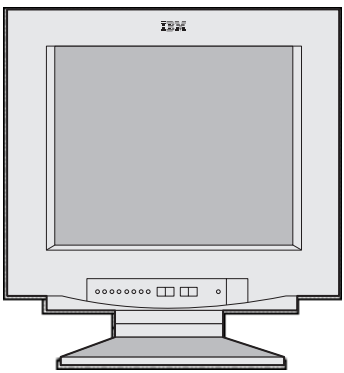
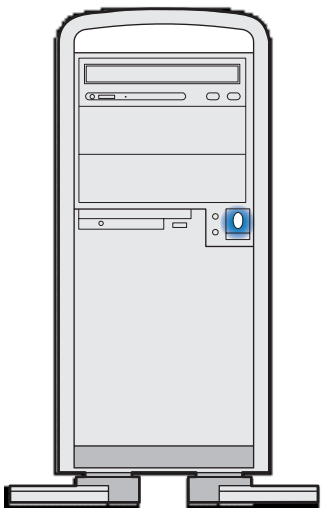
Hardware Maintenance Service for Service Level A

Machine Type 2136 and
IBM Monitors Type 2119 and 2120



2119/2120



2136

Aptiva

First Edition (May 1997)

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Voltage Supply Switch Settings

Your IBM Aptiva Personal Computer *might* have voltage switches, which must be set correctly for your voltage supply. If your monitor or system unit has a voltage switch, complete these steps to make sure each switch is set correctly:

1. Determine the correct voltage switch setting for your area:

Voltage Supply Range	Voltage Switch Setting
100-127 V	115 V or 115
200-240 V	230 V or 230

2. Locate the voltage switch on the back of your monitor or system unit. If the setting shown on the switch is:
    - Correct: start setting up your IBM Aptiva computer.
    - Incorrect: change the voltage switch setting.

Safety Information

The construction of the IBM Aptiva Personal Computer provides extra protection against the risk of electrical shock. This computer has a power cord with a three-prong plug that is required to ground metal parts. It is the responsibility of the person installing the computer to connect it to a properly grounded electrical outlet. Seek professional assistance before using an adapter or extension cord; these devices could interrupt the grounding circuit.

If the computer is connected to an electrical outlet that is incorrectly connected to the building wiring, serious electrical shock could result.

For continued protection against the risk of electrical shock:

- Connect your computer only to an electrical outlet of the correct voltage. If you are unsure about the voltage of the electrical outlet you are using, contact your local power company.

- If your computer has cables other than the power cords, you must connect them before plugging the power cord into an electrical outlet. Before removing these cables, you must first unplug the power cords from the outlet.

- If your computer has a telephone connection, do not touch the telephone cords when there is lightning in the area.

- Do not use or store the computer in an area where it can become wet.

- Make sure all replacement parts have characteristics identical or equivalent to the original parts. Other parts may not have the same safety features.

- Personal injury or electrical shock may result if you undertake actions other than those specifically described in this book. This is particularly true if you try to service or repair the power supply, monitor, or built-in modem. Always refer service or repairs to qualified service personnel.

Safety Notices (Multi-Lingual Translations)

The safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Hungarian
- Italian
- Russian
- Slovakian
- Spanish

Safety Notice 1

Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, then disconnect any interconnecting cables.

Antes de remover qualquer unidade substituível no local (Field Replaceable Unit - FRU), desligue o computador, retire todos os cabos de alimentação das respectivas tomadas eléctricas, remremova a pilha (se instalada) e, em seguida, desconecte todos os cabos de interligação.

在拆除任何 FRU 之前，關閉計算機電源，從電源插座拔去所有電線，
拆除電池(假如有安裝)，然後才拆接任何互連電纜

Avant de retirer une unité remplaçable en clientèle, mettez le système hors tension, débranchez tous les cordons d'alimentation des socles de prise de courant, retirez la batterie et déconnectez tous les cordons d'interface.

Die Stromzufuhr muß abgeschaltet, alle Stromkabel aus der Steckdose gezogen, der Akku entfernt und alle Verbindungskabel abgenommen sein, bevor eine FRU entfernt wird.

B rmely FRU elt volįt sa elitt ramtalanįtsa a sz mįtęgépet, hÉzza ki a vezetékeket a dugaszolę aljzatokbęl, t volįtsa el az elemet (ha arręl mûködik a készülék), majd kapcsolja szét a többi csatlakoztatę k belt.

Prima di rimuovere qualsiasi FRU, spegnere il sistema, scollegare dalle prese elettriche tutti i cavi di alimentazione, rimuovere la batteria e poi scollegare i cavi di interconnessione.

Перед тем, как снимать FRU, выключите питание компьютера, отсоедините все кабели питания от электрических розеток, снимите блок батарей, затем отсоедините все кабели.

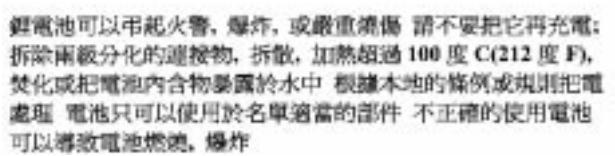
Pred odstránením ľubovoľného náhradného dielu vypnite počítaă, odpoj- te napájacie káble z elektrick–ch zásuviek, odpojte batériu (ak je inæ- talovaná), potom odpojte prepojovacie káble.

Antes de quitar una FRU, apague el sistema, desenchufe todos los cables de las tomas de corriente eléctrica, quite la batería y, a continuación, desconecte cualquier cable de conexión entre dispositivos.

Safety Notice 2

The lithium battery can cause a fire, explosion, or severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100±C (212±F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

A pilha de lítio representa risco de incêndio, explosão ou queimaduras graves. Não recarregue, desmonte ou exponha a pilha a temperaturas superiores a 100±C (212±F), não a incinere ou ponha o conteúdo da respectiva célula em contacto com a água nem remova o respectivo conector polarizado. Destrua a pilha de acordo com as normas ou regulamentações locais. Utilize apenas a pilha com o "part-number" indicado nas listas apropriadas. A utilização de uma pilha incorrecta pode resultar na ignição ou explosão da mesma.


鋰電池可以弔起火警，爆炸，或嚴重燒傷 請不要把它再充電；
拆除兩極分化的連接物，拆散，加熱超過 100 度 C(212 度 F)，
焚化或把電池內含物暴露於水中 根據本地的條例或規則把電
處理 電池只可以使用於名單適當的部件 不正確的使用電池
可以導致電池燃燒，爆炸

Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une temperature supérieure à 100±C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Die Systembatterie ist eine Lithiumbatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

Safety Notice 2 (conitued)

A l¡tium elemek tűzet, robban st vagy komoly égési sérüléseket okozhatnak. Nem szabad £jratölteni, polariz it csatlakoz£j bŁl elt vol¡tani, szétszedni, 100°C (212°F) feletti h¡mérsékletre felhev¡teni, elégetni, vagy az elem cell j nak tartalm t nedvesség hat s nak kitenni. Az elem megsemmis¡tésének a helyi rendelkezések és szab lyzatok alapj n kell történnie. Csak a tartozékok list j ban meghat rozott t¡pus£ elemeket haszn lja. Nem megfelel¡ elem haszn lata esetén az elem felhevülhet és szétrobbanhat.

La batteria di supporto e una batteria al litio e puo incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

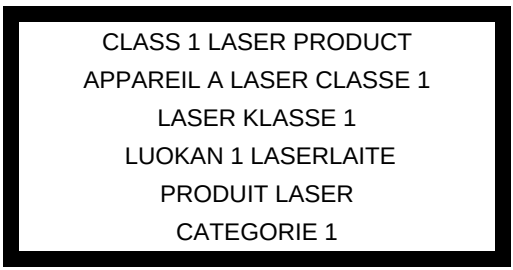
Литиевая батарея может вызвать пожар, взрыв или серьезный ожог. Не перезаряжайте ее, не снимайте полюсный разъем, не разбирайте ее, не нагревайте выше 100 градусов Цельсия, не поджигайте и не мочите.
Использованный блок батарей можно помещать в отходы только в соответствии с национальным законодательством или нормативами. При замене блока батарей разрешается использовать только батареи, указанные в списке комплектующих. Использование несоответствующей батареи может привести к ее взрыву или загоранию.

Li batéria mô¶e zapríåiniù po¶iar, v–buch alebo úaïké popáleniny. Batériu nenabíjajte neodstranujte polarizované konektory, nerozoberajte, nezohrievajte nad 100°C (212°F), nespopolnujte ju alebo nepokladajte áläanky batérie do vody. Zbavte sa batérie podia po¶adovan–ch lokálnych predpisov a pravidiel. Pou¶ite iba v–robcom odporúåanú batériu. Pou¶itie nevhodnej batérie mô- ¶e zapríåiniù vznietenie alebo v–buch batérie.

La bateria de repuesto es una bateria de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100±C (212±F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

Laser Compliance Statement

The CD-ROM drive in the computer is a laser product. The CD-ROM drive's classification label (sample shown below) is located on the drive.



The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products.

In other countries, the drive is certified to conform to the requirements of EN60825.

Class 1 laser products are not considered to be hazardous. The CD-ROM drive has an internal Class 1, 0.5-milliwatt, aluminum gallium-arsenide laser that operates at a wavelength of 760 to 810 manometers.

The design of the laser system and the CD-ROM drive ensures that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

Federal Communications Commission (FCC) Notice

The following statement applies to this IBM product. The statement for other IBM products intended for use with this product will appear in their accompanying manuals.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 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 off and on, 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 connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class B limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications.

Canadian Department of Communications Certification Label

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Attention: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

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Preface

This manual is intended to be used as a stand-alone document to service Aptiva machine type 2136 product. It is divided into the following chapters:

"General Information" contains a brief description of this manual.

"Check Procedures" provides step-by-step instructions that aid in locating the falling Field Replaceable Unit (FRU).

"Diagnostic Aids" explains the diagnostics for removing FRUs.

"Parts/Test Point Locations" contains illustrations and descriptions of the locations of the major parts, jumpers, and connectors .

"Safety Inspection Guide" contains information about inspecting a machine for safety problems before putting the machine under a Maintenance Agreement.

"Parts Catalog" contains descriptions, illustrations, and part numbers for individual FRUs.

Appendix A, "Part Number Index" contains part numbers listed in numerical order.

Appendix B, "Online Support Information" contains online support information.

Appendix C, "Model/Monitor Configurations and FRU Part Numbers" contains models and FRUs listed by part number for all countries.

General Information

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Chapter Description

This chapter contains general information about the contents of this manual, product descriptions, and other information useful when servicing the product.

Diagnostic Information

The diagnostic information contains the check procedures you use to diagnose and isolate product failures. Diagnostic information consists of:

Start:

This is the starting point for any diagnostic action. Based on high-level symptoms, the information in this check procedure directs you to more detailed procedures to help you resolve the machine failure.

Symptoms, Messages, Error Codes, and Beeps:

The Index of Symptoms, Messages, Error Codes, or Beeps lists symptoms and their probable causes, and directs you to the applicable check procedures to help you resolve the machine failure. The index also lists which FRU is the likely cause of the problem.

Check Procedures:

When the Start check procedure sends you to a specific check procedure or the Index of Symptoms, Messages, Error Codes, or Beeps, turn to that section and perform the steps as instructed. If there are any notes or instructions at the top of the page, read them before you start the procedure. Carefully read each step of the check procedure and perform the appropriate action as instructed. If you do not remember the location of a specific part or test point, or if you do not remember an adjustment or removal procedure, see the chapter with that information. Always return to the check procedure after you do this. In some cases, you are sent to other check procedures to find the failure.

Diagnostic Aids:

The Diagnostic Aids chapter contains additional information to help you diagnose a failure of a specific part.

Using the Check Procedures

***Failing Parts or Assemblies*:** The check procedures generally help you trace a problem to one part or assembly. The last step of the specific check procedure you are using indicates that a part or assembly is failing. You should inspect the part or assembly before you decide to replace it. It might be loose, dirty, or in need of a small repair. The check procedures might lead you to two, or even three, possible failing parts or assemblies. The parts that might

be failing are listed in order of the most probable failure and. Also, the FRU parts are defined as a replaced unit which are not repaired in the field.

***Measuring Voltages*:** Many check procedure steps instruct you to measure voltages on cable plugs and electronic board connectors. If you are asked to measure voltage at several places on a plug or connector, a chart next to or near the instruction indicates the number of the plug or connector, the pin numbers you should measure, the signal name, and the correct voltage for the condition you are measuring. Measure the voltage only at the pins listed in the chart. Remember to set the meter on the correct scale and to put the meter leads in the correct position for the voltage you are asked to measure.

Note: Use frame ground for the ground reference. Attach the black meter (ground) lead to frame ground, except where specified otherwise.

Diagnostic Aids

This chapter contains information outside the check procedures to help you diagnose a failure of a specific part. Some diagnostic aids are resident in the machine, such as the Power-On Self Test (POST). The machine performs the POST each time it is powered on. Use this information throughout the diagnostic procedures. You should become familiar with the POST and be able to determine if the machine performed all the steps.

***POST*:** The normal POST is initiated automatically each time the system unit is powered on. The POST is a series of system checks and initializations that verify the correct operation of the base system.

After a successful POST, a single short beep is generated. The system attempts to load an operating system. The system can be customized for different startup (boot) methods by BIOS Setup Utility.

The system's default startup sequence automatically looks for the operating system files on the hard disk if the files are not found on diskette.

Note: Remember that the POST does not test all areas, but only those that allow the system to operate well enough to run the Diagnostics program.

Repair Information

This chapter contains removal and replacement instructions.

Parts/Test Point Locations

This chapter contains system board layouts and jumper settings. It is useful when you are asked to measure voltages. Use this information to help you locate parts such as electronic boards, connectors, pin numbers, and test points. This chapter also contains jumper settings for the hard disk drive, CD-ROM (compact disc-read-only memory) drive, and the connector information for Audio-I/O sound card and fax/modem adapter card.

Safety Inspection Guide

This chapter contains guidelines to help you identify possible safety concerns. Use this information to inspect a machine for safety problems before putting the machine under a Maintenance Agreement.

Parts Catalog

This catalog includes figures, part numbers, and part names for parts ordering information use.

Part Number Index

This chapter contains part numbers listed in numerical order.

Product Description

This manual contains service information for the **2136 Service Level A (SL-A)** model of the IBM Aptiva Personal Computer, worldwide. The Machine Type 2136 contains two PCI slots, three ISA slots and one PCI/ISA-shared slot.

For FRU parts information, see the “Parts Catalog” on page 7-1.

***Security*:** Power-on password. See “Power-On Password” on page1-15.

***System Boards*:** See "System Board Layout" on page 5-2 for system board jumper and connector locations.

The system board supports the Pentium processor and has the following features:

- Pentium socket-7 Zero Insertion Force (ZIF) connector. You must remove the old processor to install an upgrade processor.
- Detachable CPU heat sink with fan.
- 16-KB CPU internal cache memory
- Onboard fixed 256-KB Pipe-Line Burst external cache(PBSRAM).
- Onboard fixed 1-MB video Synchronize Graphics RAM(SGRAM).
- Four, 72-pin system memory module sockets support these memory modules:
  - 4-MB, 8-MB, 16-MB, or 32-MB SIMM modules.
  - Non-Parity (32-bit) memory SIMMs.
  - Memory speed of 60 nanoseconds (ns).
  - Tin-lead contacts.
  - Support fast page mode or Extended Data Out (EDO) Dynamic Random Access Memory (DRAM).
  - Maximum system board memory is 128 MB. Refer to "SIMM Configurations " on page 5-16.
- Ports for
  - Video port (15-pin D-sub connector)
  - Parallel port (25-pin D-sub connector)
  - Two serial ports (9-pin D-sub connector)

  - Keyboard port (PS/2 connector)
  - Mouse port (PS/2 connector)
- Connectors for
  - PCI/ISA riser card (1x186-pin)
  - Input power (12-pin)
  - AT diskette drive (34-pin)
  - Two 40-pin Enhanced IDE drive channels: a primary local bus IDE that supports two hard disk drives and a secondary Enhanced IDE that supports a CD-ROM drive and one hard disk drive, or two hard disk drives.
  - 2-wire power Light-Emitting Diode (LED) cable
  - 4-wire hard disk Light-Emitting Diode (LED) cable
  - 2-wire power switch connector cable
  - 3-wire power supply auxiliary control connector from power supply to system board for Microsoft Windows 95 software shutdown feature.
  - RTC lithium battery.

Processors

- One of the following processors can be installed:
  - Pentium P54C-120 MHz internal; 66 MHz external
  - Pentium P54C-133 MHz internal; 66 MHz external
  - Pentium P54C-150 MHz internal; 60 MHz external
  - Pentium P54C-166 MHz internal; 66 MHz external
  - Pentium P54C-200 MHz internal; 66 MHz external
  - Pentium MMX P54C-200 MHz internal; 66 MHz external
  - Pentium MMX P54C-200 MHz internal; 66 MHz external
  - Cyrix PR150+ processor
  - Cyrix PR166+ processor

Diskette Drive

- AT-type
- 3.5-in. 1.44 MB slimline diskette drive.

Multimedia

- Onboard 5.25-in. high-performance, eight-speed (8X), twelve-speed (12X), or sixteen-speed (16X) CD-ROM IDE/AT drive that can read data and play audio from standard and mini CD-ROM and audio compact discs (audio CDs). It is compatible with industry-standard multimedia requirements.
- Audio-I/O card (either of with or without wave table feature).
- Fax/modem adapter card with fax send/receive, voice-over-data features,
- One pair of external speakers with power adapter.
- External microphone.

Power management

- Enable/disable power saving feature by BIOS Setup Utility.
- Devices (monitor and hard disk drive) power saving control by BIOS timer setup.
- System (standby and suspend modes) power saving control by BIOS timer setup.

Power Supply

- The power supply is a 200-W switchable high/low voltage power supply with a thermal sensing variable fan speed and a connector for a detachable grounded 3-wire power cord.
- The power cable has four DASD connectors: one mini power connector and three standard 4-pin connectors.
- To support the Microsoft Windows 95 software shutdown feature, all power supplies have a 3-wire auxiliary control cable that connects to the system board. There is no on/off switch cable assembly for the power supply.

Cables

- Two 40-pin ribbon cable for hard disk drives and CD-ROM
- One 34-pin ribbon cable for diskette drive
- One 3-pin auxiliary power control cable from power supply to system board
- One 4-pin (2-wire) HDD LED cable from system board to front panel

- One 3-pin (2-wire) power LED cable from system board to front panel
- One 2-pin (2-wire) power switch cable from system board to front panel
- One 4-pin voice signal cable from system board to fax/modem adapter card
- One 10-pin and one 34-pin ribbon cable from system board to Audio-I/O card.

Hard Disk Drive

- The hard disk drive is a 3.5-in. low profile, 1-in. height IDE AT drive with "look-ahead" 128 KB cache memory and a minimum of 12ms average seek time. Access time varies by the hard disk drive and the hard disk drive manufacturer.

Monitors

- 14”(13.1” viewable image size)/15”(13.6” viewable image size) SVGA (Super Video Graphics Array) monitors include:
  - 0.28-mm dot pitch.
  - Automatic scanning horizontal frequencies from 30KHz to 54KHz and all vertical frequencies between 50Hz and 100Hz.
  - Up to nine user controls: power, contrast, brightness, horizontal center, vertical center, horizontal size, vertical size, pincushion
  - Auto-sensing power input for 100 Vac to 240 Vac.
  - With DDC2A/B feature
  - Suspend and off modes with amber indicator blinking.
  - Power switch.
  - Tilt and swivel base
  - Connector for a detachable grounded 3-wire power cord.
  - 1.8-m (5.8-ft) attached signal cable.

Keyboard

- 104-key, or 105-key rubber dome keyboard with 1.8-m (6-foot) cable.

Mouse

- PS/2 mouse with 1.8-m (6-foot) cable

Hardware Interfaces

The following peripheral interfaces for adapters, options, and drives are supported in the system unit.

Table 1- 1 System Board Hardware Interfaces

Item	**Interface**
Hard disk drives	Two Enhanced IDE mode 4 local bus interface (American National Standards Institute-ANSI)
Input/output (I/O) adapter cards	IBM AT-ISA Plug and Play compatible fax/modem adapter card that operates at 8 MHz bus speed
Diskette drive	AT diskette interface
Video	For refresh rates and monitor frequency settings, see "Refresh Rates and Monitor Frequencies". Physical interface is compatible with the IBM Personal System/2 (PS/2) VGA interface.
Serial	9-pin connector with RS232D electrical interface
Parallel	Bidirectional, ECP bidirectional and EPP bidirectional interfaces are supported.
Pointing device	IBM PS/2-compatible mouse
Keyboard device	IBM PS/2-compatible enhanced keyboard
CD-ROM drive	AT IDE, extended architecture (XA) enabled drive
Sound	Sound feature is built in system board with the compatibility to Sound Blaster (Creative Labs, Inc.). Wave table feature is resided in Audio-I/O adapter card.

Table 1- 2 Audio-I/O Card Hardware Interfaces

Item	**Interface**
Game port	Game port interface for joystick, it also supports MIDI feature.
Microphone-in Speaker-out Line-in	Sound I/O interfaces between system board and external peripheral.

Memory Map

This table shows the hexadecimal addresses for the system memory regions. You may use this information for adapter cards that require you to set up memory regions.

Table 1- 3 Memory Map Table

Address range	**Description**
0~640 KB (000000 ~ 09FFFF)	Base memory
640~768 KB (0A0000 ~ 0BFFFF)	PCI/ISA video buffer memory
768~800 KB (0C0000 ~ 0C7FFF)	Video BIOS memory
800~896 KB (0C8000 ~ 0DFFFF)	ISA card BIOS and buffer memory
896~960 KB (0E0000 ~ 0EFFFF)	BIOS extension memory Setup and POST memory PCI development BIOS
960~1024 KB (0F0000 ~ 0FFFFF)	System BIOS memory
1024 KB~Upper Limit	Main memory
Upper Limit ~ 4 GB	PCI memory

System Input/Output Addresses

This table shows the hexadecimal addresses for each of the system board input/output (I/O) functions.

Table 1- 4 System Input / Output Addresses Table

Address range	**Function**
0000-001F	DMA controller 1
0020-003F	Interrupt controller 1
0040-0047	System timer
0050-0057	System timer
0060-006F	System controller 8742
0070	CMOS RAM address and NMI mask
0078-007B	Real-time clock
0080-009F	DMA page register
00A0-00BF	Interrupt controller 2
00C0-00DF	DMA controller 2
000F-00FF	Math coprocessor
0170-0177, 0376	Secondary IDE controller
01F0-01F7, 03F6	Primary IDE controller
0200-0207	Joystick
0220-022F, 0388-0389, 0534-0537	Audio
0330-0333	MIDI
0278-027F	Parallel port 2
02F8-022F	Serial port 2
0378-037F	Parallel port 1
03F0-03F7	Diskette drive controller
03F8-03FF	Serial port 1/modem
0CF8	PCI mechanism #1 configuration address register
0CFC	PCI mechanism #2 configuration data register
F000-F010	Bus master IDE

System Interrupts

This table shows the system interrupt requests (IRQs) and their functions. You may use this information if you install an adapter card that requires you to set IRQs.

Note: IRQ 11 may be used if hardware MPEG is enabled.

Table 1- 5 System Interrupts Table

Interrupt request (IRQ)	**Function**
0	Timer
1	Keyboard
2	Cascade interrupt control
3	Serial alternate/modem
4	Serial primary
5	Audio
6	Diskette
7	Parallel port
8	Real-time clock
9	MIDI
10	Not used
11	Not used
12	PS/2 mouse
13	Math coprocessor
14	Primary IDE
15	Secondary IDE

DMA Channel Assignments

This table shows the channel assignments for direct memory access (DMA). DMA allows I/O devices to transfer data directly to and from memory. You may need to select an open DMA channel if you add an I/O device that uses DMA.

Table 1- 6 DMA Channel Assignments Table

DMA channel	Assignment
0	Audio
1	Audio
2	Diskette
3	Audio
4	Cascade
5	Not used
6	Not used
7	Not used

Serial Port Addresses

The built-in serial port supports these addresses and interrupts.

Table 1- 7 Serial Port Addresses Table

Address	Windows 95	Interrupt	Default
3F8	COM1	IRQ 4	Modem
3E8	COM3		Serial port B
2F8	COM2	IRQ 3	Serial port A
2E8	COM4		

Note: Conflicts may arise if you add adapter cards with serial ports or if you change the address settings on your modem if you are using an operating system other than Windows 95. You can resolve most of these conflicts by using the BIOS Setup Utility to change serial port addresses. See “Changing Devices and I/O Port Configurations” on page 1-22 for more information.

Refresh Rates and Monitor Frequencies

This section provides the refresh rates and monitor frequencies for system boards.

Refresh Rates and Monitor Frequencies

The following table lists the maximum vertical refresh rates from system board ATI264VT video chip. The used refresh rate should be within monitor's specification.

Table 1- 8 System Board Output Vertical Refresh Rates			
Resolution →	640x480	800x600	1024x768
Color ↓			
256	100 Hz.	100 Hz.	75 Hz.
64,000	100 Hz.	75 Hz.	--
16,000,000	75 Hz.	--	--

CMOS Reset

The BIOS program design makes it impossible to block user entry to BIOS Setup Utility, so the process to reset the CMOS information is no longer needed. The user can release the corrupt CMOS information by executing the "Load BIOS Default Settings" in BIOS Setup. See "Changing and Restoring Settings" on page1-20.

Power-On Password

A power-on password denies access to the system by an unauthorized user when the system is powered on. When a power-on password is active, the password prompt appears on the screen each time the system is powered on. The system unit starts after the proper password is entered.

In some cases, you might be required to service a system with an active and unknown power-on password. To clear a password from the system, first identify the system password jumper by referring to "System Board Layout" in page 5-2, then follow these steps.

1. Power-off the system unit.
2. Unplug the power cable from the electrical outlet.

   Attention: Do not attempt these steps with the power cord plugged into the electrical outlet. The power supply maintains +5 Vdc of auxiliary power when the power switch is powered off. System damage might result if the power cord is not unplugged during testing.

3. Move the jumper JP4 from pins 1-2 to pins 2-3 to bypass the password check process. See "System Board Layout" in page 5-2.

   Note: If you want to skip password checking step for service and are not requested to clear the password for customer, then here the procedure is enough.

   Do not forget to return the password jumper to 1-2(check status) if you want the machine remains the original password setting.

4. Plug the power cable, turn on the system, depress F1 while POST to enter BIOS Setup menu.
5. Select Advanced Options, then enter Security Options and set Power-on Password setting to “None” to clear password.
6. Save the exit from BIOS Setup.
7. Unplug the power cable from the electrical outlet.
8. Move the jumper from pins 2-3 back to pins 1-2 to enable the password check process. See "System Board Layout” on page 5-2.

   Notes: To reinstall the password, the user must enter a password in the Setup Utility.

Flash (BIOS) Update Procedure

1. Prepare a bootable DOS diskette disk with AFLASH.EXE, MSG.DAT, RXX-YY.RN and RXX-YY.BIN.

   Note: The AFLASH.EXE and MSG.DAT are flash utility program. The RXX-YY.RN file has the BIOS checksum information. The RXX-YY.BIN is BIOS source code binary file and its file size should be 131.072 bytes.

2. Insert the diskette disk and boot up from Drive A:.

   Warning: Do not boot up with any memory related driver such as HIMEM.SYS, EMS.SYS ….

3. Run AFLASH.EXE

4. Press any key to pass the information screen, execute “LOAD BIOS FILE TO BUFFER” and key-in BIOS file name (RXX-YY.BIN). Program then automatically loads BIOS file into memory buffer. If the BIOS file does not exist, a warning message will appear on screen.

5. Verify the checksum value is same to the information from RXX-YY.RN file.

6. Execute “PROGRAM FLASH ROM” from main menu.

Warning: Shutting down the power, or resetting the system (or any interruption) while the AFLASH program is programming BIOS will result in the corruption of system BIOS. This will render the system inoperative. In the event that this happen, the “bad” flash ROM will have to be replaced with a successfully programmed BIOS. Please see “Parts Catalog” on page 7-4 for a programmed BIOS FRU number information.

7. Follow the instruction on screen to complete the programming BIOS.

8. Power off system after the BIOS is been completely updated.

Changing the BIOS (Flash ROM) Model Number and Serial Number

1. Prepare a bootable DOS diskette with BCREADER.EXE.
2. Insert the diskette and boot from Drive A:.

   Warning: Do not boot with any memory related driver such as HIMEM.SYS, EMS.SYS ….

