The

COMPLETE

GUIDE TO

HIGH-PERFORMANCE

COMPUTING

WITH YOUR

PANTERA

COMPUTER

User's Guide

ZEOS®

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Contents

FCC Compliance Statement for U.S. and Canadian Users

Warning!

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15, Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is needed.
- Consult the dealer or an experienced radio/TV technician for help.

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment.

This equipment is a Class B digital apparatus which complies with the Radio Interference Regulations, C.R.C., c. 1374.

Cet appareil numèrique de la classe B est conformè au Règlement sur le brouillage radioèlèctrique, C.R.C., ch. 1374.

Caution: Lithium Batteries

Danger of explosion if battery is incorrectly replaced. Replace lithium CMOS battery only with the same type or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Customer Assurance Program

Thirty (30) Day Money-Back Guarantee on Most Products.

Any product (except for software, software disks, related documentation and consumables) purchased from ZEOS may be returned within thirty days from the date it was shipped by ZEOS for a full refund of the purchase price excluding original shipping charges.

Returned products must be in as new condition, in original packing, complete with all warranty cards, manuals, cables and other materials as originally shipped; not modified or damaged.

Any returned product must be shipped prepaid and insured. Any return must carry a ZEOS Return Merchandise Authorization (RMA) number, obtained from ZEOS, on the outside of each carton. Returns without RMA numbers will not be accepted. After thirty days from shipment, all sales are final and credit or refunds will not be given.

1. The Big Picture

Welcome to the ZEOS *User's Guide*! The *User's Guide* works with the *Getting Started* manual to help keep your system running trouble free, year after year.

This *User's Guide* is divided into five chapters.

Chapter 1, The Big Picture gives an overview of typical desktop, tower, and mini-tower systems. It also shows the major components inside the computer case.

Chapter 2, The Mainboard gives detailed information about your mainboard.

Chapter 3, Using SETUP explains how to use the SETUP utility program to customize the built-in features of your system's BIOS (Basic Input/Output System).

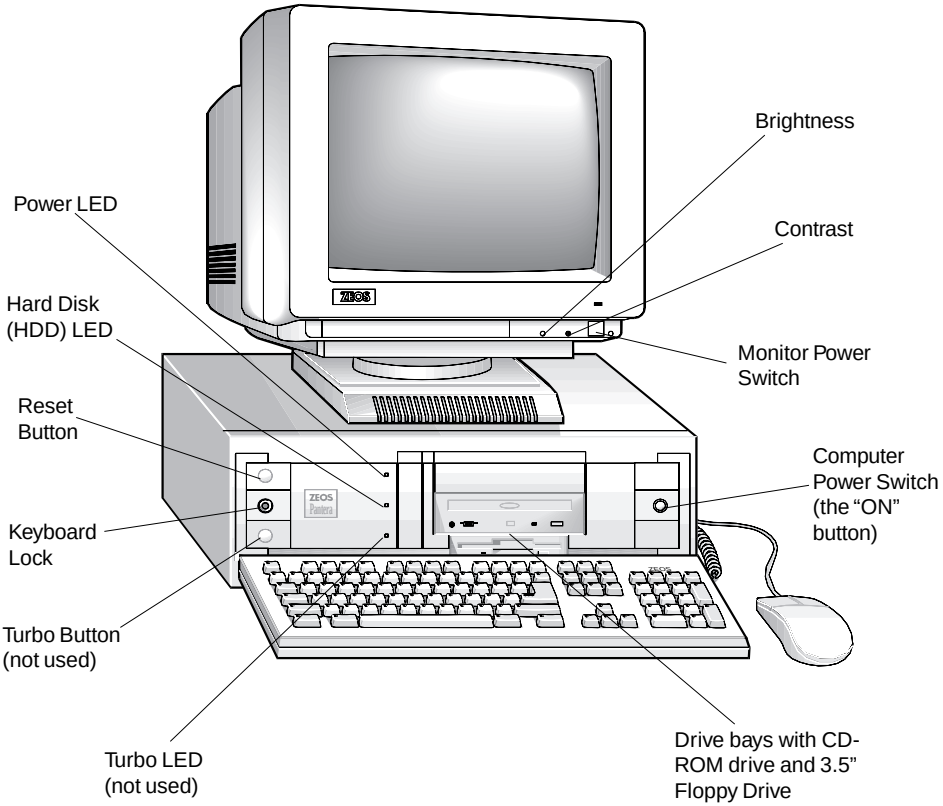
Chapter 4, Expanding Your System shows how to add components and enhancements to your system. These include a video adapter card, a controller card, an internal modem, a floppy drive, an IDE hard drive, a CD-ROM drive, memory RAM SIMMs, system cache, and a new CPU.

Chapter 5, Mainboard Specifications includes your mainboard specifications, environmental specifications, plus pin assignments for your serial and parallel ports.

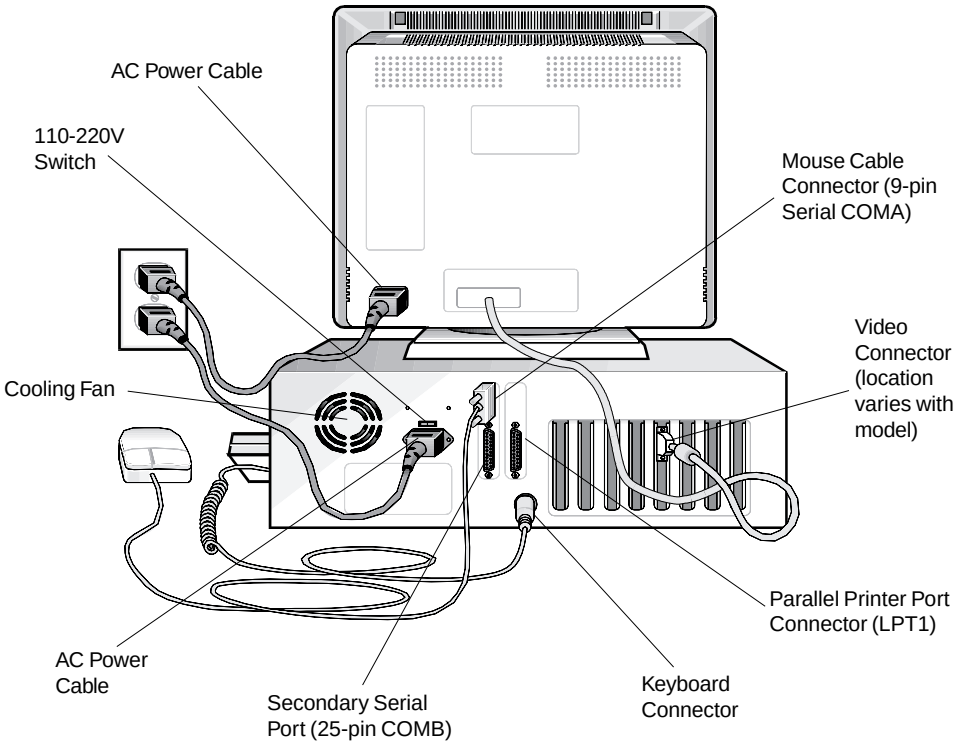
The **Handy Cheat Sheet** gives a short summary of some of the most needed or most forgotten commands.

The **Glossary** gives short definitions of some common computer terms.

Desktop System At A Glance



Desktop Front



Desktop Rear

How to Open a Desktop Case

Caution:

Whenever you open the case or work inside the computer there is danger of static electric shock. These shocks can permanently damage your equipment. Always ground yourself by touching the system cabinet before touching any internal component. We strongly recommend using an antistatic wrist strap attached to cabinet ground.

To open a desktop case:

1. Turn off the monitor and system unit power. Unplug the AC power cables and disconnect any other cables attached to the back of the system unit.

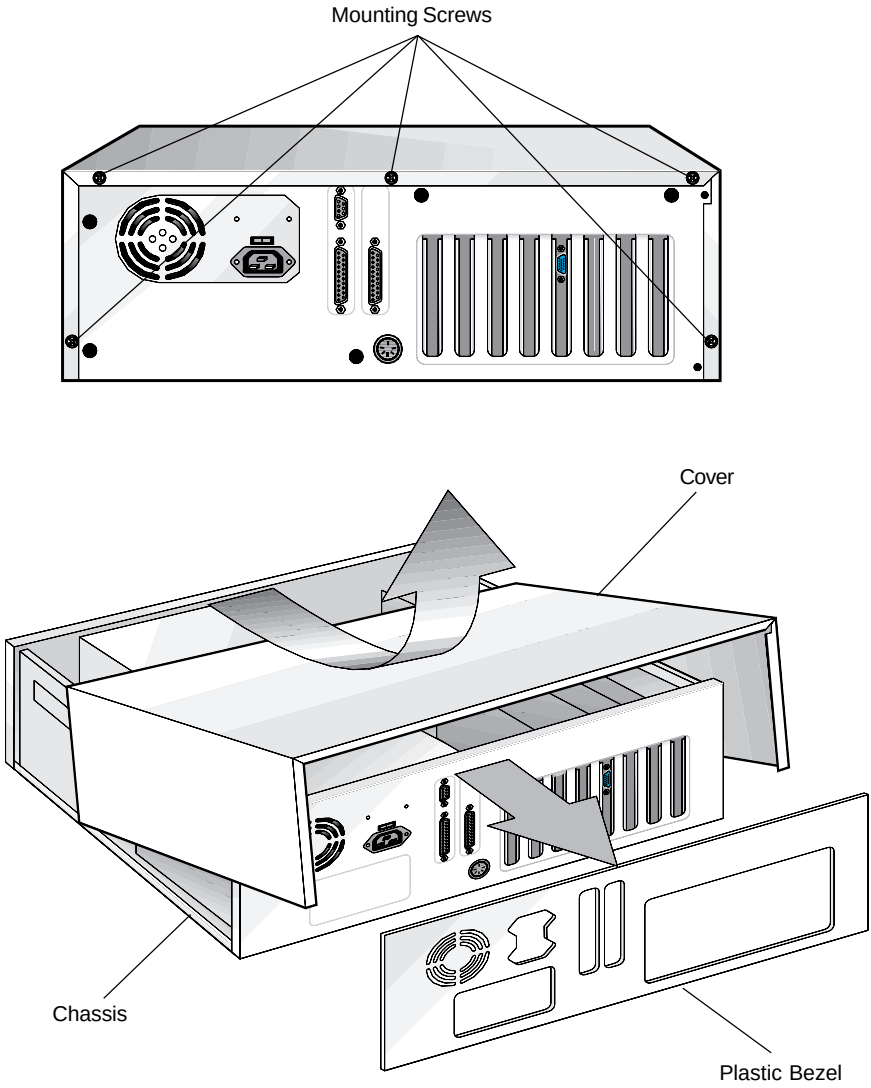
2. Remove the plastic bezel from the back of the case by pulling it away from the case.

3. Remove the five mounting screws at the back of the case that hold the case cover to the system unit chassis.

4. Slide the case cover back and up. Be careful not to snag any cables or connectors inside the case.

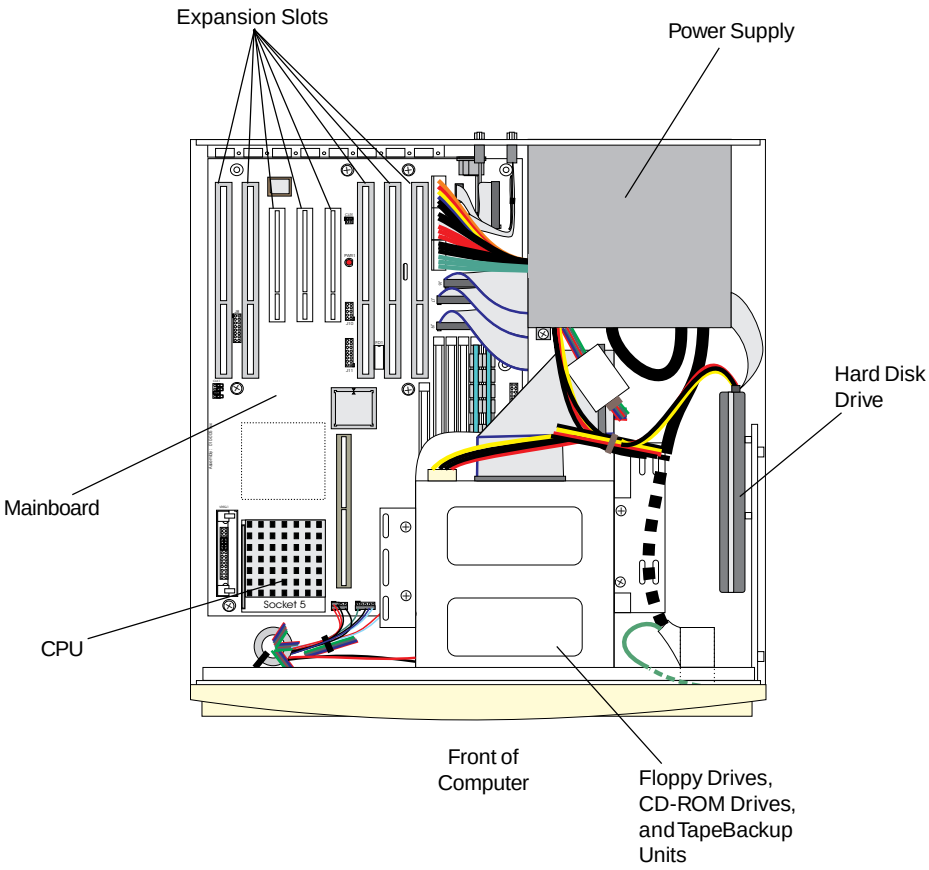
5. Set the case cover aside while you work on your system.

6. When through, reattach the case cover, screws, bezel, and cables in the reverse order.



The illustrations above show the plastic bezel, screw locations, and how to remove a desktop PC's cover.

