

# TOSHIBA

Infinia 7130, 7160, 7161,  
7200, 7201, and 7220 Series

# *Preliminary Maintenance Manual*

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# **Chapter 1**

## **Hardware Overview**

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## System Features

The Infinia™ Models 7130, 7160, 7161, 7200, 7201, and 7220 are some of the most powerful multimedia desktop computers available. Integrating advanced technologies and high-speed, energy-efficient components with a simple and elegant design, the Infinia™ line offers state-of-the-art capabilities in an easy-to-service package. The Infinia™ line delivers the following features:

### ❑ Microprocessor

The Intel Pentium® microprocessor operates at five speeds:

- 133 MHz (Model 7130)
- 166 MHz (Model 7160)
- 166 MHz MMX™ (Model 7161)
- 200 MHz (Model 7200)
- 200 MHz MMX™ (Model 7201 and 7220)

### ❑ Memory

Each Infinia™ Model 7130 and 7160 comes equipped with 16 megabytes (MB) of 60 ns EDO RAM (2x8 SIMMs), expandable to 128 MB. Each Infinia™ Model 7161, 7200, 7201, and 7220 comes equipped with 32 MB of 60 ns EDO RAM (2x8 SIMMs), expandable to 128 MB.

### ❑ Cache memory

Each Infinia™ model comes equipped with 256 kilobytes (KB) write-back pipeline burst SRAM.

### ❑ Disk storage

Each Infinia™ model comes equipped with one 3.5" 1.44 MB / 1.2 MB / 720 KB (formatted) Floppy Disk Drive.

The Infinia™ series comes with the following standard Enhanced IDE hard disk drives:

- 1.5 GB (Model 7130 and 7161)
- 2.1 GB (Model 7160)
- 2.5 GB (Model 7161)
- 3.0 GB (Model 7200, 7201, and 7220)

### ❑ CD-ROM

Each Infinia™ Model 7130, 7160, and 7200 comes equipped with one ATAPI 8X CD-ROM drive.

Each Infinia™ Model 7161 and 7201 comes equipped with one ATAPI 12X CD-ROM drive.



DVD-ROM

Infinia™ Model 7220 comes equipped with one SD-M1002 DVD-ROM and an MPEG2/AC-3 decoder board.

InTouch™ Module

The InTouch™ Module provides centralized control of various attached devices such as a television, FM radio, music CD player, and telephone answering machine. The InTouch™ Module Remote Control (standard on Models 7200, 7201, and 7220) provides remote operation of the InTouch™ Module.

TV Tuner Card

Standard on Models 7200, 7201, and 7220, the TV Tuner Card delivers PCI Plug and Play; Integrated FM radio, TV, and (optional) video conferencing. It supports closed-caption and intercast decode, full-motion live video capture and display, stereo cable TV reception, and NTSC/PAL composite video output.

Display system

The Infinia™ series monitors are available in 15- and 17-inch versions. The monitors have the following features:

- .28 mm dot pitch
- 75 Hz non-interlaced refresh rate at resolutions up to 1280x1024
- EPA Energy Star compliant
- Integrated microphone
- Cabinet-integrated speakers
- Built-in subwoofer (17-inch monitor only)

104-key Windows 95 compatible keyboard

PS/2 mouse

Data/FAX modem

Each Infinia™ Model comes equipped with V.34 full-duplex speakerphone fax-modem operating at either 28.8 Kbps (upgradeable to 33.6 Kbps) or 33.6 Kbps.

Audio system

Full-duplex Sound Blaster - Pro compatible SRS 3-D sound is delivered through speakers on the monitor.

200 watt power supply

3 ISA bus slots and 3 PCI bus slots for future expansion

One combination slot for either a PCI or ISA add-in board

- ❑ External interfaces
  - Two serial 16550 UART compatible ports, one DB-9 serial port on the system board
  - One parallel port
  - One external SVGA Monitor connector
  - One keyboard port
  - Two Universal Serial Bus (USB) ports
  - One external mono microphone jack
  - One stereo speaker jack
  - One MIDI/Game port
  - One AC in connector
- ❑ Sleep button

The sleep button places the computer in a power saving mode with near-instant response time to requests by attached devices.
- ❑ Three expansion bays (one occupied by the CD-ROM drive for Models 7120, 7160, 7161, 7200, and 7201 or DVD-ROM drive for Model 7220)
- ❑ Mini-tower chassis
  - Tool-less access to system board and memory
  - Easy installation of 5.25" and 3.5" devices
  - Cable tab to lock mini-tower to the desktop
  - Front access to power, reset, and sleep controls
  - Power, CPU status, HDD, FDD, and CD-ROM indicators displayed on front

## System Configuration

The Infinia™ Personal Computer is shown in Figure 1-1 and its system configuration is illustrated in Figure 1-2.

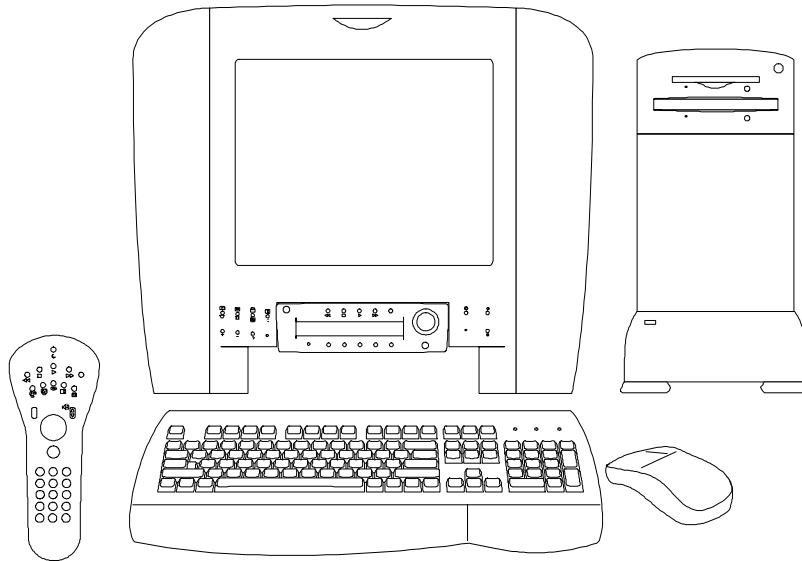


Figure 1-1 Infinia™ Personal Computer

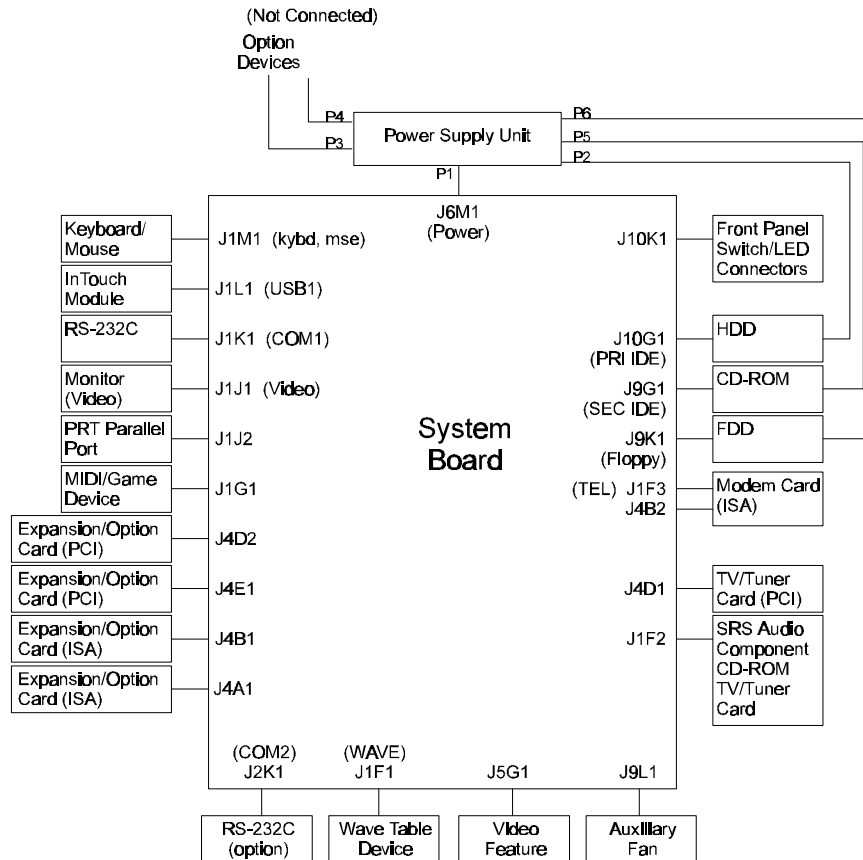


Figure 1-2 Infinia™ System Unit Configuration

## **Infinia™ Field Replaceable Units (FRUs)**

Each Infinia™ computer consists of the following FRU's.

- System board
- Microprocessor
- Single Inline Memory Modules (SIMMs)
- Power Supply
- 3.5" Floppy Disk Drive (FDD)
- 3.5" Enhanced IDE Hard Disk Drive (HDD)
- CD-ROM Drive (Models 7130, 7160, 7161, 7200, and 7201)
- DVD-ROM Drive and MPEG2/AC-3 Card (Model 7220 only)
- Keyboard
- Mouse
- Modem
- InTouch™ Module
- TV Tuner Card (standard on the Models 7200, 7201, and 7220)
- InTouch™ Module Remote Control (standard on the Model 7200, 7201, and 7220)
- Monitor

A description and specification list for each FRU follows.

## System Board

The Infinia™ system board has the following features.

- Intel Pentium® microprocessor running at 133 MHz (Model 7130), 166 MHz (Model 7160), 166 MHz MMX™ (Model 7161), 200 MHz (Model 7200), or 200 MHz MMX™ (Model 7201 and 7220)
- ATX form factor system board
- Support for up to 128 MB of DRAM. Models 7130 and 7160 come equipped with 16 MB installed. All other models come equipped with 32 MB installed.
- Support for 256 KB secondary (L2) cache. Each Infinia™ computer comes with 256 KB installed.
- Intel 82430HX PCI chipset (Model 7130, 7160, and 7200) or Intel 82439HX and 82371 chipset (Model 7161, 7201, and 7220)
- SRS Labs Sound Retrieval System (SRS) 3D audio
- S3 ViRGE graphics controller
- PC87306B Super I/O controller
- Expansion slots for up to seven add-in cards:
  - Three dedicated PCI-bus slots
  - Three dedicated ISA-bus slots
  - One combination slot for either a PCI or an ISA add-in board
- Two RS-232C (16550 UART) compatible 9-pin serial connectors
- One multimode, 25-pin Centronics compatible parallel port
- SVGA monitor connector
- Two USB ports
- PS/2-style keyboard and mouse connectors
- BIOS password protection for security

The system board has the configuration shown in Figure 1-3.

*Table 1-1 System Board Environmental Specifications (1/2)*

Item	Specification
Temperature	
– Operating Temperature	0° C to 70° C
– Non-Operating	-40° C to 55° C
DC Voltages	
– +5 V	±5%
– - 5 V	±5%
– + 12 V	±5%
-- 12 V	±5%
– +3.3 V	±5%

Table 1-1 System Board Environmental Specifications (2/2)

Item	Specification		
Shock			
- Unpackaged	50G Trapezoidal waveform. Velocity change 170 in/sec		
- Packaged	Product (Weight)	Free fall (in.)	Velocity (in/sec)
	<20 lbs	36	167
	21-40 lbs	30	152
	41-80 lbs	24	136
	81-100 lbs	18	118

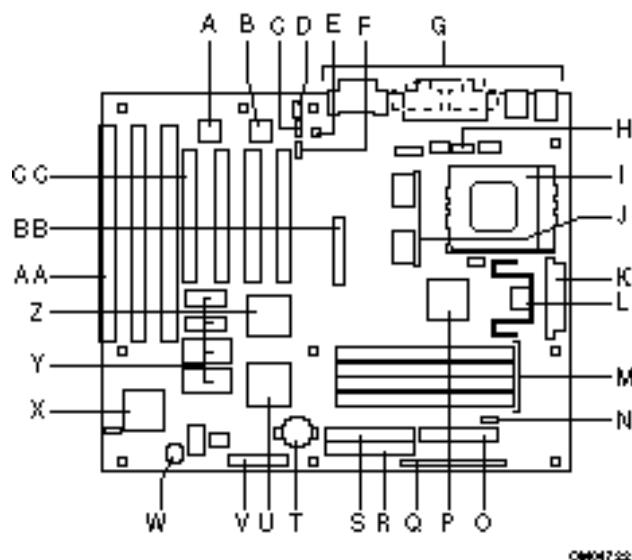
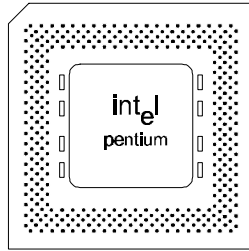


Figure 1-3 System Board Layout

- |  |  |
|--|--|
| A. Yamaha OPL4-ML wavetable (Model 7161, 7200, 7201, and 7220) | P. Intel 82439HX Xcelerated Controller (TXC) |
| B. Yamaha OPL3-SA CODEC (Models 7130 and 7160)                 | Q. Front panel connectors                    |
| C. CD-ROM audio connector                                      | R. Primary IDE connector                     |
| D. Wavetable connector   | S. Secondary IDE connector                   |
| E. Telephony connector   | T. Battery                                   |
| F. SRS audio component   | U. PCI/ISA IDE Xcellerator (PIIX3)           |
| G. External I/O connectors                                     | V. Jumper block                              |
| H. Onboard serial port connector                               | W. Onboard speaker                           |
| I. Socket 7 Pentium® processor socket                          | X. National PC87306B Super I/O controller    |
| J. 256 KB L2 cache SRAM  | Y. EDO graphics memory                       |
| K. Power connector   | Z. S3 graphics controller                    |
| L. Voltage regulator   | AA. ISA add-in board connectors              |
| M. SIMM sockets  | BB. Video feature connector                  |
| N. Auxiliary fan connector                                     | CC. PCI add-in board connectors              |
| O. Floppy connector  |  |

## Microprocessor

Each Infinia™ computer comes with a 3.3 volt Intel Pentium® Processor running at 133 MHz (Model 7130), 166 MHz (Model 7160), 166 MHz MMX™ (Model 7161), 200 MHz (Model 7200), or 200 MHz MMX™ (Models 7201 and 7220). The processor is installed in a socket 7 zero insertion force (ZIF) socket. Socket 7 provides a processor upgrade path that includes higher performance Pentium® OverDrive™ processors and processors using MMX™ technology. An onboard linear voltage regulator circuit provides the required 3.3 volts from the 5.0 volt power supply.



*Figure 1-4 Microprocessor*

## Single Inline Memory Modules (SIMMs)

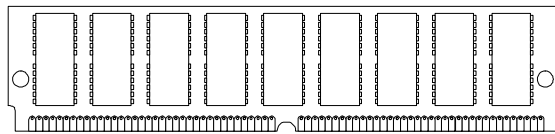
Infinia™ Models 7130 and 7160 computers come equipped with two 72-pin, 8 MB, 60 ns EDO DRAM (Extended Data Out Dynamic RAM) SIMMs delivering 16 MB of RAM. Models 7161, 7200, 7201, and 7220 come equipped with two 72-pin, 16 MB, 60 ns EDO DRAM SIMMs delivering 32 MB of RAM.

The system board provides four 72-pin SIMM sockets that make it possible to install up to 128 MB of RAM. The sockets support 1 x 32 (4 MB), 2 x 32 (8 MB), 4 x 32 (16 MB), and 8 x 32 (32 MB) single- or double-sided modules. Minimum memory size is 8 MB and maximum size, using four 8 x 32 SIMMs, is 128 MB. Memory timing requires 70 ns fast page devices, or for optimum performance, 60 ns EDO DRAM (as delivered).

The four sockets are arranged in two banks of two sockets each. The sockets are designated Bank 0 and Bank 1. Both SIMMs in a bank must be of the same memory size and type, although the types of memory may differ between banks.

No jumper settings changes are required when replacing or upgrading SIMMs. The BIOS automatically detects any changes.

Use only tin lead SIMMs when replacing or upgrading DRAM.



*Figure 1-5 A Typical SIMM*



## Power Supply

Each Infinia™ computer comes equipped with a 200 W power supply.

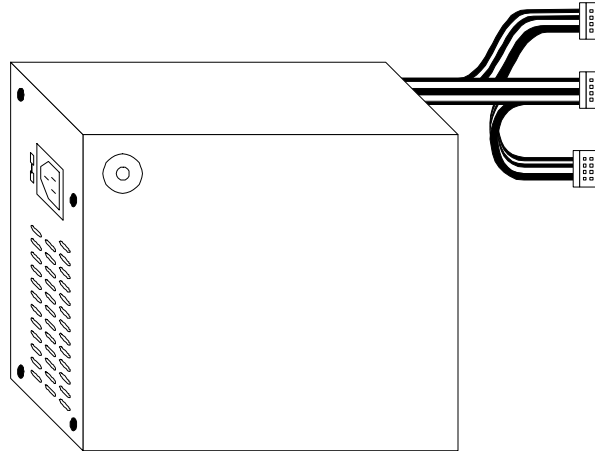


Figure 1-6 Power Supply

Table 1-2 Power Supply Specifications

Item	Specification	
Electrical	<b>US</b>	<b>Metric</b>
– Voltage Select Setting	115 VAC	230 VAC
– Operating Voltage Range	90 Vrms (Min.), 135 Vrms (Max.)	180 Vrms (Min.), 265 Vrms (Max.)
– Input Current	4 A	2 A
– Voltage Frequency	50 - 60 Hz (Nominal)	50 - 60 Hz (Nominal)
– Power Output	3.2 V - 3.465 V	3.2 V - 3.465 V
Weight	2.65 LB (1.2 kg)	
Environmental		
– Operating Temperature	50° to 104°F (10° to 40°C)	
– Non-Operating Temperature	-40° to 158°F (-40° to 70°C)	
– Operating Humidity	95% Relative Humidity	
– Non-Operating Humidity	95% Relative Humidity	
– Operating Altitude	10,000 ft (3,048 m) (max.)	
– Non-Operating Altitude	50,000 ft (15,240 m) (max.)	
Shock		
– Operating	1 G (peak) in any axis	
– Non-Operating	30 G (peak), 11 msec in any of the three orthogonal axis, either direction	

## Floppy Disk Drive (FDD)

Each Infinia™ computer comes equipped with a triple density (2 MB / 1.6 MB / 1 MB, unformatted, 1.44 MB / 1.2 MB / .720 KB, formatted) 3.5 inch micro floppy disk drive (FDD).

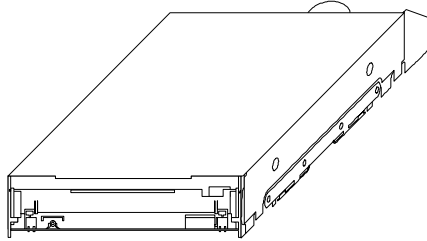


Figure 1-7 3.5" Floppy Disk Drive

Table 1-3 FDD Configuration and Performance Specifications

Item	2 MB Mode	1.6 MB Mode	1 MB Mode
Storage Capacity			
– Unformatted	2 MB	1.6 MB	1 MB
– Formatted	1.44 MB	1.2 MB	.720 KB
Data transfer rate	500 Kbps	500 Kbps	250 Kbps
Rotation speed (rpm)	300	360	300
Number of Heads	2		
Number of Cylinders	80		
Access time (ms)			
– Track to track	3 ms		
– Average	94 ms		
– Head setting time	15 ms (max.)		
Recording track density	135 tpi		
Recording method	Modified Frequency Modulation (MFM)		
Required Power	+ 5 V single (4.5 V ~ 5.5 V)		
Interface Connector	34-pin right header connector		

Table 1-4 FDD Physical Specifications

Dimension	Specification
Height	1.00 inch (25.4 mm)
Depth	5.71 inch (145 mm) (Excluding bezel)
Width	4.00 inch (101.6 mm)
Weight	.76 lb. (345 g), 0.79 lb. (360 g) (max.)

*Table 1-5 FDD Environmental Specifications*

<b>Parameter</b>	<b>Operating</b>	<b>Storage</b>	<b>Transport</b>
Ambient Temperature	39° - 125°F (4° to 51.7 °C)	-8° - 140°F (-22° to 60C)	-40° - 149°F (-40° to 65°C)
Relative Humidity	20% to 80% (Non-condensing)	5% to 90% (Non-condensing)	5% to 95% (Non-condensing)
Wet Bulb	85°F (29.4°C) (max.)	104°F (40°C) (max.)	113°F (45°C) (max.)
Altitude	-980 to 16,400 ft (-300 - 5,000 m)	N/A	N/A

*Table 1-6 FDD Power Requirements*

<b>Mode</b>	<b>Average Current</b>		<b>Average Power</b>	
	Typical	Max.	Typical	Max.
Standby	3.0 mA	5.0 mA	15 mW	28 mW
Read	0.30 A	0.40 A	1.5 W	2.20 W
Write	0.30 A	0.40 A	1.5 W	2.20 W
Seek (3 ms)	0.48 A	0.58 A	2.40 W	3.19 W
Seek (6 ms)	0.56 A	0.68 A	2.80 W	3.74 W
Spindle Motor Start	0.62 A	0.70 A	3.10 W	3.85 W

## Enhanced IDE Hard Disk Drive

Each Infinia™ computer comes equipped with one of six hard disk drives (HDD) (as listed in Table 1-7). Each HDD is a 3.5-inch, low-profile, high-capacity, enhanced IDE disk drive.

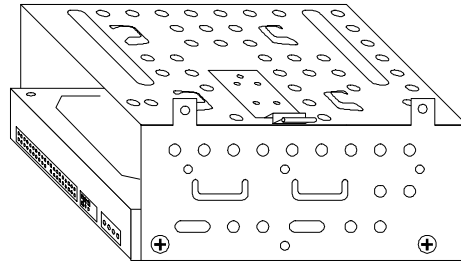


Figure 1-8 3.5" Hard Disk Drive

Table 1-7 Enhanced IDE Hard Disk Drive Configuration Specifications

Model	Cylinders	Heads	Sectors/Track	MB
Maxtor 72700A	5,248	16	63	2,583
Western Digital AC33100	6,136	16	63	3,166.7
Maxtor 72025AP	3,936	16	63	1,937
Western Digital AC32100	4,092	16	63	2,134.5
Maxtor 71687AP	3,280	16	63	1,687
Western Digital AC21600	3,148	16	63	1,624.6

Table 1-8 Enhanced IDE Hard Disk Drive Jumper Specifications  
(Maxtor Models 71687AP, 72025AP, and 72700A)

Configuration	Jumper Setting
Master/Single	J50 Jumped
Slave	J50 Open
Cable Select Enabled	J48 Jumped
Write Cache Disabled	J46 Jumped

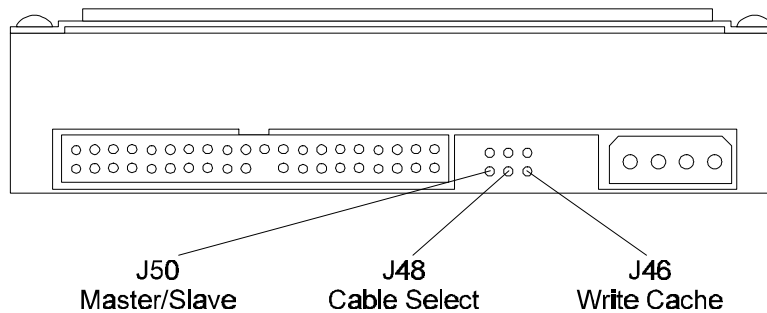
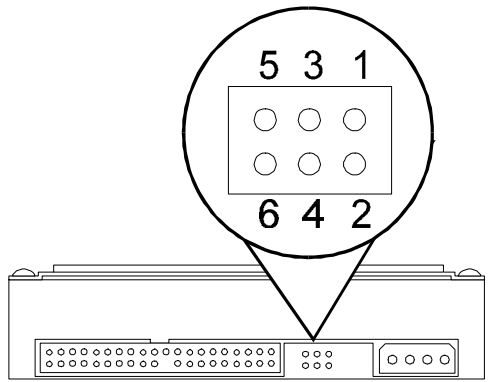


Figure 1-9 Jumper Pin Locations  
(Maxtor Models 71687AP, 72025AP, and 72700A)

*Table 1-9 Enhanced IDE Hard Disk Drive Jumper Specifications  
(Western Digital Models AC21600, AC32100, AC33100)*

<b>Configuration</b>	<b>J8 Jumper Setting</b>
Single	Pins 3 and 5
Master	Pins 5 and 6
Slave	Pins 3 and 4
Cable Select Enabled	Pins 1 and 2



*Figure 1-10 Jumper Pin Locations  
(Western Digital Models AC21600, AC32100, AC33100)*

## CD-ROM Drive

Infinia™ Models 7130, 7160, and 7200 come equipped with a Toshiba XM-5602B CD-ROM 8X ATA Packet Interface (ATAPI) drives. Models 7161 and 7201 come equipped with Toshiba XM-5702B CD-ROM 12X ATAPI drives. Both drives provides Photo-CD Multi-session and Multimedia PC-3 compatibility.

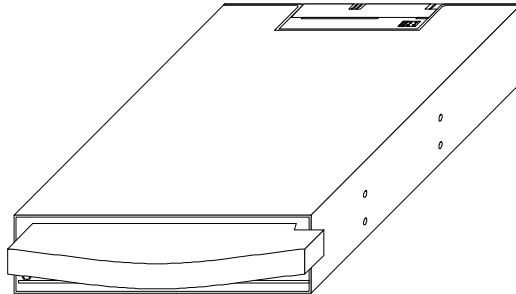


Figure 1-11 CD-ROM Drive

Table 1-10 CD-ROM Drive Physical Dimensions

Dimension	Specification
Height	1.63 in (41.5 mm)
Length	7.5 in (190 mm) (excluding bezel)
Width	5.75 in (146 mm)
Weight	2 LB (0.9 kg)

Table 1-11 CD-ROM Drive Performance Characteristics (1/2)

Item	Specification
Applicable Disc Formats	All: Red-Book, Yellow-Book, CD-ROM XA, CD-I, Bridge (Photo-CD, Video CD), CD-I, CD-I Ready, CD-G, and Multi-session (Photo-CD, CD EXTRA) 12X CD-E
Disk Sizes	4.75 in and 3 in (12 cm and 8 cm)
Data Capacity (Yellow-Book)	
– User Data/Block (Mode 1)	2,048 byte/block
– User Data/Block (Mode 2)	2,336 byte/block
Rotational Speed	
– 1X	Approx. 200 to 530 rpm
– 4X	Approx. 800 to 2,120 rpm
– 8X	Approx. 1,600 to 4,240 rpm
– 12X	Approx. 2,400 to 6,360 rpm
Transfer Rates <sup>1</sup>	

<sup>1</sup> (1 KB = 2<sup>10</sup> byte = 1024 bytes, 1 MB = 2<sup>20</sup> byte = 1,048,576 bytes)

Table 1-11 CD-ROM Drive Performance Characteristics (2/2)

– Sustained Block Transfer Rate	
1X	75 block/s
4X	Approx. 300 block/s
8X	Approx. 600 block/s
12X	Approx. 900 block/s
– Sustained Data Transfer Rate (Mode 1)	
1X	150 KB/s
4X	Approx. 600 KB/s
8X	Approx. 1,200 Kbyte/s
12X	Approx. 1,800 Kbyte/s
– Sustained Data Transfer Rate (Mode 2)	
1X	171 KB/s
4X	Approx. 684 KB/s
8X	Approx. 1,360 byte/s
12X	Approx. 2,052 byte/s
– Sustained PIO Host Transfer Rate	11.1 MB/s (PIO Mode 3)
– Single Word DMA Transfer Mode 2	8.33 MB/s
– Multiple Word DMA Transfer Mode 1	13.3 MB/s
Access Times	
– Average Random Access Times	
1X	320 ms (Typical)
4X	170 ms (Typical)
8X	145 ms (Typical)
12X	120 ms (Typical)
– Average Full-Stroke Access Times	
1X	400 ms (Typical)
4X	270 ms (Typical)
8X	230 ms (Typical)
12X	220 ms (Typical)
Spin-up Time	8X: 3.0 s (Typical) 3.5 s (Max.) 12X: 3.9 s (Typical) 4.5 s (Max)
Data Buffer Capacity	256 KB
Audio Output	
– Analog Output Level	1.0 Vrms (Typical)
– Digital Output Level	0.6 V p-p
– Headphones Output Level	0.7 Vrms (Typical)
– Headphone Connector	3.5 mm Stereo Headphone Jack
Power Supply	+ 5 V, + 12 V

*Table 1-12 CD-ROM Drive Environmental Conditions*

<b>Item</b>	<b>Operating</b>	<b>Non-Operating / Storage</b>	<b>Transporting</b>
Temperature	41° to 122° F (5° to 50°C)	14° to 140° F (-10° to 60°C)	-40° to 150° F (-40° to 65°C)
Temperature Gradient	52° F/hour (max.) (11° C/hour {max.})	68° F/hour (max.) (20° C/hour {max.})	68° F/hour (max.) (20° C/hour {max.})
Humidity (Non-Condensing)	8% to 80% (wet bulb 81° F (27 °C) max.)	5% to 95%	5% to 95%
Atmospheric Pressure and Altitude	0 to 9,850 ft (0 to 3,000 m)		0 to 39,000 ft (0 to 12,000 m)



## DVD-ROM Drive

Each Infinia™ Model 7220 comes equipped with a Toshiba SD-M1002 DVD-ROM Drive. DVD (Digital Versatile/Video Disc) is a new digital video decoding technology that uses the variable bit-rate MPEG2 compression to provide enhanced video, audio, and multimedia capabilities. This drive reads digital data stored on CD-ROM, DVD-ROM, and CD audio discs. Maximum storage capacity is 4.38 GB for single layers/single sided disc and 15.9 GB for dual layered/double sided disc. Because of the high storage capacity and data transfer rate (1350 KB/sec), these drives are capable of storing and reading high quality and long duration MPEG2 moving picture data. Additionally, the drive reads data stored on CD-ROM at up to 8X and supports Revision 2.6 of ATAPI.

*Table 1-13 DVD-ROM Drive Physical Dimensions*

Dimension	Specification
Height	1.63 in (41.5 mm)
Length	7.5 in (192 mm) (excluding bezel)
Width	5.75 in (146 mm)
Weight	2 LB (0.9 kg)

*Table 1-14 DVD-ROM Drive Performance Characteristics (1/2)*

Item	Specification
Applicable Disc Formats	DVD: UDF Bridge (DVD-ROM Book, DVD-Video Book) CD: Red-Book, Yellow-Book, CD-ROM XA, CD-I, Bridge (Photo-CD, Video CD), CD-I, CD-I Ready, CD-G, and Multi-session (Photo-CD, CD EXTRA)
Disk Sizes	4.75 in and 3 in (12 cm and 8 cm)
Data Capacity (Yellow-Book) – User Data/Block	DVD-ROM DVD-ROM Book: 2,048 byte/block CD-ROM: Yellow Book: 2,048 byte/block (Mode 1) 2,336 byte/block (Mode 2)
Rotational Speed	DVD: Approx. 570 to 1,530 rpm CD: 1X Approx. 200 to 530 rpm 4X Approx. 800 to 2,120 rpm 8X Approx. 1,600 to 4,240 rpm
Transfer Rates	
– Sustained Block Transfer Rate	DVD: Approx. 676 block/s CD: 1X Approx. 75 block/s 4X Approx. 300 block/s 8X Approx. 600 block/s

Table 1-14 DVD-ROM Drive Performance Characteristics (2/2)

Item	Specification
– Sustained Data Transfer Rate (Mode 1)	DVD: Approx. 1,350 block/s CD (Mode 1) 1X Approx. 150- block/s 4X Approx. 600 block/s 8X Approx. 1,200 block/s
– Sustained Data Transfer Rate (Mode 2)	CD (Mode 2) 1X Approx. 171- block/s 4X Approx. 684 block/s 8X Approx. 1,370 block/s
– Sustained PIO Host Transfer Rate	11.1 MB/s (PIO Mode 3)
– Single Word DMA Transfer Mode 2	8.33 MB/s
– Multiple Word DMA Transfer Mode 1	13.3 MB/s
Access Times	
– Average Random Access Times	DVD: 220 ms (Typical) to be improved CD: 1X 290 ms (Typical) 4X 190 ms (Typical) 8X 120 ms (Typical)
– Average Random Seek Times	DVD: 140 ms (Typical) CD: 1X 155 ms (Typical) 4X 150 ms (Typical) 8X 110 ms (Typical)
– Average Full-Stroke Access Times	DVD: 550 ms (Typical) CD: 1X 400 ms (Typical) 4X 240 ms (Typical) 8X 210 ms (Typical)
Spin-up Time	DVD: 2 s (Typical) CD: 8X 2.7 (Typical) 5 s (Max)
Data Buffer Capacity	256 KB
Load/Eject	Electrical Load/Eject (Eject Button) Load/Eject by ATAPI command Emergency Eject
Air Flow	Not Required <b>CHECK</b>
Acoustic Noise	45dB (IEC 179 A weighted at 1 m)
Power Supply	+ 5 V, + 12 V

*Table 1-15 DV-ROM Drive Environmental Conditions*

<b>Item</b>	<b>Operating</b>	<b>Non-Operating / Storage</b>	<b>Transporting</b>
Temperature	41° to 113° F (5° to 45°C)	14° to 140° F (-10° to 60°C)	-40° to 150° F (-40° to 65°C)
Temperature Gradient	52° F/hour (max.) (11° C/hour {max.})	68° F/hour (max.) (20° C/hour {max.})	68° F/hour (max.) (20° C/hour {max.})
Humidity (Non-Condensing)	8% to 80% (wet bulb 81° F (27 °C) max.)	5% to 95%	5% to 95%
Atmospheric Pressure and Altitude	0 to 9,850 ft (0 to 3,000 m)		0 to 39,000 ft (0 to 12,000 m)

## MPEG2/AC-3 Card

Infinia™ Model 7220 comes equipped with a Toshiba IPC0100A MPEG2/AC-3 decoder card implemented by a PCI bus slot corresponding to a DVD-ROM Drive. The MPEG2 card, used in conjunction with the DVD-ROM Drive plays movies and 5.1 channel surround sound.

*Table 1-16 MPEG2/AC-3 Physical Dimensions*

Dimension	Specification
Length	in (289.56 mm) (excluding bezel)
Width	in (106.68 mm)

*Table 1-17 MPEG2/AC-3 Specifications*

Item	Specification
System Decoder	<ul style="list-style-type: none"> <li>– System decoder by H/W</li> <li>– DVD format stream supported</li> </ul>
MPEG Video	<ul style="list-style-type: none"> <li>– MPEG video supported</li> <li>– ITU-R601 (CCITT) resolution decoded before MP@ML is possible</li> <li>– 3/2 pulldown supported</li> <li>– 16 Mbyte for decoder memory</li> </ul>
Audio	<ul style="list-style-type: none"> <li>– Dolby AC-3 audio 2 channel output</li> <li>– Dolby AC-3 5.1 channel digital output</li> <li>– Liner PCM (TBD)</li> </ul>
Display Control	<ul style="list-style-type: none"> <li>– Letter box display supported</li> <li>– Sub picture display supported</li> <li>– Video output of NTSC supported</li> <li>– Composite and S-Video output supported</li> </ul>
PCI Video I/F	<ul style="list-style-type: none"> <li>– Data transfered by master DMA</li> </ul>
Digital Video Port	<ul style="list-style-type: none"> <li>– 8 bit/16 bit digital video port</li> <li>– YUV4:2:2 format output</li> </ul>
Application Graphic Accelerator	
– 8 bit digital video interface	<ul style="list-style-type: none"> <li>– S3 LPB I/F</li> <li>– Cirrus 5440</li> </ul>
– 16 bit digital video interface	<ul style="list-style-type: none"> <li>– ZV-port</li> </ul>
Copy Protection	<ul style="list-style-type: none"> <li>– Analog copy protection (Macro Vission) supported</li> <li>– Digital copy protection supported</li> </ul>

## Keyboard

Each Infinia™ computer comes equipped with a compact 104-key Windows 95-compatible keyboard connected to the computer by a 79 inch (2 m) cable. The cable connects to the computer through the labeled 6-pin jack on the rear of the computer.

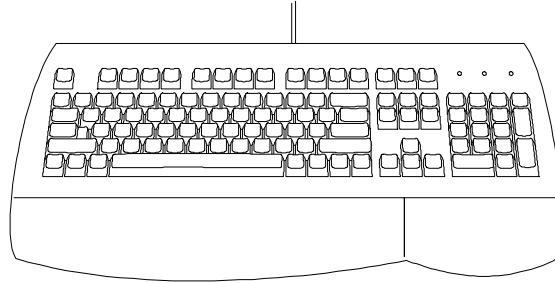


Figure 1-12 Keyboard

Table 1-18 Keyboard Specifications

Item	Specification
Environmental Data	
– Operating Temp.	32° to 104°F (0° to 40°C)
– Non-Operating Temp.	-4° to 140°F (-20° to 60°C)
– Operating Humidity	5% to 90% non-cond. ambient temp.
– Non-Operating Humidity	0% to 95% non-cond. at 104°F (40°C)
– Operating Shock	10 G
– Non-Operating Shock	50 G
Electrical Data	
– Input Power (max.)	+5 Vdc ± .25 V at 100 mA (max.)
Mechanical Data	
– Total Travel	0.150 in ± .020 in (3.81 mm ± .5 mm)
– Travel to Peak	0.50 in ± .010 in (12.7 mm ± .25 mm)
– Peak Force	2.0 oz. ± .6 oz. (57 g ± 17 g)
– Fire Point	.120 in (3.05 mm) nominal
– Serial Data Output	Synchronous 8-bit
Dimensions	
– Height	1.5 in (38 mm)
– Length	17.90 in (455 mm)
– Depth	6.75 in (171 mm)
– Weight	1.9 LB (.86 kg)

## Mouse

Each Infinia™ computer comes equipped with a PS/2-compatible mouse connected to the computer by a 6 foot (1.8 m) cable. The cable connects to the computer through the labeled 6-pin jack on the rear of the computer.

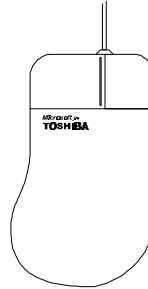


Figure 1-13 Mouse

Table 1-19 Mouse Specifications

Item	Specification
Dimensions	
– Height	1.57 in (40 mm)
– Width (Button Area)	2.25 in (57 mm)
– Width (Palm Area)	2.5 in (63 mm)
– Length	4.48 in (114 mm)
Weight	5 oz ± 1 oz (150 g ± 25 g)
Base Resolution	400 points/inch (both X- and Y- axis)
Minimum Travel	50 miles (80 km) (in any direction)
Environmental	
– Operating Temperature Range	41° to 95° F (5° to 35° C) at 10% to 80% relative humidity (non-condensing)
– Storage Temperature Range	-4° to 140° F (-20° to 60° C) at 10% to 80% relative humidity (non-condensing)
Power Requirements	8.5 mA (Typical) 20 mA (Max.)
Connector Type	6 pin Mini-DIN

## Modem

Each Infinia™ computer comes equipped with a V.34 internal data/fax, full-duplex speakerphone modem.