3. At the DOS prompt, type `A:>BCREADER/I` then press Enter. A warning message indicating BIOS information change appears. Type `Y` to continue.

   Note: Before you change the model number and the serial number, type `A:>BCREADER/D` and press Enter to display the original model number and serial number information (the characters that appear after `String 1:` denote the model number, while those that follow `String 2:` denote the serial number).

4. When the screen shows:

   ```
   A:>MODEL_NUMBER:
   ```

   enter the new model number and press Enter to continue. Take note that you can type a maximum 16 characters (without space) for the model number.

5. When the screen shows:

   ```
   A:>SERIALNUMBER:
   ```

   Enter the new serial number and press Enter to continue. Take note that you can type a maximum 16 characters (without space) for the serial number.

6. Type `A:>BCREADER/D` and press Enter to display and verify your input model number and serial number information.

   Note: The characters that appear after `String 1:` denote the model number, while those that follow `String 2:` denote the serial number.

BIOS Setup Utility

The Setup Utility lets you review and change important information about the computer and its hardware.

Starting the Setup Utility

Follow these steps to start the Setup Utility.

1. Turn on your monitor.
2. Turn on the system unit.
3. When you see the IBM logo and the line message “Press F1 to enter Setup”, press F1 to enter the Setup Utility. If you have previously set a power-on password, you are prompted to type in the password after you press the F1 key. See the section “Configuring Advanced Options” on page 1-27 for information on setting, changing, or removing the password and “Power-On Password” on page 1-15 for bypassing password.

Note: You cannot enter the Setup Utility after the power-on self test (POST).

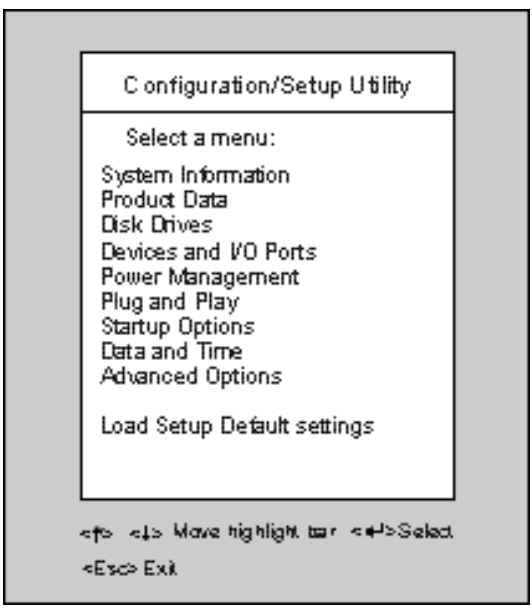

Figure 1- 1 BIOS Setup Main Menu Display

Working with the Setup Utility menus

The Setup Utility Main Menu lists options that identify system configuration topics. When you select one of these options, an additional menu appears.

To select and move through Setup Utility options, you must use the keyboard. To move through menus, press the down or up arrow key on the keyboard until the option you want is highlighted. To select a highlighted menu option, press the Enter key.

To move through menus, use the following keys:

Keys	Function
Down or up arrow key	Use these arrow keys to highlight an option on the menu. (Press the Enter key to choose the option.)
Left or right arrow key	Use these arrow keys to make a selection and change an option's setting. On some menus, you can use these keys to move from one field to another.
F1	Press this key if you want help for a selected menu option.
Esc	After viewing or making changes to the settings on a menu, press this key to exit the menu.
Enter	Press this key to choose a highlighted option from a menu.

Changing and restoring settings

In Setup Utility menus, the configuration information you can change is enclosed in brackets like these: [ ]. You cannot change information that is not surrounded by brackets.

When you complete your changes or finish viewing information, return to the Main Menu. From this location, you can exit the Setup Utility and save your changes or exit without saving your changes.

To exit the Setup Utility, follow these steps:

1. From the Main Menu, press the Esc key.
2. The Exit Setup Utility menu appears. If you have made changes in the Setup Utility, it will contain an option for saving your changes.
    - If you would like to save your changes, press the left arrow key to select the option Yes, then press Enter to save your changes and exit the Setup Utility.

- If you do not want to save your changes, press the right arrow key to select the option No, then press Enter, to exit the Setup Utility without saving.

Restoring factory settings

When you purchase an Aptiva computer, it is already configured for use. The Setup Utility stores these original configuration settings, called factory or default settings, so that you can return to the original configuration at any time. If you have made changes in the Setup Utility and you would like to restore the factory settings, follow these steps:

1. From the Main Menu, highlight the option Load Setup Default Settings then press Enter. A dialog box appears confirming if you want to load the default settings.
2. Use the left arrow key to select Yes, then press Enter.
3. Press Esc to save your changes and exit the Setup Utility.

Viewing System Information

From the Setup Utility Main Menu, select the System Information option to view information about the hardware installed on your computer. You cannot use this screen to change information. The Setup Utility automatically updates this menu when you:

- Add or change hardware on your computer
- Make changes to other menus in the Setup Utility and save those changes.

The System Information menu contains information about the processor, memory, drives, and ports installed in your system. It includes information on the video and I/O port addresses. This screen also shows if the mouse is installed.

The option Product Data lists other information about your computer including model number, serial number, and BIOS version and date.

Changing Disk Drive Configuration

If you install a new diskette, hard disk, or CD-ROM drive, BIOS auto-detects the presence of these devices. Enter the Setup Utility to identify or verify the type of drive installed in the computer.

From the Setup Utility Main Menu, select the System Information to display a screen with a list of the devices installed. The device settings in this screen are not configurable.

If you want to change any drive setting, select Disk Drives from the main menu. The Disk Drives menu appears showing the cylinders, heads, sectors, and size of the hard disk drives installed in your computer.

Diskette drive (A: or B:)

These options display the size and storage capacity of the currently installed diskette drive or drives. Empty drive bays are indicated with a “None” setting. Your Aptiva computer comes with a diskette drive A:. If you add an additional diskette drive, it will be designated as diskette drive B.

IDE hard disks and CD-ROM drives

These options display the IDE hard disks and CD-ROM drives that either are already installed or can be installed in your computer. You can have a maximum of four IDE drives.
The drives are identified as follows:

- IDE 1st Channel Master is attached to IDE connector 1 on the system board and set as the master device. This is the hard disk that comes preinstalled with your computer.

- IDE 1st Channel Slave (if installed) is attached to IDE connector 1 on the system board and set as the slave device.

- IDE 2nd Channel Master (if installed) is attached to IDE connector 2 on the system board and set as the master device.

- IDE 2nd Channel Slave (if installed) is attached to IDE connector 2 on the system board and set as the slave device. Normally, a preinstalled CD-ROM drive is connected here.

If the cylinders, heads, sectors, and size of a particular drive channel appear, it means that a hard disk drive is installed in that channel.

Enhanced IDE Features

Hard disk block mode

This function enhances disk performance depending on the hard disk in use. BIOS automatically detects if your hard disk supports this feature.

Setting to Auto allows data transfer in blocks (multiple sectors) to increase the data transfer rate. If your system does not boot after setting this parameter to Auto, change the setting to Disabled. The default setting for this parameter is Auto.

Advanced PIO mode

Enabling this parameter improves system performance by allowing the use of faster hard drives. If your hard disk does not support this function, set this parameter to Disabled. The default is Auto.

Large hard disk support

This enhance IDE feature works only under DOS and Windows 3.1x environments. If enabled, it allows you to use a hard disk with a capacity of more than 504MB. This is made possible through the Logical block address (LBA) mode translation. Other operating systems require this parameter to be set to Disabled.

To prevent data loss, set this parameter to Auto if you are using a hard disk with more than 504MB capacity that was previously configured through the LBA mode. If you use a hard disk configured through the user-specific cylinder-head-sector (CHS) mode, set this parameter to Disabled.

Hard disk 32-bit access

Setting this parameter to Auto improves system performance by allowing the use of the 32-bit hard disk access. This enhanced IDE feature only works under DOS, Windows 3.x, Windows 95, and Novell NetWare. If your software does not support this function, set this parameter to Disabled. The default setting is Auto.

Changing devices and I/O port configurations

From the Setup Utility Main Menu, select the Devices and I/O Ports option to view or change port configuration settings. The Devices and I/O Ports menu appears. This menu lets you configure serial and parallel ports.

Also included in this menu are items for enabling or disabling the onboard audio chip and the keyboard numeric lock.

Onboard communication ports

Serial ports

Your computer comes with two 9-pin serial ports. The serial port parameters display the current address for the serial ports in your computer.

Use the serial port parameters to make sure that each serial port has a different address. If you change serial port addresses, you might also need to make changes in the software that uses serial ports. For instructions on changing your software, see the user's guide or online documentation that came with the software.

Parallel port

Your computer comes with one parallel port. This parameter displays the current address for the parallel port on your system board.

Use this menu to make sure that each parallel port has a different address. If you change parallel port addresses in this menu, you might also need to make changes in the software that uses the parallel port. For instructions on changing your software, see the user's guide or online information that came with the software.

Operation mode

As long as the parallel port setting is not disabled, this item allows you to choose an operation mode for the parallel port.

You can select either the Standard mode or one of the extended modes (Bidirectional, EPP, or ECP) for a parallel port operation mode. The extended modes increase the efficiency of your parallel port; however, these modes use recent technology and are only supported by newer hardware (such as some printer models). The available extended modes are:

- **Standard** This mode allows for one-way operation at a normal speed.
- **Bidirectional** This mode allows for a two-way operation at a normal speed.
- **EPP** This mode allows for a bidirectional parallel port operation at a maximum speed.
- **ECP** This mode allows the parallel port to operate in a bidirectional mode and at a speed higher than the maximum data transfer rate.

ECP DMA Channel

This item becomes active only if you select ECP as the operation mode. It allows you to select DMA channel 1 or DMA channel 3 depending on the available system resource.

NumLock after boot

This parameter displays whether the NumLock function on the keyboard turns on automatically each time you turn your computer on. You can set this to Enabled or Disabled. The default is Enabled.

Setting Power Saving Timers

The system power management feature allows you to reduce power consumption. When the Power Management Mode parameter is set to Enabled, you can configure the different power saving timers to your desired settings. Setting this parameter to Disabled deactivates the power management feature and all the timers.

Monitor power saving timer

This timer allows the monitor to enter suspend mode after the number of minutes that you specified has elapsed. Any keyboard or mouse action, or a video buffer access, returns the monitor to normal operation. Press the left or right arrow key to select your desired setting. Setting this timer to Off deactivates the monitor power saving function. The default setting is 15 minutes.

Set this timer to Off if you want to use the monitor energy saving feature in Windows 95.

IDE hard disk standby timer

This parameter allows the hard disk to enter standby mode after inactivity of 1 to 15 minutes, depending on your setting. When you access the hard disk again, allow 3 to 5 seconds (depending on the hard disk) for the system to recover and return to normal speed. Set this parameter to Off if your hard disk does not support this function.

System standby timer

This parameter sets the system to a “fast-on” power saving mode. It automatically enters the standby mode after a period of inactivity. Any keyboard or mouse activity, or any enabled monitored activities occurring in the IRQ/DMA channels resume system operation.

Press the left or right arrow key to select your desired setting. Setting this to Off disables the timer.

System suspend timer

This timer supports the lowest power saving mode. After the time specified in this timer has elapsed without any system activity, the system enters suspend mode. To resume system operation, you can either press a key or move the mouse.

Press the left or right arrow key to select your desired setting. Setting to Off disables the suspend function.

Changing Plug and Play Configuration

When you install a new Plug and Play adapter card, the system BIOS automatically detects it and configures your computer to use the card. If you install a non-Plug and Play or a non-PCI adapter card, the BIOS does not detect it. Instead, use Windows 95 Device Manager to dedicate ISA Legacy resources for the card.

From the Setup Utility Main Menu, select the Plug and Play option to view or change BIOS configuration policy or clear configuration data when installing adapter cards.

Plug and Play OS

When this parameter is set to Yes, BIOS initializes only Plug and Play boot devices, then the Plug and Play operating system takes care of the other devices. When set to No, BIOS initializes all Plug and Play boot and non-boot devices.

Set this parameter to Yes if you are using the Windows 95 operating system. Set to No if you run any other operating system. The default setting is Yes.

Reset resource assignments

Set this parameter to Yes to avoid IRQ conflict when installing non-Plug and Play cards. This clears all resource assignments and allow BIOS to reassign resources to all installed Plug and Play devices the next time the system boots. After clearing the resource data, the parameter resets to the default setting No.

Before you install non-Plug and Play cards, set this parameter to Yes, exit the Setup Utility and turn off the computer. Then refer to “Memory Map” on page 1-10, “System Input/Output Addresses” on page 1-11, “System Interrupts” on page 1-12, and “DMA Channel Assignments” on page 1-13 to ensure there is no conflict to system resources.

Configuring Startup Options

From the Setup Utility Main Menu, select the Startup Options option to view or change start-up configuration settings. The Startup Options menu appears. This menu identifies the start-up devices.

System boot drive

This parameter has four options:

- **Drive A Then C** In this option, the system BIOS checks drive A first. If there is a diskette in the drive, the system boots from drive A. Otherwise, it boots from drive C. This is the default setting.
- **Drive A only** It directs BIOS to boot up the system from drive A.
- **Drive C only** It directs BIOS to boot up the system from drive C.
- **Drive C then Drive A** In this option, the system BIOS checks drive C first. If there is no hard disk drive, the system boots from drive A.
- **Boot from CD-ROM** When enabled, this parameter prompts BIOS to look first for a bootable CD in the CD-ROM drive. If a bootable CD is present, the system boots from the CD-ROM. Otherwise, it boots from the drive specified in the System Boot drive parameter.

Setting the Date and Time

From the Setup Utility Main Menu, select the Date and Time option to view or change the system clock from the Date and Time menu.

If you want to change the system date, enter the date in the format shown on the screen as in the following example:

Tue Feb 14, 1997

If you change the time, enter the time in 24-hour format (hours, minutes, seconds). For example:

- 12 midnight is 00:00:00
- 12 noon is 12:00:00
- 1 p.m. is 13:00:00

When setting date and time, press the up or down arrow key to highlight a field. Press the left or right arrow key to select settings.

Configuring Advanced Options

From the Setup Utility Main Menu, select the Advanced Options option to view or change a variety of configuration settings. The Advanced Options menu appears, with the following options:

- Security Options
- Cache Options
- PCI Options

Each of these options opens an additional menu.

Security options

The Security Options menu lets you configure the following parameters:

- Power On Password
- Disk Drive Control

Power on password

Select this option to open the Power On Password menu. In this window, you can set up a password to restrict the use of your computer. You can also change or remove the password.

If you set up a power-on password, you must type this password each time your computer is turned on. If you do not type the correct password, you cannot use your computer.

Note: Make sure that jumper JP4 is set to pins 1-2 (check password). This is the default setting. See “System Board Layout” on page 5-2.

Follow these steps to set a power on password:

1. Highlight the Power On Password parameter and press the left or right arrow key to display the Power On Password window.
2. Type a password consisting of up to seven characters, then press Enter.

3. Retype the password then press Enter.

   The Power On Password window disappears. The Power On Password parameter automatically sets to Present.

The next time you turn on the system, you will be prompted to enter your power-on password. If you press F1 during POST to enter the Setup Utility, you must key in the password as well.

Disk drive control

These parameters allow you to write-protect the diskette and hard disk drives. The settings include:

- **Write protect all sectors** It disables the write function all sectors of the diskette or hard disk drive.
- **Write protect boot sector** It disables the write function only on the boot sector of the diskette or hard disk drive.
- **Normal** It allows the diskette or hard disk drive to function normally.
- **Disabled** It disables all diskette or hard disk drive functions.

Cache Options

The Cache Options menu allows you to configure the internal and external caches. Enabling the cache parameters optimize system performance.

Some older applications, however, may not run properly with the caches enabled. Set the parameters to Disabled when you run these applications. Disabling the caches will degrade system performance.

Internal cache

This parameter enables or disables the internal cache memory.

External cache

This parameter enables or disables the external cache memory.

Cache scheme

This item indicates the cache scheme when you enable the external cache parameter. It turns grey when the external cache is disabled. The fixed setting is Write Back.

The Write Back cache scheme allows updates in the cache but not in the memory when there is a write instruction. The memory is only updated when there is inconsistency between the cache and the memory.

PCI options

The parameters in the PCI Options menu allow you to set the IRQ assignments for your PCI devices.

PCI IRQ setting

This parameter allows for automatic or manual configuration of PCI devices. If you use Plug and Play devices, you can keep the default setting Auto. The system then automatically configures the Plug and Play devices. If you install non-Plug and Play adapter cards, set this parameter to Manual. This allows you to assign resources to non-Plug and Play cards first.

If you have to configure PCI resources manually, use the up or down arrow key to move between fields and select the IRQ assignments using the left or right arrow key.

PCI slots

These parameters allow you to specify the appropriate PCI devices. You may assign IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, IRQ12, IRQ14, or IRQ15 if they have not been previously assigned to other devices. Some IRQs are normally assigned to specific system devices. See “System Interrupts” on page 1-12 to make sure that the IRQ that you want to use is free to avoid resource conflicts.

Onboard PCI VGA

This parameter lets you to assign an interrupt for the onboard PCI VGA device.

Bus mastering

When set to Enabled, this option allows for the PCI cycles not to pass through the CPU for faster operation. When set to Disabled, all PCI transactions pass through the CPU.

Loading the Setup default settings

There are times when you will have to load the Setup default settings of your computer. In the following instances, you must load the Setup defaults:

- when you replace the system battery
- when you customize your system configuration settings, and some resource assignments conflict, causing the computer to hang.

At certain times, you have to load the default settings to optimize system performance.

System Memory

The system board support 72-Pin, 60 nS, tin-lead, fast page or EDO, 32-bit Single Inline Memory Module, (SIMM).

Specifications

Dimension:

- System unit:
  - Width: 190 mm (7.48 in.)
  - Depth: 466 mm (18.35 in.)
  - Height: 442 mm (16.61 in.)
- 14” Monitor (13.1” viewable image size):
  - Width: 352 mm
  - Depth: 378 mm
  - Height: 356 mm with tilt/swivel stand
- 15” Monitor (13.6” viewable image size):
  - Width: 376 mm
  - Depth: 385 mm
  - Height: 367 mm with tilt/swivel stand

Weight:

- System unit:
  - 11.5 kg (25.35 lb)
- 14” Monitor (13.1” viewable image size):
  - 11 kg (24.25 lb)
- 15” Monitor (13.6” viewable image size):
  - 16 kg (35.27 lb)

Environment:

- Temperature for system unit:
  - Power on: 10° to 35°C (50° to 95°F)
  - Power off: -10° to 60°C (14° to 140°F)
- Temperature for monitor :
  - Power on: 10° to 40°C (50° to 104°F)
  - Power off: -40° to 60°C (-40° to 140°F)
- Humidity for system unit:

  - Power on: 20% to 80%
  - Power off: 20% to 80%
- Humidity for monitor :
  - Power on: 20% to 90%
  - Power off: 10% to 95%

Power consumption:

- System unit:
  - Maximum: 200 Watts
- Monitors :
  - Maximum: 90 Watts

Electrical input:

- Input voltage for system unit (Sine-wave input is required) :
  - Low Range: 90 Vac to 132 Vac
  - High Range: 180 Vac to 264 Vac
- Input voltage for monitor (Sine-wave input is required) :
  - 90 Vac to 264 Vac

Operating Requirements

All machines require two power input: one on the system unit and one on the display.

The system units come with a voltage selector switch, allowing selection of voltage of either 110Vac or 220Vac. This switch must be in the 220 Vac position when the machine is plugged into a 220 Vac electrical outlet.

If the display was shipped with the model, its required power supply input is voltage auto-sensing type which doesn't need to set any switch.

When the system unit is powered off for 10 seconds or more and then powered on, the power supply generates a "power good" signal that resets the system logic.

A Note About Energy Saver Monitors

- Monitors rated as "Energy Saver" models use less than 15 watts when operating in the energy-saving mode or when the system unit is powered off.

- To extend monitor life, the monitor should be powered off at the end of each day.

Special Tools

The following special tools are required to service this system:

- Wrap plug, P/N 72X8546

Check Procedures

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Check Procedures Start

This is the entry point for all check procedures. The check procedures use failure symptoms, POST error codes, or beeps to help determine the failing field replaceable unit (FRU). Follow the suggested check procedures or use the Diagnostics Diskette to determine the problem FRU.

Important: Do not replace an FRU unless you can determine the error is not caused by software, loose-contact, or dirt on component surface. Also, any change of the FRU should be verified by a complete test ("Diagnostics \ All Test" in PC-Doctor diagnostic program).

The diagnostics program comes on one diskette supplied with this book. Use only this diskette for **2136 Service Level A (SL-A)** IBM Aptiva Personal Computers.

Note: The Diagnostics Diskette is not a bootable diskette. See "Creating a Boot Diskette With Drivers" in "Diagnostic Aids" on page 3-5 for detail information about making a bootable Diagnostics Diskette.

The diagnostics program is intended to test only IBM products. Non-IBM products, prototype cards, or modified options can give false errors and invalid system responses.

All voltages in the check procedures are positive unless otherwise shown. Use frame ground for all voltage checks unless otherwise specified.

Note: If the check procedures instruct you to replace a FRU and the error message remains the same, an option adapter card might be causing the failure. Remove all option adapter cards, one at a time, until the error changes or the problem is no longer apparent. Replace the last option adapter card removed.

The hard disk drive contains pre-loaded software. Refer to "Software Installation Procedure" on page 4-34 to reinstall the original software. Be sure to reload the software on the primary hard disk drive (drive C) when replacing it.

Note: The drives in the system you are servicing might have been re- arranged, or the drive startup sequence, changed. Be extremely careful during write operations, such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive. **Ask the customer to back up any additional software from the hard disk drive before you take any action.**

***How to Diagnose Combined FRUs*:** If an adapter or device consists of more than one FRU, any of the FRUs might cause an error code. Before replacing the device or adapter, remove the FRUs, one by one, to see if the symptoms change.

If you have been directed here from another check procedure and were instructed to replace the system board, and that does not correct the problem, reinstall the original system board and go through "START" again.

A POST error code and message can occur when system is powered-on until the after of IBM logo shown on screen and one beep issued. Please go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7 for additional help.

If you want to print a copy of a Setup Utility screen on an attached printer, press **Print Screen** while the screen is displayed.

***How to Use Error Messages*:** Use the messages, error codes, and beep combinations that occur to diagnose failures. If more than one failure occurs, diagnose the first failure first. The cause of the first failure can result in false messages, error codes, or beeps. If you did not receive any messages, error codes, or beeps, see if the symptom is listed in "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

Attention: When you have deemed it necessary to replace a FRU, and have then done so, you must then run a total system check to ensure that no other activity has been affected by the change. This System Check can be made through PC-Doctor (Diagnostics \ All Test).

PLEASE READ THE FOLLOWING

Human Error is a cause for concern when applied to check procedures. It exists in every first time set of analysis procedures. It is therefore essential for effective and time-efficient servicing that each stage of every procedure is verified. (For example: When a symptom is found, or when a symptom appears to have been cured; the preceding steps should be repeated for accuracy of analysis).

001 - START

To begin this check, note the following:

- To disable or reset the power-on password, see "Power-On Password" on page 1-15.
- Disconnect all external cables and devices including speakers and microphone from the system unit, except for the keyboard, mouse, and monitor.
- Power-off the system unit whenever the machine is to be removed or replaced FRUs.
- Remove all adapter cards from the riser card, except for the factory-installed Audio-I/O card or modem adapter card and any other IBM Aptiva factory-installed adapter cards.
- Disconnect any drives except:
  - 3.5-in. diskette drive
  - Hard disk drive (some machines can have up to 4 hard disk drives installed.)
  - IBM Aptiva factory-installed devices (such as a CD-ROM drive).
- Ensure all power cords and cables are connected properly.
- Ensure the monitor brightness and contrast controls are not turned down.
- Power-on the system unit.

  Note: Some monitors have a detachable system I/O signal cable between the monitor and the system unit. In either case, check the power cord or cable before replacing the unit. See "Monitor Port Signals" on page 5-17 for pin identification.

  High voltage Northern and Southern Hemisphere monitors might come with a voltage selector (110 V-220 V) switch.

- Ensure correct monitor refresh rate. See "Refresh Rates and Monitor Frequencies" on page 1-14.
- Note any symptoms, messages, error codes, or beeps.
- Make sure there are no diskette or CD in the drives.

002 - DOES THE SYSTEM COMPLETE POST WITH ONE SHORT BEEP AND DOES AN IBM LOGO SCREEN APPEAR? (YES, READ AHEAD. NO, GO TO STEP 004.)

– Insert the system Bootable Diagnostics Diskette in the diskette drive. (See “Creating a Boot Disk With Drivers” in “Diagnostic Aids” on page 3-5 for detail information about making a Bootable Diagnostics Diskette.)

003 - DOES THE SYSTEM LOAD THE DIAGNOSTIC PROGRAM FROM THE DISKETTE DRIVE WHEN POWERED OFF AND THEN ON? (YES, READ AHEAD. NO, GO TO STEP 004.)

– Select **Utility** on the menu.

– Select **Tech Support Form** on the menu, press F5 to execute, then generate a hardware configuration report.

– Compare the system configuration list with the actual devices installed in the system unit.

Note: If necessary, remove the cover and visually compare the devices installed in the system unit to those shown in the hardware configuration report.

– Go to step 006

004 - DO ANY MESSAGES, ERROR CODES, OR SYMPTOMS APPEAR? (YES, READ AHEAD. NO, GO TO STEP 005)

– Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

005 -

– If the keyboard responds incorrectly, go to "Keyboard" on page 2-29.

– If the monitor shows problems, such as jittering, shifting, or being out of focus, go to "Monitor" on page 2-43 and run the Diagnostics tests.

006 - DOES THE HARDWARE CONFIGURATION REPORT CORRECTLY IDENTIFY THE DEVICES INSTALLED IN THE SYSTEM UNIT? (YES, READ AHEAD. NO, GO TO STEP 007.)

– Select **Diagnostics** from the menu.

– Select **All Tests** from the menu.

– Go to step 008

007 -

The Hardware Configuration Report shows only those devices supported by the Diagnostics Diskette and only factory-installed devices for the model you are servicing.
If a device is missing from the list and is not factory installed, refer to the service manual provided for that device. (Refer to the Appendix B, "Model/Monitor Configurations and FRU Part Numbers" to determine the factory-installed devices in the model you are servicing.)
If a factory-installed drive device or adapter card is not listed in the Hardware Configuration Report, go to "Diagnostics for Factory-Installed Riser Card, or Audio-I/O Card Not Supported by Diagnostics Program" on page 2-37.

008 - DOES THE DIAGNOSTICS\ALL TEST FINISH WITHOUT ERROR CODES? (YES, READ AHEAD. NO, GO TO STEP 009.)

- If the **DIAGNOSTICS\ALL TEST** did not detect a failure. If the system still displays a failure:
  - Check all adapter card jumper settings.
  - Check all adapter card switch settings.
  - Check all adapter card cables and connectors for proper installation.
  - Make sure all of the above are set correctly and show the correct voltages and continuity. Replace any defective cables or adapter cards. See "Power Supply" on page 2-32, "System Board Layout" on page 5-2.
- Run the **DIAGNOSTICS\ALL TEST** again.
- If an error or other symptom is displayed, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.
- If no error can be detected or the symptom is intermittent, go to "Undetermined Problem" on page 2-45.
- End

009 -

- If the last test stops and you cannot continue, first make sure all switches, power connectors, cables, and jumpers are set correctly and show the correct voltages and continuity.
- Make note of any messages, error codes, beeps, or new symptoms. Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

Index of Symptoms, Messages, Error Codes, or Beeps

Table 2-1 lists failure symptoms and possible causes. The most likely cause is listed first. Make sure you complete all items in the cause or "Action/FRU" column. When servicing a system, always begin with "Start". This index can also be used to help you decide which FRUs to have available when servicing a system.
If you are unable to correct the problem using this index, go to "Undetermined Problem".

Notes:

1. If an error message and incorrect audio response occur, diagnose the error message first.
2. If you cannot run the Diagnostics tests but did receive a POST error code, diagnose the POST error message.
3. If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
4. Check all power supply voltages, switch, and jumper settings before you replace the system board. Also check the power supply voltages if you have a system no-power condition. (See "Power Supply", "System Board Layout"

If you are unable to correct the problem using this index, go to "Undetermined Problem".

