The

COMPLETE

GUIDE TO

HIGH PERFORMANCE

COMPUTING

WITH YOUR

PANTERA

COMPUTER

User's Guide

ZEOS®

INTERNATIONAL, LTD.

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Illustrations: Steve Scofield, Pat Foust
Cover Design by Jean Mueller

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.

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All new ZEOS computer systems come with a One Year Limited Warranty which provides that the products ZEOS manufactures or assembles, other than items such as software, disks and related documentation, will remain in good working condition, free from defects in material and workmanship under normal use and service, for a period of one year from the date of shipment from ZEOS. This warranty is limited to the original purchaser and is not transferable. During this one year period, ZEOS will repair or replace, at its option, any defective product or parts at no additional charge to the customer, provided that the defective product or part is returned, shipment prepaid, to ZEOS. All replaced products and parts become the property of ZEOS. Replacement parts shall be similar new or serviceable used parts. This Limited Warranty does not extend to any products which have been damaged as a result of accident, misuse, abuse (such as incorrect voltages, power surges, improper or insufficient ventilation, failure to follow ZEOS' provided operating instructions, "acts of God" or other situations beyond the control of ZEOS), or as the result of service or modification by anyone other than ZEOS. Non-ZEOS installed parts or components are not covered, nor is damage to ZEOS provided components covered as a result of their installation. This warranty does not cover work performed by others, all warranty work must be performed by ZEOS.

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.

Contents

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.

The *User's Guide* is divided into four chapters, plus technical specifications and some general information about personal computers.

Chapter 1, The Big Picture gives an overview of a typical desktop and tower system. 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 view and change your system's BIOS (Basic Input/Output System) settings by using the SETUP program.

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 SIMMs, system cache, and a new CPU.

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.

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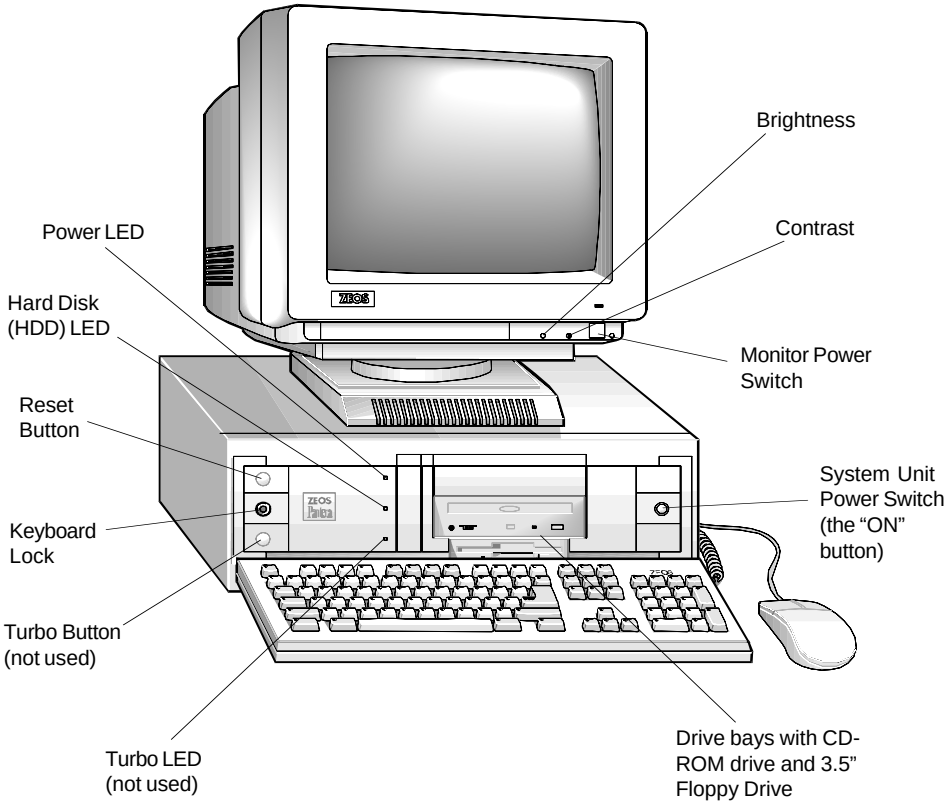
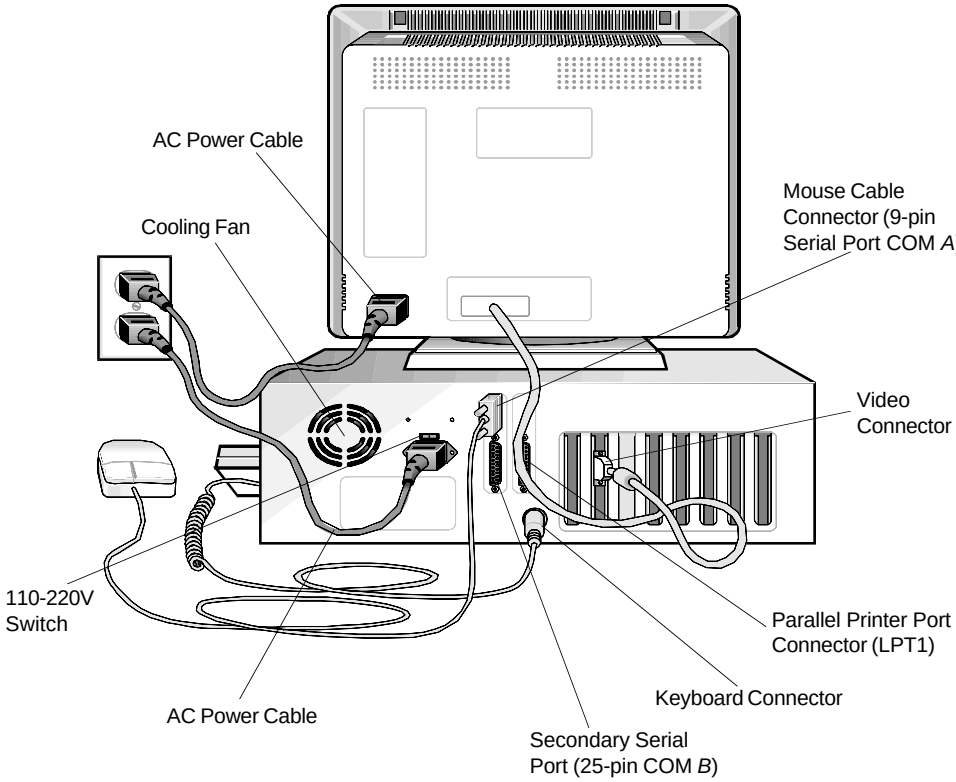
Desktop System At A Glance