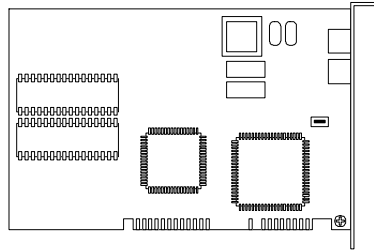


Figure 1-14 Infinia™ Modem

Table 1-20 Modem Specifications

Item	Specification
CCITT / Bell Standard	V.42bis, V.42, V.34, V.32bis, V.32, V.29, V.27ter, V.22bis, V.22, V.21, V.17, Bell212/103
MNP Protocols	MNP 5, 4, 3, 2
Host Interface	ISA 8 bit bus, Plug and Play (optional)
COMM Ports	1, 2, 3, 4
IRQ Lines	2, 3, 4, 5
DMA Channels	1, 3
FAX Group	Group III
FAX Command	Class 1 and Class 2
Voice Command	Sierra Voice Command Set
Escape Detection	TIES Escape Sequence
Transmit Level	-12 dBm ± 1 dB
Sensitivity	-43 dBm
UART	16550 compatible
Power	.75 W (max.)
Operating Temperature	32 to 131 °F (0 to 55 °C)
Non-Operating Temperature	-4 to 176 °F (-20 to 80 °C)

Table 1-21 COMM Port and IRQ Jumper Settings

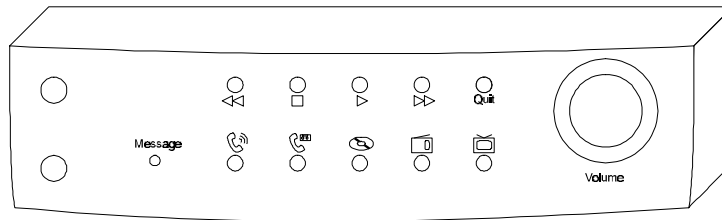
COM Port	IRQ	S1	S2	S3	S4	S5	JP13	JP10	JP11	JP12	JP14
1	4	Off	Off	Off	On	Off	On	Off	Off	Off	Off
2	3	On	Off	On	Off	Off	On	Off	Off	Off	Off
3	5	Off	On	Off	Off	On	On	Off	Off	Off	Off
	4	Off	On	Off	On	Off	On	Off	Off	Off	Off
4	3	On	On	On	Off	Off	On	Off	Off	Off	Off
PnP Mode		Off	Off	Off	Off	Off	Off	On	On	On	On

## InTouch™ Module

The major hardware components of the InTouch™ Module System include the Module and the Remote Control. The Remote Control is optional with Infinia™ Models 7130, 7160, and 7161. It is standard with the Models 7200, 7201, and 7220.

The Infinia™ Models 7130, 7160, and 7161 come equipped with the InTouch™LED Module, and Models 7200, 7201, and 7220 come equipped with the LCD Module.

Each Module connects to the PC through the Universal Serial Bus (USB). Each receives infrared (IR) signals from the Remote Control. The LED Module indicates its current operational status through 6 LEDs. The LCD Module indicates its current operational status through an LCD panel and one LED.



*Figure 1-15 LED Module*



*Figure 1-16 LCD Module*



## InTouch™ Module Remote Control

The major hardware components of the InTouch™ Module System include the Module and the Remote Control. The Remote Control is optional with Models 7130, 7160, and 7161. It is standard with the Models 7200, 7201, and 7220.

The Remote Control allows remote operation of all of each Module's features.



Figure 1-17 InTouch™ Module Remote Control

Table 1-22 Remote Control Specifications

Item	Specification
Transmission Range	
– Distance	Line of sight 40 ft (8 m)
– Angle	± 45° horizontal, ± 30° vertical at 25 ft
Power	4 “AAA” batteries
– Battery Life	1 year with typical use
ESD Susceptibility	IEC 801-2, air discharge method level 3
EMI	FCC Rule 15, Class B computer device peripheral
Environmental	
– Operating Temperature Range	32° to 158° F (0° to 70° C)
– Storage Temperature Range	-40° to 185° F (-40° to 85° C)
– Operating Humidity Range	5-95% relative humidity (non-condensing)
– Operating Shock	80G acceleration in 11 msec
– Water Resistance	All components water compatible

## TV Tuner Card

The Infinia™ Models 7200, 7201, and 7220 come equipped with a TV Tuner Card (optional on Models 7130, 7160, and 7161). The TV Tuner Card is a PCI plug-n-play television, FM radio, video conferencing and capturing board.

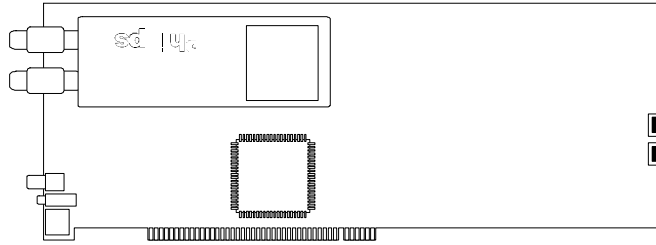


Figure 1-18 TV Tuner Card

Table 1-23 TV Tuner Card Specifications (1/2)

Item	Specification
Video Quality	Live video: 4:2:2 YUV resolution
Video Processor and PCI Bus Interface	Single chip Brooktree Bt848 to perform the video decoding, VBI extraction, and PCI interface
Video Input (Internal)	Composite video from on-board tuner
Video Input (External)	Composite NTSC/PAL video from VCR/LD player
Tuner	Cable-ready Philips NTSC(M) TV/FM tuner
Television Stereo	Phase-Locked Loop Stereo Decoder for BTSC system using Philips TEA5582
Digital Camera (optional)	Full-feature NTSC/PAL digital camera in small form factor package. Software programmable features include sharpness, brightness, field selection, temperature adjustment.
Camera Decoder	4:2:2 video output quality with gamma correction, aperture correction, and color-separation matrix
FM Radio	Part of Tuner (above)
Audio In	
– CD-In	Line-out level from CD-ROM player
– Television	Television audio from TV stereo decoder
– Radio	FM audio from FM demodulator
Audio Processor	Selectable CD-In, TV, and radio audio sources. Volume, balance, bass, treble, and mute control also supported. Controlled through I2C.
Audio Out	Miniature stereo jack
I/O Interface	PCI via Bt848
I2C Interface	I2C control signal originates from Bt848

Table 1-23 TV Tuner Card Specifications (2/2)

Item	Specification
External I/O Connections	
– Antenna Television Input	Software programmable NTSC(M) TV/FM tuner with extended F-connector mounted at the board edge for TV broadcast signal reception
– Antenna Radio Input	Extended F-connector mounted at the board edge for radio signal reception
– Video Input	One composite video source connected through a board edge mounted RCA jack
– Audio Output	Miniature stereo jack for external connection to the System Board
– Camera Inputs	9-pin DIN connector
Internal I/O Connections	
– Digital Camera Connector	1 unit of 2x20 and 2x3(100 mil pitch) headers
– CD-In Connector	1 unit of 1x4 (2 mm pitch) header with shroud for CD analog line-out audio from the CD-ROM player
– Audio-Out Connector	1 unit of 1x4 (2 mm pitch) header with shroud for switched audio back to the CD-In of the System Board
Physical Dimensions	9 in x 4.2 in (229 x 107 mm) PCI bus board
Power	
– Voltage	+5 V, +12 V
– Wattage	2.7 watts (Typical)

The Board has a terminator on the 9-pin DIN connector, per FCC requirements.

## Monitor

The Infinia™ Autoscan VGA color monitor comes in two models: a 15-inch model, and a 17-inch model. Each monitor is a single Field Replaceable Unit.

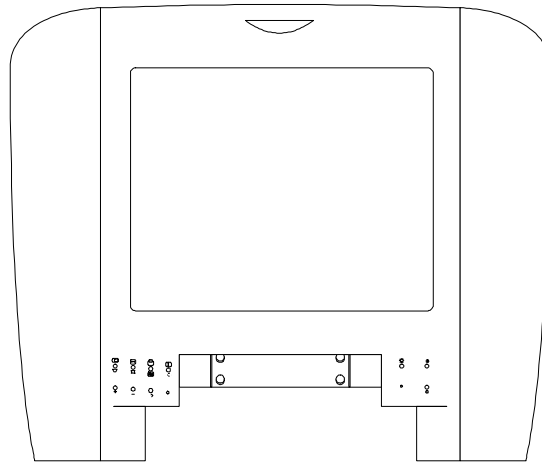


Figure 1-19 Monitor

Table 1-24 Monitor Specifications (1/3)

Item	15" Monitor	17" Monitor
General		
– Type	110 V	110 V
– Main Voltages	90 - 132 VAC	90 - 132 VAC
– Frequencies	48 - 62 Hz	48 - 62 Hz
– Power Consumption	100 W (max.)	130 W (max.)
– Environmental	Temperature: 32° to 104° F (0 to 40° C) Humidity: 20 to 80% (Non-Condensing) Air Pressure: 70 to 110 Kpa	Temperature: 32° to 104° F (0 to 40° C) Humidity: 20 to 80% (Non-Condensing) Air Pressure: 70 to 110 Kpa
– Non-operating Environment Limits	Temperature: -13° to 149°F (-25° to 65° C) Humidity: 20 to 90% (Non-Condensing) Air Pressure: 30 to 110 Kpa	Temperature: -13° to 149°F (-25° to 65° C) Humidity: 20 to 90% (Non-Condensing) Air Pressure: 30 to 110 Kpa
– Weight	33.7 lb. (15.3 kg)	45.3 lb. (20.6 kg)
– Dimensions	20 x 16.1 x 15.6 in (WxHxD) (509 x 409 x 397 mm)	22.1 x 17.6 x 18.2 in (WxHxD) (562 x 447 x 462 mm)

Table 1-24 Monitor Specifications (2/3)

Item	15" Monitor	17" Monitor
Picture Tube		
– Size	15 inch	17 inch
– Light Transmission	57% (dark glass)	42% - 57%
– Deflection Angle	90 degrees	90 degrees
– EHT Voltage	24.5 ± 1 kV	25 kV
– Pitch	.28 mm dotted	.28 mm dotted
Video		
– Dot Rate	108 MHz	110 MHz
– Video Signal	0.7 Vp-p 75 Ω	0.7 Vp-p 75 Ω
– Image Size (WxH)	260 ± 3 mm x 195 ± 3 mm	300 ± 5 mm x 225 ± 5 mm
– H-Shift Range	10 mm (min.)	20 mm (min.)
– V-Shift Range	10 mm (min.)	10 mm (min.)
Sync Signal		
– Vertical Frequency	50 - 110 Hz	50 - 110 Hz
– Horizontal Frequency	30 - 66 KHz	30 - 66 KHz
Audio Input Signal		
– Speaker (L/R) Connector Type	3.5 mm stereo plug	3.5 mm stereo plug
– Cable Length	71 inches (1.8 m) (fixed)	71 inches (1.8 m) (fixed)
– Nominal L/R input level	Approx. 1V	Approx. 1V
– L/R input impedance	Approx. 10 k Ω	Approx. 10 K Ω
– Subwoofer Connector Type	N/A	Input normally derived from Left/Right amplifiers. 3.5 mm jack available for optional input
– Subwoofer nominal input level	N/A	Approx. 1 Vrms
– Subwoofer input impedance	N/A	Approx. 4 k Ω
Audio Output Signal		
– Max. Speaker Power Output in 16 Ω	5 W (RMS)/channel at 10% THD (measured at 1 kHz)	5 W (RMS)/channel at 10% THD (measured at 1 kHz)
– Amplifier bandwidth	30 Hz - 19 kHz	30 Hz - 19 kHz
– Headphone Connector	3.5 mm jack (speakers silenced with plug inserted)	3.5 mm jack (speakers silenced with plug inserted)
– Headphone application	15 mW (RMS) (max.) in 32 Ω	15 mW (RMS) (max.) in 32 Ω
– Subwoofer Power Output (Internal)	N/A	5W (RMS) at approx. 12% THD
– Subwoofer Amplifier Bandwidth (Internal)	N/A	20 Hz - 100 Hz 80 dB/decibel roll-off

Table 1-24 Monitor Specifications (3/3)

Item	15" Monitor	17" Monitor
Audio Output Signal (Continued)		
– Subwoofer Power Output (External)	N/A	5W (RMS) at approx. 12% THD
– Subwoofer amplifier bandwidth (External)	N/A	20 Hz - 180 Hz, 40 dB/decibel roll-off
Internal Speakers		
– Type	L/R: 2 x 5 in, full range	L/R: 2 x 5 in, full range Subwoofer: 3 in, long stroke
– Rated RMS Power	6 W	6 W (Speakers and Subwoofer)
– Nominal Impedance	16 Ω	16 Ω (Speakers and Subwoofer)
– Application	Tuned bass reflex box	Tuned bass reflex box (Speakers and Subwoofer)
Microphone		
– Type	Internal, mounted at the top of the monitor cabinet	Internal, mounted at the top of the monitor cabinet
– Output signal	10 mVpp (min.)with normal speech level at 8 in (20 cm)	10 mVpp (min.)with normal speech level at 8 in (20 cm)
– External microphone connector type	3.5 mm stereo jack	3.5 mm stereo jack
– External microphone type	Electrical, multimedia standard, stereo plug DC bias through "right" connection AC signal through "left" connection Output: AC coupled to PC through cable and 3.5 mm mono plug	Electrical, multimedia standard, stereo plug DC bias through "right" connection AC signal through "left" connection Output: AC coupled to PC through cable and 3.5 mm mono plug

Table 1-25 15- and 17-inch Monitor Factory Preset Resolution and Sync. Polarities

Mode	Resolution	Horizontal	Vertical	Refresh	Sync. Polarity	
	(dots x line)	Freq. (kHz)	Freq. (Hz)		H	V
VGA	640 x 480	31.5	60	Non-Interlaced	-	-
VGA	640 x 480	31.5	70	Non-Interlaced	-	+
VESA	640 x 480	37.5	75	Non-Interlaced	-	-
VESA	800 x 600	37.9	60	Non-Interlaced	+	+
VESA	800 x 600	46.9	75	Non-Interlaced	+	+
VESA	1024 x 768	48.4	60	Non-Interlaced	-	-
VESA	1024 x 768	60.0	75	Non-Interlaced	+	+
VESA	1280 x 1024	64.0	60	Non-Interlaced	+	+

Table 1-26 15-inch Monitor Power Management

Mode	Signal			Audio Amplifier	Power		Recovery Time	LED Color
	Video	H-Sync	V-Sync		A (min.)	A (max.)		
On	Active	Active	Active	Active	≤ 90 W	≤ 110 W	NA	Green
Stand-By	Blanked	Inactive	Active	Active	≤ 25 W	≤ 35 W	~ 3 sec.	Amber
Suspend	Blanked	Active	Inactive	Active	≤ 15 W	≤ 25 W	~ 7 sec.	Amber
Off	Blanked	Inactive	Inactive	Off	≤ 5 W	≤ 5 W	~ 7 sec.	Dark

The audio system is active in **On**, **Standby**, and **Suspend** modes. Without L/R input signal, the amplifier dissipates 2 W. Under full load (2 x 5 W), the amplifier dissipates 17 W.

Table 1-27 17-inch Monitor Power Management

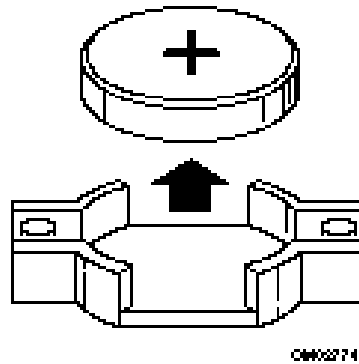
Mode	Signal			Audio Amplifier	Power	Recovery Time	LED Color
	Video	H-Sync	V-Sync				
On	Active	Active	Active	Active	130 W	NA	Green
Stand-By	Blanked	Inactive	Active	Active	43 W	~ 3 sec.	Amber
Suspend	Blanked	Active	Inactive	Active	30 W	~ 7 sec.	Amber
Off	Blanked	Inactive	Inactive	Off	5 W	~ 7 sec.	Dark

The audio system is active in **On**, **Standby**, and **Suspend** modes. Without L/R input signal, the amplifier dissipates 2 W. Under full load (3 x 5 W), the amplifier dissipates 22 W.

## Real-Time Clock Battery

A lithium battery, installed in a socket on the system board, provides power for the real-time clock and CMOS RAM.

The battery has an estimated life expectancy of three years. When the battery starts to weaken, it loses voltage. When the voltage drops below a certain level, the system settings stored in CMOS RAM (for example, the date and time) may be wrong. If the battery fails, replace it with an equivalent battery.



*Figure 1-20 Real-Time Clock Battery*



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# **Chapter 2**

## **Troubleshooting Procedures**

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## Troubleshooting

This chapter explains how to determine if an Infinia™ Field Replaceable Unit (FRU) or other component is causing the reported system problem. The following troubleshooting processes are covered in this chapter:

- Boot Failure Troubleshooting Process
- System Board Troubleshooting Process
- Power Supply Troubleshooting Process
- Switch Troubleshooting Process
- LED Troubleshooting Process
- Floppy Disk Drive (FDD) Troubleshooting Process
- Hard Disk Drive (HDD) Troubleshooting Process
- CD-ROM Drive Troubleshooting Process
- DVD-ROM Drive Troubleshooting Process
- Monitor Troubleshooting Process
- Monitor No Display Troubleshooting Process
- InTouch™ Module Troubleshooting Process
- InTouch™ Module No Display Troubleshooting Process
- Keyboard Troubleshooting Process
- Mouse Troubleshooting Process

In addition to providing troubleshooting processes for FRUs and other Infinia™ components, this chapter provides the following procedures to help you successfully solve reported system problems:

- Problem Definition Process
- No Trouble Found Process
- Repair Completion Process

## Recommended Tools and Equipment

The following tools and equipment are recommended to perform the troubleshooting processes described in this chapter:

- Generic monitor
- Generic keyboard
- Generic mouse
- External speakers
- Audio CD-ROM
- Multimeter
- FDD cleaning kit
- MS-DOS 3.5 inch bootable diskette
- External stereo audio device
- Virus scanning software

- ❑ QAPlus®/FE diagnostic diskettes

**NOTE:** Refer to section 4.1.8. for a list of tools necessary to disassemble and assemble the computer.

## Troubleshooting Process Overview

The flowchart shown in Figure 2-1 represents the Infinia™ troubleshooting process as a whole and how the various processes relate to one another. Use this flowchart as a guide to assist you in determining the appropriate process to perform.

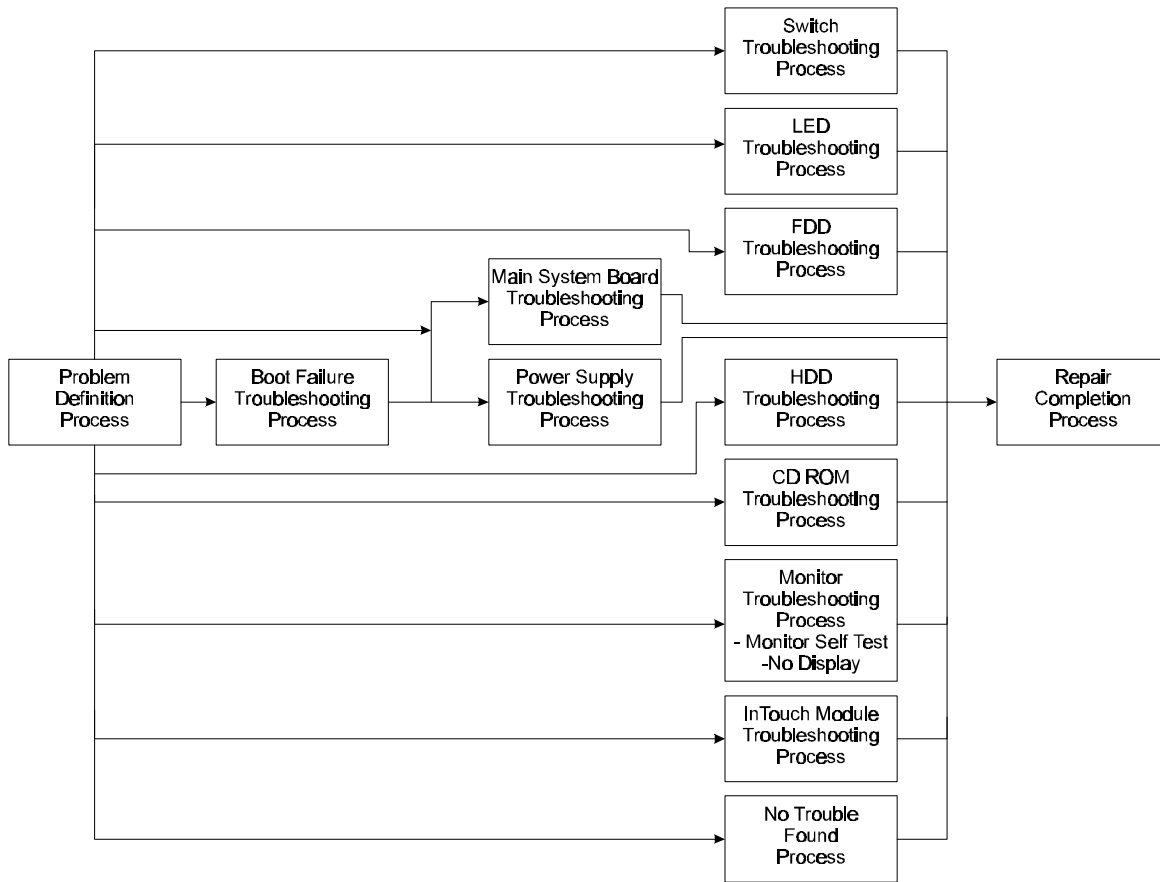


Figure 2-1 Infinia™ System-Wide Troubleshooting Process

## Problem Definition Process

The purpose of this process is to help you determine the cause of reported system problems and to refer you to the appropriate troubleshooting procedures necessary to correct these problems. To perform this process, begin with Step 1 and perform the subsequent steps as instructed.

- Step 1 (A) Obtain a detailed description of the problem from the customer and analyze the failure. (B) Perform Step 2.
- Step 2 (A) Verify that the appropriate power cords are connected to the computer and to the monitor. (B) Verify that the power outlet is operating properly. (C) Turn the



monitor on and verify that the Brightness and Contrast are both adjusted correctly.  
(D) Turn the computer on. (E) Verify that the system has the latest BIOS.  
(F) Perform Step 3.

- Step 3 Determine if the computer's Power LED is illuminated (green).  
If the computer's Power LED is illuminated, perform Step 5. If the computer's Power LED is not illuminated, perform Step 4.
- Step 4 Determine if the fan is running.  
If the fan is running, perform the LED Troubleshooting Process. If the fan is not running, perform the Power Supply Troubleshooting Process.
- Step 5 Determine if the monitor's Power LED is illuminated (green).  
If the monitor's Power LED is illuminated, perform Step 6. If the monitor's Power LED is not illuminated, perform Step 7.
- Step 6 Determine if anything is displayed on the screen.  
If something is displayed on the screen, perform Step 9. If nothing is displayed on the screen, perform the Monitor Troubleshooting Process.
- Step 7 (A) Verify that the video cable is not crimped. (B) Verify that the connector pins are not damaged. (C) Verify that the connector is properly connected to the appropriate port in the rear of the computer. (D) Reconnect the monitor's power and video cables, if necessary. (E) Perform Step 8.
- Step 8 Determine if the monitor's Power LED is illuminated (green).  
If the monitor's Power LED is illuminated, perform Step 6. If the monitor's Power LED is not illuminated, perform the Monitor Troubleshooting Process.
- Step 9 Determine if the system loads DOS from the FDD without error.  
If the system loads DOS from the FDD without error, perform Step 10. If the system does not load DOS from the FDD without error, perform Step 11.
- Step 10 Determine if the original problem still exists.  
If the original problem still exists, perform Step 15. If the original problem no longer exists, perform Step 12.

- Step 11 Determine if the system comes up in sleep mode.  
If the system comes up in sleep mode, perform Step 13. If the system does not come up in sleep mode, perform Step 14.
- Step 12 Attempt to duplicate the reported problem, as described by the customer.  
If the problem can be duplicated, perform Step 15. If the problem cannot be duplicated, perform the No Trouble Found Process.
- Step 13 Turn the computer on using the computer's Power button (see Figure 2-2 for the location of this button).  
If the system loads DOS without error, perform Step 16. If the system does not load DOS without error, perform the Boot Failure Troubleshooting Process.
- Step 14 Press the Reset button on the front of the computer (see Figure 2-2 for the location of this button).  
If the system loads DOS without error, perform Step 16. If the system does not load DOS without error, perform the Boot Failure Troubleshooting Process.
- Step 15 (A) Examine the system setup parameters. (B) Select the default setting. (C) Save and exit. (D) Test to determine if the original problem still exists.  
If the original problem still exists, perform Step 17. If the original problem no longer exists, perform the Repair Completion Process.
- Step 16 Determine if the original problem still exists.  
If the original problem still exists, perform Step 12. If the original problem no longer exists, perform Step 15.
- Step 17 (A) Remove all expansion cards and devices (refer to Chapter 4). (B) Reboot the system.  
If the problem still exists, perform Step 18. If the problem no longer exists, perform Step 19.
- Step 18 Determine if the computer boots up correctly.  
If the computer boots up correctly, perform Step 22. If the computer does not boot up correctly, perform the Boot Failure Troubleshooting Process.
- Step 19 Reinstall expansion cards and devices one at a time (refer to Chapter 4) and test after each installation.  
If the problem still exists, perform Step 20. If the problem no longer exists, perform Step 21.
- Step 20 (A) Replace the expansion card or device suspected of causing the problem (refer to Chapter 4). (B) Test to determine if the original problem still exists.  
If the original problem still exists, perform Step 22. If the original problem no longer exists, perform the Repair Completion Process.

- Step 21 Install all expansion cards and devices (refer to Chapter 4) and test after each installation.  
If the problem still exists, perform Step 22. If the problem no longer exists, perform the No Trouble Found Process.
- Step 22 Determine if the problem is specific to the mouse or keyboard.  
If the problem is specific to the mouse or the keyboard, perform Mouse or Keyboard Troubleshooting Process as required. If the problem is not specific to the mouse or the keyboard, perform Step 23.
- Step 23 Determine if the problem is specific to the FDD.  
If the problem is specific to the FDD, perform the FDD Troubleshooting Process. If the problem is not specific to the FDD, perform Step 24.
- Step 24 Determine if the problem is specific to the HDD.  
If the problem is specific to the HDD, perform the HDD Troubleshooting Process. If the problem is not specific to the HDD, perform Step 25.
- Step 25 Determine if the problem is specific to the CD-ROM drive.  
If the problem is specific to the CD-ROM drive, perform the CD-ROM Drive Troubleshooting Process. If the problem is not specific to the CD-ROM drive, perform Step 26.
- Step 26 Determine if the problem is specific to the monitor's speakers.  
If the problem is specific to the monitor's speakers, perform Step 27. If the problem is not specific to the monitor's speakers, perform Step 34.
- Step 27 (A) Increase the speaker volume by turning the control knob clockwise. (B) Check the appropriate device driver for the proper configuration. (C) Test to determine if the problem still exists.  
If the problem still exists, perform Step 28. If the problem no longer exists, perform the Repair Completion Process.
- Step 28 (A) Inspect the monitor's cable for damage and for an improper connection to the appropriate port in the rear of the computer. (B) Replace the monitor, if the cable is damaged (refer to section 4.15.). (C) Correctly connect the cable to the appropriate port in the rear of the computer, if necessary. (D) Test to determine if the problem still exists.  
If the problem still exists, perform Step 29. If the problem no longer exists, perform the Repair Completion Process.
- Step 29 Test the computer's audio with external speakers.  
If the problem still exists, perform Step 30. If the problem no longer exists, perform Step 31.
- Step 30 Test the speaker with another stereo audio device.  
If the monitor's speakers operate properly, perform the System Board Troubleshooting Process. If the monitor's speakers do not operate properly, perform Step 31.

Step 31 (A) Replace the monitor (refer to section 4.15.). (B) Test to determine if the problem still exists.

If the problem still exists, perform the System Board Troubleshooting Process. If the problem no longer exists, perform the Repair Completion Process.

Step 32 Perform a virus scan on the computer.

If a virus is detected, perform Step 33. If a virus is not detected, perform Step 34.

<p><i><b>NOTE:</b> Before performing the next Step, be advised that virus' should not be removed without the customer's consent. Also, advise the customer that the system will become infected again, if the contaminated disk(s) is reused.</i></p>
---

Step 33 (A) Work with the customer to remove the virus. (B) Test to determine if the original problem still exists.

If the original problem still exists, perform Step 36. If the original problem no longer exists, perform the Repair Completion Process.

Step 34 Attempt to duplicate the reported problem or related failure by booting DOS from the FDD and running a diagnostics program (refer to Chapter 3).

If the computer passes diagnostic testing, perform the Repair Completion Process. If the computer fails diagnostics, perform Step 35.

Step 35 Verify that no conflicts or errors exist in the device drivers, the system setup, the jumper settings, and the connector locations.

If conflicts or errors are discovered with the configuration, the setup, the jumper settings, or the connector locations, perform Step 36. If conflicts or errors are not discovered within these areas, perform Step 37.

Step 36 (A) Correct any conflicts or errors discovered with the configuration, the setup, the jumper settings, and the connector locations. (B) Test to determine if the original problem still exists.

If the original problem still exists, contact Toshiba technical support. If the original problem no longer exists, perform the Repair Completion Process.

Step 37 Determine if the problem occurs only in a specific application.

If the problem occurs only in a specific application, perform Step 38. If the problem does not occur only in a specific application, contact Toshiba technical support.

Step 38 Advise the customer to consult the application's documentation to find information concerning incompatibilities and setup errors.

If incompatibility or setup errors are discovered with the application, perform Step 39. If no incompatibility or setup errors are discovered, contact Toshiba technical support.

Step 39 (A) Advise the customer to consult the application's manufacturer for possible solutions. (B) Correct the problem using the manufacturer's input. (C) Perform the Repair Completion Process.

## Boot Failure Troubleshooting

This section describes how to determine if the system is malfunctioning due to a failure at bootup. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	System Setup Check
Procedure 2	Expansion Cards and Devices Removal Check
Procedure 3	Power On/Off Check
Procedure 4	FDD Configuration Check
Procedure 5	HDD Configuration Check
Procedure 6	CD-ROM Drive Configuration Check
Procedure 7	Character Display Check

### Procedure 1 System Setup Check

The purpose of this procedure is to determine if conflicts between the hardware setup and the actual system configuration are preventing the system from booting from the HDD or the FDD. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 If possible (if not possible, perform Procedure 2), review the system setup parameters and correct inconsistencies with the actual system configuration.
- If no problems are identified and corrected while reviewing the setup parameters, perform Procedure 2. If problems are identified and corrected while reviewing the setup parameters, perform Check 2.
- Check 2 Test to determine if the problem still exists.
- If the problem still exists, perform Procedure 2. If the problem no longer exists, perform the Repair Completion Process.

### Procedure 2 Expansion Cards and Devices Removal Check

The purpose of this procedure is to determine if expansion cards and devices are causing the boot failure. Defective expansion cards and devices installed in the system can prevent the system from booting properly. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Remove all expansion cards and devices from the system (refer to Chapter 4).  
(B) Reboot the system.
- If the system successfully loads DOS, perform Check 2. If the system does not successfully load DOS, perform Procedure 3.
- Check 2 Reinstall expansion cards and devices one at a time and test after each installation.
- If the system successfully loads DOS, perform Check 4. If the system does not successfully load DOS, perform Check 3.

- Check 3 (A) Replace the expansion card or device that is suspected of causing the boot failure. (B) Reboot the system.  
If the system successfully loads DOS, perform Procedure 3. If the system does not successfully load DOS, perform Check 2.
- Check 4 (A) Install all expansion cards and devices. (B) Reboot the system.  
If the problem still exists, perform Check 2. If the problem no longer exists, perform Check 5.
- Check 5 Determine if the original problem still exists.  
If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 3 Power On/Off Check**

The purpose of this procedure is to determine if the computer is receiving sufficient power and to determine if the boot problem is associated with an FRU. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Use the Power On/Off button on the front of the computer to turn the system off (See Figure 2-2 for computer switch (button) locations). (B) Wait 15 seconds then turn the computer back on.  
If the Power/Sleep LED indicator illuminates (turns green), perform Check 2. If the Power/Sleep LED does not illuminate, perform Check 3.
- Check 2 Examine the screen to determine if a message(s) is displayed.  
If a message(s) is displayed on the screen, perform Check 4. If a message(s) is not displayed, perform Check 5.
- Check 3 Determine if the fan operates.  
If the fan operates, perform the LED Troubleshooting Process. If the fan does not operate, perform the Power Supply Troubleshooting Process.
- Check 4 Determine if the displayed message is a BIOS-generated error message (refer to section 2.4.2).  
If a BIOS-generated error message is displayed, perform Check 6. If a BIOS-generated error message is not displayed, perform Procedure 4.
- Check 5 Test the system with another VGA monitor.  
If a message(s) displays on the screen, replace the Infinia™ monitor and perform Check 4. If a message(s) does not display, perform the Monitor No Display Troubleshooting Process.
- Check 6 Determine if the displayed message is a CMOS error.  
If a CMOS error is displayed, perform Check 7. If a CMOS error is not displayed, perform Check 8.

- Check 7 (A) Access the system setup by pressing the **F1** key. (B) Set the configuration parameters to default. (C) Test to determine if the original problem still exists.

**NOTE:** *If this error occurs again after cycling power, perform the System Board Troubleshooting Process.*

If the original problem still exists, perform Check 8. If the original problem no longer exists, perform the Repair Completion Process.

- Check 8 Determine if an HDD error is displayed.

If an HDD error is displayed, perform the HDD Troubleshooting Process. If an HDD error is not displayed, perform Check 9.

- Check 9 Determine if an FDD error is displayed.

If an FDD error is displayed, perform the FDD Troubleshooting Process. If an FDD error is not displayed, perform Check 10

- Check 10 Determine if a CD-ROM drive error is displayed.

If a CD-ROM drive error is displayed, perform the CD-ROM Troubleshooting Process. If a CD-ROM drive error is not displayed, perform the System Board Troubleshooting Process.

#### **Procedure 4 FDD Configuration Check**

The purpose of this procedure is to determine if the problem is associated with the FDD or the system configuration. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Access the system setup by pressing the **F1** key. (B) Verify that the configuration parameters are set to default.

If the system configuration parameters are set to default, perform Check 3. If the system configuration parameters are not set to default, perform Check 2.

- Check 2 (A) Set the system configuration parameters to default. (B) Test to determine if the problem still exists.

If the problem still exists, perform Check 3. If the problem no longer exists, perform the Repair Completion Process.

- Check 3 Determine if the system recognizes the FDD in setup.

If the system recognizes the FDD in setup, perform Check 4. If the system does not recognize the FDD in setup, perform the FDD Troubleshooting Process.

- Check 4 (A) Insert a known good MS-DOS bootable diskette into the FDD. (B) Reboot the system.

If DOS successfully loads from the FDD, perform Procedure 5. If DOS does not successfully load from the FDD, perform the FDD Troubleshooting Process.

## **Procedure 5                      HDD Configuration Check**

The purpose of this procedure is to determine if the problem is associated with the HDD or the system configuration. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1     Determine if the system recognizes the HDD in setup or during bootup.  
              If the system recognizes the HDD in setup or during bootup, perform Check 2. If the system does not recognize the HDD in setup or during bootup, perform the HDD Troubleshooting Process.
- Check 2     (A) Remove the bootable diskette from the FDD. (B) Reboot the system.  
              If DOS successfully loads from the HDD, perform Procedure 6. If DOS does not successfully load from the HDD, perform the HDD Troubleshooting Process.

## **Procedure 6                      CD-ROM Drive Configuration Check**

The purpose of this procedure is to determine if the problem is associated with the CD-ROM drive or the system configuration. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1     Determine if the system recognizes the CD-ROM drive in setup or during bootup.  
              If the system recognizes the CD-ROM drive in setup or during bootup, perform Check 2. If the system does not recognize the CD-ROM drive in setup or during bootup, perform the CD-ROM Drive Troubleshooting Process.
- Check 2     (A) Start the CD-ROM player software. (B) Insert a CD into the CD-ROM drive. (C) Click on the [Play] button on the CD-ROM software's interface.  
              If the CD-ROM drive operates properly, perform Procedure 7. If the CD-ROM drive does not operate properly, perform the CD-ROM Drive Troubleshooting Process.

## **Procedure 7                      Character Display Check**

The purpose of this procedure is to determine if the system responds to keyboard input. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1     Test the keyboard's operation by pressing (typing) character keys on the keyboard.  
              If characters display on the screen as typed, perform Check 2. If characters do not display on the screen as typed, perform the Keyboard Troubleshooting Process.
- Check 2     Determine if the original problem still exists.  
              If the original problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the No Trouble Found Process.



## System Board Troubleshooting

This section describes how to determine if the system board is defective or is not operating properly. Start with Procedure 1 and perform the remaining procedures as instructed. The procedures described in the section include:

Procedure 1	BIOS Beep Code Check
Procedure 2	BIOS Error Message Check
Procedure 3	PCI Configuration Error Message Check
Procedure 4	ISA NMI Error Message Check
Procedure 5	Expansion Cards and Devices Removal Check
Procedure 6	HDD DOS Loading Check
Procedure 7	Memory SIMM Replacement Check
Procedure 8	System Board Check
Procedure 9	FDD Boot Disk Check
Procedure 10	Diagnostic Testing Check
Procedure 11	CD-ROM Drive Check
Procedure 12	InTouch™ Module Check
Procedure 13	Keyboard Check
Procedure 14	Expansion Card Check
Procedure 15	Expansion Card Replacement Check
Procedure 16	Microprocessor Replacement Check
Procedure 17	System Board Replacement Check

**NOTE:** Before performing this troubleshooting process, verify that the customer has the newest BIOS version loaded on the computer. Also, check symptoms for a defective microprocessor, memory SIMM, or RTC battery and, if necessary, replace them. Refer to Table 2-1 for symptoms related to system board FRU problems.

Table 2-1 System Board FRU Problems/Symptoms

Problem	Symptom(s)
Microprocessor is missing or damaged. (If you find it necessary to remove or replace the microprocessor, refer to section 4.10.)	<input type="checkbox"/> No monitor display <input type="checkbox"/> No monitor LED activity <input type="checkbox"/> Power/Sleep LED flashing <input type="checkbox"/> CD-ROM LED flashing <input type="checkbox"/> Power supply fan running <input type="checkbox"/> HDD spins up but no HDD LED activity <input type="checkbox"/> No FDD activity <input type="checkbox"/> External speaker does not make static "clicking" noise
SIMM memory modules are missing, damaged, or improperly installed. (If you find it necessary to remove or replace SIMM memory modules, refer to section 4.11.)	<input type="checkbox"/> System speaker makes three long beeps <input type="checkbox"/> No monitor display <input type="checkbox"/> No monitor LED activity <input type="checkbox"/> Power/Sleep LED shows solid green <input type="checkbox"/> CD-ROM LED flashing <input type="checkbox"/> Power supply fan running <input type="checkbox"/> HDD spins up but no HDD LED activity <input type="checkbox"/> No FDD activity <input type="checkbox"/> External speaker does not make static "clicking" noise
RTC battery is missing, damaged, or improperly installed. (If you find it necessary to remove or replace the RTC battery, refer to section 4.12.)	CMOS time and date not set error message appears on bootup. A working RTC battery should measure approximately 3.0V.

**Procedure 1 BIOS Beep Code Check**

The purpose of this procedure is to determine if BIOS testing has identified a problem with the system board. The Initial Reliability Test (IRT) within the BIOS checks the system board for possible problems or errors. When the IRT detects an error, the system halts and a corresponding beep code is sounded. To perform this procedure, perform the following Check.

