amount shown in Table 25 on page 29.

Table 29. Pin Assignments for the 4-Pin Power Connectors (PC 300PL, Type 6562)

Connector	Location	Pin 1	Pin 2	Pin 3	Pin 4
P2	DASD	+12 V	Ground	Ground	+5 V
P3	DASD	+12 V	Ground	Ground	+5 V
P4	DASD	+12 V	Ground	Ground	+5 V

Table 30. Pin Assignments for the 4-Pin Power Connectors (PC 300PL, Type 6592)

Connector	Location	Pin 1	Pin 2	Pin 3	Pin 4
P3	3.5-inch diskette drive	+5 V	Ground	Ground	+12 V
P4	DASD	+12 V	Ground	Ground	+5 V
P5	DASD	+12 V	Ground	Ground	+5 V
P6	DASD	+12 V	Ground	Ground	+5 V
P7	DASD	+12 V	Ground	Ground	+5 V

Chapter 5. Physical Specifications

The tables in this chapter list the physical specifications for PC 300PL computers.

Note: The computers are electromagnetically compatible with FCC Class B.

Table 31. Size

Description	Measurement (Type 6562)	Measurement (Type 6592)
Depth	450 mm (17.7 in.)	445 mm (17.5 in.)
Height	128 mm (5.0 in.)	492 mm (19.4 in.)
Width	450 mm (17.7 in.)	200 mm (7.9 in.)

Table 32. Weight

Description	Measurement (Type 6562)	Measurement (Type 6592)
Minimum configuration	9.9 kg (22 lb)	15 kg (33 lb)
Maximum configuration	11.3 kg (25 lb)	17.3 kg (38 lb)

Table 33. Cables

Description	Measurement
Power cable	1.63 m (5 ft 4 in.)
Keyboard cable	1.83 m (6 ft)
Ribbon cable (IDE interface)	0.51 m (1 ft 8 in.)
SCSI cable (models with SCSI adapter only)	0.91 m (3 ft)

Table 34. Air Temperature

Description	Measurement
System on	10 to 35°C (50 to 95°F)
System off	10 to 43°C (50 to 110°F)

Note: The maximum altitude at which the specified air temperatures apply is 2134 m (7000 ft). At higher altitudes, the maximum air temperatures are lower than those specified.

Table 35. Humidity

Description	Measurement
System on	8% to 80%
System off	8% to 80%

In the following two tables, maximum power and heat specifications are based on the maximum capacity of the power supply (145-watt maximum for Type 6562 and 200-watt maximum for Type 6592).

Table 36. Electrical Input

Description	Measurement
Low range	90 V ac (minimum) 137 V ac (maximum) 100 to 127 V ac (nominal)
High range	180 V ac (minimum) 265 V ac (maximum) 200 to 240 V ac (nominal)
Sine-wave input	50 to 60 Hz is required
Input kilovolt-amperes, minimum (approximate)	0.08 kVA (Types 6562 and 6592)
Input kilovolt-amperes, maximum (approximate)	0.37 kVA (Type 6562) 0.52 kVA (Type 6592)

Table 37. Heat Output (Approximate)

Description	Measurement (Type 6562)	Measurement (Type 6592)
Minimum configuration	35 W (120 Btu per hour)	35 W (120 Btu per hour)
Theoretical maximum configuration[8]	207 W (704 Btu per hour)	285 W (970 Btu per hour)

[8] Under typical maximum configurations, the heat output will be significantly below the theoretical maximum.

Chapter 6. System Compatibility

This chapter provides information on some of the hardware, software, and BIOS compatibility issues for the PC 300PL (Type 6562) and (Type 6592). For a list of compatible hardware and software option packages available, refer to the *Compatibility Report* for these computers on the World Wide Web at http://www.us.pc.ibm.com/cdt.

Hardware Compatibility

This section discusses hardware and BIOS compatibility issues that must be considered when designing application programs.

Many of the interfaces are the same as those used by the IBM Personal Computer AT. In most cases, the command and status organization of these interfaces is maintained.

The functional interfaces are compatible with the following interfaces:

- The Intel 8259 interrupt controllers (edge-triggered mode)
- The National Semiconductor NS16450 and NS16550A serial communication controllers
- The Motorola MC146818 Time of Day Clock command and status (CMOS reorganized)
- The Intel 8254 timer, driven from a 1.193 MHz clock (channels 0, 1, and 2)
- The Intel 8237 DMA controller, except for the Command and Request registers and the Rotate and Mask functions; the Mode register is partially supported
- The Intel 8272 or 82077 diskette drive controllers
- The Intel 8042 keyboard controller at addresses 0060h and 0064h
- All video standards using VGA, EGA, CGA, MDA, and Hercules modes
- The parallel printer ports (Parallel 1, Parallel 2, and Parallel 3) in compatibility mode

Use the following information to develop application programs. Whenever possible, use the BIOS as an interface to hardware to provide maximum compatibility and portability of applications among systems.

Hardware Interrupts

Hardware interrupts are level-sensitive for PCI interrupts and edge-sensitive for ISA interrupts. The interrupt controller clears its in-service register bit when the interrupt routine sends an End of Interrupt (EOI) command to the controller. The EOI command is sent regardless of whether the incoming interrupt request to the controller is active or inactive.

The interrupt-in-progress latch is readable at an I/O-address bit position. This latch is read during the interrupt service routine and might be reset by the read operation, or it might require an explicit reset.

Note: For performance and latency considerations, designers might want to limit the number of devices sharing an interrupt level.

