

TOSHIBA

500 Series

*Maintenance  
Manual*

**PN: 500-9400**

## 1.1 Features

The Toshiba 500 Series Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology to provide minimum size and weight, low power usage, and high reliability. The computer incorporates the following features and benefits:

- Microprocessor

This computer uses an Intel ® Pentium® processor 120 MHz with VRT (Voltage Reduction Technology) that operates at 2.9/3.3 volts. The math co-processor and 16 KB cache memory are integrated into Pentium.

- Cache memory

256 KB level-2 cache memory is provided in pipe-line burst SRAM.

- Hard disk drive

1.3 billion byte (1.26 GB) removable HDD pack.

- Selectable Bay

Provides for connection of either an FDD, a CD-ROM, or a second HDD module. A Floppy Disk Drive supports 3.5-inch 2HD (1.44 MB) disks and 2DD (720 KB) disks. The FDD module can be connected to an external FDD port with an attachment when another module is installed in the Selectable Bay. A full-size, six-speed CD-ROM drive contains an ATAPI (AT Attachment Packet Interface) interface controller, and supports the following formats: audio CD, photo CD, ISO 9660, and CD plus. The CD-ROM drive is optional on the 500CS. An optional second HDD has 1.3 billion byte (1.26 GB) capacity.

- Memory

Standard with 16 MB of EDO (Extend Data Out) DRAM. This includes 640 KB of conventional memory and 15488 KB of extended memory.

- Display

12.1-inch DSTN (Dual-Scan Supertwist Nematic) color LCD 800 x 600 pixels (500CS). 12.1-inch TFT (Thin Film Transistor) color LCD 800 x 600 pixels (500CDT). The built-in display controller supports full color capability and up to 1280 x 1024 resolution on an external monitor.

- Keyboard

An-easy-to-use 82/84-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. This keyboard supports software that uses a 101- or 102-key enhanced keyboard.

Batteries

Three different batteries: a Lithium-Ion main battery, a backup battery (for memory backup), and an RTC battery (Real Time Clock).

Expansion memory slot

An optional 8, 16, 32, 48, or 128 MB memory module can be installed in the memory slot.

Parallel port

This port can be used to connect a Centronics ® compatible printer or other parallel device. The port supports ECP (Extended Capabilities Port) conforming to IEEE-1284.

Serial port

The serial controller is 16550UART compatible. This standard, 9-pin, serial port can be used to connect such serial devices as a serial printer, serial mouse, or external modem.

External monitor port

The female, 15-pin, D-shell connector can be connected to an external SVGA monitor. This computer supports VESA (Video Electronics Standards Association) DDC (Display Data Channel) 2B compatible functions.

PS/2™ mouse/keyboard port

Either a PS/2 compatible keyboard or a PS/2 compatible mouse can be connected to this port.

PC card slot

A PC card slot can accommodate two Type II (5.0mm) cards or one Type III (10.5mm) card, which support PCMCIA Release 2.01 standard. These slots are ready for advanced cards, including PC card 16 multifunction cards and CardBus 32-bit cards as well as the ZV (Zoomed Video) port, which is dedicated to high-performance video data transfer such as MPEG video playback.

Docking interface port

This 240-pin port enables connection of an Enhanced Port Replicator II or a Desk Station V Plus. The Enhanced Port Replicator II duplicates the following ports on the computer: PS/2 keyboard, PS/2 mouse, serial port, parallel port, external CRT, audio line-in, audio line-out, headphone, and microphone. It also provides a joystick port and two additional PC card slots (Type III). The Desk Station V Plus expands additional features to the Enhanced Port Replicator II as follows: two PCI/ISA bus slots and one PCI bus expansion slot, a 5.25-inch drive bay, a Selectable Bay, and an on-board SCSI-2 (Small Computer System Interface) controller.

External FDD port

The external FDD port lets you connect an external FDD in the attachment when a CD-ROM drive or second HDD is installed in the SelectBay.

AccuPoint

A pointer control stick, located in the center of the keyboard, provides convenient control of the cursor without requiring desk space for a mouse.

Serial infrared port

Incorporates two infrared ports located on the front and back. These ports are compatible with IrDA1.1 (Infrared Data Association) FIR (Fast Infrared) standard, which enables cableless 4 Mbps data transfer.

Sound System

Compatible with Sound Blaster™ Pro™ and Windows® Sound System. This computer is equipped with a microphone, stereo speakers, and the following jacks: audio line-in, audio line-out, headphone, and microphone.

Internal Modem (optional in some markets)

Supports V.34 data communication (28.8Kbps), V.17 class-1 facsimile (14.4Kbps), and voice functions (speaker phone and TAM: Telephone Answering Machine). This computer is equipped with an RJ11 modem jack to connect a telephone line directly.

The 500 series Personal Computer is shown in figure 1-1.

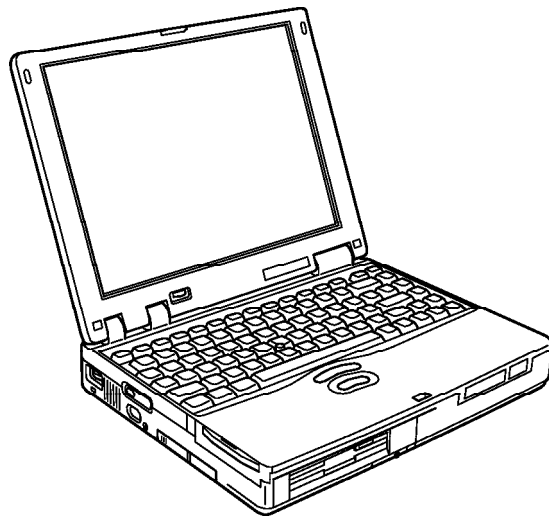


Figure 1-1 500 series personal computer

The 500 series system configuration is shown in figure 1-2.

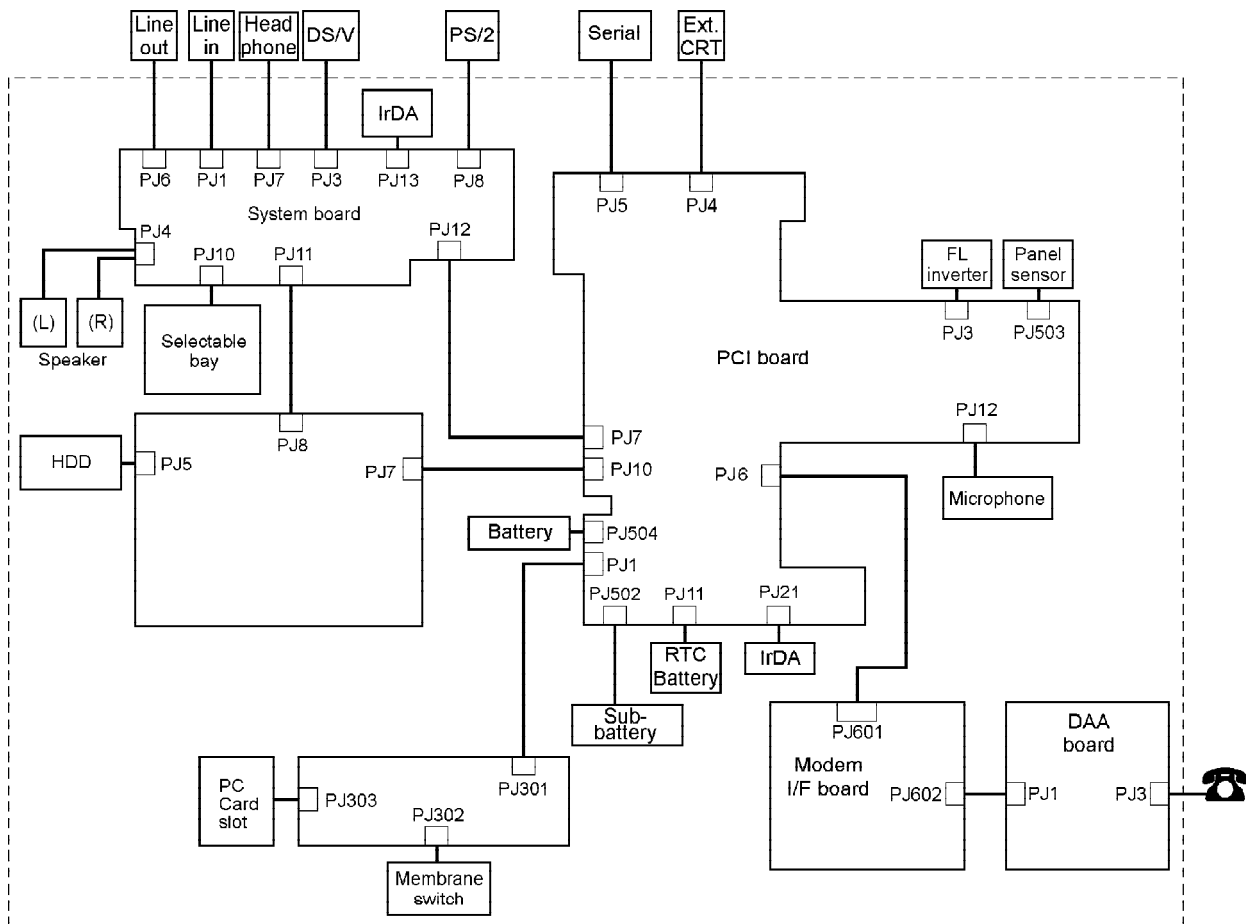


Figure 1-2 500 series system unit configuration

## 1.2 System Unit Block Diagram

Figure 1-3 is a block diagram of the system unit.