- Check If the system halts and a beep code is sounded, refer to Table 2-2 for BIOS beep codes and the corresponding actions. If no beep codes are sounded, perform Procedure 2.

Table 2-2 BIOS Beep Codes and Corresponding Actions

Number of Beeps	Action
1, 6, 9, 10	Replace the system board (refer to section 4.9.).
3	Replace memory SIMMs in bank 0 (refer to section 4.11.).
4	Replace memory SIMMs in bank 0 and test (refer to section 4.11.). If the same beep code sounds, replace the system board (refer to section 4.9.).
5, 7	Replace the microprocessor and test (refer to section 4.10.). If the same beep code sounds, replace the system board (refer to section 4.9.).
8	Reload the display driver and test. If the same beep code sounds, replace the system board (refer to section 4.9.).

## Procedure 2 BIOS Error Message Check

The purpose of this procedure is to determine if BIOS testing has identified a problem with the system board. The Initial Reliability Test (IRT) within the BIOS checks the system board for possible problems or errors. When the IRT detects an error, the system halts and a corresponding error message is displayed on the screen.

**Check** If the system halts and an error message displays on the screen, refer to Table 2-3 for BIOS error messages and the corresponding actions. If no error messages display, perform Procedure 3.

Table 2-3 BIOS Error Messages and Corresponding Actions (1/2)

Error Messages	Action
(1) 8042 Gate - A20 error (3) Cache Memory Bad, Do Not Enable Cache (4) CH-2 Timer Error (12) DMA Error (13) DMA#1 Error (14) DMA#2 Error	Replace the system board (refer to section 4.9.).
(2) Address Line Short (17) INTR#1 Error (18) INTR#2 Error	Replace the microprocessor (refer to section 4.10.) and test. If the error message displays again, replace the system board (refer to section 4.9.).
(5) CMOS Battery State Low	Replace the RTC battery (refer to section 4.12) and test. If the error message displays again, replace the system board (refer to section 4.9.).

Table 2-3 BIOS Error Messages and Corresponding Actions (2/2)

Error Messages	Action
(6) CMOS Checksum Failure (7) CMOS System Option Not Set (8) CMOS Display Type Mismatch (9) CMOS Memory Size Mismatch (10) CMOS Time and Date Not Set	These errors occur (A) when the system configuration preserved in the RTC memory does not match the actual configuration or (B) when data is lost.  Press the [F1] key to access setup and set the system configuration to default, then test. If error message (10) is displayed often when the system is turned on, set the time and the date in setup. If this does not resolve the error, replace the RTC Battery (refer to section 4.12.). If this error message or any of the other error messages continues to display, replace the system board (refer to section 4.9.).
(11) Diskette Boot Failure (15) FDD Controller Failure (19) Invalid Boot Diskette	Perform the FDD Troubleshooting Process.
(16) HDD Controller Failure	Perform the HDD Troubleshooting Process.
(20) Keyboard is locked...Unlock It	Unlock the keyboard by entering the user's password.
(21) KB/Interface Error	Perform the Keyboard Troubleshooting Process.
(22) Parity Error - System Halted	Replace the memory SIMMs (refer to section 4.11.) and test. If this error message is displayed again, replace the system board (refer to section 4.9.).

### Procedure 3 PCI Configuration Error Message Check

The purpose of this procedure is to determine if BIOS testing has identified a problem with the system board. The Initial Reliability Test (IRT) within the BIOS checks the system board for possible problems or errors. When the IRT detects an error, the system halts and a corresponding error message is displayed on the screen.

**Check** If the system halts and an error message displays on the screen, refer to Table 2-4 for PCI configuration error messages and the corresponding explanation. If no error messages display, perform Procedure 4.

*Table 2-4 PCI Configuration Error Messages and Explanations*

<b>Message</b>	<b>Explanation</b>
Bad PnP Serial ID Checksum	The Serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared By Jumper	The "Clear CMOS" jumper has been moved to the "Clear" position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.
PCI Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, CD-ROM drive, or network) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.
Primary Input Device Not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.
Motherboard Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.

**Procedure 4 ISA NMI Error Message Check**

The purpose of this procedure is to determine if BIOS testing has identified a problem with the system board. The Initial Reliability Test (IRT) within the BIOS checks the system board for possible problems or errors. When the IRT detects an error, the system halts and a corresponding error message is displayed on the screen.

- Check 1 If the system halts and the error message **Memory Parity Error at xxxxx** displays on the screen, perform Check 2. If the system halts and the error messages **I/O Parity Error at xxxxx** or **DMA Bus Time-out** display on the screen, perform Check 8. If no error messages display, perform Procedure 5.

- Check 2 (A) Turn the system off. (B) Remove ISA cards from ISA slots. (C) Turn the system back on.  
If no error message displays, perform Check 3. If the error message displays, perform Check 4.
- Check 3 (A) Reinstall ISA cards (refer to section 4.4) one at a time and test after each installation. (B) Replace the ISA card suspected of causing the error (refer to section 4.4). (C) Perform Check 4.
- Check 4 (A) Reseat all memory SIMMs. (B) Test the system.  
If the error message displays, perform Check 6. If the error message does not display, perform Procedure 5.
- Check 5 (A) Replace the memory SIMMs (refer to section 4.11.). (B) Test the system.  
If the error message displays, perform Check 7. If the error message does not display, perform Procedure 5.
- Check 6 (A) Remove the memory SIMMs from Bank 0 and install them in Bank 1 (refer to section 4.11.). (B) Test the system.  
If the error message displays, perform Check 5. If the error message does not display, perform Procedure 5.
- Check 7 (A) Replace the system board (refer to section 4.19.). (B) Test the system.  
(C) Perform the Repair Completion Process.
- Check 8 (A) Remove I/O cards from ISA slots (refer to section 4.5.). (B) Test the system.  
If the error message displays, perform Check 7. If the error message does not display, perform Check 9.
- Check 9 (A) Reinstall I/O cards one at a time (refer to section 4.5.) and test after each installation. (B) Replace the I/O card suspected of causing the error (refer to section 4.5.). (C) Test the system.  
If the error message displays, perform Check 7. If the error message does not display, perform Procedure 5.

### **Procedure 5 Expansion Cards and Devices Removal Check**

The purpose of this procedure is to determine if expansion cards and devices are causing the system to malfunction. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Remove all expansion cards and devices from the system (refer to Chapter 4).  
(B) Test to determine if the original problem still exists.  
If the original problem still exists, perform Procedure 6. If the original problem no longer exists, perform Check 2.
- Check 2 Reinstall the expansion cards and devices one at a time (refer to Chapter 4) and test after each installation.  
If the problem still exists, perform Check 3. If the problem no longer exists, perform Check 4.

Check 3 (A) Replace the expansion card or device suspected of causing the problem (refer to Chapter 4). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 6. If the problem no longer exists, perform the Repair Completion Process.

Check 4 Determine if the original problem still exists.

If the original problem still exists, perform Procedure 6. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 6 HDD DOS Loading Check**

The purpose of this procedure is to determine if the system can properly boot from the HDD. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Reboot the computer.

If DOS successfully loads, perform Procedure 9. If DOS does not successfully load, perform Check 2.

Check 2 Determine if messages display on the screen.

If messages display on the screen, perform Check 3. If messages do not display on the screen, perform the Monitor No Display Troubleshooting Process.

Check 3 Determine if the displayed messages are error messages.

If error messages are displayed, perform Procedure 2. If error messages are not displayed, perform Check 4.

Check 4 Determine if the system completes the post memory test.

If the post memory test completes, perform Procedure 9. If the post memory test does not complete, perform Procedure 7.

### **Procedure 7 Memory SIMM Replacement Check**

The purpose of this procedure is to determine if damaged memory SIMMs are causing the system to malfunction. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Examine the monitor's display to determine if a memory error message is displayed.

If a memory error message is displayed, perform Check 2. If a memory error message is not displayed, perform Procedure 8.

Check 2 (A) Replace memory SIMMs (refer to section 4.11.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 8. If the problem no longer exists, perform Check 3.

Check 3 Determine if the original problem still exists.

If the original problem still exists, perform Procedure 9. If the original problem no longer exists, perform the Repair Completion Process.





### **Procedure 11                      CD-ROM Drive Check**

The purpose of this procedure is to determine if the problem is related to the CD-ROM drive. To perform this procedure, perform the following Check.

Check    Test to determine if the problem is related to the CD-ROM drive.

If the problem is related to the CD-ROM drive, perform the CD-ROM Troubleshooting Process. If the problem is not related to the CD-ROM drive, perform Procedure 12.

### **Procedure 12                      InTouch™ Module Check**

The purpose of this procedure is to determine if the problem is related to the InTouch™ Module. To perform this procedure, perform the following Check.

Check    Test to determine if the problem is related to the InTouch™ Module.

If the problem is related to the InTouch™ Module, perform the InTouch™ Module Troubleshooting Process. If the problem is not related to the InTouch™ Module, perform Procedure 13.

### **Procedure 13                      Keyboard Check**

The purpose of this procedure is to determine if the problem is related to the keyboard. To perform this procedure, perform the following Check.

Check    Test to determine if the problem is related to the keyboard.

If the problem is related to the keyboard, perform the Keyboard Troubleshooting Process. If the problem is not related to the keyboard, perform Procedure 14.

### **Procedure 14                      Expansion Card Check**

The purpose of this procedure is to determine if the problem is related to improperly connected or damaged expansion cards. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    Determine if the problem is related to an expansion card.

If the problem is related to an expansion card, perform Check 3. If the problem is not related to an expansion card, perform Check 2.

Check 2    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

Check 3    (A) Inspect the expansion card and connector for damage. (B) Repair or replace the expansion card as necessary (refer to sections 4.4. and 4.5. as necessary). (C) Verify that the expansion card is properly installed and configured. (D) Test the system to determine if the problem still exists.

If the problem still exists, perform Procedure 15. If the problem no longer exists, Perform Check 4.

Check 4 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the No Trouble Found Process.

### **Procedure 15 Expansion Card Replacement Check**

The purpose of this procedure is to determine if the problem is related to a defective expansion card. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Replace the expansion card suspected of causing the problem (refer to sections 4.4. and 4.5. as necessary). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 16. If the problem no longer exists, perform Check 2.

Check 2 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 16 Microprocessor Replacement Check**

The purpose of this procedure is to determine if the problem is related to a defective microprocessor. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Replace the microprocessor (refer to section 4.10.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 17. If the problem no longer exists, perform Check 2.

Check 2 (A) Reinstall all expansion cards and devices (refer to Chapter 4). (B) Test the system to determine if the original problem still exists.

If the original problem still exists, contact Toshiba technical support. If the original problem no longer exists, perform the Repair Completion Process.

## Procedure 17 System Board Replacement Check

The purpose of this procedure is to determine if the problem is related to a defective system board. To perform this procedure, begin with Check 1 and continue as instructed.

**NOTE:** *The microprocessor, the heat sink, the memory SIMMs, and the I/O spring are individual FRUs and are not considered part of the system board. Remove these FRUs from the current system board and install them on the new system board before performing Check 1.*

Check 1 (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the problem still exists.

If the problem still exists, contact Toshiba technical support. If the problem no longer exists, perform Check 2.

Check 2 (A) Reinstall all expansion cards and devices (refer to Chapter 4). (B) Test the system to determine if the original problem still exists.

If the original problem still exists, contact Toshiba technical support. If the original problem no longer exists, perform the Repair Completion Process.

## Power Supply Troubleshooting Process

This section describes how to determine if the power supply is defective or is not operating properly. Begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	Voltage Check
Procedure 2	Short Circuit Check
Procedure 3	FDD Check
Procedure 4	HDD Check
Procedure 5	CD-ROM Drive Check
Procedure 6	Optional Component Check

**NOTE:** *While performing the procedures in this section, refer to Appendix I for proper power supply voltages as necessary.*

### Procedure 1 Voltage Check

The purpose of this procedure is to determine if the power supply unit is supplying the appropriate voltages. To perform this procedure, complete the following instructions, then begin with Check 1 and continue as directed.

- Verify that the computer is powered off.
- Verify that the AC power cord is disconnected.
- Remove all expansion cards and devices from the system (refer to chapter 4).
- Disconnect power supply connectors P1 through P6 from the system board and other devices (HDD, FDD, CD-ROM Drive).

- Check 1 (A) Verify that the 115/230V selection switch (located in back of the power supply unit behind the back cover) is set to the correct position. (B) Connect AC power to the computer. (C) Measure to determine if the correct voltages are present at pins 14 and 9 of the P1 connector—reference ground using pin 15. If 5VDC exists at pins 14 and 9, perform Procedure 2. If 5VDC does not exist at pins 14 and 9, perform Check 2.
- Check 2 (A) Replace the power supply (refer to section 4.3.). (B) Perform Check 1.

## **Procedure 2                      Short Circuit Check**

The purpose of this procedure is to determine, by creating a temporary load, if the power supply unit is supplying the appropriate voltages. The power supply unit only supplies voltages when a load is attached. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    (A) Create a short between pins 14 (green) and 15 (black/ground) on the P1 connector. (B) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Check 3. If correct voltages are not present at these connectors, perform Check 2.

Check 2    (A) Replace the power supply (refer to section 4.3.). (B) Perform Procedure 1.

Check 3    (A) Remove the short between pins 14 and 15 of the P1 connector. (B) Disconnect the AC power cord from the computer. (C) Plug the P1 connector into the system board at J6M1. (D) Reconnect the AC power cord to the system. (E) Verify that the computer's Power button is operating properly (refer to the Switch Troubleshooting Process). (F) Turn the computer on using the Power button on the front of the computer (See Figure 2-2 for computer switch (button) locations). (G) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Procedure 3. If correct voltages are not present, perform Check 4.

Check 4    (A) Disconnect P1 from the system board. (B) Replace the system board (refer to section 4.9.). (C) Perform Procedure 1.

## **Procedure 3                      FDD Check**

The purpose of this procedure is to ensure that the power supply operates properly under load. To do this, all devices (loads) must be connected to the power supply one at a time. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    (A) Turn the computer off. (B) Connect the P6 connector to the FDD. (C) Turn the computer back on. (D) Measure to determine if the correct voltages are present at the P6 connector (12V yellow/5V red).

If the correct voltages are present at this connector, perform Check 2. If the voltages are not correct, perform Check 3.

Check 2    (A) Inspect the FDD data cable to ensure it is not damaged. (B) If the cable is damaged, replace it with a new cable (refer to section 4.1.3.2.). (C) Connect the FDD data cable to J9K1 on the system board. (D) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Procedure 4. If the voltages are not correct, perform Check 3.

- Check 3 (A) Replace the FDD (refer to section 4.8.). (B) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.  
If the correct voltages are present at these connectors, perform Procedure 4. If the voltages are not correct, perform Check 4.
- Check 4 (A) Replace the system board (refer to section 4.9.). (B) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.  
If the correct voltages are present at these connectors, perform Procedure 4. If the voltages are not correct, contact Toshiba technical support.

#### **Procedure 4 HDD Check**

The purpose of this procedure is to ensure that the power supply operates properly under load. To do this, all devices (loads) must be connected to the power supply one at a time. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Turn the computer off. (B) Connect the P2 connector to the HDD. (C) Turn the computer back on. (D) Measure the voltage at the P2 connector (12V yellow/5V red).  
If the correct voltages are present at this connector, perform Check 2. If the voltages are not correct, perform Check 3.
- Check 2 (A) Inspect the HDD data cable to ensure it is not damaged. (B) If the data cable is damaged, replace it with a new cable (refer to section 4.1.3.2.). (C) Connect the HDD data cable to J10G1 on the system board. (D) Measure to determine if the correct voltages are present at the P1 and P2 connectors.  
If the correct voltages are present at these connectors, perform Procedure 5. If the voltages are not correct, perform Check 3.
- Check 3 (A) Replace the HDD (refer to section 4.6.). (B) Measure to determine if the correct voltages are present at the P1 and P2 connectors.  
If the correct voltages are present at these connectors, perform Procedure 5. If the voltages are not correct, perform Check 4.
- Check 4 (A) Replace the system board (refer to section 4.9.). (B) Measure to determine if the correct voltages are present at the P1 and P2 connectors.  
If the correct voltages are present at these connectors, perform Procedure 5. If the voltages are not correct, contact Toshiba technical support.

## **Procedure 5 CD-ROM Drive Check**

The purpose of this procedure is to ensure that the power supply operates properly under load. To do this, all devices (loads) must be connected to the power supply one at a time. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Turn the computer off. (B) Connect the P5 connector to the CD-ROM drive. (C) Turn the computer back on. (D) Measure to determine if the correct voltages are present at the P5 connector (12V yellow/5V red).

If the correct voltages are present at this connector, perform Check 2. If the voltages are not correct, perform Check 3.

- Check 2 (A) Inspect the CD-ROM drive data cable to ensure it is not damaged. (B) If the data cable is damaged, replace it with a new cable (refer to section 4.1.3.2.). (B) Connect the CD-ROM drive data cable to J9G1 on the system board. (C) Measure to determine if the correct voltages are present at the P1 and P5 connectors.

If the correct voltages are present at these connectors, perform Procedure 6. If the voltages are not correct, perform Check 3.

- Check 3 (A) Replace the CD-ROM drive (refer to section 4.7.). (B) Measure to determine if the correct voltages are present at the P1 and P5 connectors.

If the correct voltages are present at these connectors, perform Procedure 6. If the voltages are not correct, perform Check 4.

- Check 4 (A) Replace the system board (refer to section 4.9.). (B) Measure to determine if the correct voltages are present at the P1 and P5 connectors.

If the correct voltages are present at these connectors, perform Procedure 6. If the voltages are not correct, contact Toshiba technical support.

## **Procedure 6 Expansion Cards and Devices Check**

The purpose of this procedure is to ensure that the power supply operates properly under load. To do this, all expansion cards and devices (loads) must be connected to the power supply one at a time. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Turn the computer off. (B) Reinstall— one at a time— expansion cards and devices (refer to Chapter 4). (C) Turn the computer back on. (D) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Check 3. If the voltages are not correct, perform Check 2.

Check 2 (A) Replace the expansion card(s) and/or the device(s) that caused the missing or incorrect voltage reading(s) (refer to Chapter 4). (B) Check connectors and slots on the system board for damage. (C) Replace the system board if it is damaged (refer to section 4.9.). (D) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Check 3. If they are not correct, perform Check 4.

Check 3 (A) If you have not done so already, install all expansion cards and devices one at a time until they have all been installed. (B) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform Check 4. If the voltages are not correct, perform Check 2.

Check 4 (A) Replace the system board (refer to section 4.9.). (B) Measure to determine if the correct voltages are present in all pins at connector P1 through connector P6.

If the correct voltages are present at these connectors, perform the Repair Completion process. If the voltages are not correct, contact Toshiba technical support.

## **Switch (Button) Troubleshooting Process**

This section describes how to determine if Infinia™ front panel switches are defective or malfunctioning (see Figure 2-2 for Infinia™ front bezel switch (button) locations). To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

- |             |                                   |
|-------------|-----------------------------------|
| Procedure 1 | Switch (Button) Resistance Check  |
| Procedure 2 | Switch (Button) Replacement Check |
| Procedure 3 | Switch (Button) Operation Check   |
| Procedure 4 | System Board Replacement Check    |



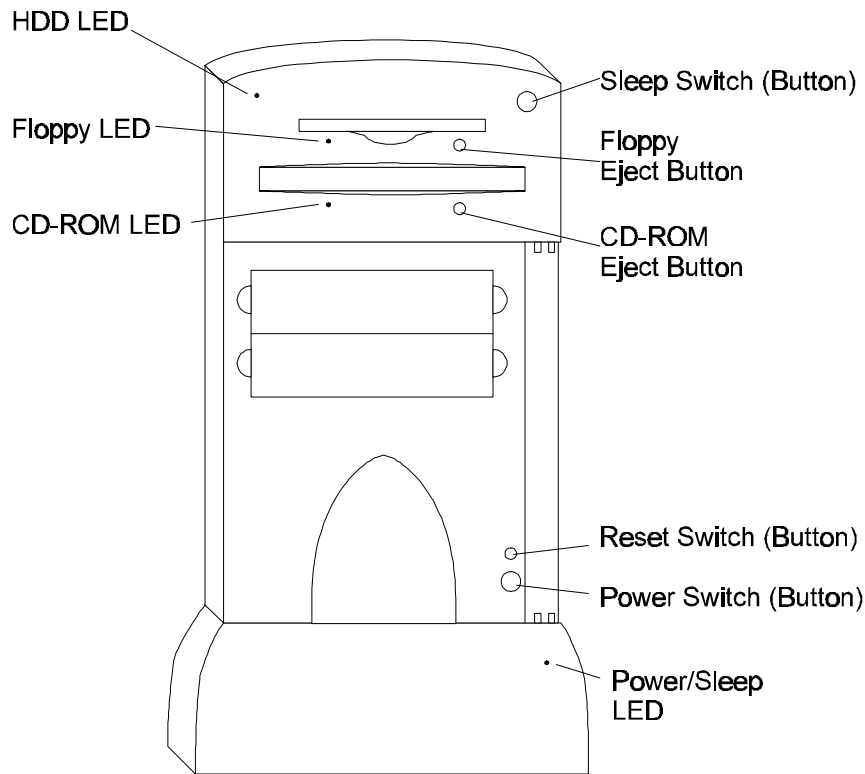


Figure 2-2 *Infinia™ Front Bezel Switch (Button) and LED Locations*

## **Procedure 1                      Switch (Button) Resistance Check**

The purpose of this procedure is to determine if the resistance of the suspect switch measures properly when the it is closed or open. To perform this procedure, perform the following Check.

Check    (A) Disconnect the suspect switch from the system board. (B) Measure the resistance between two pins on the switch.

If the resistance is correct, perform Procedure 3. If the resistance is not correct, perform Procedure 2.

***NOTE:** Resistance between the two switch pins should be 0 ohms when the switch is pushed in (closed).*

## **Procedure 2                      Switch (Button) Replacement Check**

The purpose of this procedure is to determine if the suspect switch is defective. To perform this procedure, perform the following check.

Check    (A) Replace the switch. (B) Perform Procedure 1.

## **Procedure 3                      Switch (Button) Operation Check**

The purpose of this procedure is to determine if the switch operates properly when connected to the system board. To perform this procedure, perform the following check.

Check    (A) Reconnect the switch to the system board. (B) Test to determine if the switch operates properly.

If the switch operates properly, perform the Repair Completion Process. If the switch does not operate properly, perform Procedure 4.

## **Procedure 4                      System Board Replacement Check**

The purpose of this procedure is to determine if the switch problem is caused by a defective system board. To perform this procedure, perform the following check.

Check    (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the switch operates properly.

If the switch operates properly, perform the Repair Completion Process. If the switch does not operate properly, contact Toshiba technical support.

## **LED Troubleshooting Process**

This section describes how to determine if all four Infinia™ front panel LEDs are operating properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

- Procedure 1                      Diode Check
- Procedure 2                      Power/Sleep LED Illumination Check
- Procedure 3                      HDD LED Illumination Check

Procedure 4	FDD LED Illumination Check
Procedure 5	CD-ROM LED Illumination Check
Procedure 6	Power/Sleep LED Voltage Check (Sleep Mode)
Procedure 7	Power/Sleep LED Voltage Check (Normal Mode)
Procedure 8	Power/Sleep LED Replacement Check
Procedure 9	FDD Replacement Check
Procedure 10	CD-ROM Drive Replacement Check
Procedure 11	HDD LED Voltage Check
Procedure 12	HDD Replacement Check
Procedure 13	System Board Replacement Check

### **Procedure 1                      DIODE Check**

The purpose of this procedure is to determine if the suspect LED is operating properly as a diode. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1    (A) Disconnect the non-operational LED from the system board. (Only the Power/Sleep and HDD LEDs are connected to the system board. The other LEDs are hardwired into the corresponding device.) (B) Perform a DIODE check on the LED connector.

**NOTE:** *The Forward BIOS voltage should equal 1.8VDC and the Reverse BIOS voltage should equal OL (overload).*

If the LED readings are correct, perform Check 3. If the LED readings are not correct, perform Check 2.

- Check 2    (A) Replace the LED. (2) Perform Check 1.

- Check 3    If the non-operational LED is:
- the Power/Sleep LED, perform Procedure 2.
  - the HDD LED, perform Procedure 3.
  - the FDD LED, perform Procedure 4.
  - the CD-ROM LED, perform Procedure 5.

## Procedure 2 Power/Sleep LED Illumination Check

The purpose of this procedure is to determine if the Power/Sleep LED is operating properly. To perform this procedure, complete the following instructions, then begin with Check 1 and continue as directed.

- Reconnect the Power/Sleep LED (if it is disconnected) to the system board.

**NOTE:** When reconnecting this connector, verify that the black wire is on top and the green wire is on bottom, and that the label (POWER LED) on the connector itself is facing towards the front of the computer.

- Verify that the computer is turned on using the Power button on the front of the computer (See Figure 2-2 for computer switch (button) locations).

Check 1 Determine if the Power/Sleep LED illuminates (turns green) after the computer is turned on.

If the Power/Sleep LED illuminates, perform Check 2. If the Power/Sleep LED does not illuminate, perform Procedure 7.

Check 2 (A) Verify that the Sleep switch operates properly (refer to the Switch Troubleshooting Process). (B) Engage this switch by pushing it in.

If the Power/Sleep LED flashes green, perform Check 3. If this LED does not flash green, perform Procedure 6.

Check 3 Determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

## Procedure 3 HDD LED Illumination Check

The purpose of this procedure is to determine if the HDD LED is operating properly. To perform this procedure, begin with Check 1 and continue as instructed. Before performing this check, perform the following instructions:

- Connect the HDD LED connector back to the system board, if the LED is disconnected.

**NOTE:** When reconnecting this connector, verify that the black wire is on top and the blue wire is on bottom, and that the label (HDD LED) on the connector itself is facing towards the back of the computer.

- Verify that the computer is turned on using the Power button on the front of the computer (See Figure 2-2 for computer switch (button) locations).

Check 1 Determine if the HDD LED illuminates (turns green) when the HDD is accessed.

If the HDD LED illuminates, perform Check 2. If the HDD LED does not illuminate, perform Procedure 11.

Check 2 Determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

#### **Procedure 4 FDD LED Illumination Check**

The purpose of this procedure is to determine if the FDD LED is operating properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Verify that the computer is turned on using the Power button on the front of the computer (See Figure 2-2 for computer switch (button) locations).  
(B) Determine if the FDD LED illuminates when the FDD is accessed.

If the FDD LED illuminates, perform Check 2. If the FDD LED does not illuminate, perform Procedure 9.

Check 2 Determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

#### **Procedure 5 CD-ROM LED Illumination Check**

The purpose of this procedure is to determine if the CD-ROM drive LED is operating properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Verify that the computer is turned on using the Power button on the front of the computer (See Figure 2-2 for computer switch (button) locations).  
(B) Determine if the CD-ROM drive LED illuminates when the drive is accessed.

If the CD-ROM drive LED illuminates, perform Check 2. If the CD-ROM drive LED does not illuminate, perform Procedure 10.

Check 2 Determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

#### **Procedure 6 Power/Sleep LED Voltage Check (Sleep Mode)**

The purpose of this procedure is to determine if the system board is providing the appropriate voltages to the Power/Sleep LED. To perform this procedure, perform the following Check.

Check Measure the voltages between pins 18 and 20 at J10K1 (Power/Sleep LED connector) on the system board when the system is in Sleep mode.

If the voltage alternates between 5VDC and 0VDC, perform Procedure 8. If the voltage does not alternate between these two voltages, perform Procedure 13.



### **Procedure 11                      HDD LED Voltage Check**

The purpose of this procedure is to determine if the system board is providing the necessary voltages to the HDD LED. To perform this procedure, perform the following Check.

**Check**     Measure the voltage between pins 15 and 16 at J10K1 (HDD LED connector) on the system board.

If the voltage fluctuates between 0.4VDC and 2 VDC when the HDD is accessed, perform Procedure 12. If the voltage does not fluctuate between these two voltages, perform Procedure 13.

### **Procedure 12                      HDD Replacement Check**

The purpose of this procedure is to determine if the HDD LED is defective. To perform this procedure, perform the following Check.

**Check**     (A) Replace the HDD (refer to section 4.6.). (B) Test to determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

### **Procedure 13                      System Board Replacement Check**

The purpose of this procedure is to determine if the system board is defective, causing the LED problem. To perform this procedure, perform the following Check.

**Check**     (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

## **Floppy Disk Drive (FDD) Troubleshooting Process**

This section describes how to determine if the FDD is operating properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	FDD Boot Disk Check
Procedure 2	Data Cable and Connector Check
Procedure 3	Voltage Check
Procedure 4	FDD Replacement Check
Procedure 5	System Board Replacement Check

### **Procedure 1                      FDD Boot Disk Check**

The purpose of this procedure is to determine if the system boots from the FDD. To perform this procedure, complete the following instructions, then begin with Check 1 and continue as directed.

- Access system setup by pressing the **F1** key when prompted.

- Select FDD “A” as “1 . 44 / 1 . 25MB 3-1 / 2”.
  - Select Read/Write for floppy access.
  - Save settings and exit.
- Check 1 (A) Insert a known good bootable MS-DOS diskette in the FDD. (B) Restart the computer and attempt to boot from the FDD.
- If the system boots, perform Check 2. If the system does not boot, perform Procedure 2.
- Check 2 Determine if the FDD LED illuminates (turns green) when the FDD is accessed
- If the LED illuminates, perform Check 3. If the LED does not illuminate, perform Procedure 2.
- Check 3 (A) Clean the FDD heads using a head-cleaning kit. (B) Perform FDD diagnostics using the QAPLus® Diagnostics program . (C) Format a diskette with a system transfer. (D) Attempt to copy several files from C: to A: and from A: to C:.
- If FDD errors are reported, perform Procedure 2. If no FDD errors are reported, perform the Repair Completion Process.



## **Procedure 2                      Data Cable and Connector Check**

The purpose of this procedure is to determine if the data cable that connects the FDD to the system board, and the power cable that supplies power from the power supply unit to the FDD through the P6 connector, are damaged or are not connected properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    Inspect the data and power cables to the FDD for damage and appropriate connections.

If the data and power cables are not damaged and are properly connected, perform Check 3. If the data and power cables are damaged or are not properly connected, perform Check 2.

Check 2    (A) Replace damaged cables, or reconnect the improperly connected connectors (refer to section 4.1.3.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Check 3. If the problem no longer exists, perform the Repair Completion Process.

Check 3    (A) Insert a known good bootable MS-DOS diskette into the FDD. (B) Restart the computer and attempt to boot from the FDD.

If the system boots, perform Check 4. If the system does not boot, perform Procedure 3.

Check 4    (A) Clean the FDD heads using a head-cleaning kit. (B) Perform FDD diagnostics using the QAPLus® Diagnostics program . (C) Attempt to copy several files from C: to A: and from A: to C:.

If FDD errors are reported, perform Procedure 4. If FDD errors are not reported, perform Check 5.

Check 5    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 3                      Voltage Check**

The purpose of this procedure is to determine if the power supply unit is providing the appropriate voltages to the FDD. To perform this procedure, perform the following Check.

Check    Measure the FDD power cable to ensure the yellow cable has 12VDC power and the red cable has 5VDC power.

If the power cable does not have the correct voltages, perform the Power Supply Troubleshooting Process. If the power cable does have correct voltages, perform Procedure 4.

#### **Procedure 4 FDD Replacement Check**

The purpose of this procedure is to determine if the FDD is defective. To perform this procedure, perform the following Check.

Check (A) Replace the FDD (refer to section 4.8.). (B) Insert a known good bootable MS-DOS diskette in the FDD. (C) Restart the computer and attempt to boot from the FDD.

If the system boots, perform the Repair Completion Process. If the system does not boot, perform Procedure 5.

#### **Procedure 5 System Board Replacement Check**

The purpose of this procedure is to determine if the system board is defective, causing the FDD problem. To perform this procedure, perform the following Check.

Check (A) Replace the system board (refer to section 4.9.). (B) Insert a known good bootable MS-DOS diskette in the FDD. (C) Restart the computer and attempt to boot from the FDD.

If the system boots, perform the Repair Completion Process. If the system does not boot, contact Toshiba technical support.

### **Hard Disk Drive (HDD) Troubleshooting Process**

This section describes how to determine if the HDD is operating properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	HDD Boot Check
Procedure 2	Data Cable and Connector Check
Procedure 3	Voltage Check
Procedure 4	FDD Boot Disk Check
Procedure 5	Data Cable Replacement Check
Procedure 6	Virus Check
Procedure 7	Diagnostics Testing Check
Procedure 8	Abnormal Noise Check
Procedure 9	Connector Pin Check
Procedure 10	HDD Reformat Check
Procedure 11	HDD Replacement Check

**NOTE:** Before performing the HDD troubleshooting process, advise the customer to attempt to perform a back up on the HDD to protect personal data. Also, advise the customer that if they have not already received the Backup Utilities Software CD-ROM, they should contact Toshiba for information on how to receive this backup utility.

## Procedure 1

## HDD Boot Check

The purpose of this procedure is to determine if the HDD is properly configured and if it is spinning at a constant speed. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Remove any diskette from the FDD. (B) Reboot the system.

If the message, Hard Disk 0 installed WDC AC21600H appears on the screen, perform Check 2. If this message does not appear, perform the following HDD setup procedure, then perform Check 2.

To properly configure HDD settings, perform the following instructions:

- During reboot, access setup by pressing the **F1** key when prompted.
- Select PRIMARY IDE MASTER WDC AC21600H.
- Press the **Enter** key and verify that the device configuration is selected as Auto Configured.
- Save settings (if you made a change) and exit.

- Check 2 Determine if the HDD's LED flashes green when the HDD is accessed.  
If the LED flashes green, perform Check 3. If the LED does not flash green but the system boots properly, perform the LED Troubleshooting Process. If the LED does not flash green and the system does not boot from the HDD, perform Procedure 2.
- Check 3 Attempt to reboot the system from the HDD.  
If the system does not reboot, perform Procedure 2. If the system does reboot, perform Check 4.
- Check 4 Inspect the HDD to determine if it is spinning at a constant speed.  
If the HDD is not spinning at a constant speed, perform Procedure 2. If the HDD is spinning at a constant speed, perform Procedure 6.

### **Procedure 2 Data Cable and Connector Check**

The purpose of this procedure is to determine if the data cable that connects the HDD to the system board, and the power cable that supplies power from the power supply unit to the HDD through the P2 connector, are damaged or are not connected properly. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 Inspect the data and power cables to the HDD and the system board for damage and improper connections.  
If the data and power cables are not damaged and are properly connected, perform Procedure 3. If the data and power cables are damaged or are not properly connected, perform Check 2.
- Check 2 (A) Replace damaged cables, or reconnect improperly connected connectors (refer to section 4.1.2.). (B) Test to determine if the problem still exists.  
If the problem still exists, perform Procedure 3. If the problem no longer exists, perform the Repair Completion Process.

### **Procedure 3 Voltage Check**

The purpose of this procedure is to determine if the power supply unit is providing the appropriate voltages to the HDD. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 Measure to determine if the HDD power cable has 12VDC (yellow) and 5VDC (red).  
If the voltages are within specification and remain stable, perform Check 2. If the voltages are not within specification or do not remain stable, perform the Power Supply Troubleshooting Process.
- Check 2 Attempt to reboot the system from the HDD.  
If the system reboots from the HDD, perform Procedure 6. If the system does not reboot from the HDD, perform Procedure 4.

#### **Procedure 4 FDD Boot Disk Check**

The purpose of this procedure is to determine if the reported problem is boot-failure related. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Insert a known good bootable MS-DOS diskette into the FDD. (B) Attempt to boot from the FDD.

If the system boots from the FDD, perform Check 2. If the system does not boot from the FDD, perform the Boot Failure Troubleshooting Process.

Check 2 Attempt to access the HDD from the FDD.

If the HDD can be accessed from the FDD, perform Procedure 6. If the HDD cannot be accessed from the FDD, perform Procedure 5.

#### **Procedure 5 Data Cable Replacement Check**

The purpose of this procedure is to determine if the data cable that connects the HDD to the system board is defective. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Disconnect the CD-ROM data cable and use it in place of the HDD data cable (refer to section 4.1.3.2.). (B) Remove any diskette from the FDD. (C) Reboot the system.

If the system reboots, perform Check 2. If the system does not reboot, reconnect the CD-ROM and HDD data cables and perform Procedure 8.

Check 2 (A) Replace the defective HDD cable (also, reconnect the CD-ROM data cable) (B) Perform Procedure 6.

#### **Procedure 6 Virus Check**

The purpose of this procedure is to determine if a virus is causing the HDD problem. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Perform a virus scan on the HDD.

If no viruses are detected, perform Procedure 7. If a virus is detected, perform Check 2.

**NOTE:** Before performing the next Check, be advised that virus' should not be removed without the customer's consent. Also, advise the customer that the system will become infected again, if the contaminated disk(s) is reused.

Check 2 (A) Remove the virus. (B) Perform Procedure 7.

## **Procedure 7 Diagnostic Testing Check**

The purpose of this procedure is to determine if diagnostics testing can identify possible problems with the HDD. To perform this procedure, perform the following Check.

Check (A) Perform QA Plus Diagnostics testing on the HDD. (B) Attempt to copy some files from A: to C: and C: to A:.

If no HDD errors are reported, perform the Repair Completion Process. If HDD errors are reported, perform Procedure 10.

## **Procedure 8 Abnormal Noise Check**

The purpose of this procedure is to determine if the HDD is making abnormal noises, which could indicate a problem with the HDD. To perform this procedure, perform the following Check.

Check Listen for abnormal noises coming from the HDD.

If abnormal noises are coming from the HDD, perform Procedure 11. If abnormal noises are not coming from the HDD, perform Procedure 9.

## **Procedure 9 Connector Pin Check**

The purpose of this procedure is to determine if connector pins on the HDD or the system board are damaged or causing a short. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Inspect the HDD and the system board connectors for damaged or shorted pins.

If damage or shorts are discovered, perform Check 2. If damage or shorts are not discovered, perform Check 3.

Check 2 (A) Replace the damaged FRU (refer to Chapter 4). (B) Test to determine if the original problem still exists.

If the original problem still exists, perform Procedure 6. If the original problem no longer exists, perform Check 3.

Check 3 (A) Perform QA Plus Diagnostics testing on the HDD. (B) Check the screen to determine if HDD seek or status errors are reported.

If HDD seek or status errors are reported, perform Procedure 11. If these errors are not reported, perform Procedure 10.

## **Procedure 10 HDD Reformat Check**

The purpose of this procedure is to determine if reformatting the HDD will rectify the problem. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Perform a DOS format on the HDD with a system transfer. (B) Test to determine if the format completed without errors.

If the format completes without errors, perform Check 2. If the format did not complete without errors, perform Procedure 11.

Check 2 Reinstall DOS.

If DOS installs without errors, perform Check 3. If DOS does not install without errors, perform Procedure 11.

Check 3 (A) Reinstall Windows '95 using the CD provided by Toshiba. (B) Test to determine if the original problem still exists.

If the original problem still exists, perform Procedure 11. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 11 HDD Replacement Check**

The purpose of this procedure is to determine if the HDD is defective. To perform this procedure, perform the following Check.