With level-sensitive interrupts, the interrupt controller requires that the interrupt request be inactive at the time the EOI command is sent; otherwise, a new interrupt request will be detected. To avoid this, a level-sensitive interrupt handler must clear the interrupt condition (usually by a read or write operation to an I/O port on the device causing the interrupt). After processing the interrupt, the interrupt handler:

1. Clears the interrupt
2. Waits one I/O delay
3. Sends the EOI
4. Waits one I/O delay
5. Enables the interrupt through the Set Interrupt Enable Flag command

Hardware interrupt IRQ9 is defined as the replacement interrupt level for the cascade level IRQ2. Program interrupt sharing is implemented on IRQ2, interrupt 0Ah. The following processing occurs to maintain compatibility with the IRQ2 used by IBM Personal Computer products:

1. A device drives the interrupt request active on IRQ2 of the channel.
2. This interrupt request is mapped in hardware to IRQ9 input on the second interrupt controller.
3. When the interrupt occurs, the system microprocessor passes control to the IRQ9 (interrupt 71h) interrupt handler.
4. This interrupt handler performs an EOI command to the second interrupt controller and passes control to the IRQ2 (interrupt 0Ah) interrupt handler.
5. This IRQ2 interrupt handler, when handling the interrupt, causes the device to reset the interrupt request before performing an EOI command to the master interrupt controller that finishes servicing the IRQ2 request.

Diskette Drives and Controller

The following table shows the reading, writing, and formatting capabilities for the diskette drive type supported by PC 300PL computers.

Table 38. 3.5-Inch Diskette Drive Reading, Writing, and Formatting Capabilities

Diskette Drive Type	720 KB Mode	1.44 MB Mode	2.88 MB Mode
1.44 MB drive	RWF	RWF	Not supported

Copy Protection

The following methods of copy protection might not work in systems using the 3.5-inch, 1.44 MB diskette drive.

- Bypassing BIOS routines:
  - Data transfer rate: BIOS selects the proper data transfer rate for the media being used.
  - Diskette parameter table: Copy protection, which creates its own diskette parameter table, might not work in these drives.
- Diskette drive controls:
  - Rotational speed: The time between two events in a diskette drive is a function of the controller.
  - Access time: Diskette BIOS routines must set the track-to-track access time for the different types of media that are used in the drives.
  - 'Diskette change' signal: Copy protection might not be able to reset this signal.
- Write-current control: Copy protection that uses write-current control does not work, because the controller selects the proper write current for the media that is being used.

Hard Disk Drives and Controller

Reading from and writing to the hard disk is initiated in the same way as in other IBM Personal Computer products; however, new functions are supported.

Software Compatibility

To maintain software compatibility, the interrupt polling mechanism that is used by IBM Personal Computer products is retained. Software that interfaces with the reset port for the IBM Personal Computer positive-edge interrupt sharing (hex address 02F*x* or 06F*x*, where *x* is the interrupt level) does not create interference.

Software Interrupts

With the advent of software interrupt sharing, software interrupt routines must daisy-chain interrupts. Each routine must check the function value, and if it is not in the range of function calls for that routine, it must transfer control to the next routine in the chain. Because software interrupts are initially pointed to address 0:0 before daisy chaining, check for this case. If the next routine is pointed to address 0:0 and the function call is out of range, the appropriate action is to set the carry flag and do a RET 2 to indicate an error condition.

Machine-Sensitive Programs

Programs can select machine-specific features, but they must first identify the machine and model type. IBM has defined methods for uniquely determining the specific machine type. The machine model byte can be found through Interrupt 15H, Return System Configuration Parameters function ((AH)=C0H).

Appendix A. Connector Pin Assignments

The following tables show the pin assignments for various riser card and system board connectors.

ISA Bus Connectors

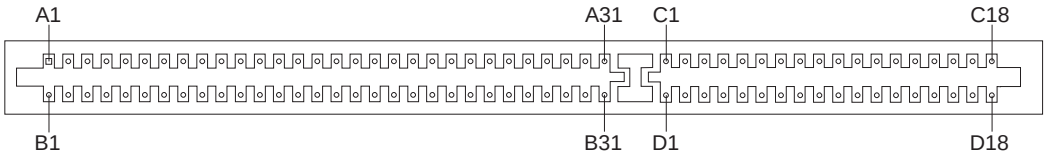

Figure 4. ISA Bus Connector

The ISA bus connectors are located on the riser card.

Table 39 (Page 1 of 2). Pin Assignments for the ISA Bus Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
B1	Ground	NA	A1	IOCHCK#	I
B2	RESET DRV	O	A2	SD7	I/O
B3	+5 V dc	NA	A3	SD6	I/O
B4	IRQ2/9	I	A4	SD5	I/O
B5	–5 V dc	NA	A5	SD4	I/O
B6	DRQ2	I	A6	SD3	I/O
B7	–12 V dc	NA	A7	SD2	I/O
B8	0WS#	I	A8	SD1	I/O
B9	+12 V dc	NA	A9	SD0	I/O
B10	Ground	NA	A10	IOCHRDY	I
B11	SMEMW#	O	A11	AEN	O
B12	SMEMR#	O	A12	SA19	I/O
B13	IOW#	I/O	A13	SA18	I/O
B14	IOR#	I/O	A14	SA17	I/O
B15	DACK3#	O	A15	SA16	I/O
B16	DRQ3	I	A16	SA15	I/O
B17	DACK1#	O	A17	SA14	I/O
B18	DRQ1	I	A18	SA13	I/O
B19	REFRESH#	I/O	A19	SA12	I/O
B20	CLK	O	A20	SA11	I/O
B21	IRQ7	I	A21	SA10	I/O
B22	IRQ6	I	A22	SA9	I/O
B23	IRQ5	I	A23	SA8	I/O
B24	IRQ4	I	A24	SA7	I/O
B25	IRQ3	I	A25	SA6	I/O
B26	DACK2#	O	A26	SA5	I/O
B27	TC	O	A27	SA4	I/O
B28	BALE	O	A28	SA3	I/O