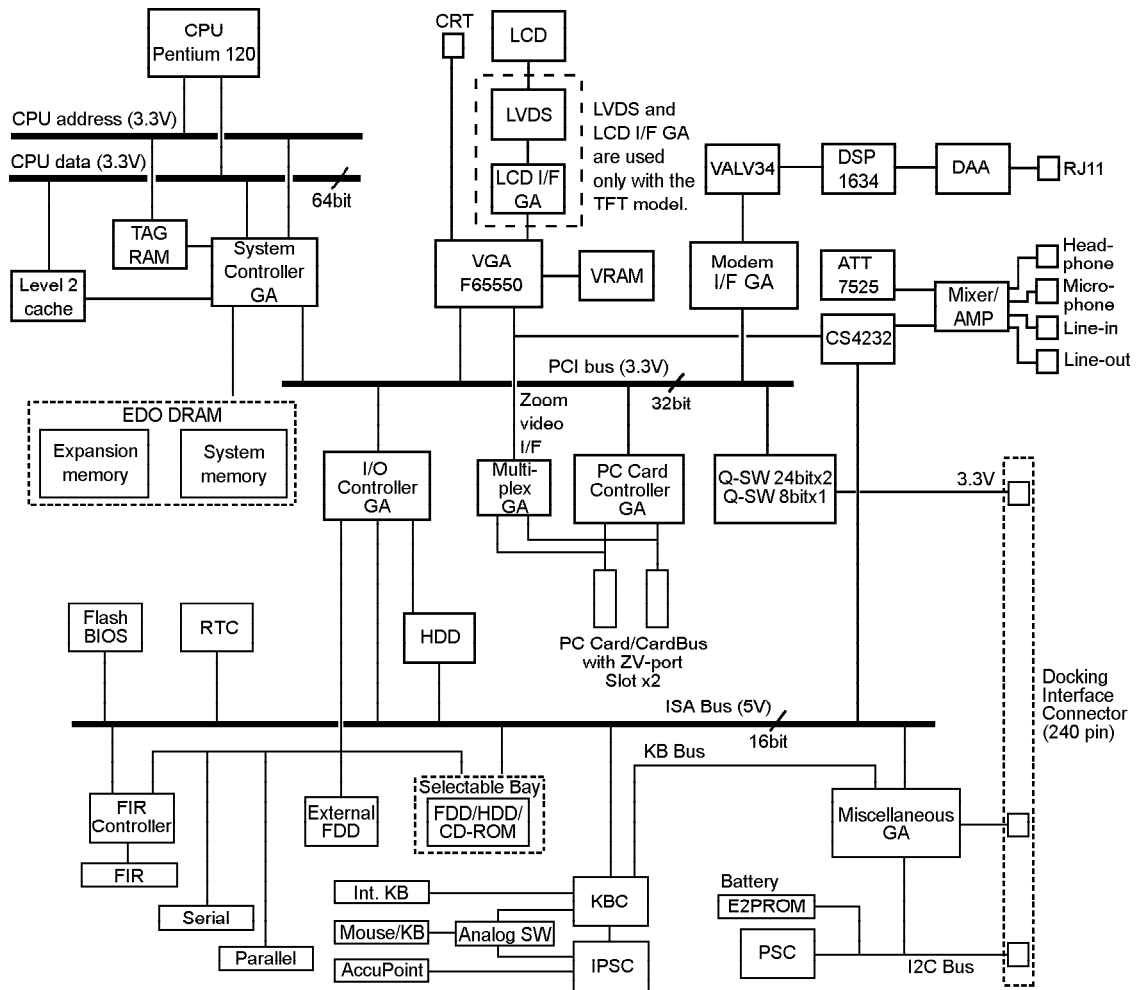


Figure 1-3 System board block diagram

The system board is composed of the following major components:

- ❑ Intel Pentium processor
  - Operates at 120 MHz and 2.9/3.3 volts. The math co-processor and 16 KB cache memory are integrated into Pentium.
  
- ❑ Level-2 cache memory
  - Data RAM: 256 KB
    - Two 32K x 32-bit pipe-line burst synchronous SRAM chips
    - 3.3 volt operation
    - Access time 8 ns
  - Tag RAM: 32 KB (only 8 KB is used)
    - One 32K x 8-bit asynchronous SRAM chip
    - 3.3 volt operation
    - Access time 15 ns
  - The level-2 cache is a direct map method and a write-through policy.
  
- ❑ Standard RAM
  - 16 MB, eight 1M x 16-bit EDO DRAM chips
  - 3.3 volt operation
  - No parity bit
  - Access time 60/65 ns
  - Data transfer is 64-bit width
  
- ❑ BIOS ROM (Flash EEPROM)
  - 256 KB, one 256K x 8-bit chip
    - 128 KB used for system BIOS
    - 64 KB used for VGA-BIOS
    - 8 KB used for plug and play data area
    - 8 KB used for password security
    - 16 KB used for boot strap
    - 32 KB reserved
  - 5 volt operation
  - Access time 80 ns
  - Data transfer is 8-bit width
  
- ❑ Optional memory
  - One expansion memory slot is available for 8, 16, 32, 48, and 128 MB memory modules. 8, 16, 32, and 48 MB memory modules consist of some 1M x 16-bit chips. 128 MB memory modules consist of some 4M x 16-bit chips.
    - EDO DRAM is used
    - 3.3 volt operation
    - No parity bit
    - Access time 60 ns
    - Data transfer is 64-bit width

- ❑ Video RAM
  - 2 MB, four 256K x 16-bit EDO DRAM chips
  - 5 volt operation
  - Access time 50 ns
  
- ❑ System Controller Gate Array
  - This gate array has the following functions:
    - CPU interface/control
    - Level-2 cache memory control
    - DRAM control
    - PCI master/slave interface
    - Write buffer (CPU-DRAM, CPU-PCI, PCI-DRAM)
    - Prefetch buffer (PCI-DRAM)
    - Two DMACs: 82C37 equivalent
    - Two PICs: 82C59 equivalent
    - One PIT: 82C54 equivalent
    - Serial interrupt function
    - Power management control
    - Suspend/resume control
    - CPU stop clock function
  
- ❑ I/O Controller Gate Array
  - This gate array has the following functions:
    - Two UARTs 16550A equivalent (One SIO is used for SIR)
    - One FDC  $\mu$ PD765A equivalent
    - One parallel port control supported ECP
    - ISA bus control
    - PCI bus front end control
  
- ❑ Multiplex Gate Array
  - This gate array is a multiplexer for a ZV-port.
  
- ❑ LCD Interface Gate Array (TFT only)
  - Controls data transfer between a VGA controller and LVDS
  
- ❑ PC Card Controller Gate Array
  - This gate array has the following functions:
    - PC card control
    - CardBus control
    - ZV-port support (multiplex gate array control)

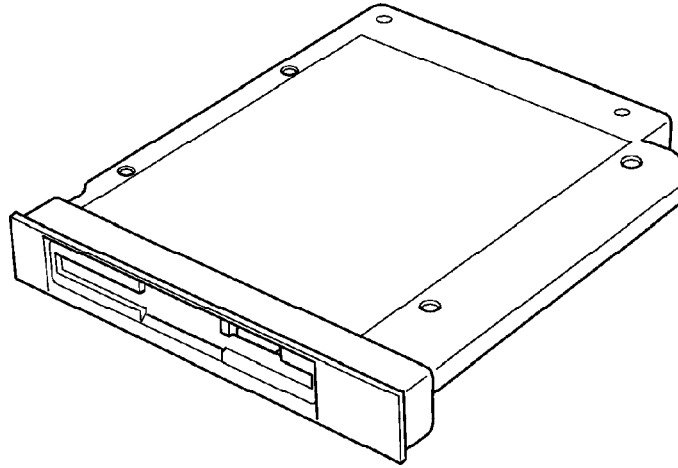


- ❑ Miscellaneous Gate Array
  - This gate array has the following functions:
    - Communication control
      - Communication with KBC
      - I2C bus interface
        - Communication with PS
        - Communication with Desk Station V Plus
        - Communication with EEPROM
        - Communication register set
    - PWM control
      - Beep volume
    - Speaker control
    - Universal I/O port
    - Q-SW control
- ❑ Modem Interface Gate Array
  - Controls modem interface LSIs
- ❑ Video Controller
  - Chips & Technologies F65550 is used
  - Controls internal LCD and external monitor
- ❑ Keyboard Controller (KBC)
  - One M38802M4 chip is used
  - Includes the keyboard scan controller and keyboard interface controller.
  - Controls the internal keyboard, external keyboard, and PS/2 mouse.
- ❑ AccuPoint Controller (IPSC)
  - One KPAAC0062A chip is used
  - Provides simultaneous control of both the AccuPoint and a PS/2 mouse.
- ❑ Real Time Clock (RTC)
  - One T9934 chip is used
  - The T9934 has 128 of bytes memory. Fourteen bytes of memory are used for the calendar and clock. The remaining 114 bytes are used for the system configuration data.

### 1.3 3.5-inch Floppy Disk Drive

The 3.5-inch removable FDD is a thin, high-performance reliable drive that supports 720-KB (formatted) 2DD and 1.44-MB (formatted) 2HD disks. When a CD-ROM is installed in the Selectable Bay, an FDD attachment can be used to connect the FDD to an external FDD port.

The FDD is shown in Figure 1-4.



*Figure 1-4 3.5-inch FDD*

The specifications for the FDD are listed in Table 1-1.

*Table 1-1 3.5-inch FDD specifications*

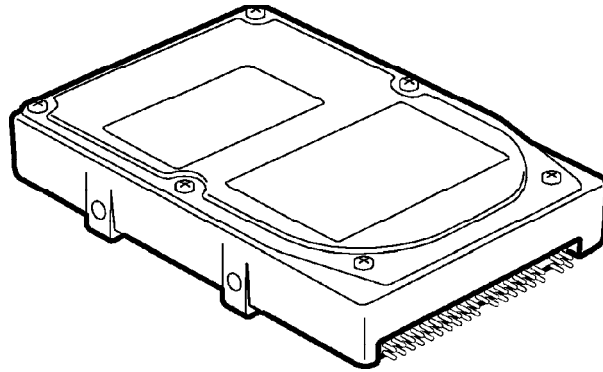
Item	2-MB mode	1-MB mode
Storage capacity (KB)		
Unformatted	2,000	1,000
Formatted	1,440	720
Number of heads	2	2
Number of cylinders	80	80
Access time (ms)		
Track to track	3	3
Average	181	181
Head settling time	15	15
Recording track density (tpi)	135	135
Data transfer rate (Kbps)	500	250
Rotation speed (rpm)	300	300
Recording method	Modified Frequency Modulation (MFM)	

## 1.4 2.5-inch Hard Disk Drive and Second Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-winchester type magnetic heads.

The 500 series supports two 1.3 billion byte (1.26 GB) HDDs.

The 500 series HDD is shown in Figure 1-5.



*Figure 1-5 2.5-inch HDD*

Specifications for the HDDs are listed in Tables 1-2 and 1-3.

*Table 1-2 2.5-inch HDD specifications*

<b>Items</b>	<b>(MK2720FC)</b>
Storage capacity Formatted (byte)	1,358,880,768
Cylinders	2,633
Heads	16
Sectors	63
Bytes per sector	512
Rotation speed (rpm)	4,200
Recording method	8-9 RLL

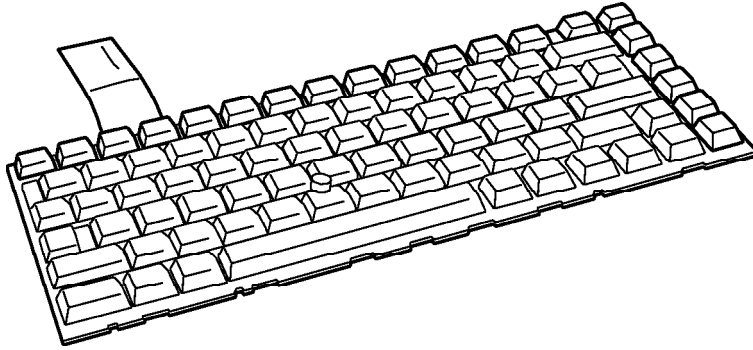
Table 1-3 Second HDD specifications

Items	(MK1301MAV)
Formatted capacity (byte)	1,358,880,768
Disks	3
Heads	16
Cylinders	2,633
Sectors	63
Bytes per sector	512
Access time (MS)	
Average	13
Track to track	3
Maximum stroke	25
Rotation speed (rpm)	4,200
Data transfer rate (Mbps)	31.8 to 54.8
Buffer size (Kbytes)	128
Power requirement	+5V
Power (W)	
Seek	3.8
Read/Write	3.2
Idle	1.0
Standby	0.4
Sleep	0.2

## 1.5 Keyboard

The 82-(USA) or 84-(European) key keyboard is mounted on the system unit. The keyboard is connected to the keyboard controller on the system board through a 25-pin flat cable. The 500 series AccuPoint, located in the center of the keyboard, provides convenient control of the cursor without requiring desk space for a mouse. The keyboard is shown in Figure 1-6.

See Appendix E for optional keyboard configurations.