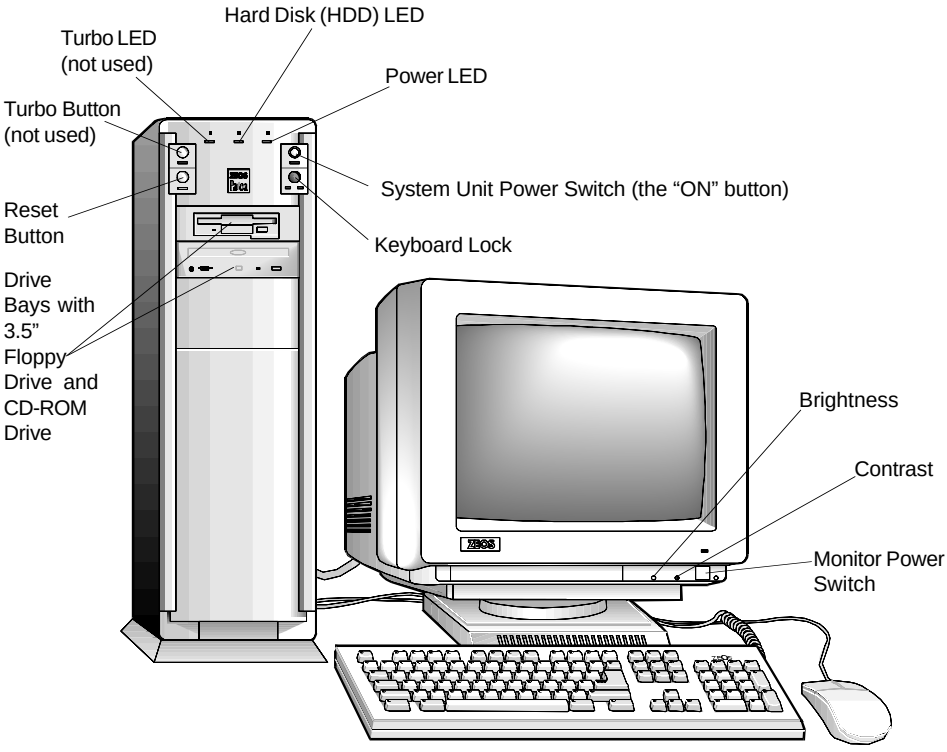


Front View

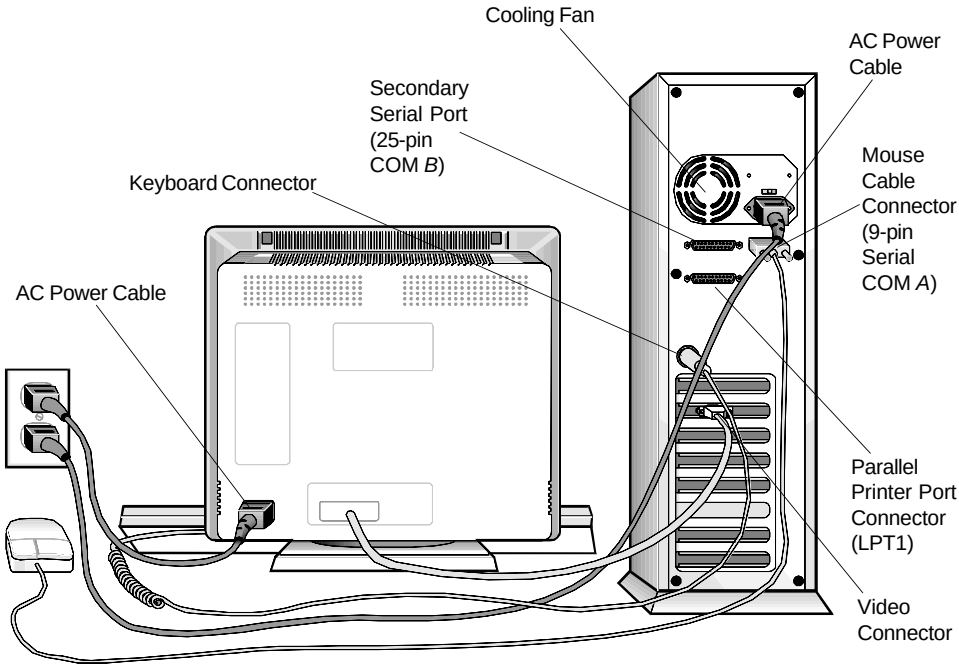

AC Power Cable
Cooling Fan
Mouse Cable Connector (9-pin Serial Port COM *A*)
Video Connector
110-220V Switch
Parallel Printer Port Connector (LPT1)
Keyboard Connector
AC Power Cable
Secondary Serial Port (25-pin COM *B*)

Rear View

Tower System At A Glance



Front View


Cooling Fan
AC Power Cable
Secondary Serial Port (25-pin COM *B*)
Keyboard Connector
Mouse Cable Connector (9-pin Serial COM *A*)
AC Power Cable
Parallel Printer Port Connector (LPT1)
Video Connector

Rear View

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.

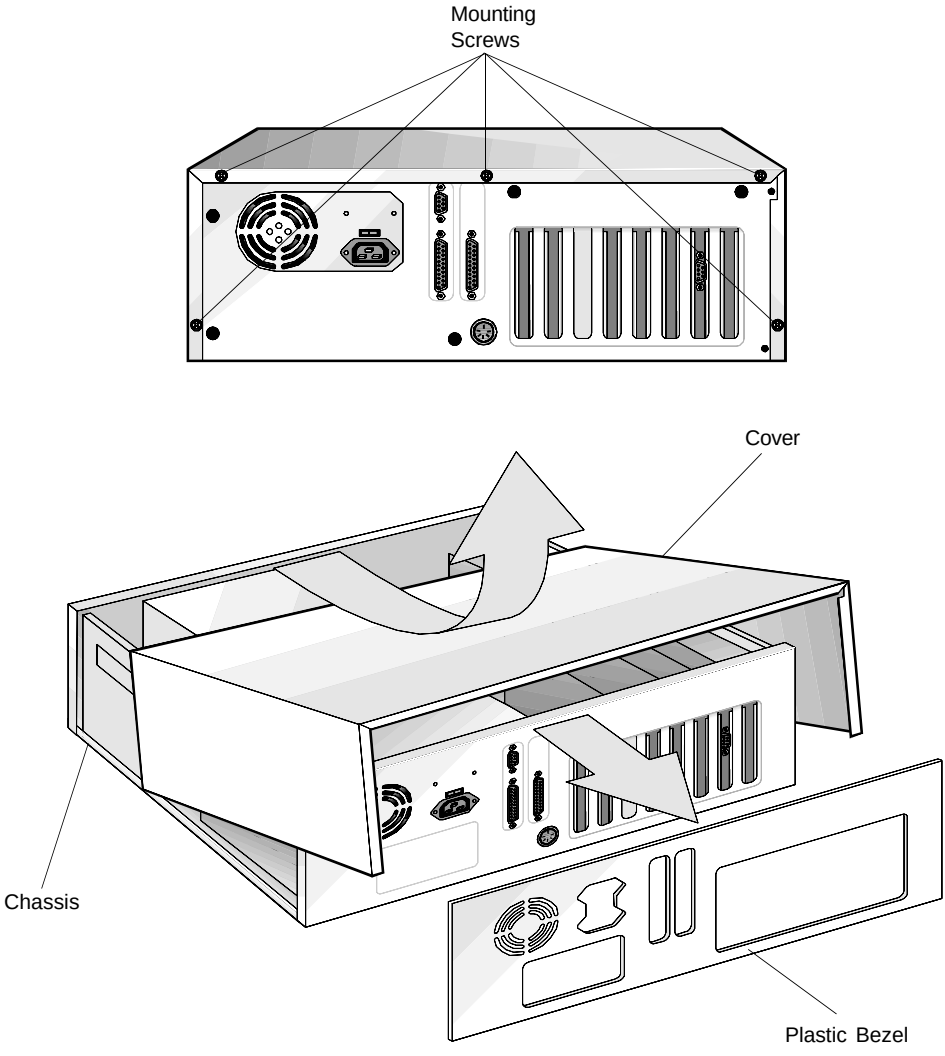
3. Unscrew the five mounting screws at the back of the case that hold the case cover to the system unit chassis.

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 figures opposite show the plastic bezel, screw locations, and how to remove a desktop PC's cover.



Removing the Cover

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 vertical case is almost identical to opening a desktop case.

To open a vertical 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.

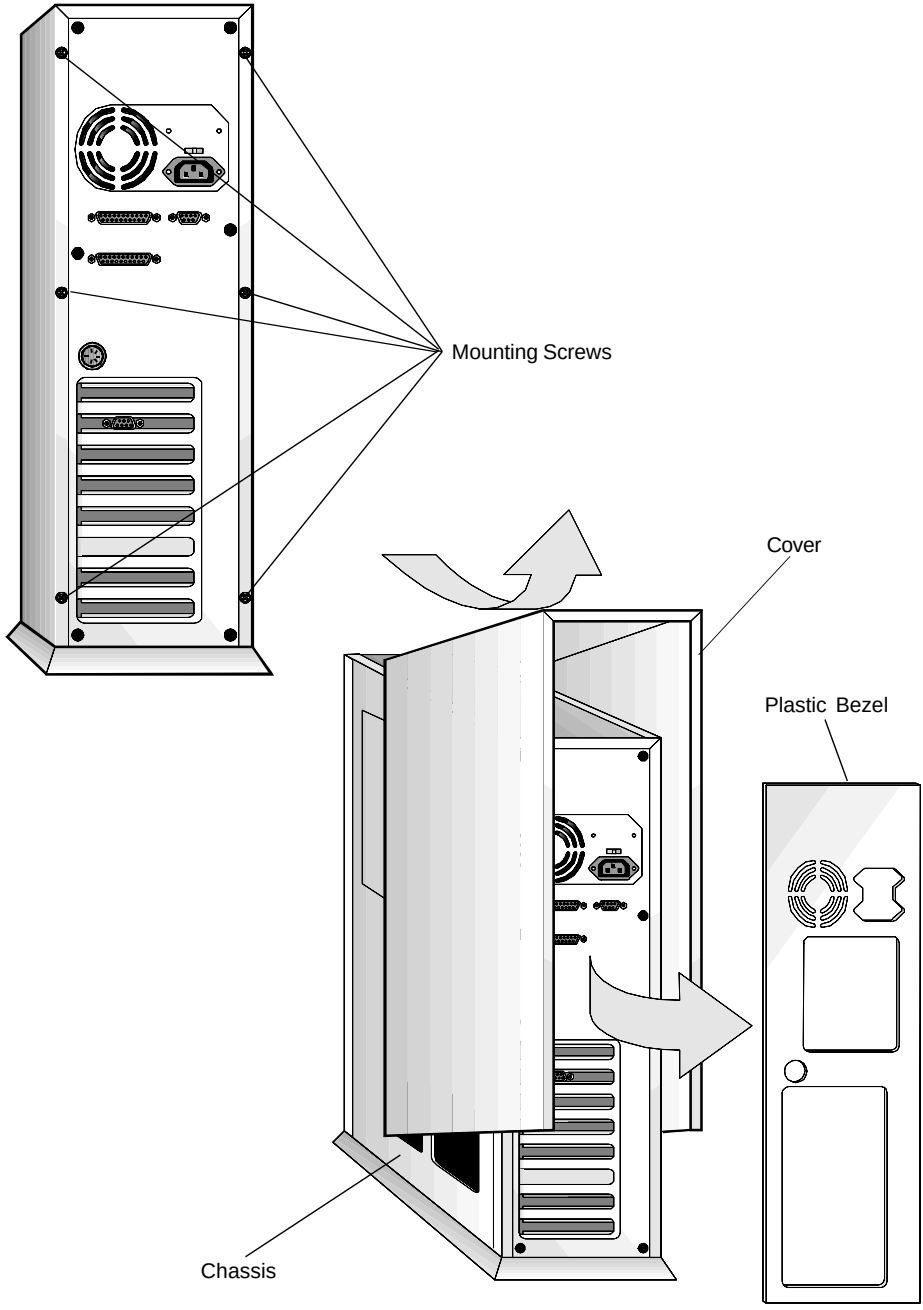
3. Unscrew the six mounting screws at the back of the case that hold the case cover to the system unit chassis.