Table 39 (Page 2 of 2). Pin Assignments for the ISA Bus Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
B29	+5 V dc	NA	A29	SA2	I/O
B30	OSC	O	A30	SA1	I/O
B31	Ground	NA	A31	SA0	I/O
D1	MEMCS16#	I	C1	SBHE#	I/O
D2	IOCS16#	I	C2	LA23	I/O
D3	IRQ10	I	C3	LA22	I/O
D4	IRQ11	I	C4	LA21	I/O
D5	IRQ12	I	C5	LA20	I/O
D6	IRQ15	I	C6	LA19	I/O
D7	IRQ14	I	C7	LA18	I/O
D8	DACK0#	O	C8	LA17	I/O
D9	DRQ0	I	C9	MEMR#	I/O
D10	DACK5#	O	C10	MEMW#	I/O
D11	DRQ5	I	C11	SD8	I/O
D12	DACK6#	O	C12	SD9	I/O
D13	DRQ6	I	C13	SD10	I/O
D14	DACK7#	O	C14	SD11	I/O
D15	DRQ7	I	C15	SD12	I/O
D16	+5 V dc	NA	C16	SD13	I/O
D17	MASTER#	I	C17	SD14	I/O
D18	Ground	NA	C18	SD15	I/O

PCI Bus Connectors

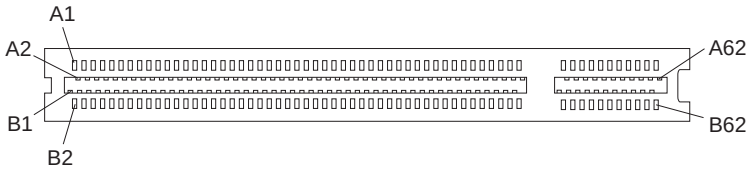

Figure 5. PCI Bus Connector

Note: The PCI bus connectors are located on the riser card.

Table 40 (Page 1 of 2). Pin Assignments for the PCI Bus Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
A1	TRST#	O	B1	–12 V dc	NA
A2	+12 V dc	NA	B2	TCK	O
A3	TMS	O	B3	Ground	NA
A4	TDI	O	B4	TDO	I
A5	+5 V dc	NA	B5	+5 V dc	NA
A6	INTA#	I	B6	+5 V dc	NA
A7	INTC#	I	B7	INTB#	I
A8	+5 V dc	NA	B8	INTD#	I
A9	Reserved	NA	B9	PRSNT1#	I
A10	+5 V dc	NA	B10	Reserved	NA
A11	Reserved	NA	B11	PRSNT2#	I
A12	Ground	NA	B12	Ground	NA
A13	Ground	NA	B13	Ground	NA
A14	Reserved	NA	B14	Reserved	NA
A15	RST#	O	B15	Ground	NA
A16	+5 V dc	NA	B16	CLK	O
A17	GNT#	O	B17	Ground	NA
A18	Ground	NA	B18	REQ#	I
A19	Reserved	NA	B19	+5 V dc	NA
A20	Address/Data 30	I/O	B20	Address/Data 31	I/O
A21	+3.52 V dc	NA	B21	Address/Data 29	I/O
A22	Address/Data 28	I/O	B22	Ground	NA
A23	Address/Data 26	I/O	B23	Address/Data 27	I/O
A24	Ground	NA	B24	Address/Data 25	I/O
A25	Address/Data 24	I/O	B25	+3.52 V dc	NA
A26	IDSEL	O	B26	C/BE3#	I/O
A27	+3.52 V dc	NA	B27	Address/Data 23	I/O
A28	Address/Data 22	I/O	B28	Ground	NA
A29	Address/Data 20	I/O	B29	Address/Data 21	I/O
A30	Ground	NA	B30	Address/Data 19	I/O
A31	Address/Data 18	I/O	B31	+3.52 V dc	NA
A32	Address/Data 16	I/O	B32	Address/Data 17	I/O
A33	+3.52 V dc	NA	B33	C/BE2#	I/O