*Figure 1-6 Keyboard*

## 1.6 CD-ROM Drive

The removable CD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CDs. It provides high-performance, six-speed play (reads 900KB per second). This drive supports the following formats:

Red-Book, Yellow-Book, CD-ROM XA, Photo CD, CD-Bridge, CD-I, and CD Plus

The CD-ROM drive is shown in Figure 1-7.

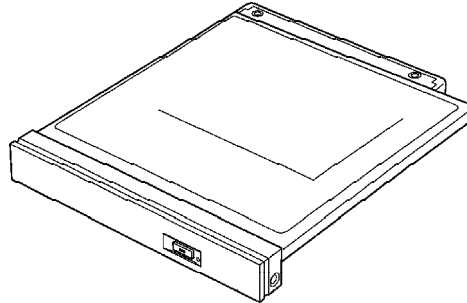


Figure 1 -7 CD-ROM drive

The specifications for the CD-ROM drive are listed in Table 1-4.

Table 1-4 CD-ROM drive specifications

Item	1 x mode	6 x mode
Data Capacity (bytes/block)		
Mode 1	2,048	
Mode 2	2,336	
Transfer Rate		
Sustained Block transfer speed (blocks/s)	75	450
Sustained Data transfer speed (kbytes/s)		
Mode 1	150	900
Mode 2	171	1,026
ATAPI Burst (Mbytes/s)	8.33 (PIO mode 2)	
Access time (ms)		
Average Random Access	350	190
Average Random Seek	230	160
Average Full Stroke Access	500	330
Rotation speed (rpm)	200 to 530	1,200 to 3,180
Data Buffer Capacity (Kbytes)	128	

## 1.7 STN Color LCD

The 500CS STN Color Liquid Crystal Display (LCD) contains an LCD module, a Fluorescent Lamp (FL), and an FL inverter board.

### 1.7.1 STN Color LCD Module

The STN color LCD is backlit and supports 800x600 pixels with built-in display controller. This controller includes the functions of Video Graphics Array (VGA) and Super VGA (SVGA) for external display.

The video controller, F65550, enables an LCD display of a maximum 64K colors.

The STN LCD is shown in Figure 1-8.

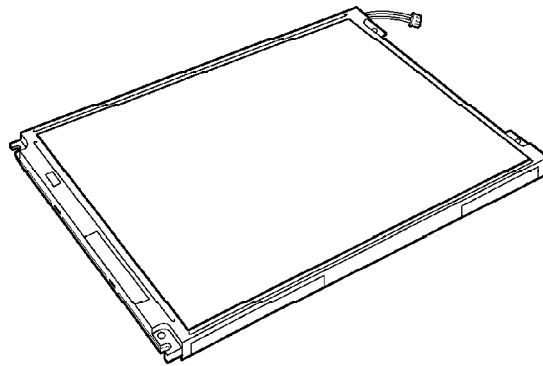


Figure 1-8 STN color LCD

The specifications for the LCD are listed in Table 1-5.

Table 1-5 STN color LCD specifications

Item		Specifications
Number of Pixels	(pixels)	800x600
Dot pitch	(mm)	0.3075x0.3075
Display area	(mm)	246 (W)x184.5(H)
Contrast		20:1
FL current	(mA)	6.0/4.0/3.6/2.4* (Bright/Semi-bright)

**\*NOTE:** The FL currents at power on are:

	<i>Bright</i>	<i>Semi-bright</i>
<i>AC cable connected</i>	<i>6 mA</i>	<i>3.6 mA</i>
<i>AC cable not connected</i>	<i>4 mA</i>	<i>2.4 mA</i>

(The settings at power on do not change even if the AC cable connection changes.)

## 1.7.2 Fluorescent Lamp (FL) Inverter Board for STN

The FL inverter board supplies high frequency current to light the LCD's Fluorescent Lamp. The specifications for the FL inverter are listed in Table 1-6.

*Table 1-6 FL inverter board specifications for STN color LCD*

Item		Specifications
Input	Voltage (V)	4 to 5.5
	Power (W)	4.8
Output	Voltage (Vrms)	1,100
	Current (mA)	6.0/4.0/3.6/2.4



## 1.8 TFT Color LCD

The 500CDT TFT Color LCD contains an LCD module, an FL, and an FL inverter board.

### 1.8.1 TFT Color LCD Module

The TFT color LCD is backlit and supports 800x600 pixels with built-in display controller. This controller includes the functions of VGA and SVGA for external display.

The video controller, F65550, enables an LCD display of a maximum 16M colors.

The TFT LCD is shown in Figure 1-8.

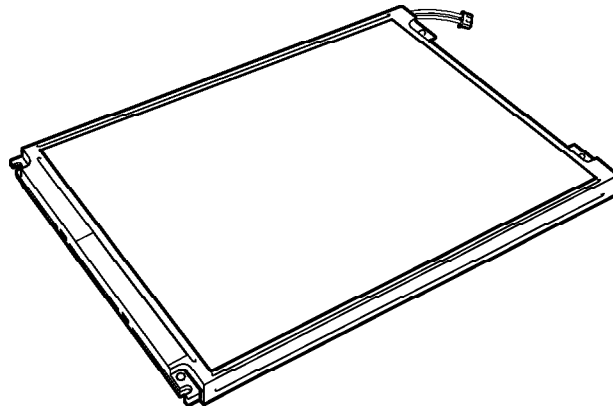


Figure 1-9 TFT color LCD

The specifications for the LCD are listed in Table 1-7.

Table 1-7 TFT color LCD specifications

Item		Specifications
Number of Pixels	(pixels)	800x600
Dot pitch	(mm)	0.3075x0.3075
Display area	(mm)	246 (W)x184.5(H)
Contrast		100:1
FL current	(mA)	6.0/4.6/3.6/2.8* (Bright/Semi-bright)

**\*NOTE:** The FL currents at power on are:

	<i>Bright</i>	<i>Semi-bright</i>
<i>AC cable connected</i>	<i>6 mA</i>	<i>3.6 mA</i>
<i>AC cable not connected</i>	<i>4.6 mA</i>	<i>2.8 mA</i>

(The settings at power on do not change even if the AC cable connection changes.)

## 1.8.2 Fluorescent Lamp (FL) Inverter Board for TFT

The FL inverter board supplies high frequency current to light the LCD's Fluorescent Lamp. The specifications for the FL inverter board are listed in Table 1-8.

*Table 1-8 FL inverter board specifications for TFT color LCD*

Item			Specifications
Input	Voltage	(V)	4 to 5.5
	Power	(W)	4.8
Output	Voltage	(Vrms)	1,100
	Current	(mA)	6.0/4.6/3.6/2.8

## 1.9 Power Supply

The power supply provides four kinds of voltages to the system board. The power supply has one microprocessor, operates at 2 MHz, and contains the following functions:

1. Determines if the AC cable or battery is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the Battery icon and AC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Determines if the power can be turned on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Detects Ring Indicator (RI) signal for Auto Power On Function.

The power supply output rating is specified in Table 1-9.

*Table 1-9 Power supply board output rating*

Use	Name	DC voltage (V)	Regulation tolerance (%)	Maximum current (mA)	Ripple (mV)
System logic, FDD, HDD Display panel, FL and PC card	B5V	+5.0	±5	3,400	100
CPU, RAM, PC card	B3V	+3.3	±5	3,800	60
Flash ROM, PC card	B12V	+12.0	±5	100	240
System logic	MCV	+5.0	±5	5	50

## 1.10 Batteries

The computer has three types of batteries:

- Main battery pack
- Backup battery
- RTC battery

Battery specifications are listed in Table 1-10.

*Table 1-10 Battery specifications*

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	10.8 V	3,600 mAh
Backup battery	Nickel Metal Hydride	7.2 V	30 mAh
RTC battery	Nickel Metal Hydride	3.6 V	30 mAh

### 1.10.1 Main Battery

The removable main battery pack is the computer's main power source when the AC cable is not attached. The backup and main battery maintain the state of the computer when you enable AutoResume.

### 1.10.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor that is mounted on the PCI board. The microprocessor controls whether the charge is on or off and detects a full charge when the AC cable and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

- Quick Battery Charge

When the AC cable is attached, there are two types of quick charge: quick charge 1 when the system is powered off and quick charge 2 when the system is powered on.

*Table 1-11 Time required for quick charges*

	Charging time
Quick charge 1 (power off)	2 to 3.5 hours
Quick charge 2 (power on)	5 to 8 hours

- NOTES**
- 1: *The time required for quick charge 2 is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.*
  - 2: *Using quick charge 1, the system CPU automatically stops the charge after five hours and 30 minutes regardless of the condition of the battery.*

If one of the following occurs, the battery quick charge process stops.

1. The battery becomes fully charged.
2. The AC cable or battery is removed.
3. The battery or output voltage is abnormal.

Trickle Battery Charge

When the main battery is fully charged and the AC cable is attached, the microprocessor automatically changes quick charge 1 or 2 to trickle charge.

Detection of full charge

A full charge is detected only when the battery is charging at quick charge. A full charge is detected under any of the following conditions:

1. The current in the battery charging circuit drops under the predetermined limit.
2. The charging time exceeds the fixed limit.
3. The battery's temperature is over 50°C.

### 1.10.3 Backup Battery

The backup battery maintains data for AutoResume. The power source used to back-up the AutoResume data is determined according to the following priority:

AC cable > Main battery > Backup battery

The backup battery is charged by the AC cable. Table 1-12 shows the charging time and data preservation period of the backup battery.

*Table 1-12 Backup battery charging/data preservation time*

	<b>Time</b>
Charging Time	10 H
Data preservation period (full charge)	1.5 H

#### 1.10.4 RTC Battery

The RTC battery provides power to keep the current date, time, and other setup information in memory while the computer is turned off. Table 1-13 shows the charging time and data preservation period of the RTC battery.

*Table 1-13 RTC battery charging/data preservation time*

	<b>Time</b>
Charging Time (Power On)	48 H
Data preservation period (full charge)	1 month

## 2.1 Troubleshooting

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

1. System (FVRSY\*) Board
2. PCI (FVRPL\*/PS\*) Board
3. Sound (FVRSD\*) Board
4. CardBus (FVRCD\*) Board
5. LCD FPC (FVRLF\*) Board  
(only for 500CS)
6. DAA (FLXDA\*) Board
7. Modem (FVRMD\*) Board
8. Floppy Disk Drive
9. Hard Disk Drive
10. CD-ROM Drive
11. Keyboard
12. Display

**NOTE:** The DAA (FLXDA\*) Board is standard equipment in Canada and the United States and an option in Europe.

The Diagnostics Disk operations are described in Chapter 3 and Replacement Procedures are detailed in Chapter 4.

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk
2. Phillips screwdriver (2 mm)
3. Toshiba MS-DOS system disk(s)  
(You must install the following onto the disk: SYS.COM, FORMAT.COM, FDISK.COM and FDISK.EXE)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Cleaning kit for floppy disk drive troubleshooting
6. Printer port LED
7. Printer wraparound connector
8. Serial port wraparound connector
9. PC Card wraparound card
10. Multimeter
11. External monitor
12. PS/2 or compatible keyboard
13. PS/2 or compatible mouse
14. Multimedia sound system with line-in and line-out ports
15. Headphone
16. Microphone
17. Speakers with amplifier
18. External FDD attachment
19. Lens cleaner for CD-ROM laser pickup lens
20. Toshiba-EMI Test Disk TDY-03 for CD-ROM drive.