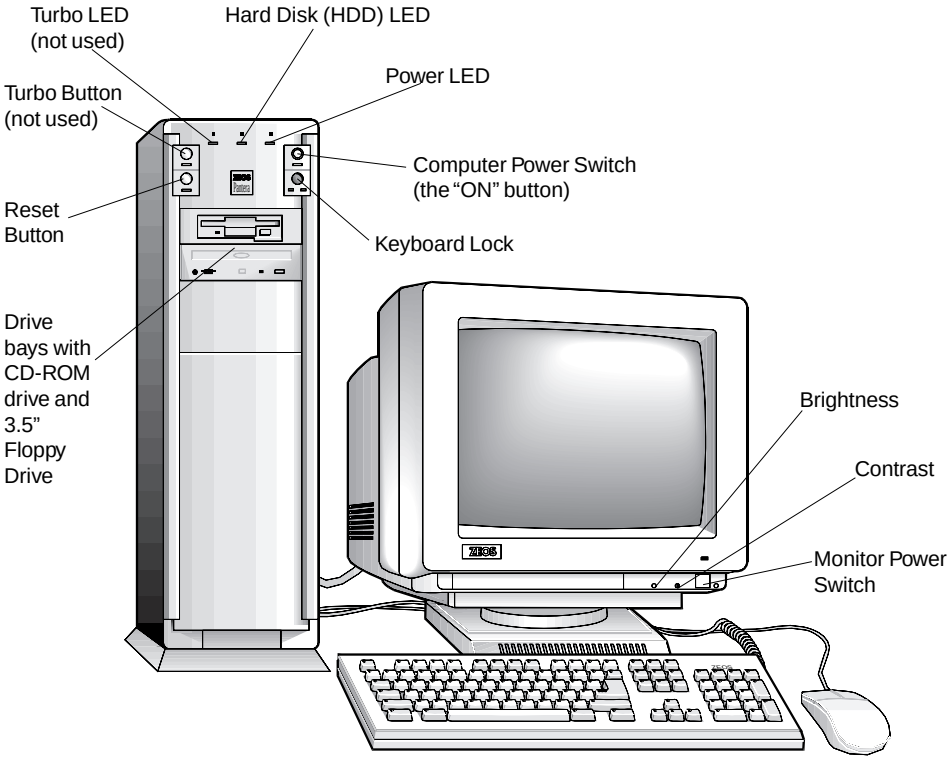
Inside a Desktop Computer



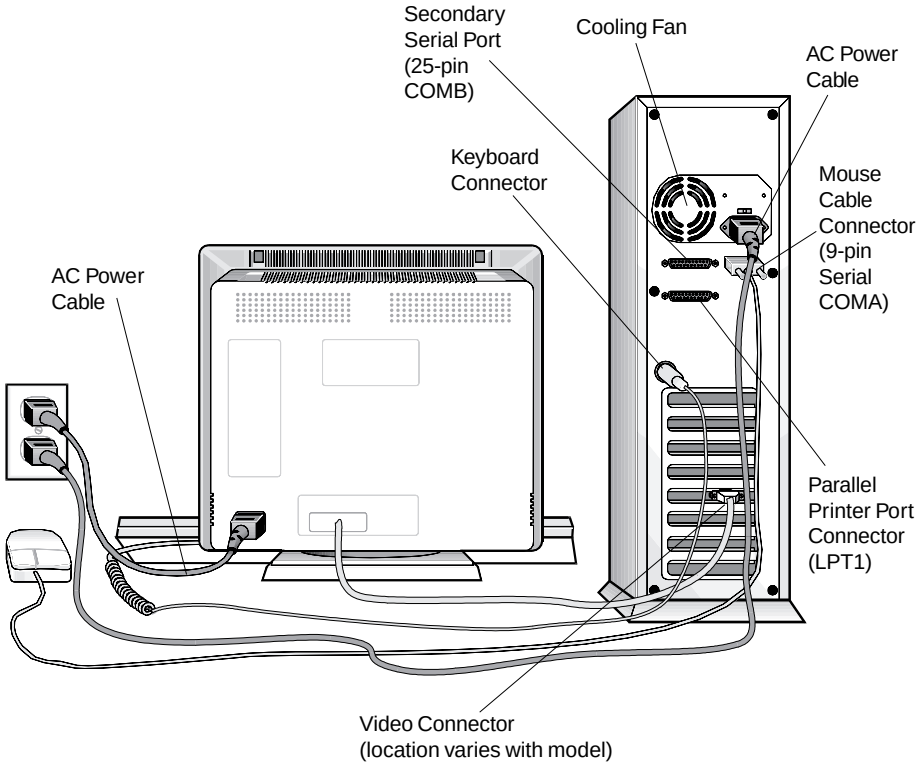
The figure above shows some of the most common components inside the computer.

The mainboard is the large circuit board at the bottom of the chassis. It is the heart of your system. All of the other components inside the case work for the mainboard. The power supply delivers electricity to the mainboard. The disk drives, keyboard connectors, and other parts of the system unit bring information to and from the mainboard.

Tower System At A Glance



Tower Front


Secondary
Serial Port
(25-pin
COMB)
Cooling Fan
AC Power
Cable
Keyboard
Connector
Mouse
Cable
Connector
(9-pin
Serial
COMA)
AC Power
Cable
Parallel
Printer Port
Connector
(LPT1)
Video Connector
(location varies with model)

Tower Rear

How to Open a Tower Case

Caution:

Whenever you open the case or work inside the computer there is danger of static electric shock. These shocks can permanently damage your equipment. Always ground yourself by touching the system cabinet before touching any internal component. We strongly recommend using an antistatic wrist strap attached to cabinet ground.

Opening a tower case is similar to opening a desktop case.

To open a tower case:

1. Turn off the monitor and system unit power. Unplug the AC power cables and disconnect any other cables attached to the back of the system unit.

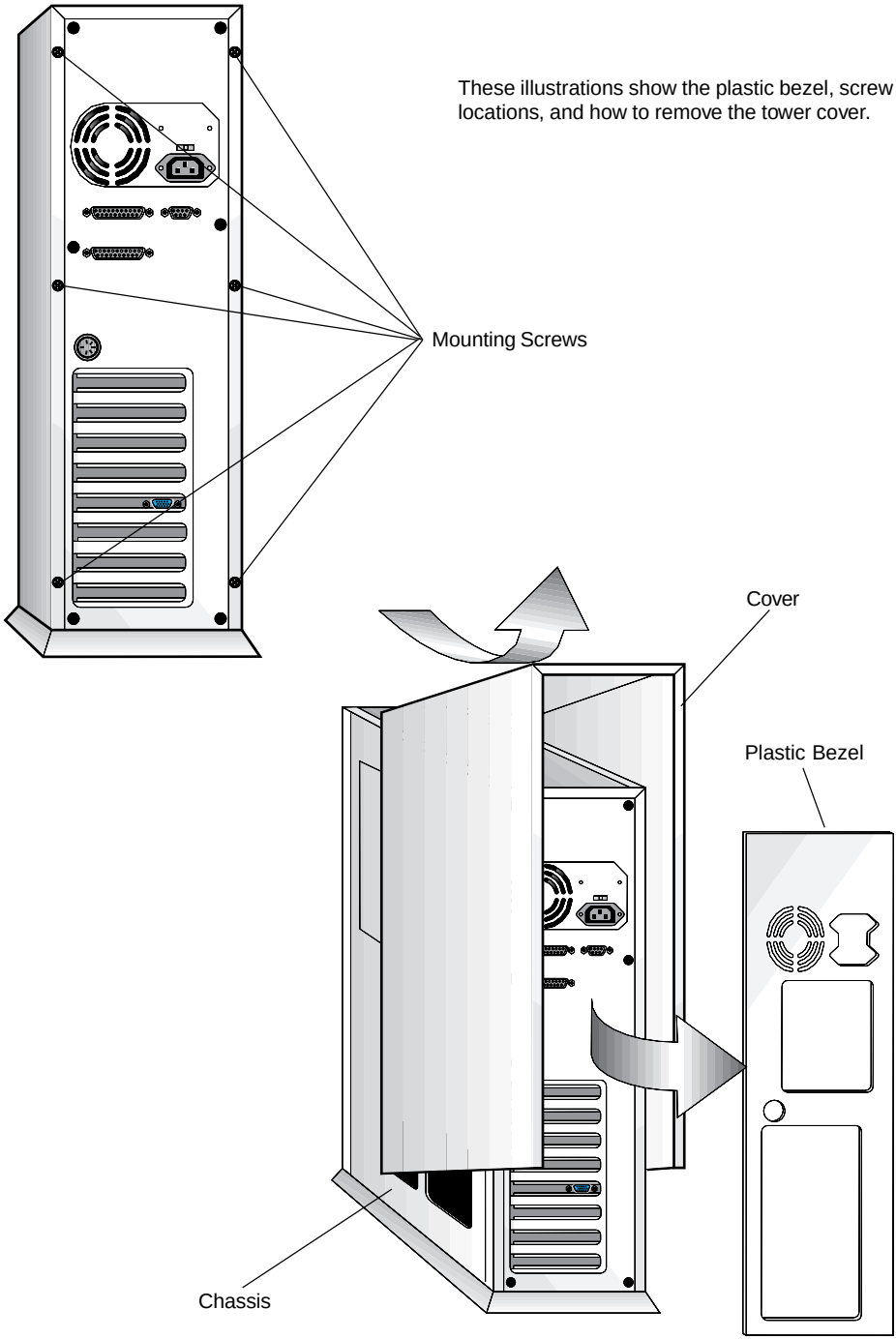
2. Remove the plastic bezel from the rear of the case by pulling it away from the case.

3. Unscrew the six mounting screws at the back of the case that hold the case cover to the system unit chassis.

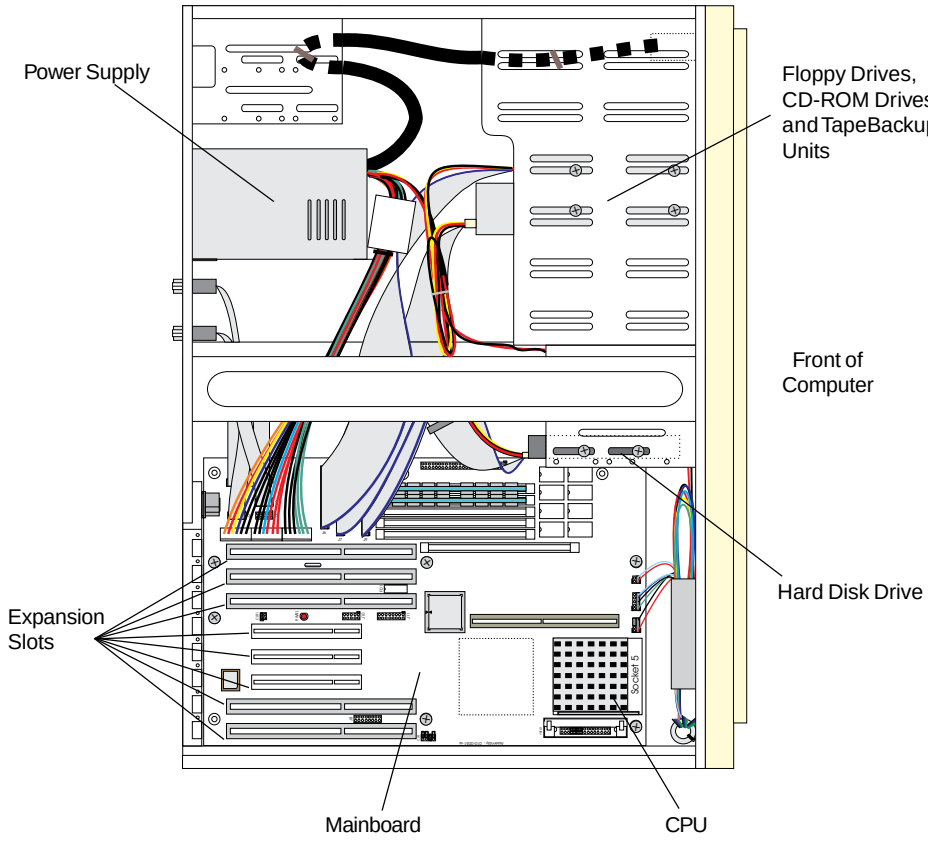
4. Slide the case cover back and up, taking care not to snag any cables or connectors inside.

5. Set the case cover aside while you work on your system.

6. Afterwards, reattach the case cover, screws, bezel, and cables in the reverse order.


These illustrations show the plastic bezel, screw locations, and how to remove the tower cover.
Mounting Screws
Cover
Plastic Bezel
Chassis

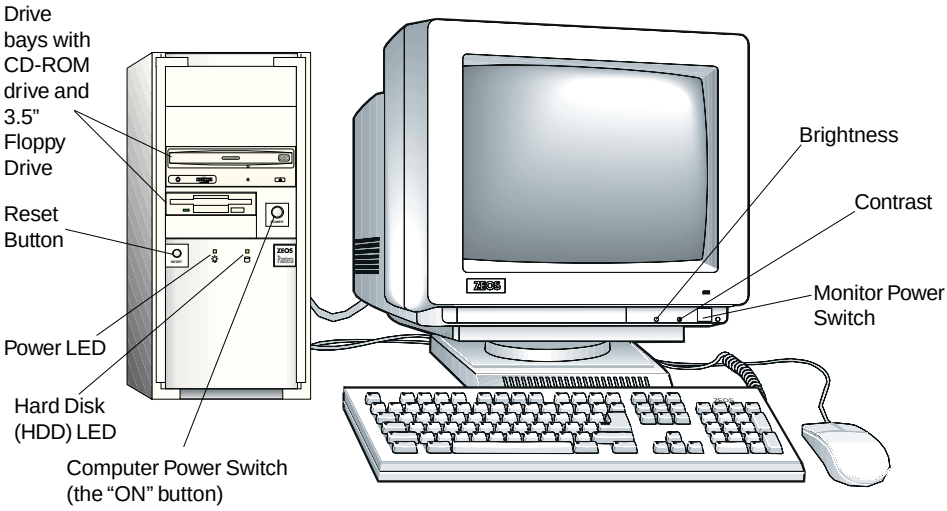
Inside a Tower Computer



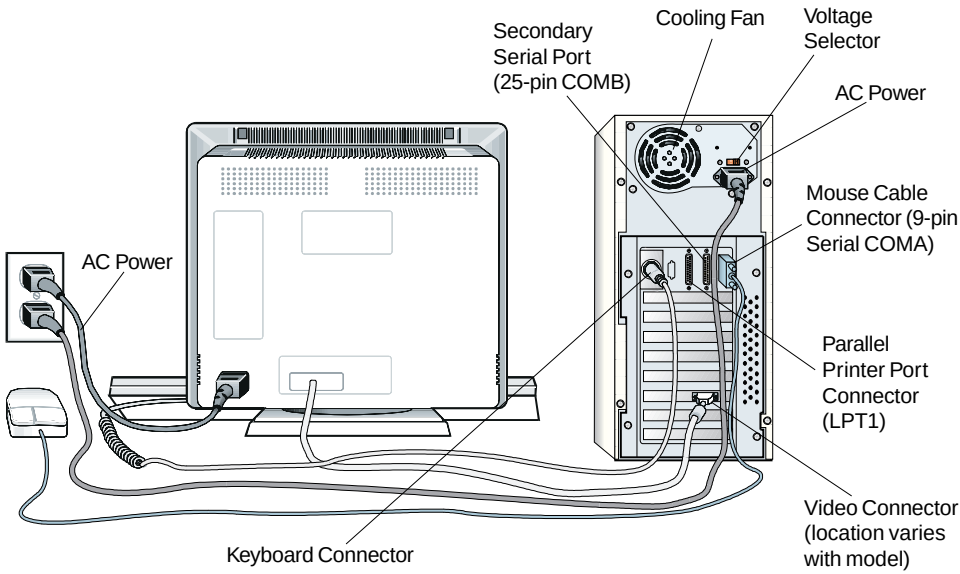
Tower systems have the same components as desktop systems. The figure above shows the mainboard and typical components inside a Tower case.