Check (A) Replace the HDD (refer to section 4.6.). (B) Format the HDD with a system transfer. (C) Install software using the CD provided by Toshiba and/or backup diskettes. (D) Test to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **CD-ROM Drive Troubleshooting Process**

This section describes how to determine if the CD-ROM drive is operating properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	Initial Boot Message Check
Procedure 2	Eject Button Check
Procedure 3	Caddy Recede Check
Procedure 4	CD-ROM Audio Check
Procedure 5	Monitor Speaker Check
Procedure 6	Cable and Connector Check
Procedure 7	Voltage Check
Procedure 8	Data Cable Replacement Check
Procedure 9	TV Tuner Card Check
Procedure 10	CD-ROM Replacement Check
Procedure 11	System Board Replacement Check

### **Procedure 1 Initial Boot Message Check**

The purpose of this procedure is to determine if the CD-ROM drive is not properly configured, which could be causing the CD-ROM drive problem. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Reboot the system.

If the message, "CD-ROM Drive Installed Toshiba CD ROM XM-5602B" displays on the screen, perform Procedure 2. If this message does not display, perform Check 2.

Check 2 (A) Properly configure the CD-ROM drive in system setup (refer to the CD-ROM Setup Instructions below). (B) Test the CD-ROM drive.

If the problem still exists, perform Procedure 2. If the problem no longer exists, perform the Repair Completion Process.

### **CD-ROM Setup Instructions**

To properly configure the CD-ROM drive, perform the following instructions:

- During bootup, access setup by pressing the **F1** key when prompted.
- Select SECONDARY IDE MASTER TOSHIBA CD ROM XM and press the **Enter** key.
- Verify that the IDE device configuration is **Auto Configured**.
- Save settings and exit.
- Access the Windows '95 main menu and click on [START].
- Select Settings.



- Select Control Panel.
- Select System and Device Manager.
- Verify that "Toshiba CD-ROM XM-56028" is selected. If it is not selected, select it.

### **Procedure 2 Eject Button Check**

The purpose of this procedure is to determine if the CD-ROM drive eject mechanism functions properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Press the eject button on the CD-ROM drive.

If the CD-ROM eject mechanism operates properly (if the caddy ejects properly), perform Procedure 3. If the mechanism does not operate properly, perform Check 2.

Check 2 Determine if the CD-ROM drive LED flashes red when the computer is turned on.

If the LED does not flash red, perform Procedure 6. If the LED does flash red, perform Procedure 10.

### **Procedure 3 Caddy Recede Check**

The purpose of this procedure is to determine if the CD-ROM drive caddy properly recedes. To perform this procedure, perform the following Check.

Check (A) Insert an audio CD into the CD-ROM caddy. (B) Press the eject button on the CD-ROM drive.

If the caddy properly recedes, perform Procedure 4. If the caddy does not properly recede, perform Check 2 of Procedure 2.

### **Procedure 4 CD-ROM Audio Check**

The purpose of this procedure is to determine if the CD-ROM drive properly functions with a CD-ROM installed. Before performing this procedure, complete the following instructions, then begin with Check 1 and continue as directed:

- Access the Windows '95 main menu.
- Select Program.
- Select CD Player.
- Increase the volume.
- Click on [PLAY].

Check 1 Listen for audio coming from the monitor's (or external) speakers.

If audio can be heard from the speakers, perform the Repair Completion Process. If audio cannot be heard from the speakers, perform Check 2.

Check 2 Increase speaker volume by turning the volume control knob clockwise.

**NOTE:** *The volume control knob is located behind the left speaker near the bottom of the monitor.*

If audio can be heard from the speakers, perform the Repair Completion Process.  
If audio cannot be heard from the speakers, perform Procedure 5.

### **Procedure 5 Monitor Speaker Check**

The purpose of this procedure is to determine if the monitor's speakers are operating properly. To perform this procedure, perform the following Check.

Check Use another program (such as the radio, TV, video games, or .WAV files) to play audio.

If audio can be heard from the speakers, perform Procedure 6. If audio cannot be heard from the speakers, perform the Monitor Troubleshooting Process.

### **Procedure 6 Cable and Connector Check**

The purpose of this procedure is to determine if the data and sound cables that connect the CD-ROM drive to the system board, and the power cable that supplies power from the power supply unit to the CD-ROM drive through the P5 connector, are damaged or are not connected properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Inspect the data, sound, and power cables to the CD-ROM drive for damage and improper connections.

If the data, sound, and power cables are not damaged and are properly connected to the back of the CD-ROM drive and the system board, perform Procedure 7. If the data, sound or power cables are damaged or are not properly connected, perform Check 2.

Check 2 (A) Replace damaged cables, or reconnect the improperly connected connectors (refer to section 4.1.3.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 7. If the problem no longer exists, perform the Repair Completion Process.

### **Procedure 7 Voltage Check**

The purpose of this procedure is to determine if the power supply unit is providing the appropriate voltages to the CD-ROM drive. To perform this procedure, perform the following Check.

Check Measure to determine if the CD-ROM drive power cable (P5) has 12VDC (yellow) and 5VDC (red).

If the voltages are within specification and remain stable, perform Procedure 8. If the voltages are not within specification or do not remain stable, perform the Power Supply Troubleshooting Process.

## **Procedure 8      Data Cable Replacement Check**

The purpose of this procedure is to determine if the data cable that connects the CD-ROM drive to the system board is defective. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1    (A) Disconnect the HDD data cable and use it in place of the CD-ROM data cable (refer to section 4.1.3.2.). (B) Test the CD-ROM drive by playing an audio CD-ROM.
- If audio can be heard from the speakers, perform Check 2. If audio cannot be heard from the speakers, perform Procedure 9.
- Check 2    (A) Replace the defective CD-ROM data cable (also, reconnect the HDD data cable). (B) Perform Procedure 6.

## **Procedure 9      TV Tuner Card Check**

The purpose of this procedure is to determine if the TV Tuner Card is defective, causing audio problems. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1    Determine if a TV Tuner Card is installed in the computer.
- If a TV Tuner Card is installed, perform Check 2. If a TV Tuner Card is not installed, perform Procedure 10.
- Check 2    (A) Disconnect the CD-ROM audio cable from the TV Tuner Card at JP4 (CD) and connect the cable to the system board at J1F2 (CD) (refer to section 4.1.3.3.). (B) Test the CD-ROM drive by playing an audio CD-ROM.
- If audio can be heard from the speakers, perform Check 3. If audio cannot be heard, perform Procedure 10.
- Check 3    (A) Reconnect the CD-ROM audio cable to the TV Tuner Card at JP4 (CD IN). (B) Verify that the audio cable is connected between the TV Tuner Card at JP5 (AUX OUT) and the system board at J1FC (CD). (C) Test the CD-ROM drive by playing an audio CD-ROM.
- If audio can be heard from the speakers, perform the Repair Completion Process. If audio cannot be heard, perform Check 4.
- Check 4    (A) Replace the TV Tuner Card (refer to section 4.5.). (B) Test the CD-ROM drive to determine if the original problem still exists.
- If the original problem still exists, perform Procedure 10. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 10                      CD-ROM Replacement Check**

The purpose of this procedure is to determine if the CD-ROM drive is defective. To perform this procedure, perform the following Check.

Check    (A) Replace the CD-ROM drive (refer to section 4.7). (B) Test the new drive by playing an audio CD-ROM.

          If audio can be heard from the speakers, perform the Repair Completion Process.  
          If audio cannot be heard, perform Procedure 11.

## **Procedure 11                      System Board Replacement Check**

The purpose of this procedure is to determine if the system board is defective, causing the CD-ROM drive problem. To perform this procedure, perform the following Check.

Check    (A) Replace the system board (refer to section 4.9.). (B) Test the CD-ROM drive by playing an audio CD-ROM.

          If audio can be heard from the speakers, perform the Repair Completion Process.  
          If audio cannot be heard, contact Toshiba technical support.

## **DVD-ROM Drive Troubleshooting Process**

Information to be provided when available.

## **Monitor Troubleshooting Process**

This section describes how to determine if the Infinia™ 15” or 17” monitor is operating properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	LED Check
Procedure 2	Data Display Check
Procedure 3	Cable Inspection Check
Procedure 4	Monitor Self Test Check
Procedure 5	Substitute Monitor Check
Procedure 6	Monitor Replacement Check
Procedure 7	System Board Replacement Check

### **Procedure 1            LED Check**

The purpose of this procedure is to determine if the monitor receives power and powers up when turned on. Before performing this procedure, complete the following instructions, then perform the Check below.

- Verify that the wall outlet power is appropriate as required.
- Verify that power cables are properly connected to the wall outlet, to the computer, and to the monitor.
- Verify that the video cable is properly connected to the computer’s VGA port.

Check Turn the monitor and the computer on.

If the computer's power LED illuminates (turns green), perform Procedure 2. If the power LED does not illuminate, perform Procedure 3.

## **Procedure 2 Data Display Check**

The purpose of this procedure is to determine if the monitor receives data from the computer. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 Determine if data displays on the screen.

If data displays, perform Check 2. If data does not display, perform the No Display Troubleshooting Process.

Check 2 Determine if the screen satisfactorily displays data.

If data displays satisfactorily, perform Check 3. If data does not display satisfactorily, perform Check 4.

Check 3 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process or the Boot Failure Troubleshooting Process. If the problem no longer exists, perform the Repair Completion Process.

Check 4 (A) Verify that display-related drivers are properly configured (if necessary, contact Toshiba technical support). (B) Determine if the screen satisfactorily displays data.

If data displays satisfactorily, perform Check 3. If data does not display satisfactorily, perform Check 5.

Check 5 (A) Adjust the display by using the monitor adjustment buttons (See Figure 2-3 for monitor button locations). (B) Determine if the monitor satisfactorily displays data.

If data displays satisfactorily, perform Check 3. If data does not display satisfactorily, contact Toshiba technical support.

### **Procedure 3 Cable Inspection Check**

The purpose of this check is to determine if the monitor's cable is damaged. To perform this procedure, perform the following Check.

**NOTE:** *The data and speaker cables are attached to the monitor and are not removable.*

Check Inspect the monitor's cables and connectors for damage.

If cables or connectors are damaged, repair them if possible. If they cannot be repaired, perform Procedure 6. If cables or connectors are not damaged, perform Procedure 4.

### **Procedure 4 Monitor Self Test Check**

The purpose of this check is to determine if the monitor can run a self check to resolve the problem. The monitor's function switches (buttons) control the monitor's self test. See Figure 2-3 for the position of these buttons and refer to Table 2-5 for button functions. Before performing this procedure, complete the following instructions, then begin with Check 1 and continue as directed:

- Disconnect the video cable from the computer.
- Connect the monitor power cable to the wall outlet.
- Turn the monitor on.
- Push the Contrast and Brightness buttons to release them from the disabled position.
- Turn the brightness and contrast buttons to their maximum levels (full clockwise position.)
- Push the select button.

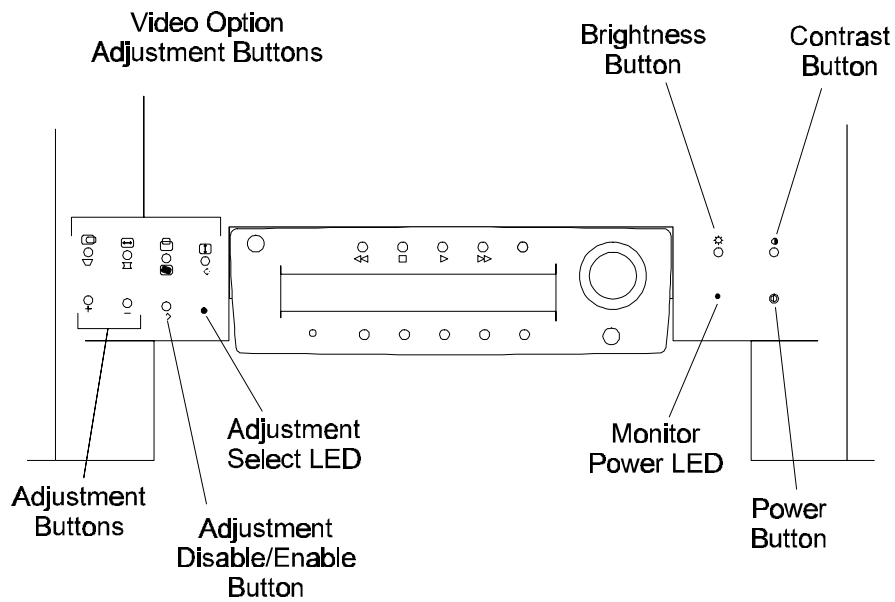


Figure 2-3 Monitor Button Locations

Table 2-5 Monitor Button Functions and Operations

Function	Operation
Video option adjustment buttons	N/A
Adjustment buttons	N/A
Adjustment disable/enable button	N/A
Adjustment select LED	Green: enable monitor adjustment Not illuminated: disable monitor adjustment
Brightness button	In (recessed) position: no adjustment Out (raised) position: clockwise to increase brightness. Counter-clockwise to decrease brightness.
Contrast button	In (recessed) position: no adjustment Out (raised) position: clockwise to increase contrast. Counter-clockwise to decrease contrast.
Monitor power LED	Green: On Amber: Sleep Not illuminated: Off
Power button	In (recessed) position: monitor power on Out (raised) position: monitor power off

Check 1 Determine if the monitor's power LED illuminates (turns green) for 20 seconds. If the LED illuminates, perform Check 2. If the LED does not illuminate, perform Procedure 6.

Check 2 Determine if the monitor's "adjust select" LED illuminates (turns green) for 20 seconds.

If the adjust select LED illuminates, perform Procedure 5. If this LED does not illuminate, perform Procedure 6.

### **Procedure 5 Substitute Monitor Check**

The purpose of this procedure is to determine if the original monitor is defective. To perform this procedure, perform the following Check.

Check (A) Replace the original monitor with another VGA monitor (refer to section 4.15.). (B) Test to determine if the data displays.

If data displays on the substitute screen, perform Procedure 6. If data does not display on the substitute screen, perform Procedure 7.

### **Procedure 6 Monitor Replacement Check**

The purpose of this check is to determine if the new monitor functions properly. To perform this procedure, perform the following Check.

Check (A) Replace the monitor (refer to section 4.15.). (B) Perform Procedure 1.

### **Procedure 7 System Board Replacement Check**

The purpose of this check is to determine if the system board is defective, causing the display problem. To perform this procedure, perform the following Check.

Check (A) Replace the system board (refer to section 4.9.). (B) Perform Procedure 1.

## **Monitor (No Display) Troubleshooting Process**

This section describes how to determine if the Infinia™ 15" or 17" monitor is operating properly in regard to displaying data. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

- |             |  |
|-------------|--|
| Procedure 1 | Initial Display Check                          |
| Procedure 2 | Monitor Switch (Button) Check                  |
| Procedure 3 | Expansion Card and Device Reinstallation Check |
| Procedure 4 | Expansion Card and Device Replacement Check    |
| Procedure 5 | Voltage Check                                  |

### **Procedure 1 Initial Display Check**

The purpose of this procedure is to determine if the monitor, when turned on, displays data. Before performing this procedure, complete the following instructions, then perform the Check below.



- Disconnect all expansion cards (modem, TV Tuner) and devices (CD-ROM, HDD, FDD) from the system board.
  - Verify that the P1 connector is connected to the system board.
  - Verify that the video connector is connected to the system board.
  - Refer to Table 2-1 for possible microprocessor or memory-related problems.
- Check (A) Turn the computer and monitor on. (B) Determine if anything displays on the screen.

If something displays on the screen, perform Procedure 3. If nothing displays on the screen, perform Procedure 2.

## **Procedure 2      Monitor Switch (Button) Check**

The purpose of this check is to determine if the monitor's switches are operating properly. To perform this procedure, perform the following Check.

- Check (A) Verify that the computer's Power button is working properly (refer to the Switch Troubleshooting Process). (B) Verify that the monitor's Contrast and Brightness buttons are properly adjusted. (C) Verify that the Power button is engaged (pushed in). (D) Determine if anything displays on the screen.

If something displays on the screen, perform Procedure 3. If nothing displays on the screen, perform Procedure 5.

### **Procedure 3      Expansion Card and Device Reinstallation Check**

The purpose of this procedure is to determine if an expansion card or device is defective. If expansion cards or devices are defective, they can prevent the system from booting or displaying data. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    Reinstall cards and devices (refer to Chapter 4) one at a time and test after each installation.

If something displays on the screen, perform Check 2. If nothing displays on the screen, perform Procedure 4.

Check 2    (A) Reinstall all cards and devices (refer to Chapter 4). (B) Perform Check 2 of Procedure 2 in the Monitor Troubleshooting Process.

### **Procedure 4      Expansion Card and Device Replacement Check**

The purpose of this procedure is to determine if an expansion card or device is defective. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    (A) Replace the expansion card or device suspected of causing the display problem (refer to Chapter 4). (B) Test to determine if anything displays on the screen.

If something displays on the screen, perform Check 2. If nothing displays on the screen, contact Toshiba technical support.

Check 2    (A) Reinstall all expansion cards and devices (refer to Chapter 4). (B) Test to determine if anything displays on the screen.

If something displays on the screen, perform Check 2 of Procedure 2 in the Monitor Troubleshooting Process. If nothing displays, contact Toshiba technical support.

### **Procedure 5      Voltage Check**

The purpose of this procedure is to determine if the power supply unit is supplying the appropriate voltages. To perform this procedure, perform the following Check.

Check    Measure to determine if the correct voltages are present at the P1 connector on the system board at J6M1 (refer to Appendix I for power supply voltages).

If the correct voltages are present at this connector, perform Procedure 5 in the Monitor Troubleshooting Process. If the voltages are not correct, perform the Power Supply Troubleshooting Process.

## **InTouch™ Module Troubleshooting Process**

This section describes how to determine if the InTouch™ Module (both the LED and LCD versions) operates properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1      InTouch™ Module Operation Check

Procedure 2      LCD/LED Check

Procedure 3	Remote Control Button Operation Check
Procedure 4	Sleep Button Operation Check
Procedure 5	CD-ROM Player Button Operation Check
Procedure 6	Telephone/Answering Machine Button Operation Check
Procedure 7	TV/Radio Button Operation Check
Procedure 8	Remote Control Replacement Check
Procedure 9	InTouch™ Module Replacement Check

### **Procedure 1      InTouch™ Module Operation Check**

The purpose of this procedure is to determine if the InTouch™ Module is damaged or defective. To perform this procedure, complete the following instructions, then begin with Check 1 and continue as directed.

- Verify that the InTouch™ Module drivers are properly configured.
- Verify that InTouch™ Module applications have been activated.
- Verify that the InTouch™ Module cable is properly connected to the USB port in the rear of the computer.

Check 1    Test the InTouch™ Module for proper operation.

If the InTouch™ Module operates properly, perform Check 2. If the Module does not operate properly, perform Procedure 2.

Check 2    Test the InTouch™ Module Remote Control for proper operation.

If the Remote Control operates properly, perform Check 3. If the Remote Control does not operate properly, perform Procedure 3.

Check 3    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 2 LCD/LED Check**

The purpose of this procedure is to determine if the InTouch™ Module's LCD or LED display functions properly. To perform this procedure, perform the following Check.

**Check** Determine if anything displays on the InTouch™ LCD Module or if the buttons on the InTouch™ LED Module flash green when Windows '95 is started.

If something displays on the LCD display, or if the buttons flash green on the LED version when Windows '95 is started, perform Procedure 4. If nothing displays on the LCD or if the buttons do not flash green, perform Procedure 1 in the InTouch™ Module No Display Troubleshooting Process.

## **Procedure 3 Remote Control Button Operation Check**

The purpose of this procedure is to determine if the buttons on the InTouch™ Module Remote Control operate properly. To perform this procedure, begin with Check 1 and continue as instructed.

**Check 1** Determine if the problem exists with all the buttons on the Remote Control or select buttons only.

If the problem exists with all of the buttons, perform Check 2. If the problem exists with select buttons only, perform Procedure 8.

**Check 2** (A) Test the Remote Control's batteries and replace them if necessary. (B) Test to determine if the Remote Control operates properly.

If the Remote Control operates properly, perform Check 3. If the Remote Control does not operate properly, perform Procedure 8.

**Check 3** Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 4 Sleep Button Operation Check**

The purpose of this procedure is to determine if the Sleep button on the InTouch™ Module operates properly. To perform this procedure, begin with Check 1 and continue as instructed.

**Check 1** Determine if the Sleep button on the InTouch™ Module operates properly.

If the Sleep button on the Module operates properly, perform Procedure 5. If the Sleep button on the Module does not operate properly, perform Check 2

**Check 2** Determine if the Sleep button on the computer operates properly.

If the Sleep button on the computer operates properly, perform Procedure 9. If the Sleep button on the computer does not operate properly, perform Check 3.

**Check 3** (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the problem still exists.

If the problem still exists, contact Toshiba technical support. If the problem no longer exists, perform the Repair Completion Process.

### **Procedure 5 CD-ROM Player Button Operation Check**

The purpose of this procedure is to determine if the CD-ROM button on the InTouch™ Module operates properly. To perform this procedure, perform the following Check.

**Check** Determine if the CD-ROM player operates properly when the CD button on the InTouch™ Module is engaged (recessed).

If the CD-ROM player operates properly when the CD-ROM button on the Module is engaged, perform Procedure 6. If the CD-ROM player does not operate properly when this button is engaged, perform Procedure 5 in the InTouch™ Module No LCD Display Troubleshooting Process.

### **Procedure 6 Telephone/Answering Machine Button Operation Check**

The purpose of this procedure is to determine if the modem button on the InTouch™ Module operates properly. To perform this procedure, perform the following Check.

**Check** Determine if the telephone and answering machine operate properly when the modem button on the InTouch™ Module is engaged.

If the telephone and answering machine operate properly when the modem button on the Module is engaged, perform Procedure 7. If the telephone and answering machine do not operate properly when the modem button on the Module is engaged, perform Procedure 6 in the InTouch™ Module No LCD Display Troubleshooting Process.

### **Procedure 7 TV/Radio Button Operation Check**

The purpose of this procedure is to determine if the TV/Radio button on the InTouch™ Module operates properly. To perform this procedure, begin with Check 1 and continue as instructed.

**Check 1** Determine if the television or the radio operates properly when the TV/Radio button on the InTouch™ Module is engaged.

If the television or the radio operates properly when the TV/Radio button on the Module is engaged, perform Check 2. If the television or the radio does not operate properly when the TV/Radio button on the Module is engaged, perform Procedure 7 in the InTouch™ Module No LCD Display Troubleshooting Process.

**Check 2** Determine if the original problem still exists.

If the original problem still exists, contact Toshiba technical support. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 8 Remote Control Replacement Check**

The purpose of this procedure is to determine if the InTouch™ Module Remote Control operates properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Replace the Remote Control. (B) Test the new Remote Control to determine if the problem still exists.

If the problem still exists, perform Procedure 9. If the problem no longer exists, perform Check 2

Check 2 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

## **Procedure 9 InTouch™ Module Replacement Check**

The purpose of this test is to determine if the original InTouch™ Module is defective.

Check 1 (A) Replace the InTouch™ Module (refer to section 4.16.). (B) Test the Module to determine if the problem still exists.

If the problem still exists, contact Toshiba technical support. If the problem no longer exists, perform Check 2.

Check 2 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **InTouch™ Module No Display Troubleshooting Process**

This section describes how to determine if the InTouch™ Module LCD display and LED buttons operate properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

- |             |   |
|-------------|---|
| Procedure 1 | InTouch™ Module Cable/Connector Check       |
| Procedure 2 | Expansion Card Removal Check                |
| Procedure 3 | Expansion Card Reinstallation Check         |
| Procedure 4 | Expansion Card Replacement Check            |
| Procedure 5 | CD-ROM Player Operation Check               |
| Procedure 6 | Telephone/Answering Machine Operation Check |
| Procedure 7 | TV/Radio Operation Check                    |
| Procedure 8 | InTouch™ Module Replacement Check           |
| Procedure 9 | System Board Replacement Check              |

## **Procedure 1      InTouch™ Module Cable/Connector Check**

The purpose of this procedure is to determine if the InTouch™ Module cable and connector are damaged or improperly connected to the USB port. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    (A) Inspect the InTouch™ Module's cable and connector for damage. (B) Verify that the module's cable is properly connected to the USB port. (C) Replace parts as necessary or properly connect the module connector to the USB port (refer to section 4.16.). (D) Test the module to determine if the problem still exists.

If the problem still exists, perform Procedure 2. If the problem no longer exists, perform Check 2.

Check 2    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 2      Expansion Card Removal Check**

The purpose of this procedure is to determine if expansion cards are causing the problem with the InTouch™ Module. To perform this procedure, perform the following Check.

Check    (A) Remove all expansion cards installed in the computer (refer to section 4.4. and 4.5. as necessary). (B) Test the InTouch™ Module to determine if the problem still exists.

If the problem still exists, perform Procedure 8. If the problem no longer exists, perform Procedure 3.

### **Procedure 3      Expansion Card Reinstallation Check**

The purpose of this procedure is to determine if a specific expansion card is causing the problem with the InTouch™ Module. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    Reinstall the expansion cards one at a time and test after each card is installed (refer to sections 4.4. and 4.5. as necessary).

If the problem still exists, perform Procedure 4. If the problem no longer exists, perform Check 2.

Check 2    (A) Reinstall all the expansion cards (refer to sections 4.4. and 4.5. as necessary).  
(B) Test the InTouch™ Module to determine if the problem still exists.

If the problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform Check 3.

Check 3    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 4      Expansion Card Replacement Check**

The purpose of this procedure is to determine if replacing the defective expansion card solves the original problem. To perform this procedure, perform the following Check.

Check    (A) Replace the expansion card suspected of causing the problem (refer to sections 4.4. and 4.5. as necessary). (B) Test the InTouch™ Module to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 5      CD-ROM Player Operation Check**

The purpose of this check is to determine if the CD-ROM player operational software operates properly. Properly operating CD-ROM player software could indicate a defective InTouch™ Module. To perform this procedure, perform the following Check.

Check    Test the CD-ROM player operational software to determine if the CD-ROM drive is operating properly.

If the CD-ROM player software operates properly, perform Procedure 8. If this software does not operate properly, perform the CD-ROM Troubleshooting Process.



## **Procedure 6 Telephone/Answering Machine Operation Check**

The purpose of this procedure is to determine if the telephone and the answering machine operational software operates properly. Properly operating telephone or answering machine software could indicate a defective InTouch™ Module. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Inspect the modem card and the ISA slot (in which the card is installed) for damage. (B) Verify that the modem card is properly inserted in the appropriate ISA slot. (C) Replace the modem card if it is damaged or properly install the card in the ISA slot (refer to section 4.4.). (D) Test the telephone or answering machine software to determine if the problem still exists.

If the problem still exists, perform Check 2. If the problem no longer exists, perform Procedure 8.

- Check 2 (A) Replace the modem card (refer to section 4.4.). (B) Test to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original no longer exists, perform the Repair Completion Process.

## **Procedure 7 TV/Radio Operation Check**

The purpose of this procedure is to determine if TV and radio operational software operates properly. Properly operating TV or radio could indicate a defective InTouch™ Module. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1 (A) Inspect the TV Tuner Card and the PCI slot (in which the card is installed) for damage. (B) Verify that the TV Tuner Card is properly inserted in the appropriate PCI slot. (C) Replace the TV Tuner Card if it is damaged, or properly install the card into the appropriate PCI slot (refer to section 4.5.). (D) Test the TV or radio software to determine if the problem still exists.

If the problem still exists, perform Check 2. If the problem no longer exists, perform Procedure 8.

- Check 2 (A) Replace the TV Tuner Card (refer to Section 4.5.). (B) Test to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Procedure 8 InTouch™ Module Replacement Check**

The purpose of this test is to determine if the original InTouch™ Module is defective. To perform this procedure begin with Check 1 and continue as instructed.

- Check 1 (A) Replace the InTouch™ Module (refer to section 4.16.). (B) Test the module to determine if the problem still exists.

If the problem still exists, perform Procedure 9. If the problem no longer exists, perform Check 2.

Check 2 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

### **Procedure 9 System Board Replacement Check**

The purpose of this check is to determine if the system board is defective. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1 (A) Replace the system board (refer to section 4.9.). (B) Test the InTouch™ Module to determine if the original problem still exists.

If the problem still exists, contact Toshiba technical support. If the problem no longer exists, perform Check 2.

Check 2 Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the problem no longer exists, perform the Repair Completion Process.

## **Keyboard Troubleshooting Process**

This section describes how to determine if the Infinia™ keyboard operates properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

Procedure 1	Keyboard Cable/Connector Check
Procedure 2	Keyboard Substitution Check
Procedure 3	Keyboard Operation Check
Procedure 4	Keyboard Replacement Check
Procedure 5	System Board Replacement Check

### **Procedure 1 Keyboard Cable/Connector Check**

The purpose of this procedure is to determine if a damaged keyboard cable or an improper connection is causing the keyboard to malfunction. To perform this procedure, perform the following Check.

Check (A) Inspect the keyboard cable and connector for damage. (B) Replace the keyboard if it is damaged (refer to section 4.13.). (C) Verify that the keyboard is correctly connected to the appropriate port in the rear of the computer. (D) Reboot the system.

If the message, Keyboard Detected displays on the screen during bootup, perform Procedure 3. If this message does not display on the screen during bootup, perform Procedure 2.

## **Procedure 2      Keyboard Substitution Check**

The purpose of this procedure is to determine if the keyboard is defective. To perform this procedure, perform the following Check.

- Check    (A) Replace the keyboard with a substitute keyboard (refer to section 4.13.).  
          (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 5. If the problem no longer exists, perform Procedure 4.

## **Procedure 3      Keyboard Operation Check**

The purpose of this procedure is to determine if the keyboard operates properly. To perform this procedure, begin with Check 1 and continue as instructed.

- Check 1    Test the keyboard's operation by pressing (typing) each character key on the keyboard.

If the characters display on the screen as typed, perform Check 2. If the characters do not display on the screen as typed, perform Procedure 4.

- Check 2    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the No Trouble Found Process.

## **Procedure 4      Keyboard Replacement Check**

The purpose of this procedure is to determine if the new Infinia™ keyboard operates properly. To perform this procedure, perform the following Check.

- Check    (A) Replace the defective keyboard with a new Infinia™ keyboard (refer to section 4.13.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 5. If the problem no longer exists, perform the Repair Completion Process.

## **Procedure 5      System Board Replacement Check**

The purpose of this procedure is to determine if a defective system board is causing the problem. To perform this procedure, perform the following Check.

- Check    (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

## **Mouse Troubleshooting Process**

This section describes how to determine if the Infinia™ mouse operates properly. To perform this process, begin with Procedure 1 and perform the remaining procedures as instructed. The procedures described in this section include:

- Procedure 1      Mouse Cable/Connector Check

Procedure 2	Mouse Substitution Check
Procedure 3	Mouse Operation Check
Procedure 4	Mouse Replacement Check
Procedure 5	System Board Replacement Check

### **Procedure 1      Mouse Cable/Connector Check**

The purpose of this procedure is to determine if a damaged mouse cable or an improper connection is causing the mouse to malfunction. To perform this procedure, perform the following Check.

Check    (A) Inspect the mouse cable and connector for damage. (B) Replace the mouse if it is damaged (refer to section 4.14.). (C) Verify that the mouse is correctly connected to the appropriate port in the rear of the computer. (D) Reboot the system.

If the message, *Mouse Detected* displays on the screen during bootup, perform Procedure 3. If this message does not display on the screen during bootup, perform Procedure 2.

### **Procedure 2      Mouse Substitution Check**

The purpose of this procedure is to determine if the mouse is defective. To perform this procedure, perform the following Check.

Check    (A) Replace the mouse with a substitute mouse (refer to section 4.14.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 5. If the problem no longer exists, perform Procedure 4.

### **Procedure 3      Mouse Operation Check**

The purpose of this procedure is to determine if the mouse operates properly. To perform this procedure, begin with Check 1 and continue as instructed.

Check 1    Test the mouse's operation.

If the mouse operates properly, perform Check 2. If the mouse does not operate properly, perform Procedure 4.

Check 2    Determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the No Trouble Found Process.

#### **Procedure 4      Mouse Replacement Check**

The purpose of this procedure is to determine if the new Infinia™ mouse operates properly. To perform this procedure, perform the following Check.

Check    (A) Replace the defective mouse with a new Infinia™ mouse (refer to section 4.14.). (B) Test to determine if the problem still exists.

If the problem still exists, perform Procedure 5. If the problem no longer exists, perform the Repair Completion Process.

#### **Procedure 5      System Board Replacement Check**

The purpose of this procedure is to determine if the system board is defective. To perform this procedure, perform the following Check.

Check    (A) Replace the system board (refer to section 4.9.). (B) Test to determine if the original problem still exists.

If the original problem still exists, perform the Problem Definition Process. If the original problem no longer exists, perform the Repair Completion Process.

#### **No Trouble Found Process**

The purpose of this process is to perform specific tests and diagnostics to ensure that no problems exist with the system. To perform this process, begin with Step 1 and perform the remaining steps as instructed.

Step 1    (A) Run a diagnostics program and test the system (refer to Chapter 3).

If the diagnostic tests report problems, perform the Problem Definition Process. If no problems are reported, perform Step 2.

Step 2    (A) Inform the customer that the problem could not be duplicated. (B) Attempt to obtain further details about the problem. (C) Perform Step 3.

Step 3    Determine if the system fails intermittently or under certain ambient conditions.

If the system fails under these conditions, perform Step 4. If the system does not fail under these conditions, perform Step 5.

Step 4    Simulate the conditions related to the reported problem and attempt to duplicate the failure.

If the problem can be duplicated, perform the Problem Definition Process. If the problem cannot be duplicated, perform Step 5.

Step 5    Disassemble and inspect the system (refer to Chapter 4).

If there is any obvious damage, perform Step 6. If there is no obvious damage, perform Step 7.

Step 6    (A) Repair or replace the damaged FRU(s) (refer to Chapter 4). (B) Perform Step 7.

Step 7    Determine if there are any missing or damaged stand-off or incorrectly-sized screws.

- Step 8 If there are damaged or missing screws, perform Step 9. If there are no damaged or missing screws, perform Step 10.
- Step 9 Locate screws and system board stand-off and inspect for damage that may have been caused by these items.  
If damage is found in relation to these items, perform Step 10. If no damage is found, perform Step 11.
- Step 10 (A) Replace the screws and/or repair or replace the damaged FRU (refer to Chapter 4). (B) Perform Step 11.
- Step 11 Measure to determine if FRU voltages are within specification.  
If FRU voltages are within specification, perform Step 12. If these voltages are not within specification, perform the Power Supply Troubleshooting Process.
- Step 12 (A) Inspect all cables, connectors, and jumpers for damage and loose connections. (B) Securely reconnect all loose connections. (C) Replace damaged cables, connectors, and jumpers as necessary (refer to section 4.1.3.). (D) Inspect ICs for bent or broken pins. (E) Replace damaged ICs as necessary. (F) Perform Step 13.

Step 13 Determine if the system was serviced prior to the problem being reported.

If the system was serviced prior to the problem being reported, contact Toshiba technical support. If the system was not serviced, perform the Repair Completion Process.

## Repair Completion Process

The purpose of this process is to ensure that the system is operating properly after an FRU has been replaced or a repair has been performed. To perform this process, begin with Step 1 and perform the remaining steps as instructed.

- Step 1 (A) Verify that all expansion cards and devices that were removed from the system are properly reinstalled (refer to Chapter 4). (B) Perform Step 2.
- Step 2 (A) Verify that the CMOS setup is properly configured. (B) Perform Step 3.
- Step 3 (A) Verify that the system configuration and device drivers are properly configured. (B) Perform Step 4.
- Step 4 Perform QA Plus Diagnostics testing on the system and on expansion cards and devices.
- If the test routine reports an error, perform Step 5. If no errors are reported, perform Step 6.
- Step 5 Determine if the reported error indicates the original problem.
- If the reported error indicates the original problem, contact Toshiba technical support. If the reported error indicates a new problem, perform the Problem Definition Process.
- Step 6 (A) Verify that the system configuration is consistent with the original configuration. (B) Advise the customer of any changes to the system configuration.

**NOTE:** *If you need assistance concerning system configuration issues, contact Toshiba technical support.*

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# **Chapter 3**

## **Tests and Diagnostics**

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## **Diagnostics Programs**

Toshiba does not provide proprietary diagnostics for the desktop line of products at this time. We do, however, recommend that you obtain a copy of DiagSoft's QAPI<sup>®</sup>FE to run diagnostic programs on the system to assist you in troubleshooting hardware problems.

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# **Chapter 4**

# **Replacement Procedures**

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## General

This chapter explains how to disassemble the Infinia™ 7130, 7160, 7161, 7200, 7201, and 7220 desktop computers and replace Field Replaceable Units (FRUs). The Infinia™ is designed for optimum serviceability, providing easy to remove and replace FRUs and components. See Figure 4-1 to view the locations of internal component for the Infinia™.

When performing the procedures in this chapter, be aware of the following points:

- ❑ The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.
- ❑ All replacement procedures are a continuation of removal procedures. Replacement procedures should not be performed without first performing the relevant removal procedures.

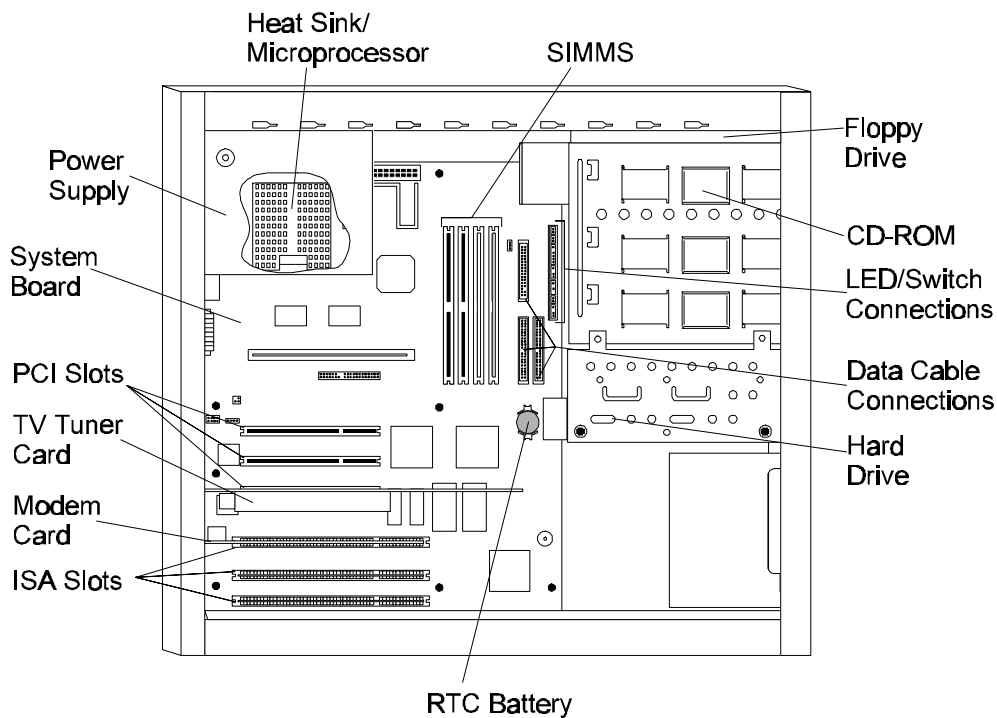


Figure 4-1 Internal Component Location Diagram

## Safety Precautions

Before you begin disassembly procedures, read the following safety precautions and observe them *carefully* as you work.

- DANGER:**
1. Always use the Real-Time Clock (RTC) battery that is authorized by Toshiba or compatible with the computer. Since other batteries have different specifications, they may be incompatible with the Infinia™, and they may burst or explode. Heating the battery could cause leakage of alkaline solution. Throwing the battery into a fire could cause the battery to explode. Batteries can retain electrical charge, so there is danger of electrical shock even when the computer is disconnected from the AC power source.
  2. The power supply and other components carry high voltages. To avoid the risk of electric shock (when you turn on the power of a partially assembled computer to check operation), be very careful not to touch connectors or components. Also, do not disassemble individual components during first-level maintenance.