## 2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, do the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password. If the user has forgotten the password, connect the printer port wraparound board (F31PRT), then turn the POWER switch on. The computer will override the password function by erasing the current password.
- Verify with the customer that Toshiba MS-DOS or Toshiba Windows<sup>®</sup> 95 is installed on the hard disk. Non-Toshiba operating systems can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive is empty.



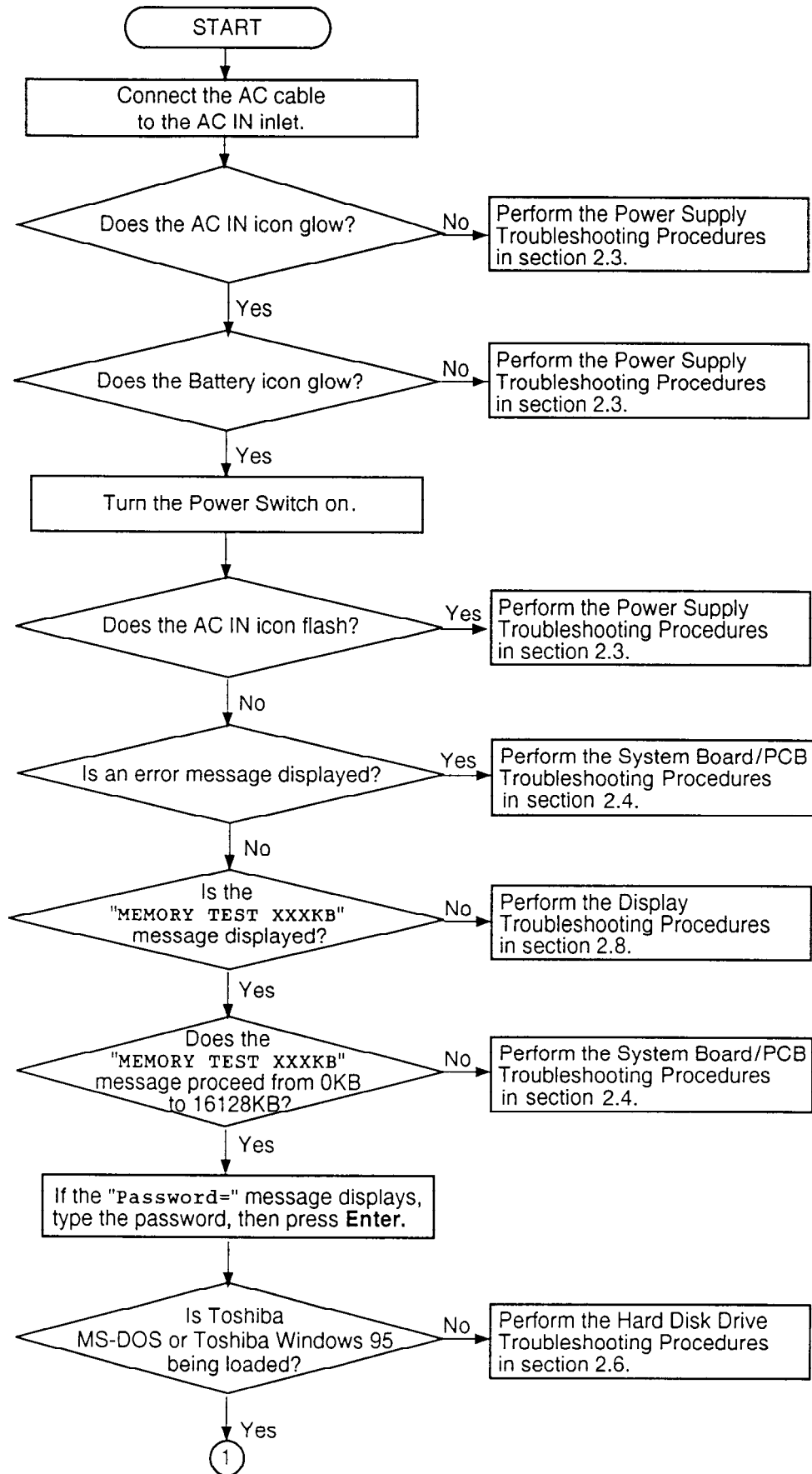


Figure 2-1 Troubleshooting flowchart (1/2)

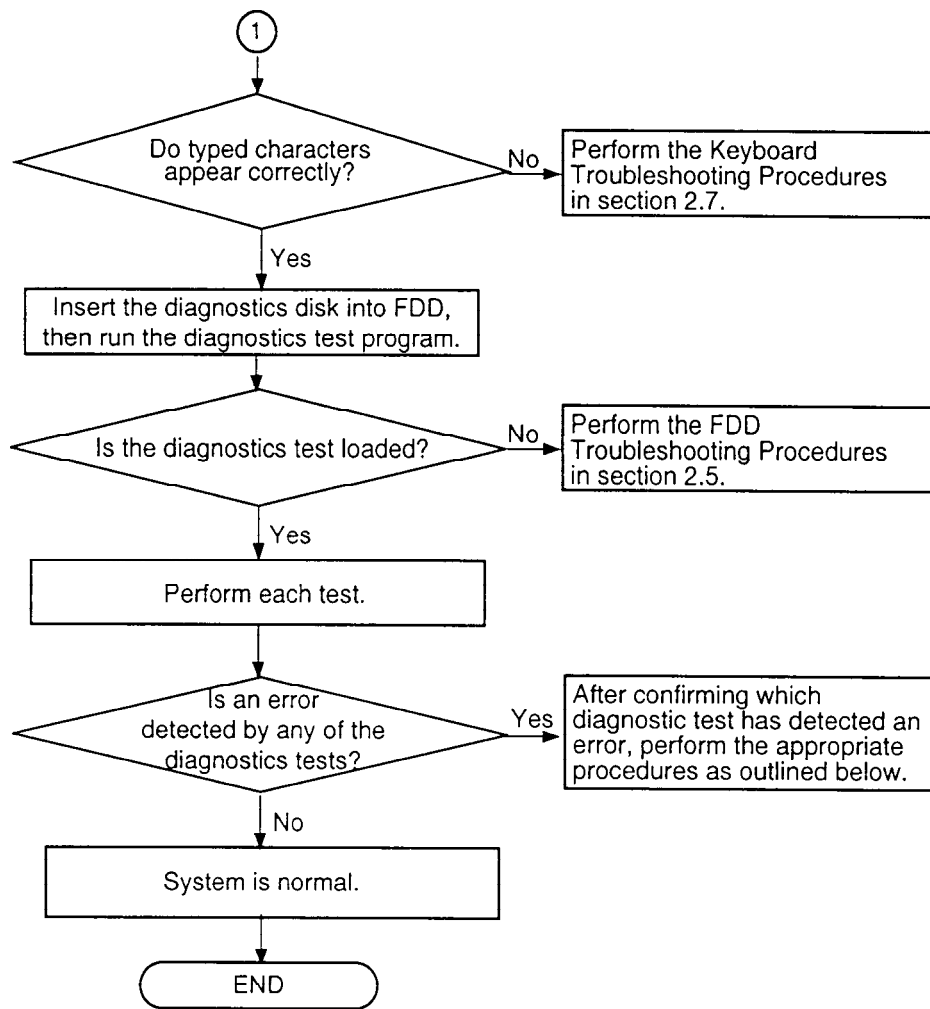


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Running Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error(s), then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the system test, memory test, display test, ASYNC test, printer test, expansion test, sound test, or real timer test perform the system board/PCB troubleshooting procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the FDD troubleshooting procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the hard disk drive troubleshooting procedures in Section 2.6.
4. If an error is detected on the keyboard test, perform the keyboard troubleshooting procedures in Section 2.7.

5. If an error is detected on the display test, perform the display troubleshooting procedures in Section 2.8.
6. If an error is detected on the CD-ROM test, perform the CD-ROM drive troubleshooting procedures in Section 2.9.
7. If an error is detected on the modem test, perform the modem troubleshooting procedures in Section 2.10.

## 2.3 Power Supply Troubleshooting

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The procedures described in this section are:

Procedure 1: Power Status Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Quick Charge Check

Procedure 5: Replacement Check

## Procedure 1 Power Status Check

The following icons indicate the power supply status:

- Battery icon
- AC IN icon

The power supply controller displays the power supply status through the Battery and the AC IN icons as shown in the tables below.

*Table 2-1 Battery icon*

<b>Battery icon</b>	<b>Power supply status</b>
Lights yellow	Quick charge
Lights green	Battery has a full charge and the AC cable is connected
Blinks yellow (even intervals)	The battery level becomes low while operating the computer on battery power <sup>*1</sup>
Flashes yellow	The power switch is pressed on when the battery level is low <sup>*2</sup>
Doesn't light	Any condition other than those above

\*1 AutoResume Off will be executed soon.

\*2 AutoResume Off has already been executed.

*Table 2-2 AC IN icon*

<b>AC IN icon</b>	<b>Power supply status</b>
Lights green	DC power is being supplied from the AC PS unit, Desk Station V Plus
Blinks green	Power supply malfunction <sup>*3</sup>
Doesn't light	Any condition other than those above

\*3 When the power supply controller detects a malfunction, the AC IN icon blinks and an error code is displayed.

To check the power supply status, install a battery pack and connect an AC PS unit.

Check 1 If the AC IN icon flashes yellow, go to Procedure 2.

Check 2 If the AC IN icon does not light, go to Procedure 3.

Check 3 If the Battery icon does not light yellow or green, go to Procedure 4.

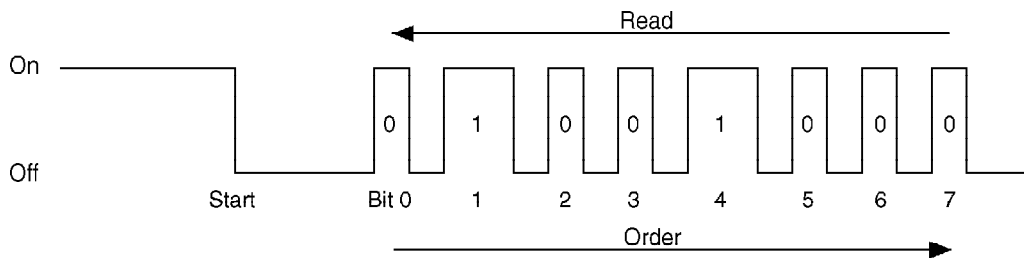
## Procedure 2 Error Code Check

If the microprocessor detects a malfunction, the AC IN icon blinks yellow. The blink pattern indicates an error as shown below.

- Start Off for 2 seconds
- Error code (8 bit)
  - "1" On for one second
  - "0" On for half second
- Interval between data bits Off for half second

The error code begins with the least significant digit.

Example: Error code 12h (Error codes are given in hexadecimal)



Check 1 Convert the AC IN icon blink pattern into the hexadecimal error code and compare it to the tables below.

- DC power supplied through AC PS unit or Desk Station V Plus / Enhanced Port Replicator II

Error code	Meaning
01h	AC PS unit output is over the maximum allowed limit.
02h	Desk Station V Plus output is over the maximum allowed limit.
04h	Current from the AC PS unit is over the maximum allowed limit.

- Battery pack

Error code	Meaning
10h	Battery voltage is over the maximum allowed limit.
11h	Battery charge current is over the maximum allowed limit.