The mainboard is the large circuit board at the bottom of the chassis. It is the heart of your system. All of the other components inside the case work for the mainboard. The power supply delivers electricity to the mainboard. The disk drives, keyboard connectors, and other parts of the system unit bring information to and from the mainboard.

Mini-Tower System At A Glance



Mini-Tower Front



Mini-Tower Rear

How to Open a Mini-Tower Case

Caution:

Whenever you open the case or work inside the computer there is danger of static electric shock. These shocks can permanently damage your equipment. Always ground yourself by touching the system cabinet before touching any internal component. We strongly recommend using an antistatic wrist strap attached to cabinet ground.

Opening a mini-tower case is similar to opening a tower case.

To open a mini-tower case:

1. Turn off the monitor and system unit power. Unplug the AC power cables and disconnect any other cables attached to the back of the system unit.

2. Remove the four mounting screws at the back of the case that hold the case cover to the system unit chassis.

3. Slide the case cover back and up, taking care not to snag any cables or connectors inside.

4. Set the case cover aside while you work on your system.

5. Afterwards, reattach the case cover, screws, and cables in reverse order.

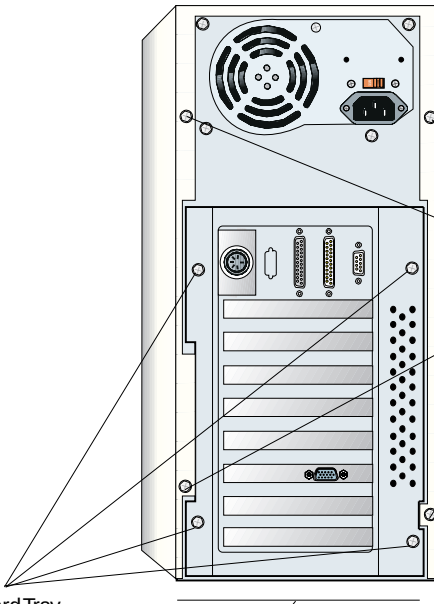
To remove the mainboard tray:

1. Remove the case cover (see above).

2. Remove all cables and connectors binding the mounting plate to interior components.

3. Remove the tray's four retaining screws (see opposite).

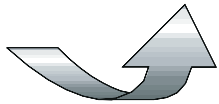
4. Carefully slide the tray out, checking for stray connectors.



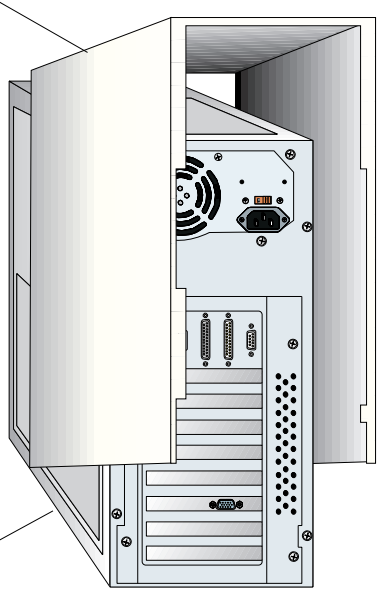
Case Cover
Mounting Screws

Mainboard Tray
Retaining Screws

The mainboard tray slides out, letting you reach expansion cards, the CPU, memory modules, etc.



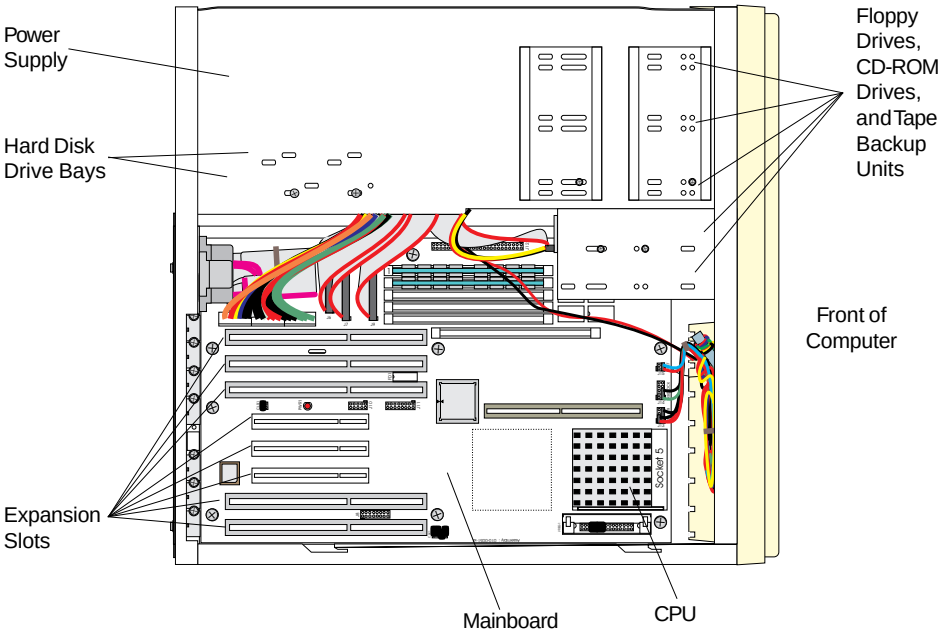
Case Cover



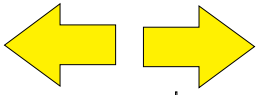
Chassis

These illustrations show the screw locations, how to remove the mini-tower cover, and the location of the mainboard tray.

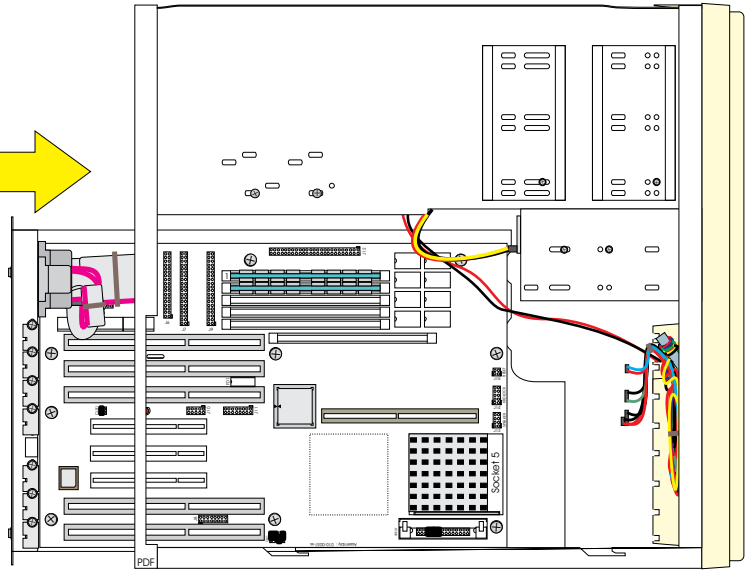
Inside a Mini-Tower Computer



The mini-tower's mainboard tray slides in and out for easy maintenance.



Note: Be sure to detach all cables and connectors before you pull out the tray!



2. The Mainboard

The mainboard is the largest circuit board in the computer. It contains the CPU (Central Processing Unit), the Level 2 cache, expansion slots, ports and connectors for other components, and the system's main memory, or RAM (Random Access Memory).

Mainboard Features

Standard Features:

- Intel Pentium (P54C) 75, 90, 100, 120, 133, 150MHz
- Optional 512K Level 2 synchronous burst cache, write-back, direct-mapped
- 200-Watt power supply (300-Watt optional)
- 384MB RAM capacity (EDO, D-RAM)
- RAM Configurations: 2, 4, 6, 8, 10,12, 16, 32, 64, 128, 192, 384MB, etc. (See *RAM Configurations*, Chapter 4)
- On-board PCI IDE drive controller supports 4 devices
- On-board floppy drive controller
- Three 32-bit PCI local bus expansion slots
- Five 16-bit ISA expansion slots
- EPP/ECP parallel port, software configurable
- Two RS232, 16550 high-speed serial ports
- Flash BIOS, relocatable to system RAM to boost performance
- Clock/calendar with on-board battery backup
- EPA *Energy Star* power management

Factory Installed Options:

- AMD SCSI controller on PCI bus
- AMD network controller on PCI bus
- AMD combined SCSI/network controller on PCI bus

PCI Local Bus 32-Bit High Speed Expansion Slots

The three PCI local bus, high speed expansion slots move information at up to 132 MB/s. This offers a high performance, 32-bit interface to support local bus peripherals such as video cards, LAN adapters and hard disk drives.

Secondary Cache Subsystem

The secondary (Level 2) cache subsystem enhances the performance of the CPU. The on-board cache controller allows cache memory to provide an ultra high-speed, 7-nanosecond buffer between the CPU and conventional (60 or 70ns) RAM. Your system can accommodate 0K or 512K of Level 2 cache. The single cache slot (labelled *Cache Socket*) is located next to the CPU.

Keyboard Activated Turbo Mode

Pantera systems do not use the Turbo button and Turbo LED (if present on your system case). Instead, pressing the <Alt><Ctrl>+<MINUS> keys on the numeric keypad places the system in de-Turbo mode and issues one long beep. Pressing the <Alt><Ctrl>+<PLUS> keys places the system in Turbo mode and issues two short beeps.

Replacement Battery Connector

Pantera mainboards include a connector for a replacement CMOS battery. Located near the parallel port header, this BATT_1 connector lets you add a new CMOS battery after the original runs out of energy. This battery maintains the customized BIOS settings in CMOS (Complimentary Metal-Oxide Semiconductor) memory. Your computer uses these hardware settings each time you turn it on.

On-Board Peripherals

Your mainboard has all of the standard peripheral interfaces and many extras built in. This eliminates the need for many peripheral expansion cards and greatly enhances system reliability.

Integrated on-board peripherals include:

- Two serial ports, each with its own 16550 UART data buffer
- Enhanced (EPP), Extended Capabilities (ECP), or bidirectional parallel port (assigned through SETUP)
- Floppy drive controller (handles floppy drives up to 2.88Mb)
- Two PCI local bus IDE hard drive controller ports, each capable of controlling two hard drives

Factory installed options:

- SCSI port (supports both SCSI-1 and -2 devices)
- Ethernet port

Serial Ports

Your mainboard has two RS-232C asynchronous serial ports, which are usually referred to as COM1 or (9-pin) and COM2 (25-pin) ports. The serial ports are used to attach mice, serial printers, modems, or other serial peripheral devices. Each serial port has its own 16550 UART data buffer, offering high-speed data transfer rates.

You can install up to two additional serial ports (COM3 and COM4) simultaneously in your system. However, because MS-DOS does not manage more than two COM ports simultaneously very well, you shouldn't attempt to use more than two COM ports at the same time. Specifically, don't try to use COM1 and COM3 at the same time, or COM2 and COM4 at the same time.

Parallel Port

Your computer's 25-pin parallel port is often called the *printer* port because it is usually used for printers. However, new devices that use this communication line, such as SCSI and network adapters, are rapidly entering the market. Your parallel port now fully supports the new IEEE 1284 parallel port specification. IEEE 1284 specifies how to speedup data transfers between a PC and peripheral devices, as well as ways to enhance the port's capabilities. IEEE 1284 is divided into three levels, or "modes," each offering different features: Bidirectional, Enhanced Parallel Port (EPP), and Extended Capabilities Port (ECP). Your Pantera can use all these modes. Pantera also incorporates "ChiProtect" circuitry which protects your computer from damage caused during printer power-on.

Following are some features of your Pantera's parallel port modes.

Bidirectional parallel port mode:
Two-way communication between your PC and your printer, controlled by the PC. Allows parallel port to receive as well as send data.

Enhanced Parallel Port (EPP) mode:
Up to 300KB/sec. Two-way communication between a PC and parallel devices. Support includes onscreen status-reporting printers. Enables daisy chaining of up to seven devices from the parallel port using pass-through connectors on the peripheral devices.

Extended Capabilities Port (ECP) mode:
Up to 2MB/sec. two-way communication between a PC and parallel devices, as well as Direct Memory Access (DMA) and a memory buffer to smooth multitasking. Can compress data. May allow LAN-like networking between two PCs with parallel ports joined by high-speed cables.

PCI SCSI/ Ethernet Port

The optional on-board SCSI (host adapter allows you to connect and control up to seven peripheral devices such as SCSI-compatible disk drives, tape backup units, communications devices, and CD-ROM drives.