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

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

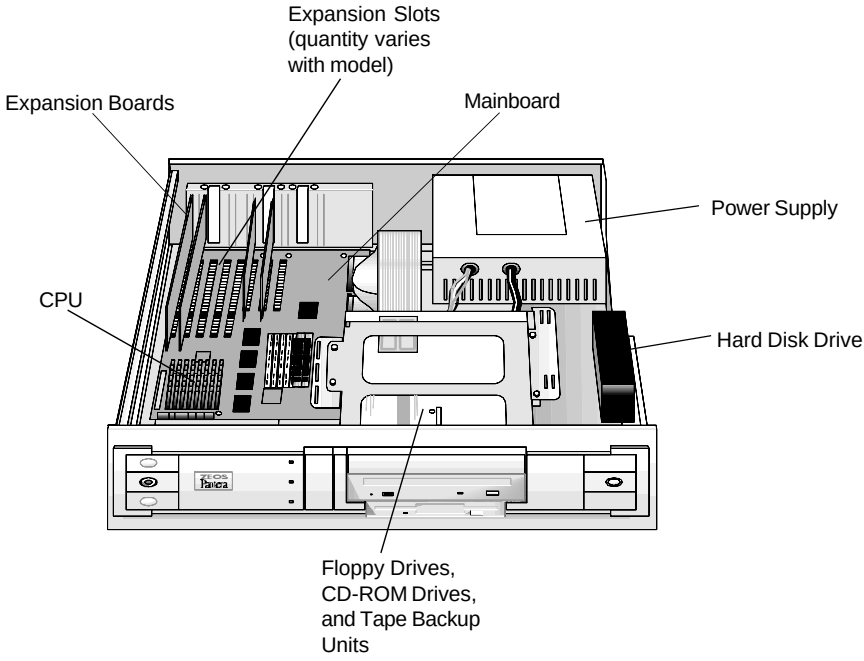
6. When through, reattach the case cover, screws, bezel, and cables in the reverse order.

The figures opposite show the plastic bezel, screw locations, and cover motion for a tower case.



Removing the Cover

Inside a Desktop Computer

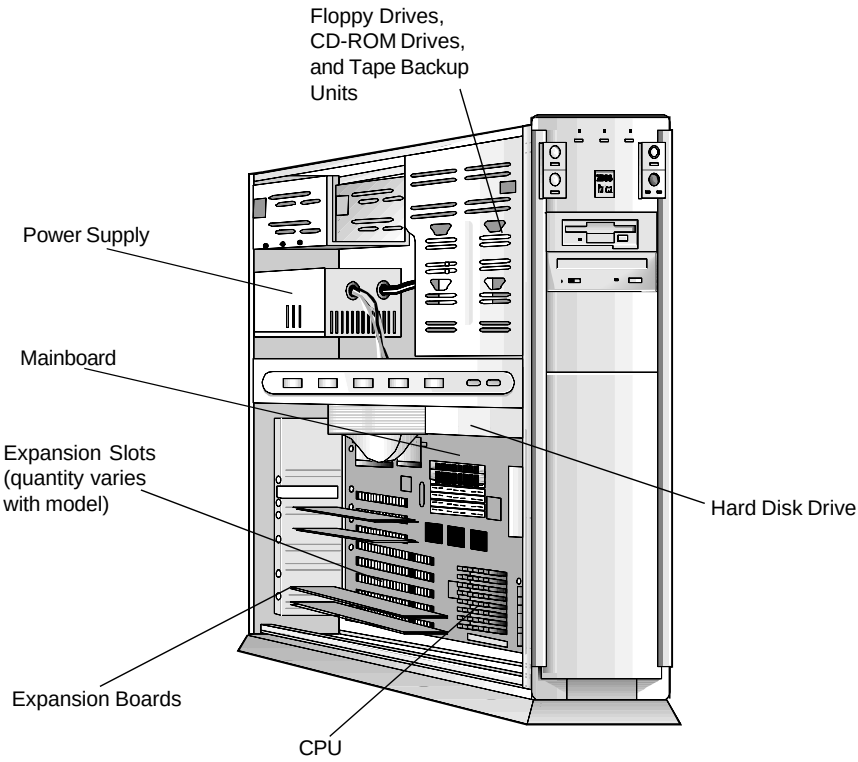


Desktop Interior

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.

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

Inside a Tower Computer



Tower Interior

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

2. The Mainboard

The mainboard is the largest circuit board in the computer. It contains the central processing unit (CPU), secondary cache subsystem, expansion slots, ports and connectors for other computer components, and the system main solid-state memory, or RAM (Random Access Memory).

Mainboard Features

Your mainboard includes:

- Intel 80486DX, DX2, DX4 or Overdrive P24T and P24D running at 25, 33, 50, 66, 75, or 100 MHz
- Optional 128K or 512K secondary SRAM system cache, write-back, direct-mapped
- Integrated onboard floppy drive controller
- Two onboard IDE hard drive interface ports supporting up to 4 IDE devices (primary is PCI local bus)
- Bi-directional Parallel Port (configurable through software)
- Two RS232, 16550 high-speed serial ports
- Flexible RAM: four sockets handle mixed SIMM capacities (512K to 32Mb) and speeds (50, 60, 70ns) in any combination
- 128Mb maximum RAM capacity
- Flash BIOS, relocatable to system RAM to boost performance
- Four 16-bit ISA expansion slots
- Three 32-bit PCI local bus expansion slots
- Clock/calendar with onboard battery backup
- Energy saving, low power “sleep” mode

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 onboard cache controller allows cache memory to provide an ultra high-speed, 12-15-nanosecond buffer between the CPU and conventional (50, 60, or 70ns) RAM. Your system can accommodate three cache configurations: 0K, 128K, or 512K of Level 2 cache.

Continuous Full-Speed Processing

Pantera systems now run continuously at maximum speed, eliminating Turbo Mode. Because of this, the Turbo button and Turbo LED are not used on Pantera systems.

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 onboard peripherals include:

- Two serial ports (16550 UART)
- Parallel port (bi-directional, assigned through SETUP)
- Floppy drive controller (handles floppy drives up to 2.88Mb)
- Two IDE hard drive controller ports each capable of controlling two hard drives (primary port J8 is PCI local bus)