Table 40 (Page 2 of 2). Pin Assignments for the PCI Bus Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
A34	FRAME#	I/O	B34	Ground	NA
A35	Ground	NA	B35	IRDY#	I/O
A36	TRDY#	I/O	B36	+3.52 V dc	NA
A37	Ground	NA	B37	DEVSEL#	I/O
A38	STOP#	I/O	B38	Ground	NA
A39	+3.52 V dc	NA	B39	LOCK#	I/O
A40	SDONE	I/O	B40	PERR#	I/O
A41	SBO#	I/O	B41	+3.52 V dc	NA
A42	Ground	NA	B42	SERR#	I/O
A43	PCIPAR	NA	B43	+3.52 V dc	NA
A44	Address/Data 15	I/O	B44	C/BE1#	I/O
A45	+3.52 V	I/O	B45	Address/Data 14	I/O
A46	Address/Data 13	NA	B46	Ground	NA
A47	Address/Data 11	I/O	B47	Address/Data 12	I/O
A48	Ground	I/O	B48	Address/Data 10	I/O
A49	Address/Data 9	NA	B49	Ground	NA
A50	##Key##	NA	B50	##Key##	NA
A51	##Key##	NA	B51	##Key##	NA
A52	C/BE0#	I/O	B52	Address/Data 8	I/O
A53	+3.52 V dc	I/O	B53	Address/Data 7	I/O
A54	Address/Data 6	NA	B54	+3.52 V dc	NA
A55	Address/Data 4	I/O	B55	Address/Data 5	I/O
A56	Ground	I/O	B56	Address/Data 3	I/O
A57	Address/Data 2	NA	B57	Ground	NA
A58	Address/Data 0	I/O	B58	Address/Data 1	I/O
A59	+5 V dc	NA	B59	+5 V dc	NA
A60	REQ64#	I/O	B60	ACK64#	I/O
A61	+5 V dc	NA	B61	+5 V dc	NA
A62	+5 V dc	NA	B62	+5 V dc	NA

IDE Connectors

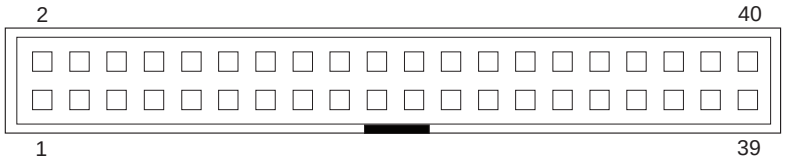

Figure 6. IDE Connector

The IDE connectors are 40-pin, shrouded berg strips located on the riser card.

Table 41. Pin Assignments for the IDE Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Reset	O	2	Ground	NA
3	D7	I/O	4	D8	I/O
5	D6	I/O	6	D9	I/O
7	D5	I/O	8	D10	I/O
9	D4	I/O	10	D11	I/O
11	D3	I/O	12	D12	I/O
13	D2	I/O	14	D13	I/O
15	D1	I/O	16	D14	I/O
17	D0	I/O	18	D15	I/O
19	Ground	NA	20	Key	NA
21	DMA REQ	NA	22	Ground	NA
23	IOW#	O	24	Ground	NA
25	IOR#	O	26	Ground	NA
27	IOCHRDY	I	28	CSEL	O
29	DMA ACK#	NA	30	Ground	NA
31	IRQ	I	32	CS16#	I
33	SA1	O	34	No connect	I
35	SA0	O	36	SA2	O
37	CS0#	O	38	CS1#	O
39	Active#	I	40	Ground	NA

Diskette Drive Connector

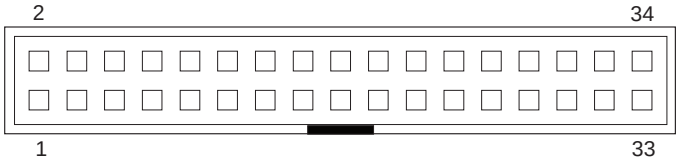

Figure 7. Diskette Drive Connector

The diskette drive connector is a 34-pin, shrouded berg strip located on the riser card.

Table 42. Pin Assignments for the Diskette Drive Connector

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Drive 2 installed#	I	2	High density select	O
3	Not connected	NA	4	Not connected	NA
5	Ground	NA	6	Data rate 0	NA
7	Ground	NA	8	Index#	I
9	Reserved	NA	10	Motor enable 0#	O
11	Ground	NA	12	Drive select 1#	O
13	Ground	NA	14	Drive select 0#	O
15	Ground	NA	16	Motor enable 1#	O
17	MSEN1	I	18	Direction in#	O
19	Ground	NA	20	Step#	O
21	Ground	NA	22	Write data#	O
23	Ground	NA	24	Write enable#	O
25	Ground	NA	26	Track 0#	I
27	MSEN0	I	28	Write protect#	I
29	Ground	NA	30	Read data#	I
31	Ground	NA	32	Head 1 select#	O
33	Ground	NA	34	Diskette change#	I

System Memory Connectors

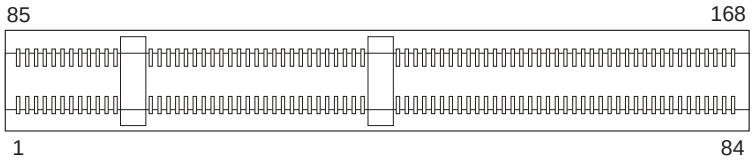

Figure 8. System Memory (DIMM) Connector

Each DIMM connector is a 168-pin, gold-lead, unbuffered, 3.3 V, SDRAM connector.

Table 43 (Page 1 of 3). Pin Assignments for the DIMM Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Ground	NA	85	Ground	NA
2	DQ0	I/O	86	DQ32	I/O
3	DQ1	I/O	87	DQ33	I/O
4	DQ2	I/O	88	DQ34	I/O
5	DQ3	I/O	89	DQ35	I/O
6	Vcc	I/O	90	Vcc	NA
7	DQ4	I/O	91	DQ36	NA
8	DQ5	I/O	92	DQ37	I/O
9	DQ6	I/O	93	DQ38	I/O
10	DQ7	I/O	94	DQ39	I/O
11	DQ8	I/O	95	DQ40	I/O
12	Ground	NA	96	Ground	NA
13	DQ9	I/O	97	DQ41	I/O
14	DQ10	I/O	98	DQ42	I/O
15	DQ11	O	99	DQ43	I/O
16	DQ12	O	100	DQ44	I/O
17	DQ13	O	101	DQ45	I/O
18	Vcc	O	102	Vcc	NA
19	DQ14	O	103	DQ46	I/O
20	DQ15	I/O	104	DQ47	I/O
21	CB0	I/O	105	CB4	I/O
22	CB1	I/O	106	CB5	I/O
23	Ground	I/O	107	Ground	NA
24	NC	NA	108	NC	NA
25	NC	NA	109	NC	NA
26	Vcc	I/O	110	Vcc	NA
27	/WE0	O	111	NC	NA
28	DQMB0	O	112	DQMB4	O
29	DQMB1	O	113	DQMB5	O
30	/S0	O	114	/S1	O
31	/OE0	O	115	NC	NA
32	Ground	O	116	Ground	NA
33	A0	O	117	A1	O