- WARNING:** To avoid the risk of electrical shock or other injury:
1. Always turn the computer's power off and disconnect the AC power cord from the power source before disassembly.
  2. Remove metal jewelry or accessories such as necklaces, bracelets, or rings.
  3. Never work with wet or damp hands.
  4. Make sure that all replacement components meet the specifications for the computer, and that all cables and connectors are securely fastened.
  5. The Infinia™ has many sharp edges and corners; be careful not to injure yourself.

**CAUTION:** *To avoid damage to the computer:*

1. *When you change a component, make sure the replacement component meets the required specifications. Never use non-standard parts.*
2. *Metal objects such as screws or paper clips that fall into the computer can cause short circuits, fires, or other internal damage.*
3. *When assembling the computer, make sure to use the correct screws to secure FRUs and other Infinia™ parts in place. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, or fire.*
4. *Before removing components, make sure all cables to the component have been disconnected.*
5. *Be sure to use the AC power cable that came with the computer or one recommended by Toshiba.*

## **Before You Begin**

In addition to the safety precautions listed in section 4.1.1, review and become familiar with the following points, which will also help you avoid personal injury and damage to the computer.

- Only disassemble the computer if it is not operating correctly.
- Use only the correct and approved tools.
- Make sure the working environment (whether you are using or storing the computer) is free of the following elements:
  - Contaminates
  - Static electricity
  - Extreme heat, cold, or humidity
- Make sure the FRU you are replacing is causing the faulty operation by performing the appropriate diagnostic tests described in Chapter 3 of this manual.
- Do not perform any operations that are not necessary and use only the described procedures for disassembling and replacing FRUs.
- Do not remove cables by pulling on the cables. Instead, remove cables by pulling the connector out of the socket.

- ❑ After removing components from the computer, store them in a safe place away from the computer, so they will not be damaged and will not interfere with your work.

- ❑ After removing screws, make sure to store them in a safe place and to identify them with the corresponding parts.
- ❑ After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

## Cables and Connectors

The Infinia™ uses various types of cables and connectors for internal operation. Infinia™ cables and connectors include:

- ❑ Power cables
- ❑ Data cables
- ❑ Audio cables
- ❑ Switch and LED cables
- ❑ Normal pin and latch connectors

## Connecting and Disconnecting Power Cables

Power cables are groups of cables that connect the power supply to various components and to the system board. These cables use normal pin connectors (except for the power cable to the system board, which uses a latch connector) that are keyed, meaning that they can only be connected to a socket one way. See Figure 4-2.

**CAUTION:** When disconnecting and connecting the P1 power cable, be careful not to touch the system board's regulator, which may be hot if the computer has been running.

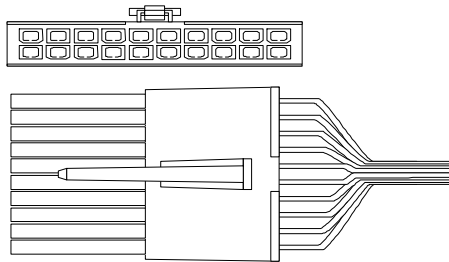


Figure 4-2 Power Cable and Connector

## Connecting and Disconnecting Data Cables

Data cables are ribbon cables that connect to various components, cards, and boards in the computer. When connecting data cables to devices, make sure the red stripe on the cable is the side of the cable closest to the power connector (be aware that some of these connectors are keyed while others are not).

Each end of a data cable is labeled, identifying the proper connection. For instance, the data cable that connects the system board to the CD-ROM drive will be labeled **CPU** near the connector that must be attached to the system board and **CD-ROM** near the connector that must be attached to the CD-ROM drive. See Figure 4-3.

**CAUTION:** When disconnecting and connecting data cables, be careful not to touch the system board's video chip, which may be hot if the computer has been running.

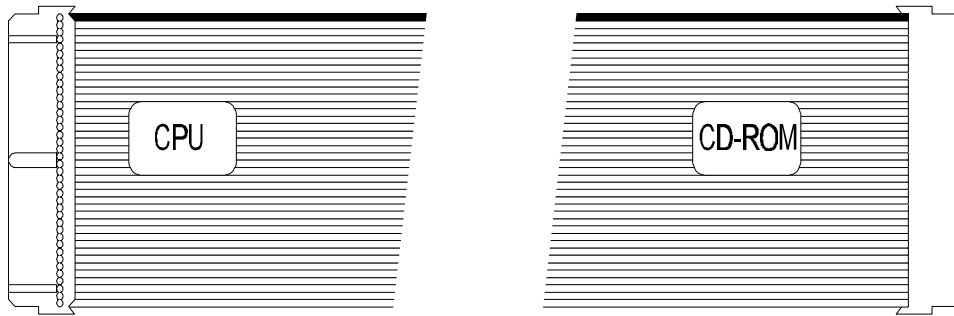


Figure 4-3 Data Cable

## Connecting and Disconnecting Audio Cables

Audio cables are thin cables that connect the CD-ROM drive to the TV Tuner Card and the system board, and the modem card to the system board. These connectors are keyed, meaning that they can only be connected to a socket one way. See Figure 4-4.

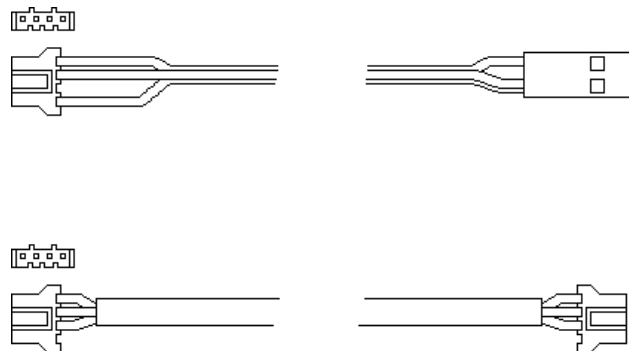


Figure 4-4 Audio Cables

## Connecting and Disconnecting LED and Switch Cables

Switch and LED cables are stranded cables (two) that are attached to the computer and connect to the system. These cables use normal pin connectors (not keyed) that are labeled with the name of the switch or LED that the cable connects to. For instance, the connector on the cable coming from the reset switch is labeled **Reset SW** while the connector on the cable coming from the hard drive is labeled **H.D.D. LED**. See Figure 4-5.

**NOTE:** The Power LED connector attaches to the pins labeled SLEEP LED on the system board.

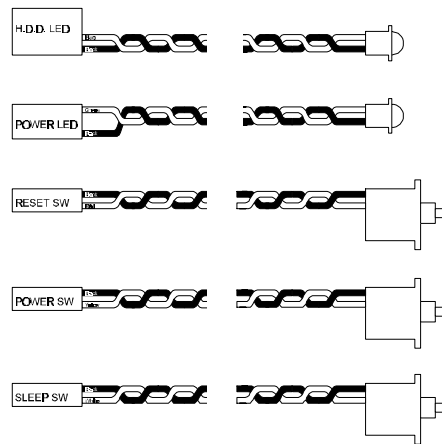


Figure 4-5 Switch and LED Cables

Switch and LED cables connect to sockets on the system board. These sockets are labeled with the name of the switch or LED that the corresponding cable connects to. For instance, the socket intended for the **Reset SW** cable is labeled **Reset**.

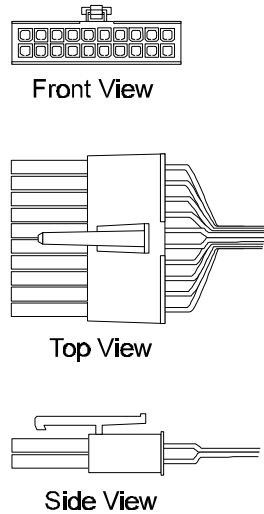
## Connecting and Disconnecting Cable Connectors

The Infinia™ uses two types of cable connectors: normal pin connectors and latch connectors. To connect and disconnect these connectors, perform the following general instructions and refer to Figure 4-6.

- ❑ Disconnect normal pin connectors by grasping the connector and carefully pulling the connector from its socket.
- ❑ Connect normal pin connectors by aligning the holes on the cable's connector with the pins on the corresponding socket, then pushing the connector into the socket.
- ❑ Disconnect latch connectors by pressing the latch on the connector and carefully pulling the connector from its socket.
- ❑ Connect latch connectors by aligning the holes on the cable's connector with the pins on the corresponding socket, then pushing the connector into the socket until the latch catches.
- ❑ Gently pull on cable connectors to make sure they are secure.



## LATCH CONNECTORS



## NORMAL PIN CONNECTORS

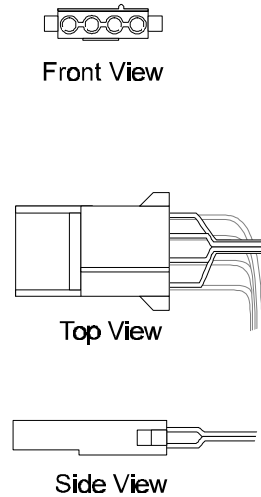


Figure 4-6 Normal Pin and Latch Connectors

### Replacing Expansion Cards

Depending on the model, the Infinia™ is shipped with both a modem card and a TV Tuner Card (7200, 7201, or 7220) or just a modem card (7130, 7160, and 7161). As of shipping, the modem card is inserted in the middle ISA slot and the TV Tuner Card is inserted in the middle PCI slot. When replacing the modem card and the TV Tuner Card, be sure to install these cards in the same slot you removed them from; failure to do so could cause software configuration problems.

### Changing Jumper Settings

The system board has configuration jumpers that allow you to change the system configuration. A jumper is a small plastic-encased conductor that slips over jumper pins. To change a jumper setting, use a pair of needle-nosed pliers to remove the jumper from its current location and slide it onto the new pins to obtain the desired settings. See Figure 4-7.

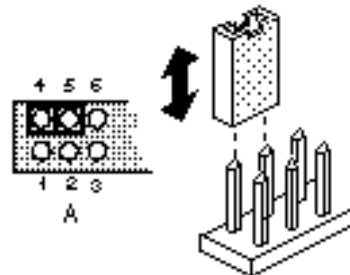


Figure 4-7 Changing Jumper Settings

### Assembly Reminders

While assembling the computer, remember the following general points:

- ❑ Make a note, while disassembling the computer, of the locations and connections of the various components, cards, and cables. This will make assembly easier.
- ❑ Take your time, making sure to follow the instructions closely. Many problems can occur from hurried assembly.
- ❑ Make sure all cables and connectors are securely fastened.
- ❑ Make sure cable connectors are properly attached to sockets. Attaching a connector backwards could cause improper card or component operation.
- ❑ Before securing an FRU or other components, make sure cables will not be pinched by screws or the FRU.
- ❑ When replacing side panels, make sure cables are tucked inside the computer's chassis to avoid damaging the cables.
- ❑ Make sure all latches are securely closed.
- ❑ When assembling the computer, make sure to use the correct screws to secure the various components, and make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, and fire.
- ❑ Make sure the correct screws are used to secure all FRUs and other computer parts. Using the incorrect screws could damage the threads or the head of the screws, resulting in improper seating of the screw. Refer to Table 4-1 for a listing of screw sizes and quantities for each FRU and computer part.

*Table 4-1 FRU Screw Sizes and Quantity*

<b>FRU/Computer Part</b>	<b>Screw Size</b>	<b>Number of Screws</b>	<b>Torque</b>
Floppy Disk Drive	M3x4 Hex Head	4	5 in/lbs +/- .5 in/lbs
CD-ROM Drive	M3x4 Hex Head	4	5 in/lbs +/- .5 in/lbs
System Board	M3x6 Hex Head	8	6 in/lbs +/- .5 in/lbs
System Board Mounting Plate	6/32x1/4	2	6 in/lbs +/- .5 in/lbs
Slot Cover	6/32x1/4	1 (2 on 7200, 7201, and 7220)	6 in/lbs +/- .5 in/lbs
Hard Disk Drive	6/32x1/4	4	6 in/lbs +/- .5 in/lbs
Power Supply	6/32x1/4	4	6 in/lbs +/- .5 in/lbs
Rear Bezel Latch	M3x5 Hex Head	2	NA

## **Protecting the System from Electrostatic Discharge (ESD)**

Electrostatic discharges can cause serious damage to computer components and circuitry. Static electricity can be generated in many, seemingly innocent, ways such as walking across a vinyl floor or rubbing your hand on a carpeted area. With this in mind, it is important to protect the computer from the dangers of static electricity while you perform the removal and replacement procedures in this manual. The following information addresses effective grounding techniques and protecting components and drives from ESD.

### **Protecting Components from ESD**

Perform the following precautions when working with computer components:

- Protect all components by placing them in anti-static packaging.
- Keep components in their protective packaging until you are ready to install them.
- Place components on a grounded, static-free surface.
- Place reusable components in protective packaging before storing them.
- Ensure you are grounded before handling components.
- When handling a card or board, place the anti-static packaging behind the card or board.
- Avoid unnecessary handling and moving of components.
- Touch the metal chassis before touching components. Keep part of your body in contact with the chassis to dissipate the static charge while handling components.
- Do not slide boards over any surface.

### **Protecting Drives from ESD**

Perform the following precautions when working with computer drives:

- Only handle drives if you are properly grounded.
- Store drives in the original shipping packages.
- Keep drives in their protective packaging until you are ready to install them.
- Only set drives on surfaces that have at minimum 1-inch of foam.
- Place a drive's Printed Circuit Board (PCB) assembly side down on foam.

## Grounding Methods to Protect the System from ESD

Perform the following precautions when preparing to work on a computer:

- Use anti-static mats, wrist or heel straps, and other anti-static materials.
- Avoid touching connector pins, leads, and PCB circuitry.
- Turn off power to the computer before removing and inserting connectors or test equipment.
- Use tools and other equipment that are conductive.

## Recommended Tools and Equipment

The following equipment is necessary to disassemble and assemble the computer:

- Toshiba #1/#2 reversible magnetic screwdriver
- Small, flat-bladed screw driver
- Needle-nose pliers
- ESD mats for the working area floor and table
- An ESD wrist strap or heel grounder
- Anti-static carpeting or flooring
- Air ionizers in highly static-sensitive areas
- Protective gloves

## Panels and Bezels

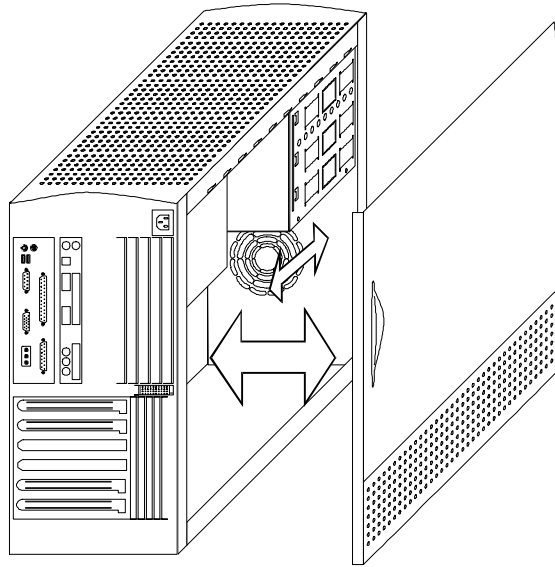
This section covers the removal and replacement of the computer's side panels and front and rear bezels.

**NOTE:** *The following procedures assume that when you remove and replace panels and bezels, you are viewing the computer from the rear.*

### Removing the Right-Side Panel

To remove the computer's right-side panel, perform the following procedure and refer to Figure 4-8.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Slide the release latch on the rear bezel to the left.
3. Slide the panel toward you until it is free of the chassis.
4. Lift the panel away from the chassis.
5. Remove the panel skirt by pulling on the skirt until it is free of the panel.



*Figure 4-8 Removing and Replacing the Right-Side Panel*

## **Replacing the Right-Side Panel**

To replace the computer's right-side panel, perform the following procedure and refer to Figure 4-8.

1. If removed, replace the left-side panel (refer to section 4.2.6.) and the rear bezel (refer to section 4.2.4.).
2. Insert the teeth at the top of the right-side panel into the latches at the top of the right-side chassis.
3. Slide the panel forward.
4. Slide the release latch on the rear bezel to the right.
5. Align the pins on the inside of the skirt with the holes on the panel and press in until the skirt snaps in place.
6. Connect the power cord and all external cables to the computer and turn on the power.

## Removing the Rear Bezel

To remove the computer's rear bezel, perform the following procedure and refer to Figure 4-9.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the right-side panel (refer to section 4.2.1.), as viewed from the rear.

**NOTE:** When performing the next step, notice that the top tab is blocked by the power supply, making it impossible to press in on the tab. After releasing the bottom and middle tabs, the top tab should release when you pull the bezel away from the chassis. If it does not release, press the tab forward until it is free of its latch.

1. Press in on the bottom and middle tabs on the inside right of the rear chassis.
2. Pull the bezel away from the chassis.

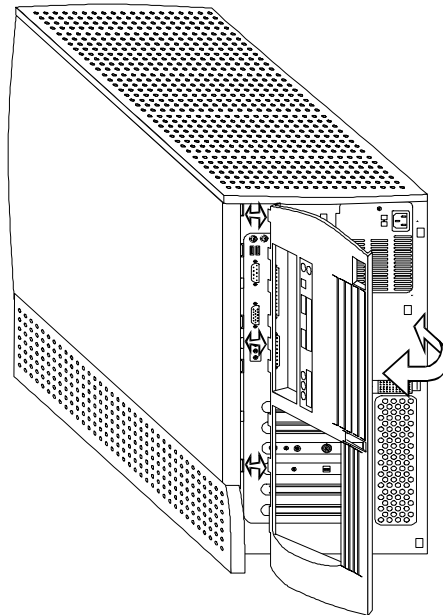


Figure 4-9 Removing and Replacing the Rear Bezel

## **Replacing the Rear Bezel**

To replace the computer's rear bezel, perform the following procedure and refer to Figure 4-9.

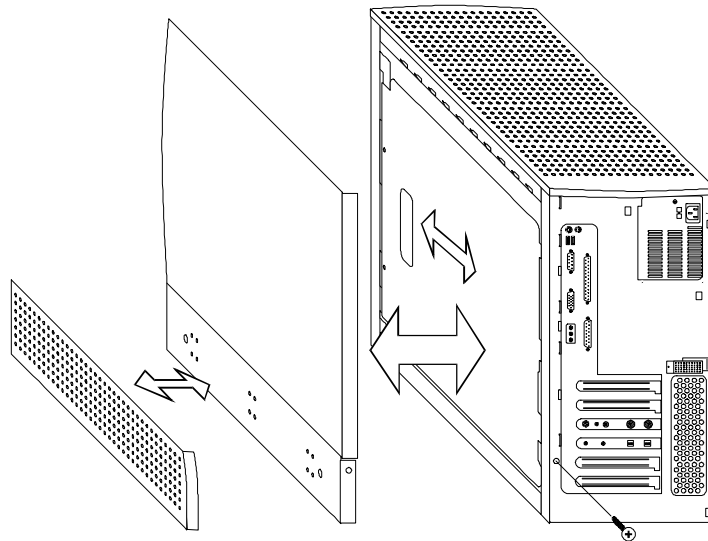
1. If removed, replace the left-side panel (refer to section 4.2.6.).
2. Insert the tabs on the left side of the rear bezel into the latches on the rear edge of the left-side panel.
3. Push the right side of the bezel forward until the bezel snaps in place.
4. Connect the power cord and all external cables to the computer and turn on the power.



## Removing the Left-Side Panel

To remove the computer's left-side panel, perform the following procedure and refer to Figure 4-10.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the right-side panel (refer to section 4.2.1.) and rear bezel (refer to section 4.2.3.), as viewed from the rear.
3. Remove the skirt from the left-side panel by pulling outward on the skirt until it is free of the panel.
4. Remove the screw that secures the panel to the chassis.
5. Slide the panel toward you until it is free of the chassis.
6. Lift the panel away from the chassis.



*Figure 4-10 Removing and Replacing the Left-Side Panel*

## **Replacing the Left-Side Panel**

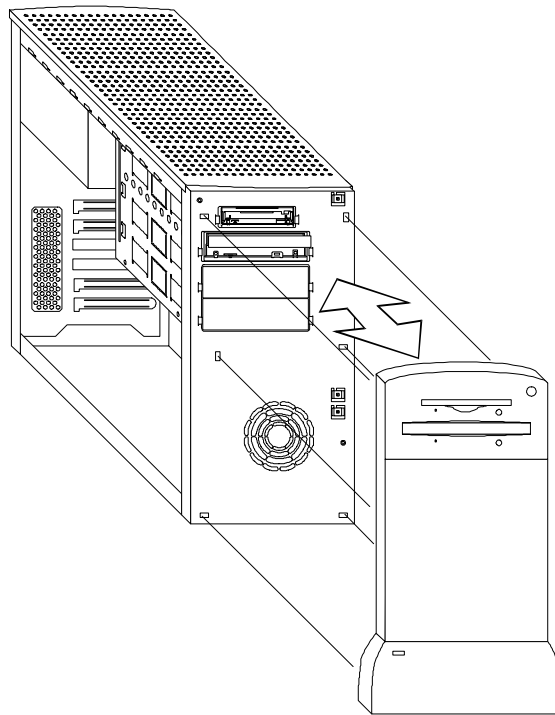
To replace the computer's left-side panel, perform the following procedure and refer to Figure 4-10.

1. Insert the teeth at the top of the left-side panel into the latches at the top of the left-side chassis.
2. Push the panel forward.
3. Secure the panel to the chassis with one screw.
4. Align the pins on the inside of the skirt with the holes on the panel and press in until the skirt snaps in place.
5. Connect the power cord and all external cables to the computer and turn on the power.

## Removing the Front Bezel

To remove the computer's front bezel, perform the following procedure and refer to Figure 4-11.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the right-side panel (refer to section 4.2.1.), rear bezel (refer to section 4.2.3.), and left-side panel (refer to section 4.2.5.), as viewed from the rear.
3. Remove the HDD (refer to section 4.6.1.).
4. On the right-hand side of the front chassis, press down on the bottom tab, press in on the middle tab, and press up on the top tab.
5. On the left-hand side of the front chassis, press down on the bottom and middle tabs.
6. On the left-hand side of the front chassis, carefully use a screw driver or other instrument to press in on the top tab.
7. Pull the bezel away from the chassis.



*Figure 4-11 Removing and Replacing the Front Bezel*

## **Replacing the Front Bezel**

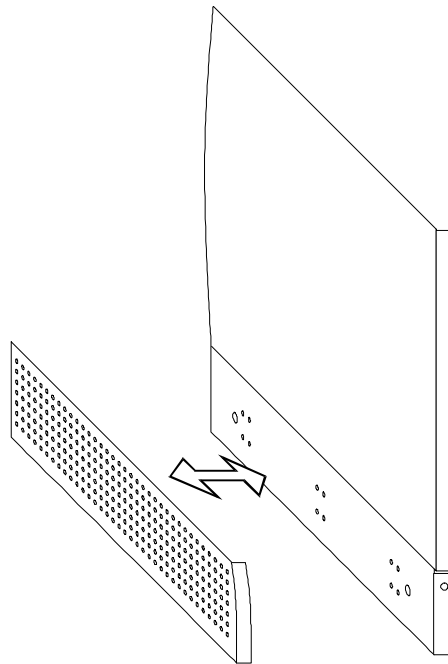
To replace the computer's front bezel, perform the following procedure and refer to Figure 4-11.

1. Align the six tabs on the bezel with the six latches on the front chassis.
2. Push the tabs into the latches until the bezel snaps in place.
3. Connect the power cord and all external cables to the computer and turn on the power.

## Removing the Panel Skirts

To remove the skirt from the left- and right-side panels, perform the following procedure and refer to Figure 4-12.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the skirt from the left-or right-side panel by pulling outward on the skirt until it is free of the panel.



*Figure 4-12 Removing and Replacing the Skirts*

## Replacing the Panel Skirts

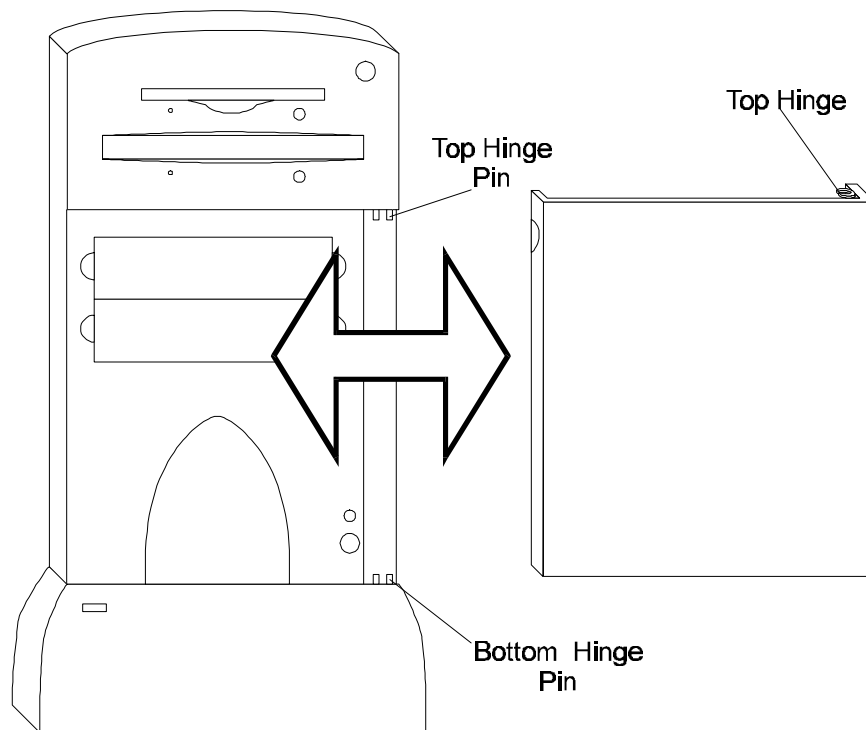
To replace the skirt on the left- and right-side panels, perform the following procedure and refer to Figure 4-12.

1. Align the pins on the inside of the skirt with the holes on the panel and press in until the skirt snaps in place.
2. Connect the power cord and all external cables to the computer and turn on the power.

## Removing the Front Bezel Door

To remove the computer's front bezel door, perform the following procedure and refer to Figure 4-13.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Open the door, using the front bezel's door latch, to an angle of about 30°.
3. Facing the front of the computer, push the left-hand side of the door toward the hinges until the top and bottom hinges separate from their hinge pins.



*Figure 4-13 Removing and Replacing the Front Bezel Door*

## Replacing the Front Bezel Door

To replace the computer's front bezel door, perform the following procedure and refer to Figure 4-13.

1. Align the door's hinges with the hinge pins, located at the right hand-side of the top and bottom of the door's opening.
2. With the door open at approximately 30°, firmly press the hinged side of the door toward the computer until it snaps on to the hinge pins.
3. Close the door, connect the power cord and all external cables to the computer, and turn on the power.

## Power Supply

This section covers the removal and replacement of the computer's power supply.

### Removing the Power Supply

To remove the computer's power supply, perform the following procedure and refer to Figure 4-14.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.) and rear bezel (refer to section 4.2.3.), as viewed from the rear.
3. Lay the computer on its side, open side up.

**NOTE:** The power supply is heavy, weighing nearly three pounds. When performing the next step, hold on to the power supply while you remove the screws, so that the power supply does not fall and damage other components.

1. Remove the four 6/32x1/4 screws that secure the power supply to the chassis.
2. Disconnect the power cables from all components and from the system board.

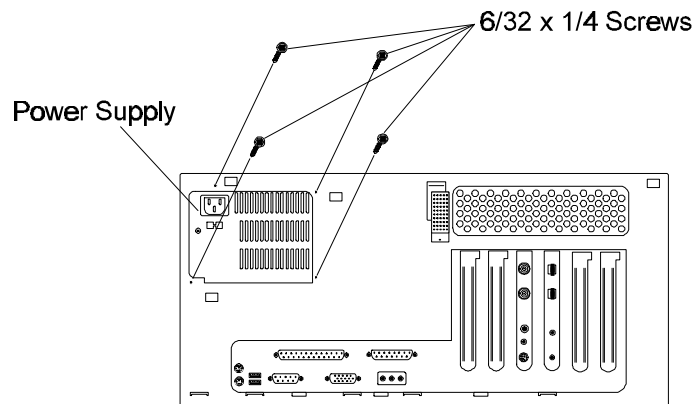


Figure 4-14 Removing and Replacing the Power Supply

## Replacing the Power Supply

To replace the power supply, perform the following procedure and refer to Figure 4-14.

1. Connect power cable P1 (label up) to the connector at J6M1 on the system board.
2. Connect power cable P6 (label down) to the FDD.
3. Set the power supply in place with the fan facing the system board and secure it with four 6/32x1/4 screws.
4. Connect power cable P2 (label up) to the HDD.
5. Connect power cable P5 (label up) to the CD-ROM drive.
6. Replace the computer's right-side panel (refer to section 4.2.2.) and rear bezel (refer to section 4.2.4.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

## Modem Card

This section covers the removal and replacement of the computer's modem card.

### Removing the Modem Card

To remove the computer's modem card, perform the following procedure and refer to Figure 4-15.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), as viewed from the rear.
3. Lay the computer on its side, so that you are looking down into the computer.
4. Disconnect the audio cable from the socket at JP4 on the modem card.
5. Remove the screw that secures the modem card to the chassis.
6. Carefully grasp the modem card, noting the ISA slot it is in, and gently pull until it is free of its slot.



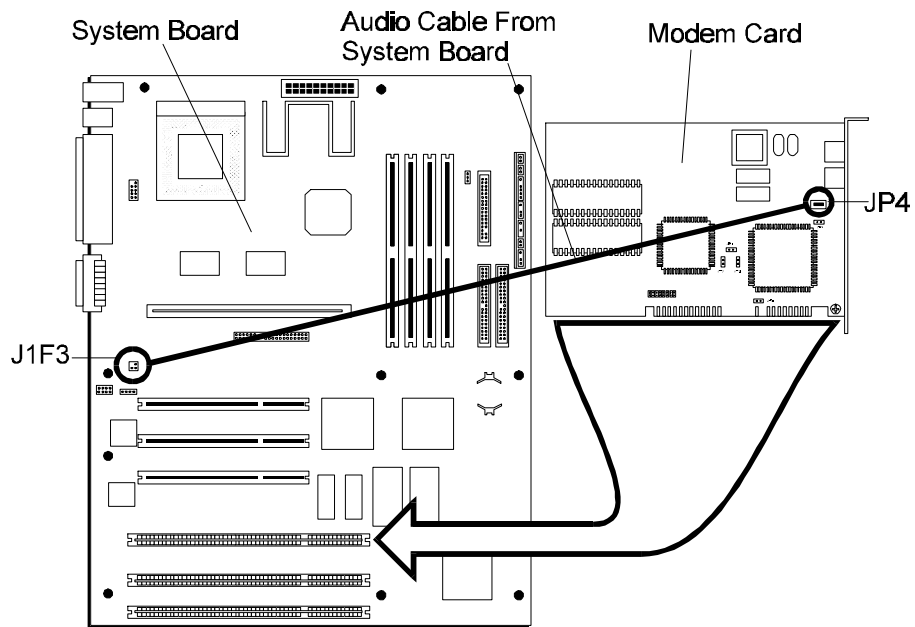


Figure 4-15 Removing and Replacing the Modem Card

## Replacing the Modem Card

To replace the computer's modem card, perform the following procedure and refer to Figure 4-15.

1. Set the jumpers on the new modem card to match the settings of the card you replaced. Refer to section 1.3.10. for correct COMM port and IRQ jumper settings.
2. Connect the audio cable coming from the socket at J1F2 on the system board to the socket at JP4 on the modem card.
3. Align the new card with the same ISA slot from which the original card was removed. Carefully, but firmly, press the card into the slot until the card snaps in place.
4. Secure the card to the chassis with one screw.
5. Stand the computer upright.
6. Replace the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

## TV Tuner Card

This section covers the removal and replacement of the computer's TV Tuner Card.

### Removing the TV Tuner Card

To remove the computer's TV Tuner Card, perform the following procedure and refer to Figure 4-16.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), as viewed from the rear.
3. Lay the computer down on its side, open side up.
4. Disconnect the audio cables from the sockets at JP4 and JP5 on the TV Tuner card.
5. Remove the screw that secures the TV Tuner Card to the chassis.
6. Carefully grasp the TV Tuner Card, noting the PCI slot it is in, and gently pull until it is free of its slot.

**CAUTION:** When removing the TV Tuner Card, be careful not to touch the system board's video chip, which may be hot if the computer has been running.

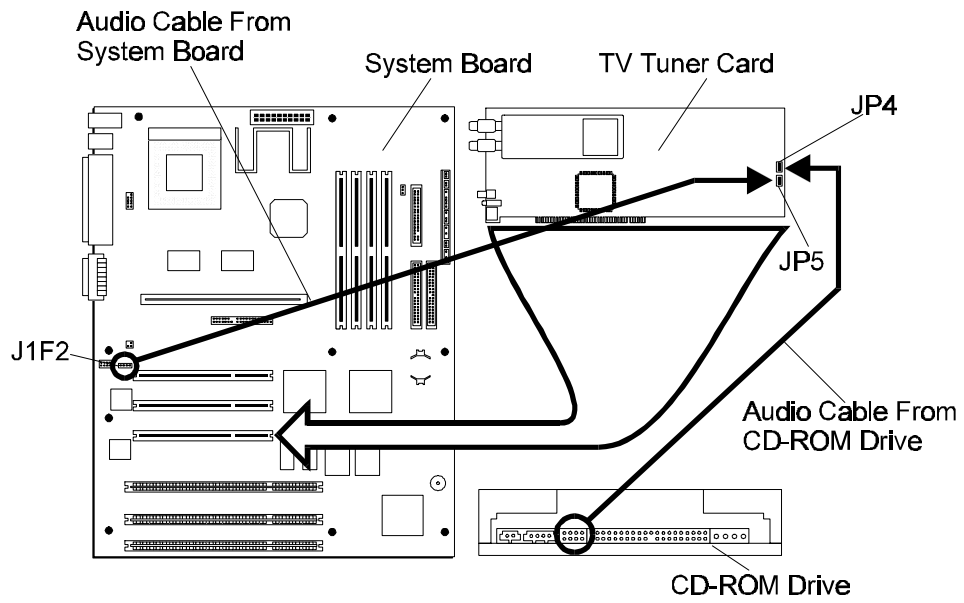


Figure 4-16 Removing and Replacing the TV Tuner Card

## Replacing the TV Tuner Card

To replace the computer's TV Tuner Card, perform the following procedure and refer to Figure 4-16.

1. Set the jumpers on the new TV Tuner Card to match the settings of the card you replaced.
2. Connect the audio cable coming from the CD-ROM drive to the connector at JP4 on the TV Tuner Card.
3. Connect the audio cable to the connector at J1F2 on the system board to the socket at JP5 on the TV Tuner Card.

**NOTE:** When performing the next step, you may find it necessary to remove the modem audio cable from its socket on the system board. If so, remember to connect the modem cable to the socket at J1F3 on the system board before continuing.

1. Align the new TV Tuner Card with the same PCI slot from which the original card was removed. Carefully, but firmly, press the card into the slot until the card snaps in place.
2. Secure the TV Tuner Card to the chassis with one screw.
3. Stand the computer upright.
4. Replace the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
5. Connect the power cord and all external cables to the computer and turn on the power.

## MPEG2/AC-3 Card

Information to be provided when available.

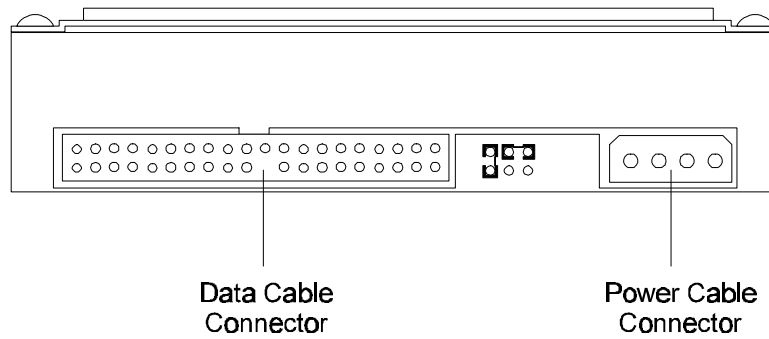
## Hard Disk Drive (HDD)

This section covers the removal and replacement of the computer's hard disk drive.

### Removing the HDD

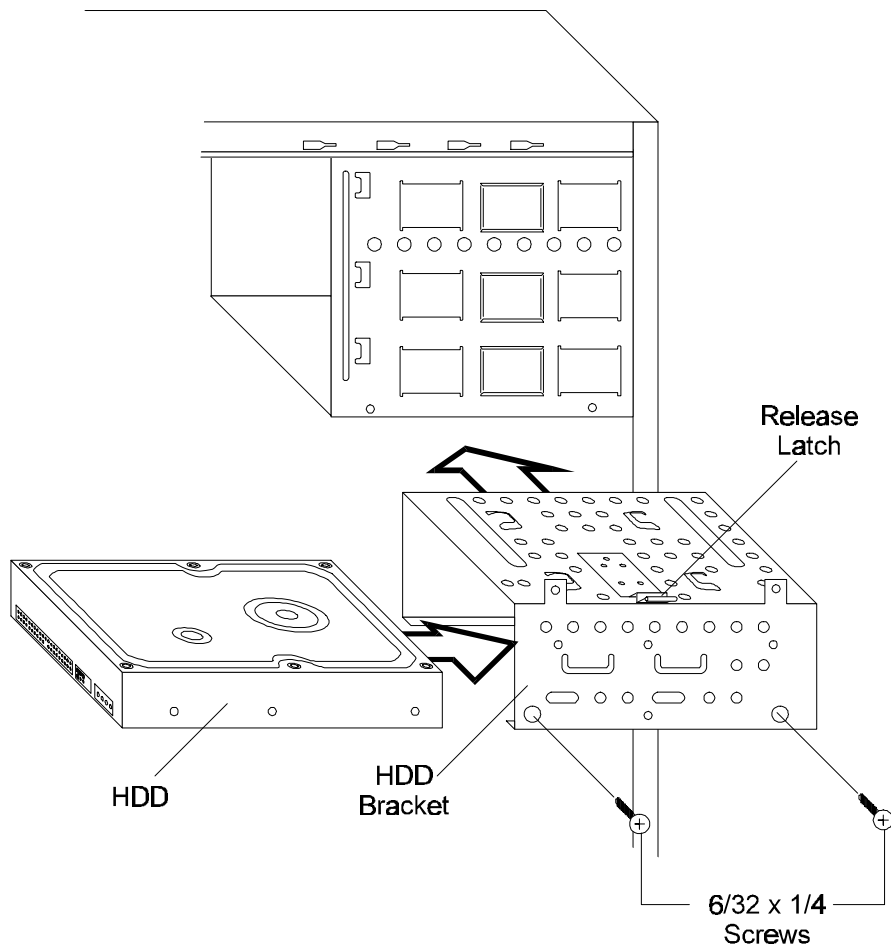
To remove the computer's HDD, perform the following procedure and refer to Figures 4-17 and 4-18.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), as viewed from the rear.
3. Disconnect the power cable and the data cable from the HDD.



*Figure 4-17 Disconnecting and Connecting HDD Cables*

4. Press the release latch on top of the HDD bracket and slide the bracket out of the chassis.
5. Remove the four 6/32x1/4 screws that secure the HDD to the bracket. Carefully slide the HDD out of the bracket.