Serial Ports

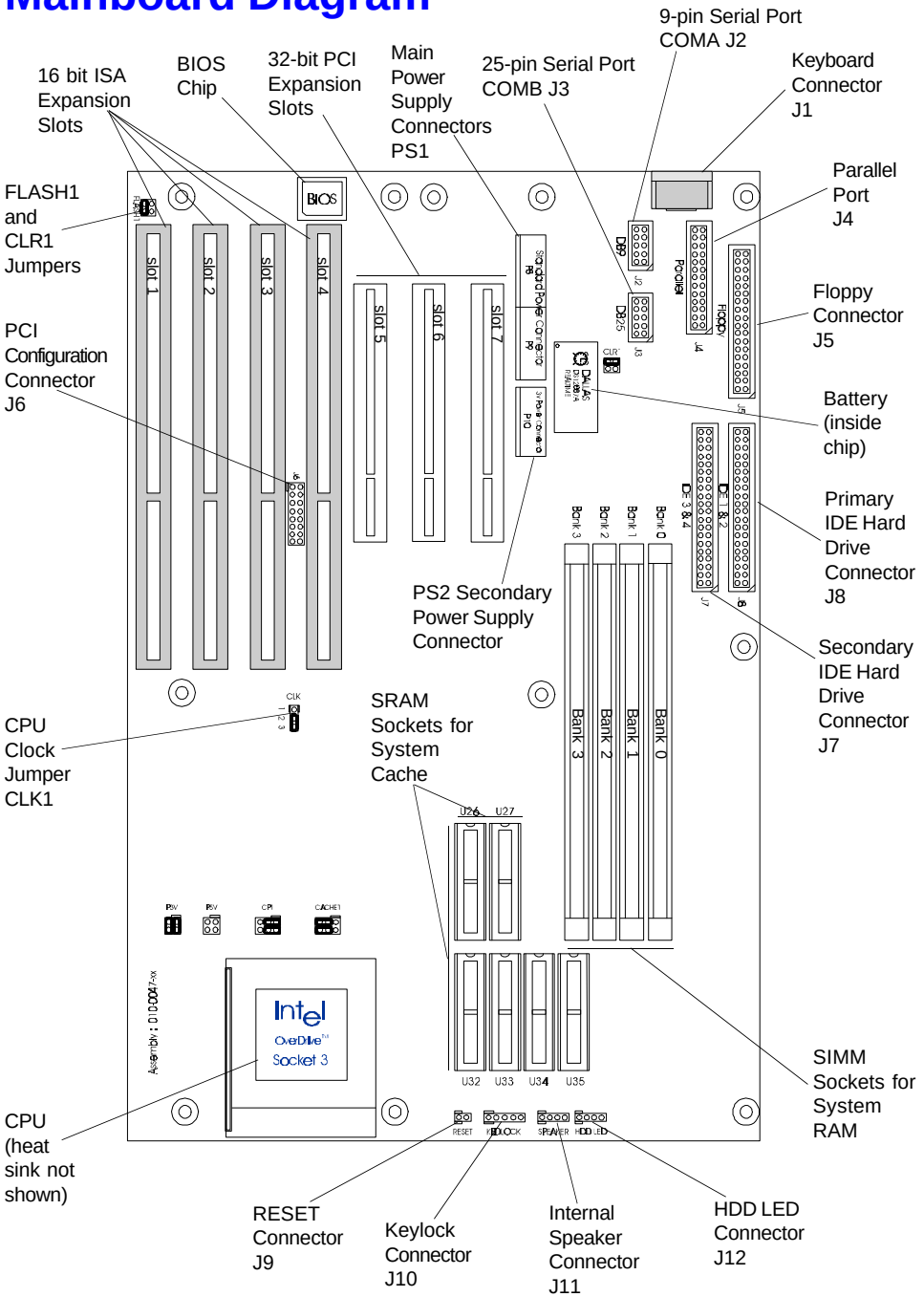
Your mainboard has two RS-232C asynchronous serial ports, which are usually referred to as COM1 or COM*A* (9-pin) and COM2 or COM*B* (25-pin) ports. The serial ports are used to attach mice, serial printers, modems, or other serial peripheral devices. Both serial ports are 16550 UART compatible for higher 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

The 25-pin Centronics parallel port is often called the *printer* port because it is usually used for printers. However, devices that use this speedy parallel interface are becoming more common. Your Pantera's parallel port is also Bi-directional, allowing data to flow to and from an external device at the same time.

Mainboard Diagram



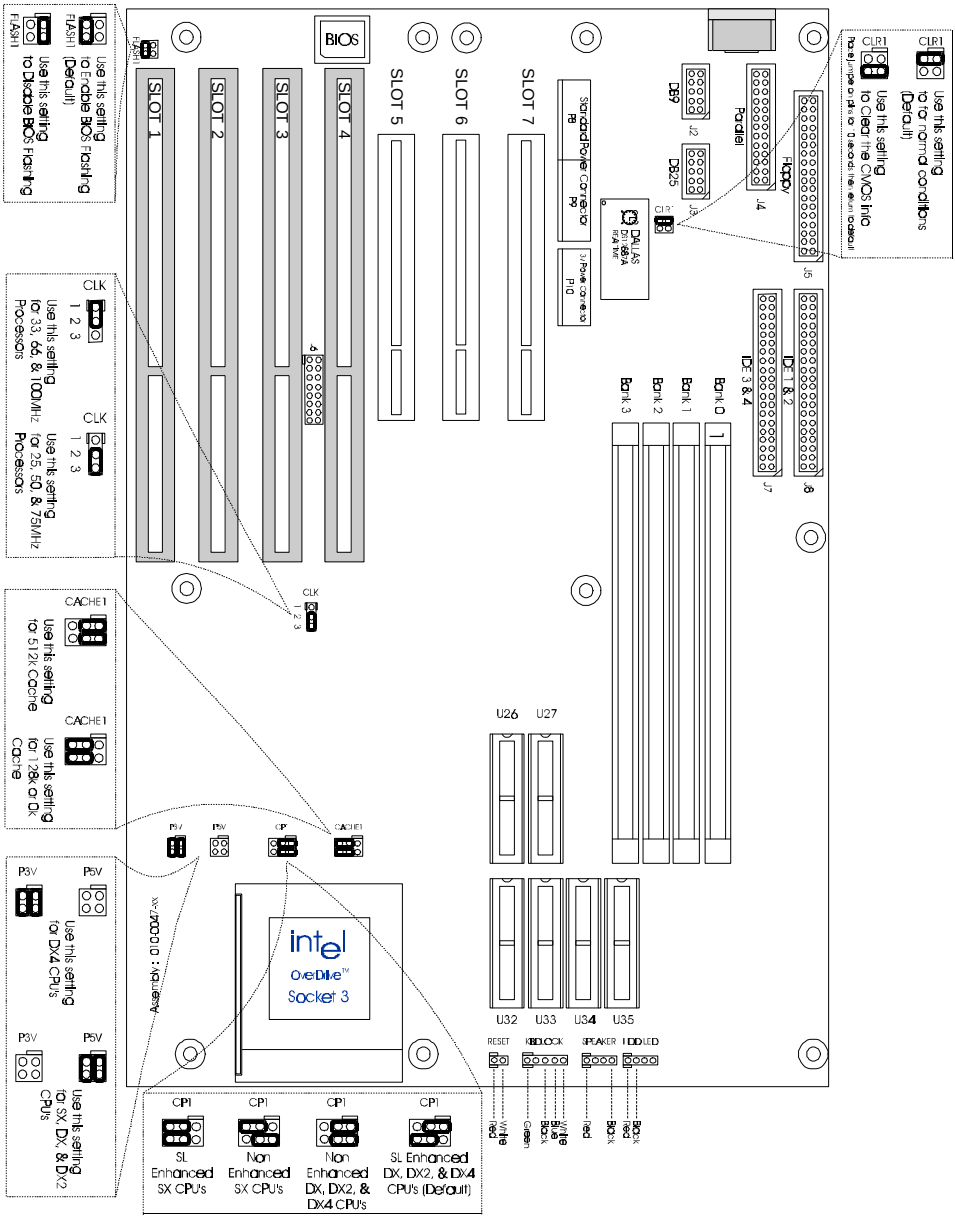
Mainboard Connectors

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

Mainboard Connectors

Connector ID	Description
J1	Keyboard connector
PS1	Main power supply connector
PS2	PCI 3.3 volt power supply connector
J2	COMA: communications port A (DB9)
J3	COMB: communications port B (DB25)
J4	Parallel “printer” port connector
J5	Floppy disk drive connector
J6	PCI Configuration connector
J7	Secondary IDE hard drive connector
J8	Primary IDE hard drive connector (PCI local bus)
J9	RESET switch input
J10	KBDLOCK: Keyboard lock input
J11	SPEAKER output
J12	HDD LED: Hard drive LED output

Mainboard Jumpers



Mainboard 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 six jumpers, allowing great system flexibility. However, most system settings are stored in battery-backed CMOS (Complimentary Metal-Oxide Semiconductor) memory. You can use the BIOS SETUP program to change settings stored in the CMOS. A FLASH programming utility can be used to upgrade the system BIOS.

Other mainboards use multiple jumpers to configure upgrade options and parameters mechanically on the board. Pantera mainboards use the SETUP program and the FLASH programming utility instead, making BIOS changes and upgrades fast and easy.

FLASH1

The FLASH1 jumper allows or disallows reprogramming of the FLASH BIOS with the FLASH utility program. The default or normal position is to allow programming with the FLASH program.

CLR1

The CLR1 jumper holds or resets the CMOS battery backed SETUP memory. You should not clear the CMOS SETUP memory unless it becomes corrupted and cannot be reprogrammed with the SETUP program. To clear the CMOS memory, **turn off system power**, then momentarily place the jumper in the CLEAR position, then return the jumper to the NORMAL position. Your system will not operate with the jumper in the CLEAR position, so be sure to return the CLR1 jumper to the NORMAL position.