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
Note: To diagnose a problem, first find the symptom, message, error code, or beeps in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.	
POST Error Codes and Messages	
010 Memory Error at XXXX:XXXX:XXXX	Plug memory module in SIMM socket properly and reboot system. Memory module. See the “Step 005” of “Memory” on page 2-28 to replace memory module. System board
011 64KB System Management Memory Bad	Enter BIOS Setup, then reboot system. Memory module. See the “Step 005” of “Memory” on page 2-28 to replace memory module. System board
012 System Management Memory Not Exist	Enter BIOS Setup, then reboot system. Memory module. See the “Step 005” of “Memory” on page 2-28 to replace memory module. System board
020 Keyboard Interface Error	Plug keyboard connector properly and reboot system. Keyboard System board
021 Keyboard Error or Keyboard Not Connected	Ensure keyboard and mouse are connected in their own connectors without mix-up. Plug keyboard connector properly and reboot system. Keyboard System board

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
030 Pointing Device Error	Ensure keyboard and mouse are connected in their own connectors without mix-up. Plug mouse connector properly and reboot system. Replace PS/2 mouse System board
031 Pointing Device Interface Error	Ensure keyboard and mouse are connected in their connectors without mix-up. Replace PS/2 mouse System board
040 Diskette Drive Controller Error	Ensure the diskette drive configuration setting in BIOS Setup is correct. Diskette drive cable/connection. Diskette drive. System board.
041 Diskette Drive A Error	Ensure the diskette drive A configuration setting in BIOS Setup is correct. Diskette drive power. Diskette drive cable/connection. Diskette drive A
043 Diskette Drive B Error	Ensure the diskette drive A configuration setting in BIOS Setup is correct. Diskette drive power. Diskette drive cable/connection. Diskette drive B
045 CPU Clock Mismatch	Enter BIOS Setup, then reboot system. Ensure the CPU frequency jumpers (JP15,17 and JP8) are set correctly. See “System Board Layout” on page 5-2.
047 Diskette Drive(s) Disabled	Ensure the diskette drive is not set to [Disabled] in the Security Options of BIOS Setup.

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
048 Diskette Write Protected	Ensure the diskette drive is not set to [Write protect] in the Security Options of BIOS Setup.
050 IDE Drive 0 Error	Ensure the hard disk 0 is set to [AUTO] in the Disk Drives of BIOS Setup. Check hard disk jumper. See “Hard Disk Drive Jumper Settings” on page 5-11. Hard disk drive power. Hard disk cable/connection. Hard disk
051 IDE Drive 1 Error	Ensure the hard disk 1 is set to [AUTO] in the Disk Drives of BIOS Setup. Check hard disk jumper. See “Hard Disk Drive Jumper Settings” on page 5-11. Hard disk drive power. Hard disk cable/connection. Hard disk
052 IDE Drive 2 Error	Ensure the hard disk 2 is set to [AUTO] in the Disk Drives of BIOS Setup. Check hard disk jumper. See “Hard Disk Drive Jumper Settings” on page 5-11. Hard disk drive power. Hard disk cable/connection. Hard disk
053 IE Drive 3 Error	Ensure the hard disk 3 is set to [AUTO] in the Disk Drives of BIOS Setup. Check hard disk jumper. See “Hard Disk Drive Jumper Settings” on page 5-11. Hard disk drive power. Hard disk cable/connection. Hard disk

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
054 IDE Drive(s) Disabled	Ensure the hard disk drive is not set to [Disabled] in the Security Options of BIOS Setup.
055 Hard Disk Drive(s) Write Protected	Ensure the hard disk drive is not set to [Write protected] in the Security Options of BIOS Setup. Hard disk drive power. Hard disk cable/connection. Hard disk.
056 IDE Drive 0 Auto Detection Failed	Ensure the hard disk 0 is set to [AUTO] in the Disk Drives of BIOS Setup. Hard disk drive power. Hard disk cable/connection. Hard disk
057 IDE Drive 1 Auto Detection Failed	Ensure the hard disk 1 is set to [AUTO] in the Disk Drives of BIOS Setup. Hard disk cable/connection. Hard disk
058 IDE Drive 2 Auto Detection Failed	Ensure the hard disk 2 is set to [AUTO] in the Disk Drives of BIOS Setup. Hard disk drive power. Hard disk cable/connection. Hard disk
059 IDE Drive 3 Auto Detection Failed	Ensure the hard disk 3 is set to [AUTO] in the Disk Drives of BIOS Setup. Hard disk drive power. Hard disk cable/connection. Hard disk
070 Real Time Clock Error	Enter BIOS Setup, then reboot system. RTC battery. See “RTC Lithium Battery” on page 4-28. System board

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
071 CMOS Battery Bad	Enter BIOS Setup, then reboot system. RTC battery. See ““RTC Lithium Battery” on page 4-28. System board
072 CMOS Checksum Error	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system RTC battery. See ““RTC Lithium Battery” on page 4-28. System board
080 PCI Device Error	Remove the non-factory-installed adapter card and reboot system. PCI card
081 System Resource Conflict	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
082 IRQ Setting Error	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
083 Expansion ROM Allocation Fail	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
180 Onboard Serial Port 1 IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
181 Onboard Serial Port 2 IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
182 Onboard Parallel Port IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
183 Onboard Diskette Drive IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
184 Onboard Pointing Device IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
185 Onboard IDE Channel 2 IRQ Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
186 Onboard ECP Parallel Port DMA Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
187 Onboard Diskette Drive DMA Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
188 Onboard Diskette Drive I/O Address Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
189 Onboard IDE Channel 2 I/O Address Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
190 Onboard Serial Port 1 I/O Address Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
191 Onboard Serial Port 2 I/O Address Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
192 Onboard Parallel Port I/O Address Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
193 Onboard Serial Port 1 Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
194 Onboard Serial Port 2 Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
195 Onboard Parallel Port Conflict(s)	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Remove the non-factory-installed adapter card and reboot system.
246 Equipment Configuration Error	Ensure the equipment(diskette drive, hard disk drive, keyboard, mouse, etc.) are connected properly and are set correctly in BIOS Setup. System board

Table 2- 1 BIOS Error Codes, Messages, and Beeps List	
BIOS Error Codes, Messages, beeps	**Action/FRU**
BIOS Runtime Error Code and Error Message	
101 RAM Parity Error	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system Plug memory module in SIMM socket properly and reboot system. Memory module System board
102 I/O Parity Error	ISA adapter card Riser card System board
103 Press <Esc> to turn off NMI or other key to reboot	Enter BIOS Setup to execute Load Setup Default Settings, then reboot system. Remove the non-factory-installed adapter card and reboot system.
104 Insert system diskette and press <Enter> to reboot	Ensure the “System boot drive” in the Startup Options of BIOS setup is not set to [Drive A only]. Insert system diskette into diskette drive and reboot system. Ensure the diskette drive configuration setting in BIOS Setup is correct. HDD power. Diskette drive. System board.
Beeps	
One long beep then two short beeps	Power off then on the system. System board

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Note: To diagnose a problem, first find the symptom, message, error code, or beeps in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.	
CPU	
Note: CPU fan should be operative normally and CPU clock setting should be exactly set to matched its speed requirement before the any diagnose of CPU problems.	
Processor fan does not run when the power supply fan runs.	With power-on, check the processor fan connector FN1. See “System Board Layout” on page 5-2. Processor fan System board
An error was detected during the CPU Test.	Processor System board
System	
Note: Ensure memory modules are installed in pair before the any diagnose of system problems.	
Memory test failed.	"Memory" on page 2-28. System board
Incorrect memory size shown or repeated during POST.	“SIMM Configuration “ on page 5-16. "Memory" on page 2-28.
Machine works but fails to enter power saving mode when the Standby Mode or Suspend Mode is set to [Enabled] in BIOS Setup.	System board.
System hangs before system boot.	“Index of Symptoms, Messages, Error Codes, or Beeps” on page 2-7. "Undetermined Problem" on page 2-45.

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
System hangs after system boot.	Execute the Diagnostic/All Test in PC-DR diagnostic program and set its configuration at “Halt on Error” to see what its potential problem cause might be. "Undetermined Problem" on page 2-45.
Blinking cursor only, and machine not working normally.	"Factory-Installed Drive Devices" on page 2-24. Diskette/hard disk drive connection/cables Diskette/hard disk drives System board
Diskette Drive	
Note: Ensure diskette drive configuration is set correctly in BIOS Setup and its read/write head is clean before the any diagnose of diskette problems.	
3.5-in. diskette drive does not work.	Diskette drive power Diskette drive connection/cable Diskette drive System board
Diskette drive read or write error.	Ensure the diskette drive is not set to [Write protect] in the Security Options of BIOS Setup. Diskette Diskette drive cable Diskette drive System board
Diskette drive read/write test error.	Diskette Diskette drive cable Diskette drive System board

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Diskette drive indicator LED keeps on lighting for more than 2 minutes when diskette is accessed.	Diskette Diskette drive connection/cable Diskette drive System board
Diskette drive indicator LED light fails to appear, and the drive is unable to be accessed for more than 2 minutes.	Diskette Diskette drive power Diskette drive connection/cable Diskette drive System board
Unknown Media Drive (X). Diskette Drive Test error. Media/drive mismatch.	Diskette Diskette drive System board Diskette drive cable
Hard Disk Drive	
Note: Ensure hard disk drive configuration is set correctly in BIOS Setup, cable/jumper are set correctly before the any diagnose of hard disk drive problems.	
Hard drives failed. Hard disk drive test error.	Hard disk drive Hard disk drive cable System board
Hard disk drive format error.	Hard disk drive cable Hard disk drive System board
Hard disk drive write error.	Hard disk drive

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Hard disk or power-on indicator LED does not light. The machine functions normally otherwise.	Check hard disk LED connector (CN20) voltages: (See "System Board Layout" on page 5-2.) CN20 Hard Disk Idle/Accessing pin-1 +5 Vdc / +5 Vdc pin-2 +5 Vdc / 0 Vdc pin-3 +5 Vdc / 0 Vdc pin-4 +5 Vdc / +5 Vdc HDD LED cable
CD-ROM Drive	
Note: Ensure CD-ROM drive configuration is set correctly in BIOS Setup, cable/jumper are set correctly and its laser beam is clean before the any diagnosis of CD-ROM drive problems.	
CD-ROM drive LED came flashing and stayed on more than 30 seconds before shutting off. Software asks to install disc. Software displays a Reading CD error.	CD may have dirt or foreign material on it, check with a known good disc. CD is not inserted properly. CD is damaged.
CD-ROM drive LED does not flash if a disc is loaded while system is powered on and CD-ROM drive power connector has the correct voltage.	CD-ROM drive
CD-ROM drive LED does not come on but CD-ROM drive works normally.	CD-ROM drive

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
CD-ROM drive does not load when system is powered on, CD-ROM LED lights off, and the eject button is pressed and held.	CD-ROM drive power. "CD-ROM Drive" on page 2-26. CD-ROM drive
CD-ROM drive does not eject when system is powered on, CD-ROM LED lights off, and the eject button is pressed and held.	“CD-ROM Emergency-exit Option” on page 5-16, 5-17. CD-ROM drive power. "CD-ROM Drive" on page 2-26. CD-ROM drive
CD-ROM drive does not read data files and no error codes or messages are displayed. **Cannot read from Drive E. Retry loading CD** message is displayed with disc loaded in CD-ROM drive.	CD may have dirt or foreign material on it, check with a known good disc. CD-ROM drive.
CD-ROM drive does not play an audio disc. But system function works properly and CD-ROM drive reads data files.	Audio cable on CD-ROM drive is not connected to system board properly if music can be heard through headphones. Speaker power/connection/cable. Audio-I/O card connection/cable. CD-ROM drive.
Real-Time Clock	
Real-time clock is inaccurate.	Ensure the information in the Date and Time of BIOS Setup are correct. RTC battery. See “RTC Lithium Battery” on page 4-28. System board

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Audio	
Audio software program invoked but no sound comes out of speakers.	"Diagnostics for Factory-Installed Riser Card, or Audio-I/O Card Not Supported by Diagnostics Program " on page 2-37. Speaker power/connection/cable. Audio-I/O card connection/cable. System board
Modem	
Modem function does not receive data files.	" Diagnostics for Factory-Installed Fax/Modem Card " on page 2-42.
Modem function has no sound output. (Data files are received normally; voice from modem cannot be produced, but system sound feature works normally.)	" Diagnostics for Factory-Installed Fax/Modem Card " on page 2-42. "Diagnostics for Factory-Installed Riser Card, or Audio-I/O Card Not Supported by Diagnostics Program " on page 2-37. Audio-I/O card
Video	
Video memory test error.	System board
Video adapter failed.	System board
Monitor	
Display problem: - Incorrect colors - No high intensity - Missing, broken, or incorrect characters - Blank monitor(dark) - Blank monitor(bright) - Distorted image - Unreadable monitor - Other monitor problems	Monitor signal connection/cable. Monitor System board

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Display changing colors.	Monitor signal connection/cable Monitor System board
Display problem not listed above (including blank or illegible monitor).	"Monitor" on page 2-42. System board
Parallel/Serial Ports	
Note: Execute “Load BIOS Default Settings” in BIOS Setup to confirm parallel/serial ports’ presence before the any diagnose of parallel/serial ports drive problems.	
Serial or parallel port loop-back test failed.	Loop-back. System board.
Parallel port or serial port failure.	Test using a loop-back while running diagnostics program System board
Printing failed.	Refer to the service manual for the printer. Printer Printer cable System board
Printer problems.	Refer to the service manual for the printer.
Joystick	
Game port does not respond at all or does not work correctly.	Connected a joystick to game port and execute “Interactive Test/Joystick” test in diagnostic program. Audio-I/O card connection/cable. System board.

Table 2- 2 Error Symptoms List	
Error Symptoms	**Action/FRU**
Diagnostic Program	
Diagnostics programs cannot be executed.	Reboot the system from the bootable Diagnostic diskette. Diagnostic diskette Memory module System board
Missing diagnostic files(s).	Diagnostic diskette.
Keyboard	
Some or all keys on keyboard do not work.	“Keyboard “on page 2-29.
Power Supply	
System unit does not turn off with power switch. (System unit must be unplugged from electrical outlet to completely turn off.)	JP20 should be set to “Software shutdown enabled”. See “System Board Layout” on page 5-2. "Power Supply" on page 2-32. Power switch cable assembly System board
Software shutdown feature is disappeared but power supply can be controlled by power switch.	JP20 should be set to “Software shutdown enabled”.. See “System Board Layout” on page 5-2. System board.
No system power, or fan is not running.	"Power Supply" on page 2-32. Power switch assembly. Power supply. System board.
Other Problems	
Any other problem.	"Undetermined Problem" on page 2-45.

Factory-Installed Drive Devices

Use this check procedure to test any factory-installed drives.

Attention: The customer may have customized settings in the Setup Utility (other than default settings) on the computer you are servicing. Running the Setup Utility might alter those settings. Note the current settings and verify that the customer settings are in place when service is complete.

Note: If you cannot access the hard disk drive or load a diskette from drive A or load a CD from the CD-ROM drive, make sure the Setup Utility has the startup sequence set with **Diskette**, **CD-ROM**, and **Hard Disk** enabled.

001 - START

- Insert the Bootable Diagnostics Diskette into the diskette drive.
- Power-off the system unit.
- Power-on the system unit, and check for the following responses:
  1. One short beep after POST completed.
  2. Diagnostic program main menu screen
- Refer to "Device Presence by Diagnostics Program Test" on page 2-35 to check Hardware Configuration.

002 - IF THE NUMBER OF DISKETTE DRIVES INSTALLED IS NOT CORRECT:

1. Check the installation of the drive ribbon cable to the system board.
2. Check the voltages to the diskette drive with the power on (see “Power Supply” on page 2-32).
3. Try to correct the drive setting in the Disk Drives of the BIOS Setup.
4. Run the "Device Presence by Diagnostics Program Test" on page 2-35.
5. If you can correct the Installed Devices list, but cannot complete the Diagnostics test for that device, replace FRUs, in the following order, until the problem goes away:
6. Diskette drive cable (if continuity check fails)
7. Diskette drive
8. System board

003 - IF THE NUMBER OF HARD DISK DRIVES, OR CD-ROM IS NOT CORRECT:

1. Check the installation of the drive ribbon cable to the system board. Be sure that Hard Disk Drive 1 and Hard Disk Drive 2 in the Setup Utility are connected to the primary hard disk drive connector CN11 on the system board. (see “System Board Layout” on page 5-2)
2. Check the hard disk drive jumper settings (see "Hard Disk Drive Jumper Settings" on page 5-11).
3. Check the voltages to the disk drive power connectors with the power on (see “Power Supply” on page 2-32).
4. Try to correct the drive setting in the Disk Drives of the BIOS Setup.
5. Run the "Device Presence by Diagnostics Program Test" on page 2-35. for hard disk drives and CD-ROM drive.
6. Restart the system and check the BIOS Setup.
7. In the BIOS Setup, check that the correct drive size is set for the flagged drive shown in the Installed Devices list.
   - If any drive is flagged as **Not Installed**, check the signal and power cable for that drive.
   - If the first drive is flagged as **Not Installed**, replace the primary drive.
   - If all drives are flagged as **Not Installed**, replace the primary drive.
   - If any drive (other than the first drive) is flagged as **Not Installed**, replace that drive.

   If the problem remains, check the continuity on the drive cable and replace the cable if necessary. If that does not fix the problem, replace the system board.
8. If an upgrade processor is installed, make sure that the processor speed shown is correct.

Note: The CD-ROM must be the last device installed and jumpers set correctly to be listed in the BIOS Setup. See "Hard Disk Drive Jumper Settings" on page 5-11 for factory-installed drive device jumper settings and "CD-ROM Drive Jumper Settings" on page 5-13. Also ensure the CD-ROM cable is installed in connector CN2 on the system board.

For machine type 2136 models that come with an internal CD-ROM drive. Ensure that its jumper is set as slave.

CD-ROM Drive

Note: The CD-ROM indicator on the front panel lights up while data is being read from the disc; flashes during seek operation.

001 - START

- Insert the bootable Diagnostic diskette (with CD-ROM drive driver installed) into the diskette drive.
- Ensure there is no CD in the CD-ROM drive.
- Select **Interactive Tests** menu.
- Select and execute **CD-ROM Test**.

002 - DO YOU SEE A MESSAGE "NO CD-ROM DRIVE OR MSCDEX DEVICE DRIVER INSTALLED."? (YES, READ AHEAD. NO, GO TO 004)

- Exit the diagnostic program and power off the system.
- Check and ensure CD-ROM drive power, audio and data cables are not damaged and are connected properly.
- Check and ensure CD-ROM drive driver if load correctly.

003 - HAS THE SAME MESSAGE OCCURED MORE THAN ONCE? (YES, GO TO STEP 009. NO, GO TO STEP 001)

004 - DO THE TEST OF OPEN/CLOSE TRAY BY DIAGNOSTIC PROGRAM AND BY DEPRESSING CD-ROM DRIVE BUTTON WORK? (YES, READ AHEAD. NO, GO TO STEP 007.)

- Load a data CD into the CD-ROM drive and try to read its content by typing DIR in DOS prompt.

005 - DOES THE CD DISC CAN BE READ? (YES, GO TO STEP 008. NO, READ AHEAD.)

- Try with a know-good CD and try to read it again.

007 - DOES THE CD STILL CANNOT BE READ? (YES, READ AHEAD. NO, GO TO STEP 009.)

- Replace system board
- End

008 -

- Replace CD-ROM drive.
- Go to 001.

009 -

- CD-ROM drive is functioned normally.
- End

Memory

001 - START

- Power-off the system unit.
- Insert the a Bootable Diagnostics Diskette into the diskette drive.
- Ensure all SIMMs are seated correctly.
- Power-on the system unit.
- Note any messages, error codes, or symptoms.

002 - DO YOU RECEIVE POST MEMORY ERROR MESSAGE? (YES, READ AHEAD. NO, GO TO STEP 003)

- Enter BIOS Setup then reboot system.

003 - DOES THE POST ERROR MESSAGE STILL REMAIN? (YES, GO TO STEP 005. NO, READ AHEAD.)

- Follow the screen instructions to run the Memory tests.
- If you cannot run the memory test or the test does not find a problem, use the following procedure to find the failure.

  Replace each SIMM, one at a time, with a known, correctly-working SIMM of the same size and type. If the problem goes away, the last SIMM replaced is defective. If all SIMMs, on the system board, have been replaced and the problem remains, replace the system board.

004 - DOES THE MEMORY TESTS COMPLETE WITHOUT AN ERROR? (YES, READ AHEAD. NO, GO TO STEP 005.)

- The system memory is now functioning correctly. If you suspect an intermittent problem, run the Memory test multiple times.
- End

005 -

- Replace each SIMM, one at a time, with a known, correctly-working, SIMM of the same size and type.
- If the problem goes away, the last SIMM replaced is defective. If all SIMMs on the system board, have been replaced and the problem remains, replace the system board.
- Go to 001.

Keyboard

001 - START

– Power-off the system unit and ensure the keyboard plug is connected properly.

002 -

– Power-on the system unit.

– Insert the Diagnostic diskette into the diskette drive.

– Select **Interactive Tests** menu, then execute **Keyboard** test.

003 - DOES THE KEYBOARD FUNCTION CORRECTLY? (YES, READ AHEAD. NO, GO TO STEP 004.)

– Keyboard has no problem.

– End

004 - ARE THERE ANY BROKEN PINS IN THE KEYBOARD PLUG?(YES, READ AHEAD . NO, GO TO STEP 005)

– Replace Keyboard.

– End

005 - HAS THE SAME ERROR SYMPTOM OCCURED MORE THAN ONCE? (YES, READ AHEAD. NO, GO TO STEP 002)

– Replace Keyboard.

006 - DOES THE ERROR SYMPTOM STILL REMAIN? (YES, READ AHEAD. NO, GO TO STEP 007.)

– Replace system board.

– End.

007 -

– End.

Mouse

Note: A sticking keybutton can cause the mouse to operate incorrectly. If you suspect this, go to "Keyboard" on page 2-29.

001 - START

- Make sure the mouse ball turns freely.
- Make sure the mouse plug connects properly.

002 -

- Power-off the system unit.
- Insert the Mouse Driver and Diagnostic diskette into the floppy drive.
- Power-on the system unit.
- Select **Interactive Test** menu, then execute **Mouse** test.

003 - DO YOU SEE THE MOUSE CURSOR IN THE DIAGNOSTIC PROGRAM? (YES, READ AHEAD. NO, GO TO STEP 011)

- Test right (left) button and check if right (left) button works.

004 - DOES THE MOUSE BUTTON WORK? (YES, READ AHEAD. NO, GO TO STEP 007)

- Test mouse cursor movement.

005 - DOES THE MOUSE MOVE SMOOTHLY AND KEEP X AND Y COORDINATES CHANGED? (YES, READ AHEAD. NO, GO TO STEP 006)

- Mouse has no problem.
- End.

006 -

- Power-off the system unit.
- Open mouse bottom cover and clean track ball.
- Go to step 002.

007 -

- Power-off the system unit.
- Check mouse plug.

008 - ARE THERE ANY BROKEN PINS IN THE MOUSE PLUG? (YES, READ AHEAD. NO, GO TO STEP 010)

– Replace mouse.

009 - DO THE ERROR SYMPTOMS STILL REMAIN? (YES, READ AHEAD NO, GO TO STEP 005)

– Replace main board.

– End

010 - HAS THE SAME ERROR SYMPTOM OCCURED MORE THAN ONCE? (YES, READ AHEAD. NO, GO TO STEP 011.)

– Replace mouse.

– End.

011 -

– Exit diagnostic program.

– Ensure mouse driver is properly installed.

– Go to step 002.

Power Supply

001 - START

- Power-off the system unit.
- Check the power cord for continuity. Replace if necessary.
- Check for the correct line voltage from the power outlet, and verify that the voltage selector switch (if present) is set for the correct voltage.
- Power-on the system unit.

002 - DOES THE POWER SUPPLY FAN RUN? (YES, GO TO STEP 003. NO, GO TO STEP 004)

003 - DOES THE SYSTEM UNIT FAIL TO SHUT OFF WHEN THE ON/OFF SWITCH IS PRESSED? (YES, READ AHEAD. NO, GO TO STEP 005)

- You might have a damaged on/off switch cable assembly.
- Disconnect the on/off switch cable assembly connector from the power supply connector and take an ohm reading.
- Go to step 007

004 -

- Disconnect the power cord from the back of the system unit.
- Disconnect all power and switch cable connectors from the system board and the power supply.
- Disconnect the power connectors to all drives.
- Make a connection (jumper) between the black and white wires of the auxiliary power control cable as shown in the following figures.
- Connect any one of the power connector to system board or drive as power load for driving up power supply.
- Reconnect the power cord.

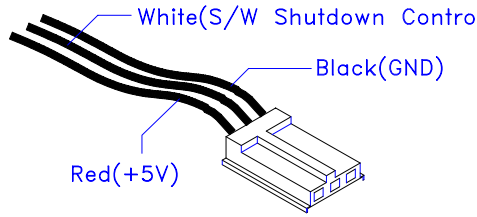

Figure 2- 1 Auxiliary power control cable

005 - DOES THE POWER SUPPLY FAN RUN? (YES, READ AHEAD. NO, GO TO STEP 009)

– With the system powered on and the power supply fan running, check the voltages at the power supply connectors for the system board and all drive connectors, as shown in the following figures.

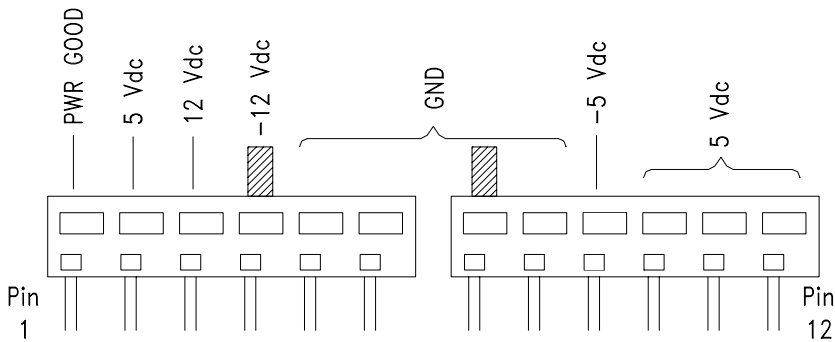

Figure 2- 2 . System Board Power Supply Connectors (Bottom View)

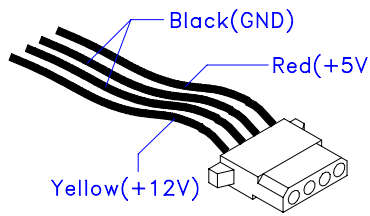

Figure 2- 3 Hard Drive or CD-ROM End of Power Cable

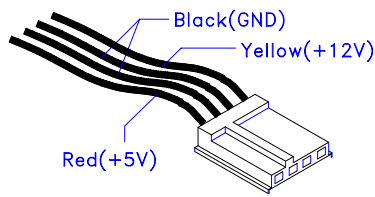

Figure 2- 4 3.5-In. Diskette Drive End of Power Cable

006 - ARE THE VOLTAGES CORRECT AND DOES THE FAN RUN? (YES, READ AHEAD. NO, GO TO STEP 009)

- The power supply is working normally.
- If you suspect the on/off switch cable assembly, see Step 003.
- If the fan continues to run when all connectors are plugged back in, go to "Undetermined Problem".
- If the fan stops running when a drive connector is plugged back in, go to "Factory-Installed Drive Devices".

007 - DO YOU HAVE AN OHM READING WHEN THE SWITCH IS PRESSED AND AN OPEN READING WHEN THE SWITCH IS RELEASED? (YES, READ AHEAD. NO, GO TO STEP 008)

- Replace the on/off switch cable assembly.

008 -

- Replace the system board.
- End.

009 -

- Replace the power supply.
- End.

Device Presence by Diagnostics Program Test

001 - START

- Insert the Bootable Diagnostics Diskette into the diskette drive.
- Power-off the system unit.
- Power-on the system unit, and check for the following responses:
  1. One short beep after POST completed.
  2. Diagnostic program main menu screen.

002 - DO ANY POST MESSAGES, ERROR CODES, BEEPS, OR SYMPTOMS APPEAR? (YES, READ AHEAD. NO, GO TO STEP 003)

- Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

003 -

- Select **Utility** on the menu.
- Select and execute **Tech Support Form** on the menu to generate a hardware configuration list.
- Compare the Tech Support Form screen with the actual devices installed in the system unit.

  Note: If necessary, remove the cover and visually compare the devices installed in the system unit to those shown in the Tech Support Form.