*Figure 4-18 Removing and Replacing the HDD*

## Replacing the HDD

To replace the HDD, perform the following procedure and refer to Figures 4-17 and 4-18.

1. Verify that the jumper settings on the new HDD are correct for this computer's configuration. Refer to the HDD's label or section 1.3.6. for the appropriate jumper settings
2. Secure the HDD to the bracket with four 6/32x1/4 screws.
3. Align the guides on the bracket with the guides on the chassis and slide the bracket into the chassis until the bracket snaps in place.
4. Connect power cable P2 (label up) and the data cable (bottom connector) to the HDD.
5. Make sure that the CMOS setting is correct for the replaced HDD. Refer to the HDD's label for CMOS information.
6. Replace the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

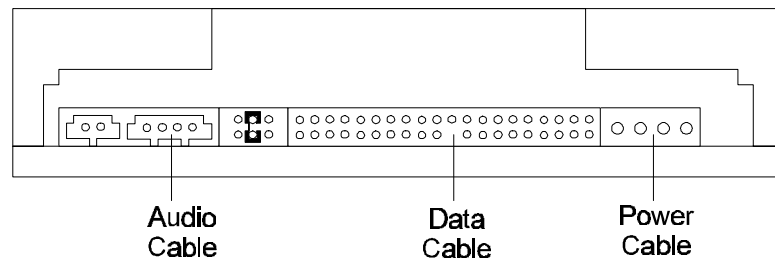
## CD-ROM Drive

This section covers the removal and replacement of the computer's CD-ROM drive.

### Removing the CD-ROM Drive

To remove the computer's CD-ROM drive, perform the following procedure and refer to Figures 4-19 and 4-20.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.) and front bezel (refer to section 4.2.7.), as viewed from the rear.
3. Disconnect the power cable, the data cable, and the audio cable from the CD-ROM drive.



*Figure 4-19 Disconnecting and Connecting CD-ROM Drive Cables*

4. At the front of the computer, simultaneously press the release latches on each of the drive rails and pull the CD-ROM drive out of its face-plate slot.
5. Remove the four M3x4 screws (two on each side) that connect the guide brackets to the CD-ROM drive.

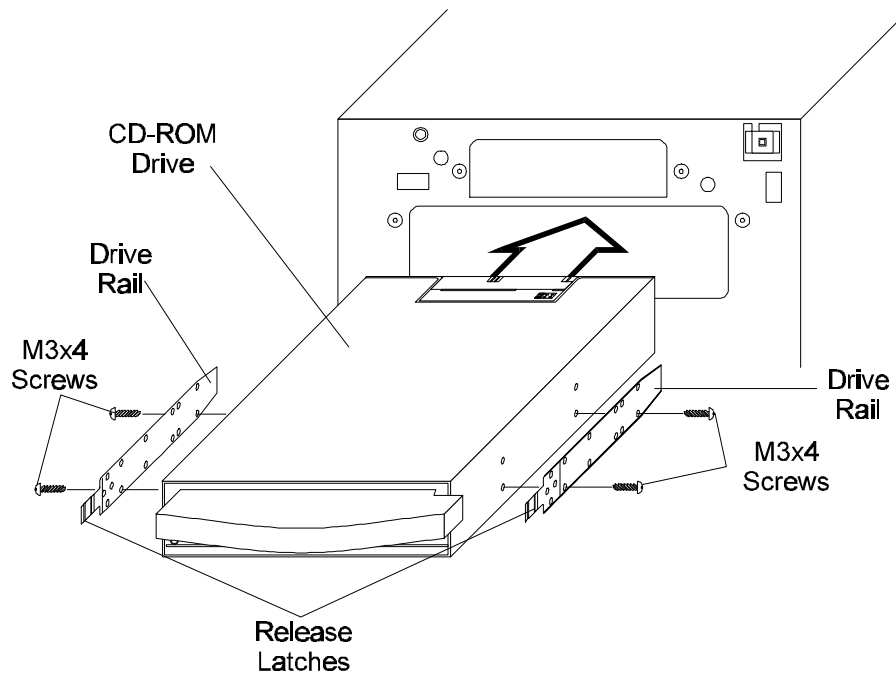


Figure 4-20 Removing and Replacing the CD-ROM Drive

### Replacing the CD-ROM Drive

To replace the computer's CD-ROM drive, perform the following procedure and refer to Figures 4-21 and 4-22.

1. Verify that the device configuration jumper is set in the slave position.

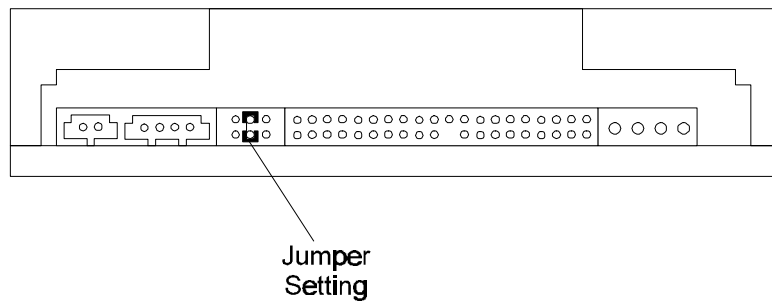
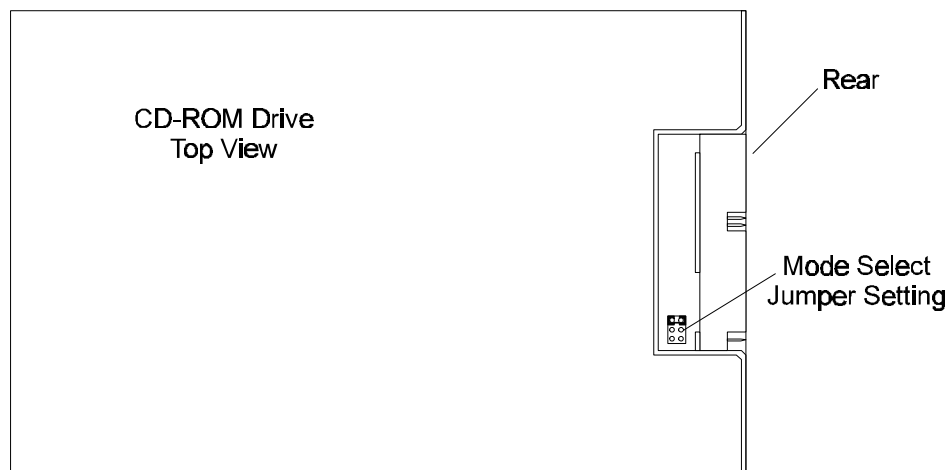


Figure 4-21 Device Configuration Jumper Setting



2. Verify that the mode select jumper is set to enable CD-ROM ejection.



*Figure 4-22 Mode Select Jumper Setting*

3. Connect the drive rails to the CD-ROM drive (release latches to the front) using the four M3x4 screws (two on each side).
4. Gently push the CD-ROM drive into its face-plate slot until the drive snaps in place.
5. Connect power cable P5 (label up), the data cable, and the audio cable to the CD-ROM drive.
6. Replace the computer's right-side panel (refer to section 4.2.2.) and front bezel (refer to section 4.2.8.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

## **DVD-ROM Drive**

Information to be provided when available.

## **Floppy Disk Drive (FDD)**

This section covers the removal and replacement of the computer's floppy disk drive.

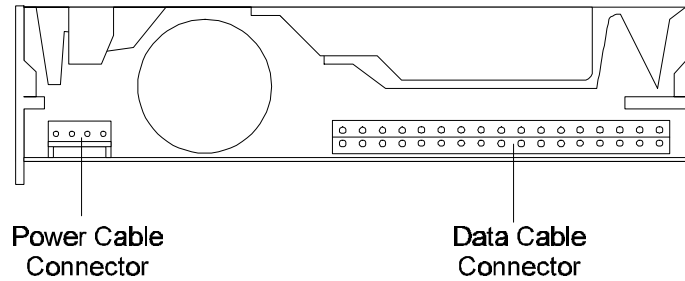
### **Removing the FDD**

To remove the computer's FDD, perform the following procedure and refer to Figures 4-23 and 4-24.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), left-side panel (refer to section 4.2.5.) and front bezel (refer to section 4.2.7.), as viewed from the rear.

**NOTE:** Before performing the next step, you may want to pull the CD-ROM drive partially out of its slot (refer to section 4.7.1.). This will make it easier to get at the cables connected to the FDD.

1. Disconnect the power cable and the data cable from the FDD.



*Figure 4-23 Disconnecting and Connecting FDD Cables*

2. At the front of the computer, simultaneously press the release latches on both of the drive rails and pull the FDD out of its face-plate slot.
3. Remove the four M3x4 screws (two on each side) that connect the drive rails to the FDD.

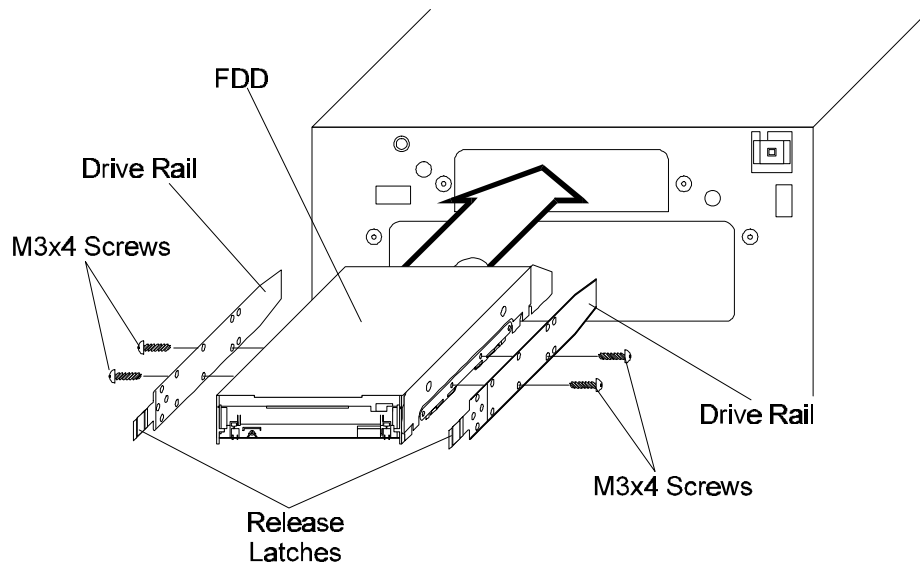


Figure 4-24 Removing and Replacing the FDD

## Replacing the FDD

To replace the computer's FDD, perform the following procedure and refer to Figures 4-23 and 4-24.

1. Connect the drive rails to the FDD (release latches to the front) using four M3x4 screws (two on each side).
2. Gently push the FDD into its face-plate slot until the drive snaps in place.
3. Connect power cable P6 (label down) and the data cable to the FDD.

**NOTE:** If you partially removed the CD-ROM drive (as suggested in section 4.8.1 Removing the FDD), secure the CD-ROM drive before continuing.

1. Replace the computer's right-side panel (refer to section 4.2.2.), left-side panel (refer to section 4.2.6.) and front bezel (refer to section 4.2.8.), as viewed from the rear.
2. Connect the power cord and all external cables to the computer and turn on the power.

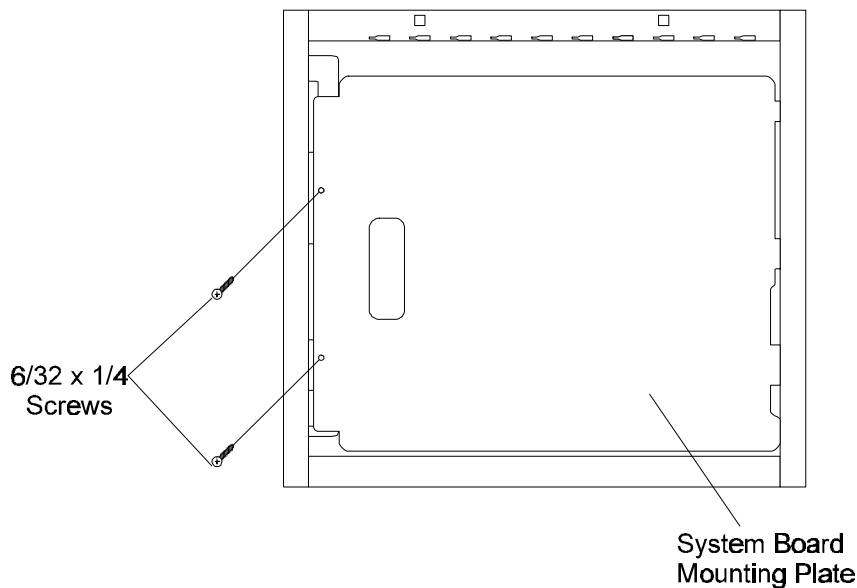
## System Board

This section covers the removal and replacement of the computer's system board.

## Removing the System Board

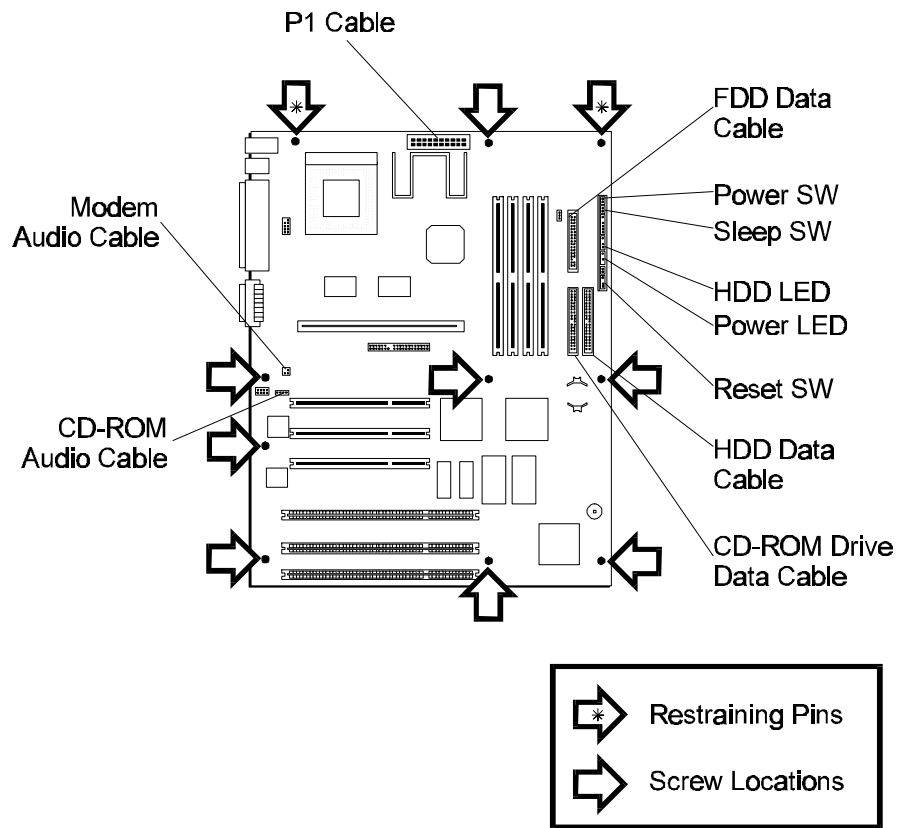
To remove the computer's system board, perform the following procedure and refer to Figures 4-25 and 4-26.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
3. Disconnect all cables from the system board, including power cables, data cables, switch and LED cables, audio cables, and so on.
4. Remove any expansion cards, such as the modem card (refer to section 4.4.1.) and the TV Tuner Card (Refer to section 4.5.1.), from the system board.
5. Remove the computer's rear bezel (refer to section 4.2.3.) and left-side panel (refer to section 4.2.5.).
6. Remove the two 6/32x1/4 screws that secure the system board mounting plate to the chassis. Slowly swing the plate outward from left to right. Slide the plate out of the latches on the chassis. Lay the panel on a flat surface, system board facing up.



*Figure 4-25 Removing the System Board Mounting Plate*

7. Remove the eight M3x6 screws that secure the system board to the system board mounting plate.



*Figure 4-26 Removing and Replacing the System Board*

8. Place your fingers in the space between the system board and the system board mounting plate on the opposite side of the restraining pins. Carefully lift up until the board is free of the plate's restraining pins.
9. Remove the heat sink and microprocessor from the system board (refer to section 4.10.1.).
10. Remove the SIMMs from the system board (refer to section 4.11.1.).
11. Remove the RTC battery from the system board (refer to section 4.12.1.).

## Replacing the System Board

To replace the system board, perform the following procedure and refer to Figures 4-25 through 4-27.

1. Align the system board on the system board mounting plate so that the appropriate holes rest on top of the restraining pins. Carefully, but firmly, press down until the board snaps into place.
2. Secure the system board to the system board mounting plate with eight M3x6 screws.
3. Install the microprocessor and heat sink on the system board (refer to section 4.10.2.).
4. Verify that the jumper settings for the microprocessor are correct. Refer to Table 4-2 for proper microprocessor jumper settings.

*Table 4-2 Microprocessor/Bus Speed Settings*

Microprocessor Freq. (MHz)	Host Bus Freq. (MHz)	Jumper Settings for J1F1-C	Jumper Settings for J1F1-D	PCI Freq. (MHz)	Clock Ratio	ISA Freq. (MHz)
200	66	1-2 and 5-6	1-2 and 5-6	33	6/2	8.33
166	66	1-2 and 5-6	2-3 and 5-6	33	5/2	8.33
133	66	1-2 and 5-6	2-3 and 4-5	33	4/2	8.33

5. Install the SIMMs on the system board (refer to section 4.11.2.).
6. Install the RTC battery on the system board (refer to section 4.12.2.).
7. Slide the fasteners on the right side of the system board mounting plate into the latches in the chassis.
8. Push the mounting plate forward until it is flush against the chassis.
9. Secure the system board mounting plate to the chassis with two 6/32x1/4 screws.
10. Install expansion cards, such as the modem card (refer to section 4.4.2.) and the TV Tuner Card (refer to section 4.5.2.), on the system board.
11. Connect the modem audio cable to the connector at J1F3 on the system board.
12. Connect the CD-ROM audio cable to the connector at J1F2 on the system board.

**NOTE:** *If a TV Tuner Card is installed, connect the CD-ROM audio cable to JP4 on the TV Tuner Card. Also, connect the audio cable from the TV Tuner Card at JP5 to the connector at J1F2 on the system board.*

1. Connect the HDD data cable to the connector at J10G1 on the system board.
2. Connect the CD-ROM data cable to the connector at J9G1 on the system board.
3. Connect the FDD data cable to the connector at JPK1 on the system board.
4. Connect the power cable to the connector at J6M1 on the system board.

**NOTE:** When connecting switch and LED cables, make sure the printed side of the connector faces the board, except for the LED connector labeled POWER LED. For this LED, the printed side of the connector faces away from the board. Refer to section 4.1.3.4.

1. Connect the power switch cable to the pins labeled PWR ON (black cable to pin 1 and yellow cable to pin 2) on the system board.
2. Connect the sleep switch cable to the pins labeled SLEEP (black cable to pin 3 and white cable to pin 4) on the system board.
3. Connect the HDD LED cable to the pins labeled HD LED (blue cable to pin 16 and black cable to pin 15) on the system board.
4. Connect the power LED cable to the pins labeled SLEEP LED (black cable to pin 18 and green cable to pin 20) on the system board.
5. Connect the reset switch cable to the pins labeled RESET (black cable to pin 22 and red cable to pin 23) on the system board.

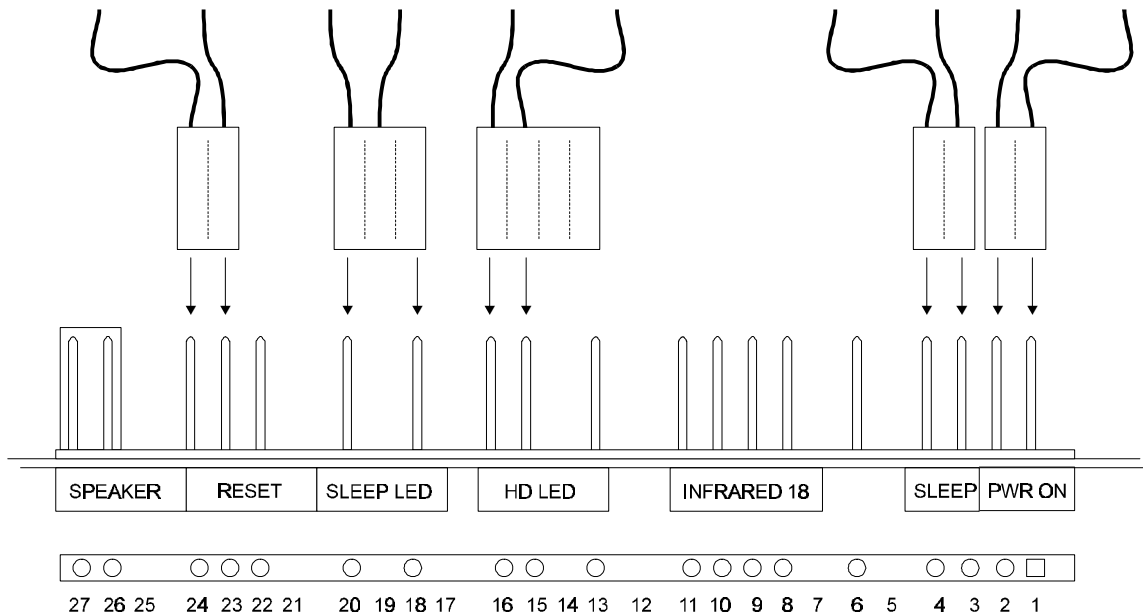


Figure 4-27 Switch and LED Cable Connections

6. Replace the computer's right-side panel (refer to section 4.2.2.), left-side panel (refer to section 4.2.6.), and rear bezel (refer to section 4.2.4.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

## Removing the I/O Spring

To remove the I/O spring, perform the following procedure and refer to Figure 4-28.

1. Remove the system board (refer to section 4.9.1.).
2. Pull the I/O spring away from the system board.

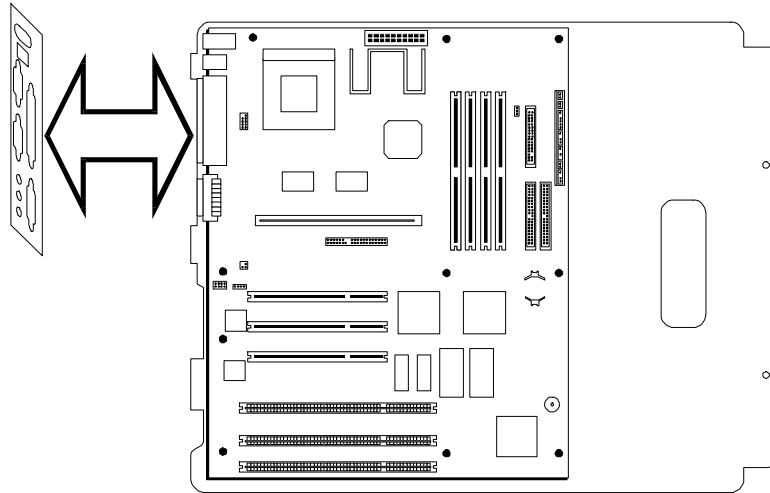


Figure 4-28 Removing and Replacing the I/O Spring

## Replacing the I/O Spring

To replace the I/O spring, perform the following procedure and refer to Figure 4-28.

1. Align the I/O spring cutouts with the appropriate system board ports.
2. Press the I/O spring into place.
3. Replace the system board (refer to section 4.9.2.).

## Microprocessor

This section covers the removal and replacement of the computer's microprocessor.

### Removing the Microprocessor

To remove the microprocessor, perform the following procedure and refer to Figure 4-29.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the system board (refer to section 4.9.1.).

**CAUTION:** *If the system has been running, the heat sink, microprocessor, and regulator may be hot. Allow a few minutes for cooling. Consider wearing protective gloves.*



**CAUTION:** While performing the next step, be careful not to break the plastic retaining tab that secures the clamp to the heat sink.

1. Insert the head of a small, flat-bladed screwdriver into the space between the bottom of the clamp (side closest to the edge of the system board) and the socket. Press down on the top of the clamp. Carefully pull the clamp away from the tab.
2. Ease the clamp up and away from the heat sink and the microprocessor.

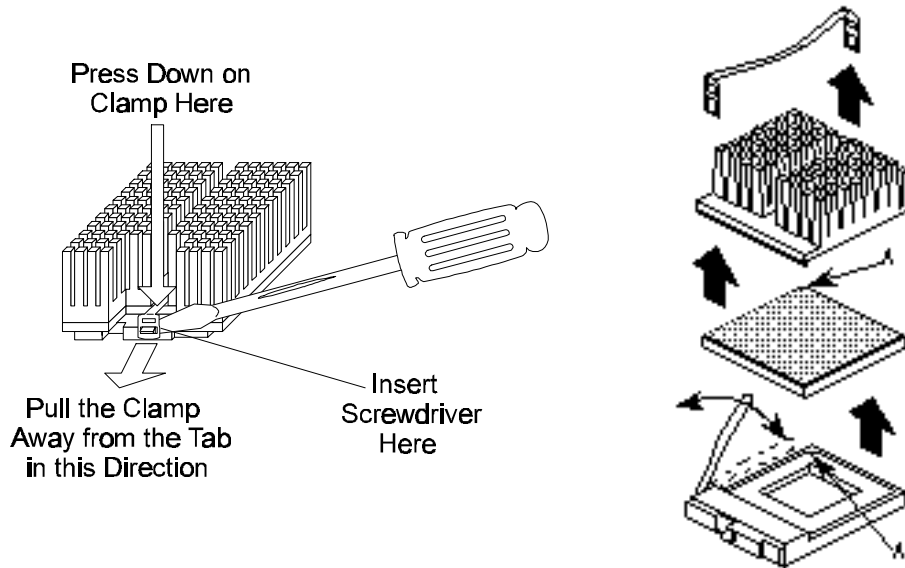


Figure 4-29 Removing the Spring Clamp, Heat Sink, and Microprocessor

**CAUTION:** Do not touch or bend the microprocessor's pins.

1. Remove the heat sink.
2. Push the lever on the microprocessor socket down and out (away from the socket) until the lever pulls up freely. Lift the lever straight up. Remove the microprocessor from the socket.
3. Place the microprocessor in conductive foam and store it in an anti-static package.

## Replacing the Microprocessor

To replace the microprocessor, perform the following procedure and refer to Figure 4-29.

1. Make sure that the jumper settings on the system board are correct for the microprocessor you are installing. Refer to Appendix B for the correct jumper settings.
2. Align pin 1 on the microprocessor with side A of the socket at U3L1 on the system board. This socket is keyed, meaning that the microprocessor can only be connected one way.

**CAUTION:** *While performing the next step, if the microprocessor causes excessive resistance, verify that it is properly aligned with the socket and try again. Forcing the lever down could cause damage to the microprocessor or to the system board.*

1. With the microprocessor securely in place, carefully push the lever on the socket down until the lever snaps in place.
2. Place the heat sink on top of the microprocessor. Place the clamp on the heat sink, inserting the slot on the left side of the clamp under the tab on the left side of the socket. Press down on the clamp until the slot on the right side of the clamp locks under the tab on the right side of the socket.
3. Replace the system board (refer to section 4.9.2.).
4. Connect the power cord and all external cables to the computer and turn on the power.

## SIMMs

This section covers the removal and replacement of SIMMs.

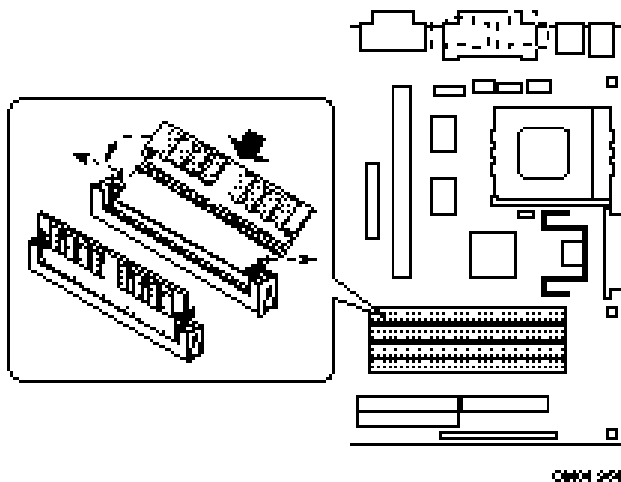
### Removing SIMMs

To remove SIMMs, perform the following procedure and refer to Figure 4-30.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), as viewed from the rear.
3. Lay the computer on its side, so that you are looking down into the computer at the SIMM slots. Carefully push cables out of the way as necessary.

**NOTE:** *When removing SIMMs, remove the SIMM closest to the empty bank first. This will give you the room you need to lift the SIMM away from its socket.*

1. Gently spread the retaining clip at each end of the SIMM socket and push the SIMM forward.
2. Holding the SIMM only by the edges, lift the SIMM away from the socket and store it in an anti-static package.
3. Repeat steps 4 and 5 for each SIMM to be removed.



*Figure 4-30 Removing and Replacing SIMMs*

## Replacing SIMMs

Before replacing SIMMs, be aware of the following points:

- ❑ When you install SIMMs, you must completely fill at least one bank; that is, you must completely fill both sockets of the bank.
- ❑ The computer automatically detects the installed memory, so it does not matter which bank is used, as long as both sockets are filled.
- ❑ Both SIMMs in one bank must be the same size. For instance, you cannot install an 8 MB SIMM in one socket of bank 0 and a 16 MB SIMM in the other socket of bank 0. However, you could use different size SIMMs in different banks.

To replace SIMMs, perform the following procedure and refer to Figure 4-30.

1. Position the SIMM at a 45° angle relative to the system board. Make sure the small notch in the middle of the bottom edge of the SIMM aligns with the notch in the SIMM socket.
2. With the SIMM chips facing the far edge of the system board, insert the bottom edge of the SIMM into the socket, making sure the SIMM is seated firmly.
3. Hold the SIMM at each end and gently push the top edge forward until the SIMM snaps in place.
4. Perform steps 1 through 3 for each remaining SIMM.
5. Set the computer upright.
6. Replace the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
7. Connect the power cord and all external cables to the computer and turn on the power.

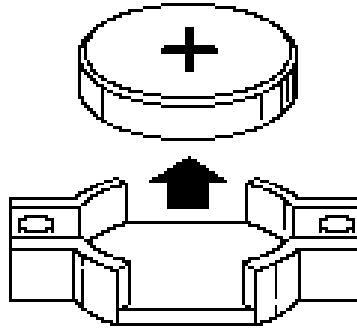
## Real-Time Clock (RTC) Battery

This section covers the removal and replacement of the RTC battery.

### Removing the RTC Battery

To remove the RTC battery, perform the following procedure and refer to Figure 4-31.

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.1.), as viewed from the rear.
3. Lay the computer on its side, so that you are looking down into the computer at the RTC Battery. Carefully push cables out of the way as necessary.
4. Using a small, flat-bladed screwdriver, gently pry the battery free from its socket.



*Figure 4-31 Removing and Replacing the Battery*

### **Replacing the RTC Battery**

To install an RTC battery, perform the following procedure and refer to Figure 4-31.

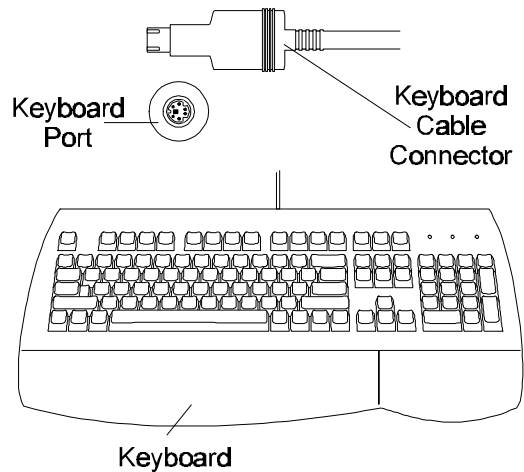
1. Align the battery with the socket at BT9E1 on the system board, ensuring that the positive side of the battery is up. Gently press down on the battery until it snaps in place.
2. Set the computer upright.
3. Replace the computer's right-side panel (refer to section 4.2.2.), as viewed from the rear.
4. Connect the power cord and all external cables to the computer and turn on the power.

### **Keyboard**

This section covers the removal and replacement of the keyboard.

#### **Removing the Keyboard**

To remove the keyboard, turn off power to the computer and disconnect the keyboard cable connector from the keyboard port (color-coded magenta) in the rear of the computer. See Figure 4-32.



*Figure 4-32 Removing and Replacing the Keyboard.*

### **Replacing the Keyboard**

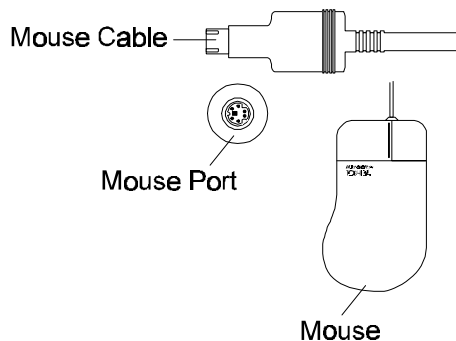
To replace the keyboard, align the keyboard cable connector with the keyboard port (color-coded magenta) in the rear of the computer. Adjust the connector so that the pins on the connector align with the holes in the port. Push the connector into the port. Restore power to the computer.

### **Mouse**

This section covers the removal and replacement of the mouse.

### **Removing the Mouse**

To remove the mouse, turn off power to the computer and disconnect the mouse cable connector from the mouse port (color-coded green) in the rear of the computer. See Figure 4-33.



*Figure 4-33 Removing and Replacing the Mouse*

## Replacing the Mouse

To replace the mouse, align the mouse cable connector with the mouse port (color-coded green) in the rear of the computer. Adjust the connector so that the pins on the connector align with the holes in the port. Push the connector into the port. Restore power to the computer.

## Monitor

This section covers the removal and replacement of the monitor.

### Removing the Monitor

To remove the monitor, turn off power to the computer and disconnect the monitor cable connector from the video port (color-coded yellow) in the rear of the computer. Disconnect the optional speaker cable from the line out jack (color-coded blue) in the rear of the computer. Disconnect the optional microphone cable (color-coded red) from the microphone jack in the rear of the computer. See Figure 4-34.

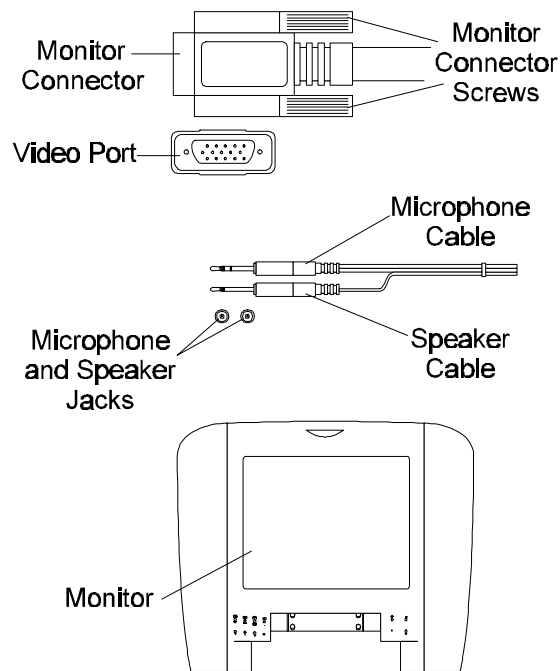


Figure 4-34 Removing and Replacing the Monitor

### Replacing the Monitor

To replace the monitor, align the monitor cable connector with the video port (color-coded yellow) in the rear of the computer. Adjust the connector so that the pins on the connector align with the holes in the port. Push the connector into the port. Tighten the connector screws until you feel tension. Plug the optional speaker cable into the line out jack (color-coded blue) in the rear of the computer. Connect the optional microphone cable (color-coded red) from the microphone jack in the rear of the computer. Restore power to the computer.

## InTouch™ Module

This section covers the removal and replacement of the InTouch™ Module.

### Removing the InTouch™ Module

To remove the InTouch™ Module, turn off power to the computer and disconnect the Module cable connector from the first USB port (color-coded white) in the rear of the computer. On the back of the Module, slide the latch down to release the module from the mounting bracket on the monitor. See Figure 4-35.

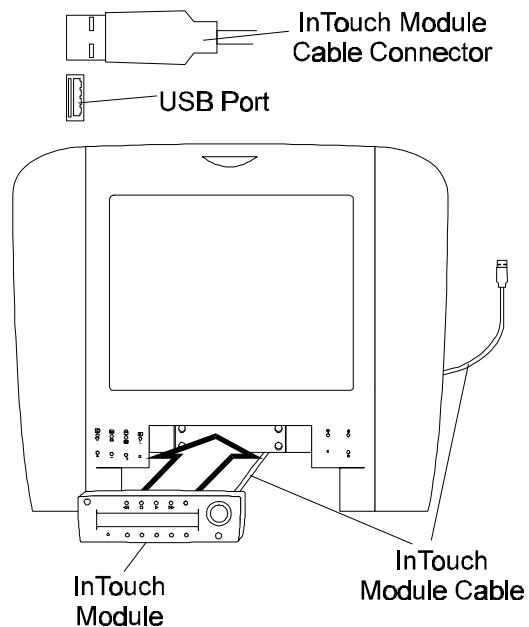


Figure 4-35 Removing and Replacing the InTouch™ Module

### Replacing the InTouch™ Module

To replace the InTouch™ Module, route the Module cable under the monitor. Align the Module cable connector with the first USB port (color-coded white) in the rear of the computer. Adjust the connector so that the pins on the connector align with the holes in the port. Push the connector into the port. Restore power to the computer.