(continued next page)

Mainboard Jumpers Described (continued)

CLK

The CLK jumper sets the speed of the system clock. It will be set correctly to work with your system, so don't change this jumper unless you change CPUs. When Pin1 and Pin2 are jumpered, CPU clock speed may be 33, 66, or 100 Megahertz. When Pin2 and Pin3 are jumpered, CPU clock speed may be 25, 50, or 75 Megahertz.

See the diagram, *Mainboard Jumpers,* for the location of these jumpers.

Cache1

The Cache1 jumper configures the amount of Level 2 cache to be used on your system. Default setting is for 0K or 128K, but it can be adjusted to accept a set of chips giving you 512K Level 2 cache. A fast CPU operates more efficiently when it has a buffer of ultrafast RAM between itself and the main RAM SIMMs. The mainboard is designed to hold a set of six SRAM chips for its optional Level 2 cache.

P3V and P5V

DX4 CPUs and the newer Pentium chips require less power (3 volts) to operate than previous SX, DX or DX/2 CPUs (5 volts). The P3V and P5V jumpers allow you to run either class of chip on your ZEOS Pantera.

***Note**: If you switch from a 5-volt to a 3-volt CPU, you'll also need a 3-volt power supply.*

CP1

The CP1 jumper tells the mainboard what kind of CPU (Central Processing Unit) to expect. It also tells the computer whether or not the CPU has its own math coprocessor.

3. Using SETUP

The SETUP program is part of your computer's Extended BIOS software system. SETUP works with your system BIOS to make your system more flexible and adjustable. *To run the BIOS SETUP program, press **F2** during system boot*. Once inside SETUP, press the right and left arrow keys to reach a section. After that, use the up and down arrow keys to reach a topic. Topics with subsections are indicated by an arrowhead on the left side of the screen. To enter a subsection, highlight a topic, then press the **Enter** key.

SETUP's five sections are *Main*, *Advanced*, *Security*, *Power*, and *Exit*. Each section in SETUP contains several system parameters you can alter or experiment with, although our engineers generally optimize them for the system we ship to you. When in doubt, you can simply reload the original factory default settings from ROM by entering SETUP, then pressing the **F9** key, or load the most recently saved settings from battery backed CMOS by pressing **F10**. Pressing **F1** toggles the General Help window, while the right-hand 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 that only an item whose label is surrounded by square brackets may be changed.

Once you've finished tinkering, press the **Esc** key until you reach the Exit menu. There you can decide if you really want to keep your changes, if you'd prefer to return to the factory defaults, or if you want to go back to using your previously saved values. In any case, remember you can always change the BIOS settings again next time you boot up.

Main Menu

Your system's BIOS settings are configured at the factory to maximize performance with the options you ordered. Generally, you need to run SETUP only if you install new or different hardware (such as a new hard drive), or if the onboard battery fails.

SETUP's Main Menu allows you to view and configure several basic parameters, including System Time and Date, Diskette A and B, System memory amount, Extended memory amount, and Video system type.

The Main Menu also offers you the following sub-menus:

- 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 these four IDE Adapter sub-menus lets you view and configure a separate IDE device attached directly to you mainboard. The sub-menus are described on the following pages.

In addition, SETUP's Main Menu lets you view and configure both your Memory Cache (six SRAM chips, if present), and how your system shadows (copies) BIOS data to your main RAM SIMMs.

System Time

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.

Diskette A:

Specifies the size and capacity of the floppy-disk drive installed as drive A. Options are: 360K, 720K, 1.2M, 1.44M, and 2.88M.

Diskette B:

Specifies the size and capacity of the floppy-disk drive installed as drive B.

IDE Adapter Sub-menus

Each of the four IDE Adapter sub-menus allows you to view and change configurations of the IDE devices attached to your onboard IDE Hard Drive connectors, J7 and J8. The IDE Adapter sub-menus list the IDE devices that are currently installed, and allow you to configure devices you are adding to your system. Your Primary (local bus) hard drive (J8) is listed as *IDE Adapter 0 Master*. You can attach a second local bus hard drive to the same (J8) 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 Secondary connector (J7) is not local bus, making it more appropriate for slower IDE devices such as CD-ROM drives and tape backups.

***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 connector. Just be sure that one drive is configured as Master and the other drive is configured as Slave.*

Autotype Fixed Disk

After you press the Enter key, this utility attempts to detect and configure your IDE (Integrated Drive Electronics) adapter for each device you attach to it, assuming it conforms to ANSI (American National Standards Institute) technical specifications. Drives shipped with ZEOS systems are pre-configured at the factory, so you shouldn't have to use the utility unless you're adding a new IDE device. This is usually just a matter of attaching the device properly, then running the Autotype utility within SETUP. If Autotype Fixed Disk is successful, it will

(more settings, next page)

recognize your new hard drive's type and display the correct drive parameters. If the utility can't recognize your new device, you can select Type USER, then set *Cylinders*, *Heads*, *Sectors*/*Track* and *Write Precomp* according to the information supplied by the device's manufacturer.

***Note**: Don't alter this parameter unless you change or add a hard drive or other IDE device.*

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 Transfers

Determines the number of sectors per block for multiple sector transfers. Options are Disabled, 2, 4, 8, and 16. Older hard drives (and even some newer drives) won't 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 format the drive, then run FDISK. Later, you can enable Multi-Sector Tranfers again.*

LBA Mode Control

Enables or disables Logical Block Addressing, which allows you to use IDE hard drives with capacities greater than 528 MB (megabytes).
Default: *Disabled*.

Video System

This option sets the video type. It can be set to *Monochrome*, *CGA 80 x 25* (80 column Color Graphics), or *EGA/VGA* (Enhanced/Video Graphics Adapter).
Default: *EGA/VGA*.

Memory Cache

The Memory Cache sub-menu allows you to make detailed changes to your cache memory configuration. Memory Cache makes certain regions of the SRAM cache available to code that has been shadowed in conventional RAM, further boosting system performance.

External Cache

Permits you to enable or disable the external (level two) cache memory, if the optional SRAM chips are present in your system. Some applications are not compatible with caching, so this option lets you disable memory caching, if necessary.
Default: *Enabled*.

SRAM Speed

This sets the speed of the SRAM chips either to 15ns (nanoseconds) or 20ns. This must be set to 20ns unless all your SRAM chips operate at 15ns.
Default: *20ns*.

Cache Mode

Determines whether the system caches only data reads (Write Through) or if it caches both reads and writes (Write Back). Write Back gives better performance.
Default: *Write Back*.

Cache System BIOS area

Determines whether the System BIOS code can be cached in the SRAM chips. This boosts system performance.
Default: *Enabled*.

Cache Video BIOS area

Determines whether Video BIOS code may be cached in SRAM. This boosts video performance.
Default: *Enabled*.

(more settings, next page)

Cache Memory Regions

Allows you to choose which specific shadowed BIOS memory regions will be cached in SRAM.
Default: All specific regions are *Disabled*.

Memory Shadow

BIOS shadowing copies data from portions of the computer's slower ROM (Read-Only Memory) chips into much faster RAM chips in system memory. Because the BIOS data can be read more quickly by the CPU, system performance improves noticeably. The Memory Shadow sub-menu lets you make specific additional regions of your upper memory available for BIOS shadowing, besides those memory regions already reserved for basic system and video BIOS code.

System Shadow

This setting is not adjustable. System shadow is always *Enabled*.

Video Shadow

Enables or disables copying of the video BIOS into upper memory RAM. Shadowing the video BIOS code improves video performance.
Default: *Enabled*.

Shadow Memory Regions

Allows you to enable which specific memory regions (other than System and Video) will be shadowed in upper RAM memory. If enabled, ROM data in the specified region is copied to shadow RAM.
Default: All specific regions are *Disabled*.

Advanced Options

Warning!

Setting these items incorrectly could disable your system. Never needlessly change from the defaults.

The Advanced Menu lets you view and change the following settings: Integrated Peripherals, Advanced Chipset Control, Plug & Play O/S, and Large Disk Access Mode.

Integrated Peripherals

This sub-menu lets you view and configure the I/O addresses and interrupts (IRQs) of COM*A* and COM*B*, as well as the I/O addresses and IRQs for your integrated onboard serial and parallel ports.

COM port

When either of the two COM ports is set to *Auto*, the system will automatically configure the IRQs for both ports. Otherwise, this option allows you to manually configure or disable the IRQ and I/O address settings for both the 9-pin (COM *A*) and the 25-pin (COM *B*) serial ports.

LPT Port

Sets or disables LPT port address and IRQ. The *Auto* setting configures the address and IRQ automatically. Otherwise you can choose either 278 or 378 as the LPT port address (both addresses use IRQ 7).
Default: *Auto*.