004 - DOES THE TECH SUPPORT FORM CORRECTLY IDENTIFY THE DEVICES INSTALLED IN THE SYSTEM UNIT? (YES, READ AHEAD. NO, GO TO STEP 005)

- The Tech Support Form shows only those devices supported by the Diagnostics Diskette and only factory-installed devices for the model you are servicing.
- If a device is missing from the list and is not factory installed, refer to the service manual provided for that device. (Refer to the Appendix B, "Model/Monitor Configurations and FRU Part Numbers" to determine the factory-installed devices in the model you are servicing.)

– If a factory-installed drive device or adapter card is not listed in the Tech Support Form, go to "Diagnostics for Factory-Installed Riser Card, or Audio-I/O Card Not Supported by Diagnostics Program " on page 2-37.

– End

005 -

– Select **Diagnostics** from the Main Menu.

– Select and execute **All Tests** from the Diagnostics Menu.

006 - DOES THE TEST FINISH WITHOUT FAILURE? (YES, READ AHEAD. NO, GO TO STEP 007)

– The **Diagnostic \ All Test** did not detect a failure. If the system still displays a failure:

  - Check all adapter card jumper settings.
  - Check all adapter card switch settings.
  - Check all adapter card cables and connectors for proper installation.
  - Make sure all of the above are set correctly and show the correct voltages and continuity. Replace any defective cables or adapter cards. See "Power Supply" on page 2-32, "System Board Layout" on page 5-2.

– Run the **Diagnostic \ All Test** again.

  - If an error or other symptom is displayed, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.
  - If no error can be detected or the symptom is intermittent, go to "Undetermined Problem" on page 2-45.

– End.

007 -

– If the last test stops and you cannot continue, first make sure all switches, power connectors, cables, and jumpers are set correctly and show the correct voltages and continuity.

– Make note of any messages, error codes, beeps, or new symptoms. Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

– End

Diagnostics for Factory-Installed Riser Card, or Audio-I/O Card Not Supported by Diagnostics Program

Note: While performing this check, you may need to enter and exit Microsoft Windows 95 several times. When instructed to select an icon or button, double-click on the item with the mouse.
For more information about using Microsoft Windows 95, see the user's guide provided with the computer.
If an operating system other than Microsoft Windows 95 is installed, program screens and icons may differ from these instructions.
This Diagnostics test is intended to be used only with factory-installed adapter cards.

001 - START

- Remove the Bootable Diagnostics Diskette.
- Power-off the system unit and wait 10 seconds.
- Power-on the system unit.

002 - IS A POST ERROR CODE AND MESSAGE DISPLAYED? (YES, GO TO STEP 018. NO, READ AHEAD.)

003 - ARE ANY MESSAGES OR ERROR CODES DISPLAYED AFTER POST COMPLETES BUT BEFORE MICROSOFT WINDOWS 95 STARTS? (YES, GO TO STEP 007. NO, GO TO STEP 004)

Note: If POST does not complete, answer this question "No."

004 -

- Power-off the system unit.
- Disconnect the riser card and any adapter card's cables or connectors from the system unit.

  Notes: When removing adapter cards, be careful not to change any jumper or switch settings on the card.

- Power-on the system unit.

005 - DOES THE SYSTEM UNIT WORK CORRECTLY BY ITSELF? (YES, READ AHEAD. NO, GO TO STEP 019.)

- Power-off the system unit.
- Reconnect (reseat) the riser card.
- Do not install any adapter cards on the riser card.
- Power-on the system unit.
- Check the voltages at pins B3, B5, B7, and B9 on the ISA slots and A1, B2, B5 on the PCI slots of the riser card.

ISA Slots	PCI Slots
B3 = +5 V dc	A1 = -12 Vdc
B5 = -5 V dc	B2 = +12 Vdc
B7 = -12 V dc	B5 = +5 Vdc
B9 = +12 V dc	

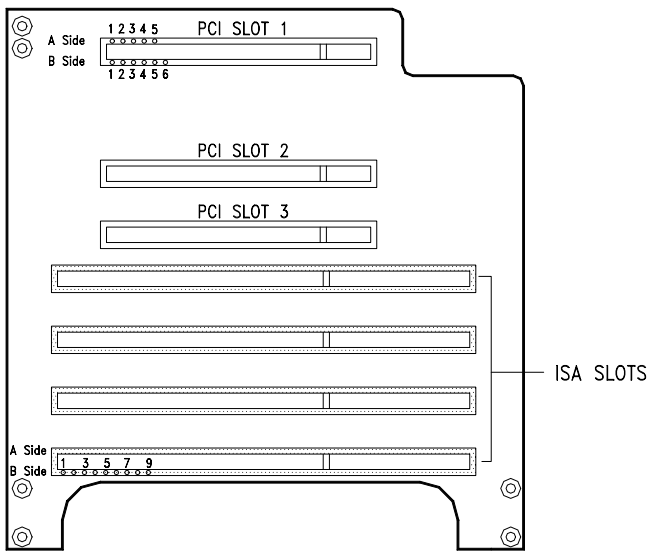

Figure 2- 5 Riser Card Voltage Testing Points

006 - ARE THE VOLTAGES CORRECT? (YES, GO TO STEP 007. NO, GO TO STEP 019)

007 -

– Install the failing factory-installed adapter card in a different slot in the riser card than where originally installed.

008 - DOES THE FEATURE FUNCTION NORMALLY? (YES, GO TO STEP 019. NO, READ AHEAD.

– Power-off the system unit.

– Check one adapter card at a time. To do this, install one adapter card in the riser card and power-on the system unit.

– Repeat this with each adapter card if necessary.

009 - IS A WINDOWS 95 DRIVER ERROR DISPLAYED FOR THE INSTALLED ADAPTER CARD? (YES, READ AHEAD. NO, GO TO STEP 010)

– Check for proper installation of the adapter card.

– Check all adapter card jumper positions. See "System Board Layout" on page 5-2.

– Check all cables and connectors on the adapter card for proper installation.

– Check continuity of any cable attached to the adapter card and replace if necessary.

– If the problem remains, replace the factory-installed adapter card.

– If the problem remains with a card that was not factory installed, consult the service information provided by the card manufacturer.

– End

010 -

– Power-off the system unit.

– Reinstall the adapter card and any cables.

– Power-on the system unit without the Diagnostics Diskette inserted.

– Perform the following when the system is running:

Note: If an operating system other than Microsoft Windows 95 is installed, program screens and icons may differ from these instructions.

1. Open Microsoft Windows 95 if not already opened by the system.
2. Select the **Start** icon.

3. Select **Settings**, then select **Control Panel**.
4. Select the **Sound** icon.
5. In the Sound window, select chimes from the **Names** field. (To test other adapter card software, select an action from a menu in that software.)

011 - IS THE PREVIEW BUTTON (OR ACTION IN OTHER SOFTWARE) SELECTABLE ON THE SCREEN (SHOWN IN BLACK AND NOT GRAY)? (YES, READ AHEAD. NO, GO TO STEP 017)

– Select the **Preview** button from the Sound window.

013 - DO YOU HEAR ANY SOUND FROM THE SYSTEM? (YES, READ AHEAD. NO, GO TO STEP 014.)

– The system is working normally.

– Click Cancel to close the dialog box. Exit Microsoft Windows 95.

– If the symptom remains or has changed, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 2-7.

– End

014 -

– Make sure the volume control on the sound adapter card (if any) is not turned low.

– Make sure the speakers are not damaged. If damaged, replace the speakers.

– Make sure the speaker sound cable is plugged into the Audio-I/O card Speak-out jack. See “Audio-I/O Card Layout” on page 5-9.

– Repeat the test in Step 010 on page 2-39.

015 - DOES THE SYMPTOM CHANGE? (YES, READ AHEAD. NO, GO TO STEP 016)

– If you hear sound from the speakers, the system is working normally.

– If you suspect another problem, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.

– End

016 -

– Replace the speakers or Audio-I/O card or system board.

– End

017 -

- Replace system board.
- End

018 -

- Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.
- End

019 -

- Replace the riser card.
- End

Diagnostics for Factory-Installed Fax/Modem Card

Note: The factory-installed modem is a 33.6 Kbps modem with a cable of microphone-in and speaker-out from system board.

001 - START

- Power-off the system unit.
- Ensure the modem is not configured with a conflicting COM port and IRQ setting.
- Ensure the communication software is configured with the correct COM and IRQ settings (same COM port and IRQ as the modem).
- Ensure all communication parameters (baud rate, data, stop and parity bits) are properly configured and are identical on both sides.
- Connect phone line to the LINE port of the fax/modem card.

  Note: Check the outside phone line by connecting a working telephone to the telephone wall jack. Listen for a dial tone for ensuring the phone line is good.

002 -

- Insert the Diagnostic diskette into the diskette drive.
- Power-on the system unit.
- Select **Diagnostics** menu,
- Select **All Test,** then execute **modem** test.

003 - DOES THE MODEM TEST SUCCESSFULLY? (YES, READ AHEAD. NO, GO TO STEP 004.)

- The modem is functioning correctly.
- End.

004 -

- Power-off the system unit.
- Plug the modem adapter card into a different riser card slot.
- Go to step 002.

005 - DOES THE ERROR SYMPTOM REMAIN?

- Replace modem adapter card.
- End

Monitor

First, set the system to VGA mode. To do this in Windows 95, depress the **F8** function key during startup. Safe mode (VGA) will be set for Windows 95. Use the operating system's video setup to change the monitor resolution.
The monitors that come with the system are DDC2A/B (Display Data Channel) compliant. While Windows 95 comes up, the DDC2 monitor passes resolution and frequency information to the system. The system interprets the data and sets up the proper refresh rate.
If the monitor type is set to the power saving mode, the screen remains black and the LED lights or flashes in amber color. When the monitor is turned-on alone, or is turned-on and connected to a powered-off system unit, the monitor LED presents amber blinking. Under the normal operation conditions, the LED lights in green color.

Note: Some monitors have a detachable system I/O signal cable between the monitor and the system unit. Check the line voltage, power cord, and continuity for the system I/O signal cable before replacing the monitor. See "Monitor Port Signals" on page 5-17 for pin identification.

001 - START

- Power-off the system unit and monitor.
- Remove all adapter cards from the riser card.
- Make sure the monitor I/O signal cable is properly connected to the system unit and monitor.
- Make sure the power cords are properly connected to the system unit and monitor, and that the line voltage is correct. See "Power Supply" on page 2-32.
- Make sure the monitor contrast and brightness controls are not turned too low.
- Make sure the Bootable Diagnostics Diskette is in the diskette drive.
- Power-on the monitor, and wait 20 seconds.
- Power-on the system unit.

Note: If the monitor was not sold together with the system unit, you may need to refer to the service information provided with the monitor.

002 - IS THE SCREEN READABLE? (YES, READ AHEAD. NO, GO TO STEP 004)

Note: If the screen shows a blinking cursor with no memory count running, answer this question "No."

- Select **Interactive Tests** from the Main Menu.
- Select and execute **Video** test from the menu.
- Follow the prompts and perform the video test.
- Go to "Index of Symptoms, Messages, Error Codes, or Beeps"

Note: You might have to refine the monitor controls to obtain the best image.

003 - DOES THE MONITOR SUCCESSFULLY PASS ALL TESTS? (YES, READ AHEAD. NO, GO TO STEP 004)

- You have successfully completed the video diagnostics tests. If the problem remains, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7.
- End

004 -

- Power-off the system unit.
- Remove the hard disk drive system cable.
- Power-on the system unit.

005 - IS THE SCREEN READABLE?

- Replace the monitor. If the symptom remains, replace the system board.
- End

Undetermined Problem

If an error code is present, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 2-7. If no error code is present, continue with this check. Check the power supply voltages (see “Power Supply” on page 2-32). If the voltages are correct, return here and continue with the following steps:

1. Power-off the system unit.
2. Perform the following checks, one by one, until you have isolated the problem FRU (refer to "Parts/Test Point Locations" on page 5-1 for locations):
    - Check all system board jumper positions and switch settings.
    - Check all adapter card jumper positions.
    - Check all device jumper positions.
    - Check all cables and connectors for proper installation.

If the jumpers, switch settings, and voltages are correct, return here and continue:

3. Remove or disconnect the following, one at a time:
    - Non-IBM devices
    - External devices
    - Audio-I/O card
    - Any adapters
    - Modem card, if installed
    - Riser card
    - CD-ROM drive
    - Diskette drive
    - Hard disk drive
    - SIMM
    - CPU
    - System board
4. Power-on the system unit.
5. Repeat steps 1 through 4 until you find the failing device or adapter.

If the symptom changes, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 2-7 or to the check procedure for the last item tested. Replace the last item tested if the system operates normally after removing the last item.

Diagnostic Aids

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Introduction

This section explains the diagnostic aids that are available for troubleshooting problems on the system.

Power-On Self Test

Each time you power-on the system, the power-on self test (POST) is initiated. Several items are tested during POST, but is for the most part transparent to the user.

POST checks the following:

- System Board
- Memory
- VGA Controller
- Hard Disk Drive(s)
- Floppy Diskette Drive(s)
- Keyboard
- Mouse
- Parallel Port(s)
- Serial Port(s)
- Modem(s)
- CD-ROM Drive(s)
- Sound Controller

To start POST, turn on the monitor and then the system unit. The following will happen:

1. The IBM logo will appear on center of the screen, followed by a beep from the internal system buzzer and the message "Press **<F1>** to go to the Setup Utility" will appear at the lower left corner of the screen.
2. At this time one of two hot-keys may be used. The **<F1>** key, as described on screen, will cause the system Setup Utility menu to appear. The **<F9>** key will switch the graphical IBM logo screen to the traditional text-based system startup screen, which displays BIOS version and system memory tested.
3. If an error is detected during POST, the IBM logo screen will automatically switch to the text-based screen and display the error message or code. Depending on the criticality of the POST error, the system may halt and/or display the message "Press **<F1>** to go to the Setup or **<Enter>** to continue…" If this message appears, pressing the **<Enter>** key will allow the system to attempt to proceed despite the reported error; pressing **<F1>** will cause the system Setup Utility menu to appear.
4. If no keyboard keys are pressed, and if POST is completed without errors, the system will then proceed with the loading of DOS or other operating system from the floppy diskette drive A or a fixed disk (hard disk) or CD-ROM drive, depending on the options selected in the Setup Utility.

Diagnostic Diskette

The diagnostic program comes on one diskette along with this book.

This version of PC-Doctor diagnostic program, developed by Watergate for IBM, is the primary method of testing the computer. You can use it to test the IBM components of the system and some external devices. The amount of time required to test components depends on the number of components installed and selected. The more devices you have attached to your system and selected in PC-Doctor, the longer the testing will take.

Note: The diagnostic program and this manual is intended to test the IBM Aptiva 2136 machine type only. Testing devices not included with the original product package, including other IBM products, prototype cards, or modifying hardware settings may give false errors and invalid system responses. Diagnostics and/or programs not specifically made for this model may also report incorrect errors and information.

Diagnostic Program Features

PC-Doctor includes the following features:

Table 3- 1 Diagnostic Program Features

Feature	**Description**
Diagnostics	• System Test • Memory Test • Hard Disk Test • Floppy Disk Test • All Test
Interactive Tests	• Keyboard • Video • Internal Speaker • Mouse • Joystick Test • Diskette • System Load • Printer Test • CD-ROM Test • Stereo Speaker

Table 3- 1 Diagnostic Program Features	
Hardware Info	• System Configuration • Memory Contents • IRQ and DMA Use • Device Drivers • COM and LPT Ports • Physical Disk Drives • Logical Disk Drives • VGA Information • Software Interrupts • I/O Use • IDE Drive Info. • PCI Information

Using the Diagnostic Diskette

PC-Doctor for DOS can be executed directly from the floppy diskette or copied to a hard disk. The program may be executed by typing PCDR at the DOS prompt.

Note: The PC-Doctor bundled with HMM is a DOS based utility. DOS, as a minimum is required. PC-Doctor is not a bootable program. Please be sure the system is running PC-DOS (or MS-DOS) 6.xx or higher for PC-Doctor DOS version. DOS may be loaded from floppy diskette, hard disk or CD-ROM. To create a floppy diskette, see "Creating a Boot Diskette with Drivers" on page 3-5.

PC-Doctor diagnostics includes modules for testing the mouse, CD-ROM drive and modem components. The DOS version of PC-Doctor drivers for the mouse, CD-ROM and modem must be loaded before testing of these modules.

Mouse Driver:

MOUSE.EXE may be found on the PC-Doctor for DOS diskette. To use this driver, type `MOUSE.EXE` at the DOS prompt or add:

AUTOEXEC.BAT:
`MOUSE.EXE`

CD-ROM Driver:

IBMCD.SYS may be found on the PC-Doctor for DOS diskette; MSCDEX.EXE may be found in your DOS directory. To activate the CD-ROM drive, add:

CONFIG.SYS:

```
DEVICE=CDROM.SYS /D:CD1
```

AUTOEXEC.BAT:

```
MSCDEX.EXE /D:CD1
```

Audio Parameter:

To initiate the audio controller, the following needs to be added:

AUTOEXEC.BAT:

```
SET BLASTER=A220 I5 D1 T4
```

Note: Testing of the modem in PC-Doctor requires that a working phone line be attached to the LINE port of the modem. During the modem test, PC-Doctor will issue a carrier detect; there must be tone on the attached phone line. **If there is no fax/modem card equipped in system, then modem driver should not be installed, or system will be hang while running PC-Doctor modem test.**

Modem Driver:

SETPNP.EXE and AZTPATH.COM may be found on the PC-Doctor diskette. To initiate the modem controller, the following needs to be added:

AUTOEXEC.BAT:

```
SETPNP.EXE
AZTPATH.COM
```

Note: Testing of the modem in PC-Doctor requires that a working phone line be attached to the LINE port of the modem. During the modem test, PC-Doctor will issue a carrier detect; there must be tone on the attached phone line. **If there is no fax/modem card equipped in system, then modem driver should not be installed, or system will be hang while running PC-Doctor modem test.**

Note: Damage to the modem and to the system may result if connected to a PBX. Some PBX (private branch exchange) deliver electrical power via standard RJ11 phone jacks to its equipment. Please make sure the phone line you are connecting to the modem conforms to conventional telephone standards.

Creating a Boot Diskette with Drivers

1. Using the DOS FORMAT.COM utility and using the /S parameter, format and transfer system to a new diskette.
2. Copy MSCDEX.EXE (Microsoft CD Extension) to the root directory of the new floppy diskette.
3. Copy the contents of the PC-Doctor for DOS diskette to the new diskette.

To Load the Diagnostics Diskette

1. Power-off the system unit.
2. Insert the bootable PC-Doctor for DOS diskette with drivers in drive A.
3. Power-on the system unit.
4. Do not press **F1** during POST.
5. If any POST errors appear after POST, make a note of the errors and press the **<Enter>** key to continue.
6. DOS should load.
7. During boot, verify that each driver loads successfully. For drivers that do not load successfully, verify that the device the driver is associated with it is installed properly.
8. PC-Doctor for DOS will load

Repair Information

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Removals and Replacements

See Safety Notice following: (Translation on page VIII)

BEFORE REMOVING ANY FRU, POWER-OFF THE COMPUTER, UNPLUG ALL POWER CORDS FROM ELECTRICAL OUTLETS, THEN DISCONNECT ANY INTERCONNECTING CABLES.

Attention: The system board, processors, adapter cards, SIMMs, and upgrade processors can be damaged by electrostatic discharge. Use an electrostatic discharge (ESD) strap to establish personal grounding. If you don't have an ESD strap, establish personal grounding by touching a ground point with one hand before touching the static-sensitive FRUs.

The arrows in the removals and replacements procedures show the direction of movement to remove a field-replaceable unit (FRU), to turn a screw, or to press a tab to release the FRU.

Begin all removals by removing the cover (and rear cover, if applicable).

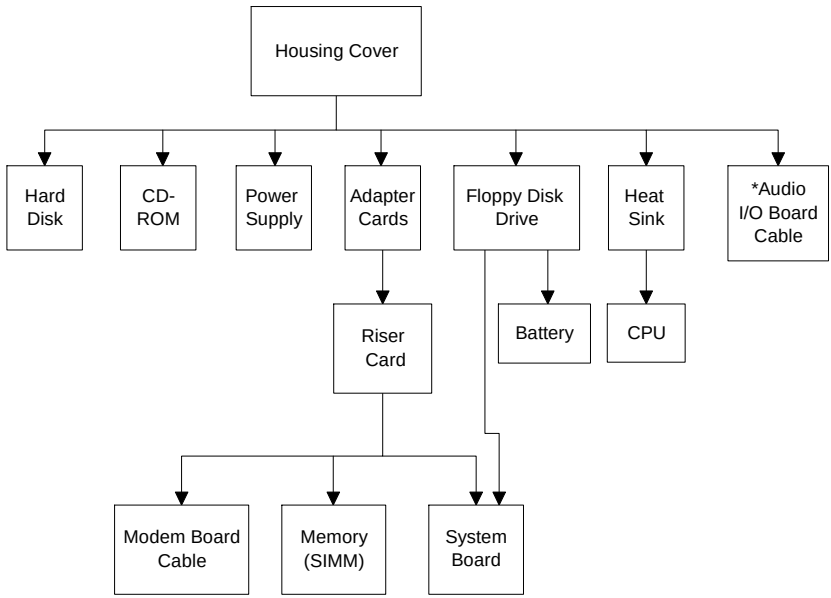
When other FRUs must be removed prior to removing the failing FRU, they are listed at the top of the page. Go to the removal procedure for each FRU listed, remove the FRU, and then continue with the removal of the failing FRU.

To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement.

Before disconnecting any cables, note their locations. Reinstall any new FRUs with cables in the same locations.

Removal Sequence

The following chart shows you how to remove certain system components without going through the whole removal process.



* Note: You can connect the Audio I/O Board cable to the system board first before assembling the other components.

Identifying The Parts of The System Unit

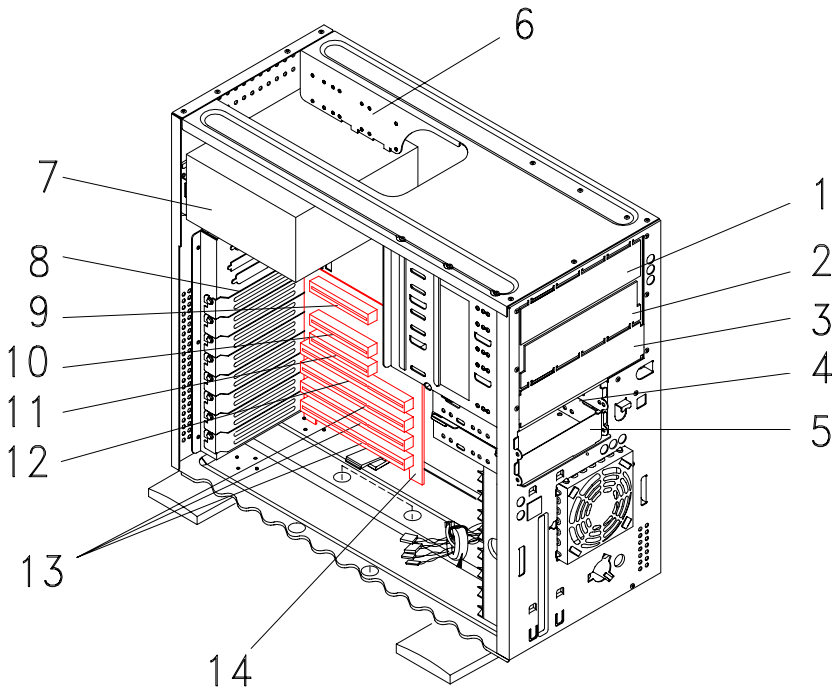


Figure 4- 1 The Parts of The System Unit

1. **Bay 1.** This bay can hold a 5.25-inch half-high drive, such as diskette, hard disk, tape, or CD-ROM drive.
2. **Bay 2.** This bay can hold a 5.25-inch half-high drive, such as diskette, hard disk, tape or CD-ROM drive.
3. **Bay 3**. This bay can hold a 5.25-inch half-high drive, such as diskette, hard disk, tape or CD-ROM drive.
4. **Bay 4.** This bay can hold a 3.5-inch slim drive, such as a diskette or tape drive.(with external access)
5. **Bay 5**. This bay can hold a 3.5-inch slim drive, such as a diskette or tape drive. (with external access)

6. **Bay 6**. This bay can hold a 3.5-inch slim drive, such as a diskette or tape drive. (No external access)
7. **Power Supply.** Capable of providing at lease 200 watts of power to the system unit.
8. **Adapter Card Slots**. Eight openings for adapter cards.
9. **PCI Adapter Card Connector 1(PCI-1).** Holds one PCI adapter card.
10. **PCI Adapter Card Connector 1(PCI-2).** Holds one PCI adapter card.
11. **PCI Adapter Card Connector 1(PCI-3).** Holds one PCI adapter card. This connector shares a slot with the AT-3 connector. If you install a card in this connector, you can not install a card in connector AT-3.
12. **AT adapter card connector 3(AT-3).** Holds an AT adapter card. This connector shares a slot with the PCI-3 connector. If you install a card in this connector, you cannot install a card in connector PCI-3.
13. **AT adapter card connector 4 to 6 (AT 4-6).** Holds AT adapter cards.
14. **Riser Card**. Interface between main board and add-on adapter cards.

Cover

- Disconnect the system unit power cord.
- Release the lock that secures the cover at the back of the unit by pressing it toward the unlocked icon.
- Slip your hand underside the front panel and pull on the handle to fully release the cover.
- While still holding the handle, slide the cover forward to remove it completely. The cover slides along grooves that run on the sides of the unit.
- Touch the bare metal frame of your system unit to dissipate the static electricity from your body. Do not touch any of the components inside the frame before you touch the frame. Do not touch any component with a voltage warning label.

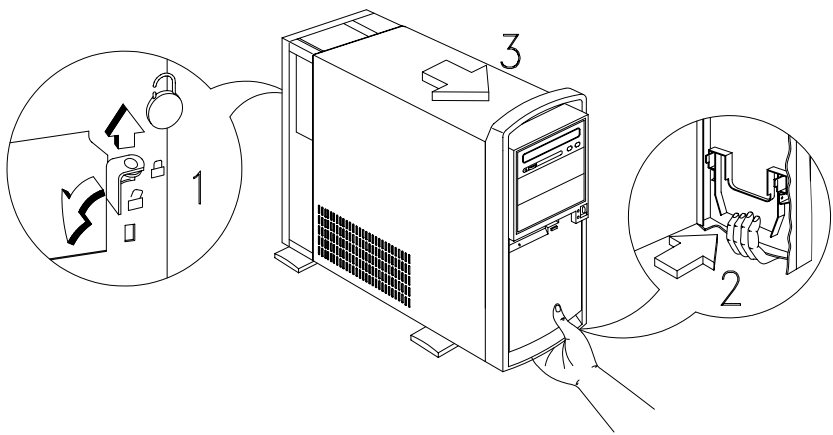
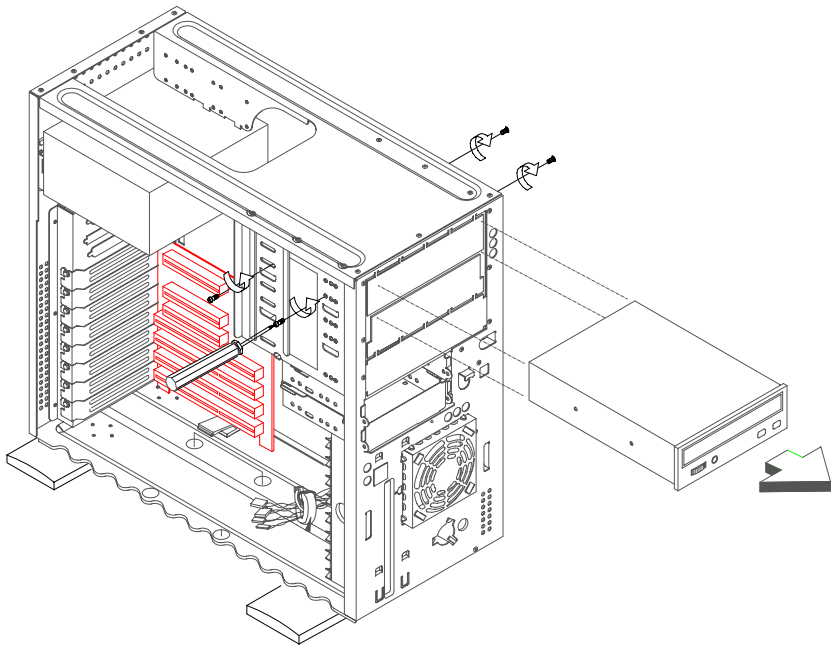


Figure 4- 2 Pull Out on the Cover

Bays 1, 2, 3 (5.25-In. Internal /External Bays)

- Disconnect any cable on the drive (note location of cables).
- Remove the screws.
- Pull out the drive.