Table 43 (Page 2 of 3). Pin Assignments for the DIMM Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
34	A2	O	118	A3	O
35	A4	O	119	A5	O
36	A6	O	120	A7	O
37	A8	O	121	A9	O
38	A10	O	122	A11	O
39	NC	O	123	NC	O
40	Vcc	NA	124	Vcc	NA
41	Vcc	NA	125	NC	NA
42	NC	NA	126	NC	NA
43	Ground	NA	127	Ground	NA
44	/OE2	O	128	NC	NA
45	/S2	O	129	/S3	O
46	DQMB2	O	130	DQMB6	O
47	DQMB3	O	131	DQMB7	O
48	/WE2	O	132	NC	NA
49	Vcc	O	133	Vcc	NA
50	NC	NA	134	NC	NA
51	NC	NA	135	NC	NA
52	CB2	I/O	136	CB6	I/O
53	CB3	I/O	137	CB7	I/O
54	Ground	NA	138	Ground	NA
55	DQ16	I/O	139	DQ48	I/O
56	DQ17	I/O	140	DQ49	I/O
57	DQ18	I/O	141	DQ50	I/O
58	DQ19	I/O	142	DQ51	I/O
59	Vcc	NA	143	Vcc	NA
60	DQ20	I/O	144	DQ52	I/O
61	NC	NA	145	NC	NA
62	NC	NA	146	NC	NA
63	NC	NA	147	NC	NA
64	Ground	NA	148	Ground	NA
65	DQ21	I/O	149	DQ53	I/O
66	DQ22	I/O	150	DQ54	I/O
67	DQ23	I/O	151	DQ55	I/O
68	Ground	NA	152	Ground	NA
69	DQ24	I/O	153	DQ56	I/O
70	DQ25	I/O	154	DQ57	I/O
71	DQ26	I/O	155	DQ58	I/O
72	DQ27	I/O	156	DQ59	I/O
73	Vcc	NA	157	Vcc	NA
74	DQ28	I/O	158	DQ60	I/O
75	DQ29	I/O	159	DQ61	I/O
76	DQ30	I/O	160	DQ62	I/O

Table 43 (Page 3 of 3). Pin Assignments for the DIMM Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
77	DQ31	I/O	161	DQ63	I/O
78	Ground	NA	162	Ground	NA
79	NC	I/O	163	NC	NA
80	NC	I/O	164	NC	NA
81	NC	I/O	165	SA0	I/O
82	SDA	I/O	166	SA1	I/O
83	SCL	I/O	167	SA2	I/O
84	Vcc	NA	168	Vcc	I/O

Notes:

1. DU = Don't use
2. NC = Not connected

USB Connectors

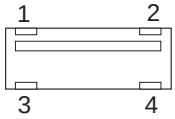

Figure 9. USB Connector

The external interface for the USB ports consists of two, 4-pin connectors.

Table 44. Pin Assignments for the USB Connectors

Pin	Signal Name	I/O
1	VCC	NA
2	-Data	I/O
3	+Data	I/O
4	Ground	NA

Parallel Port Connector

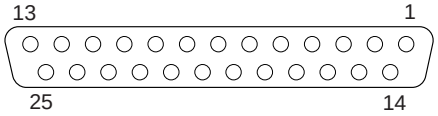

Figure 10. Parallel Port Connector

The external interface for the parallel port is a 25-pin, female, D-shell connector.

Table 45. Pin Assignments for the Parallel Port Connector

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	STROBE#	I/O	2	D0	I/O
3	D1	I/O	4	D2	I/O
5	D3	I/O	6	D4	I/O
7	D5	I/O	8	D6	I/O
9	D7	I/O	10	ACK#	I
11	BUSY	I	12	PE	I
13	SLCT	I	14	AUTO FD XT#	O
15	ERROR#	I	16	INIT#	O
17	SLCT IN#	O	18	Ground	NA
19	Ground	NA	20	Ground	NA
21	Ground	NA	22	Ground	NA
23	Ground	NA	24	Ground	NA
25	Ground	NA			

Serial Port Connectors

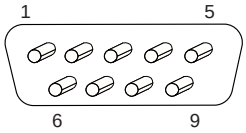

Figure 11. Serial Port Connector

The external interface for the serial ports consists of two, 9-pin, male, D-shell connectors (in a stacked configuration).

Table 46. Pin Assignments for the Serial Port Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Data carrier detect	I	2	Receive data#	I
3	Transmit data#	O	4	Data terminal read	O
5	Ground	NA	6	Data set ready	I
7	Request to send	O	8	Clear to send	I
9	Ring indicator	I			

Infrared Port Connector (Optional)

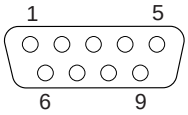

Figure 12. Infrared Port Connector

The external interface for the optional infrared port is a 9-pin, female, D-shell connector.