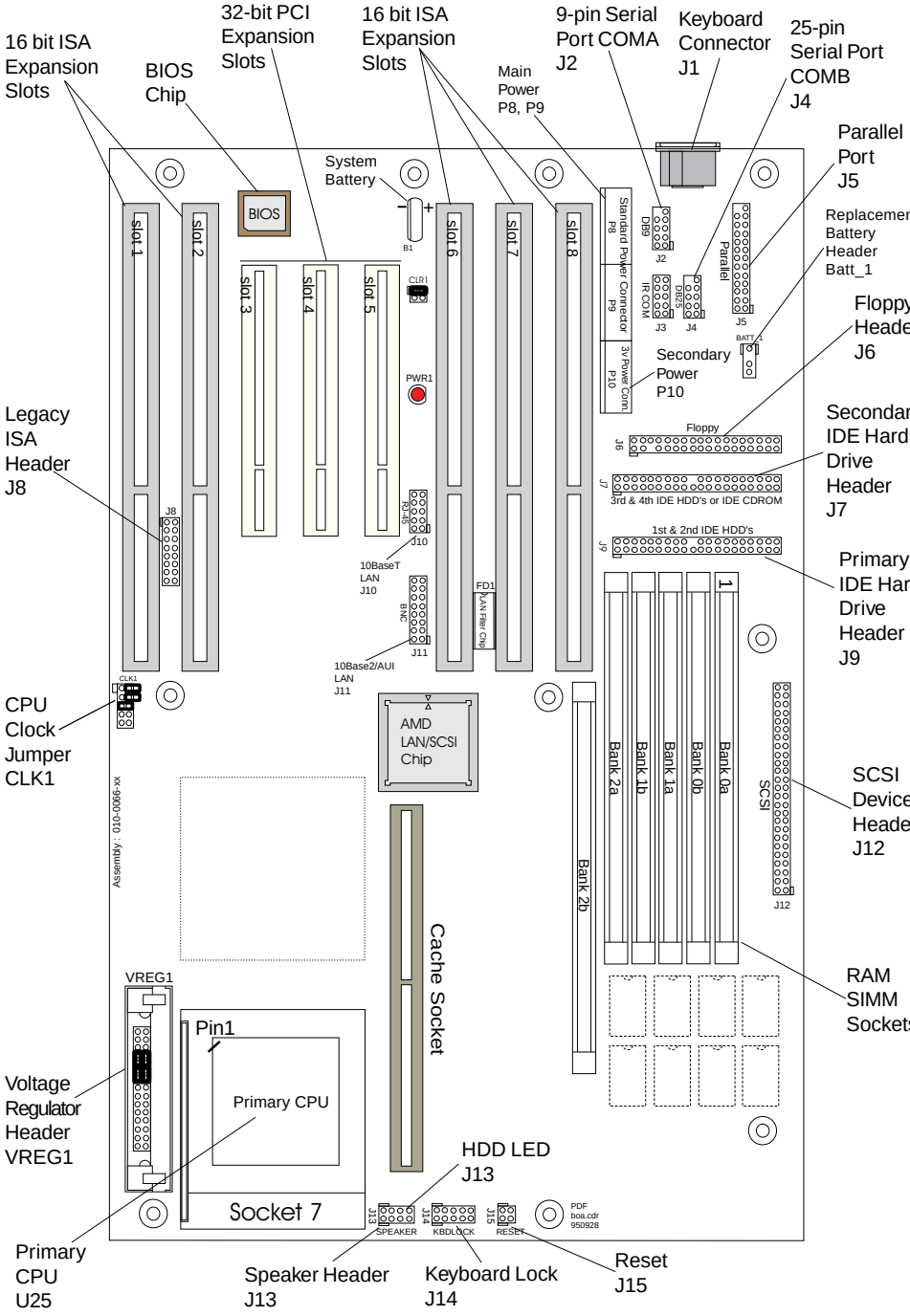
The SCSI port is a parallel, multitasking interface which supports both SCSI-1 and SCSI-2 devices.

The SCSI port is configured from the system SETUP program. For SCSI system setup parameters, refer to the SCSI Control Menu in *Using SETUP*.

The SCSI host adapter socket can also accept an Ethernet LAN controller chip allowing you to make direct Ethernet LAN connections for high speed local area network communications.

Note: The on-board SCSI and LAN options are factory installed options only. The on-board SCSI and LAN option can only be upgraded at the time of purchase.

Mainboard Diagram



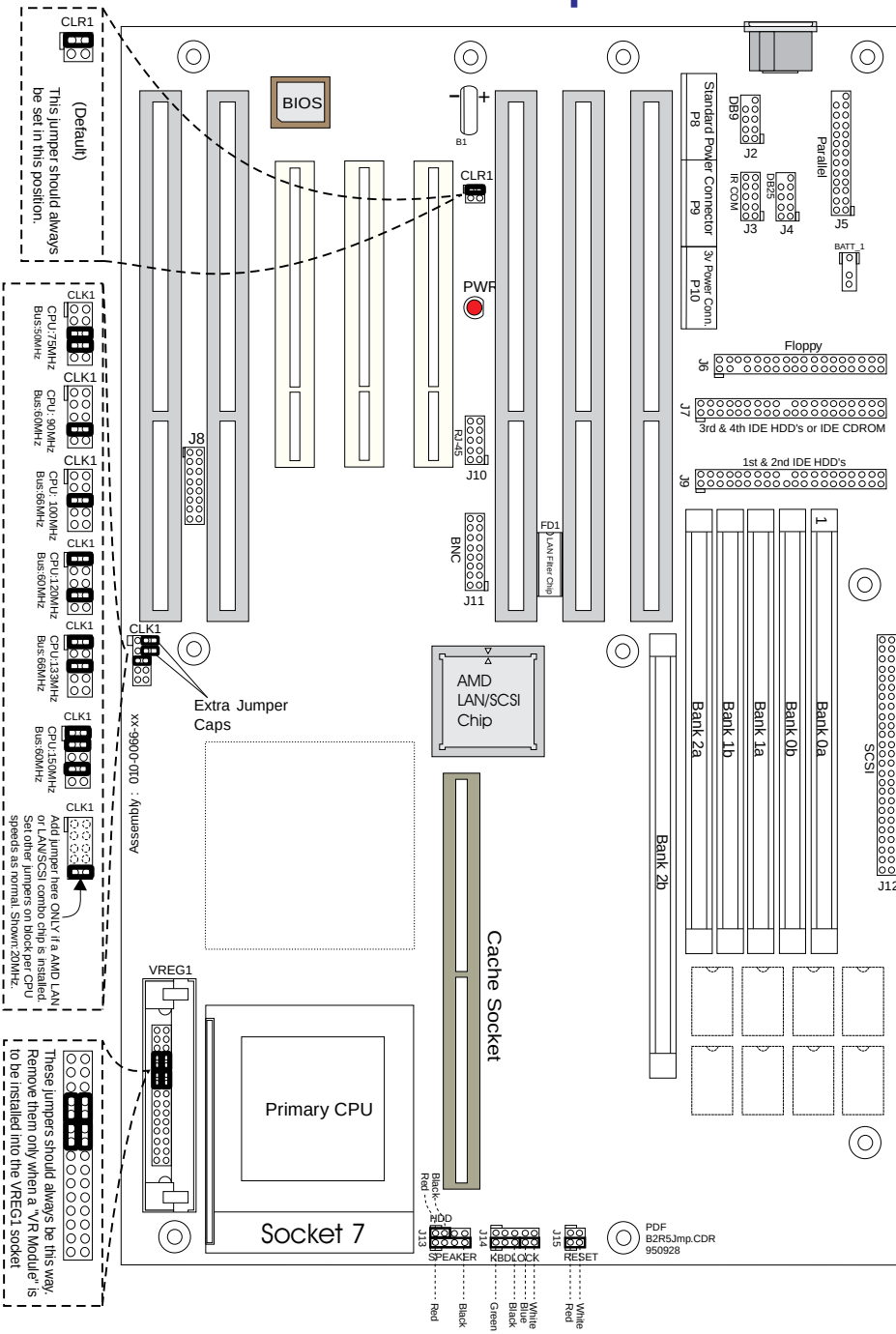
Mainboard Connectors

Connectors and headers are used to attach devices to the mainboard. Attached devices can be internal (e.g., hard disk indicator lights), or external (e.g., serial and parallel ports). The most commonly used connectors are shown in the *Mainboard Diagram*. The table below provides a brief summary.

Table 1. - Mainboard Connectors

Connector ID	Description
J1	Keyboard connector
P8, P9	Main power supply header
P10	PCI 3.3-Volt power supply header
J2	DB9: First serial port
J4	DB25: Second serial port
J5	LPT1: Parallel “printer” port header
J6	Floppy disk drive header
J7	Secondary IDE header (3rd & 4th IDE HDDs)
J8	Legacy ISA header
J9	Primary IDE header (1st & 2nd IDE HDDs)
J10	10BaseT LAN header
J11	10Base2/AUI LAN header
J12	SCSI device header
J13	SPEAKER output, HDD LED output
J14	KBDLOCK: Keyboard Lock input
J15	RESET switch header

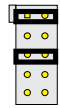
Mainboard Jumpers



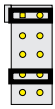
Jumper Settings

CLK1: CPU Speed/Bus Speed; On-board AMD SCSI, LAN Settings

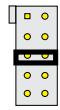
150MHz/60MHz Bus



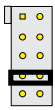
133MHz/66.6MHz Bus



120MHz/60MHz Bus

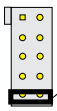


100MHz/66.6MHz Bus

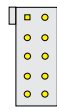


90MHz/60MHz Bus

75MHz/50MHz Bus



AMD LAN Chip, LAN/SCSI Chip (20MHz)



AMD SCSI Chip (40MHz)

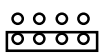
CLR1: Clear CMOS Jumper

Enable CMOS Battery

Clear CMOS

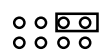
LED's, Reset, Keyboard Lock

J13: Internal Speaker, Hard Disk Drive LED



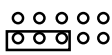
Speaker On

HDD LED

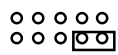


HDD LED

J14: Power LED, Keyboard Lock



Power LED



Keyboard Lock

J15: Reset Switch

Reset

Reset

Jumpers Described

Jumpers are small groups of pins that can be connected or disconnected with jumper caps. To connect a jumper, carefully place the jumper cap over the pins you wish to connect, then gently press down.

The mainboard uses the CLK1 jumper to adjust CPU clockspeed and the Bus clock. The remaining system settings are stored in battery-backed CMOS (Complimentary Metal-Oxide Semiconductor) memory. You can use the SETUP program to change settings stored in the CMOS, or restore factory default settings with the CLR1 jumper (see below).

Other mainboards depend heavily on jumpers to configure upgrade options and parameters on the mainboard. Pantera mainboards use the SETUP program and the FLASH programming utility instead, making BIOS changes and upgrades without removing the BIOS chip.

CLR1

The CLR1 jumper holds or resets the factory default BIOS settings stored in the CMOS (Complimentary Metal-Oxide Semiconductor) BIOS chip. Do not clear the CMOS memory unless it becomes corrupted and cannot be reprogrammed with the SETUP program, which also can reset the factory default BIOS settings.

CLK1

The CLK1 jumper sets the speed of the system clock, and enables the appropriate AMD LAN or SCSI chip (optional). It will be set correctly to work with your system, so don't change this jumper unless you change CPUs.

Pins Jumpered	CPU Clock Speed (MHz)	Bus Clock Speed (MHz)
1-2, 3-4, 7-8	150	60
1-2, 5-6	133	66.6
1-2, 7-8	120	60
5-6	100	66.6
7-8	90	60
5-6, 7-8	75	50

On-board SCSI or SCSI/LAN chip (optional)

9-10 jumpered	Enables AMD LAN or SCSI/LAN chip	20MHz
9-10 not jumpered	Enables AMD SCSI chip	40MHz

See the diagram, *Mainboard Jumpers*, for these jumper locations.

Other Mainboard Features

Most Pantera mainboard features are controlled by the BIOS, whose settings appear in the SETUP program (see Chapter 3, *Using SETUP*). The following features are controlled automatically; their status is automatically determined and reported at bootup.

Note: Several mainboard headers are now "keyed" (a selected pin has been removed) in order to conform to the Windows® 95 hardware engineering specification. Keying the headers and cables prevents attaching them backwards.

CPU Pipelining

Increases data throughput by allowing the CPU to start the next machine cycle before it finishes processing the current one. Pipelining is implemented automatically for CPUs that offer this feature.

Burst Cache Module (Synchronous)

A synchronous Level 2 cache module can transfer large packages of data consisting of a beginning address, a quantity of bytes to expect, then the data itself. The CPU transfers those bytes as a single package (a “burst”), without needing to generate any intermediate addresses.
Access Time: 7 nanoseconds.

Asynchronous Cache Module

An asynchronous Level 2 cache module can generate wait states that tell the CPU to delay transferring information until valid data is ready to be transferred to or from the Level 2 cache.
Access Time: 12 nanoseconds.

Note: If Level 2 cache is enabled in SETUP, the system determines during the POST (Power On Self Test) if a cache SIMM is present. If so, it next determines whether the system uses synchronous or asychronous cache. This test occurs each time you turn on the computer.

3. Using SETUP

The SETUP utility program allows you to customize your computer's BIOS (Basic Input/Output System), which controls features of your mainboard. You may need to use the SETUP program if you add non-Plug and Play components to your system. To run SETUP, press the <**F2**> key during system boot. Once inside SETUP, you can move within a menu by pressing the right/left arrow keys on your keyboard. Submenus are indicated by a right-pointing triangle just before a menu name. To enter a submenu, highlight the menu name, then press the <**Enter**> key.

SETUP has five menus: Main, Advanced, Security, Power, and Exit. Each menu shows current settings you can view or adjust to suit your needs. Although SETUP allows you to customize various system parameters, our technicians optimize them for your system as shipped. If you inadvertently change BIOS values that cause your system to malfunction, you can reload the original factory default settings from ROM by entering SETUP, then pressing the <**F9**> key. Otherwise, you can load the most recently saved settings from battery backed CMOS by pressing <**F10**>. Within SETUP, pressing <**F1**> toggles the General Help window, while the right-hand Help panel describes the function of the currently highlighted topic.

To change your BIOS settings, first use the arrow keys to highlight the desired topic, then press the space bar or the <**+**> or <**-**> key on the numeric keypad to rotate through the available options.

Note: only an item whose label is surrounded by [square brackets] may be changed; values not in brackets report the status of an automatic feature.

When you're finished with SETUP, press the <**Esc**> key a couple times to reach the Exit menu. There you can decide whether to keep your changes, return to the factory defaults, or use the most recently saved settings. Remember: You can always change the BIOS settings again next time you boot up by pressing the <**F2**> key.

Main Menu

Your system's BIOS settings were configured at the factory to maximize performance with the options you ordered. Generally, you need to run SETUP only if you install a new or different hard drive, if the on-board battery fails, or if you otherwise add to or change your basic hardware.

SETUP's Main Menu allows you to view and configure several basic parameters, including system time, date, and daylight savings, Diskette A and B, system memory (RAM) timing, memory shadowing, boot sequence options, and video system type.

The Main Menu lets you configure four PCI local bus IDE devices:

- IDE Adapter 0 Master (Drive letter, capacity in megabytes)
- IDE Adapter 0 Slave (Drive letter, capacity in megabytes)
- IDE Adapter 1 Master (Drive letter, capacity in megabytes)
- IDE Adapter 1 Slave (Drive letter, capacity in megabytes)

Each of the four IDE Adapter subsections lets you view and customize the settings for a separate PCI local bus IDE device attached directly to you mainboard. The subsections are described on the following pages.

SETUP's Main Menu also contains subsections for Memory Control, Memory Shadow, and Boot Sequence. Finally, System Memory and Extended Memory are displayed. At the very bottom is a chart showing how to navigate and change values in SETUP.

Main Menu Options

SystemTime

Sets the real-time clock, using a 24-hour format. During the power-up sequence, the real time is read and saved in memory for use by the operating system. After boot up, the operating system updates the system time.