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## Appendix A



# Pinout Assignments

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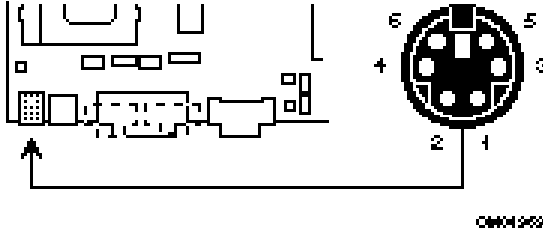
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## Back Panel Connectors

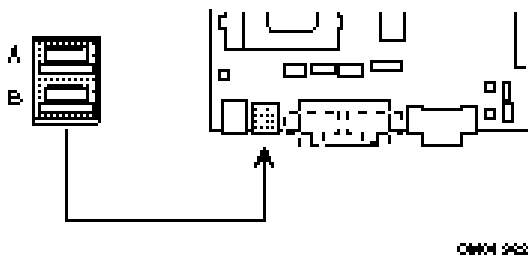
### Mouse and Keyboard Connectors



*Table A-1 Mouse and Keyboard Connector Pinout*

Pin	Signal Name
1	Data
2	No connect
3	Ground
4	+5V (fused)
5	Clock
6	No connect

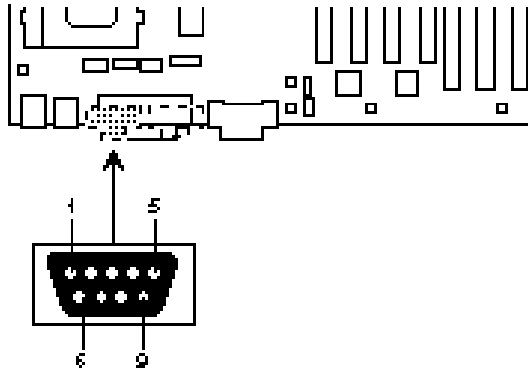
### USB Connectors



*Table A-2 USB Connector Pinout*

Pin	Signal Name
1	+5V (fused)
2	USBP0# [USBP1#] (fused)
3	USBP0 [USBP1] (fused)
4	Ground

## Serial Port Connector

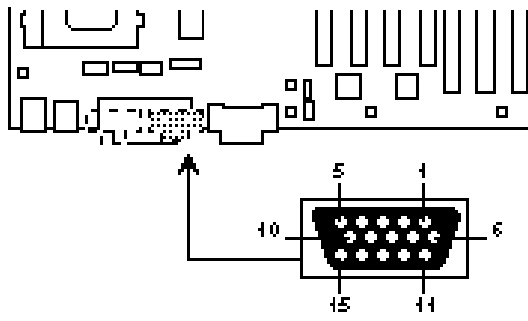


OMM 961

*Table A-3 Serial Port Connector Pinout*

Pin	Signal Name
1	DCD
2	Serial In# (SIN)
3	Serial Out# (SOUT)
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

## Video Monitor Connector



OMM 962

*Table A-4 Video Monitor Connector Pinout*

Pin	Signal Name
1	Red
2	Green
3	Blue
4	No connect
5	Ground
6	Ground
7	Ground
8	Ground
9	No connect
10	Ground
11	No connect
12	DDC Data
13	Horizontal Sync
14	Vertical Sync
15	DDC Clock

## Parallel Port Connector

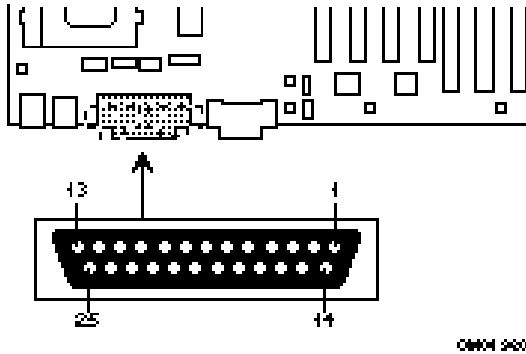


Table A-5 Parallel Port Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	Strobe#	14	Auto Feed#
2	Data Bit 0	15	Fault#
3	Data Bit 1	16	INIT#
4	Data Bit 2	17	SLCT IN#
5	Data Bit 3	18	Ground
6	Data Bit 4	19	Ground
7	Data Bit 5	20	Ground
8	Data Bit 6	21	Ground
9	Data Bit 7	22	Ground
10	ACK#	23	Ground
11	Busy	24	Ground
12	Paper Error	25	Ground
13	SLCT		

## MIDI/Game Port Connector

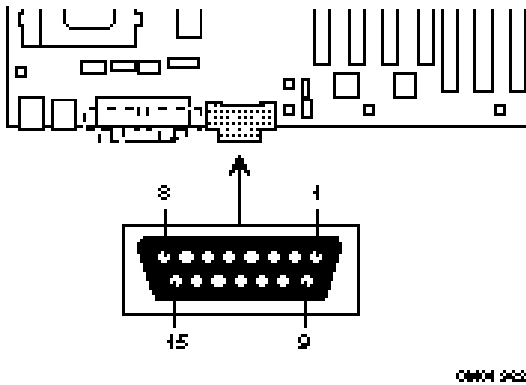
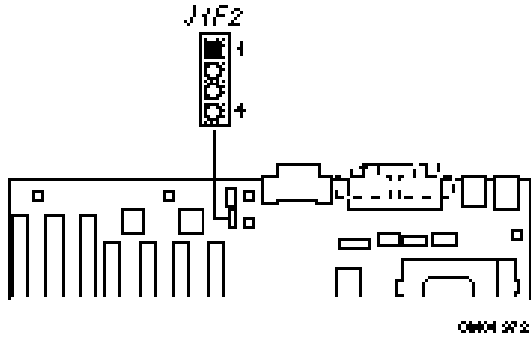


Table A-6 MIDI/Game Port Connector Pinout

Pin	Signal Name
1	+5V (fused)
2	JSBUTO
3	JSX1R
4	Ground
5	Ground
6	JSY1R
7	JSBUT1
8	+5V (fused)
9	+5V (fused)
10	JSBUT2
11	JSX2R
12	MIDI-OUTR
13	JSY2R
14	JSBUT3
15	MIDI-INR

## System Board Connectors

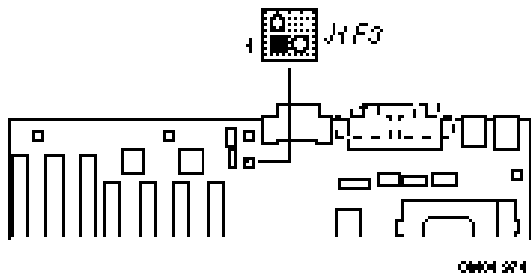
### CD-ROM / TV Tuner Audio Connector



*Table A-7 CD-ROM / TV Tuner Audio Connector Pinout*

Pin	Signal Name
1	Ground
2	CD-Left
3	Ground
4	CD-Right

### Telephony Connector



*Table A-8 Telephony Connector Pinout*

Pin	Signal Name
1	Ground
2	Audio Out
3	Audio In
4	Key

## Wavetable Connector

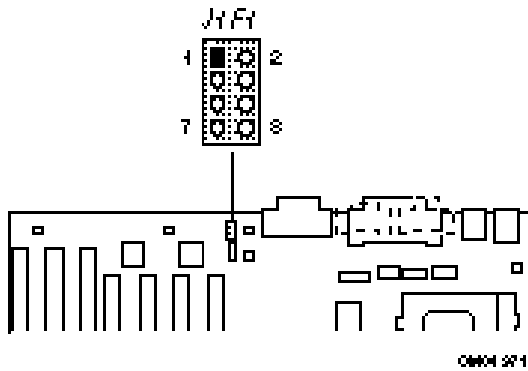


Table A-9 Wavetable Connector Pinout

Pin	Signal Name
1	Wave Right
2	Ground
3	Wave Left
4	Ground
5	Key
6	Ground
7	No connect
8	MIDI Out

## Serial Port Connector

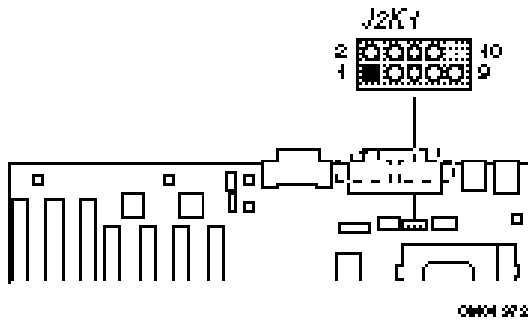


Table A-10 Serial Port Connector Pinout

Pin	Signal Name
1	DCD
2	DSR
3	Serial In# (SIN)
4	RTS
5	Serial Out# (SOUT)
6	CTS
7	DTR
8	RI
9	Ground
10	Key



## Video Feature Connector

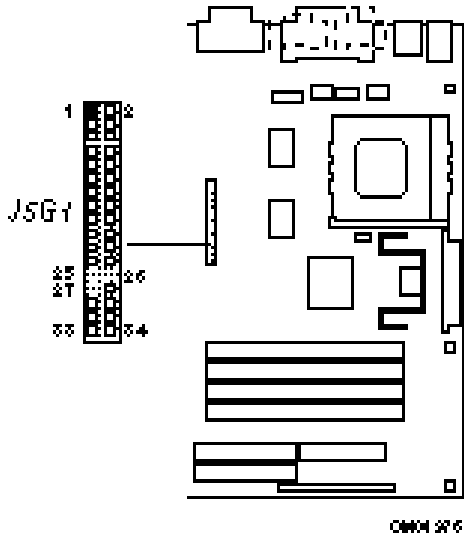


Table A-11 Video Feature Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	Ground	2	Data 0
3	Ground	4	Data 1
5	Ground	6	Data 2
7	Data enable	8	Data 3
9	Sync enable	10	Data 4
11	PCLK enable	12	Data 5
13	N/C	14	Data 6
15	Ground	16	Data 7
17	Ground	18	PCLK
19	Ground	20	BLANK
21	Ground	22	HSYNC
23	N/C	24	VSYNC
25	Key	26	Ground
27	Key	28	Key
29	Ground	30	IICCLK
31	N/C	32	IICDAT
33	GOP1	34	ENFEAT#

## Power Connector

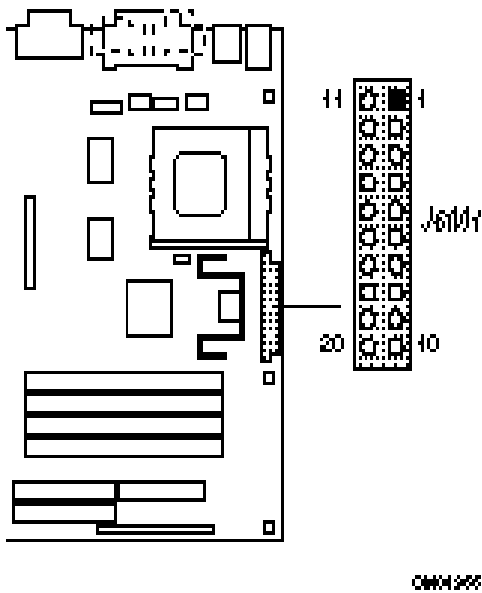
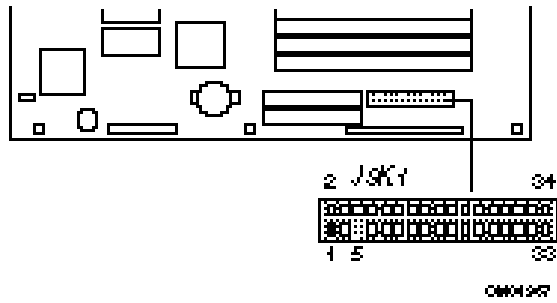


Table A-12 Power Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	PS-ON
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	PW-OK	18	-5V
9	+5VSB	19	+5
10	+12V	20	+5V

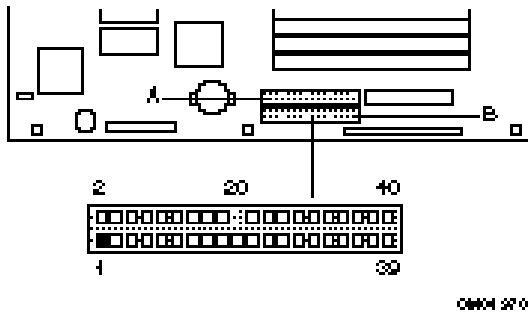
## Floppy Drive Connector

Table A-13 Floppy Drive Connector Pinout



Pin	Signal Name	Pin	Signal Name
1	Ground	2	DENSEL
3	Ground	4	N/C
5	Key	6	FDEDIN
7	Ground	8	Index#
9	Ground	10	Motor Enable A#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor Enable B#
17	MSEN1	18	DIR#
19	Ground	20	STEP#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 00#
27	MSEN0	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Side 1 Select#
33	Ground	34	Diskette Change#

## IDE Connectors



A is the primary connector. B is the secondary connector.

Table A-14 IDE Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DDRQ0 (DDRQ1)	22	Ground
23	I/O Write#	24	Ground
25	I/O Read#	26	Ground
27	IOCHRDY	28	Vcc pull-up
29	DDACK0 (DDACK1)#	30	Ground
31	IRQ14 (IRQ15)	32	Reserved
33	Add 1	34	Reserved
35	Add 0	36	Add 2
37	Chip Select 1P (1S)#	38	Chip Select 3P (3S)#
39	Activity	40	Ground

## Auxiliary Fan Connector

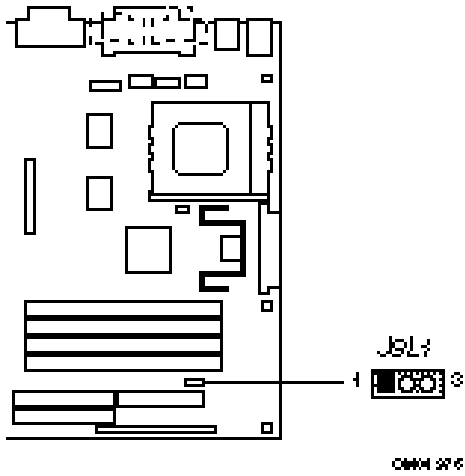


Table A-15 Auxiliary Fan Connector Pinout

Pin	Signal Name
1	Ground
2	+12V
3	Ground

## Power On Connector

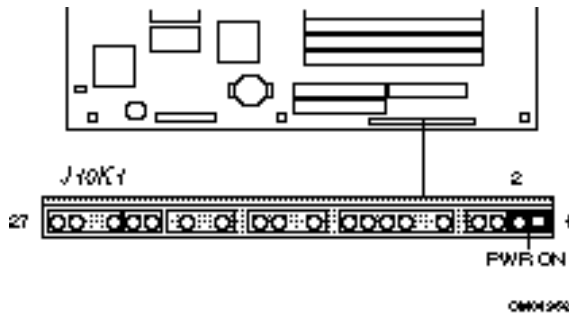


Table A-16 Power On Connector Pinout

Pin	Signal Name
1	Power On
2	Ground

## Sleep Connector

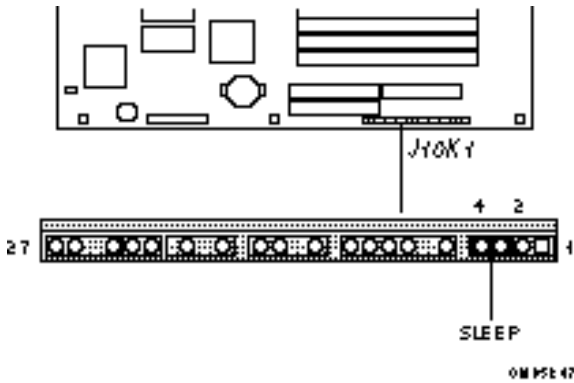


Table A-17 Sleep Connector Pinout

Pin	Signal Name
3	Sleep Request
4	Sleep+5V (pull-up)

## Infrared Connector

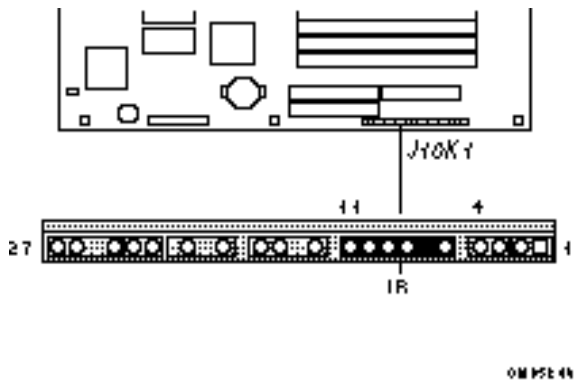
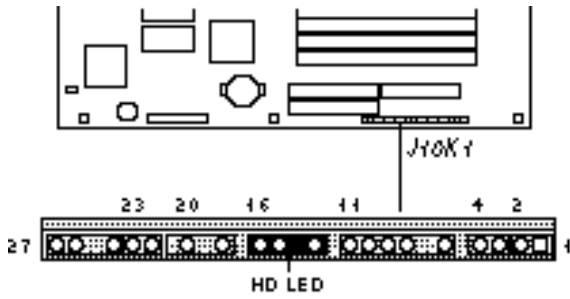


Table A-18 Infrared Connector Pinout

Pin	Signal Name
6	+5V
7	Key
8	IR_RX
9	Ground
10	IR_TX
11	IR_SL1

## Hard Drive LED Connector

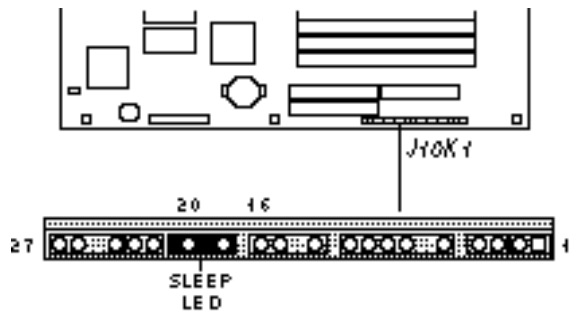


0M PSE 4F

*Table A-19 Hard Drive LED Connector Pinout*

Pin	Signal Name
13	+5V (pull-up)
14	Key
15	HD Active#
16	+5V (pull-up)

## Power LED Connector



0M PSE 5F

*Table A-20 Power LED Connector Pinout*

Pin	Signal Name
18	Ground
19	Key
20	LED_PWR/SLEEP (pull-up)

## Reset Connector

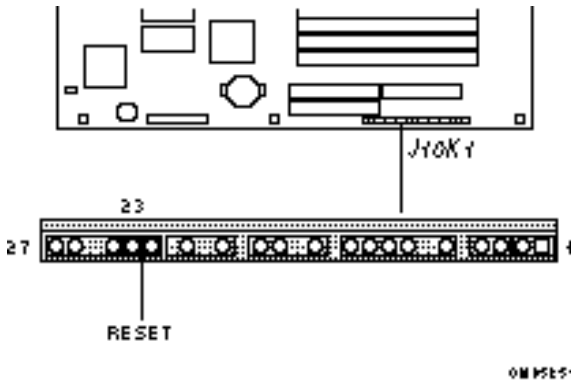


Table A-21 Reset Connector Pinout

Pin	Signal Name
22	Ground
23	Reset

## Speaker Connector

A jumper that enables the onboard speaker is installed over pins 26 and 27. If you install an offboard speaker, remove the jumper.

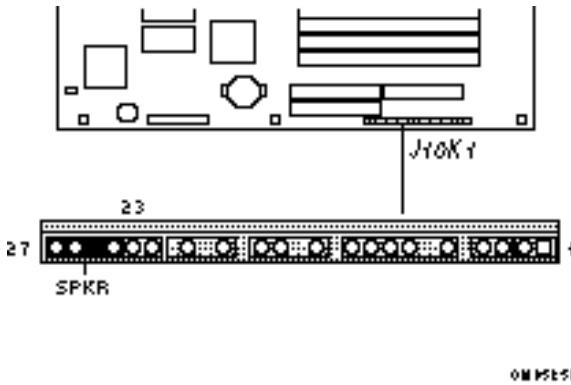


Table A-22 Speaker Connector Pinout

Pin	Signal Name
24	Ground
25	Key
26	SPKR_DAT (Off board)
27	SPKR_DAT (On board)

## ISA Connectors

Table A-23 ISA Connector Pinout

Pin	Signal Name	Pin	Signal Name
B1	Ground	A1	IOCHK#
B2	RSTDRV	A2	SD7
B3	Vcc	A3	SD6
B4	IRQ9	A4	SD5
B5	-5V	A5	SD4
B6	DRQ2	A6	SD3
B7	-12 V	A7	SD2
B8	0WS-	A8	SD1
B9	+12 V	A9	SD0
B10	Ground	A10	IOCHRDY
B11	SMEMW#	A11	AEN
B12	SMEMR#	A12	SA19
B13	IOW#	A13	SA18
B14	IOR#	A14	SA17
B15	DACK3#	A15	SA16
B16	DRQ3	A16	SA15
B17	DACK1#	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH#	A19	SA12
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7
B25	IRQ3	A25	SA6
B26	DACK2#	A26	SA5
B27	TC	A27	SA4

Pin	Signal Name	Pin	Signal Name
B28	BALE	A28	SA3
B29	Vcc	A29	SA2
B30	OSC	A30	SA1
B31	Ground	A31	SA0
KEY		KEY	
D1	MEMCS16#	C1	SBHE#
D2	IOCS16#	C2	LA23
D3	IRQ10	C3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0#	C8	LA17
D9	DRQ0	C9	MEMR#
D10	DACK5#	C10	MEMW#
D11	DRQ5	C11	SD8
D12	DACK6#	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7#	C14	SD11
D15	DRQ7	C15	SD12
D16	Vcc	C16	SD13
D17	Master#	C17	SD14
D18	Ground	C18	SD15



## PCI Connectors

Table A-24 PCI Connector Pinout

Pin	Signal Name	Pin	Signal Name
A1	TRSH#	B1	-12 V
A2	+12 V	B2	TCK
A3	TMS	B3	Ground
A4	TDI	B4	TDO
A5	Vcc	B5	Vcc
A6	INTA#	B6	Vcc
A7	INTC#	B7	INTB#
A8	Vcc	B8	INTD#
A9	Reserved	B9	PRSNT1#
A10	Vcc	B10	Reserved
A11	Reserved	B11	PRSNT2#
A12	Ground	B12	Ground
A13	Ground	B13	Ground
A14	Reserved	B14	Reserved
A15	RST#	B15	Ground
A16	Vcc	B16	CLK
A17	GNT#	B17	Ground
A18	Ground	B18	REQ
A19	Reserved	B19	Vcc
A20	AD30	B20	AD31
A21	3.3 V	B21	AD29
A22	AD28	B22	Ground
A23	AD26	B23	AD27
A24	Ground	B24	AD25
A25	AD24	B25	3.3 V
A26	IDSEL	B26	C/BE3#
A27	3.3 V	B27	AD23
A28	AD22	B28	Ground
A29	AD20	B29	AD21
A30	Ground	B30	AD19
A31	AD18	B31	3.3 V
A32	AD16	B32	AD17
A33	3.3 V	B33	C/BE2#
A34	FRAME#	B34	Ground
A35	Ground	B35	IRDY#
A36	TRDY#	B36	3.3 V
A37	Ground	B37	DEVSEL#
A38	STOP#	B38	Ground
A39	3.3 V	B39	LOCK#

Pin	Signal Name	Pin	Signal Name
A40	SDONE	B40	PERR#
A41	SBO#	B41	3.3 V
A42	Ground	B42	SERR#
A43	PAR	B43	3.3 V
A44	AD15	B44	C/BE1#
A45	3.3 V	B45	AD14
A46	AD13	B46	Ground
A47	AD11	B47	AD12
A48	Ground	B48	AD10
A49	AD9	B49	Ground
A50	KEY	B50	KEY
A51	KEY	B51	KEY
A52	C/BE0#	B52	AD8
A53	3.3 V	B53	AD7
A54	AD6	B54	3.3 V
A55	AD4	B55	AD5
A56	Ground	B56	AD3
A57	AD2	B57	Ground
A58	AD0	B58	AD1
A59	Vcc	B59	Vcc
A60	REQ64#	B60	ACK64#
A61	Vcc	B61	Vcc
A62	Vcc	B62	Vcc

---

# **Appendix B**

## **Jumper Settings**

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**Contents**

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**Figures**

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# System Board Jumper Settings

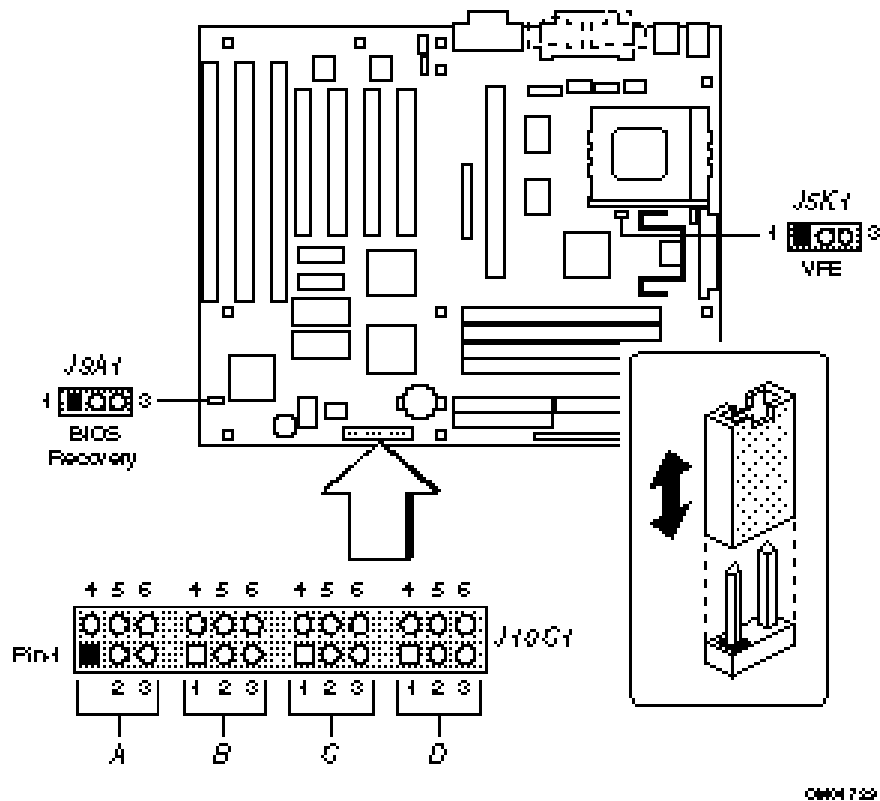


Figure B-1 Jumper Locations

Table B-1 Configuration Jumper Settings

Function	Jumper	Configuration
Password clear	J10C1-A	1-2 Password enabled ( <b>Default</b> ) 2-3 Password clear/disabled
CMOS clear	J10C1-A	4-5 Keep ( <b>Default</b> ) 5-6 Clear
Setup Access	J10C1-B	1-2 Access allowed ( <b>Default</b> ) 2-3 Access denied
Microprocessor speed ratio	J10C1-C	See Table B-2
Host bus speed <b>(Note: These jumpers also set the PCI and ISA clock speeds.)</b>	J10C1-D	See Table B-2
Processor voltage	J5K1	1-2 Standard voltage ( <b>Default</b> ) 2-3 VFE enabled
BIOS recovery	J9A1	1-2 Normal operation ( <b>Default</b> ) 2-3 Recovery mode

## Microprocessor Configuration (J10C1-C, D)

These allow the board to be switched between different speeds of the Pentium processor. These jumpers also affect the PCI and ISA clock speeds according to the following table.

*Table B-2 Microprocessor/Bus Speed Settings*

Microprocessor Freq. (MHz)	Host Bus Freq. (MHz)	Jumper Settings for J10C1-C	Jumper Settings for J10C1-D	PCI Freq. (MHz)	Clock Ratio	ISA Freq. (MHz)
200	66	1-2 and 5-6	1-2 and 5-6	33	6/2	8.33
180	60	2-3 and 4-5	1-2 and 5-6	30	6/2	7.5
166	66	1-2 and 5-6	2-3 and 5-6	33	5/2	8.33
150	60	2-3 and 4-5	2-3 and 5-6	30	5/2	7.5
133	66	1-2 and 5-6	2-3 and 4-5	33	4/2	8.33
120	60	2-3 and 4-5	2-3 and 4-5	30	4/2	7.5
100	66	1-2 and 5-6	1-2 and 4-5	33	3/2	8.33
90	60	2-3 and 4-5	1-2 and 4-5	30	3/2	7.5
75	50	2-3 and 5-6	1-2 and 4-5	25	3/2	8.33
Reserved	-	1-2 and 4-5	-	-	-	

### Password clear (J10C1-A, Pins 1, 2, and 3)

Allows both passwords to be cleared by moving the jumper from pins 1-2 to pins 2-3 and turning the computer on. The computer should then be turned off and the jumper should be returned to the 1-2 position to restore normal operation. This procedure should only be done if the user or administrative password has been forgotten. The password function is effectively disabled if this jumper is in the 2-3 position. Default is for the password to be enabled (1-2 position).

### Clear CMOS (J10C1-A, Pins 4, 5, and 6)

Allows CMOS settings to be reset to default values by moving the jumper from pins 4-5 to pins 5-6 and turning the computer on. When the computer reports that "NVRAM cleared by jumper", the computer can be turned off, and the jumper should be returned to the 4-5 position to restore normal operation. Default is for this jumper to be on pins 4-5.

### Setup Access (J10C1-B, Pins 1, 2, and 3)

Allows access to the Setup program to be disabled by moving this jumper from the 1-2 position to the 2-3 position. Default is for access to Setup to be enabled (1-2 position).

### BIOS Recovery (J9A1)

This jumper block allows for the system to be booted with a basic BIOS that is hard-coded in the firmware. Should the system become disabled due to BIOS corruption, you can recover the system by changing this jumper to recovery mode. Jumpered pins 1-2 is the default setting for normal operations. Pins 2-3 set the system to recovery mode.

### **Microprocessor Voltage (J5K1)**

This jumper block changes the output of the on-board voltage regulator. Pins2 should be jumpered for processors that require standard voltage regulation. Pins3 should be jumpered for processors that require the VRE specification. This jumper should not be changed by the user unless changing to a new processor type. Some upgrade processors may require a different setting. Check the processor's documentation for the correct setting.  
(Standard = 3.135-3.63V, VR = 3.3-3.465V, VRE = 3.465-3.63V)



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## **Appendix C**

# **Error and Information Messages**

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## C.1. BIOS Beep Codes

Table C-1 Beep Codes

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
3	Base 64 KB Memory Failure	Memory failure in the first memory block checked.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
6	8042 - Gate A20 Failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The microprocessor generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	ROM checksum value does not match the value encoded in BIOS.

## C.2. PCI Configuration Error Messages

The following PCI messages are displayed as a group with bus, device and function information.

Table C-2 PCI Configuration Error Messages

Message	Explanation
Bad PnP Serial ID Checksum	The Serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared By Jumper	The "Clear CMOS" jumper has been moved to the "Clear" position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.
PCI Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, CD-ROM drive, or network) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.

Primary Input Device Not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.
Motherboard Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.

### C.3. BIOS Error Messages

*Table C-3 BIOS Error Messages*

<b>Error Message</b>	<b>Explanation</b>
CH-2 Timer Error	Most systems include two timers. There is an error in timer 2.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Time and Date Not Set	Run Setup to set the date and time in CMOS RAM.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A:, but cannot boot the system. Use another boot disk.
Memory Size Decreased	The amount of memory on the motherboard is less than it was at the last boot.
Parity Error - System Halted	Fatal Error has occurred - System halted.

### C.4. ISA NMI Messages

*Table C-4 ISA NMI Messages*

<b>ISA NMI Message</b>	<b>Explanation</b>
Memory Parity Error at xxxxx	Memory failed. If the memory location can be determined, it is displayed as xxxxx.

Uncorrectable ECC Error	A multi-bit ECC error has occurred - System halted.
Undetermined NMI	An NMI has occurred, however, the generating source of the NMI cannot be determined.

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## **Appendix D**

# **Graphics Subsystem**

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## Graphics Subsystem

The Infinia™ Models 7130, 7160, 7161, 7200, 7201, and 7220 system board features S3 ViRGE SVGA graphics controller.

**CAUTION:** When removing graphics memory from the on board sockets, use an approved SOJ IC removal tool, so that damage does not occur to the traces on the etched circuit board.

### S3 ViRGE Graphics

The S3 ViRGE SVGA graphics controller has 2 MB of 50 ns EDO SOJ DRAM. The S3 ViRGE has a high performance 64-bit 2D/3D graphics engine and incorporates the S3 Streams Processor that enables the device to convert YUV formatted video data to RGB and provides acceleration for scaling the video display without compromising picture quality or frame rate. The on-chip RAMDAC/clock synthesizer is capable of output pixel data rates of 135 MHz providing non-interlaced screen resolutions of up to 1280x1024x256 colors at 75 Hz. The 64-bit S3d Engine incorporates the key Windows and other GUI accelerator functions of BitBLT, line draw and polygon fill. 3D features include flat shading, Gouraud shading and texture mapping support. Advanced texture mapping features include perspective correction, bi-linear and tri-linear filtering, MIP-mapping, and Z-buffering. These features provide the most realistic user experience for interactive 3D applications. In addition, a fast linear addressing scheme based upon DCI reduces software overhead by mapping the display memory into the microprocessor's upper memory address space and permitting direct microprocessor access to the display memory.

*Table D-1 S3 ViRGE Supported Resolutions*

Resolution	Refresh rate (Hz)
640 x 480 x 16 colors	60
640 x 480 x 256 colors	60, 72, 75, 85
640 x 480 x 65536 colors	60, 72, 75
640 x 480 x 16,777,216 colors (non-accelerated mode)	60, 72, 75
800 x 600 x 256	56, 60, 72, 75, 85
800 x 600 x 65536	60, 72, 75
800 x 600 x 16,777,216 colors (non-accelerated mode)	60, 72, 75
1024 x 768 x 256	43(IL*), 60, 70, 75, 85
1024 x 768 x 65536	43(IL*), 60, 70, 75
1280 x 1024 x 256	43(IL*), 60, 70, 75

\* = Interlaced

**NOTE:** The S3 ViRGE graphics controller supports more modes than shown above. However, the drivers support only those modes listed.

## **Graphics Drivers and Utilities**

Graphics drivers for OS/2 2.11 and OS/2 WARP, MS-DOS applications such as AutoCAD and Microstation, as well as driver updates for Windows 3.11, Windows 95, Windows NT may be downloaded from the Intel Applications Support BBS or the world wide web (<http://www.intel.com>). Drivers for SCO UNIX are available from SCO.

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# **Appendix E**

## **Audio Subsystem**

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## Audio Subsystem

The Infinia™ Models 7130, 7160, 7161, 7200, 7201, and 7220 system boards feature a 16-bit stereo audio subsystem. The audio subsystem is based upon the Yamaha YMF701 OPL3-SA FM synthesizer. The OPL3-SA provides all the digital audio and analog mixing functions required for recording and playing of audio on personal computers. These functions include stereo analog-to-digital and digital-to-analog converters, analog mixing, anti-aliasing and reconstruction filters, line and microphone level inputs, and digital audio compression via selectable A-law /μlaw, and full digital control of all mixer and volume control functions.

## Yamaha OPL4-ML

The Infinia™ Models 7200, 7201, and 7220 system board also features the Yamaha OPL4-ML wavetable. The OPL4-ML is a ROM table containing live instrument sound samples. Wave synthesis results in richer and more realistic sounds than that of FM synthesis. If the OPL4-ML option is not installed, a wavetable upgrade connector header (J1F1) is installed allowing use of an ISA bus add in wavetable card.

## SRS

The Infinia™ Models 7130, 7160, 7161, 7200, 7201, and 7220 system boards feature an SRS Labs, Inc. Sound Retrieval System (SRS), a patented and licensed audio circuit that creates 3D spatial sound from conventional mono, stereo, or surround sound, using only two speakers. This is achieved by summing portions of the right channel audio into the left and vice versa, and does not require signal encoding/decoding, time delay or phase shift of the audio signal. The resultant effect is the creation of virtual speakers, which expands the audio image, creating a 3D sound experience, and eliminating the speakers as discrete point audio sources.

*Table E-1 Audio Resource Mapping*

Resource	Interrupts (Options)	DMA (Options)	I/O (Options)
Sound Blaster (SB DMA playback, DMA shared with Windows Sound System Capture)	10* (5, 7, 9) 7* (5, 9, 10)	0* (3)	220h (240h)
Windows Sound System (DMA playback)	11* (7, 9)	1* (3)	530h* (604h, E80h, F40h)
MPU-401 (IRQ shared with Sound Blaster)	10* (5, 7, 9)	0	330h* (300h, 332h, 334h)
FM Synthesizer Port			388h
Game Port			201h

\* indicates default setting

## Audio Drivers

Audio drivers for OS/2 2.11 and OS/2 WARP, Windows 3.11, Windows 95 and Windows NT may be downloaded from the Intel Applications Support BBS or the world wide web (<http://www.intel.com>). Also available is a Windows 95 task bar icon, SRS, which allows the user to enable/disable surround sound audio without accessing the Setup program

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# **Appendix F**

## **BIOS Update**

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## BIOS Update

The BIOS resides on a flash component. This appendix explains how to upgrade the BIOS from a diskette. The appendix also explains how to recover from an interrupted upgrade.

BIOS upgrades are available from the following sources:

- The Toshiba BBS at (714)837-4408
- CompuServe at GO TOSHIBA
- The Internet at <http://www.toshiba.com/tais/csd/support>

### Using the Upgrade Utility

1. Turn on the computer's power and access system setup by pressing **F1** when prompted.
2. Write down or print out (**Shift + Print Scrn**) the current setup selection in all three menus, *i.e.* Main, Advanced and Security. Use the right arrow key to select the individual setup menus, then print each menu.
3. Save and exit setup. Turn the computer off.
4. Remove the right-side panel (refer to section 4.2.5.) as viewed from the rear and lay the computer on its side with the open side up.
5. Remove the CMOS clear jumper at J10C1-A pins 4-5, and install it on pins 5-6 of J10C1-A (refer to Appendix B for the location of jumpers).
6. Turn on the computer's power. When the message NVRAM cleared by jumper appears, turn the computer off.
7. Insert the CMOS clear jumper back to its original position on pins 4-5 of J10C1-A.
8. Insert the bootable Bios Upgrade diskette in the floppy drive and turn the computer's power back on.
9. Press **Enter** when Flash Memory Upgrade Utility screen is displayed.
10. Select (highlight using the down arrow key) Update FLASH Memory Area and press **Enter**.
11. At the next menu Update System Bios is highlighted. Press **Enter** to select it.
12. When the next menu asks you to enter a path/file name, press the down arrow key once to select 100xDH08.BIO and press **Enter**. "x" is the version of Bios the system is being upgraded to.
13. The utility asks for confirmation that you want to load the file into Flash Memory. Press **Enter** when Continue with programming is highlighted.
14. After the BIOS upgrade is completed, remove the diskette and press **Enter** to reboot the unit.
15. Enter the setup menu by pressing **F1** when prompted, and use the copy (printout) of the setup you made at the beginning of this procedure. Set the setup options to those before the Bios was upgraded.

## BIOS Recovery

It is unlikely that anything will interrupt the flash upgrade process. However, if an interruption occurs, it is possible the BIOS could be left in an unusable state. The steps below describe how to recover from this kind of problem.

**NOTE:** *Because of the small amount of code available in the non-erasable boot block area, no video is available to direct the procedure. You must monitor the flash recovery by listening to the speaker.*

1. Turn off power to the computer, then disconnect the power cord and all external cables connected to the computer.
2. Remove the computer's right-side panel (refer to section 4.2.5.), as viewed from the back.
3. Lay the computer on its side, open side up.
4. Move the Recovery Boot Enable jumper at J9A1 from pins 1-2 to pins 2-3.
5. Insert the bootable flash upgrade diskette into drive A.
6. Turn on the computer.
7. Listen to the speaker. You should hear beeps in the following sequence:
  - a. After you turn on the computer, the speaker beeps once. This beep marks the beginning of the power on self test.
  - b. After a short delay (less than 10 seconds), the speaker beeps again at a higher frequency. This marks the beginning of the recovery process. At this point, the recovery code is being copied into the flash device.
  - c. After about 30 seconds, the speaker beeps twice at the higher frequency, marking the end of the recovery process.
8. Turn off power to the computer.
9. Move the Recovery Boot Enable jumper back to pins 1-2.
10. Replace the computer's right-side panel (refer to section 4.2.5), as viewed from the rear.
11. Connect the power cord and all external cables to the computer, leave the flash upgrade diskette in drive A, and turn on the power.
12. Continue with the normal upgrade using the upgrade utility.