- Figure 4- 3 Bay 1 (5.25-In.)

Note: To remove the front panel's drive bay cover

- Hold on to the bay cover as shown in the illustration.
- Gently pull outward until the drive bay cover snap from its place.

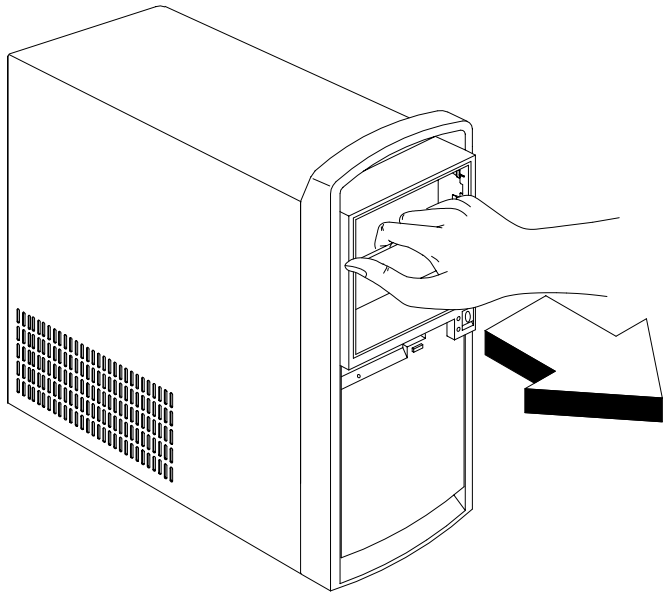


Figure 4- 4 Remove the Bay Cover

Note: To reinstall the front panel's drive bay cover:

Before installing the drive bay cover, check the clippings on both side of the cover. You will notice that one is shorter than the other. The drive bay cover is designed so that it will only fit one way. The shorter clipping should go to the left while the longer clipping goes to the right.

- Place the drive bay cover behind the front panel. Or if the front panel is attached to the housing, place the drive bay cover inside the front panel as shown in the illustration.

- Make sure that the shorter clipping is on the left side of the front panel otherwise the drive bay cover won't fit.

- Gently pull the drive bay cover until it snaps in place.

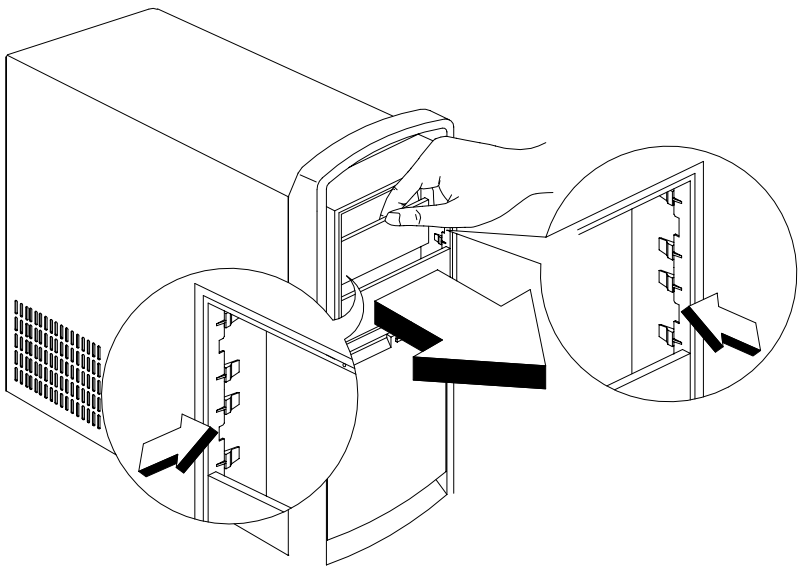


Figure 4- 5 Reinstall the Bay Cover

Bay 4 (3.5-In. FDD Bay)

- Disconnect the cables (note location of cables).
- Press the lever and rotate outward.
- Pull carefully and slowly as soon as the warning arrow appears.
- The drive frame becomes free after the line behind the arrow appears. Remove the frame from the chassis.

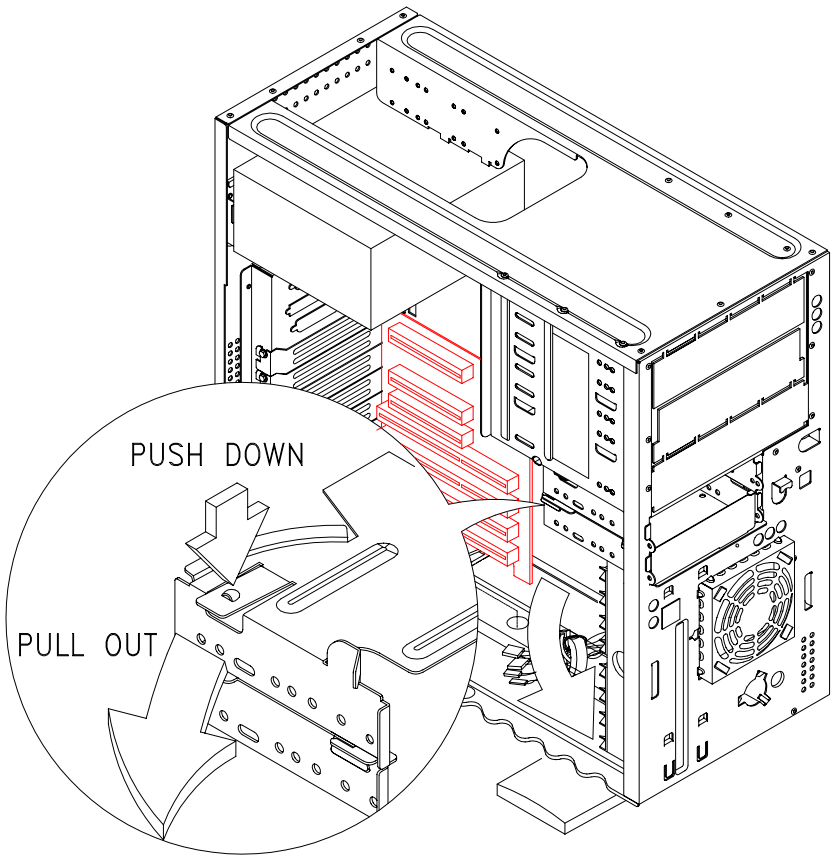


Figure 4- 6 Bay 4 (3.5-In)

- Remove screws for drive Then you can pull the old drive out.

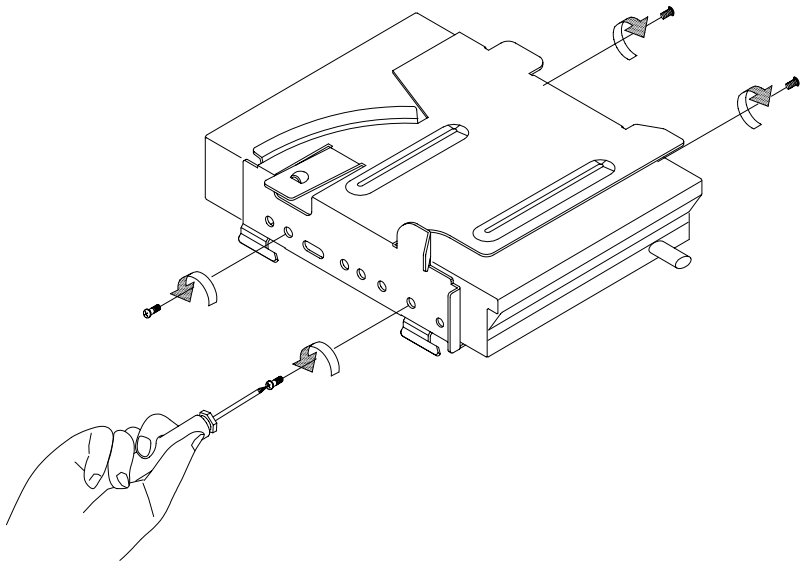


Figure 4- 7 Remove the Screws

- If upper and lower frame needs to be detached, please refer to figure 4-8.

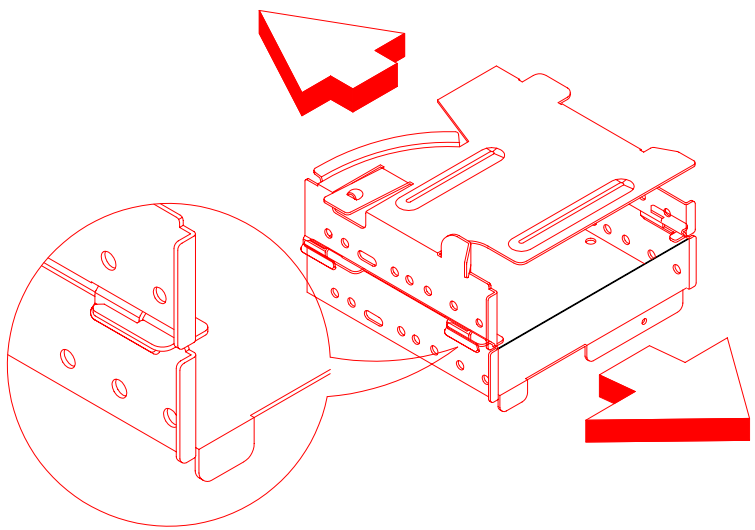


Figure 4- 8 Detach Diskette Drive Frame

Note: If you want to install another 3.5-inch drive, such as a hard disk drive, see the procedure in “Bay 5 (3.5-In. Internal Bay)” on page 4-14. Otherwise, proceed to following steps for re-install.

- Attach the upper drive frame back to the lower drive frame and click it into place.

- Insert the drive frame into the 3.5-inch drive bay and click it into place.

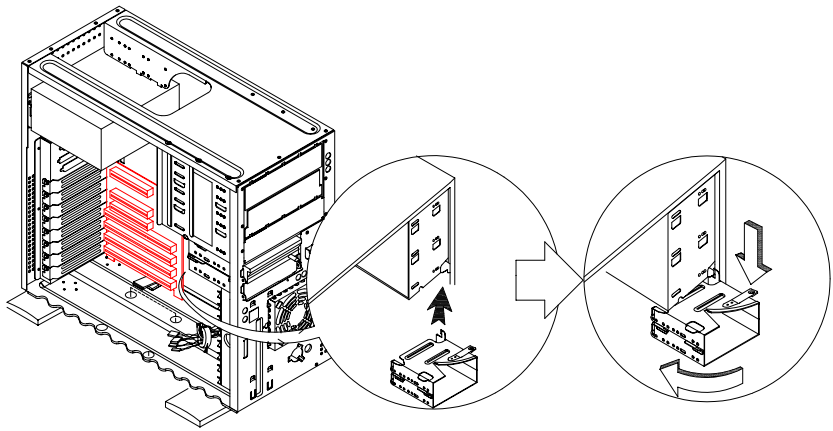


Figure 4- 9 Reattach the 3.5-inch drive

- Re-attached the power and signal cables to the drive.

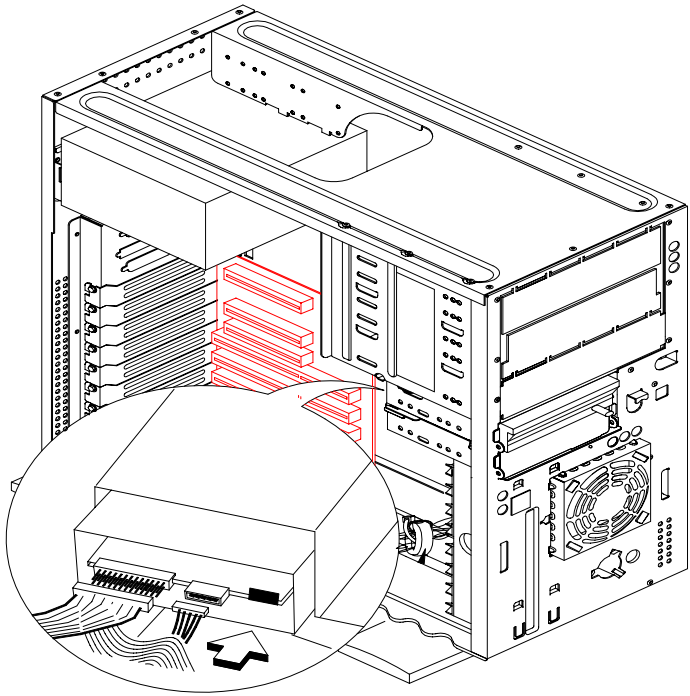


Figure 4- 10 Reattached The Cables

Bay 5 (3.5-In. Internal Bay)

If another 3.5-inch drive need to be install, please follow these step.

- Attach a 3.5-inch drive to the lower frame which has mentioned in bay-4.
- Secure it with the appropriate screws.

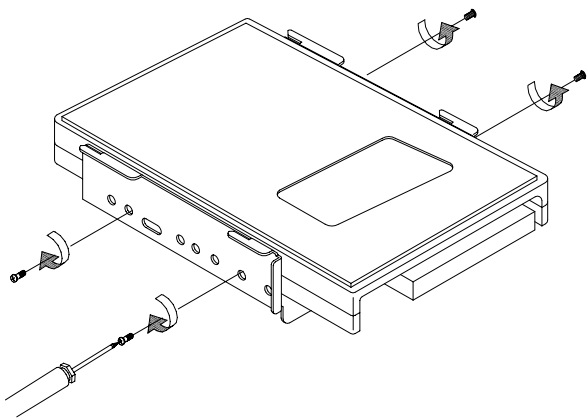


Figure 4- 11 Install another 3.5-inch drive

- See “Bay 4 (3.5-In. FDD Bay)” on page 4-10 mentioned above for reattaching the drives back to the system.

Bay 6 (3.5-In. Internal Bay)

- Disconnect any cables on the drive (Note location of cables).
- Remove the screws
- Slide out the hard disk drive.

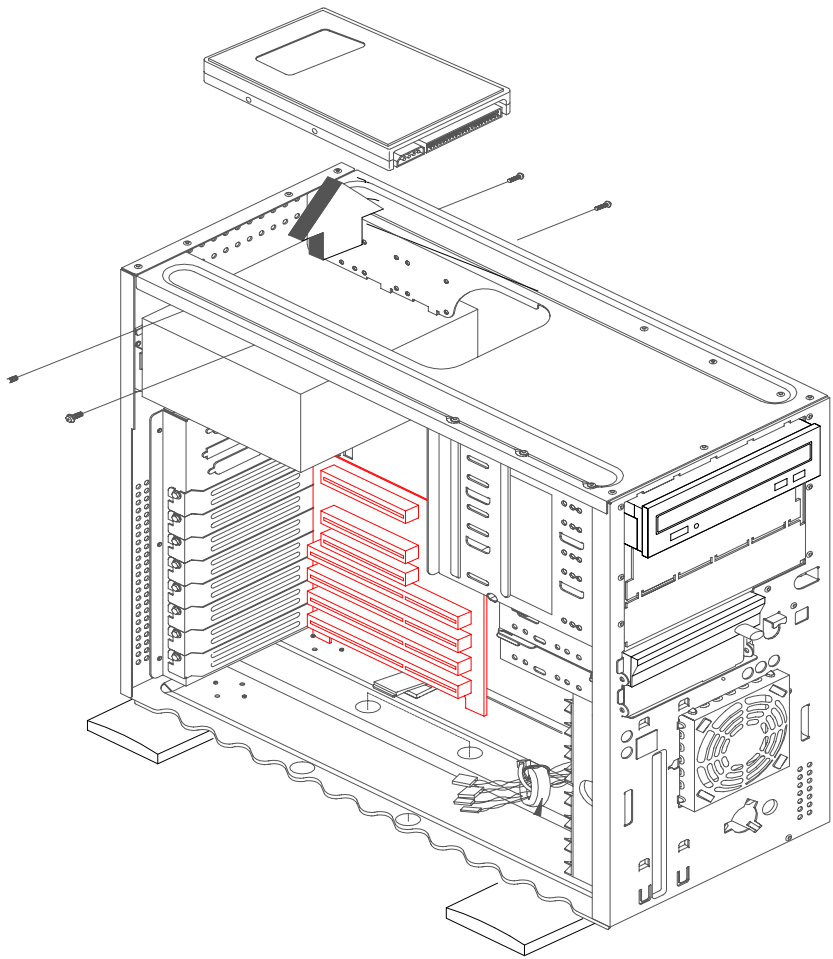


Figure 4- 12 Remove in Bay 6

When installing a drive in bay-6

- Position a hard disk drive over bay 6 such that the signal and power connectors face the front panel.
- Secure the drive with the appropriate screws
- Connect the drive cables

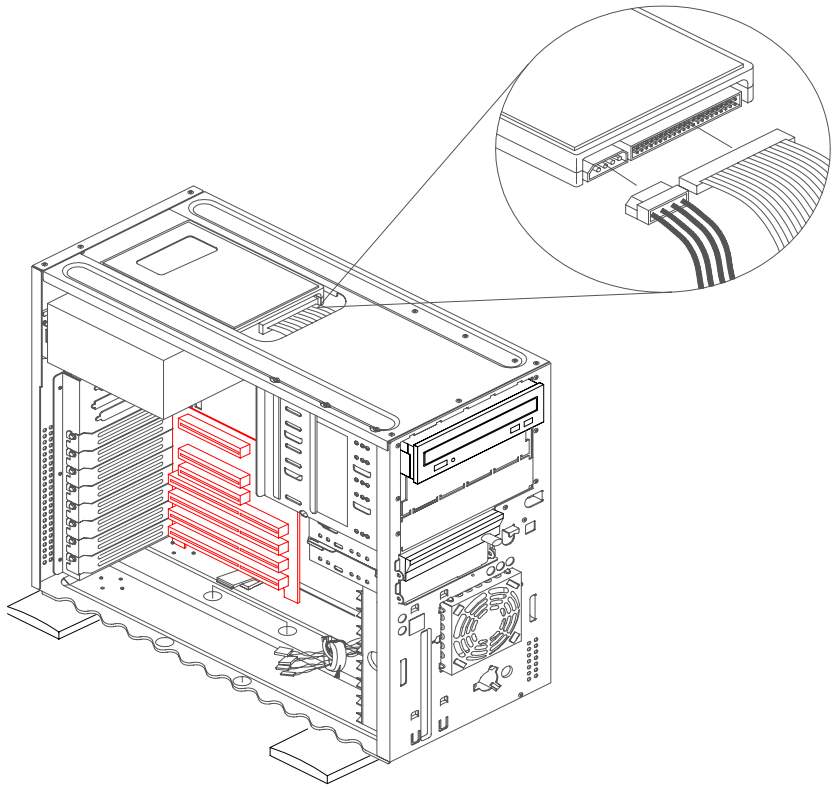


Figure 4- 13 Reattach The Cables

Power Supply

- Disconnect any cables necessary for removal (Note location of cables).
- Remove the power supply mounting screws.
- Free and remove the power supply.

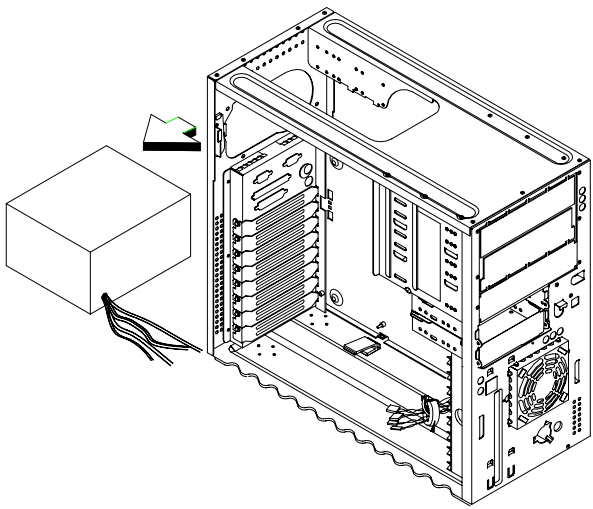


Figure 4- 14 Power Supply

Adapter Cards

Note: **1.** Before removing an adapter card, note the location of the adapter card and any cables. When removing an adapter card, install the replacement card in the same slot as the one you removed.

2. If necessary, remove cards from the adjacent slots of the failed card.

- Position the system unit such that the card is accessible to you.
- If the adapter card has cables, disconnect them. Be sure to take note where the cables are connected. You will need to reconnect these cables when you reinstall the card.
- Remove the adapter card screw.
- Carefully pull the adapter card straight out of the slot so that the card's components do not bend.

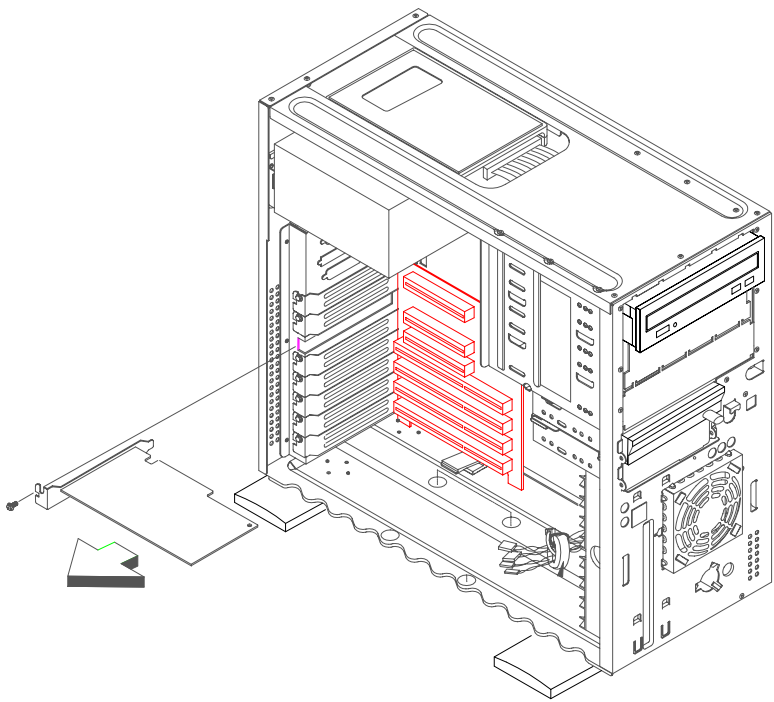


Figure 4- 15 Remove Adapter Cards

Note: Adapter Cards Install

- Remove the screw that secures the adapter card slot cover. Then remove the slot cover.

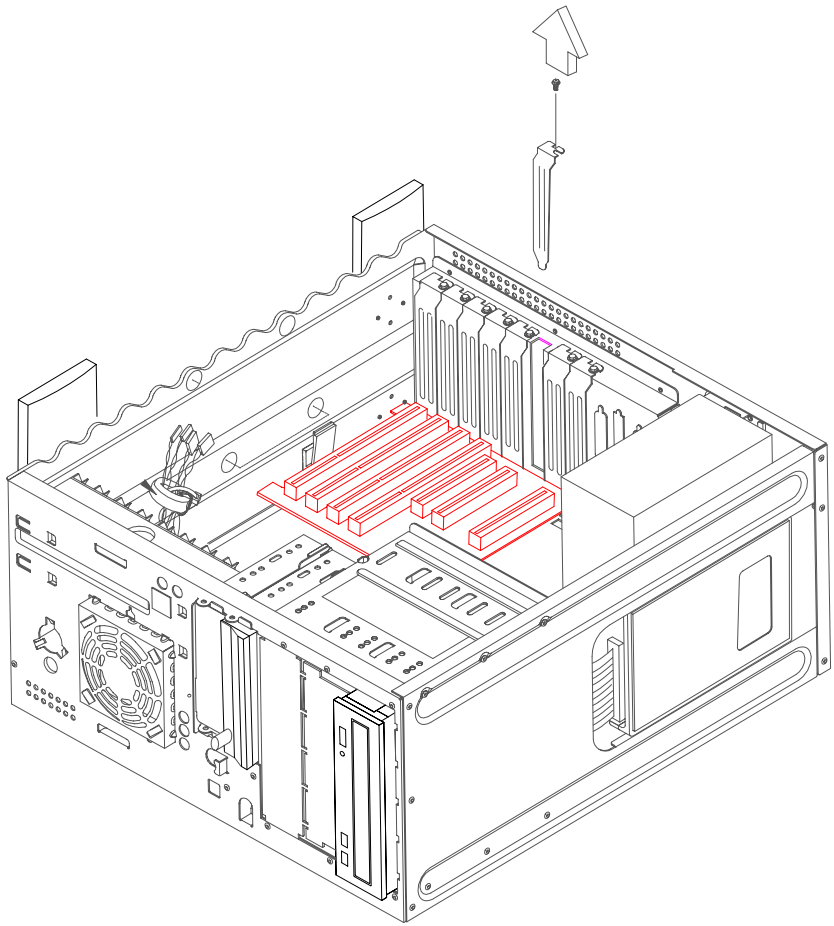


Figure 4- 16 Remove the slot covers

- Align and insert the adapter card into the adapter card connector.
- Secure the card with the original screw.

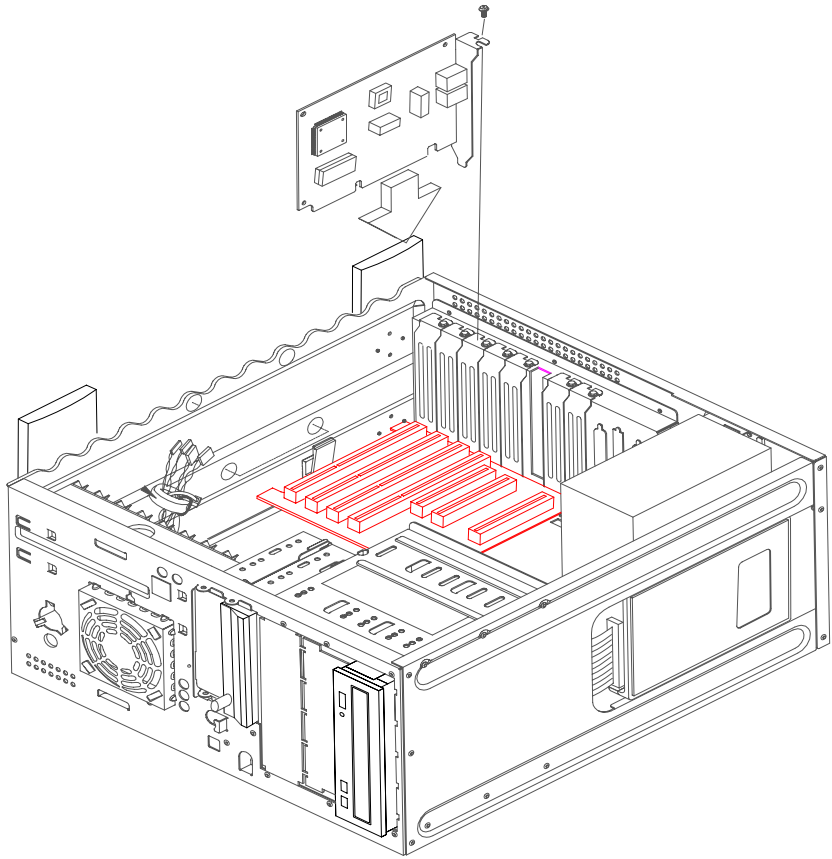


Figure 4- 17 Install an Adapter Card

Note: Reinstall adapter card.

- Align the back panel slot plate of the add-on card with the exposed opening of intended slot.
- Firmly insert the add-on cards connector(golden finger) into the open slot on the riser card.

- Make sure the add-on card's connector is seated in the slot such that the lower body of the card is flush with the top of the slot.

- Secure add-on card to housing with original screw.

Note: If you have not already done so, connect the cable or cables from the adapter card to the correct connection on the system board or CD-ROM drive. If you had to disconnect any cables to gain access to the adapter card connector on the riser card or to gain access to a section on the system board, reconnect the cables.

Riser Card

You need to remove the riser card to access the system board components or to service the main system board. To remove the riser card, you must first remove all the adapter cards from the riser card. If any of your cards have cable connections to the system board or one of your drives, disconnect the cables. Take note of all the cable connections before disconnecting them so that you can reconnect without error.

- Remove all adapter cards, noting the locations of the cable connectors from which you remove the cables.
- Use a Philips screwdriver to remove the screw that secures the riser card.
- Gently remove the riser card from the connector on the system board.