- B5V, VCC power supply output

Error code	Meaning
20h	B5V voltage is over the maximum allowed limit.
21h	B5V voltage is below the minimum allowed limit.
24h	During suspend, B5V voltage is below the minimum allowed limit.

B3V output

Error code	Meaning
30h	B3V Voltage is over the maximum allowed limit.
31h	B3V Voltage is below the minimum allowed limit.
33h	B3V is below the minimum allowed limit during suspend.

B12V Output

Error code	Meaning
40h	B12V Voltage is over the maximum allowed limit.
41h	B12V Voltage is below the minimum allowed limit.

Environmental condition

Error code	Meaning
80h	CPU temperature is outside the allowable range.
88h	The CPU overheats, the system enters resume mode and automatically shuts down.

Check 2 In case of error code 01h:

- Make sure the AC power cord is firmly plugged into the AC inlet and wall outlet. If this cable is connected correctly, go to the following step:
- Make sure the DC power cord of the AC PS unit is firmly plugged into the connector. If this cable is connected correctly, go to the following step:
- Replace the AC PS unit with a new one. If the error still exists, go to Procedure 5.

Check 3 In case of error code 02h:

- Make sure the Desk Station V Plus is firmly connected to the computer's docking interface port. If this port is connected correctly, go to following step:
- Check the connector visually to make sure no pins are bent. If a pin(s) is bent, go to Chapter 4, *Replacement Procedures*. If the connector is not physically damaged, go to the following step:
- Check the Desk Station V Plus for malfunctions. Refer to the Desk Station V Plus maintenance manual for details. If the error still exists, go to Procedure 5.

Check 4 In case of error code 10h:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

Check 5 When 80h is displayed, it indicates that the CPU temperature is outside the allowable operating range. Perform the following steps:

- Leave the computer in an area that is about room temperature until the CPU's internal temperature is within the allowable operating range.
- If the error still exists, go to Procedure 5.

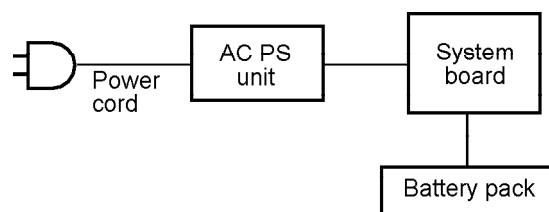
Check 6 When 88h is displayed, it indicates that the CPU temperature is too high. The computer automatically enters resume mode and shuts down.

- Leave the computer off until the AC IN icon stops blinking. It is recommended to leave the computer off until its interior reaches room temperature even though the AC IN icon stops blinking.
- If the error still exists, go to Procedure 5.

Check 7 For any other error, go to Procedure 5.

### Procedure 3 Connection Check

The power supply related wiring diagrams are shown below:



Any of the connectors may be disconnected. Perform Check 1.

Check 1 Make sure the AC power cord is firmly plugged into the AC inlet and wall outlet. If this cable is connected correctly, go to Check 2.



- Check 2
- If the AC IN icon does not glow green, go to Procedure 5.
  - If the Battery icon does not glow orange, go to Check 3.
- Check 3 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the Battery icon still does not glow orange, go to Procedure 4.

#### Procedure 4 Quick Charge Check

The power supply may not charge the battery pack. Perform the following procedures:

1. Reinstall the battery pack.
2. Attach the AC PS unit and turn on the power. (If you cannot turn on the power, go to Procedure 5.)
3. Run the Diagnostic test; go to System test and execute subtest 06 (quick charge) described in Chapter 3.
4. When quick charge is complete, the diagnostics test displays the result code. Check the result against the table below and perform any necessary check.

Result code	Contents	Check items
0	Battery is quick charging normally.	Normal
1	Battery is fully charged.	Normal
2	AC PS unit is not attached.	Check 1
3	AC PS unit output voltage is not normal.	Check 1
4	Battery is not installed.	Check 2
5	Battery output voltage is not normal.	Check 3
6	Battery temperature is not normal.	Check 4
7	Bad battery is installed.	Check 2
8	Any other problems.	Check 5

- Check 1 Make sure the AC PS unit cable and AC power cord are firmly plugged into the AC IN socket and wall outlet. If these cables are connected correctly, replace the AC power cord and AC PS unit.
- Check 2 Make sure the battery is properly installed. If it is properly installed, replace it with a new battery.

Check 3 The battery pack will be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack still isn't charged, replace the battery pack with a new one.

Check 4 The battery temperature is hot or cold. Return the temperature to normal operating condition.

If the battery pack still doesn't charge, replace the battery pack with a new one.

Check 5 Go to Procedure 5.

### **Procedure 5 Replacement Check**

The system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and check the connection between power supply board and system board. After checking the connection, perform the following check:

Check 1 Replace the system board with a new one.

## 2.4 System Board/PCB Troubleshooting

This section describes how to determine if the system board or other PCBs are defective or not functioning properly. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

- Procedure 1: Message Check
- Procedure 2: Printer Port LED Check on Boot Mode
- Procedure 3: Printer Port LED Check on Resume Mode
- Procedure 4: Diagnostic Test Program Execution Check
- Procedure 5: Replacement Check

### Procedure 1 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. The IRT tests each IC on the system board and initializes it.

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If Toshiba MS-DOS or Toshiba Windows 95 is properly loaded, go to Procedure 3.

**Check 1** If one of the following error messages is displayed on the screen, press the **F1** key as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

If you press the **F1** key as the message instructs, the TSETUP screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, perform Check 2.

- (a) \*\*\* Bad HDD type \*\*\*  
Check system. Then press [F1] key .....
- (b) \*\*\* Bad RTC battery \*\*\*  
Check system. Then press [F1] key .....
- (c) \*\*\* Bad configuration \*\*\*  
Check system. Then press [F1] key .....
- (d) \*\*\* Bad memory size \*\*\*  
Check system. Then press [F1] key .....
- (e) \*\*\* Bad time function \*\*\*  
Check system. Then press [F1] key .....
- (f) \*\*\* Bad check sum (CMOS) \*\*\*  
Check system. Then press [F1] key .....
- (g) \*\*\* Bad check sum (ROM) \*\*\*  
Check system. Then press [F1] key .....

Check 2 If the following error message displays, press any key as the message instructs.

```
WARNING: RESUME FAILURE.  
PRESS ANY KEY TO CONTINUE.
```

This message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

If any other message appears, perform Check 3.

Check 3 The IRT checks the system board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (17), (24) or (25) is displayed, replace the system board.

If error message (18) is displayed, go to the Keyboard Troubleshooting Procedures in section 2.7.

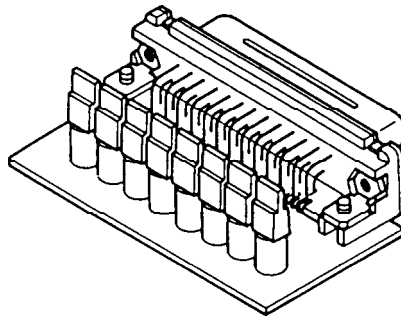
If error message (19), (20) or (21) is displayed, go to the HDD Troubleshooting Procedures in section 2.6.

If error message (22) or (23) is displayed, go to the FDD Troubleshooting Procedures in section 2.5.

- (1) PIT ERROR
- (2) MEMORY REFRESH ERROR
- (3) TIMER CH.2 OUT ERROR
- (4) CMOS CHECKSUM ERROR
- (5) CMOS BAD BATTERY ERROR
- (6) FIRST 64KB MEMORY ERROR
- (7) FIRST 64KB MEMORY PARITY ERROR
- (8) VRAM ERROR
- (9) SYSTEM MEMORY ERROR
- (10) SYSTEM MEMORY PARITY ERROR
- (11) EXTENDED MEMORY ERROR
- (12) EXTENDED MEMORY PARITY ERROR
- (13) DMA PAGE REGISTER ERROR
- (14) DMAC #1 ERROR
- (15) DMAC #2 ERROR
- (16) PIC #1 ERROR
- (17) PIC #2 ERROR
- (18) KBC ERROR
- (19) HDC ERROR
- (20) HDD #0 ERROR
- (21) HDD #1 ERROR
- (22) NO FDD ERROR
- (23) FDC ERROR
- (24) TIMER INTERRUPT ERROR
- (25) RTC UPDATE ERROR

## Procedure 2 Printer Port LED Check on Boot Mode

The printer port LED displays the IRT status and test status by turning lights on and off as an eight-digit binary value for boot mode. Figure 2-2 shows the printer port LED.



*Figure 2-2 Printer port LED*

To use the printer port LED follow these steps:

1. Plug the printer port LED into the computer's parallel port.
2. Turn on the computer's power.
3. Read the LED status from left to right as you are facing the back of the computer.
4. Convert the status from binary to hexadecimal notation.
5. If the final LED status is FFh (normal status), go to Procedure 3.
6. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

**NOTE:** *If an error condition is detected by the IRT test, the printer port LED displays an error code after the IRT test ends. For example, when the printer port LED displays 1F and halts, the IRT test has already completed the Display initialization. In this instance, the IRT indicates an error has been detected during the system memory test.*

Table 2-3 Printer port LED boot mode status (1/2)

LED status	Test item	Message
01H	Special register initialization	
02H	PIT test	PIT ERROR
	PIT initialization	—
	PIT function check	MEMORY REFRESH ERROR TIMER CH.2 OUT ERROR
03H	CMOS check	CMOS CHECKSUM ERROR CMOS BAD BATTERY ERROR
04H	Initialization of memory configuration	—
05H	SM-RAM check	—
06H	ROM/RAM copy	
07H	Selftest skip check	—
08H	Initialization of internal VGA	—
09A	System check	—
0AH	First 64KB memory test	FIRST 64KB MEMORY ERROR FIRST 64KB MEMORY PARITY ERROR
0BH	System memory initialization	—
0CH	System initialization	—
0DH	Interrupt vector initialization	—
18H	PIC initialization	—
1FH	Display initialization	VRAM ERROR
25H	System memory test	SYSTEM MEMORY ERROR SYSTEM MEMORY PARITY ERROR
30H	Extended memory test	EXTENDED MEMORY ERROR EXTENDED MEMORY PARITY ERROR
40H	DMA page register test	DMA PAGE REGISTER ERROR
41H	DMAC test	DMAC #X ERROR
42H	DMAC initialization	—
4AH	PIC test	PIC #X ERROR
50H	Mouse initialization	—
55H	KBC initialization	KBC ERROR
5AH	Boot password	—
60H	HDD initialization	HDC ERROR/HDD #0 ERROR
65H	FDD initialization	FDC ERROR/NO FDD ERROR
70H	Printer initialization	—
80H	SIO initialization	—
90H	Timer initialization	RTC UPDATE ERROR TIMER INTERRUPT ERROR
A0H	NDP initialization	—

Table 2-3 Printer port LED boot mode status (2/2)

LED status	Test item	Message
C0H	Password check	—
A6H	Initialization of expansion ROM	—
FEH	Setup boot check	*** Bad xxxx xxxx *** Check system. Then press [F1] key.
FFH	Boot load	—

Check 1 If any of the following error codes are displayed, go to Procedure 5.

00h, 01h, 02h, 03h, 04h, 05h, 06h, 07h, 08h, 09h, 0Ah, 0Bh, 0Ch, 0Dh,  
18h, 1Fh, 25h, 30h, 40h, 41h, 42h, 4Ah, 55H, 60H, 65h, 70h, 80h, 90h,  
A0H, A6h, C0h, FEh

Check 2 If error code 50h is displayed, go to the Keyboard Troubleshooting procedures in Section 2.7.