Table 47. Pin Assignments for the Infrared Connector

Pin	Signal Name	Signal Definition	I/O
1	IRTX	Infrared transmitted data (output)	O
2	Ground		NA
3	Reserved		NA
4	IRSL2	Infrared module select 2	O
5	IRSL1	Infrared module select 1	O
6	IRRX	Infrared received data (input)	I
7	VCC	Input voltage (5 V) from system board	NA
8	IRSL0	Infrared module select 0	O
9	NC	No connect	NA

Keyboard and Mouse Port Connectors

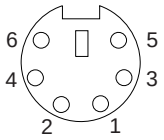

Figure 13. Keyboard and Mouse Port Connector

The keyboard and mouse ports each have a 6-pin, mini-DIN external connector.

Table 48. Pin Assignments for the Keyboard and Mouse Connectors

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Data	I/O	2	Reserved	NA
3	Ground	NA	4	+5 V dc	NA
5	Clock	I/O	6	Reserved	NA

Monitor Port Connector

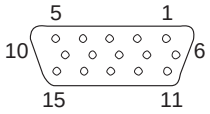

Figure 14. Monitor Connector

The external interface for the integrated Matrox MGA-1164SG 3D video subsystem is a 15-pin, female, D-shell, DDC2B-compliant connector located on the rear connector panel.

Table 49. Pin Assignments for the Monitor Connector

Pin	Signal Name	I/O
1	Red	O
2	Green	O
3	Blue	O
4	Monitor ID2 - not used	I
5	Ground	NA
6	Red ground	NA
7	Green ground	NA
8	Blue ground	NA
9	+5 V, used by DDC2B	NA
10	Ground	NA
11	Monitor ID 0 - not used	I
12	DDC2B serial data	I/O
13	Horizontal sync.	O
14	Vertical sync.	O
15	DDC2B clock	I/O

Note: All inputs and outputs are with respect to the system board.

Ethernet Connector

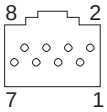

Figure 15. Ethernet Connector

The external interface for the Ethernet port is an 8-pin, RJ-45 connector.

Table 50. Pin Assignments for the Ethernet Connector

Pin	Signal Name	I/O
1	TxD+	O
2	TxD–	O
3	RxD+	I
4	Ground	NA
5	Ground	NA
6	RxD–	I
7	Ground	NA
8	Ground	NA

Appendix B. System Address Maps

System Memory Map

Memory can be mapped differently if POST detects an error.

Table 51. System Memory Map (Fixed Address Ranges)

Address Range (Dec)	Address Range (Hex)	Size	Description
0–511 KB	00000–7FFFF	512 KB	Conventional
512 KB–638 KB	80000–9FBFF	127 KB	Extended conventional
639 KB	9FC00–9FFFF	1 KB	Extended BIOS data (moveable by HIMEM, QEMM, 386MAX)
640 KB–767 KB	A0000–BFFF	128 KB	Matrox video RAM
768 KB–799 KB	C0000–C7FFF	32 KB	Matrox video ROM BIOS (shadowed)
800 KB–895 KB	C8000–DFFFF	96 KB	PCI/ISA space – available to ISA adapter ROMs
896 KB–1 MB	E0000–FFFFF	128 KB	System ROM BIOS (ISA bus, main memory shadowed)
1 MB–16 MB	100000–FFFFFF	15 MB	PCI/ISA space
16 MB–4095.872 MB	1000000–FFFDFFFF	4079.9 MB	PCI space (positive decode)
4095.872 MB–4096 (4 GB)	FFFE0000–FFFFFFFF	128 KB	System ROM BIOS (ISA bus)

Table 52. System Memory Map (Flexible Address Ranges)

Range Name	Range Size (Hex)	Range Size	Description
ROMBASE	FFFF	64 KB	Matrox ROM address (ROMBASE to ROMBASE+FFFF)
MGABASE1	3FFF	16 KB	Matrox MGA control aperture
MGABASE2	7FFFFF	8 MB	Matrox direct frame buffer access aperture
MGABASE3	7FFFFF	8 MB	Matrox 8 MB pseudo DMA window

Input/Output Address Map

The following table lists resource assignments for the I/O address map. Any addresses that are not shown are reserved.

Table 53 (Page 1 of 2). Input/Output Address Map

Address (Hex)	Size (Dec)	Description
0000–001F	32 bytes	DMA 1
0020–002D 0030–003F	30 bytes	Interrupt controller 1
002E–002F	2 bytes	Super I/O controller system board Plug-and-Play index/data registers (index=002E, data=002F)
0040–0043 0050–0053	8 bytes	Counter/timer 1
0044–004F 0054–005F	24 bytes	General I/O locations—available to ISA bus
0060	1 byte	Keyboard controller, data byte (on ISA data bus)
0061	1 byte	System port B
0064	1 byte	Keyboard controller, command and status byte (on ISA data bus)
0062, 0063, 0065–006F	13 bytes	General I/O locations—available to ISA bus
0070, bit 7 write only	1 bit	Enable/disable NMI
0070, bits 6:0	7 bits	Real-time clock, address (on ISA bus)
0071	1 byte	Real-time clock, data (on ISA bus)
0072–0077	6 bytes	General I/O locations—available to XD/ISA bus
0078	4 bytes	General purpose I/O (GPIO)
007C	4 bytes	General purpose I/O (GPIO)
0080	1 byte	POST checkpoint register during POST only
0080–008F	16 bytes	DMA page registers
0090–009F	16 bytes	General I/O locations—available to ISA bus
00A0–00B1 00B4–00BF	30 bytes	Interrupt controller 2
00B2	1 byte	Advanced power management control
00B3	1 byte	Advanced power management status
00C0–00DF	32 bytes	DMA 2
00E0–00EF	16 bytes	General I/O locations—availabe to ISA bus
00F0	1 byte	Coprocessor error register
00F1–00FF	15 bytes	General I/O locations—available to ISA bus
0170–0177	8 bytes	IDE channel 1
01F0–01F7	8 bytes	IDE channel 0
0220–0227	8 bytes	COM3 or COM4
0278–027F	8 bytes	LPT3
0290, 0295, 0296	3 bytes	System management chip
02E8–02EF	8 bytes	COM3 or COM4
02F8–02FF	8 bytes	COM2 (system board)
0338–033F	8 bytes	COM3 or COM4
0376–0377	2 bytes	IDE channel 1