System Date

Sets the real-time date for month, day, and year. During the power-up sequence, this information is read and saved in memory for use by the operating system to determine the current date. After completing the power-up sequence, the operating system updates the current date.

Daylight Savings

Adjusts system clock for daylight savings time.
Default: Enabled.

Diskette Drive A:

Specifies the size and capacity of the floppy-disk drive installed as drive A. Options: Not Installed, 360K, 720K, 1.2MB, 1.44MB, and 2.88MB.
Default: 1.44MB.

Diskette Drive B:

Specifies the size and capacity of floppy-disk drive B.
Default: Not Installed.

IDE Adapters (Four Provided)

There are four IDE Adapter subsections: IDE Adapter 0 Master, IDE Adapter 0 Slave, IDE Adapter 1 Master, IDE Adapter 1 Slave. Each has a submenu which allows you to view and change configurations of an IDE device attached to your on-board IDE Hard Drive headers, J9 and J7. The IDE Adapter subsections list the IDE devices that are currently installed. Your Primary hard drive (J9) is listed as *IDE Adapter 0 Master*. You can attach a second hard drive to the same cable as *IDE Adapter 0 Slave*, then two more devices on the Secondary connector (J7) as *IDE Adapter 1 Master*, or *IDE Adapter 1 Slave*. The following page describes the contents of each IDE Adapter subsection.

Note: If you attach two drives to a single drive cable, it doesn't matter whether or not the Master drive is connected to the end or the middle, as long as one drive is configured as Master and the other drive is configured as Slave. Also, before you add a separate hard drive, see its manual for Master/Slave configuration instructions.

Autotype Fixed Disk

Automatically detects and configures your IDE Adapter, if the attached device conforms to ANSI (American National Standards Institute) specifications. ZEOS drives are configured at the factory, so to add a hard drive you just run Autotype. If Autotype is successful, it will identify your hard drive type and display its drive parameters.

Pantera computers also are able to detect and configure ANSI-compliant IDE devices at bootup, allowing you to connect hard drives by simply turning off the computer, attaching the new device, then turning the computer on again. This usually eliminates the need to enter the SETUP program and run Autotype.

Type

Lets you select the device type from a list of presets, or manually enter the device parameters. The preset list includes types 1 to 39, excluding 15; USER (allowing you to set Cylinders, Heads, Sectors/Track and Write Precomp settings yourself using information from the device's manufacturer); or CD if you are installing an IDE CD-ROM drive.

CD-ROM Note: If you insert a CD that emulates a hard disk or a floppy diskette, the BIOS will make the CD-ROM drive the system boot drive, assigning it drive letter C:. Subsequent drives will be assigned the next available drive letter.

Note: Don't alter drive parameters unless you change or add a hard drive.

Write Precomp

Write Precompensation. In older hard drives, this setting tells the drive to apply a stronger magnetic field to inner tracks of the disk to *compensate* for magnetic drift. Your hard disk manufacturer's documentation should tell you if your drive requires this setting.
Default: *None* (Disabled).

Multi-Sector Transfer

Determines the number of sectors per block for multiple sector transfers. Options are Disabled, 2, 4, 8, 16, 32, 64, and 128 sectors. Older hard drives (and even some newer drives) will not work properly if the number of sectors is set too high. Default: Disabled.

Note: Before adding a new hard drive or formatting one from Zeos, first disable Multi-Sector Transfers, then run FDISK, then format the drive. After that, you can enable Multi-Sector Transfers again.

Prefetch (Master drives only)

Controls a hard drive feature that fetches and catches disk data bordering the last spot accessed. This "prefetched" data is can then be reached quickly by the CPU. Settings: Disabled, Enabled.
Default: Enabled.

LBA Mode Control

Controls Logical Block Addressing, which allows you to use IDE hard drives that store over 528MB. Options: Disabled, Enabled.
Default: Disabled.

32-Bit I/O

Reports 32-bit access status. Always Enabled.

Transfer Mode

Reports disk data transfer mode, determined by the Autotype utility. Settings: Standard, Fast PIO 1, Fast PIO 2, Fast PIO 3, Fast PIO 4.
Default: Determined by *Autotype*.

Pantera mainboards use a special I/O timing chip that allows each IDE device to transfer data at its top speed. This lets you run an IDE CD-ROM drive on the same data cable as a hard drive without slowing down the faster device.

Video System

Sets the video type. Options: *Monochrome*, *CGA 80 x 25* (80 column Color Graphics), or *EGA/VGA* (Enhanced/Video Graphics Adapter).
Default: EGA/VGA.

Memory Control

The Memory Control subsection lets you view and change DRAM (system RAM) Timing, enable/disable the optional L2 (Level 2) External Cache, and determine which shadowed upper memory regions (in addition to system and video) are allowed to be cached in a special superfast (7ns) 512K SRAM module.

DRAM Speed

Sets the upper limit for DRAM (system RAM) speed to 60ns or 70ns (nanoseconds). DRAM Speed must be set to match the slowest SIMM in your memory slots.
Default: 70ns.

DRAM Interleave (DRAM only--not for banks with EDO RAM)

Reports the current DRAM interleave status, determined by the BIOS.

Note: EDO RAM SIMMs do not interleave, but EDO RAM provides faster performance than interleaved banks of DRAM SIMMs without requiring matched banks of SIMMs.

Options: No Interleave, or the following Combinations:
1) Bank 0 and 1,
2) Bank 0 and 3,
3) Bank 1 and 2,
4) Bank 2 and 3,
5) Banks 0, 1 and 2, 3
6) Banks 0, 3 and 1, 2.

Memory interleaving can increase the apparent speed of memory access. By using separate memory banks for odd and even addresses, the next byte of memory can be used while the current byte is being refreshed. Pairs of identical SIMMs must be properly installed to make this feature available.

General Interleaving Restrictions:

- Interleaved banks must be 64-bits wide (e.g.: two 32-bit SIMMs)
- Each interleaved bank must contain a pair of SIMMs of the same type (single- or double-sided)

Restrictions for double-sided SIMMs:

- Combination 2 will not work unless only Banks 0 and 3 are filled
- Combination 3 will not work unless only Banks 1 and 2 are filled

EDO RAM:

- Banks populated with EDO RAM modules do not interleave

External Cache

Enables or disables the optional L2 (Level 2) External Cache. If a Level 2 cache module is present, it offers a 7-nanosecond buffer between your CPU and regular (50-70ns) system RAM. Normally L2 cache speeds up your system, but because some software has problems with L2 caching, you may (rarely) need to disable the External Cache.
Options: Enabled (default), Disabled.

Cache Memory Regions

System and Video BIOS code are always cached to boost performance. This allows you to cache other shadowed BIOS memory regions. Regions are identified by hexadecimal (Base 16) addresses.
Options: All specific regions Disabled (default), Enabled.

Memory Shadow

BIOS shadowing copies data from portions of the computer's slower ROM (Read-Only Memory) chips into much faster system RAM. This data can then be read more quickly by the CPU, so system performance improves. The Memory Shadow subsection lets you make certain regions of your upper memory (other than that reserved for basic system and video) available for BIOS shadowing.

System Shadow

System Shadow is always Enabled.

Video Shadow

Video Shadow is always Enabled.

Shadow Memory Regions

Allows additional specific ROM memory regions (other than System and Video) to be shadowed in upper RAM memory. When enabled, this ROM region will be copied to shadow RAM when you boot up. Regions are identified by hexadecimal (Base 16) addresses.
Default: All specific regions Disabled.

Boot Sequence

Configures the following bootup options:
-Boot sequence: Checks drives for an operating system in the order you choose. Options: A: then C: (default), C: then A:, C: only.
-Setup prompt: Displays SETUP entry prompt at boot; if disabled, you can still enter SETUP by pressing the <**F2**> key at bootup.
-POST Errors: If an error occurs during Power On Self Test this will offer two choices--enter SETUP <**F2**> or resume bootup <**F1**>. When disabled, system will always attempt to bootup normally.
-Floppy check: Verifies floppy drive type. Enabled (default), Disabled.
-Summary screen: Displays system configuration. Enabled (default), Disabled.
-Numlock: Auto (default), On, Off.
-Key Click: Disabled (default) or Enabled.
-Keyboard auto-repeat rate: 2, 6, 10, 13.3, 18.5, 21.8, 26.7, or 30/second. Default: 30/second.
-Keyboard auto-repeat delay: 1/4, 1/2 (default), 3/4, 1 second.

Note: The CD-ROM drive automatically becomes the boot drive if you insert a CD formatted to emulate a boot disk. The CD-ROM drive will then assume drive letter C:, and subsequent drives will get the next available drive letter.

System Memory

Reports quantity of system memory.

Extended Memory

Reports quantity of extended memory.

Advanced Menu

Warning!

Setting these items incorrectly could cause your system to malfunction. Never needlessly change from the defaults.

The Advanced Menu reports or controls the status of Integrated Peripherals, PCI Devices, Advanced Chipset Control, Plug & Play O/S, Reset Configuration Data, and Large Disk Access Mode.

Integrated Peripherals

Configures your serial and parallel ports, as well as your on-board floppy disk controller, and your on-board IDE controller. The following list describes each of these parameters.

1st COM Port

When 1st COM Port is set to *Auto*, the system will automatically set the interrupt and IRQ for that port. Otherwise this option allows you to choose (from a list) the I/O address and IRQ of the 9-pin serial port. Default: Auto.

2nd COM Port

When 2nd COM Port is set to *Auto*, the system will automatically set the interrupt and IRQ for that port. Otherwise this option allows you to choose (from a list) the I/O address and IRQ of the 25-pin serial port. Default: Auto.

LPT Port

Sets the parallel port designation. This allows you to specify the parallel port address and IRQ, which otherwise are factory set.
Default: Auto.

LPT Mode

Allows you to set the parallel port communication mode to match the capabilities of your parallel port device.
Settings: Output Only, Bidirectional or ECP.
Default: Output Only.

Diskette Controller

Enables or disables the on-board floppy diskette controller.
Default: Enabled.

Local Bus IDE Adapter

Configures the on-board Local Bus IDE controller, which controls up to four PCI local bus devices.
Settings: Disabled, Primary, Secondary, Both.
Default: Both.

PCI Devices

The PCI (Peripheral Component Interconnect) Devices submenu allows you to enable or disable the integrated SCSI and LAN options.

PCI SCSI Device

Enables/disables the built-in SCSI port, if present.
Default: Disabled.

PCI Ethernet Device

Enables/disables the on-board AMD Ethernet controller, if present.
Default: Disabled.

BIOS Enable Bus Master

Determines whether the BIOS will permit bus mastering for devices in each of the three PCI expansion slots (#3, #4, and #5). Bus mastering lets a device control its own data transfers to system memory, freeing the CPU for other work. Normally, the peripheral device's own software will enable bus mastering, but certain nonstandard software may depend on the BIOS to enable this feature.
Options for PCI Devices, Slot #3, #4, #5: Disabled, Enabled.
Default: all Disabled.

Plug & Play O/S

Enables/disables Plug & Play hardware features for operating systems that can use them, like Windows® 95. A Plug & Play system automatically allocates system resources (IRQs, I/O addresses, and DMA channels) for PCI or ISA expansion cards that implement Plug & Play. However, a Plug & Play system cannot sense which resources are used by most older ISA cards, although it can sometimes guess correctly by using its database of typical settings. Before you install a non-Plug & Play ISA card, you must run the ICU (ISA Configuration Utility) to inform your system which resources each ISA device will use (this information should be located in your ISA device's manual). Then Plug & Play can allocate the remaining resources automatically.
Options: No, Yes.
Default: No.

Reset Configuration Data

Reloads the previously saved Plug & Play configuration settings.
Options: No, Yes.
Default: No.

Large Disk Access Mode

Lets you set your system to expect a large DOS hard disk, or some Other type of hard disk, such as expected by UNIX or Novell Netware.
Default: DOS.

OS Support for More Than 64MB

If your system has more than 64MB of RAM and you are running OS/2, Windows® NT, Windows® 95 or some other operating system that supports over 64MB, then you should enable this feature.

When enabled, interrupt 15 function 88h only reports 16MB of RAM if MORE than 64MB is installed. This is used by OS/2 and Windows® NT to recognize more than 64MB. These operating systems use Int. 15 function E001h to size the memory installed. These OS's require Int. 15 function 88h to behave as described above when more than 64MB of RAM is installed.
Options: Disabled, Enabled.
Default: Disabled.

Note: DOS currently does not support more than 64MB of RAM.

Security Options

The Security Menu allows you to password-protect system access, a way of safeguarding information. When passwords are enabled, users must type the proper password to access the protected part of the system.

Note: 1. It's easy to forget a password, so we strongly recommend writing down your passwords and storing them in a secure place.

2. If you type the User password on entering SETUP, you cannot change the Supervisor Password or Diskette Access settings.

Warning!

If you forget the password, your system will not operate and you will need to contact Technical Support for service. Write down your password and store it in a safe place.

The following security items are available:

- Set Supervisor Password
- Set User Password
- Password on Boot
- Diskette Access
- Fixed disk boot sector
- System Backup Reminder
- Virus Check Reminder

Supervisor Password is

Allows you to enter a system supervisor password. This password controls access to all features of your system.

User Password is

Accessible only after Supervisor Password is enabled, this allows you to enter a system user password. You can't use the User Password to alter the Supervisor Password in SETUP.

Password on boot

When enabled, the system asks you for a password on boot. The system will boot only after the correct supervisor or user password is entered.
Default: *Disabled*.

Diskette access

Specifies the password (Supervisor or User) required at bootup to use floppy disk drives, thus preventing unauthorized data transfers. This feature is active only when a Supervisor password is enabled.
Default: *Supervisor*.

Caution:

If you set a Supervisor password, then set Diskette Access to ***Supervisor****, all diskette drive access will be denied, including system diskettes. To avoid this, enable Password on Boot.*

Fixed disk boot sector

When enabled, this write protects the boot sector on your hard drive to protect it from boot-sector viruses.
Default: *Disabled*.

System backup reminder

When enabled, this periodically displays a boot reminder message to back up your system. Options: Daily, Weekly, Monthly, Disabled.
Default: *Disabled*.

Virus check reminder

When enabled, this periodically displays a boot reminder message to scan for viruses. Options: Daily, Weekly, Monthly, Disabled.
Default: *Disabled*.

Power Options

When your machine sits idle, it's wasting energy and costing you money. You can conserve your precious resources by telling your system to "go to sleep" when it's not active. Pantera's *Standby* and *Suspend* modes offer increasing savings, while letting you resume work in moments. Choose a Power Savings Preset, or try your own settings in *Customize* mode.

APM (Automatic Power Management)

Controls the BIOS's Automatic Power Management (APM) functions, which let each application program manage power consumption.
Options: Enabled (default), Disabled.