Check 3 If error code 5Ah is displayed, go to the HDD Troubleshooting Procedures in Section 2.6.

Check 4 If error code 65h is displayed, go to the FDD Troubleshooting Procedures in Section 2.5.

### Procedure 3 Printer Port LED Check on Resume Mode

The printer port LED displays the IRT status and test status by turning lights on and off as an eight-digit binary value for resume mode.

To use the printer port LED follow these steps:

1. Make sure the computer is in resume mode.
2. Plug the printer port LED into the computer's parallel port.
3. Turn on the computer's power.
4. Read the LED status from left to right as you face the back of the computer.
5. Convert the status from binary to hexadecimal notation.
6. If the final LED status is FFh (normal status), go to Procedure 4.
7. If the final LED status matches any of the test status values in Table 2-4, perform Procedure 5.

*Table 2-4 Printer port LED resume mode error status*

<b>Error status</b>	<b>Meaning of status</b>
F1H	System BIOS RAM checksum error
F2H	External display card is connected
F3H	HDD was installed
F4H	SMRAM checksum error or memory error during suspend
F5H	Conventional memory checksum error
F6H	Video RAM checksum error
F7H	Extended memory checksum error
F8H	PnP RAM checksum error



## **Procedure 4 Diagnostic Test Program Execution Check**

Execute the following tests from the Diagnostic Test Menu. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform these tests.

1. System test
2. Memory test
3. Printer test
4. ASYNC test
5. Real Timer test
6. Expansion test
7. Sound test
8. Modem test

If an error is detected during any of these tests, go to Procedure 5.

## Procedure 5 Replacement Check

The system board or other PCBs may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

- If the System test, Memory test, Printer test, Expansion test, Async test, or Real Timer test detects an error, go to Check 1.
- If the Sound test detects an error, go to Check 2.
- If the Modem test detects an error, go to Check 4.

***NOTE:** Refer to Chapter 4 for instructions on how to remove and replace any of the following boards.*

Check 1 Replace the system board with a new one. If the problem still exists, go to Check 6.

Check 2 Replace the sound board with a new one. If the problem still exists, go to Check 3.

Check 3 Replace the flat cable with a new one. If the problem still exists, go to Check 6.

Check 4 Replace the DAA board with a new one. If the problem still exists, go to Check 5.

Check 5 Replace the modem board with a new one. If the problem still exists, go to Check 6.

Check 6 Replace the PCI (Upper System) board with a new one.

## 2.5 Floppy Disk Drive Troubleshooting

This section describes how to determine if the FDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### Procedure 1 FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program. A detailed operation is given in Chapter 3, *Tests and Diagnostics*.

Insert the Diagnostics disk into the computer's floppy disk drive, turn on the computer, and run the test. Clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 3.

If the test program cannot be executed on the computer, go to Procedure 3.

## Procedure 2 Diagnostic Test Program Execution Check

Insert the Diagnostics disk into the FDD, turn the computer on, and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

Floppy disk drive test error codes and their status names are described in Table 2-5. Make sure the floppy disk in the FDD is formatted correctly and that the write protect tab is disabled. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-5 FDD error codes and statuses

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed on dual attach card
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	FDD not drive
80h	Time out error (Not ready)
EEh	Write buffer error
FFh	Data compare error

Check 1 If the following message is displayed, disable the write protect tab on the floppy disk. If any other message appears, perform Check 2.

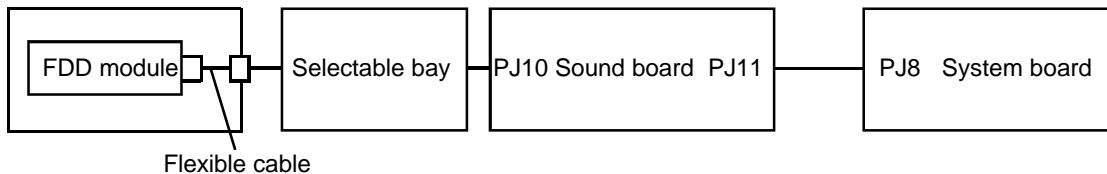
Write protected

Check 2 Make sure the floppy disk is formatted correctly. If it is, go to Procedure 3.

### Procedure 3 Connector Check and Replacement Check

There are two ways to connect the FDD: through the Selectable Bay and through the external FDD port. If the FDD is installed in the Selectable Bay, begin with Check 1 below. If the FDD is connected to the external FDD port, begin with Check 3.

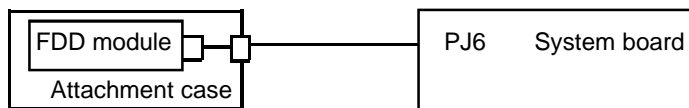
- Check 1 Make sure the Selectable bay is firmly connected to the FDD module and system board.



If any of the connections are loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

- Check 2 The Sound board may be defective or damaged. Replace the Sound board. If the FDD is still not functioning properly, perform Check 4.

- Check 3 Make sure the FDD cable is firmly connected to the external FDD port.



If this cable is disconnected, connect it to the system unit and repeat Procedure 2. If the FDD is still not functioning properly, perform Check 5.

- Check 4 The flexible cable may be defective or damaged. Replace the flexible cable with a new one following the steps in Chapter 4, *Replacement Procedures*. If the FDD is still not functioning properly, perform Check 5.
- Check 5 The FDD may be defective or damaged. Replace the FDD with a new one following the steps in Chapter 4, *Replacement Procedures*. If the FDD is still not functioning properly, perform Check 6.
- Check 6 Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.6 Hard Disk Drive Troubleshooting

To determine if the hard disk drive is functioning properly, perform the procedures below starting with Procedure 1. Continue with the other procedures as instructed.

- Procedure 1: Partition Check
- Procedure 2: Message Check
- Procedure 3: Format Check
- Procedure 4: Diagnostic Test Program Execution Check

**NOTE:** *The contents of the hard disk will be erased when the HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to a backup system (i.e., floppy disks). If the customer has not or cannot perform the back-up, create back-up disks as described below.*

- 1. If MS-DOS 6.22/Windows for Workgroups is selected, use the Master Diskette Creator (MDC) utility in the Toshiba Utility folder to back up the preinstalled software. After backing up the preinstalled software, use the BACKUP command in the Toshiba Companion Utility to back up the entire disk, including the user's files.*
- 2. If Windows 95 is selected, check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder (this tool can be used only once). If it exists, use it to back up the preinstalled software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.*

*Refer to the appropriate instructions for each operating system.*

### Procedure 1 Partition Check

Insert the Toshiba MS-DOS system disk and turn on the computer, then perform the following checks:

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Recheck the system. If the problem still exists, go to Procedure 2.

- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Recheck the system. If the problem still exists, go to Procedure 2.
- Check 4 Remove the system disk from the FDD and cold boot the computer. If the problem still exists, go to Procedure 2. Otherwise, the HDD is operating normally.

## Procedure 2 Message Check

When the HDD does not function properly, some of the following error messages may appear on the display. Start with Check 1 below and perform the other checks as instructed.

- Check 1 If any of the following messages appear, perform Check 5. If the following messages do not appear, perform Check 2:

HDC ERROR  
(After 5 seconds this message will disappear)  
or  
HDD #0 ERROR  
(After 5 seconds this message will disappear)  
or  
HDD #1 ERROR  
(After 5 seconds this message will disappear)

- Check 2 If either of the following messages appears, perform Check 3. If the following messages do not appear, perform Check 5.

Insert system disk in drive  
Press any key when ready .....  
or  
Non-System disk or disk error  
Replace and press any key

- Check 3 Check TSETUP to see whether the Hard Disk option is set to "Not used." If so, choose another setting and repeat Check 1. If it is not set to "Not used," go to Check 4.

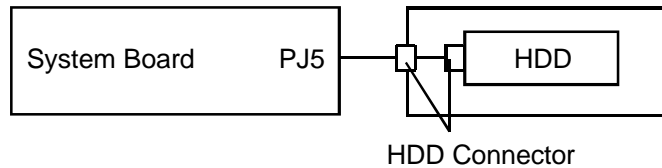
- Check 4 Using the Toshiba MS-DOS system disk, install a system program on the hard disk using the SYS command.

If the following message appears on the display, the system program has been transferred to the HDD.

System transferred

Restart the computer. If the error message still appears, perform Check 5.

- Check 5 The HDD is connected to the flexible cable and the system board. The flexible cable can become disconnected or damaged. Disassemble the computer as described in Chapter 4, *Replacement Procedures*. If the HDD is not firmly connected, connect it to the flexible cable and return to Procedure 1. If the HDD is firmly connected to the system board, perform Check 6.



- Check 6 The HDD connector may be defective or damaged. Replace the HDD connector with a new one following the steps in Chapter 4, *Replacement Procedures*. If the HDD is still not functioning properly, perform Procedure 3.

### Procedure 3 Format Check

The HDD is formatted using the low level format program and the MS-DOS FORMAT program. To format the HDD, start with Check 1 below and perform the other steps as required.

- Check 1 Using the Toshiba MS-DOS system disk, partition the hard disk using the FDISK command. Format the hard disk using **FORMAT C:/S/U** to transfer the system program to the HDD. If the following message appears on the display, the HDD is formatted.

```
Format complete
```

If any other error message appears on the display, refer to the Toshiba MS-DOS Manual for more information and perform Check 2.

- Check 2 Using the Diagnostic Disk, format the HDD with a low level format option. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostic program.

If the following message appears on the display, the HDD low level format is complete. Partition and format the HDD using the MS-DOS FORMAT command.

```
Format complete
```

If you cannot format the HDD using the Tests and Diagnostics program, go to Procedure 4.



## Procedure 4 Diagnostic Test Program Execution Check

The HDD test program is stored on the Diagnostics Disk. Perform all of the HDD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the HDD test program.

If an error is detected during the HDD test, an error code and status will be displayed; perform Check 1. The error codes and statuses are listed in Table 2-6. If an error code is not generated, the HDD is operating properly.

Table 2-6 Hard disk drive error codes and statuses

Code	Status
01h	Bad command
02h	Bad address mark
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	HDC overrun (DRQ)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enabled
20h	HDC error
40h	Seek error
80h	Time out error
AAh	Drive not ready
BBh	Undefined error
CCh	Write fault
E0h	Status error
EEh	Access time out error
FFh	Data compare error

Check 1 Replace the HDD unit with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the HDD is still not functioning properly, perform Check 2.

Check 2 Replace the flexible cable with a new one following the instructions in Chapter 4.

Check 3 Replace the system board with a new one following the instructions in Chapter 4.

## 2.7 Keyboard Troubleshooting

To determine if the keyboard is functioning properly, perform the following procedures. Start with Procedure 1 and continue with the other procedure as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

### Procedure 2 Connector and Replacement Check

The keyboard is connected to the sound board by a flat cable and the sound board is connected to the system board. This cable or connector may be disconnected or damaged. Disassemble the computer as described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1 Make sure the keyboard cable is not damaged and is connected to the sound board.



If this cable is damaged, replace the keyboard with a new one. If the cable is disconnected, firmly connect it. Perform Procedure 1 again. If the keyboard is still not functioning properly, perform Check 2.

Check 2 The sound board may be damaged. Replace the sound board with a new one. Refer to Chapter 4 for more information.