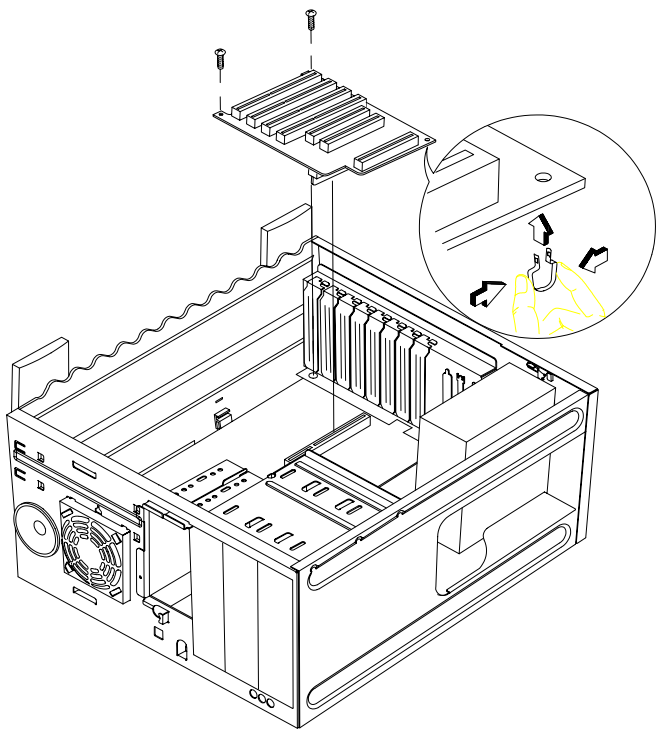


Figure 4- 18 Remove Riser Card

Note: **1. When replacing the old riser card with a new one, make sure that you remove the GND stitch from the old one and reinsert it to the new one. Please refer to figure 4-18(encircle illustration) on how to reinsert the GND stitch.**

2. To reinstall the riser card, reverse the removal procedure. Reconnect any adapter card cables that you disconnected when you remove the adapter cards from the riser card.

Memory(SIMM)

Attention: Memory modules are sensitive to static discharge.

- Remove all adapter cards.
- Remove riser card
- Locate the two clips that hold the memory module in place. One clip holds the left edge of the module and the other holds the right edge.
- At the same time, push both clips outward, away from the module. This releases the module from the socket.
- Lift the module out of the socket.
- Lift the module out of the socket.

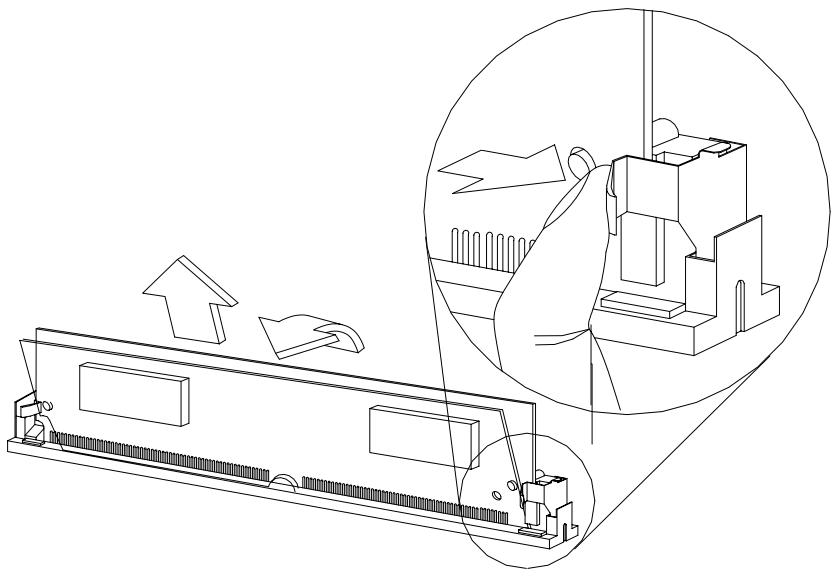


Figure 4- 19 Removing memory modules (SIMM)

Note: Installing Memory Modules (SIMM)

- Carefully slip a SIMM at a 45-degree angle into a socket making sure that the curved edge indicating the pin 1 of the SIMM matches pin 1 of the socket.

Note: A SIMM fits only in one direction. If you slip in a SIMM but does not completely fit, you may have inserted it the wrong way. Reverse the orientation of the SIMM.

- Gently push the SIMM to a vertical position until the pegs of the socket slip into the holes on the SIMM, and the holding clips lock the SIMM into position. The SIMM should be at a 90-degree angle with the system board when installed.

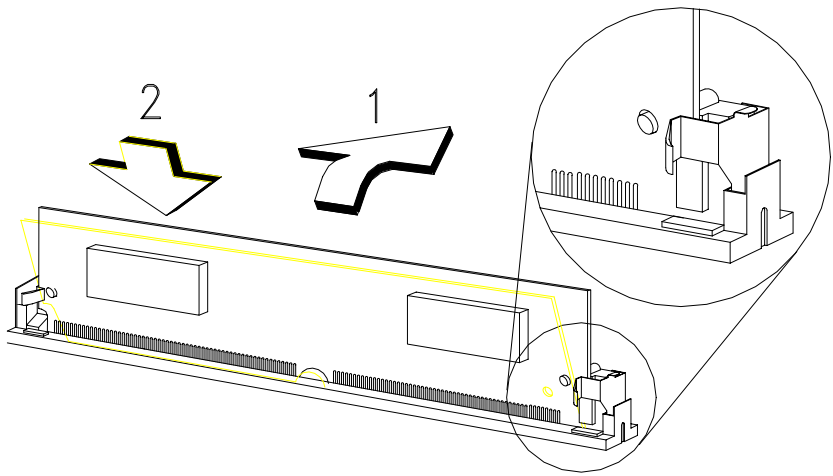


Figure 4- 20 Installing memory modules (SIMM)

Processor Removal

Notes: **Determine which type of processor you are installing and make sure the jumpers are set correctly. And run the Setup Utility after installing a processor.**

Attention: Processors are sensitive to static discharge.

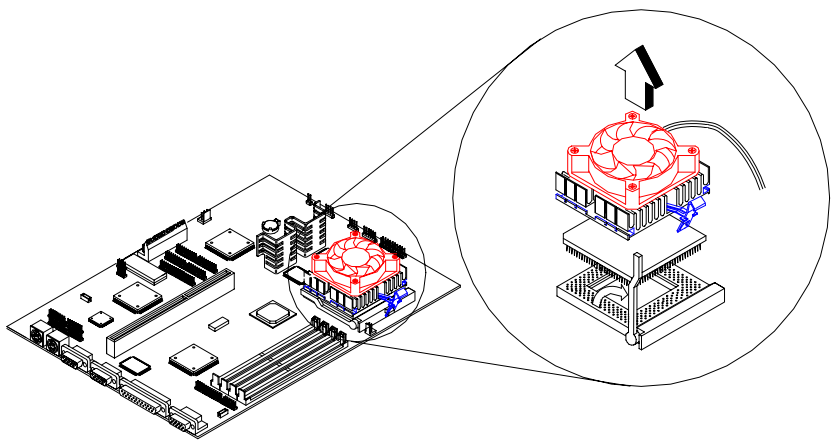
- Remove adapter cards if applicable.
- Detach the heat sink cable from the fan connector FN1.
- Remove the heat sink by pressing the release tab(rectangular end) and lifting it up from the CPU.
- Unlatch the handle on the side of the processor socket and lift it all the way up.
- Lift the processor out of the bracket.
- 

Figure 4- 21 Processor Removal

Note: Processor Install

- Insert the new CPU, making sure that the pin 1 of the CPU connects to pin 1 of the socket.
- Pull down the handle to lock the CPU to the socket.
- Place the CPU heat sink and fan over the CPU. Such that the securing latch is aligned with the CPU socket
- Link the front heat sink hook to the holding tab on the front edge of the CPU socket, then the rear hook to the rear holding tab. This locks the heat sink and fan to the CPU socket.
- Attach the CPU fan cable to the FN1 on the system board.

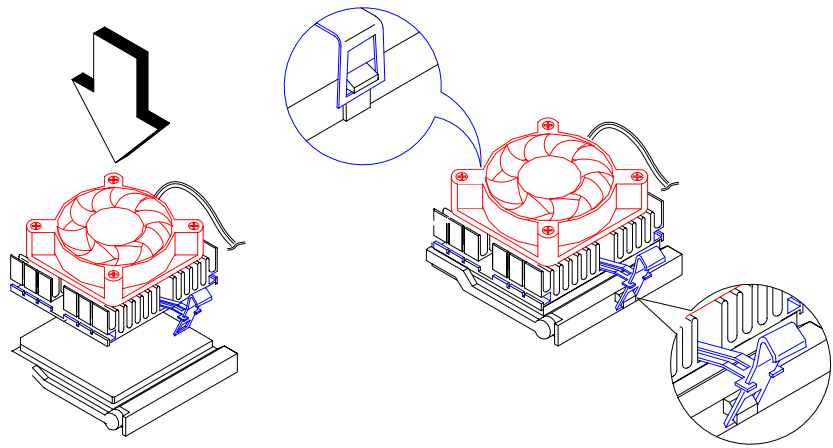


Figure 4- 22 Processor Install

RTC Lithium Battery

Attention: Be careful when removing the battery. If the retaining clip is broken, the system board must be replaced.

- Press the securing clip on the battery socket to release the battery.
- Flip out the battery from the socket.

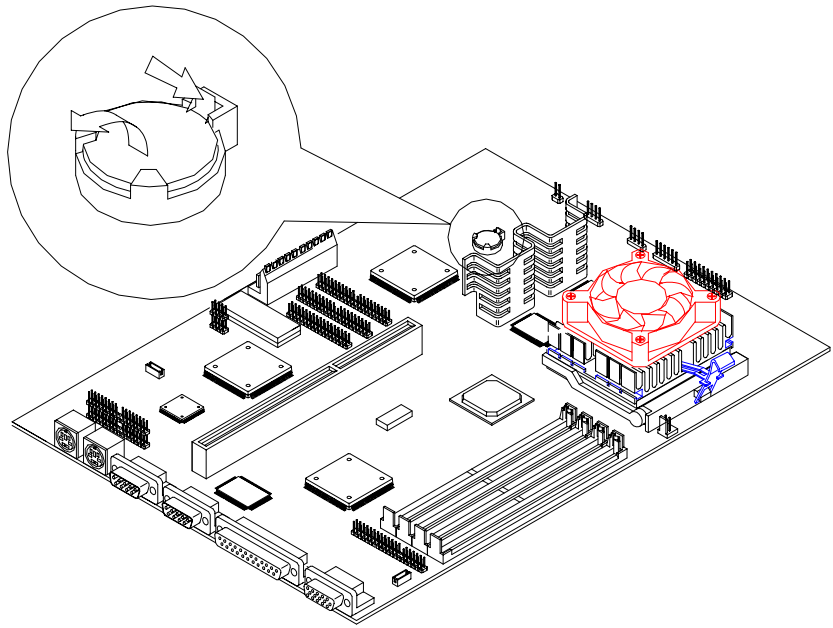


Figure 4- 23 Remove the RTC Lithium Battery

- Insert a new 3-volt(CR2032) lithium battery in the socket and press it down until the securing clip clicks and locks the battery in.
- If you replace the system battery, you need to reset the system date and time. You can perform this task from the Window 95 desktop or from the Setup Utility. To reset the system date and time in the Setup Utility, select the Date and Time option from the Main Menu. See “Setting the date and time” on page 1-25 for information about this option.

Indicator LED and Cable

- Push in on the indicator LED and remove from the rear.
- Disconnect the LED and cable from the system board.

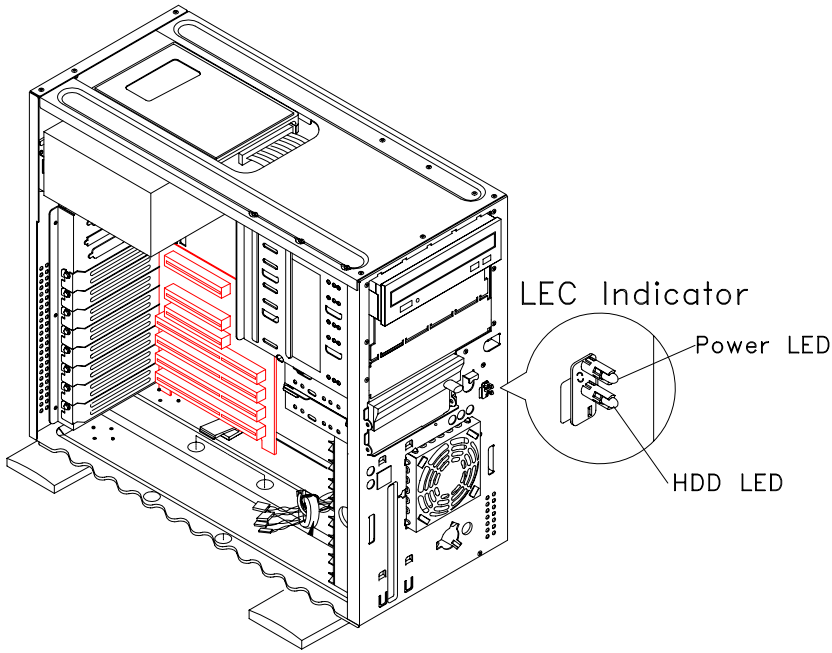


Figure 4- 24 LED Indicator

Note: LED Cables and Power Switch Cable Install

Please follow the steps below for installation instruction and refer to the diagram.

- Insert the LED cables along with the power switch cable into the circular hole (diagram 1).
- Insert LED cables along with the power switch cable into EMI reduce core (diagram 2).
- Encircle the core with LED cables and power switch cable one full turn (diagram 3).

- Fasten the cables around the core such that the core is within 20mm from the circular hole (diagram 4).
- Fix the cables and core in place with a cable tie (diagram 5).
- Cut off surplus cable tie (diagram 6).
- Fix cables into cable clip (diagram 7)**.**

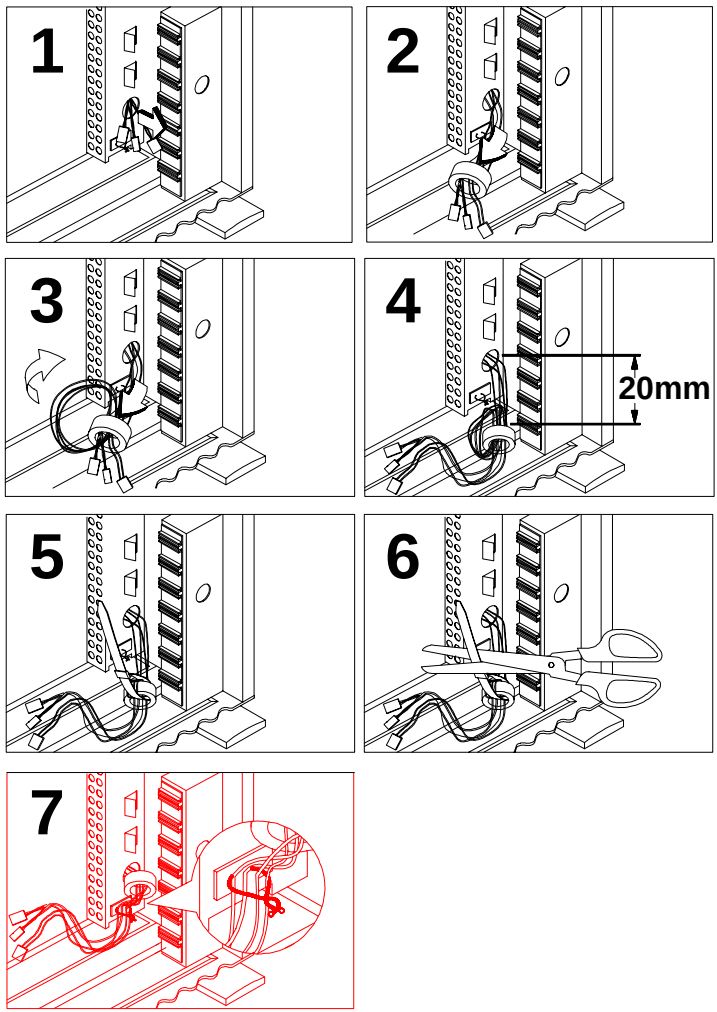


Figure 4- 25 LED Cables and Power Switch Cable Install Diagram

System Board

- Remove adapter cards.
- Remove riser card.
- Disconnect any cables necessary for removal.
- Remove memory(SIMM) if applicable.
- Remove processor.
- Use a flat blade screw driver (you can use other instruments with the same features), gently push the BKT hook which stabilize the Riser Card until it loosen as shown in the following figure.
- Press 2 hooks in the upper and bottom side to release the board out.

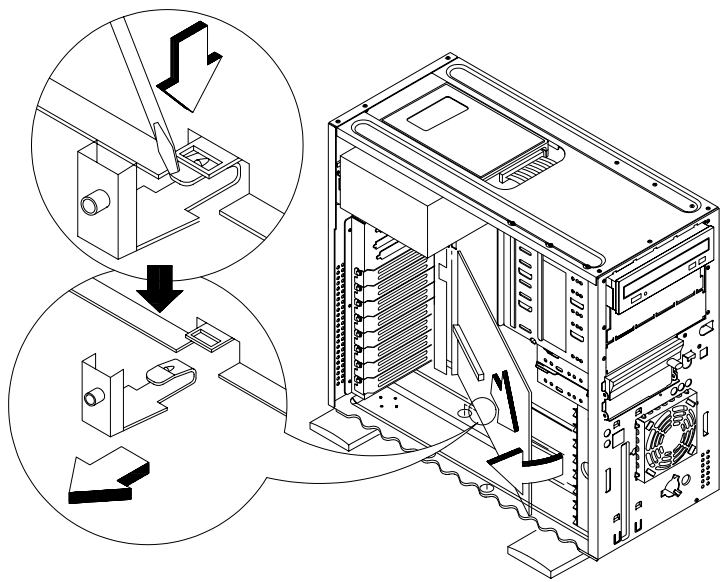


Figure 4- 26 Remove the System Board

Notes: System Board Install

- Be certain to reinstall the processor, SIMMs, and in the new system board if applicable.

- Before reinstallation, lay housing on its side. When reinstalling a new system board, push the board to the rear and place it over the front locating pin. Visually verify that the board is aligned properly, then press the board down such that the two hooks (on the two sides of the system board) locks the system board in place.

- After installing the system board, reinsert the BKT hook back to its place.

- Run the Setup Utility after changing the system board.

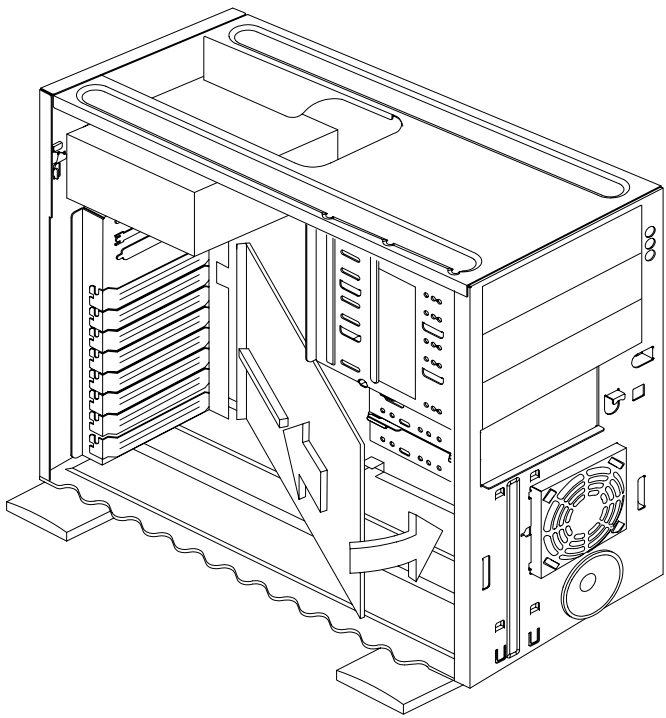


Figure 4- 27 Install the System Board

Handling ESD-Sensitive Parts

Many products use parts that are known to be sensitive to electrostatic discharge (ESD). To prevent damage when you work with ESD-sensitive parts, observe the following instructions. Do these in addition to taking all the usual precautions, such as switching off the power and unplugging the power cord before removing adapter cards.

- Keep the ESD-sensitive part in its original shipping container (a special ESD bag) until you are ready to install the part into the machine.

- Make the fewest possible movements with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.

- Put the ESD wrist strap on your wrist. Ensure the machine is turned off. Connect the wrist strap to the serial bracket mounting screw. This discharges any static electricity in your body to the machine frame.

- Hold the ESD-sensitive part by its edge connector shroud (cover). Do not touch its pins. If you are removing a pluggable module, use the correct tool.

- Do not place the ESD-sensitive part on the machine cover or on a metal table. If you need to put down the ESD-sensitive part for any reason, first put it into its special bag.

  Machine covers and metal tables are electrical grounds. They increase the risk of damage because they make a discharge path from your body through the ESD-sensitive part. (Large metal objects can be discharge paths without being grounded.)

- Prevent ESD-sensitive parts from being accidentally touched by other personnel or customers. Reinstall machine covers when you are not working on the machine.

- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).

- Be extra careful while working with ESD-sensitive parts when cold-weather heating is used because low humidity increases static electricity.

Software Recovery Procedure

The Recovery CD includes an install program that can be used to restore the original system software.

To recover the original software on the hard disk drive, use the following procedures:

1. Insert the Recovery CD into the CD-ROM drive.
2. Power-off, then power-on the system unit.
3. You will be prompted with a message.

   "Do you wish to update the software on your hard disk (Y/N)?"
   Press "y" to continue.

4. A warning message will show.

   " Do you accept these terms and conditions (Y/N)?"
   Press "y" to continue.

5. A message will appear telling you that old data will be erased and asks if you wish to continue. If you wish to continue, press enter.
   If you hard disk drive is not partitioned, the following message will be displayed.

   "Do you want me to partition it (Y/N)?"
   Press "y" to continue, then press any key to reboot.

6. Follow the instructions on the display (Auto-formatted and copied.).

Parts/Test Point Locations

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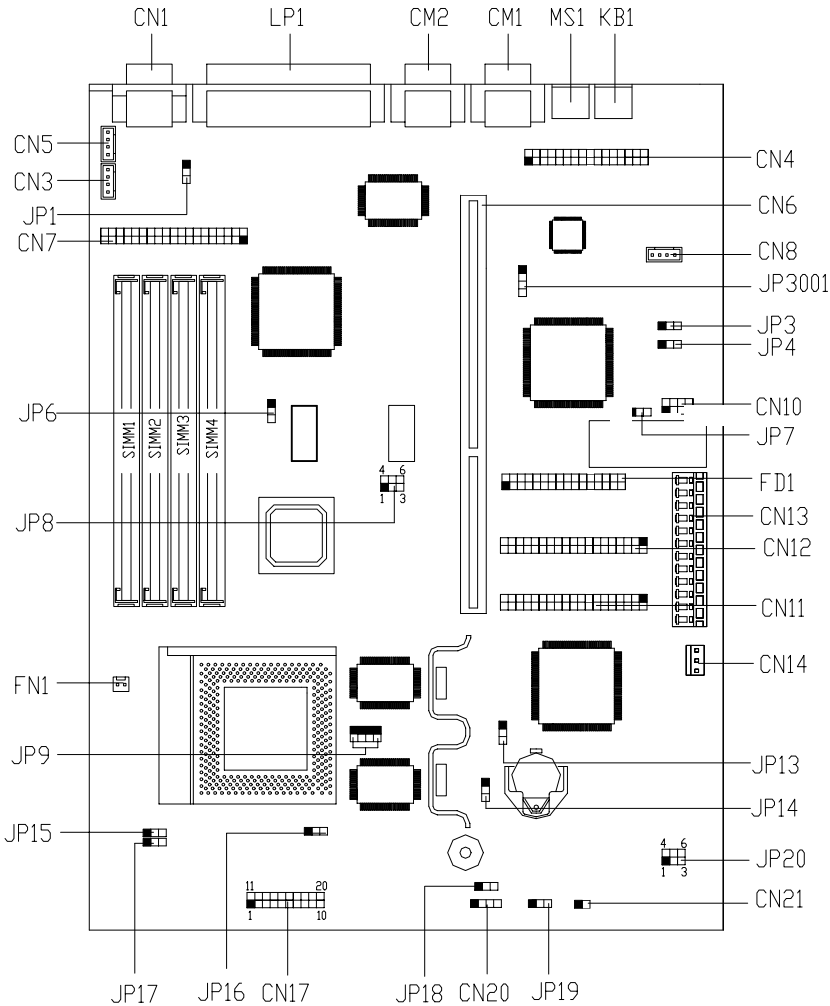
System Board Layout



Note: The blackened pin of a jumper represents pin 1.

Figure 5- 1 System Board Jumper and Connector Locations

System Board Jumper Settings

Table 5- 1 System Board Jumper Settings

Jumper/Settings	Function
JP1 1-2 2-3*	Onboard VGA Disabled Enabled
JP3** 1-2* 2-3	BIOS Type Standard BIOS for Aptiva Reserved
JP4 1-2* 2-3	Password Security Check password Bypass password
JP6** 1-2* 2-3	Cache Size 256 KB 512 KB
JP7** 1-2 2-3*	BIOS ROM Block ROM (2 Mbit) Flash ROM (Intel 28F001)
JP16** 1-2* 2-3	Cache operation mode Interleaved burst mode Linear burst mode
JP18** 1-2 2-3*	LED Functions IDE and FDD LED IDE LED only
JP19** 1-2* 2-3	Power Saving Suspend function Reserved
JP20** 1-2*, 4-5* 2-3, 5-6	Software shutdown Enable software shutdown function Reserved
JP3001** 1-2 2-3*	Sound EEPROM control Write-protect Write-enabled

* Default setting

** For reference only; DO NOT configure.

CPU Type Jumper Settings

Table 5- 2 CPU Type Jumper Descriptions	
Jumper/Settings	**Function**
JP8 1-4 2-5 3-6	CPU host bus speed 50MHz 60MHz 66MHz
JP9 ON OFF	CPU voltage type Single voltage Dual voltage
JP13 1-2 2-3	CPU voltage 2.8V 2.5V
JP14 1-2 2-3	CPU voltage 3.5V 3.35V
JP15, JP17 1-2, 1-2 2-3, 1-2 1-2, 2-3 2-3, 2-3	Host bus / CPU speed ratio 2 / 3 1 / 3 1 / 2 2 / 5

Warning: You must check out the exact processor type before setting the CPU type jumper. The wrong CPU type jumper setting may damage CPU, especially the single/dual voltage setting.

Table 5- 3 CPU Type Jumper Settings						
CPU	**JP8**	**JP9**	**JP13**	**JP14**	**JP15**	**JP17**
Pentium						
P-100	3-6	ON	1-2	1-2	1-2	1-2
P-120	2-5	ON	1-2	1-2	1-2	2-3
P-133	3-6	ON	1-2	1-2	1-2	2-3
P-150	2-5	ON	1-2	1-2	2-3	2-3
P-166	3-6	ON	1-2	1-2	2-3	2-3
P-200	3-6	ON	1-2	1-2	2-3	1-2
Pentium ODP/MMX						
166	3-6	OFF	1-2	1-2	2-3	2-3

Table 5- 3 CPU Type Jumper Settings						
CPU	**JP8**	**JP9**	**JP13**	**JP14**	**JP15**	**JP17**
200	3-6	OFF	1-2	1-2	2-3	1-2
Cyrix/IBM 6x86						
PR120+	1-4	ON	1-2	1-2	1-2	2-3
PR150+	2-5	ON	1-2	1-2	1-2	2-3
PR166+	3-6	ON	1-2	1-2	1-2	2-3
Cyrix/IBM 6x86L						
PR120+	1-4	OFF	1-2	2-3	1-2	2-3
PR150+	2-5	OFF	1-2	2-3	1-2	2-3
PR166+	3-6	OFF	1-2	2-3	1-2	2-3

System Board Connect or Functions

Table 5-3 lists the different connectors on the system board and their respective functions.

Table 5- 4 Connector Functions		
Connector	**Function**	**Connect to…**
CN1	Video port	Monitor
CN3	Fax/modem/voice-in connector	Fax/modem card
CN5	Internal line-in connector	Reserved
CN4	Audio-I/O card audio interface	Audio-I/O card
CN6	Riser card connector	Riser card
CN7	Video feature connector	Reserved
CN8	CD audio input connector	CD-ROM drive
CN10	Wave table upgrade interface	Audio-I/O card (with wave table)
CN11	Primary IDE connector channel	Hard disk drive
CN12	Secondary IDE connector channel	CD-ROM drive
CN13	System power connector	Power supply
CN14	Software shutdown control	Power supply

Table 5- 4 Connector Functions		
Connector	**Function**	**Connect to…**
CN17	Power LED connector. Connect the white wire of power LED cable to pin-3, green wire to pin-5 by crossing pin-4.	Power LED
CN20	HDD LED connector Either connect the red wire of HDD LED cable to pin-1, white wire to pin-2, then leave pin-3 and pin-4 as non-connected; or connect the red wire of HDD LED cable to pin-4, white wire to pin-3, then leave pin-1 and pin-2 as non-connected.	HDD LED
CN21	Power switch connector This connector has no directional concern.	Power switch
FD1	Diskette connector	Diskette drive
FN1	Fan connector	CPU heat sink

Power Supply Cable Connector Specifications

Refer to the following figures when checking for voltages on power supply cable connectors.