Power Management Mode

Activates a special system timer, then tells it when to cut power to your CPU, hard drive, and monitor. Depending on the Mode, you can control several aspects of power management, or let the system handle it automatically by choosing one of three **Preset Configurations**.
Settings: *Disabled* (certain games may require turning off savings).
Customize (default): Lets you manually adjust all the timeouts and speed settings.
Maximum, *Medium*, and *Minimum:* These are **Preset Configurations** that control the following items (see table, next page):

- Standby Timeout --how long your system waits before it enters Standby mode. Standby saves some power, and revives quickly.
- Suspend Timeout --how long your system waits in Standby before entering Suspend mode. Suspend saves more energy, but it takes a little longer to revive.
- Standby CPU Speed --percentage of time your CPU runs during Standby. Options: Maximum, 50%, 25%, 12%, 6%, 3%, 8MHz, and Slowest. Default: 25%.
- Fixed Disk Timeout --how long your system waits before stopping the hard disk motor. Settings available in Customize.
- CRT Standby --puts the monitor in low-power mode during Standby. Options: Disabled (default), Enabled.

Power Savings--Preset Configurations

Feature	Max. Savings	Med. Savings	Min. Savings
Standby Timeout	8 sec	10 min	5 hr
Suspend Timeout	8 sec	30 min	5 hr
Standby CPU Speed	8 MHz	3 percent	50 percent
Fixed Disk Timeout	1 min	8 min	16 min
CRT Standby	Enabled	Disabled	Disabled

Parallel Port Activity

Allows a printer or another parallel port device to reset the system timer or revive your computer from Standby or Suspend.

Options: Enabled (default), Disabled.

Serial Port Activity

Allows a mouse or another serial port device to reset the system timer or revive your computer from Standby or Suspend.

Options: Enabled (default), Disabled.

IRQn

Allows activity at a specific IRQn (n = 0 through 15) to reset the system timer or revive the system from Standby or Suspend. This lets your fax-modem or another peripheral device revive your computer while you're away.

Options: Disabled, Enabled.

Default: IRQ 1-15 Enabled, IRQ 0 Disabled.

Exit Menu Options

Offers Exit and Save options for the SETUP program.
Options: Save Changes & Exit, Discard Changes & Exit, Get Default Values, Load Previous Values, Save Changes.

Changes to the SETUP's BIOS settings are stored in CMOS (Complimentary Metal-Oxide Semiconductor) memory, a memory area maintained by power from the on-board battery.

4. Expanding Your System

Adding an Expansion Board

The five ISA and three PCI expansion slots on your mainboard are designed to accept a wide variety of add-on cards (many available from ZEOS). Scanners, tape backup units, video capture devices, and many other devices come on expansion cards, which communicate with the CPU via standard expansion slots. Often, adding these components is as easy as opening the case, slipping the new card into an empty slot, then connecting the external component (if there is one) to the card.

To add an expansion board:

1. Turn off the monitor and system unit power, then unplug the AC power cords from the wall outlet.

2. Open the system unit case (see *How to Open a Desktop Case*, earlier).

3. Find an empty expansion slot or, if you are replacing an expansion card already in your system (such as when upgrading your video card), locate the old card.

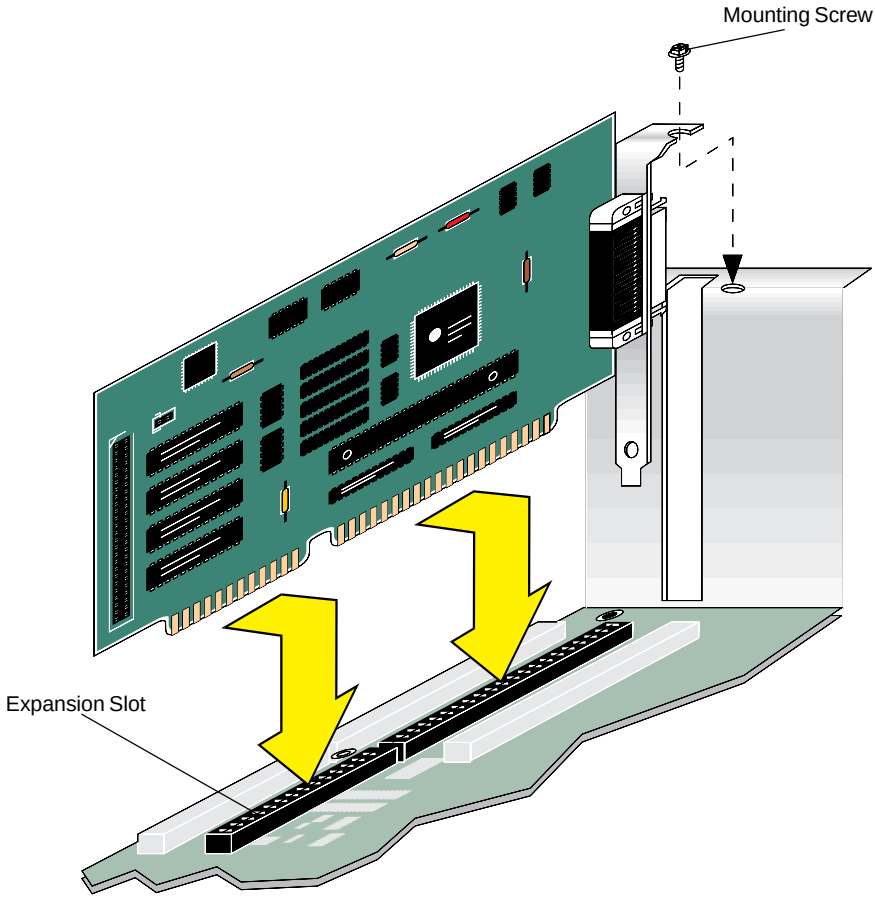
4. Unscrew the mounting screw and remove the blank bracket by sliding it up. If you are removing an old expansion card, carefully lift it straight up (sometimes you have to wiggle it a little).

5. Set any jumpers or switches on the new card. See the card's documentation for the correct jumper settings.

6. Slide the new card into the slot. Press down firmly, so the edge connector slides completely into the slot.

7. Tighten the mounting screw.

(more steps, next page)



8. Connect any internal cables to the expansion card.

9. Close the computer case, and turn on the power.

Many expansion cards require you to run diagnostic or installation software before the new board will work properly. Your expansion card's installation manual should have detailed instructions.

How Disk Drives Work

There are three main types of disks for storing files - floppy, hard, and compact disks.

Floppy disks are small, relatively slow, portable disks. Most people use floppy disks to transfer files or install new programs onto their hard drives. Floppy disks fit into the floppy disk drives mounted in your system unit. Although there are some combination drives, most floppy disk drives are designed to hold only one size of disk.

Hard, or fixed disks, are permanently mounted inside your system unit case. They are very fast, hold a lot of files, and are not removable without disassembling your system.

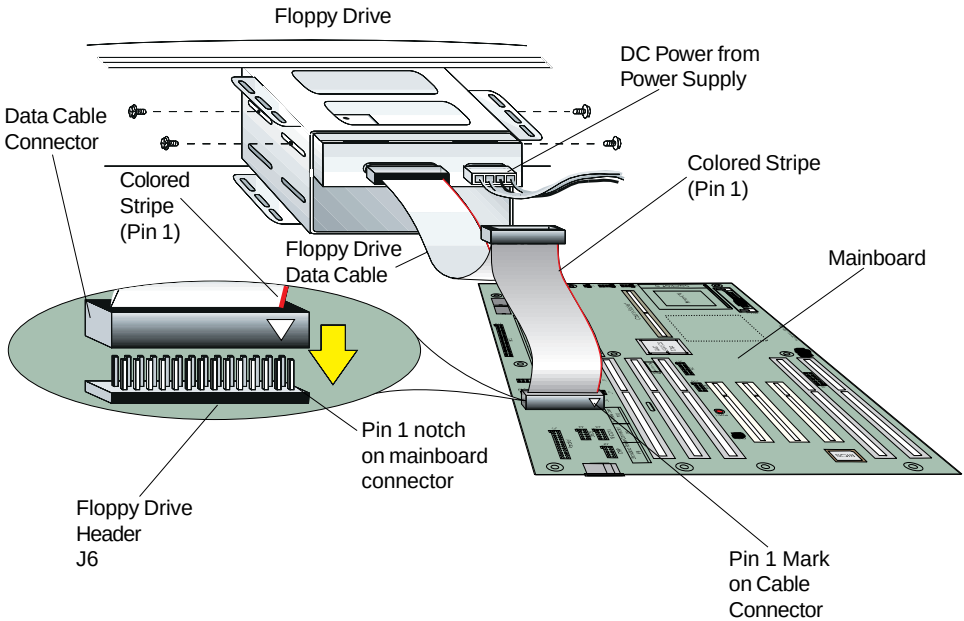
Compact disks fit into CD-ROM drives. Compact disks can store very large amounts of information.

Floppy, hard, and CD-ROM disk drives all fit into the drive bays in your system unit. This chapter shows how some of the most common drives connect to the mainboard. Most drives have two connections - a power connection and a data connection. For detailed installation and configuration information, always check the disk drive's documentation.

How a Floppy Drive Works

Floppy drives have two cables--a ribbon-type data cable between the floppy drive and its mainboard header, and a power cable that leads to the power supply. The data cable joins the back of the floppy drive with the floppy drive header J6 on the mainboard. Data ribbon cables often have two connectors, allowing up to two floppy drives to share the same ribbon cable.

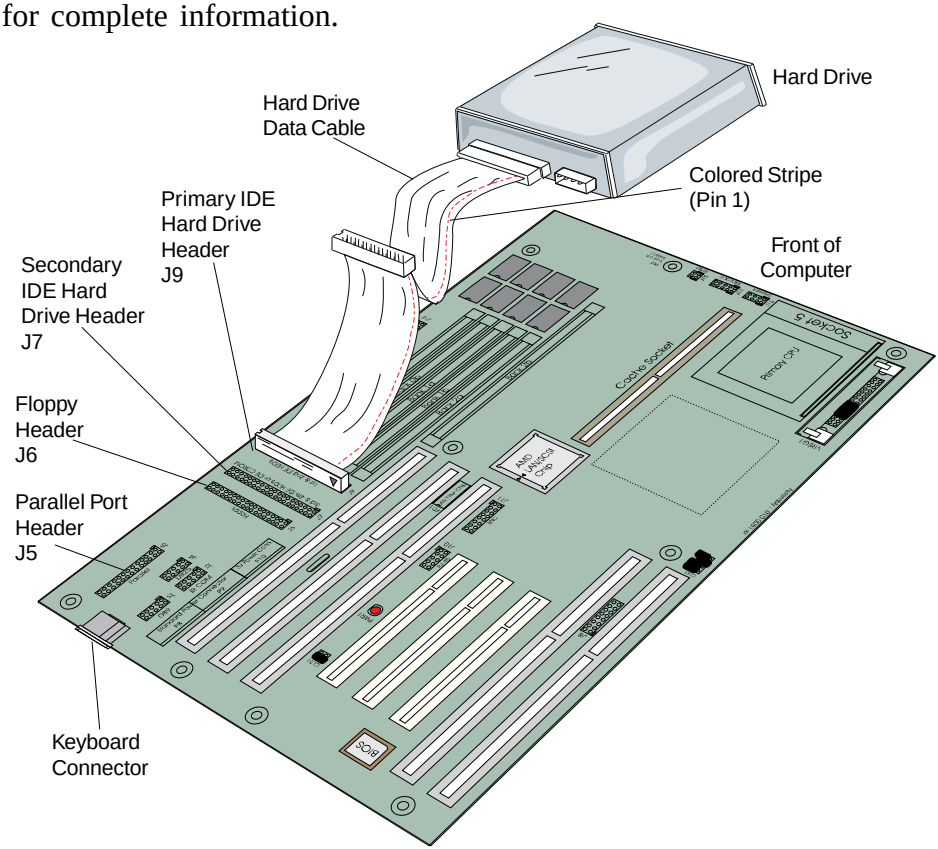
The data cable also has a colored stripe to help you orient the connector. Always attach a cable connector so the colored stripe is nearest Pin 1 of the mainboard connector. Pin 1 is often labelled with a small triangle or filled in corner.



How an IDE Hard Drive Works

IDE (Integrated Drive Electronics) hard drives are the most likely drives to be installed on your system. IDE devices have most of the electronics or "smarts" built into the drive, rather than installed on a separate controller card or on the motherboard. IDE hard drives have two main connectors – a ribbon cable called the data cable and a power connection to the power supply. The ribbon cable plugs into the back of the hard drive, then joins it to one of the mainboard's two IDE headers. Drives 1 & 2 use header J9 (primary); drives 3 & 4 use J7 (secondary). Always attach the ribbon cable so the colored stripe is nearest Pin 1 on the mainboard header.

Most drives also have configuration jumpers at the back of the drive for setting drive identification and resistors. See your hard drive user's guide for complete information.



How a CD-ROM Drive Works

CD-ROM drives read information from compact discs, or CDs. The "ROM" in CD-ROM stands for Read Only Memory. Compact discs are *read-only*--you can read information from them, but you can't add new information to them as you can with a floppy disk or hard disk. Despite their limitations, CDs have some distinct advantages. CDs can store large amounts of information--one compact disk can store as much information as 500 floppy disks. With the right software, you can even listen to music on your CD-ROM drive.

There are several types of CD-ROM drives. Most have three primary connectors: a power connector, a data cable connector, and an audio connector.

The power connector is the same kind of DC power connector used by floppy drives and hard disk drives. It accepts DC power from the computer's internal power supply. It doesn't matter which power connector goes to which drive--they're interchangeable.

The data cable is a flat ribbon cable that connects the drive with some type of controller. Your IDE CD-ROM drive connects to the IDE header on the mainboard (J7 or J9) or (with certain models) to an IDE controller card inserted into one of the ISA expansion slots. Some drives can use a CD-ROM header mounted on a sound card.

Most CD-ROM drives also have an audio connector for headphones or computer speakers. If your system has a sound card and speakers installed, the CD-ROM drive's audio connector probably can be connected to the sound card.

A CD-ROM drive can also be used as a boot drive by your Pantera. If you insert a CD that emulates either a hard disk or a floppy disk, the BIOS will recognize it as the boot device, assigning it drive letter C. Subsequent drives will be assigned the next available drive letter.

Adding System RAM

System memory is often called RAM or Random Access Memory. RAM is the "thinking space" available to your applications. Usually, the more system RAM you have, the faster your system will run. Many software applications run much faster when more RAM is available.