LPT Mode

Sets the parallel “printer” port to operate in *Output Only* or *Bi-directional* mode. *Bi-directional* mode sends data to and from a peripheral device at the same time.
Default: *Output Only*.

Diskette Controller

Enables/Disables the onboard floppy disk controller , at connector J5.
Default: *Enabled*.

(more settings, next page)

Local Bus IDE Adapter

Enables or disables the Primary onboard IDE Adapter (J8).
Default: *Primary*.

Alternate IDE Adapter

Enables or disables the Secondary onboard IDE Adapter (J7).
Default: *Secondary*.

Advanced Chipset Control

This sub-menu accesses several features of the mainboard's chipset.

Warning!

You should never change Advanced Chipset Control settings unless you're thoroughly familiar with how they affect your system.

DRAM (Dynamic Random Access Memory) Speed

Always set the DRAM speed to the slowest speed of all your installed memory SIMMs. Your mainboard supports 60ns or 70ns memory SIMMs.

Pipelined CAS (Column Address Strobe)

When Enabled, this removes an extra clock cycle between CAS [3,0] and CAS [7,4] for interleaved DRAM designs.
Default: *Disabled*.

Fast Page Write

When enabled, this improves performance when writing data sequentially to main system memory (RAM).
Default: *Disabled*.

Fast Page Data Read

When enabled, this improves performance when reading data sequentially from main system memory (RAM).
Default: *Disabled*.

Fast Page Code Read

When enabled, this improves performance when executing code sequentially in main system memory (RAM).
Default: *Disabled*.

PCI Posted Write Buffers

When enabled, this improves performance when the CPU or the PCI bus accesses memory destined for the ISA bus.
Default: *Disabled*.

CPU to PCI Bursting

When enabled, this improves performance on PCI systems when back-to-back CPU memory writes occur.
Default: *Disabled*.

CPU to PCI Byte Merging

When enabled, this improves performance on PCI systems when back-to-back CPU memory writes occur to the A000h or B000h segment.
Default: *Disabled*.

IRQ 12

Connects IRQ 12 either to 8742 ABFULL output (for the PS/2 mouse) or to the ISA bus.
Default: *ISA Bus*.

16 bit I/O Recovery

Inserts additional ISA clock cycles between back-to-back Input/Output operations.
Default: 0.

8 bit I/O Recovery

Inserts additional ISA clock cycles between back-to-back Input/Output operations.
Default: 0.

DMA (Direct Memory Access) Aliasing

Enables/disables ISA Aliasing. Used if the ISA bus has a device attached to I/O ports 90h, 94h-96h, 98h, 9Ch-9Eh.
Default: *Enabled*.

(more settings, next page)

Plug & Play O/S

Enables/disables Plug & Play option. Pick *Yes* if your system software supports Plug & Play peripheral devices.
Default: *No*.

Large Disk Access Mode

Configures the mainboard to expect either a DOS or “other” drive geometry. The *Other* setting is for operating systems such as UNIX or Novell Netware.
Default: *DOS*.

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. You will have to completely clear the CMOS memory and reenter your entire system configuration. 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

Set Supervisor Password

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

Set User Password

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.

(more settings, next page)

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

Active only when a Supervisor password is enabled, this specifies which level of password (Supervisor or User) is required on bootup to use the floppy disk drives. This can prevent unauthorized transfer of data.
Default: *Supervisor*.

***Note**: All diskette drive access can be denied (including system diskettes) by 1) setting a Supervisor password, 2) setting Password on Boot to* Disabled, *then 3) setting Diskette Access to* Supervisor.

Fixed disk boot sector

When enabled, write protects the boot sector on your hard drive to protect against 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

The Power menu lets you tell your system to enter a low-power *Standby* mode when it is idle for a specified time. Standby minimizes your system's energy consumption while allowing you to resume work within moments.

Power Savings

Lets you choose the how to conserve power used by your CPU, your fixed disk drives, and your monitor. Settings: *Customize* (default), *Maximum*, *Medium*, *Minimum*, and *Disabled*. This allows you to opt for one of three preset configurations, customize the Standby settings yourself, or disable power savings altogether. The list below describes what each setting controls:

- Standby Timeout controls how long (1 minute to 4 hours, or *Disabled*) your system must be idle before it enters Standby mode.
- Standby CPU Speed dictates the level of CPU activity (Max, High, Medium, Low) during Standby.
- Fixed Disk Timeout controls how long (1-16 minutes, or *Disabled*) an idle system waits before stopping the hard disk motor.
- CRT can be set to *OFF in Standby* or always *ON*.

Standby Timer Reset Events

When enabled, these two settings prevent the system from entering Standby mode while you're using the keyboard or the mouse.

Keyboard

Keeps system from entering Standby mode while you're using the keyboard. Default: *Enabled*.

Mouse

Keeps system from entering Standby mode while you're using the mouse. Default: *PS/2 (IRQ12)*.

(more settings, next page)

Standby Break Events

When set to *Auto*, this enables the system to resume full speed operation for as long as the specified IRQ is active. For example, this would allow you to "wake up" a remote computer via its modem, which uses an IRQ. You can set this parameter for 16 hardware IRQs, from IRQ0 to IRQ15.
Default: IRQ1 is set to *Auto*, the rest are *Disabled*.

Standby Wakeup Events

When enabled, these return the system to full speed when you begin using the keyboard or the mouse. It takes about six seconds for the CPU and the monitor to wake up, and a few moments for the hard drive to resume full speed from a standstill.

Keyboard

Returns the system to full speed when you begin using the keyboard.
Default: *Enabled*.

Mouse

Returns the system to full speed when you begin using the mouse.
Default: *PS/2 (IRQ12)*.

Exit Menu Options

Offers Exit and Save options for the SETUP program.

4. Expanding Your System

Adding an Expansion Board

The four 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).

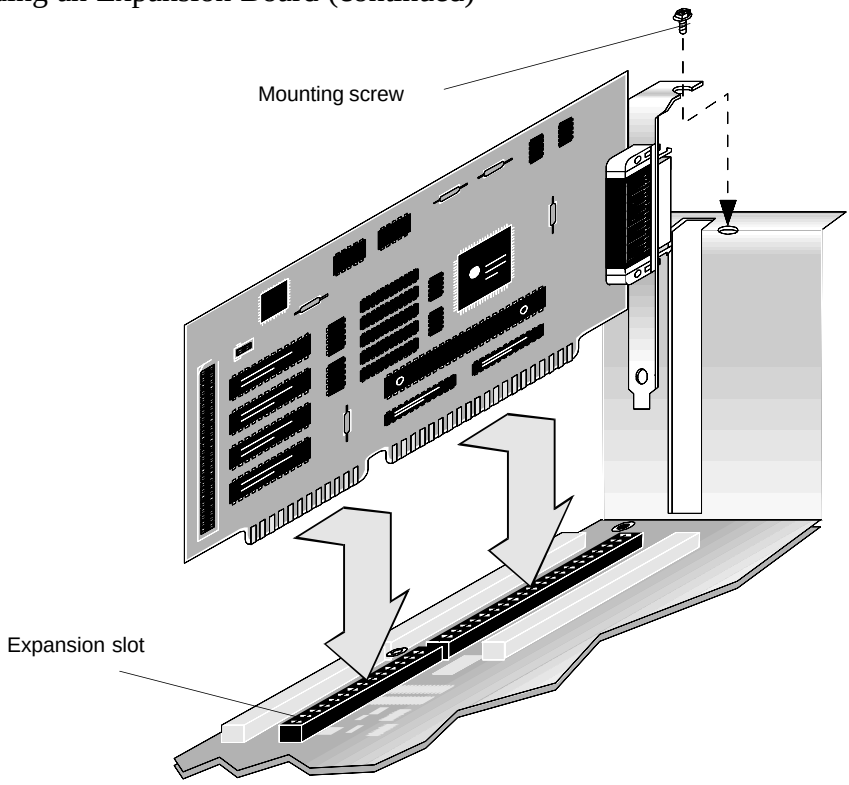
5. Set any jumpers or switches on the new card. See the card's documentation for the correct jumper settings.