Table 53 (Page 2 of 2). Input/Output Address Map

Address (Hex)	Size (Dec)	Description
0378–037F	8 bytes	LPT2
03B4–03B7 03BA	5 bytes	Matrox MGA-1164SG 3D video
03BC–03BE	4 bytes	LPT1 (system board)
03C0–03CF 03D4–03D7 03DA	20 bytes	Matrox MGA-1164SG 3D video
03E8–03EF	8 bytes	COM3 or COM4
03F0–03F5	6 bytes	Floppy channel 0
03F6	1 byte	IDE channel 0
03F7, bit 7	1 bit	Floppy disk change
03F7, bits 6:0	7 bits	IDE status channel 0
03F8–03FF	8 bytes	COM1 (system board)
04D0	1 byte	Interrupt edge/level control 1
04D1	1 byte	Interrupt edge/level control 2
0CF8–0CFB	4 bytes	PCI configuration address register
0CF9	1 byte	Reset control register
0CFC–0CFF	4 bytes	PCI configuration data register

DMA I/O Address Map

The following table lists resource assignments for the DMA address map. Any addresses that are not shown are reserved.

Table 54 (Page 1 of 2). DMA I/O Addresses

Address (Hex)	Description	Bits	Byte Pointer
0000	Channel 0, Memory Address register	00–15	Yes
0001	Channel 0, Transfer Count register	00–15	Yes
0002	Channel 1, Memory Address register	00–15	Yes
0003	Channel 1, Transfer Count register	00–15	Yes
0004	Channel 2, Memory Address register	00–15	Yes
0005	Channel 2, Transfer Count register	00–15	Yes
0006	Channel 3, Memory Address register	00–15	Yes
0007	Channel 3, Transfer Count register	00–15	Yes
0008	Channels 0–3, Read Status/Write Command register	00–07	
0009	Channels 0–3, Write Request register	00–02	
000A	Channels 0–3, Write Single Mask register bits	00–02	
000B	Channels 0–3, Mode register (write)	00–07	
000C	Channels 0–3, Clear byte pointer (write)	NA	
000D	Channels 0–3, Master clear (write)/temp (read)	00–07	
000E	Channels 0–3, Clear Mask register (write)	00–03	
000F	Channels 0–3, Write All Mask register bits	00–03	
0081	Channel 2, Page Table Address register[9]	00–07	
0082	Channel 3, Page Table Address register[9]	00–07	
0083	Channel 1, Page Table Address register[9]	00–07	
0087	Channel 0, Page Table Address register[9]	00–07	
0089	Channel 6, Page Table Address register[9]	00–07	
008A	Channel 7, Page Table Address register[9]	00–07	
008B	Channel 5, Page Table Address register[9]	00–07	
008F	Channel 4, Page Table Address/Refresh register	00–07	
00C0	Channel 4, Memory Address register	00–15	Yes
00C2	Channel 4, Transfer Count register	00–15	Yes
00C4	Channel 5, Memory Address register	00–15	Yes
00C6	Channel 5, Transfer Count register	00–15	Yes
00C8	Channel 6, Memory Address register	00–15	Yes
00CA	Channel 6, Transfer Count register	00–15	Yes
00CC	Channel 7, Memory Address register	00–15	Yes
00CE	Channel 7, Transfer Count register	00–15	Yes
00D0	Channels 4–7, Read Status/Write Command register	00–07	
00D2	Channels 4–7, Write Request register	00–02	
00D4	Channels 4–7, Write Single Mask register bit	00–02	

[9] Upper byte of memory address register.

Table 54 (Page 2 of 2). DMA I/O Addresses

Address (Hex)	Description	Bits	Byte Pointer
00D6	Channels 4–7, Mode register (write)	00–07	
00D8	Channels 4–7, Clear byte pointer (write)	NA	
00DA	Channels 4–7, Master clear (write)/temp (read)	00–07	
00DC	Channels 4–7, Clear Mask register (write)	00–03	
00DE	Channels 4–7, Write All Mask register bits	00–03	
00DF	Channels 5–7, 8- or 16-bit mode select	00–07	

Appendix C. IRQ and DMA Channel Assignments

The following tables list the IRQ (interrupt request) and DMA (direct memory access) channel assignments for PC 300PL computers.