When checking voltages, the power supply fan must be running. To power-on the power supply without using the on/off switch, use a screwdriver or other tool to short the connector CN21 (with the switch cable plug disconnected from the connector on the system board).

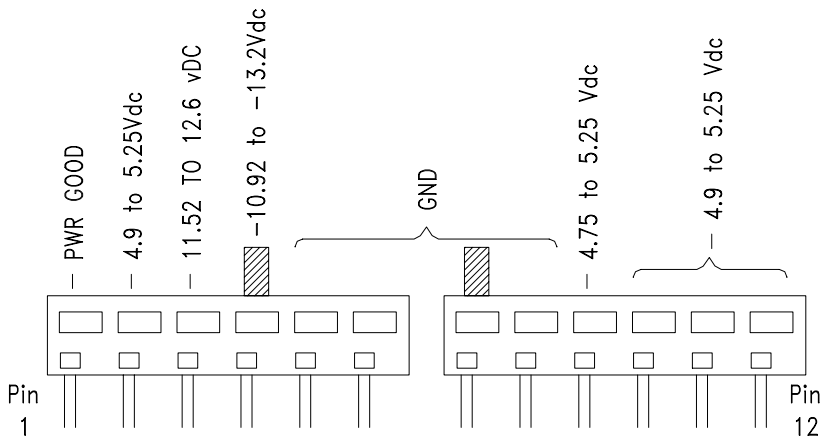


Figure 5- 2 System Board Power Supply Connectors

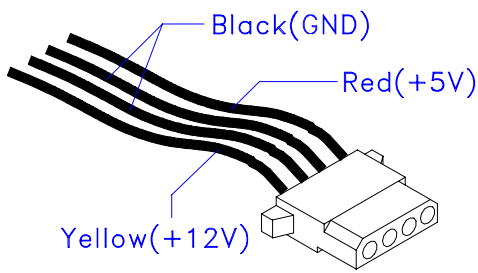


Figure 5- 3 Hard Drive or CD-ROM Power Cable Connector

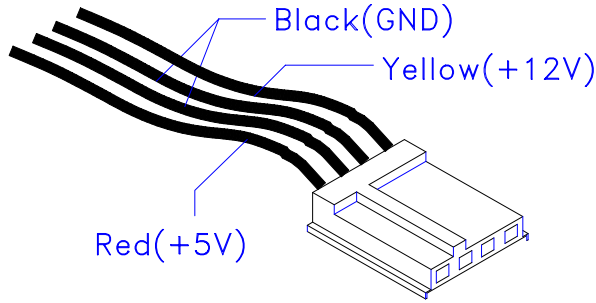


Figure 5- 4 3.5-In. Diskette Drive Power Cable Connector

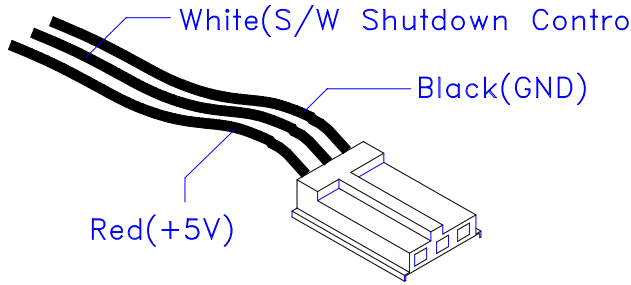


Figure 5- 5 Software Shutdown Auxiliary Control Cable

Audio-I/O Card Layout

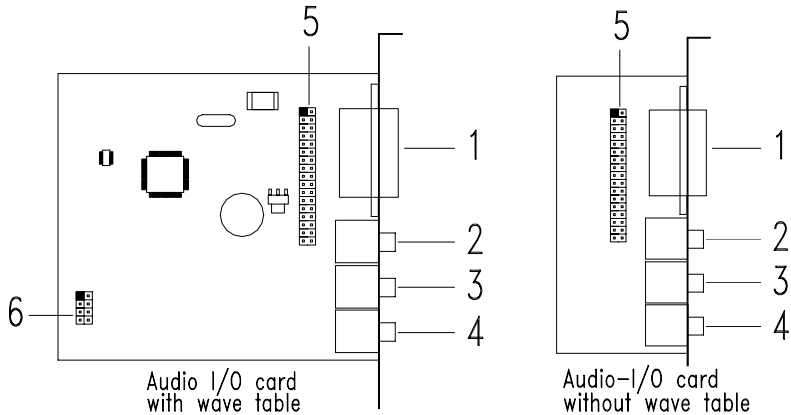


Figure 5- 6 Audio-I/O Card Layout

Audio-I/O Card Connector Functions

Table 5- 5 Audio-I/O Card Connector Functions

No.	Location	Function	Connector to…
1	CN1	Game / Midi port	Joystick
2	PH3	Speaker-out port	Speaker
3	PH2	Line-in port	Sound resource
4	PH1	Microphone-in port	Microphone
5	CN2	Audio I/O cable interface	System board CN4
6	CN3	Wave table signal interface	System board CN10

Factory-Installed Fax/Modem Card Layout

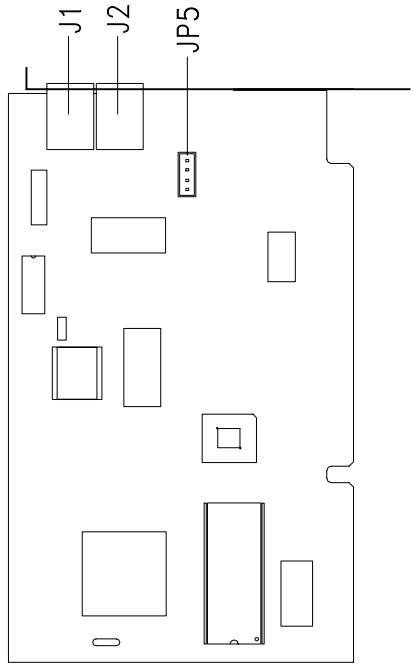


Figure 5- 7 Factory-Installed Fax/Modem Card Layout

Factory-Installed Fax/Modem Card Connector Functions

Note: There are two types of fax/modem card for Canada and Germany geography though they have the same board layout.

Table 5- 6 Factory-Installed Fax/Modem Card Connector Functions

Location	Function	Connect to…
J1	Telephone line-out	Telephone set
J2	Telephone ine-in	Telephone line
JP5	Voice-in/speaker-out connector	System board (CN3)

Hard Disk Drive

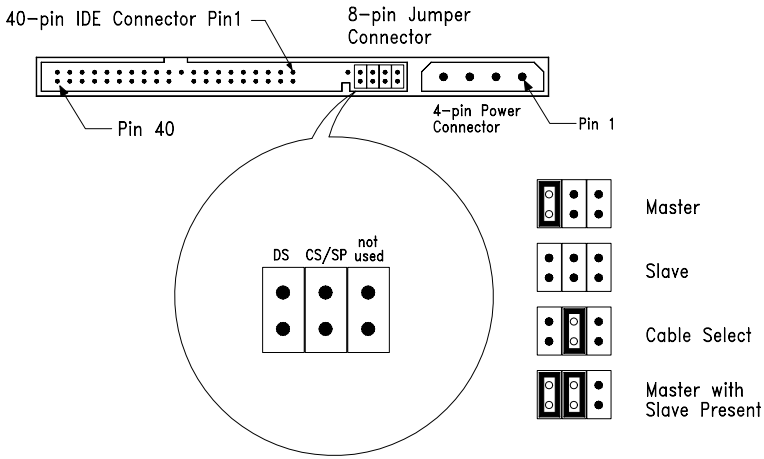


Figure 5- 8 3.5" Hard Disk Jumper Settings Layout

3.5" Hard Disk Drive Jumper Settings

The configuration of the following four jumpers controls the drive's mode of operation:

- DS – Drive Select
- CS/ SP– Cable Select / Slave Present

Table 5-7 3.5" Hard Disk Drive Jumper Settings

DS	CS/SP	NOT USED	DESCRIPTION
On	Off	--	Drive configured as a Master.
Off	Off	--	Drive configured as a Slave.
On	On	--	Drive configured as a Master, with an attached Slave

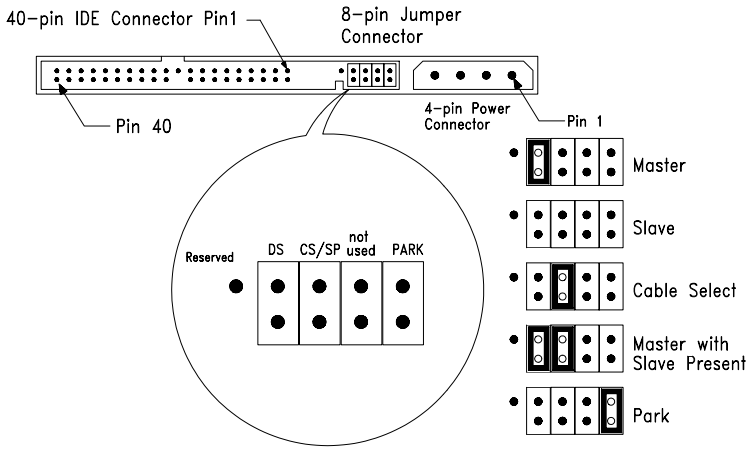


Figure 5- 9 5.25" Hard Disk Jumper Settings Layout

5.25" Hard Disk Drive Jumper Settings

The configuration of the following four jumpers controls the drive's mode of operation:

- DS – Drive Select
- CS/ SP–Cable Select / Slave Present
- Park – Used as a place to store a jumper

Table 5-8 5.25" Hard Disk Drive Jumper Settings

DS	CS/SP	NOT USED	Park	DESCRIPTION
On	Off	--	--	Drive configured as a Master.
Off	Off	--	--	Drive configured as a Slave.
On	On	--	--	Drive configured as a Master, with an attached Slave

CD-ROM Drive

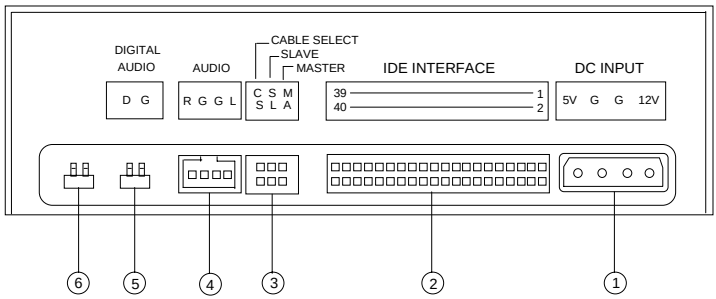


Figure 5- 10 CD-ROM Rear Panel

CD-ROM Drive Connector Features

Note: CD-ROM drives may come with no item 5 and 6 (digital audio output and testing jumper) connectors.

Table 5- 9 CD-ROM Drive Card Connector Features		
No.	**Function**	**Connect to…**
1	Power supply connector	Power supply
2	Interface connector	System board (CN12)
3	Configuration jumper. See table 5-10.	--
4	Audio line out connector	System board (CN8)
5	Digital audio output	--
6	Testing jumper is reserved for manufacturer internal testing purposes.	--

CD-ROM Drive Jumper Settings

Table 5-10 CD-ROM Drive Jumper Settings			
CS	**SL**	**MA**	**DESCRIPTION**
--	--	On	Drive configured as a Master.
--	On	--	Drive configured as a slave.
On	--	--	Cable select

CD-ROM Emergency-exit Option <1>

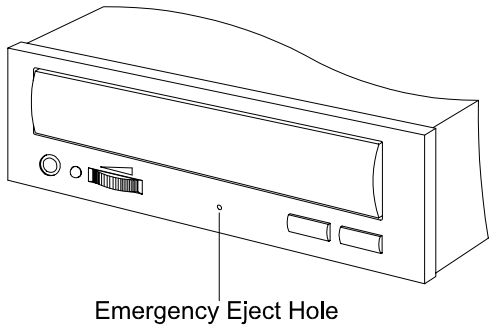
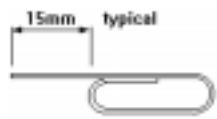


Figure 5- 11 CD-ROM Front Panel with Emergency Hole View

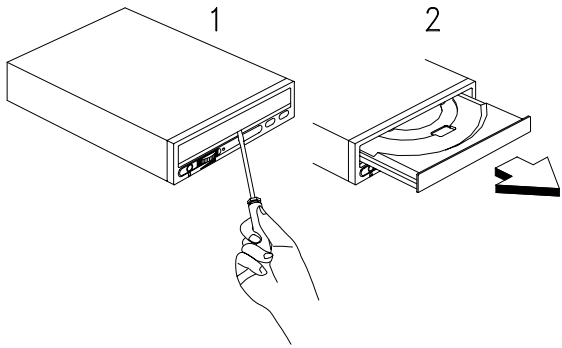
If for any reason the tray does not eject automatically, insert and press an eject-bar inside the emergency eject hole to manually eject the tray. A straightened paper clip with a diameter of 1.2 mm (typical) can be used as an eject-bar.



Note: Make sure to turn off the power before manual disc eject operation.

CD-ROM Emergency-exit Option <2>

Locate the bottom edge of the disc tray. Gently pry the disk tray open with a screwdriver. When the disc tray opens, simply remove the disc from the CD-ROM drive.


1
2

SIMM Configurations

Table 5- 11 SIMM Configurations

SIMM-1	SIMM-2	SIMM-3	SIMM-4	Total memory
4MB	4MB			8MB
		4MB	4MB	8MB
4MB	4MB	4MB	4MB	16MB
8MB	8MB			16MB
		8MB	8MB	16MB
4MB	4MB	8MB	8MB	24MB
8MB	8MB	4MB	4MB	24MB
8MB	8MB	8MB	8MB	32MB
16MB	16MB			32MB
		16MB	16MB	32MB
4MB	4MB	16MB	16MB	40MB
16MB	16MB	4MB	4MB	40MB
8MB	8MB	16MB	16MB	48MB
16MB	16MB	8MB	8MB	48MB
16MB	16MB	16MB	16MB	64MB
32MB	32MB			64MB
		32MB	32MB	64MB
4MB	4MB	32MB	32MB	72MB
32MB	32MB	4MB	4MB	72MB
8MB	8MB	32MB	32MB	80MB
32MB	32MB	8MB	8MB	80MB
16MB	16MB	32MB	32MB	96MB
32MB	32MB	16MB	16MB	96MB
32MB	32MB	32MB	32MB	128MB

System Board Connector Pin Signals

Monitor Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Red Video	O	9	+5 V dc	
2	Green Video	O	10	Synch Ground	
3	Blue Video	O	11	Monitor ID Bit 0	I
4	Monitor ID Bit 2	I	12	SDA	I
5	Synch Ground		13	Horizontal Synch	O
6	Red Ground		14	Vertical Synch	O
7	Green Ground		15	SCL	I
8	Blue Ground				

Parallel Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Strobe	O	14	Auto Feed	N/A
2	Data Bit 0	I/O	15	Error	I
3	Data Bit 1	I/O	16	Initialize	O
4	Data Bit 2	I/O	17	Select (In)	O
5	Data Bit 3	I/O	18	Ground	Power
6	Data Bit 4	I/O	19	Ground	Power
7	Data Bit 5	I/O	20	Ground	Power
8	Data Bit 6	I/O	21	Ground	Power
9	Data Bit 7	I/O	22	Ground	Power
10	Acknowledge	I	23	Ground	Power
11	Busy	I	24	Ground	Power
12	Paper Empty	I	25	Ground	Power
13	Select	O			

Serial Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O

1	Data Carrier Detect	I	6	Data Set Ready	I
2	Receive Data	I	7	Request To Send	O
3	Transmit Data	O	8	Clear To Send	I
4	Data Terminal Ready	O	9	Ring Indicator	I
5	Signal Ground				

Mouse Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Mouse Data	I/O	4	+5 V dc	Power
2	No Connection		5	Mouse Clock	I/O
3	Ground	Power	6	No Connection	

Keyboard Port Signals

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

Diskette Cable Connector Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Ground		18	Direction	O
2	Density Select	O	19	Ground	
3	No Connection		20	Step	O
4	No Connection		21	Ground	
5	Ground		22	Write Data	I
6	No Connection		23	Ground	
7	Ground		24	Write Enable	O
8	Index	I	25	Ground	
9	Ground		26	Track 0	I
10	Motor Enable 0	O	27	Ground	
11	Ground		28	Write Protect	I
12	Drive Select 1	O	29	Ground	
13	Ground		30	Read Data	I
14	Drive Select 0	O	31	Ground	
15	Ground		32	Select Head 1	O
16	Motor Enable 1	O	33	Ground	
17	Ground		34	Diskette Change	I

Hard Disk Cable Connector Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Host Reset	O	21	No Connection	
2	Ground		22	Ground	
3	Host Data 7	I/O	23	Host IOW	O
4	Host Data 8	I/O	24	Ground	Power
5	Host Data 6	I/O	25	Host IOR	O
6	Host Data 9	I/O	26	Ground	Power
7	Host Data 5	I/O	27	I/O Channel Ready	I
8	Host Data 10	I/O	28	No Connection	
9	Host Data 4	I/O	29	No Connection	
10	Host Data 11	I/O	30	Ground	Power
11	Host Data 3	I/O	31	Host IRQ	I
12	Host Data 12	I/O	32	No Connection	
13	Host Data 2	I/O	33	Host A1	O
14	Host Data 13	I/O	34	No Connection	
15	Host Data 1	I/O	35	Host A0	O
16	Host Data 14	I/O	36	Host A2	O
17	Host Data 0	I/O	37	Host CS0	O
18	Host Data 15	I/O	38	Host CS1	O
19	Ground	Power	39	ACTIVE bar	I
20	No Connection		40	Ground	Power

Safety Inspection Guide

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General Guidelines

The purpose of this Safety Inspection Guide is to help you identify possible unsafe conditions on machines that are being inspected for a Maintenance Agreement. Each machine has needed items installed to provide the operators and service personnel with an acceptable level of safety. This guide lists only these items. Good judgment should be used to identify possible safety conditions not covered by this Safety Inspection Guide.

If any unsafe conditions are present, you must find out how serious the hazard is and if you can continue before you correct the hazard.

All current IBM Aptiva service supplements outlining feature/model changes, along with the machine history, should be reviewed.

Check the following items:

- Damaged, missing, or changed parts, especially in the area of the On/Off switch and the power supply.
- Damaged, missing, or changed covers.
- Possible safety exposure from any non-IBM attachments.

Parts Catalog

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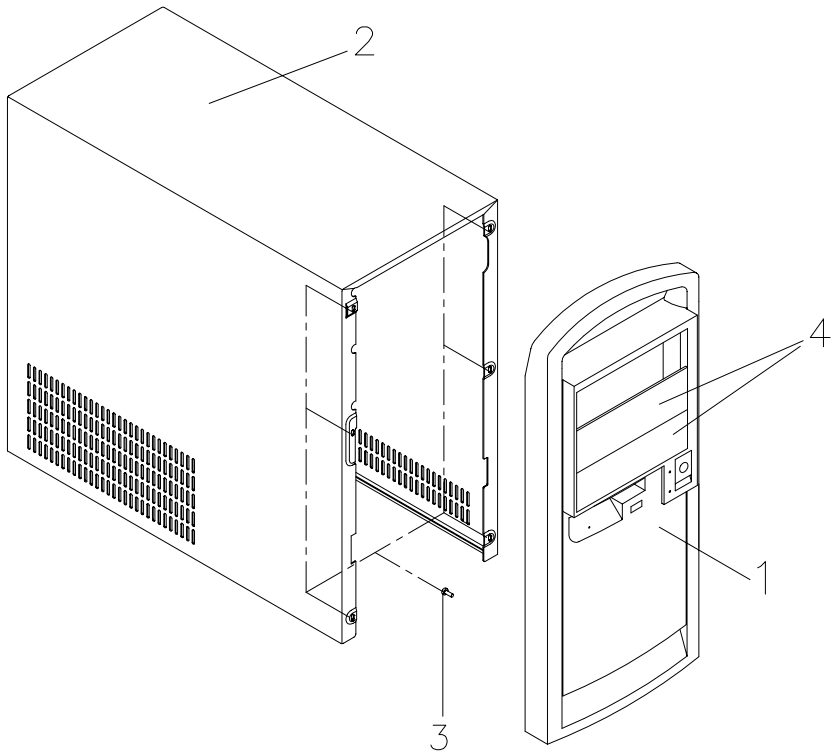
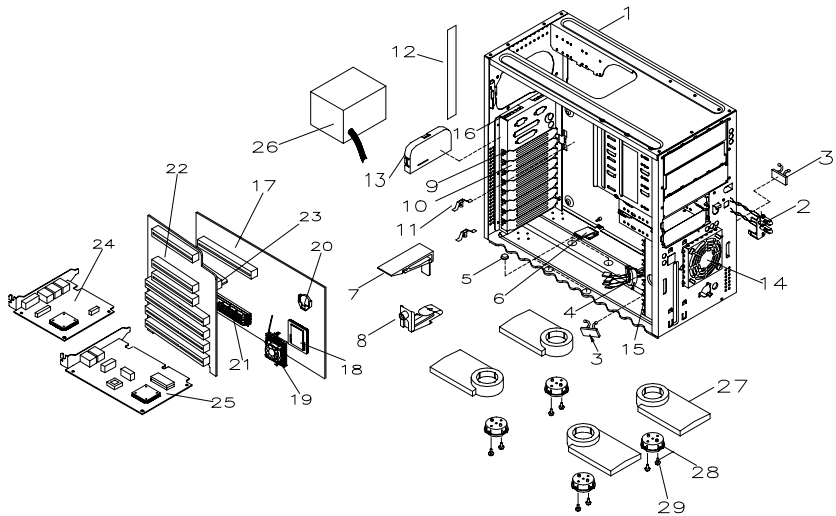
Assembly 1: System Unit - Exterior



Asm-Index	FRU Number	Description
1-1	01K4253	Front Bezel
1-2	01K4199	Top Cover
1-3	01K4262	Front Bezel Mounting Screws
1-4	01K4215	5.25-in. Bay Blank Panel

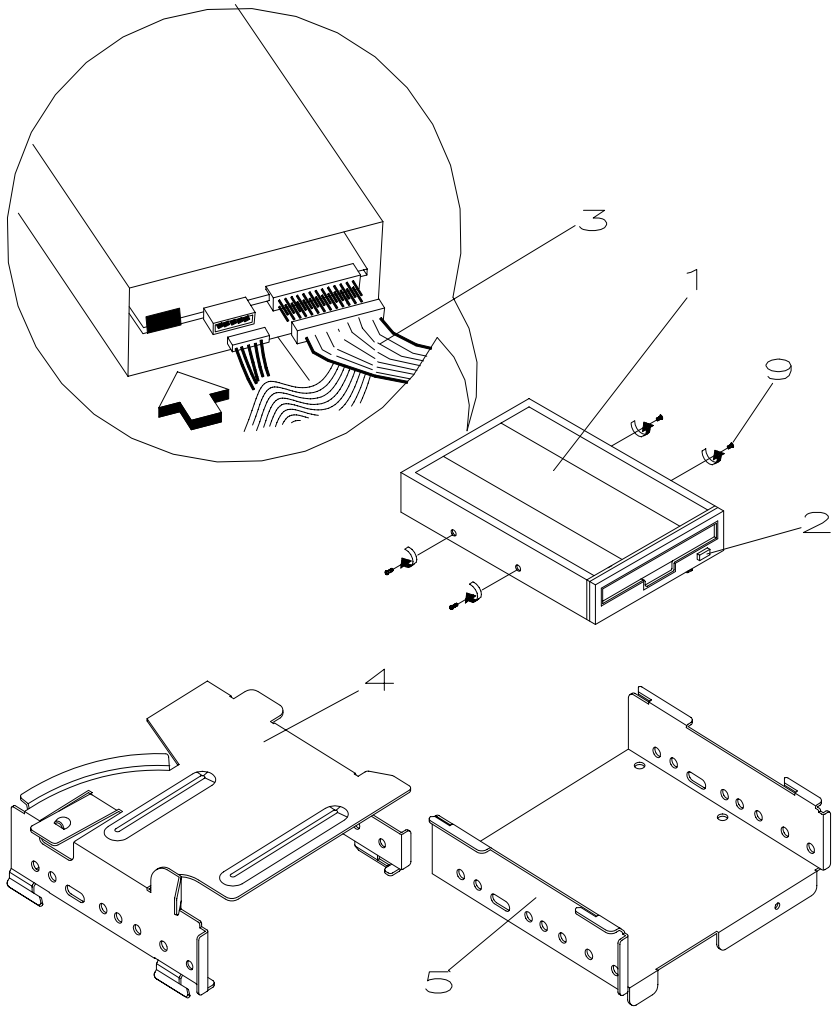
Assembly 2: System Unit - Interior

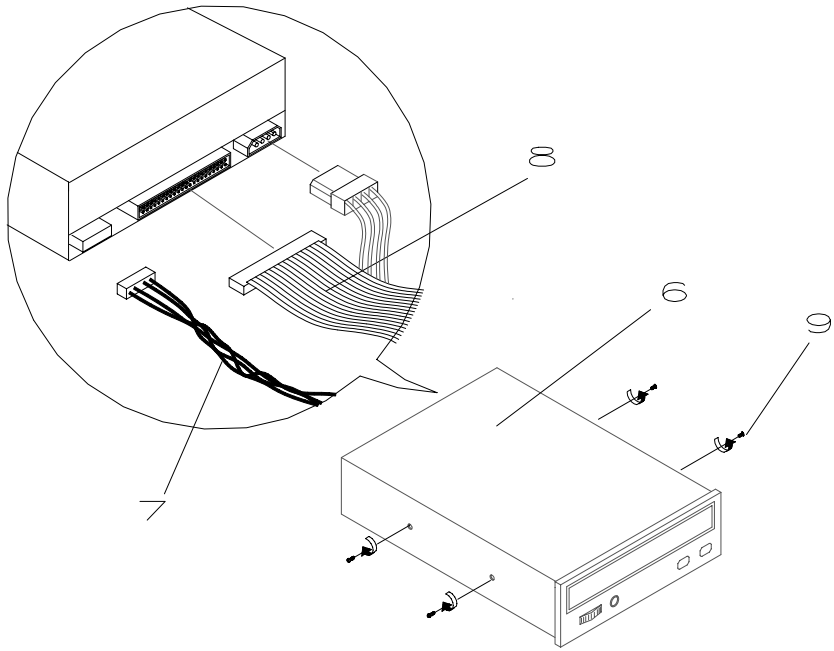


Asm-Index	FRU Number	Description
2-1	01K4248	Assembly Lower Case
2-2	01K4254	Assembly Wire LED
2-3	01K4213	Mounting Purse Lock
2-4	01K4192	Core
2-NS	01K4207	Cable Tie
2-NS	01K4204	3.5-in. Drive Spring
2-5	01K4217	Rubber
2-6	01K4210	Hook (for system board, lower)
2-7	01K4211	Hook (for system board, upper)
2-8	01K4203	BKT Hook (for riser card)
2-9	01K4258	Screw Tap
2-10	01K4200	Bracket Port
2-11	01K4276	GND Stitch
2-12	01K4208	I/O Port Plate
2-13	01K4212	Cover
2-14	01K4205	Fan Cover
2-NS	03K0327	Spring Wire for Fan Cover

Asm-Index	FRU Number	Description
2-15	01K4219	Card Guide
2-16	01K4206	Plate GND
2-17	01K4239	System Board
2-18	01K4184	Pentium 120 MHz Processor
2-18	01K4185	Pentium 133 MHz Processor
2-18	01K4187	Pentium 150 MHz Processor
2-18	01K4186	Pentium 166 MHz Processor
2-18	03K0345	Pentium 200 MHz Processor
2-18	03K0346	Pentium 166 MHz MMX Processor
2-18	03K0347	Pentium 200 MHz MMX Processor
2-18	01K4273	IMD PR150+ Processor
2-18	01K4274	IMD PR166+ Processor
2-19	01K4264	Fan Sink
2-NS	03K0328	Flash ROM
2-20	01K4278	Lithium Battery(CR2032)
2-21	01K4236	SIMM EDO, 4MB, Non Parity
2-21	01K4237	SIMM EDO, 8MB, Non Parity
2-21	03K0343	SIMM EDO, 16MB, Non Parity
2-22	01K4238	Riser Card(96477)
2-NS	01K4259	Screw for Riser Card
2-NS	03K0329	GND Stitch for Riser Card
2-23	01K4223	Golden Finger
2-24		Audio I/O Board, see page 7-7 to 7-10
2-25		Modem Card, see page 7-7 to 7-10
2-26	01K4247	Power Supply (200-W)
2-NS	01K4261	Mounting Screws for Power Supply
2-NS	01K4227	Power Switch and Cable
2-NS	01K4257	Screws for Power Switch
2-27	01K4216	Foot
2-28	01K4218	Foot Holder
2-29	01K4256	Foot Holder Screws