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

7. Screw in the mounting screw.

(more steps, next page)

Adding an Expansion Board (continued)



Inserting a Card

8. Connect any internal cables to the expansion card.

9. Close the system unit 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.

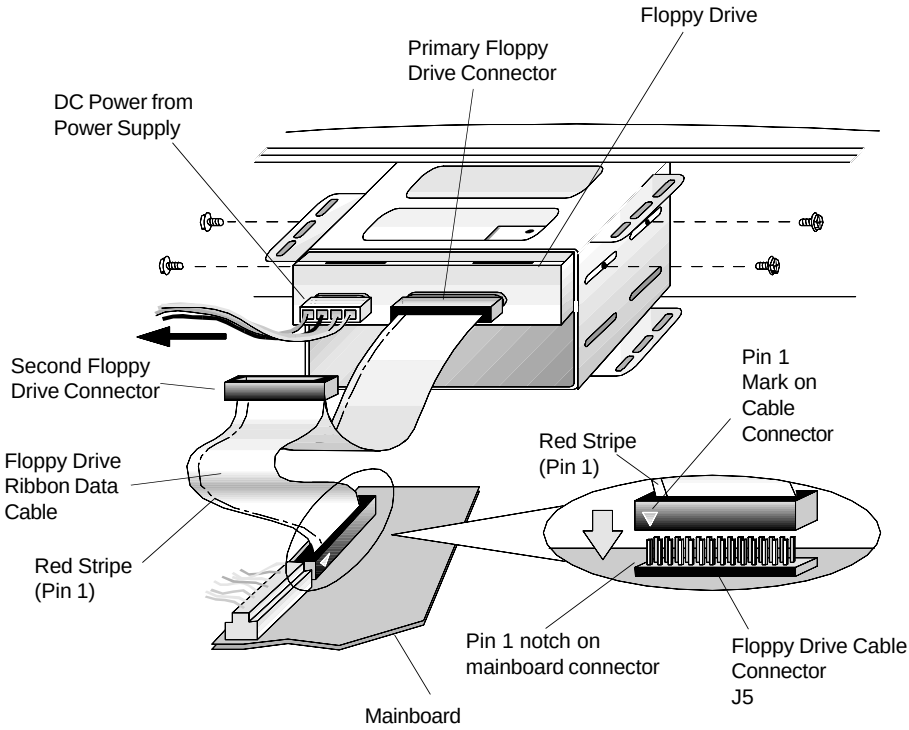
Compact disks fit into CD-ROM drives. Compact disks can store very large amounts of information.

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 primary connectors, a ribbon cable called the data cable, and a power connection to the power supply. The ribbon cable connects the back of the floppy drive with the floppy controller port J5 on the mainboard. Data ribbon cables often have two connectors. If you have more than one floppy drive on your system, they often share the same ribbon cable.

The data cable also has a red stripe. Whenever connecting or disconnecting the ribbon cable, be sure to attach the cable connectors so the red stripe is pointing toward pin 1 of the connector. Pin 1 is often labelled with a small triangle or filled in corner.

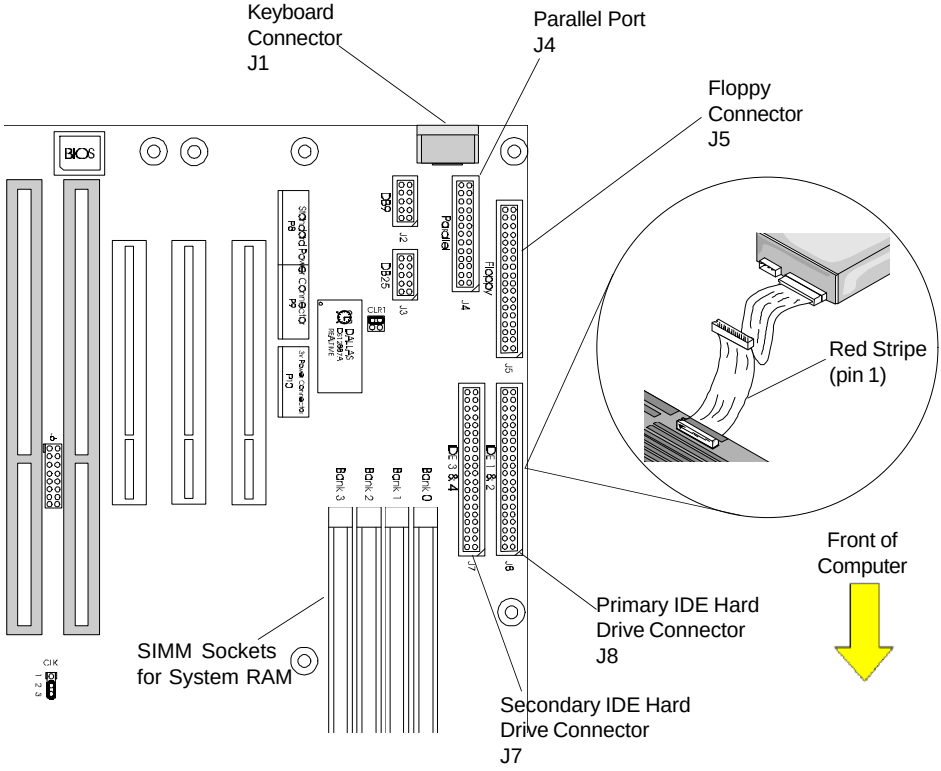


Floppy Drive Connectors

How an IDE Hard Drive Works

IDE (Integrated Drive Electronics) hard drives are the most common hard drives and are the most likely 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 connections – a ribbon cable called the data cable and a power connection to the power supply. The ribbon cable attaches to the back of the drive and connects to the IDE controller port J7 or J8 on the mainboard. Whenever connecting or disconnecting the ribbon cable, be sure to attach the data cable so the red stripe points toward pin 1 on the connector.

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.



Hard Drive Connectors

How a CD-ROM Drive Works

CD-ROM drives are capable of reading information from compact discs, or CD's. The "ROM" in CD-ROM stands for Read Only Memory. Compact discs are read-only, meaning, you can read information from them, but cannot write files or information onto them like a floppy disk or hard disk drive. With the right software, you can even "read" music by playing audio compact discs on your CD-ROM drive. Compact disks can store large amounts of information. One compact disk can store as much information as 500 floppy disks.

There are many 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 just like the DC power connector on floppy drives and hard disk drives. It accepts DC power from the computer's internal power supply.

The data cable is a flat ribbon cable that connects the drive with some type of controller. Some drives use a dedicated controller card inserted into one of the expansion slots on the mainboard. Your IDE CD-ROM drive connects to the 16-bit IDE controller port on the mainboard (J7) or to an IDE controller card inserted into one of the expansion slots. Still other drives use a CD-ROM controller port mounted on a sound card in one of the expansion slots.

Most CD-ROM drives also have an audio connector where you can connect 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.

For detailed information about your CD-ROM drive, check the manufacturer's documentation.

Why Is More RAM Better?

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 simply run much faster and more efficiently 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 four SIMMs of 32-bit RAM. Slots must be filled in sequence from 1 to 4, but otherwise your system is remarkably flexible about RAM speeds and capacities. 50ns, 60ns and 70ns SIMMs can be added in any order, as long as the BIOS SETUP is set for the slowest SIMM present. SIMM capacities can vary, too, all the way from small 512K SIMMs up to 32Mb SIMMs. The mainboard will support up to 128Mb of RAM.

***Note**: SIMMs MUST ALWAYS BE INSTALLED IN SEQUENCE FROM BANK 0 TO BANK 3, BUT THEY DON'T NEED TO BE THE SAME SPEEDS OR CAPACITIES.*

Installing SIMMs

When installing SIMMs, use 70ns or faster memory chips for maximum system performance. Faster and slower memory chips may be intermixed. However, always set the CPU/DRAM Speed option in SETUP to the slowest chip speed installed. Remember, larger numbers are slower than smaller numbers (70ns SIMMs are slower than 60ns SIMMs). For best results, use SIMMs from the same manufacturer.

Caution!

Electrostatic Discharge can result in permanent damage to the equipment. 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 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!

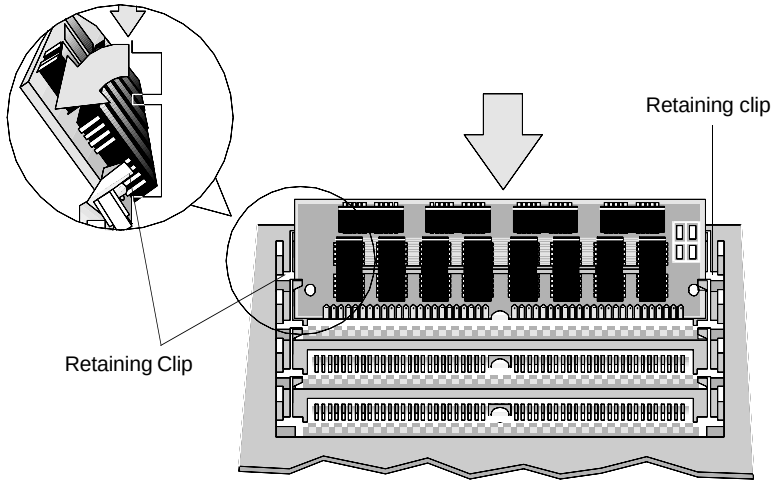
   Never use force to remove the module out of the socket. Failure to properly release the retainer clips may break the socket, causing expensive damage which is not covered by your warranty.