Table 55. IRQ Channel Assignments

IRQ	System Resource
NMI	Critical system error
SMI	System management interrupt – power management
0	Reserved, internal timer
1	Reserved, keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	Serial port 2 if enabled; otherwise, user available for ISA or PCI bus
4	Serial port 1 if enabled; otherwise, user available for ISA bus
5	Parallel port 2 if enabled; otherwise, user available for ISA or PCI bus
6	Diskette drive controller
7	Parallel port 1 if enabled; otherwise, user available for ISA bus
8	Reserved, real-time clock
9	User available for ISA or PCI bus
10	User available for ISA or PCI bus
11	User available for ISA or PCI bus
12	System board mouse port if enabled; otherwise, user available for ISA or PCI bus
13	Reserved, math coprocessor
14	IDE channel 1 if enabled; otherwise user available for ISA or PCI bus
15	IDE channel 2 if enabled; otherwise user available for ISA or PCI bus

Note: Audio IRQ and DMA resources are required and are assigned by the Plug and Play BIOS or operating system.

Table 56. DMA Channel Assignments

DMA Channel	Data Width	System Resource
0	8 bits only	User available for ISA bus
1	8 bits only	User available for ISA bus
2	8 bits only	Reserved, floppy
3	8 bits only	Parallel port if ECP; otherwise user available for ISA bus
4		Reserved–cascade channel
5	16 bits only	User available for ISA bus
6	16 bits only	User available for ISA bus
7	16 bits only	User available for ISA bus

Note: Channels 0–3 can transfer data in 64 KB pages; channels 5–7 can transfer data in 128 KB pages.

Appendix D. Error Codes

The following tables list the POST error codes and beep error codes for the PC 300PL (Type 6562) and PC 300PL (Type 6592).

POST Error Codes

POST error messages appear when POST finds problems with the hardware during power-on or when a change in the hardware configuration is found. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages. An *x* in an error message can represent any number.

Table 57 (Page 1 of 2). POST Error Codes

Code	Description
101	Interrupt failure
102	Timer failure
103	Timer-interrupt failure
104	Protected mode failure
105	Last 8042 command not accepted – keyboard failure
106	System board failure
108	Timer bus failure
109	Low MB chip select test
110	System board parity error 1 (system board parity latch set)
111	I/O parity error 2 (I/O channel check latch set)
112	I/O channel check error
113	I/O channel check error
114	External ROM checksum error
115	DMA error
116	System board port read/write error
120	Microprocessor test error
121	Hardware error
151	Real time clock failure
161	Bad CMOS Battery
162	CMOS RAM checksum/configuration error
163	Clock not updating
164	CMOS RAM memory size does not match
167	Clock not updating
175	Riser card or system board error
176	System cover has been removed
177	Corrupted administrator password
178	Riser card or system board error
183	Administrator password has been set and must be entered
184	Password removed due to checksum error
185	Corrupted boot sequence
186	System board or hardware security error
189	More than three password attempts were made to access system

Table 57 (Page 2 of 2). POST Error Codes

Code	Description
201	Memory data error
202	Memory address line error 00-15
203	Memory address line error 16-23
221	ROM to RAM remapping error
225	Unsupported memory type installed or memory pair mismatch
301	Keyboard error
302	Keyboard error
303	Keyboard to system board interface error
304	Keyboard clock high
305	No keyboard +5 V dc
601	Diskette drive or controller error
602	Diskette IPL boot record not valid
604	Unsupported diskette drive installed
605	POST cannot unlock diskette drive
662	Diskette drive configuration error
762	Math coprocessor configuration error
11xx	Serial port error (xx = serial port number)
1762	Hard disk configuration error
1780	Hard disk 0 failed
1781	Hard disk 1 failed
1782	Hard disk 2 failed
1783	Hard disk 3 failed
1800	PCI adapter has requested an unavailable hardware interrupt
1801	PCI adapter has requested an unavailable memory resource
1802	PCI adapter has requested an unavailable I/O address space, or the adapter is defective
1803	PCI adapter has requested an unavailable memory address space, or the adapter is defective
1804	PCI adapter has requested unavailable memory addresses
1805	PCI adapter ROM error
1962	Boot sequence error
2401	System board video error
8601	System board - keyboard/pointing device error
8602	Pointing device error
8603	Pointing device or system board error
12092	Level 1 cache error (Processor chip)
12094	Level 2 cache error
I9990301	Hard disk failure
I9990305	No operating system found

Beep Codes

For the following beep codes, the numbers indicate the sequence and number of beeps. For example, a "2-3-2" error symptom (a burst of two beeps, three beeps, then two beeps) indicates a memory module problem. An *x* in an error message can represent any number.

Table 58. Beep Codes

Beep Code	Probable Cause
1-1-3	CMOS write/read failure
1-1-4	BIOS ROM checksum failure
1-2-1	Programmable interval timer test failure
1-2-2	DMA initialization failure
1-2-3	DMA page register write/read test failure
1-2-4	RAM refresh verification failure
1-3-1	1st 64 K RAM test failure
1-3-2	1st 64 K RAM parity test failure
2-1-1	Slave DMA register test in progress or failure
2-1-2	Master DMA register test in progress or failure
2-1-3	Master interrupt mask register test failure
2-1-4	Slave interrupt mask register test failure
2-2-2	Keyboard controller test failure
2-3-2	Screen memory test in progress or failure
2-3-3	Screen retrace tests in progress or failure
3-1-1	Timer tick interrupt test failure
3-1-2	Interval timer channel 2 test failure
3-1-4	Time-of-Day clock test failure
3-2-4	Comparing CMOS memory size against actual
3-3-1	Memory size mismatch occurred

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