Check 3 The system board may be damaged. Replace the system board with a new one. Refer to Chapter 4 for more information.

## 2.8 Display Troubleshooting

This section describes how to determine if the display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

- Procedure 1: External Monitor Check
- Procedure 2: Diagnostic Test Program Execution Check
- Procedure 3: Connector Check
- Procedure 4: Replacement Check

### Procedure 1 External Monitor Check

Connect the external monitor to the computer's external monitor port, then boot the computer. The computer automatically detects the external monitor even if Resume mode is enabled.

If the external monitor works correctly, the internal LCD display may be damaged. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal LCD, the display controller may be damaged. Go to Procedure 2.

### Procedure 2 Diagnostic Test Program Execution Check

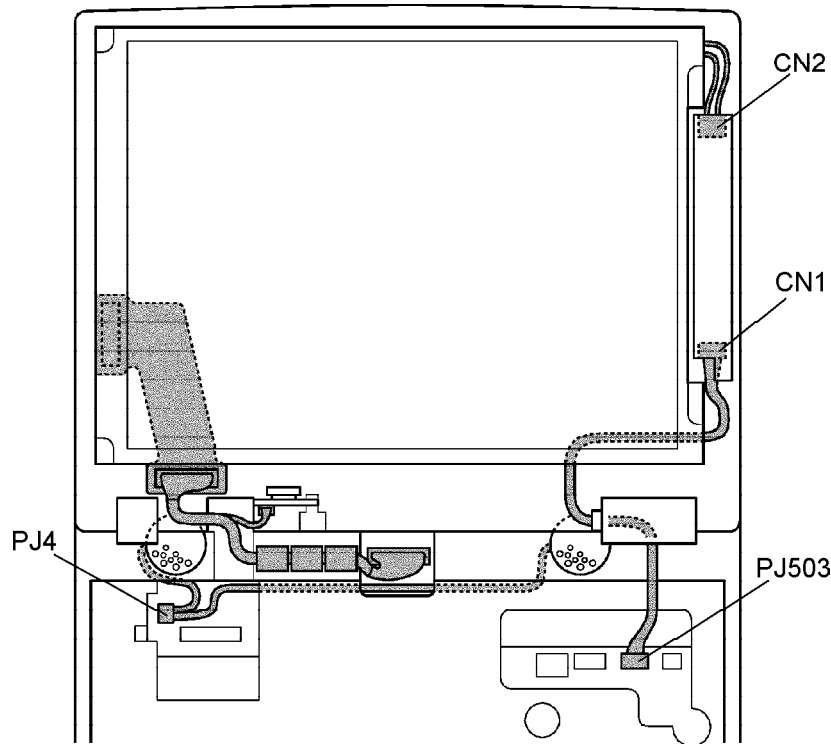
The Display Test program is stored on the computer Diagnostic Disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the floppy disk drive, turn on the computer, and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

### Procedure 3 Connector Check

The Display unit has an LCD module, FL, Display switch, and FL inverter board. The FL and FL inverter board are connected by two cables. The LCD module and system board are connected by one signal cable as shown in Figure 2-3. Any of these cables may be disconnected.

Disassemble the display unit and check the following cable connections CN1, CN2, PJ4, and PJ503. Refer to Chapter 4. *Replacement Procedures*, for more information about how to disassemble the computer.



*Figure 2-3 Display connection*

If any of these cables is not connected, firmly reconnect it and repeat Procedures 1 and 2. If the problem still exists, perform Procedure 4.

## Procedure 4 Replacement Check

The FL, FL inverter board, LCD module, and PCI board are connected to the display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

If the FL does not light, perform Check 1.

If characters are not displayed clearly, perform Check 3.

If some screen functions do not operate properly, perform Check 3.

If the FL remains lit when the display is closed, perform Check 4.

Check 1 Replace the FL inverter board with a new one and test the display again. If the problem still exists, perform Check 2.

Check 2 Replace the FL with a new one and test the display again. If the problem still exists, perform Check 3.

Check 3 Replace the LCD module with a new one and test the display again. If the problem still exists, perform Check 4.

Check 4 Replace the display switch with a new one and test the display again. If the problem still exists, perform Check 5.

Check 5 Replace the display cable with a new one and test the display again. If the problem still exists, perform Check 6.

Check 6 The PCI board may be damaged. Replace the PCI board with a new one.

## 2.9 CD-ROM Drive Troubleshooting

This section describes how to determine if the CD-ROM drive is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

- Procedure 1: CD Cleaning Check
- Procedure 2: Diagnostic Test Program Execution Check
- Procedure 3: Connector Check and Replacement Check

### Procedure 1 CD Cleaning Check

1. Turn off the power.
2. Open the CD drawer by inserting a slender object such as a straightened paper clip into the eject hole. The object must be long enough to activate the eject mechanism.
3. Clean the laser pickup lens with a lens cleaner. Apply the cleaner to a cloth and wipe the lens.
4. If the CD-ROM drive still does not function properly after cleaning, go to Procedure 2.

### Procedure 2 Diagnostic Test Program Execution Check

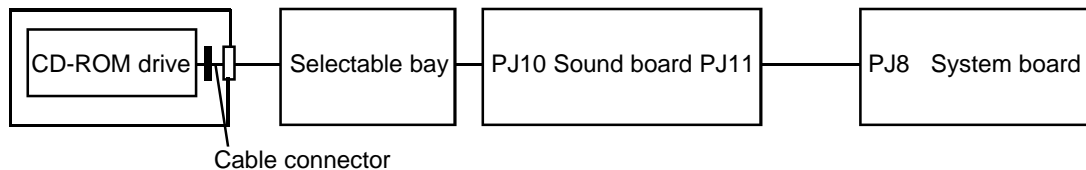
The CD-ROM drive Diagnostic test program is stored on the Diagnostics Disk. Insert a test CD (Toshiba-EMI Test Disc TDY-03) into the CD-ROM drive. Then insert the Diagnostics disk into the floppy disk drive, turn on the computer, and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any other errors occur while executing the CD-ROM drive diagnostics test, go to Procedure 3.

### Procedure 3 Connector Check and Replacement Check

The CD-ROM drive is connected to the system board and flexible cable by the CD-ROM drive cable. This cable may be disconnected from the system board or the flexible cable may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

- Check 1 Make sure the Selectable bay cable is firmly connected to the CD-ROM drive and the system board.



If any of the connections are loose, reconnect them firmly and repeat Procedure 2. If there is still an error, go to Check 2.

- Check 2 Replace the flexible cable with a new one following the steps in Chapter 4. If the CD-ROM drive is still not functioning properly, perform Check 3.
- Check 3 The cable connector may be defective or damaged. Replace the cable connector with a new one following the steps in Chapter 4. If the CD-ROM drive is still not functioning properly, perform Check 4.
- Check 4 The CD-ROM drive may be defective or damaged. Replace the CD-ROM drive with a new one following the steps in Chapter 4. If the CD-ROM drive is still not functioning properly, perform Check 5.
- Check 5 Replace the sound board with a new one following the steps in Chapter 4. If the CD-ROM drive is still not functioning properly, perform Check 6.
- Check 6 Replace the system board.

## 2.10 Internal Modem Troubleshooting

This section describes how to determine if the computer's internal modem is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedure as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

The internal modem Diagnostic test program is stored on the Diagnostic Disk. This program checks the internal modem. Insert the Diagnostics disk into the floppy disk drive, turn on the computer, and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

Check 1 Execute modem test 1. If an error occurs, the modem board may be malfunctioning. Replace the modem board. If errors still occur, go to Check 2.

Check 2 Execute modem test 3. If an error occurs, the DAA module may be malfunctioning. Replace the DAA module. If errors still occur, go to Check 3.

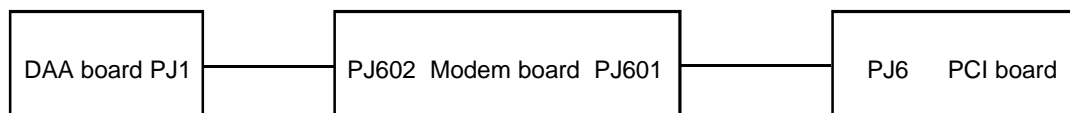
Check 3 Execute modem test 2. If an error occurs, the modem board and DAA module may be malfunctioning. Replace both.

If any other errors occur while executing the internal modem diagnostics test, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

The DAA board is connected to the modem board. If the modem malfunctions, there may be a bad connection between the DAA board and the modem board or between the modem board and the PCI board or the DAA module, modem board, or PCI board might be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1 Make sure DAA board PJ1 is firmly connected to modem board PJ602 and the modem board PJ601 is firmly connected to PCI board PJ6.



If a connector is disconnected, connect it and repeat Procedure 1. If the DAA board is still not functioning properly, perform Check 2.



- Check 2 The DAA board may be defective or damaged. Replace the DAA board with a new one following the steps in Chapter 4. If the DAA board is still not functioning properly, perform Check 3.
- Check 3 Replace the modem board with a new one following the steps in Chapter 4. If the DAA board is still not functioning properly, perform Check 4.
- Check 4 Replace the PCI board with a new one following the steps in Chapter 4.

### 3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. The Diagnostics Program is stored on the Diagnostic Disk and consists of 9 programs that are grouped into the Service Program Module (DIAGNOSTICS MENU).

- NOTES:** *To start the diagnostics, follow these steps:*
- 1. Check all cables for loose connections.*
  - 2. Exit any application you may be using and close Windows.*

The DIAGNOSTICS MENU consists of the following nine functions.

- DIAGNOSTIC TEST
- HARD DISK FORMAT
- HEAD CLEANING
- LOG UTILITIES
- RUNNING TEST
- FDD UTILITIES
- SYSTEM CONFIGURATION
- EXIT TO MS-DOS
- SETUP

The DIAGNOSTIC TEST MENU contains the following functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST
- SOUND TEST
- CD-ROM TEST
- MODEM TEST

You will need the following equipment to perform some of the Diagnostic test programs.

- The Diagnostics Disk (all tests)
- A formatted working disk for the floppy disk drive test (all tests)
- An external FDD attachment
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- A PC card wraparound connector for the I/O card test (PCMCIA test)
- A printer wraparound connector for the printer wraparound test (Printer test)
- An RS-232-C wraparound connector for the RS-232-C port wraparound test (ASYNC test)
- A CD test media (Toshiba-EMI test disk TDY-03 and music CD) (CD-ROM test)
- External CRT (All tests)
- PS/2 or compatible keyboard (All tests)
- PS/2 or compatible mouse (Keyboard test)
- Serial port wraparound connector (ASYNC test)
- Multimedia sound system with line-in and line-out ports (Sound test)
- Headphone (Sound test)
- CD-ROM drive (CD-ROM test)
- A telephone
- A microphone
- An external speaker

The following sections detail the tests within the Diagnostic Test functions of the DIAGNOSTIC TEST MENU. Refer to Sections 3.20 through 3.26 for detailed information on the remaining Service Program Module functions.

## 3.2 Executing the Diagnostic Test

Toshiba MS-DOS is required to run the DIAGNOSTICS PROGRAM. To start the DIAGNOSTIC PROGRAM follow these steps:

1. Insert the Diagnostics disk into the floppy disk drive and turn on the computer. (The diagnostics disk contains the MS-DOS boot files.)