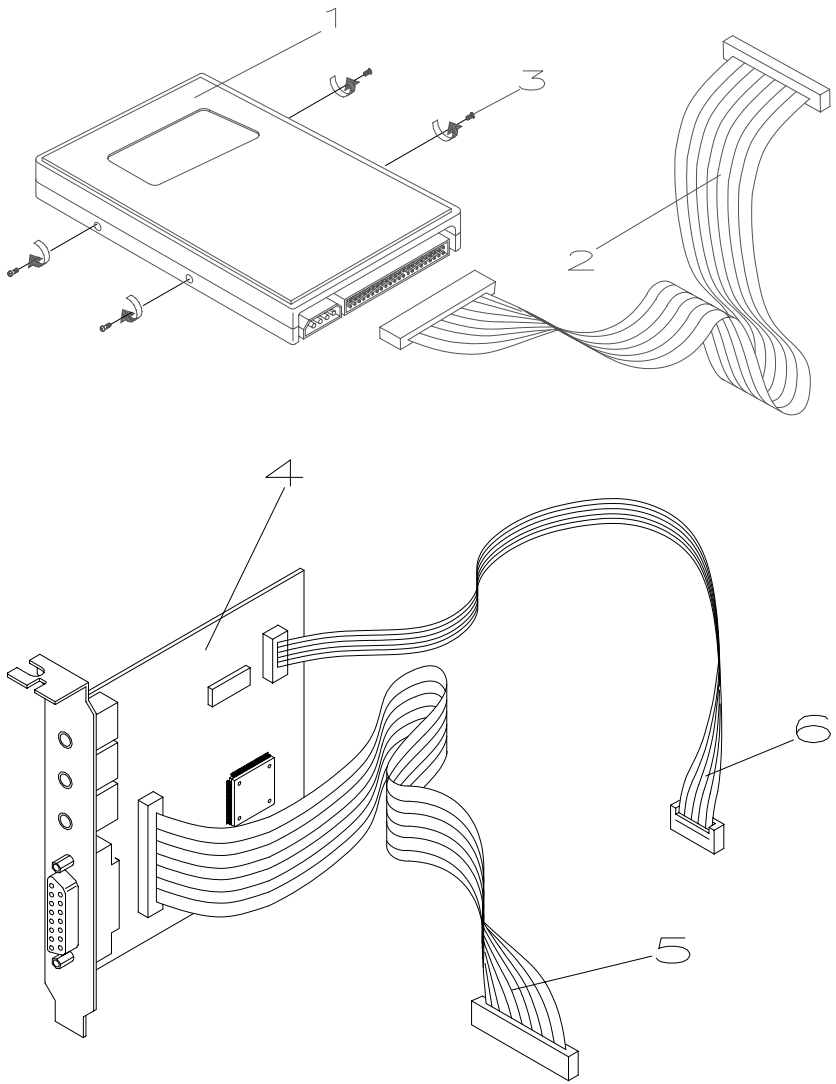
Assembly 3: Diskette, CD-ROM Drive

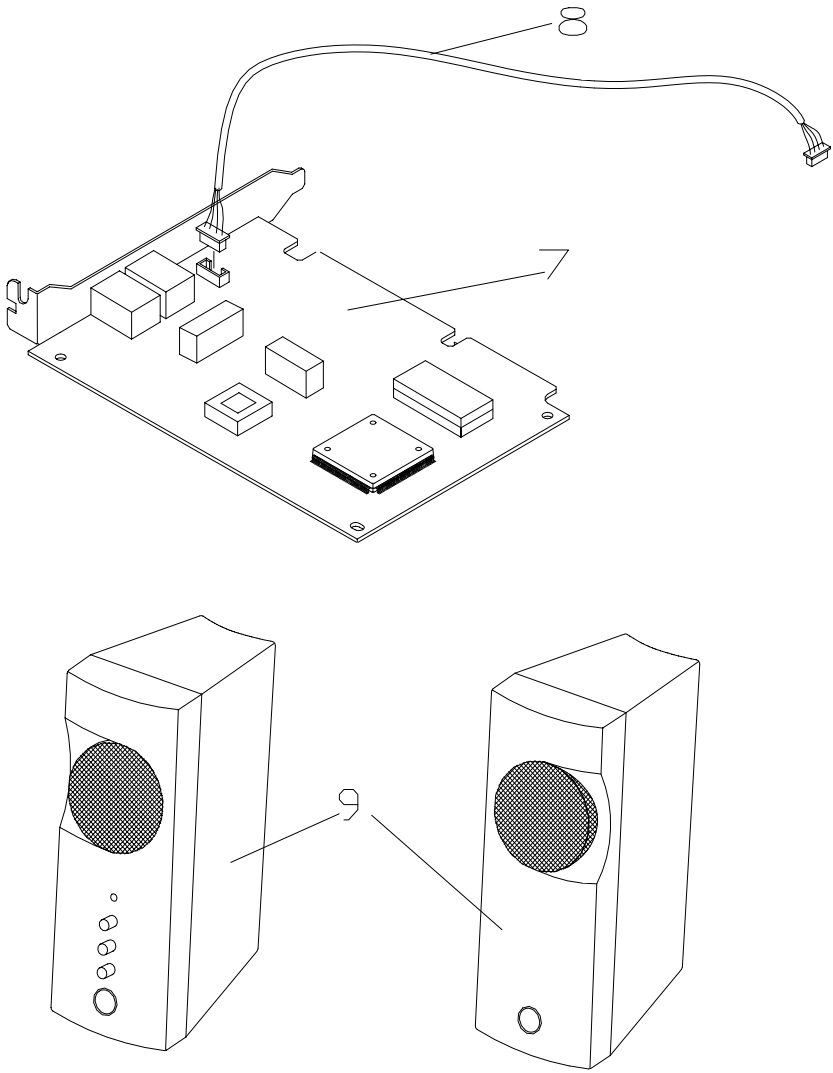


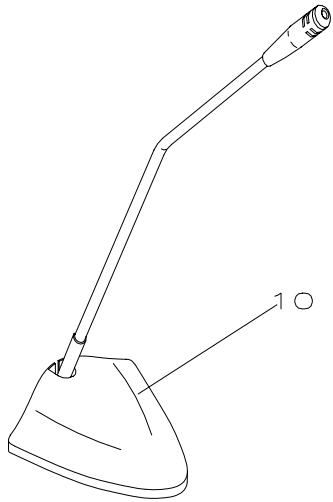


Asm-Index	FRU Number	Description
3-1	01K4242	Assembly 1.44MB Diskette Drive
3-2	01K4214	3.5-in. 1.44MB Diskette Drive Knob
3-3	01K4229	Diskette Drive Cable - 34P 4C 675MM
3-4	01K4201	3.5-in. Drive Holder- upper
3-5	01K4202	3.5-in. Drive Holder- lower
3-6	01K4267	CD-ROM (8X)- API
3-6	01K4268	CD-ROM (12X)- AO
3-6	03K0341	CD-ROM (16X)-AO
3-6	03K0342	CD-ROM (16X)- API
3-7	01K4228	CD-ROM Drive Audio Cable
3-8	01K4224	CD-ROM IDE Cable
3-9	01K4259	Mounting Screws (for Diskette & CD-ROM)

Assembly 4: Hard Disk Drives, Audio-I/O Board and Fax / Modem Card



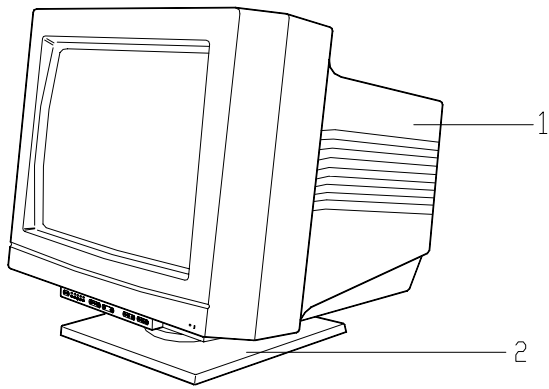

8
7
9



Asm-Index	FRU Number	Description
4-1	03K0330	2.1GB Hard Disk Drive (Quantum, 5.25”)
4-1	02K2263	4.3GB Hard Disk Drive (Quantum, 5.25”)
4-1	03K0322	1.2GB Hard Disk Drive (Seagate)
4-1	03K0323	1.7GB Hard Disk Drive (Seagate)
4-1	03K0324	2.1GB Hard Disk Drive (Seagate)
4-1	03K0325	2.5GB Hard Disk Drive (Seagate)
4-1	03K0326	3.2GB Hard Disk Drive (Seagate)
4-2	01K4224	Hard Disk Drive Cable - 40P 3C 450MM
4-3	01K4260	Mounting Screws (for HDD)
4-4	01K4240	Assembly Audio I/O Board w/Wavetable w/o Cables
4-NS	03K0318	Assembly Audio I/O Board w/o Cables
4-5	01K4232	Audio I/O Board Cable - 34pin
4-6	01K4233	Audio I/O Board Cable - 10pin
4-7	01K4234	Modem Card (CA) w/o Phone Cord
4-7	01K4272	Modem Card (GE) w/o Phone Cord

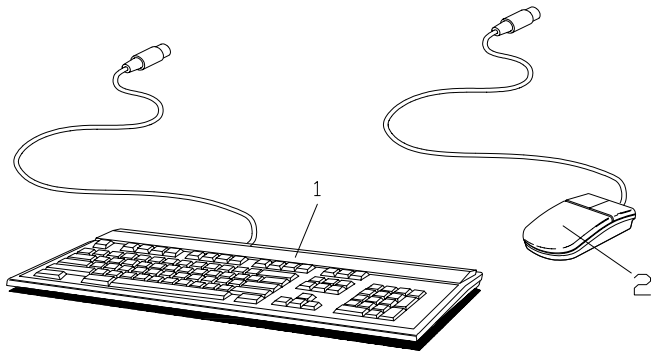
Asm-Index	FRU Number	Description
4-7	03K0320	Modem Card (FR) w/o Phone Cord
4-7	03K0321	Modem Card (UK) w/o Phone Cord
4-7	03K0331	Modem Card (ND) w/o Phone Cord
4-7	03K0332	Modem Card (SG) w/o Phone Cord
4-7	03K0333	Modem Card (NO) w/o Phone Cord
4-7	03K0335	Modem Card (SU) w/o Phone Cord
4-7	03K0336	Modem Card (DK) w/o Phone Cord
4-7	03K0337	Modem Card (SV) w/o Phone Cord
4-7	03K0340	Modem Card (AS) w/o Phone Cord
4-8	01K4231	Modem Card Audio Cable
4-NS		Phone Cord (CA) (local buy)
4-NS	03K0311	Phone Cord (FR,GE,UK)
4-NS		Country Specific Adapter(GE)*
4-NS		Country Specific Adapter(FR)*
4-NS		Country Specific Adapter(UK)*
		* An adapter is necessary for those phone cords which are used in countries other than the Canada.
4-9	06J7897	Speaker (3.0W CA)
4-9	01K4190	Speaker (3.0W UK)
4-9	01K4189	Speaker(3.0W GE/FR)
4-10	01K4191	Microphone(CA)

Assembly 5: Monitor and Power Cord



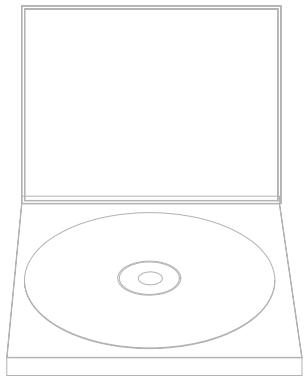
Asm-index	FRU Number	Description
5-1	01K4269	Monitor 14”(13.1” viewable image size, Tilburg,76H6981-412)
5-1	06J7898	Monitor 14”(13.1” viewable image size, Toronto,76H6981-411)
5-1	01K4270	Monitor 15”(13.6” viewable image size, Tilburg,76H6984-412)
5-1	06J7899	Monitor-15”(13.6” viewable image size, Toronto,76H6984-411)
5-2	01K4255	Monitor Stand
		Power Cord for Monitor and System Unit
5-NS	06J7900	Power Cord (CA)
5-NS	01K4196	Power Cord (CE)
5-NS	01K4198	Power Cord (UK)

Assembly 6: Keyboard and Mouse



Asm-Index	FRU Number	Description
6-1	07H0665	Keyboard-104 (CA-EN)
6-1	07H0667	Keyboard-104 (CA-FR)
6-1	07H0680	Keyboard-105 (FR)
6-1	07H0681	Keyboard-105 (GR)
6-1	07H0701	Keyboard-105 (UK)
6-1	07H0679	Keyboard (Netherlands)
6-1	07H0698	Keyboard (Switzerland-Fr/Ge)
6-1	07H0697	Keyboard (Sweden/Finland)
6-1	07H0688	Keyboard (Norwegian)
6-1	07H0678	Keyboard (Danish)
6-2	01K4263	Mouse

Assembly 7: Software



Asm-Index	FRU Number	Description
7-		Recovery (CA)
		Recovery (UK)
		Recovery (FR)
		Recovery (CA-FR)
		Recovery (GR)
	01K4275	Diagnostic Diskette

Appendix A. Part Number Index

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	4-NS	7-10
	4-NS	7-10
01K4184	2-18	7-4
01K4185	2-18	7-4
01K4186	2-18	7-4
01K4187	2-18	7-4
01K4189	4-9	7-10
01K4190	4-9	7-10
01K4191	4-10	7-10
01K4192	2-4	7-3
01K4196	5-NS	7-11
01K4198	5-NS	7-11
01K4199	1-2	7-2
01K4200	2-10	7-3
01K4201	3-4	7-6
01K4202	3-5	7-6
01K4203	2-8	7-3
01K4204	2-NS	7-3
01K4205	2-14	7-3
01K4206	2-16	7-4
01K4207	2-NS	7-3
01K4208	2-12	7-3
01K4210	2-6	7-3
01K4211	2-7	7-3
01K4212	2-13	7-3
01K4213	2-3	7-3
01K4214	3-2	7-6

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01K4215	1-4	7-2
01K4216	2-27	7-4
01K4217	2-5	7-3
01K4218	2-28	7-4
01K4219	2-15	7-4
01K4223	2-23	7-4
01K4224	3-8	7-6
01K4224	4-2	7-9
01K4227	2-NS	7-4
01K4228	3-7	7-6
01K4229	3-3	7-6
01K4231	4-8	7-10
01K4232	4-5	7-9
01K4233	4-6	7-10
01K4234	4-7	7-9
01K4236	2-21	7-4
01K4237	2-21	7-4
01K4238	2-22	7-4
01K4239	2-17	7-4
01K4240	4-4	7-9
01K4242	3-1	7-6
01K4247	2-26	7-4
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01K4253	1-1	7-2
01K4254	2-2	7-3
01K4255	5-2	7-11
01K4256	2-29	7-4
01K4257	2-NS	7-4
01K4258	2-9	7-3

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FRU Number	Asm-Index	Page
01K4259	2-NS	7-4
01K4259	3-9	7-6
01K4260	4-3	7-9
01K4261	2-NS	7-4
01K4262	1-3	7-2
01K4263	6-2	7-12
01K4264	2-19	7-4
01K4267	3-6	7-6
01K4268	3-6	7-6
01K4269	5-1	7-11
01K4270	5-1	7-11
01K4272	4-7	7-9
01K4273	2-18	7-4
01K4274	2-18	7-4
01K4275	7-	7-13
01K4276	2-11	7-3
01K4278	2-20	7-4
02K2263	4-1	7-9
03K0311	4-NS	7-10
03K0318	4-NS	7-9
03K0320	4-7	7-9
03K0321	4-7	7-10
03K0322	4-1	7-9
03K0323	4-1	7-9
03K0324	4-1	7-9
03K0325	4-1	7-9
03K0326	4-1	7-9
03K0327	2-NS	7-3
03K0328	2-NS	7-4
03K0329	2-NS	7-4
03K0330	4-1	7-9
03K0331	4-7	7-10
03K0332	4-7	7-10
03K0333	4-7	7-10
03K0335	4-7	7-10
03K0336	4-7	7-10
03K0337	4-7	7-10
03K0340	4-7	7-10
03K0341	3-6	7-6
03K0342	3-6	7-6
03K0343	2-21	7-4
03K0345	2-18	7-4
03K0346	2-18	7-4
03K0347	2-18	7-4
06J7897	4-9	7-10
06J7898	5-1	7-11
06J7899	5-1	7-11
06J7900	5-NS	7-11
07H0665	6-1	7-12
07H0667	6-1	7-12
07H0678	6-1	7-12
07H0679	6-1	7-12
07H0680	6-1	7-12
07H0681	6-1	7-12
07H0688	6-1	7-12
07H0697	6-1	7-12
07H0698	6-1	7-12
07H0701	6-1	7-12

Appendix B. Online Support Information

This section describes online technical support services available to help repair the Aptiva computer.

This section covers:

- IBM PC Company Bulletin Board Service (BBS)
- IBM PC Company Fax-Back Service
- IBM Online HelpCenter on Prodigy, America Online, CompuServe
- IBM useful sites on the World Wide Web (WWW)

Online technical support offers convenient and valuable information when you need it. IBM offers support areas on several online services where you can work with IBM technicians for solutions to your questions, download key files, and access database information for the Aptiva computer.

The IBM PC Company offers online resources including several Internet World Wide Web sites, the IBM Online HelpCenter support areas, a Fax-Back service, and a Bulletin Board Service.

The IBM PC Company BBS telephone number is (919) 517-0001. (U.S. and Canada only). The BBS contains a valuable file library with drivers, software updates, product information, and other file updates. To access the BBS, set your modem for **eight data bits, one stop bit, and no parity bit.**

The IBM PC Company Automated Fax-Back System offers a variety of IBM computer-related articles. To access this service, call 800-IBM-3395. The Fax-Back system file library can also be accessed through the PC Company BBS.

Aptiva technical support is offered through the IBM Online HelpCenters on the Prodigy Service, America Online, and through the IBM support forums on CompuServe.

IBM online support areas on all of the services can assist with your technical questions. These areas offer message boards monitored by IBM technicians, databases of computer-related solutions, and file libraries.

World-wide users can access the IBM Aptiva support forums on CompuServe. CompuServe users can use the Go word: APTIVA to reach the Aptiva support forum. For information about CompuServe, call (800) 848-8990 (U.S. and Canada only).

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To reach the IBM Online HelpCenter on Prodigy, use the jumpword: **IBM**. For information about Prodigy, please call (800) 776-3449 (U.S. and Canada only). You can reach the IBM Online HelpCenter on America Online using keyword: **IBM Connection**. For information about America Online, please call (800) 827-6364 (U.S. and Canada only). Prodigy and America Online have limited international availability.

To access the IBM PC Company Internet sites, you will need to acquire Internet access. Please check with your local Internet provider for more information. (Members of Prodigy, AOL, and CompuServe can reach these sites through the Internet capabilities of the services.)

Here are useful IBM Internet addresses for Aptiva information:

http://www.pcco.ibm.com

IBM PC Company Home Page on the World Wide Web

http://www.pc.ibm.com/aptiva/index.html

Aptiva Home Page

http://www.pc.ibm.com/products.html

Aptiva Product Specifications

http://www.pc.ibm.com/files.html

IBM PC Company Searchable File Library

http://www.pc.ibm.com/answerbk/ansbank.html

Aptiva-PS/1 Answer Bank -- A database of answers to frequently asked questions.

Appendix C. Model/Monitor Configurations and FRU Part Numbers

The models described in this appendix are Service Level A (SL-A) machines. Only factory-installed part are listed.

If the machine you are serving has Service Level A on the label, but you cannot find it listed in this appendix, call your local IBM Aptiva Servicer Bulletin Board for updated model information.

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Model/Monitor Configurations and FRU Parts Number for Canada Geography---(1)

Model	E10	E11	E12	E13	E20
Country/ Language	Canada-English	Canada-French	Canada-English	Canada-English	Canada-English
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4274	01K4274	01K4186
Memory	01K4237	01K4237	01K4236/ 01K4237	01K4236/ 01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	06J7898	06J7898	06J7898	06J7898	06J7898
CD-ROM	01K4268	01K4268	03K0341	03K0341	01K4268
Audio I/O Board	01K4240	01K4240	03K0318	03K0318	01K4240
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	01K4234	01K4234	01K4234	01K4234	01K4234

Model/Monitor Configurations and FRU Parts Number for Canada Geography---(2)

Model	E21	E22	E23	E30	E31
Country/ Language	Canada-French	Canada-English	Canada-English	Canada-English	Canada-French
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4186	03K0346	03K0346	01K4186	01K4186
Memory	01K4237	01K4236/ 01K4237	01K4236/ 01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0326	03K0326
Monitor	06J7898	06J7898	06J7898	06J7899	06J7899
CD-ROM	01K4268	03K0341	03K0341	01K4268	01K4268
Audio I/O Board	01K4240	03K0318	03K0318	01K4240	01K4240
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	01K4234	01K4234	01K4234	01K4234	01K4234

Model/Monitor Configurations and FRU Parts Number for Canada Geography---(3)

Model	E32	E33	E42
Country/ Language	Canada-English	Canada-English	Canada-English
System Board	01K4239	01K4239	01K4239
Processor	03K0346	03K0346	03K0347
Memory	03K0343	03K0343	01K4237/ 03K0343
Hard Drive	03K0326	03K0326	03K0319
Monitor	06J7899	06J7899	06J7899
CD-ROM	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247
Fax/ Modem	01K4234	01K4234	01K4234

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(1)

Model	E04	E14	E15	E16	E24
Country/ Language	UK	French	French	French	German
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4185	01K4273	01K4274	01K4273	01K4273
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0323	03K0323	03K0324	03K0323	03K0323
Monitor	01K4269	01K4269	01K4269	01K4270	01K4269
CD-ROM	01K4267	01K4267	01K4267	01K4267	01K4267
Audio I/O Board	01K4240	03K0318	03K0318	03K0318	01K4240
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(2)

Model	E24	E25	E27	E34	E34
Country/ Language	UK	French	German	UK	Austria
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4273	01K4274	01K4274	01K4274	01K4274
Memory	01K4237	01K4237	03K0343	01K4237	01K4237
Hard Drive	03K0323	03K0324	03K0323	03K0324	03K0324
Monitor	01K4269	01K4270	01K4270	01K4270	01K4270
CD-ROM	01K4267	01K4267	01K4267	01K4267	01K4267
Audio I/O Board	01K4240	03K0318	03K0318	01K4240	01K4240
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(3)

Model	E34	E35	E36	E44	E45
Country/ Language	German	French	French	German	UK
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4186	01K4186	01K4186	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0324	03K0324	03K0324	03K0324	03K0324
Monitor	01K4270	01K4270	01K4269	01K4270	01K4270
CD-ROM	01K4267	01K4267	01K4267	01K4267	01K4267
Audio I/O Board	01K4240	03K0318	03K0318	01K4240	01K4240
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	03K0320	--	03K0321

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(4)

Model	E45	E46	E46	E46	E46
Country/ Language	German	UK	French	German	Denmark
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4186	01K4273	01K4273	01K4273	01K4273
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0324	03K0330	03K0330	03K0330	03K0330
Monitor	01K4270	01K4269	01K4269	01K4269	01K4269
CD-ROM	01K4267	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	01K4240	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	01K4272	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(5)

Model	E46	E46	E46	E46	E46
Country/ Language	Nether-lands	Norway	Finland	Sweden	Swiss-German
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4273	01K4273	01K4273	01K4273	01K4273
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0330	03K0330	03K0330	03K0330	03K0330
Monitor	01K4269	01K4269	01K4269	01K4269	01K4269
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(6)

Model	E46	E46	E54	E54	E54
Country/ Language	Swiss-French	Austria	UK	French	German
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4273	01K4273	01K4274	01K4274	01K4274
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0330	03K0330	03K0330	03K0330	03K0330
Monitor	01K4269	01K4269	01K4269	01K4269	01K4269
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(7)

Model	E54	E54	E54	E54	E54
Country/ Language	Denmark	Nether-lands	Norway	Finland	Sweden
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4274	01K4274	01K4274
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0330	03K0330	03K0330	03K0330	03K0330
Monitor	01K4269	01K4269	01K4269	01K4269	01K4269
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(8)

Model	E54	E54	E54	E55	E55
Country/ Language	Swiss-German	Swiss-French	Austria	UK	French
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4274	01K4274	01K4274
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0330	03K0330	03K0330	03K0325	03K0325
Monitor	01K4269	01K4269	01K4269	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(9)

Model	E55	E55	E55	E55	E55
Country/ Language	German	Denmark	Nether-lands	Norway	Finland
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4274	01K4274	01K4274
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(10)

Model	E55	E55	E55	E55	E56
Country/ Language	Sweden	Swiss-German	Swiss-French	Austria	UK
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4274	01K4274	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(11)

Model	E56	E56	E56	E56	E56
Country/ Language	French	German	Denmark	Nether-lands	Norway
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4186	01K4186	01K4186	01K4186	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(12)

Model	E56	E56	E56	E56	E56
Country/ Language	Finland	Sweden	Swiss-German	Swiss-French	Austria
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4186	01K4186	01K4186	01K4186	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(13)

Model	E64	E64	E64	E64	E64
Country/ Language	UK	French	German	Denmark	Nether-lands
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	03K0345	03K0345	03K0345	03K0345	03K0345
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(14)

Model	E64	E64	E64	E64	E64
Country/ Language	Norway	Finland	Sweden	Swiss-German	Swiss-French
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	03K0345	03K0345	03K0345	03K0345	03K0345
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	--	--	--	--

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(15)

Model	E64	E65	E65	E65	E65
Country/ Language	Austria	UK	French	German	Denmark
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	03K0345	01K4186	01K4186	01K4186	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	--	03K0321	03K0320	01K4272	03K0336

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(16)

Model	E65	E65	E65	E65	E65
Country/ Language	Nether-lands	Norway	Finland	Sweden	Swiss-German
System Board	01K4239	01K4239	01K4239	01K4239	01K4239
Processor	01K4186	01K4186	01K4186	01K4186	01K4186
Memory	01K4237	01K4237	01K4237	01K4237	01K4237
Hard Drive	03K0325	03K0325	03K0325	03K0325	03K0325
Monitor	01K4270	01K4270	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247	01K4247	01K4247
Fax/ Modem	03K0331	03K0333	03K0335	03K0337	03K0332

Model/Monitor Configurations and FRU Parts Number for EMEA Geography---(17)

Model	E65	E65	E66
Country/ Language	Swiss-Finland	Austria	Sweden
System Board	01K4239	01K4239	01K4239
Processor	01K4186	01K4186	03K0346
Memory	01K4237	01K4237	03K0343
Hard Drive	03K0325	03K0325	03K0330
Monitor	01K4270	01K4270	01K4270
CD-ROM	03K0341	03K0341	03K0341
Audio I/O Board	03K0318	03K0318	03K0318
Power Supply	01K4247	01K4247	01K4247
Fax/ Modem	03K0332	--	03K0337

Model/Monitor Configurations and FRU Parts Number for Netherlands Geography

Model	E15	E25	E45
Country/ Language	Nether-lands	Nether-lands	Nether-lands
System Board	01K4239	01K4239	01K4239
Processor	01K4274	01K4274	01K4186
Memory	01K4237	01K4237	01K4237
Hard Drive	03K0330	03K0330	03K0330
Monitor	01K4269	01K4270	01K4270
CD-ROM	01K4267	01K4267	01K4267
Audio I/O Board	03K0318	03K0318	01K4240
Power Supply	01K4247	01K4247	01K4247
Fax/ Modem	--	--	03K0331

Model/Monitor Configurations and FRU Parts Number for USA

Model	E40
Country/ Language	USA
System Board	01K4239
Processor	01K4274
Memory	01K4237
Hard Drive	03K0330
Monitor	06J7898
CD-ROM	03K0341
Audio I/O Board	03K0318
Power Supply	01K4247
Fax/ Modem	01K4234

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