You add RAM by inserting Single In-line Memory Modules (SIMMs) into SIMM sockets on the mainboard. Your computer's mainboard will hold up to six SIMMs of 32-bit DRAM. Slots must be filled in sequence from 0A to 2B. You must have identical pairs of SIMMs in each bank, but different banks can support various capacities and speeds. The Pantera mainboard can support up to 384MB of RAM.

*Note: SIMMs MUST ALWAYS BE INSTALLED IN SEQUENCE FROM BANK 0A TO BANK 2B, AND **WITHIN THE SAME BANK, THEY MUST BE THE SAME SPEEDS AND CAPACITIES.***

***RAM Configurations**

Memory Size	SIMMs Used	Memory Scheme
2MB	two 1MB	Page
4MB	two 2MB	Page/Interleaved
8MB	two 4MB	Page/Interleaved
10MB	two 4MB, two 1MB	Page/Interleaved
12MB	six 2MB	Page/Interleaved
16MB	four 4MB	Page/Interleaved
24MB	six 4MB	Page/Interleaved
32MB	four 8MB	Page/Interleaved
64MB	four 16MB	Page/Interleaved
128MB	four 32MB	Page/Interleaved
256MB	four 64MB	Page/Interleaved
384MB	six 64MB	Page/Interleaved

Note: This is just a small sample of the many possible RAM configurations.

Installing SIMMs

When installing SIMMs, use 70ns or faster memory chips for maximum system performance. Different speed SIMMs may be mixed, but only if you put them different banks. In addition, always set the CPU/DRAM Speed option in SETUP to match the slowest SIMM. Note that with SIMMs, larger numbers mean that more time is used to access information (a 70ns SIMM is slower than a 60ns SIMM). For best results, use SIMMs from the same manufacturer.

Caution:

Static electric shocks can permanently damage your equipment. Always ground yourself by touching the metal part of the computer case before beginning the following procedure. We strongly recommend using an antistatic wrist strap attached to the case ground.

To Install SIMMs:

1. Remove system cover (see *How to Open a Desktop Case*, earlier).

2. Remove any SIMMs you are replacing with new SIMMs by gently pulling the metal socket clips away from the SIMM to release the SIMM from the socket. Hold them out while you are tilting the SIMM away from the metal clips. Carefully lift the SIMM up and out.

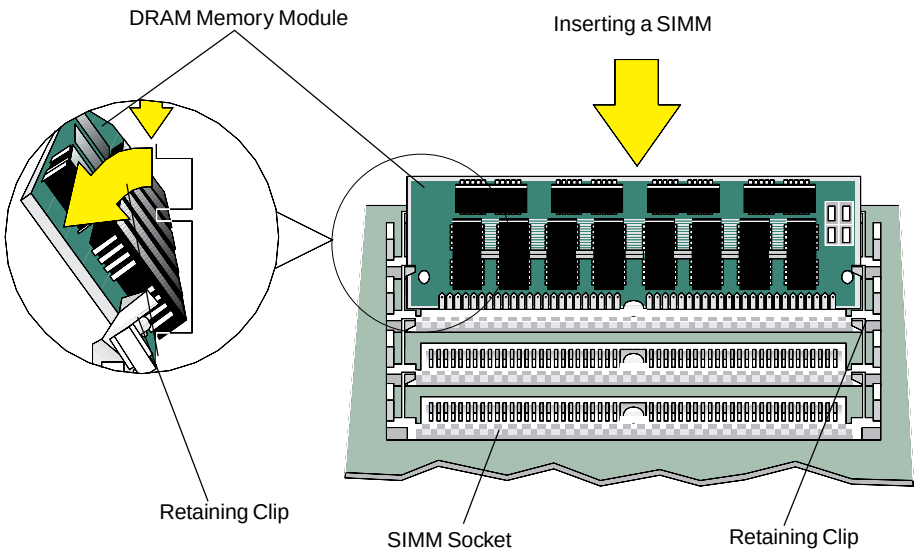
   Caution:

   Never use force to remove the module out of the socket. Failure to properly release the retainer clips may break the socket, causing expensive damage which is not covered by your warranty.

3. Grasping a new SIMM by the edge, remove it from the antistatic bag.

4. Insert the bottom edge into the socket slot. Press down firmly on the SIMM while maintaining the proper angle of insertion.

(more steps, next page)



5. Ensure the SIMM seats correctly. If not, remove and repeat Step 4.

6. Gently push the top edge toward the retainer clips until the clips snap into place.

7. Reinstall system cover.

After completing the installation, your ROM BIOS will determine the amount of memory installed; however you may need to change the CPU/ DRAM Speed option in your system SETUP program. Refer to *Using SETUP* earlier for detailed instructions.

Adding System Cache Memory

Secondary cache memory can speed up memory intensive applications and greatly enhance your CPU's performance.

You add Level 2 cache memory by adding a 64-bit Single In-line Memory Module (SIMM) into the secondary system Cache Socket on the mainboard. This optional SIMM has an access time of 7 nanoseconds.

Caution:

*You must use a **3-Volt** SIMM when you add cache memory. If you aren't sure, contact ZEOS Technical Support before purchasing or installing a cache SIMM.*

Note: System cache SIMMs are not the same as RAM memory SIMMs. Do not try to install cache SIMMs in your RAM memory sockets, or RAM SIMMs in your cache SIMM socket.

Although installing secondary cache memory is easy and straightforward, a few simple precautions will ease the installation. Before you begin, make note of your system's current SETUP parameters. You can access the SETUP screen by pressing **F2** at boot. Copy the SETUP parameters to a piece of paper.

Also, all SIMMs are extremely sensitive to static electricity. Be sure to use an antistatic wrist band and ground yourself by touching the computer case before you touch the mainboard or handle any chips.

To install secondary cache memory:

1. Turn off the system power and unplug the AC power cord. Remove system cover (see *Opening the Case*, earlier).
2. Locate the secondary system "Cache Socket." The figure opposite shows the socket's location on the mainboard.
3. If you are upgrading your system cache memory, remove the SIMM you are replacing by gently pulling it out of the socket.

(More steps, next page)

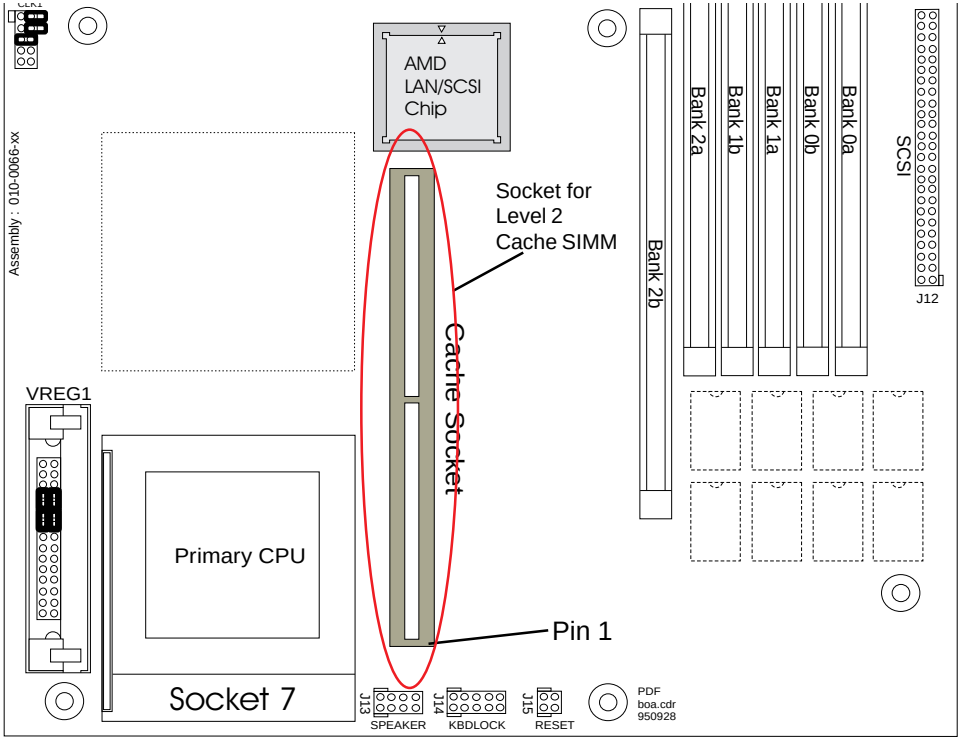
4. Grasping a new SIMM by the edge, remove it from the antistatic bag, find Pin 1 on the SIMM, align it with the socket's Pin 1, then press it into the socket.

Caution:

Static RAM is extremely sensitive to static electricity. These shocks can permanently damage your equipment. Use an antistatic wrist strap attached to cabinet ground. Be sure to ground yourself by touching the system cabinet before beginning this procedure.

5. Reinstall system cover, plug in AC power, and turn on the computer as you normally would.

6. Make sure the External Cache option on the Memory Control Menu of the Advanced System Setup Menu is Enabled. Also, check your system SETUP to be sure it hasn't changed. If any settings have changed, reenter the correct values, then reboot.



Installing a New CPU

Caution:

Static electricity can permanently destroy your CPU. Always ground yourself by touching the system cabinet before beginning the following procedure. We strongly recommend using an antistatic wrist strap attached to cabinet ground.

To install a new CPU:

1. Open the case and locate the CPU socket on the mainboard. If you need help see *How to Open a Desktop Case* and *Mainboard Diagram*, earlier.

2. Lift up the ZIF (Zero Insertion Force) socket arm to the open position. This will loosen the pressure on the pins of the old CPU chip. Carefully lift the old CPU and heat sink out of the socket.

3. Important: You must align the new CPU over the socket on the board ***exactly like the old CPU*****. Make absolutely sure the Pin 1 notch on the CPU chip aligns with Pin 1 on the ZIF socket.**

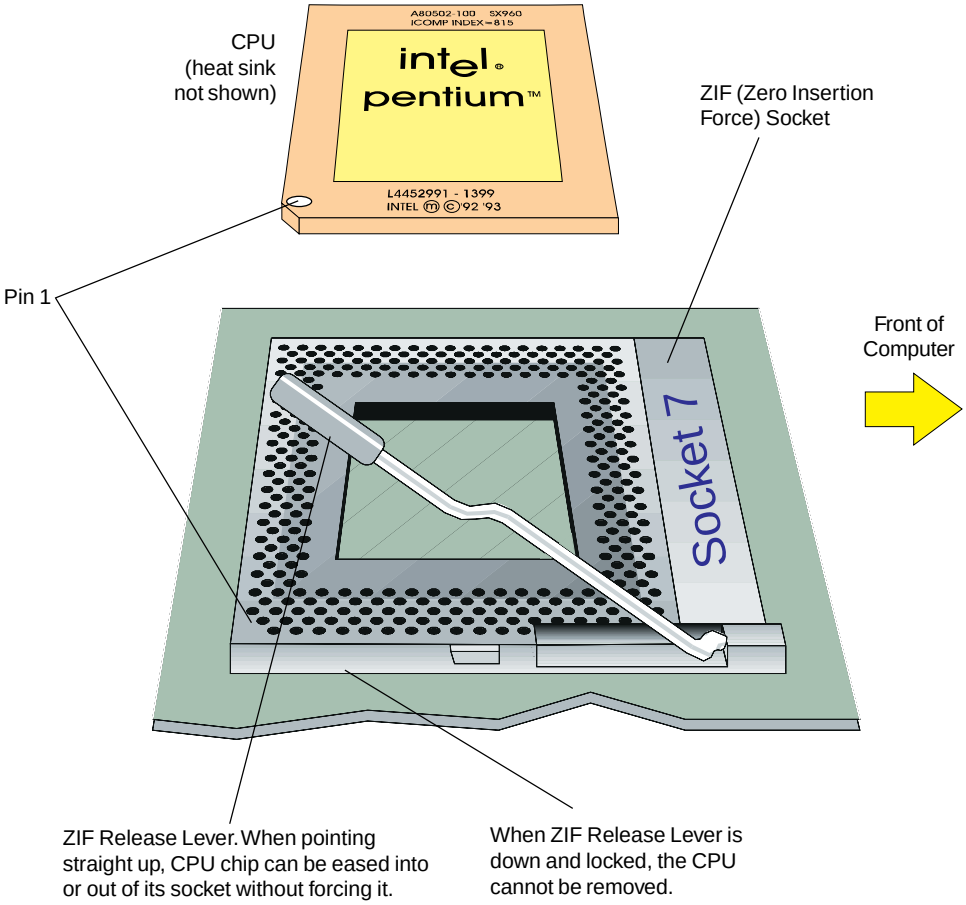
4. Place the new CPU into the socket and press gently. Be careful not to bend any pins on the CPU. Once the CPU is firmly seated in the socket, carefully lower the ZIF arm back down to the closed position.

5. Attach the heat sink to the new CPU. If your new CPU is exactly the same size as your old CPU, you can reuse your old heat sink. If your new CPU is not the same size as your old one, you must use the heat sink supplied with your new CPU. If your heat sink is a peel and stick type, peel off the adhesive layer and stick the heat sink onto the new CPU. If your heat sink uses a retaining clip, place the heat sink on the chip, then slide the retaining clip over the heat sink until it snaps onto the sides of the CPU.

(More steps, next page)

6. Set the CLK1 jumper to match the speed of your new CPU. If you need help with this jumper, see *Mainboard Jumpers Diagram*, earlier.