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)

Installing SIMMs (continued)



SIMM Sockets

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

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 cache memory by adding a set of SRAM memory chips into the secondary system cache sockets on the mainboard. Your system mainboard will hold either 128K or 512K of Level 2 cache in a set of six small chips.

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 BIOS settings. You can read and change them via the SETUP screen by pressing **F2** at boot. Copy the BIOS settings to a piece of paper.

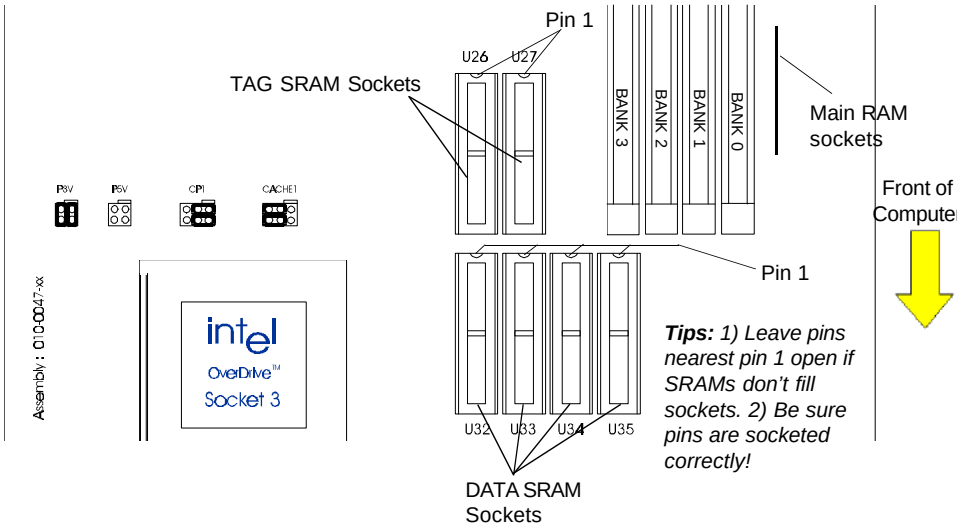
Caution!

All computer chips 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 *How to Open a Desktop/Tower Case*, earlier).
2. Locate the secondary system cache memory SRAM sockets. The next figure shows where to find the sockets on the mainboard.
3. If you are upgrading your system cache memory, remove the SRAM chips you are replacing by gently pulling them out of their sockets, taking care not to bend their pins.
4. Grasping each new SRAM chip by the edge, remove it from the antistatic bag and press it into its socket.

(more steps, next page)



Cache Memory Location

Caution!

Static RAM is extremely sensitive to static electricity, which can permanently damage your equipment. Use an anti-static 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 BIOS settings to be sure they haven'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

TIP: *If you're inserting a 486 CPU, avoid the ZIF socket's outer row of pin holes.*

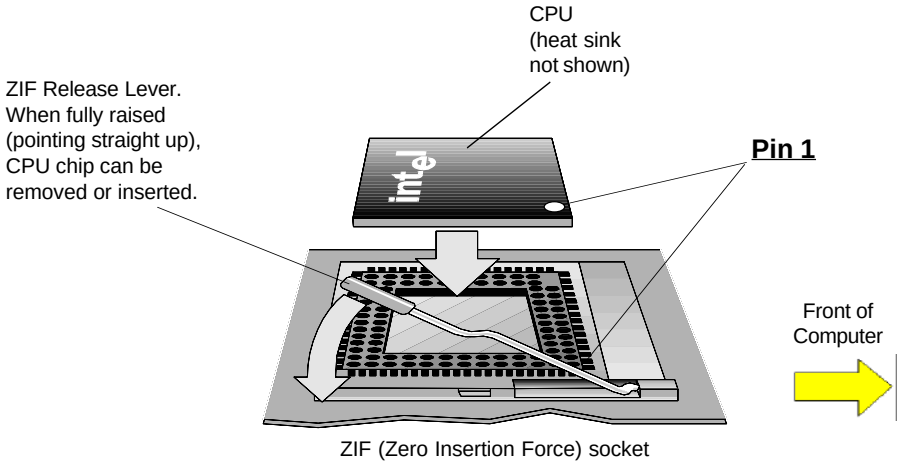
(more steps, next page)

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.

6. Set the CLK 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.



Inserting a CPU

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Mainboard Specifications

CPU	Intel 80486DX, Intel 486DX2, Intel DX4 or Intel Overdrive processors, P24T or P24D
Clock rate	33MHz, 50MHz, 66MHz, 75MHz, 100MHz
Chipset	Intel “Aries” chipset
ISA bus speed	8.25 MHz for 33MHz systems 8.33 MHz for 25MHz systems
PCI local bus speed	up to 133 MB/s (33MHz) up to 100 MB/s (25MHz)
RAM Types	512K, 1, 2, 4, 16, 32MB x36 or x32 SIMMs
RAM Speeds	50, 60, 70ns
RAM Capacity	128Mb
RAM Configurations	Various (minimum: one 4Mb SIMM)
Data Path	8, 16, 32, 64-bits
Expansion Slots (7)	Four 16-bit ISA Three 32-bit PCI local bus
Secondary Cache Mapping	Direct-mapped
Secondary Cache Write policy	Write-back
Secondary Cache Capacity	0KB (standard), 128KB, 512KB
Secondary Cache Type	128KB or 512KB SRAM (sets of six)
Secondary Cache Speed	15ns/20ns

Mainboard Environmental Specifications

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

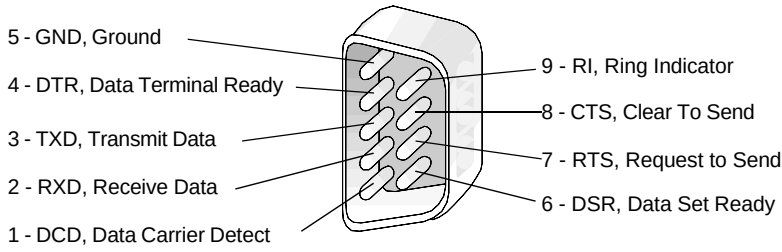
9-Pin Serial Port (J2) Pin Assignment

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

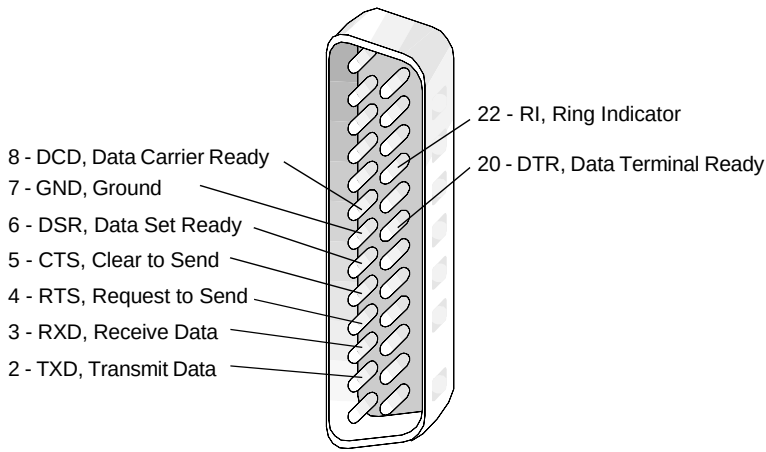
25-Pin Serial Port (J3) Pin Assignment

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



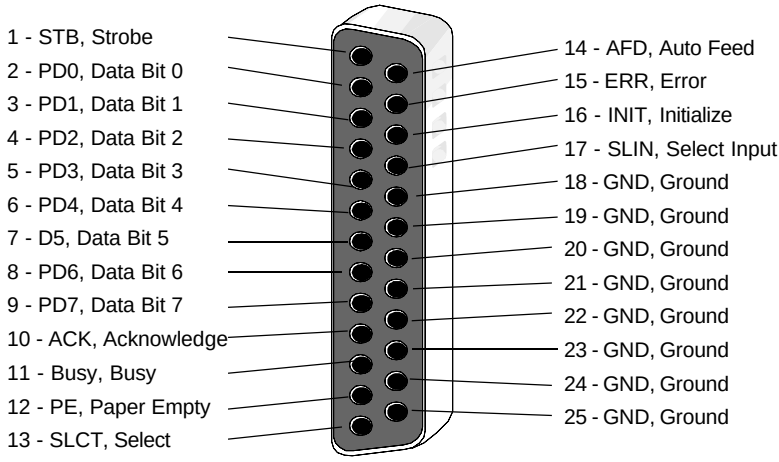
25-Pin Serial Port (J3) Pin Assignment



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.

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. Process where a hard drive, LAN adapter or other device transfers data directly to/from system RAM, bypassing the CPU.

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.

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.

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.

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.

Glossary

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 - 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. Also *DRAM*.

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.

ZEOS - Greek god of computers.

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Late Changes

The following changes arrived too late for printing:

There are no corrections at this time.