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# Appendix G

## Memory Map and I/O Map

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## Memory Map

*Table G-1 Memory Map*

<b>Address Range (Decimal)</b>	<b>Address Range (hex)</b>	<b>Size</b>	<b>Description</b>
1024K-131072K	100000-8000000	127 M	Extended Memory
960K-1023K	F0000-FFFFFF	64 K	AMI BIOS
952K-959K	EE000-EFFFF	8 K	Main BIOS (available as UMB)
948K-951K	ED000-EDFFF	4 K	ESCD (Plug and Play configuration area)
944K-947K	EC000-ECFFF	4 K	OEM LOGO (available as UMB)
896K-943K	E0000-EBFFF	48 K	BIOS reserved
800-895K	C8000-DFFFF	96 K	Available High DOS memory (open to ISA and PCI bus)
640K-799K	A0000-C7FFF	160 K	Off-board video memory and BIOS
639K	9FC00-9FFFF	1 K	Extended BIOS Data (moveable by QEMM†, 386MAX†)
512K-638K	80000-9FBFF	127 K	Extended conventional
0K-511K	00000-7FFFF	512 K	Conventional

## I/O Map

Table G-2 I/O Map (1/2)

Address (hex)	Size	Description
0000 - 000F	16 bytes	PIIX3 - DMA 1
0020 - 0021	2 bytes	PIIX3 - Interrupt Controller 1
002E - 002F	2 bytes	Super I/O Configuration
0040 - 0043	4 bytes	PIIX3 - Timer 1
0060	1 byte	Keyboard Controller Byte - Reset IRQ
0061	1 byte	PIIX3 - NMI, speaker control
0064	1 byte	Keyboard Controller, CMD/STAT Byte
0070, bit 7	1 bit	PIIX3 - Enable NMI
0070, bits 6:0	7 bits	PIIX3 - real-time clock, address
0071	1 byte	PIIX3 - real-time clock, data
0078	1 byte	Reserved - Board Configuration
0079	1 byte	Reserved - Board Configuration
0080 - 008F	16 bytes	PIIX3 - DMA Page Register
00A0 - 00A1	2 bytes	PIIX3 - Interrupt Controller 2
00B2	1 byte	APM control port
00B3	1 byte	APM status port
00C0 - 00DE	31 bytes	PIIX3 - DMA 2
00F0	1 byte	Reset Numeric Error
0170 - 0177	8 bytes	Secondary IDE Channel
01F0 - 01F7	8 bytes	Primary IDE Channel
0200 - 0207	8 bytes	Gameport Joystick
0220 - 022F	16 bytes	Sound Blaster / OPL3-SA base port
0270 - 0273	4 bytes	I/O read port for Plug and Play
0278 - 027B	4 bytes	LPT2
02E8 - 02EF	8 bytes	COM4
02F8 - 02FF	8 bytes	COM2
0330 - 0331	2 bytes	Audio - MPU-401
0376	1 byte	Secondary IDE Channel Command Port
0377	1 byte	Secondary IDE Channel Status Port
0378 - 037F	8 bytes	LPT1
0388 - 038B	4 bytes	Audio - FM Synthesizer
03B0 - 03BB	12 bytes	S3 Trio64 V+
03BC - 03BF	4 bytes	LPT3
03C0 - 03DF	32 bytes	S3 Trio64 V+
03E8 - 03EF	8 bytes	COM3
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 byte	Primary IDE Channel Command Port
03F7 (Write)	1 byte	Floppy Channel 1 Command
03F7, bit 7	1 bit	Floppy Disk Change Channel 1
03F7, bits 6:0	7 bits	Primary IDE Channel Status Port

Table G-2 I/O Map (2/2)

Address (hex)	Size	Description
03F8 - 03FF	8 bytes	COM1
04D0 - 04D1	2 bytes	Edge/level triggered
LPT + 400h	8 bytes	ECP port, LPT + 400h
0530-0537	8 bytes	Windows Sound System base port
0CF8 - 0CFB	4 bytes	PCI Configuration Address Register
0CF9	1 byte	Turbo & Reset Control Register
0CFC-0CFF*	4 bytes	PCI Configuration Data Register
FF00 - FF07	8 bytes	IDE Bus Master Register
FFA0 - FFA7	8 bytes	Primary Bus Master IDE Register
FFA8 - FFAF	8 bytes	Secondary Bus Master IDE Register

\* Only by DWORD accesses.

## Port 79 Definition

Table G-3 Port 79 Definition

Bit	Description	Bit = 1	Bit = 0
0	Reserved	N/A	N/A
1	Soft Off capable power supply present	No	Yes
2	Onboard Audio present	Yes	No
3	External Microprocessor clock	See Table B-2	See Table B-2
4	External Microprocessor clock	See Table B-2	See Table B-2
5	Setup Disable	Enable access	Disable access
6	Clear CMOS	Keep values	Clear values
7	Password Clear	Keep password	Clear password

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# **Appendix H**

## **DMA Channels and Interrupts**

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## DMA Channels

*Table H-1 DMA Channels*

<b>DMA</b>	<b>Data Width</b>	<b>Resource</b>
0	8- or 16-bits	Audio
1	8- or 16-bits	Audio
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port
4		Reserved - Cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

## Interrupts

*Table H-2 Interrupts*

IRQ	Resource
NMI	I/O Channel Check
0	Reserved, Interval Timer
1	Reserved, Keyboard buffer full
2	Reserved, Cascade interrupt from slave PIC
3	COM2
4	COM1
5	Sound Blaster/MPU/User available
6	Floppy
7	LPT1
8	Real-time Clock
9	User available
10	User available
11	Windows Sound System/ User available
12	Onboard Mouse Port if present, else user available
13	Reserved, Math coprocessor
14	Primary IDE if present, else user available
15	Secondary IDE if present, else user available

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## Appendix I

## Power Supply Voltages

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## P1 Power Connector ( J6M1 Power)

Table I-1 P1 Power Connector ( J6M1 Power)

Pin #	Signal Name	Color	NoLoad (V)	Sleep (V)	On (V)
1	+3.3V	Orange	-	.+3.3	+3.3
2	+3.3V	Orange	-	+3.3	+3.3
3	Ground	Black	-	0	0
4	+5V	Red	-	+5	+5
5	Ground	Black	-	0	0
6	+5V	Red	-	+5	+5
7	Ground	Black	-	0	0
8	PW-OK	Gray	-	+5	+5
9	+5VSB	Purple	+5	+4.99	+4.99
10	+12V	Yellow	-	+11.8	+11.86
11	+3.3V	Brown & Orange	-	+3.3	+3.3
12	-12V	Blue	-	-11.74	-11.88
13	Ground	Black	-	0	0
14	PS-ON	Green	+5	0	0.67
15	Ground	Black	-	0	0
16	Ground	Black	-	0	0
17	Ground	Black	-	0	0
18	-5V	White	-	-5.0	-5.0
19	+5V	Red	-	+5.0	+5
20	+5V	Red	-	+5.0	+5

## Main Harness Connectors (J10K1)

Table I-2 Main Harness Connectors (J10K1)

	Pin #	Signal Name	Color	Sleep Mode (V)	Power On (V)	Power Off (V)
Power On/Off Switch	1	Power On	Black	+4.75	+4.75	+4.83
	2	Power Return	Yellow	0	0	0
Sleep Mode Switch	3	Sleep_Req	Black	0	0	0
	4	Sleep_Driver	White	+5	+5	0
	5	N/C				
Infrared Connector (For future use)	6	+5V		+5	+5	0
	7	Key				
	8	IR-RX		+4.99	+4.99	0
	9	Ground		0	0	0
	10	IR_TX		0	0	0
	11	IR_SL1		+4.99	+4.99	0
	12	N/C				
	13	+5V		+5.0	+5.0	0
	14	Key				
HDD LED Connector	15	HD Active	Black	+5.0	+5.0	0
	16	+5V	Blue	+5.0	+5.0	0
	17	N/C				
Sleep_Mode	18	Ground	Black	0	0	0
LED Connector	19	Key		0	0	0
	20	LED_PWR	Green	+5.0	+5.0	0
	21	N/C				
Reset Switch	22	Ground	Black	0	0	0
	23	Reset	Red	+5.0	+5.0	0
	24	+5V				
	25	Key				
	26	SPKR_DAT connect	Jumper on Pin 26 and Pin 27			
	27	SPKR_DAT				

## A.2.10 Power On Connector

Table I-3 A.2.10 Power On Connector

Pin #	Signal Name	Color	Sleep	Power On	Power Off
1	Power On		+4.75	+4.75	+4.83
2	Power Off				

## A.2.11 Sleep Connector

Table I-4 A.2.11 Sleep Connector

Pin #	Signal Name	Color	Sleep	Power On	Power Off
1	Sleep Req		0	0	0
2	Sleep Driver		+5.0	+5.0	+5.0

## P2 HDD Power Connector

Table I-5 P2 HDD Power Connector

Pin #	Color	Signal Name	Sleep (V)	Power On (V)	Power Off (V)
1	Yellow	+12V	+11.86	+11.84	0
2	Black	Ground	0	0	0
3	Black	Ground	0	0	0
4	Red	+5V	+5.0	+5.0	0

## P3 Reserved

Table I-6 P3 Reserved

Pin #	Color	Signal Name	Sleep (V)	Power On (V)	Power Off (V)
1	Yellow	+12V	+11.86	+11.84	0
2	Black	Ground	0	0	0
3	Black	Ground	0	0	0
4	Red	+5V	+5.0	+5.0	0

## P4 Reserved

*Table I-7 P4 Reserved*

Pin #	Color	Signal Name	Sleep (V)	Power On (V)	Power Off (V)
1	Yellow	+12V	+11.86	+11.84	0
2	Black	Ground	0	0	0
3	Black	Ground	0	0	0
4	Red	+5V	+5.0	+5.0	0

## P5 CD-ROM Power Connector

*Table I-8 P5 CD-ROM Power Connector*

Pin #	Color	Signal Name	Sleep (V)	Power On (V)	Power Off (V)
1	Yellow	+12V	+11.86	+11.84	0
2	Black	Ground	0	0	0
3	Black	Ground	0	0	0
4	Red	+5V	+5.0	+5.0	0

## P6 FDD Power Connector

*Table I-9 P6 FDD Power Connector*

Pin #	Color	Signal Name	Sleep (V)	Power On (V)	Power Off (V)
1	Yellow	+12V	+11.86	+11.84	0
2	Black	Ground	0	0	0
3	Black	Ground	0	0	0
4	Red	+5V	+5.0	+5.0	0

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# Appendix J



# Keyboard Scan Codes

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# Keyboard Scan Codes

Figure J-1 shows the key numbering for the US keyboard. Figure J-2 shows the key numbering for the Kanji keyboard.

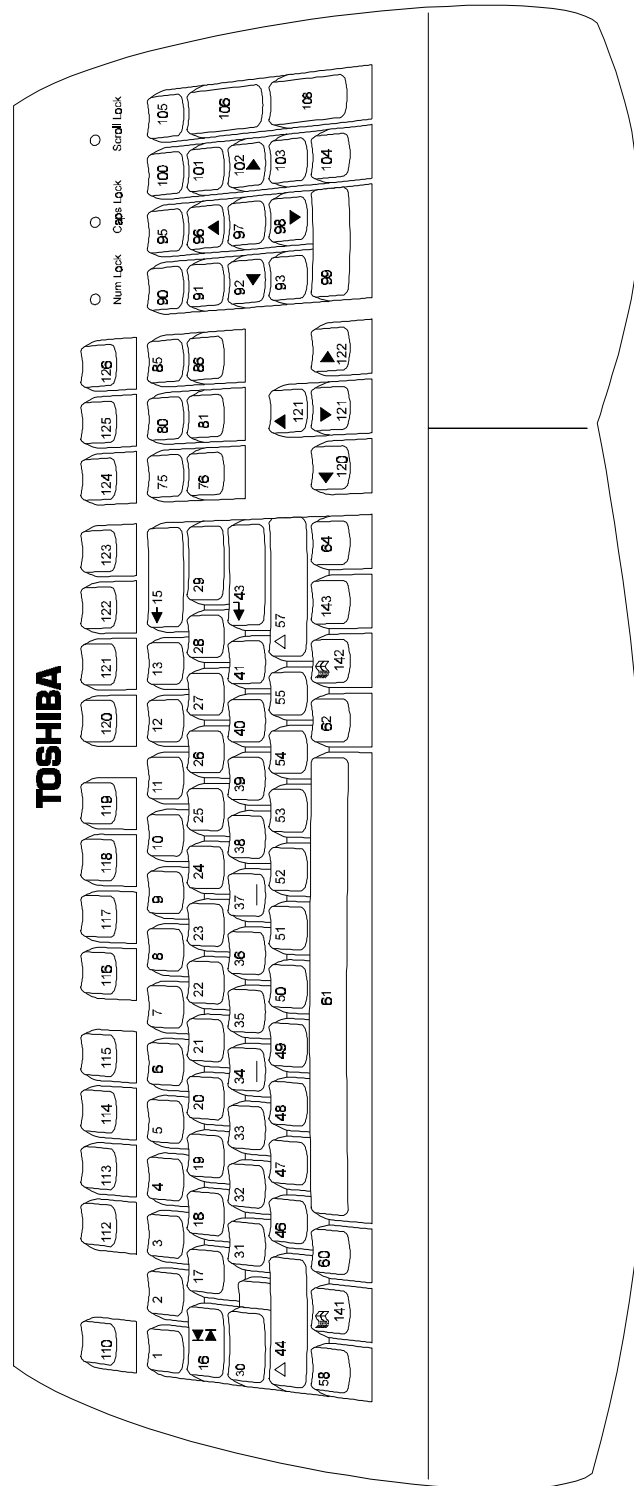


Figure J-1 United States Keyboard Numbering

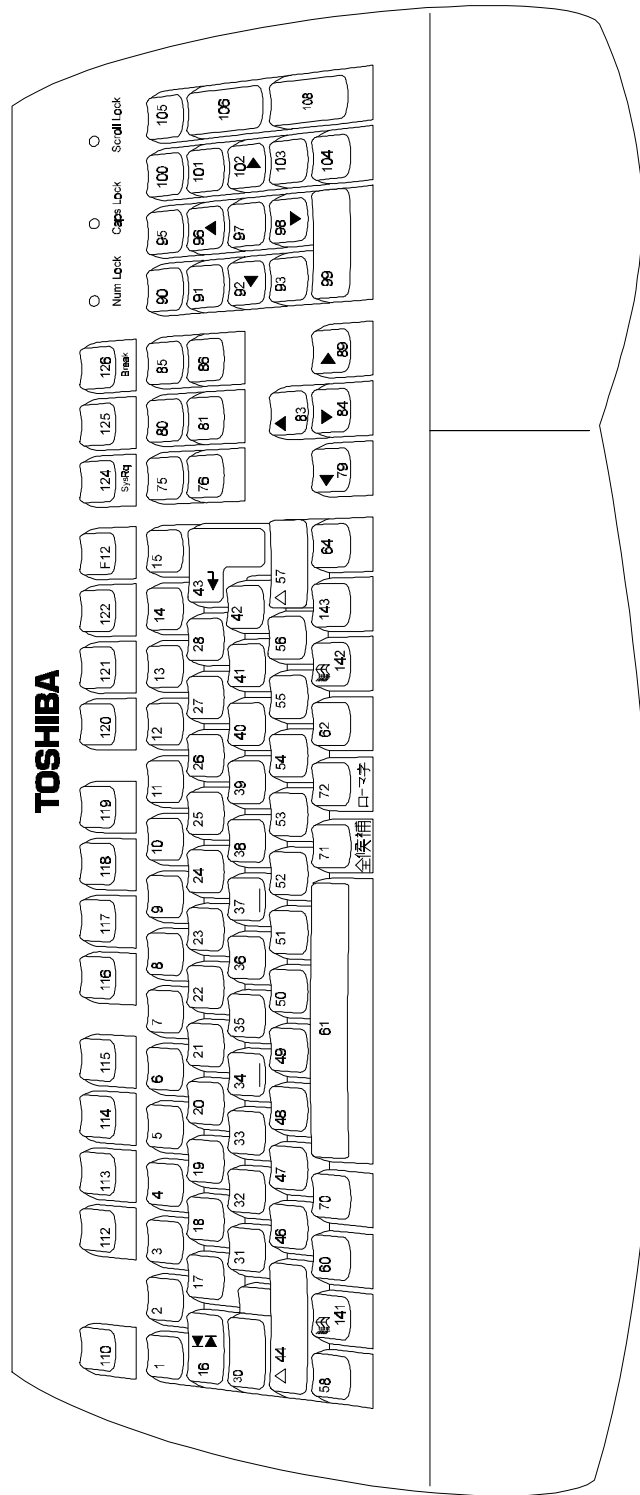


Figure J-2 Kanji Keyboard Numbering

# PC and PC X/T Scan Code Set 1

Table J-1 PC and PC/XT Scan Code Set 1 (1/2)

Key Number	Make Code	Break Code
1	29	A9
2	02	82
3	03	83
4	04	84
5	05	85
6	06	86
7	07	87
8	08	88
9	09	89
10	0A	8A
11	0B	8B
12	0C	8C
13	0D	8D
14	7D	FD
15	0E	8E
16	0F	8F
17	10	90
18	11	91
19	12	92
20	13	93
21	14	94
22	15	95
23	16	96
24	17	97
25	18	98
26	19	99
27	1A	9A
28	1B	9B
29	2B	AB
30	3A	BA
31	1E	9E
32	1F	9F
33	20	A0
34	21	A1
35	22	A2
36	23	A3
37	24	A4
38	25	A5
39	26	A6
40	27	A7

Key Number	Make Code	Break Code
41	28	A8
42	2B	AB
43	1C	9c
44	2A	AA
45	56	06
46	2C	AC
47	20	AD
48	2E	AE
49	2F	AF
50	30	B0
51	31	B1
52	32	B2
53	33	B3
54	34	B4
55	35	B5
56	73	F3
57	36	B6
58	1D	9D
60	38	B8
61	39	B9
62	E0, 38	E0, B8
64	E0, 1D	E0, 9D
70	7B	FB
71	79	F9
72	70	F0
75	See Table J-2	
76	See Table J-2	
79	See Table J-2	
80	See Table J-2	
81	See Table J-2	
83	See Table J-2	
84	See Table J-2	
85	See Table J-2	
86	See Table J-2	
89	See Table J-2	
90	45	C5
91	47	C7
92	4B	CB
93	4F	CF
94	7C	FC

Table J-1 PC and PC/XT Scan Code Set 1 (2/2)

Key Number	Make Code	Break Code	Key Number	Make Code	Break Code
95	See Table J-3		113	3C	BC
96	48	C2	114	30	BD
97	4C	CC	115	3E	BE
98	50	D0	116	3F	BF
99	52	D2	117	40	C0
100	37	B7	118	41	C1
101	49	C9	119	42	C2
102	4D	CD	120	43	C3
103	51	D1	121	44	C4
104	53	D3	122	57	D7
105	4A	CA	123	58	D8
106	4E	CE	124	See Table J-4	
107	7E	FE	125	46	C6
108	E0, 1C	E0, 9C	126	See Table J-5	
109	78	F8	141	E0 5B	E0 DB
110	01	81	142	E0 5C	E0 DC
112	3B	BB	143	E0 5D	E0 DD

**Cursor Key Scan Code Set 1**

Table J-2 Cursor Key Scan Code Set 1

Key Number	Base Case, or Shift + Num Lock "On" Make/Break	Shift Lock "On" Make/Break	Num Lock "On" Make/Break
75	E0 52 / E0 D2	E0 AA E0 52 / E0 D2 E0 2A	E0 2A E0 / E0 D2 E0
76	E0 53 / E0 D3	E0 AA E0 53 / E0 D3 E0 2A	E0 2A E0 / E0 D3 E0 AA
79	E0 4B / E0 CB	E0 AA E0 4B / E0 CB E0 2A	E0 2A E0 4B / E0 CB E0 AA
80	E0 47 / E0 C7	E0 AA E0 47 / E0 C7 E0 2A	E0 2A E0 47 / E0 C7 E0 AA
81	E0 4F / E0 CF	E0 AA E0 4F / E0 CF E0 2A	E0 2A E0 4F / E0 CF E0 AA
83	E0 48 / E0 C8	E0 AA E0 48 / E0 C8 E0 2A	E0 2A E0 48 / E0 C8 E0 AA
84	E0 50 / E0 D0	E0 AA E0 50 / E0 D0 E0 2A	E0 2A E0 50 / E0 D0 E0 AA
85	E0 49 / E0 C9	E0 AA E0 49 / E0 C9 E0 2A	E0 2A E0 49 / E0 C9 E0 AA
86	E0 51 / E0 D1	E0 AA E0 51 / E0 D1 E0 2A	E0 2A E0 51 / E0 D1 E0 AA
89	E0 4D / E0 CD	E0 AA E0 4D / E0 CD E0 2A	E0 2A E0 4D / E0 CD E0 AA

**NOTE:** If the left Shift key is held down, the AA / 2A shift break/make codes are sent along with the scan codes for the shifted character. If the right Shift key is held down, B6/36 is sent. If both Shift keys are held down, both sets of codes are sent along with the scan code for the shifted characters.



## Slash Key Scan Code Set 1

Table J-3 Slash Key Scan Code Set 1

Key Number	Scan Code Make/Break	Shift Case Make/Break
95	E0 35 / E0 B5	E0 AA E0 35 / E0 BS E0 2A

**NOTE:** If the left Shift key is held down, the AA / 2A shift make/break codes are sent along with the scan codes for the shifted character. If the right Shift key is held down, B6 / 36 is sent. If both Shift keys are held down, both sets of codes are sent along with the scan codes for the shifted characters.

## Print Screen Key Scan Code Set 1

Table J-4 Print Screen Key Scan Code Set 1

Key Number	Scan Code Make/Break	Ctrl Case, Shift Case Make/Break	Alt Case Make/Break
124	E0 2A E0 37 / E0 B7 E0 AA	E0 37 / E0 B7	54 / D4

## Pause Key Scan Code Set 1

Table J-5 Pause Key Scan Code Set 1

Key Number	Scan Code Make Only	Control Key Pressed	Alt Case Make/Break
126	E1 1D 45 E1 9D C5	E0 37 / E0 B7	54 / D4

**NOTE:** Key number 126 is not typematic. Its scan codes occur on the make of the key only.

## PC/AT Scan Code Set 2

Table J-6 PC/AT Scan Code Set 2 (1/2)

Key Number	Make Code	Break Code	Key Number	Make Code	Break Code
1	0E	F0 0E	41	52	F0 52
2	16	F0 16	42	50	F0 5D
3	1E	F0 1E	43	5A	F0 5A
4	26	F0 26	44	12	F0 12
5	25	F0 25	45	61	F0 61
6	2E	F0 2E	46	1A	F0 1A
7	36	F0 36	47	22	F0 22
8	30	F0 3D	48	21	F0 21
9	3E	F0 3E	49	2A	F0 2A
10	46	F0 46	50	32	F0 32
11	45	F0 45	51	31	F0 31

12	4E	F0 4E
13	55	F0 55
14	6A	F0 6A
15	66	F0 36
16	0D	F0 0D
17	15	F0 15
18	1D	F0 1D
19	24	F0 24
20	20	F0 2D
21	2C	F0 2C
22	35	F0 35
23	3C	F0 3C
24	43	F0 43
25	44	F0 44
26	40	F0 4D
27	54	F0 54
28	5B	F0 5B
29	50	F0 5D
30	58	F0 58
31	1C	F0 1C
32	1B	F0 1B
33	23	F0 23
34	2B	F0 2B
35	34	F0 34
36	33	F0 33
37	3B	F0 3B
38	42	F0 42
39	4B	F0 4B
40	4C	F0 4C

52	3A	F0 3A
53	41	F0 41
54	49	F0 49
55	4A	F0 4A
56	51	F0 51
57	59	F0 59
58	14	F0 14
60	11	F0 11
61	29	F0 29
62	E0 11	E0 F0 11
64	E0 14	E0 F0 14
70	67	F0 67
71	64	F0 64
72	13	F0 13
75	See Table J-7	
76	See Table J-7	
79	See Table J-7	
80	See Table J-7	
81	See Table J-7	
83	See Table J-7	
84	See Table J-7	
85	See Table J-7	
86	See Table J-7	
89	See Table J-7	
90	77	F0 77
91	6C	F0 6C
92	6B	F0 6B
93	69	F0 69
94	68	F0 68

Table J-6 PC and PC/XT Scan Code Set 2 (2/2)

Key Number	Make Code	Break Code
95	See Table J-8	
96	75	F075
97	73	F0 73
98	72	F0 72
99	70	F0 70
100	7C	F0 7C
101	70	F0 7D
102	74	F0 74
103	7A	F0 7A
104	71	F0 71
105	7B	F0 7B
106	79	F0 79
107	60	F0 6D

Key Number	Make Code	Break Code
113	06	F0 06
114	04	F0 04
115	0C	F0 0C
116	03	F0 03
117	0B	F0 0B
118	83	F0 83
119	0A	F0 0A
120	01	F0 01
121	09	F0 09
122	78	F0 78
123	07	F0 07
124	See Table J-9	
125	7E	F0 7E

108	E0 5A	E0 F0 5A
109	63	F0 63
110	76	F0 76
112	05	F0 05

126	See Table J-10	
141	E0 1F	E0 F0 1F
142	E0 27	E0 F0 27
143	E0 2F	E0 F0 2F

## Cursor Key Scan Code Set 2

Table J-7 Cursor Key Scan Code Set 2

Key Number	Base Case, or Shift + Num Lock "On" Make/Break	Shift Lock "On" Make/Break	Num Lock "On" Make/Break
75	E0 70 / E0 F0 70	E0 F0 12 E0 70 / E0 F0 70 E0 12	E0 12 E0 70 / E0 F0 70 E0 F0 12
76	E0 71 / E0 F0 71	E0 F0 12 E0 71 / E0 F0 71 E0 12	E0 12 E0 71 / E0 F0 71 E0 F0 12
79	E0 6B / E0 F0 6B	E0 F0 12 E0 6B / E0 F0 6B E0 12	E0 12 E0 6B / E0 F0 6B E0 F0 12
80	E0 6C / E0 F0 6C	E0 F0 12 E0 6C / E0 F0 6C E0 12	E0 12 E0 6C / E0 F0 6C E0 F0 12
81	E0 69 / E0 F0 69	E0 F0 12 E0 69 / E0 F0 69 E0 12	E0 12 E0 69 / E0 F0 69 E0 F0 12
83	E0 75 / E0 F0 75	E0 F0 12 E0 75 / E0 F0 75 E0 12	E0 12 E0 75 / E0 F0 75 E0 F0 12
84	E0 72 / E0 F0 72	E0 F0 12 E0 72 / E0 F0 72 E0 12	E0 12 E0 72 / E0 F0 72 E0 F0 12
85	E0 7D / E0 F0 7D	E0 F0 12 E0 7D / E0 F0 7D E0 12	E0 12 E0 7D / E0 F0 7D E0 F0 12
86	E0 7A / E0 F0 7A	E0 F0 12 E0 7A / E0 F0 7A E0 12	E0 12 E0 7A / E0 F0 7A E0 F0 12
89	E0 74 / E0 F0 74	E0 F0 12 E0 74 / E0 F0 74 E0 12	E0 12 E0 74 / E0 F0 74 E0 F0 12

**NOTE:** If the left Shift key is held down, the F0 12/12 shift make/break codes are sent along with the scan codes for the shifted character. If the right Shift key is held down, F0 59/59 is sent. If both Shift keys are held down, both sets of codes are sent along with the scan codes for the shifted characters.

## Slash Key Scan Code Set 2

Table J-8 Slash Key Scan Code Set 2

Key Number	Scan Code Make/Break	Shift Case Make/Break
95	E0 4A / E0 F0 4A	E0 F0 12 E0 4A / E0 F0 4A E0 F2

**NOTE:** If the left Shift key is held down, the F0 12/12 shift make/break codes are sent along with the scan codes for the shifted character. If the right Shift key is held down, F0 59/59 is sent. If both Shift keys are held down, both sets of codes are sent along with the scan codes for the shifted characters.

## Print Screen Key Scan Code Set 2

Table J-9 Print Screen Key Scan Code Set 2

Key Number	Scan Code Make/Break	Ctrl Case, Shift Case Make/Break	Alt Case Make/Break
124	E0 12 E0 7C / E0 F0 7C E0 F0 12	E0 7C / E0 F0 7C	84 / F0 84

## Pause Key Scan Code Set 2

Table J-10 Pause Key Scan Code Set 2

Key Number	Scan Code Make Only	Control Key Pressed
126	E1 14 77 11 F0 14 F0 77	E0 7E E0 F0 7E

**NOTE:** Key number 126 is not typematic. Its scan codes occur on the make of key only.

## Terminal Mode Scan Code Set 3

Table J-11 Terminal Mode Scan Code Set 3 (1/3)

Key Number	Make Code	Break Code	Default Key Mode
1	0E	F0 0E	Typematic
2	16	F0 16	Typematic
3	1E	F0 1E	Typematic
4	26	F0 26	Typematic
5	25	F0 25	Typematic

6	2E	F0 2E	Typematic
7	36	F0 36	Typematic
8	3D	F0 3D	Typematic
9	3E	F0 3E	Typematic
10	46	F0 46	Typematic
11	45	F0 45	Typematic
12	4E	F0 4E	Typematic
13	55	F0 55	Typematic
14	5D	F0 5D	Typematic
15	66	F0 66	Typematic
16	0D	F0 0D	Typematic
17	15	F0 15	Typematic
18	10	F0 1D	Typematic
19	24	F0 24	Typematic
20	20	F0 2D	Typematic
21	2C	F0 2C	Typematic
22	35	F0 35	Typematic
23	3C	F0 3C	Typematic
24	43	F0 43	Typematic
25	44	F0 44	Typematic
26	40	F0 4D	Typematic
27	54	F0 54	Typematic
28	5B	F0 5B	Typematic
29	5C	F0 5C	Typematic
30	14	F0 14	Make/Break
31	1C	F0 1C	Typematic
32	1B	F0 1B	Typematic
33	23	F0 23	Typematic
34	2B	F0 2B	Typematic
35	34	F0 34	Typematic
36	33	F0 33	Typematic
37	3B	F0 3B	Typematic
38	42	F0 42	Typematic
39	4B	F0 4B	Typematic
40	4C	F0 4C	Typematic

*Table J-11 Terminal Mode Scan Code Set 3 (2/3)*

<b>Key Number</b>	<b>Make Code</b>	<b>Break Code</b>	<b>Default Key Mode</b>
41	52	F0 52	Typematic
42	53	F0 53	Typematic
43	5A	F0 5A	Typematic
44	12	F0 12	Make/Break
45	13	F0 13	Make/Break
46	1A	F0 1A	Typematic
47	22	F0 22	Typematic

48	21	F0 21	Typematic
49	2A	F0 2A	Typematic
50	32	F0 32	Typematic
51	31	F0 31	Typematic
52	3A	F0 3A	Typematic
53	41	F0 41	Typematic
54	49	F0 49	Typematic
55	4A	F0 4A	Typematic
56	51	F0 51	Typematic
57	59	F0 59	Make/Break
58	11	F0 11	Make/Break
60	19	F0 19	Make/Break
61	29	F0 29	Typematic
62	39	F0 39	Make only
64	58	F0 58	Make only
70	85	F0 85	Make Only
71	86	F0 86	Make Only
72	87	F0 87	Make Only
75	67	F0 67	Make only
76	64	F0 64	Typematic
79	61	F0 61	Typematic
80	6E	F0 6E	Make only
81	65	F0 65	Make only
83	63	F0 63	Typematic
84	60	F0 60	Typematic
85	6F	F0 6F	Make only
86	60	F0 6D	Make only
89	6A	F0 6A	Typematic
90	76	F0 76	Make only
91	6C	F0 6C	Make only
92	6B	F0 6B	Make only
93	69	F0 69	Make only
94	68	F0 68	Make only
95	77	F0 77	Make only
96	75	F0 75	Make only

*Table J-11 Terminal Mode Scan Code Set 3 (3/3)*

<b>Key Number</b>	<b>Make Code</b>	<b>Break Code</b>	<b>Default Key Mode</b>
97	73	F0 73	Make only
98	72	F0 72	Make only
99	70	F0 70	Make only
100	7E	F0 7E	Make only
101	70	F0 7D	Make only
102	74	F0 74	Make only
103	7A	F0 7A	Make only

104	71	F0 71	Make only
105	84	F0 84	Make only
+	7C	F0 7C	Typematic
(Reserved)	7B	F0 7B	Typematic
Enter	79	F0 79	Make only
(Reserved)	78	F0 78	Make only
Esc	08	F0 08	Make only
F1	07	F0 07	Make only
F2	0F	F0 0F	Make only
F3	17	F0 17	Make only
F4	1F	F0 1F	Make only
F5	27	F0 27	Make only
F6	2F	F0 2F	Make only
F7	37	F0 37	Make only
F8	3F	F0 3F	Make only
F9	47	F0 47	Make only
F10	4F	F0 4F	Make only
F11	56	F0 56	Make only
F12	5E	F0 5E	Make only
Print Scrn	57	F0 57	Make only
Scroll Lock	5F	F0 5F	Make only
Pause	62	F0 62	Make only
Left Win	8B	F0 8B	Make Break
Right Win	8C	F0 8C	Make Break
Apps	8D	F0 8D	Make Break

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# **Appendix K**

## **Keyboard Layouts**

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**Contents**

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K.1. United States (U.S.) Keyboard.....	K-16
K.2. Kanji Keyboard.....	K-17



# United States (U.S.) Keyboard

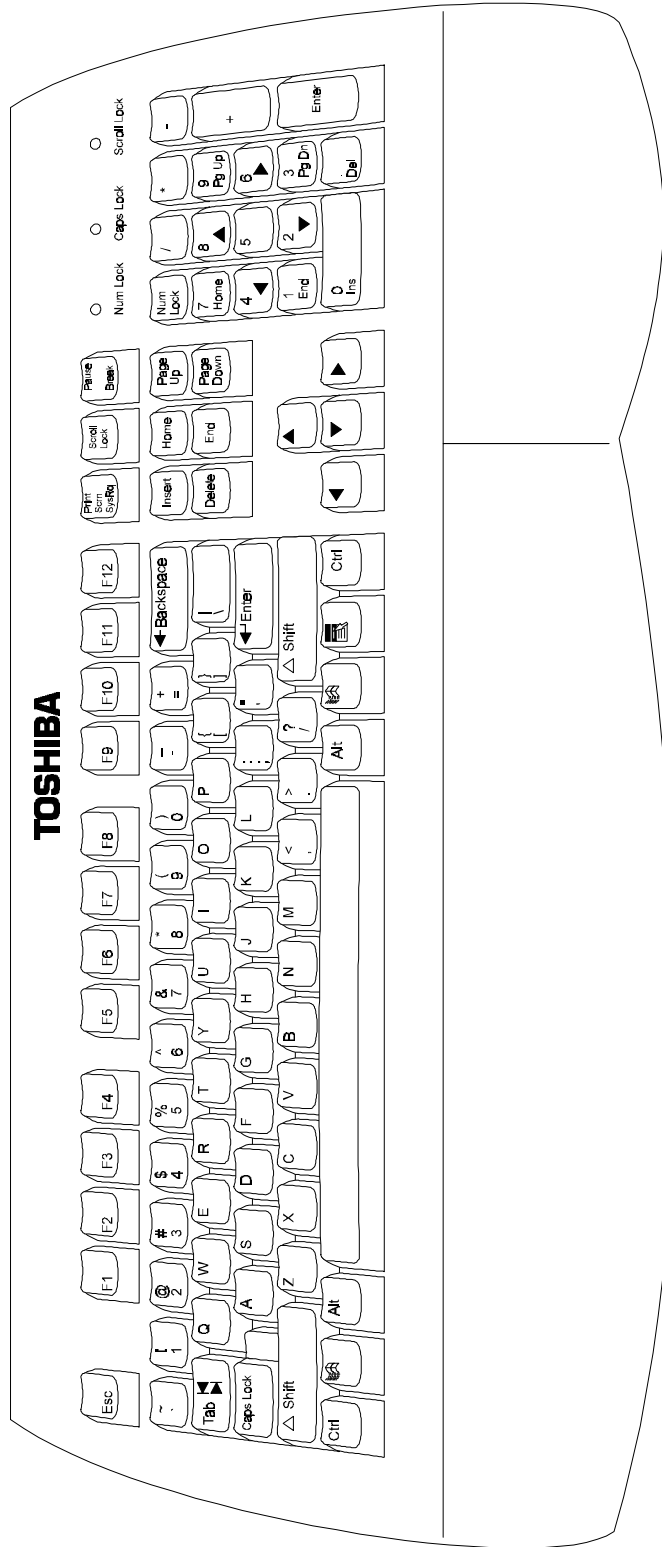


Figure K-1 United States (U.S.) Keyboard

# Japanese Keyboard

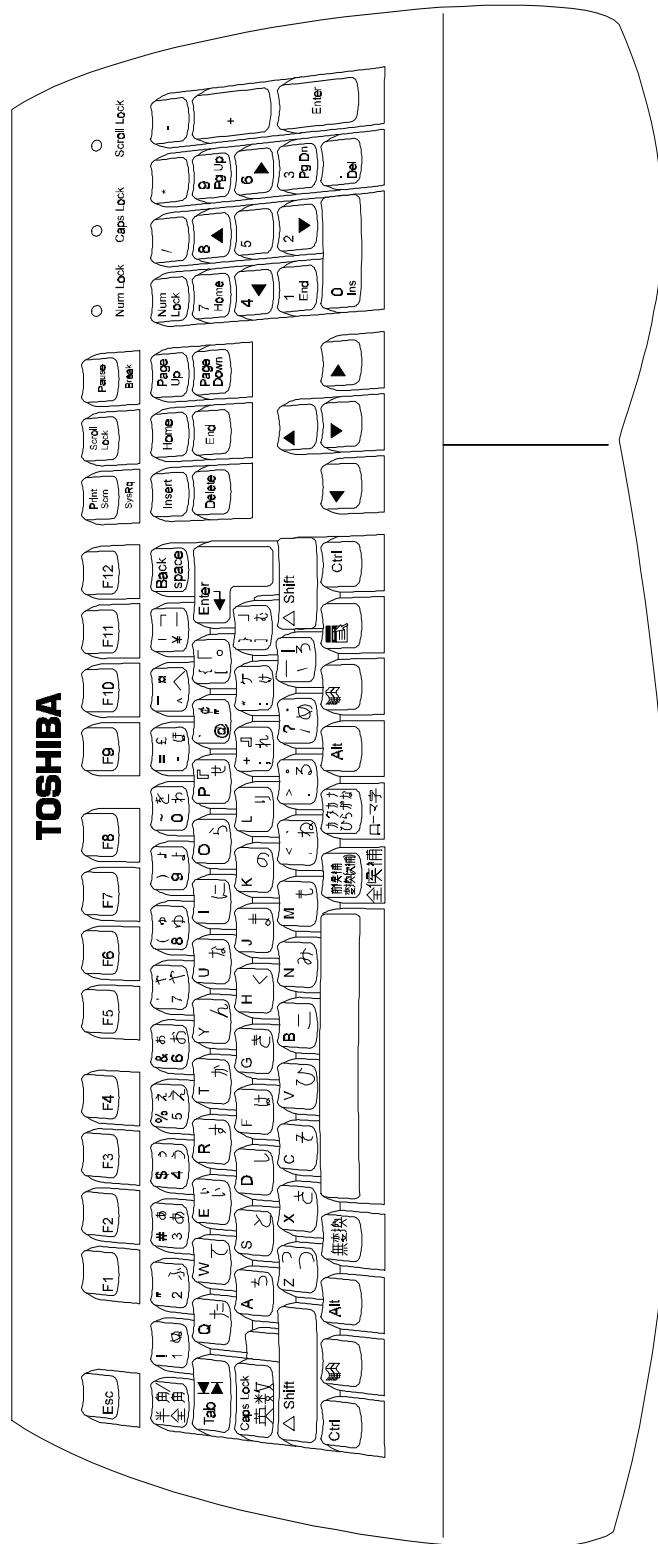


Figure K-2 Kanji Keyboard

**NOTE:** This figure is a representation of the Kanji keyboard and may not match the character set exactly.