7. Close case and boot as you normally would.



5. Mainboard Specifications

CPU	Intel Pentium (P54C)
Power consumption	Approx. 25Watts (varies with CPU, memory)
Power Supply	200 Watts standard
Clock speeds	75, 90, 100, 120, 133, 150MHz
Chipset	VLSI "Wildcat"
ISA bus speed	7.5 MHz for 90MHz system 8.25 MHz for 100 MHz systems
I/O transfer rate	Up to 33MB/s
PCI local bus speed	Up to 132MB/s (100Mhz) Up to 120MB/s (90Mhz)
Memory capacity (min.)	2MB via SIMMs
Memory capacity (max.)	384MB
Memory types	EDO RAM: 1, 2, 4, 16, 32MB x36 or x32 SIMMs
Memory speeds	60, 70ns
Memory configurations	Various (See *RAM Configurations*, Chapter 4)
Data path	8, 16, 32, 64-bits
Expansion slots (8)	Five 16-bit ISA Three 32-bit PCI local bus
Secondary cache mapping	Direct-mapped
Secondary cache write policy	Write-back L1, Write-thru L2
Secondary cache capacity	0KB (standard), 512KB
Secondary cache type	One SIMM, Pipelined Burst Syncronnous
Secondary cache speed	7ns

Mainboard Environmental Specifications

Operating Temperature	0°C to 40°C
Storage Temperature	-20°C to 60°C
Operating Humidity	Up to 100% non-condensing

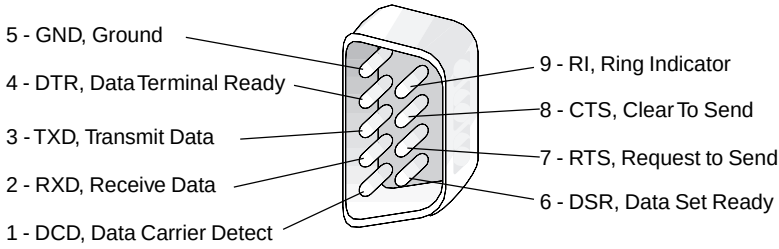
9-Pin Serial Port (J2) Pin Assignment

Header Pin Number	DB9 Connector Pin Number	Signal
1	1	DCD, Data Carrier Detect
2	6	DSR, Data Set Ready
3	2	RXD, Receive Data
4	7	RTS, Request to Send
5	3	TXD, Transmit Data
6	8	CTS, Clear To Send
7	4	DTR, Data Terminal Ready
8	9	RI, Ring Indicator
9	5	GND, Ground

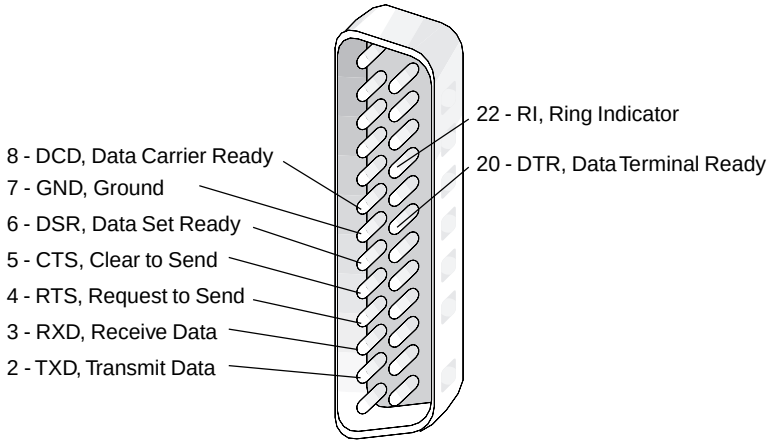
25-Pin Serial Port (J3) Pin Assignment

Header Pin Number	DB25 Connector Pin Number	Signal
1	8	DCD, Data Carrier Detect
2	3	RXD, Receive Data
3	2	TXD, Transmit Data
4	20	DTR, Data Terminal Ready
5	7	GND, Ground
6	6	DSR, Data Set Ready
7	4	RTS, Request to Send
8	5	CTS, Clear to Send
9	22	RI, Ring Indicator

9-Pin Serial Port (J2) Pin Assignment



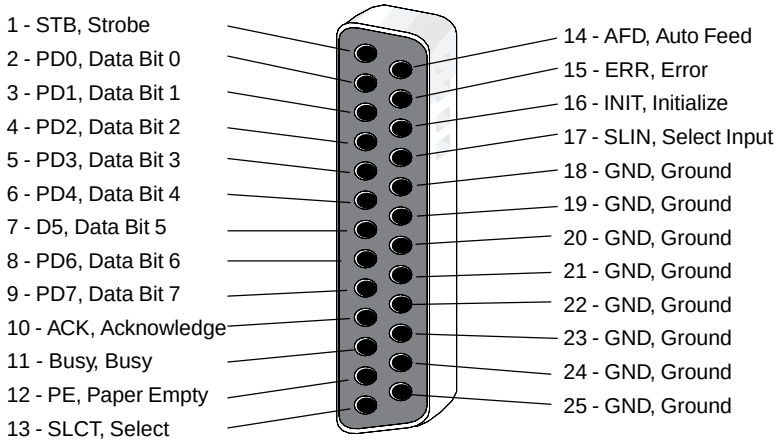
25-Pin Serial Port (J3) Pin Assignment



Parallel Port (J4) Pin Assignment

Header Pin Number	Parallel Port Connector Pin Number	Signal
1	1	STB, Strobe
3	2	PD0, Data Bit 0
5	3	PD1, Data Bit 1
7	4	PD2, Data Bit 2
9	5	PD3, Data Bit 3
11	6	PD4, Data Bit 4
13	7	PD5, Data Bit 5
15	8	PD6, Data Bit 6
17	9	PD7, Data Bit 7
19	10	ACK, Acknowledge
21	11	Busy, Busy
23	12	PE, Paper Empty
25	13	SLCT, Select
2	14	AFD, Auto Feed
4	15	ERR, Error
6	16	INIT, Initialize
8	17	SLIN, Select Input
10	18	GND, Ground
12	19	GND, Ground
14	20	GND, Ground
16	21	GND, Ground
18	22	GND, Ground
20	23	GND, Ground
22	24	GND, Ground
24	25	GND, Ground

Parallel Port (J4) Pin Assignment



Handy Cheat Sheet

Here are some of the most often needed or forgotten notes.

CTRL-ALT-DEL ..... Warm Reboot
Reset button, or
Power button ..... Cold Reboot
F2 during power up ..... Access SETUP
CTRL-BREAK, or
CTRL-C ..... Pause or Break an application or batch file

DOS Commands

COPY [filename] [drive:][path][newfilename]..... copies a file
FORMAT [drive:]..... erases and formats a disk
DIR [drive:][path] ..... lists the files in a certain drive and directory
DEL [filename] ..... deletes a file
MD[newdirectory]..... makes a new directory
RD[directoryname] ..... removes and erases an empty, old directory
RENAME [oldfilename][newfilename]..... renames a file
CHKDSK [drive:]..... displays a status report for a disk
CD[path] ..... changes to a different directory
CLS ..... clears the screen

Common DOS file extensions

.BAK backup file
.BAT ..... batch file
.COM ..... command program file
.EXE ..... executable program file
.SYS ..... system file
.INI ..... Windows initialization file
.PIF ..... Windows program information file

README files ..... text files with special instructions

Handy Cheat Sheet

Windows® Shortcuts

Ctrl-C ..... copy to clipboard
Ctrl-V ..... paste or copy from the clipboard
Ctrl-X ..... delete and copy to clipboard
Alt-Tab ..... toggle between open applications
Alt-Esc ..... jump to next open application

Wildcards - wildcards are special characters that can represent any other valid numbers, letters, or symbols in a file name.

* The asterisk represents any number of other characters. For example:

*.BAK would represent any file with the extension BAK.

GONOW.* would represent all files named GONOW with any extension.

? The question mark represents one single character. For example:

GONOW.?XE would represent any file named GONOW with an extension ending in XE.

?ONOW.EX? would represent any five character filename ending in ONOW with EX as the first two characters of its extension.

Glossary

This glossary provides general definitions of key terms. For an expanded list look in standard reference books on computers.

Address - A number or expression representing the physical location of a device or a piece of data.

APM - Automatic Power Management. A set of features designed to minimize power consumption.

Application Program - A word processor, spreadsheet, desktop publisher or other program that allows interaction with the user.

AUTOEXEC.BAT File - An MS-DOS batch file containing commands which execute automatically when you turn on your computer.

Batch File - A file containing several commands that execute in sequence as a group, or batch. MS-DOS batch files must have a filename extension of .BAT.

Boot - Short for Bootstrap. Transfer of a disk operating system program from storage on floppy disk or hard disk drive to computer's working memory.

Boot Disk - A disk with an operating system installed which loads the system on power up.

Character - Anything that can print in a single space on the page or the screen. Includes numbers, letters, punctuation marks, and graphic symbols.

Command Processor - The part of an operating system that processes commands entered by you. The command processor in MS-DOS is contained in the COMMAND.COM file.

CPU - Central Processing Unit. The piece of hardware which interprets instructions, performs the tasks you indicate, keeps track of stored data, and controls all input and output operations.

Crash - A malfunction in the computer hardware or software, usually causing loss of data.

Cursor - The arrow, vertical I-beam or other screen object that shows where you can click to select something onscreen. See Insertion point.

Diagnostics - The tests and procedures the computer performs to check its internal circuitry and set up its configuration. See POST.

DIP Switches - Small switches on a piece of hardware such as a CPU, a printer, or an option card. DIP switch settings control various functions and provide a system with information about itself. DIP stands for Dual In-Line Package.

Directory - A list of the files stored on a disk or a part of a disk. Often depicted onscreen by a small folder.

Disk Drive - The physical device which allows the computer to read from and write to a disk. A floppy disk drive has a disk slot into which you insert floppy disks. A hard disk drive is permanently fixed inside the system unit.

DMA - Direct Memory Access. A DMAcontroller transfers data directly from a hard drive, LAN adapter or other device to/from system RAM, freeing the CPU for more important work.

DOS - Disk Operating System. A computer program which continuously runs and mediates between the computer user and the Application Program, and allows access to disk data by disk filenames. The Disk Operating System controls the computer's input and output functions. See Operating System.

ECP - Extended Capabilities Port. Features an asynchronous, byte-wide, bidirectional data flow. Can distinguish between commands and data.

EDO - Extended Data Out. A type of RAM that provides much faster memory access than conventional DRAM, without interleaving.

EPP - Enhanced Parallel Port. Features an asynchronous, byte-wide, bidirectional channel, plus separate address and data cycles over eight data lines.

File - A group of related pieces of information called records, or entries, stored together on disk. Text files consist of words and sentences. Program files consist of codes and are used by computers to interpret and carry out instructions.

Floppy disk - a flat piece of flexible plastic coated with magnetic material and used to store data permanently.

Format - To prepare a new disk (or erase an old one) so it can receive information. Formatting a disk divides it into tracks and sectors which create addressable locations on it.

Hard Disk Drive - Commonly called rigid disk drives, or fixed disk drives. Unlike floppy disks, hard disks are fixed in place inside the system unit. They can process data faster and store many more files than floppy disks.

Glossary

Hardware - Any physical component of a computer system, such as a monitor, printer, keyboard, or CPU.

IDE - Integrated Drive Electronics. An IDE drive has the controller electronics built into the drive itself and is connected directly to the mainboard or to an adapter card.

IEEE - Institute of Electrical and Electronic Engineers. Engineers, scientists and students in electronics and related disciplines. Sets technical standards for computers and communications.

Insertion Point - A blinking vertical marker which shows where you can type words or numbers. Sometimes called Text Cursor. See Cursor.

Jumper - A small electrical connector that alters some of the computer's functions. Short (makes a connection) or Non-Short (no connection).

Kilobyte (KB) - A unit used to measure storage space (in a computer's memory or on a disk). One kilobyte equals 1024 bytes.

LED - Light Emitting Diode. A diode that illuminates when electricity passes through it, like the indicator lights on the front panel of the computer.

Local Bus - A set of addresses, data, and control signals that interface directly with the host CPU.
Mainboard - also *Motherboard.* A printed circuit board into which other circuit boards can be plugged. Usually, it contains the CPU, connectors for memory (SIMMs), secondary cache, adapter sockets and expansion slots for add-on devices.

Memory - Computer chips that make data quickly available to the CPU. They can store data permanently (ROM) or temporarily (RAM).

MHz - 1 Megahertz = one million (*Mega*) cycles per second (*Hertz*).

Operating System - A body of programs, such as MS-DOS, that coordinate the activities of a computer. It determines how programs run and supervises all input and output.

PCI - Peripheral Component Interconnect. PCI is an industry standard for local bus peripheral expansion.

Parallel Port - also *Printer Port.* A 25-pin Input/Output connector usually used for printers.

Peripheral - A device (such as, a printer or a modem) connected to a computer that depends on the computer for its operation.

Port - A physical input/output socket on a computer where you can connect a peripheral.

POST - Power-On Self Test. An initial diagnostic test a computer performs to check its hardware.

RAM - also *DRAM.* Random Access Memory. Small chips or modules that provide the CPU rapid access to data. Software programs and files reside in RAM while being used. RAM is called *volatile* memory because it "evaporates" when you turn off the power.

Read - To copy data from one area to another. For example, when you open a text file stored on disk, the computer reads the data from the disk and displays it on the screen.

Reset - To reload a computer's operating system so you can retry a task or begin using a different operating system. Resetting clears RAM.

ROM - Read Only Memory. A portion of memory that can only be read and cannot be used for temporary storage. ROM retains its contents even when you turn off the power.

SETUP - This refers (usually) to the program that is used to load the CMOS data base with input from the user. SETUP sets the date, time, and configuration of disk drives installed on the system.

Software - The programs that enable your computer to perform the tasks and functions you indicate. Application programs are software.

SRAM - Static RAM. Memory chips that do not require refresh circuitry, as do conventional RAM chips. SRAMs operate in the 10-30 nanosecond range, which is faster than RAM chips. SRAM is often used as a buffer between fast CPUs and RAM.

Subdirectory - A directory within another directory.

System Disk - A disk that contains the operating system. A Boot Disk.

Write - To store data on a disk.

Write-Protect - To prevent a floppy disk from being overwritten by placing a write-protect tab over the notch on the side of the floppy disk (5.25") or setting the write-protect switch (3.5"). When a floppy disk is write-protected, you cannot erase, change, or record over its contents.

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Late Changes

The following changes arrived too late for printing.

Inside front cover: new part number at bottom.
Outside back cover: new part number.
p.2: Under "Trademark Acknowledgements" new clause announces that Windows® is now a registered trademark. New part number.
p.4-5: Updated Table of Contents.
p.7: Added a caution about lithium batteries.
p.25: Updated Mainboard Features. Added 200Watt power supply.
p.26: Secondary Cache Subsystem paragraph updated. 'Continuous Full-Speed Processing' changed to 'Keyboard Activated Turbo Mode,' plus paragraph updated. Also added a paragraph on the new Replacement Battery Connector.
p.34: Jumper Settingsnow show 150MHz.
p.36: New CLK1 clock jumper table.
p.37: Updated "Burst Cache Module" section. Made a note of BIOS cache sensing.
p.38: Updated Using SETUP introduction.
pp.41-46: Various changes to SETUP features.
p.50: Under "OS Support..." registration mark (®) added to Windows® NT acknowledges that Windows® is now a registered trademark.
p.52: Fixed Disk Boot Sector default setting changed to Normal.
p.55: Removed Boot menu.
p.65: Synchronous cache speed is now 7ns.
p.69: Updated cache type and speed; Power Supply 200 Watts.
p.75: Under "Handy Cheat Sheet" registration mark (®) added to Windows® acknowledges that Windows® is now a registered trademark.
p.78-9: Updated Index. New part number.