**NOTE:** *To execute the CD-ROM test, make sure the CD-ROM and CD-ROM drive are installed in the computer and the external FDD is attached to the FDD port.*

The following menu will appear:

```
TOSHIBA personal computer xxx DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 19XX
```

```
DIAGNOSTICS MENU :
```

```
1 - DIAGNOSTIC TEST
2 - HARD DISK FORMAT
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS
0 - SETUP
```

```
↑↓→← : Select items
Enter  : Specify
Esc    : Exit
```

**NOTE:** *To exit the DIAGNOSTIC TEST MENU, press the **Esc** key. If a test program is in progress, press **Ctrl** + **Break** to exit the test program or press **Ctrl** + **C** to stop the test program.*

- To select the DIAGNOSTIC TEST MENU from the DIAGNOSTICS MENU, set the highlight bar to **1**, and press **Enter**. The following screen will appear:

```

TOSHIBA personal computer xxx DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 19XX
DIAGNOSTIC TEST MENU :

  1 - SYSTEM TEST
  2 - MEMORY TEST
  3 - KEYBOARD TEST
  4 - DISPLAY TEST
  5 - FLOPPY DISK TEST
  6 - PRINTER TEST
  7 - ASYNC TEST
  8 - HARD DISK TEST
  9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 - SOUND TEST
13 - CD-ROM TEST
14 - MODEM TEST
88 - ERROR RETRY COUNT SET [HDD & FDD]
99 - EXIT TO DIAGNOSTICS MENU

      ↑↓→←   :   Select items
      Enter   :   Specify
      Esc     :   Exit

```

Refer to sections 3.4 through 3.17 for detailed descriptions of Diagnostic Tests 1 through 14. Function 88 sets the floppy disk drive and hard disk drive error retry count. Function 99 exits the submenus of the Diagnostic Test and returns to the Diagnostic Menu.

- Select the option you want to execute and press **Enter**. The following message will appear:

```

SYSTEM TEST      XXXXXXXX

```

```

xxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break] ; test end
[Ctrl]+[C]     ; key stop

```

```

SUB-TEST : XX
PASS COUNT: XXXXX ERROR COUNT: XXXXX
WRITE DATA: XX READ DATA : XX
ADDRESS : XXXXXX STATUS : XXX

SUB-TEST MENU :

01 - ROM checksum
02 -
03 -
04 - Fan ON/OFF
05 - Thermistor check
06 - Quick charge
99 - Exit to DIAGNOSTIC TEST MENU

      ↑↓→←   :   Select items
      Enter   :   Specify
      Esc     :   Exit

```

**NOTE:** The menu displayed by your computer may be slightly different from the one shown above.

4. Select the desired subtest number from the subtest menu and press **Enter**.  
The following message will appear:

```
TEST LOOP : YES
```

Selecting **YES** increases the pass counter by one each time the test cycle ends, then restarts the test cycle.

Selecting **NO** returns the subtest menu to the main menu after the test is complete.

5. The following message will appear:

```
ERROR STOP : YES
```

Use the left or right arrow keys to move the cursor to the desired option and press **Enter**.

Selecting **YES** stops the test program when an error is found and displays the operation guide on the right side of the display screen as shown below:

```
ERROR STATUS NAME  [ [ HALT OPERATION ] ]  
  
1: Test end  
2: Continue  
3: Retry
```

These three selections have the following functions respectively:

- 1: Terminates the test program and exits to the subtest menu.
- 2: Continues the test.
- 3: Restarts the test from the error.

Selecting **NO** keeps the test running even if an error is found.

6. Use the arrow keys to move the cursor to the desired option and press **Enter**.

Table 3-1 in section 3.3 describes the function of each test on the subtest menu.

Table 3-2 in section 3.18 describes the error codes and error status for each error.

### 3.3 Subtest Names

Table 3-1 lists the subtest names for each test program in the DIAGNOSTIC TEST MENU.

*Table 3-1 Subtest names (1/2)*

No.	Test name	Subtest No.	Subtest item
1	SYSTEM	01	ROM checksum
		04	Fan ON/OFF
		05	Thermistor check
		06	Quick charge
2	MEMORY	01	RAM Constant data
		02	RAM Address pattern data
		03	RAM Refresh
		04	Protected mode
		05	Memory module
		06	Cache memory
		07	L2 Cache/TAG memory
3	KEYBOARD	01	Pressed key display
		02	Pressed keycode display
		03	PS/2 Mouse connect check
		04	Pointing stick
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
5	FDD	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wraparound

Table 3-1 Subtest names (2/2)

No.	Test name	Subtest No.	Subtest item
7	ASYNC	01	Wraparound (board)
		02	Point to point (send)
		03	Point to point (receive)
		04	Interrupt test
		05	SIR wraparound test
		06	FIR/SIR point to point (send)
		07	FIR/SIR point to point (receive)
8	HDD	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		05	Write/read/compare (CE)
		06	Write specified address
		07	Read specified address
		08	ECC circuit
		09	Sequential write
		10	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP test
11	EXPANSION	01	PCMCIA wraparound
		02	DS bus wraparound
		03	RGB monitor ID
		04	Joystick
		05	Joystick wraparound
12	SOUND	01	CODEC (Recording/Playback)
		02	FM-Synthesizer
		03	SINE-Wave Playback
		04	CODEC (Line In/Out)
13	CD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	Playback Music
14	MODEM	01	FRVMD* test
		02	LOOPBACK test
		03	Speaker (L) test
		04	Speaker (R) test
		05	Terminal



## 3.4 System Test

To execute the System Test select **1** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 ROM checksum

This subtest executes a checksum test of the BIOS ROM on the system board.

Subtest 02 Not used

Subtest 03 Not used

Subtest 04 Fan on/off

This subtest checks fan operation using the on/off command.

The fan cable is securely connected to the system board. When you execute this subtest, the following message is displayed:

```
*** Fan ON *** : Press [Enter] key?
```

When you press **Enter**, the fan should spin.

```
*** Fan OFF *** : Press [Enter] key?
```

When you press **Enter**, the fan should stop.

Subtest 05 Thermistor check

This subtest reads the thermistor connect check status of the power supply microprocessor, then compares it with the original data. If the data indicates the connector is open or shorted, it displays an error message.

Subtest 06 Quick charge

Displays quick-charge status.

## 3.5 Memory Test

To execute the Memory Test select **2** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 Constant data (real mode)

This subtest writes a 256-byte unit of constant data to conventional memory (0 to 640 KB), then reads the new data and compares the result with the original data. The constant data is FFFFh, AAAAh, 5555h, and 0000h.

### Subtest 02 Address pattern data (real mode)

This subtest writes address pattern data created by the exclusive-ORing (XORing) to the address segment and address offset in conventional memory program end to 640 KB, then reads the new data and compares the result with the original data.

### Subtest 03 Refresh (real mode)

This subtest writes a 256-byte unit of constant data to conventional memory (0 to 640 KB) then reads the new data and compares the result with the original data.

The constant data is AAAAh and 5555h.

**NOTE:** *There is a short delay between write and read operations, depending on the size of the data.*

### Subtest 04 Protected mode

**NOTE:** *The CONFIG.SYS file must be configured without expanded memory manager programs such as EMM386.EXE, EMM386.SYS or QEMM386.SYS. Also, the HIMEM.SYS must be deleted from the CONFIG.SYS file.*

This subtest writes constant data and address data to extended memory (maximum address 100000h) then reads new data and compares the result with the original data.

The constant data is FFh, AAh, 55h, and 00h.

Subtest 05 Memory module

**NOTE:** To execute this subtest, an optional memory card must be installed in the computer.

This subtest functions the same as subtest 04, except it is used for testing an optional memory card. Memory module capacity is 8 MB, 16 MB, 32 MB, 48 MB, and 128 MB.

After selecting subtest 05, the following message will appear:

```
Extended memory size
(1:8 MB, 2:16 MB, 3:32 MB, 4:48 MB, 5:128 MB)?
```

Select the number that corresponds to the memory card installed in the computer.

Subtest 06 Cache memory

To test the cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory. One test takes 3 seconds.

```
Number of misses < Number of hits → OK
Number of misses ≥ Number of hits → Fail
```

Subtest 07 L2 Cache memory

To test the cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for L2 cache memory. One test takes 3 seconds.

```
Number of misses < Number of hits → OK
Number of misses ≥ Number of hits → Fail
```

### 3.6 Keyboard Test

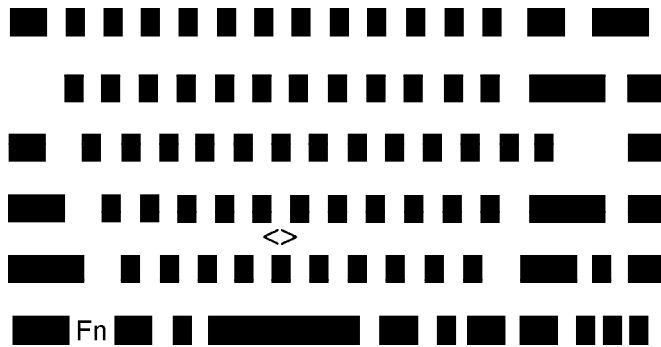
To execute the Keyboard Test select **3** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The Keyboard test contains four subtests that test the keyboard, PS/2 mouse, and AccuPoint actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01      Pressed key display (82/84)

***NOTE:** The **Num Lock** and the **Overlay** mode must be off to execute this subtest.*

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to an “\*” character. Holding a key down enables the auto-repeat function which causes the key’s display character to blink.

[[[    Press Key Display    ]]]



If test OK, Press [Del] [Enter] Key

Subtest 02      Pressed keycode display

When a key is pressed, the scan code, character code, and keytop name are displayed on the screen in the format shown below. The **Ins**, **Caps Lock**, **Num Lock**, **Scroll Lock**, **Alt**, **Ctrl**, **Left Shift**, and **Right Shift** keys are displayed in reverse screen mode when pressed. The scan codes, character codes, and keytop names are shown in Appendix D.

```
KEYBOARD TEST  IN PROGRESS  302000

          Scan code      =
          Character code =
          Keytop         =

Ins Lock Caps Lock Num Lock  Scroll Lock
Alt  Ctrl  Left Shift Right Shift

PRESS [Enter] KEY
```

Subtest 03      PS/2 mouse connect check

***NOTE:** To execute the PS/2 mouse connect check, a PS/2 mouse must be connected to the computer.*

This subtest checks whether a PS/2 mouse is connected or not.

If this test does not detect an error, it returns to the subtest menu.

If this test detects an error, the following message appears:

```
KBD - MOUSE INTERFACE ERROR

[[ HALT OPERATION ]]

1: Test end
2: Continue
3: Retry
```

Subtest 04 Pointing Stick

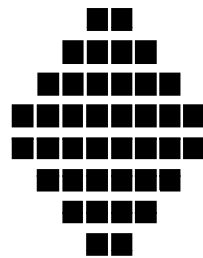
This subtest checks the functions of the pointing stick as shown below.

- a) IPS stick pressure sensing direction and parameter.
- b) IPS switch function check.

This test reports the pointing stick motion response from the IPS and IPS switch. When the stick is pressed towards the upper left, the <POINTING> display changes according to the following illustration. If an IPS switch is pressed, the <BUTTON> display alternates between black and white. Also, the parameters appear on the right side of the display. If two IPS switches are pressed at the same time, the subtest menu is displayed.

\*\*\*\*\* IPS TEST PROGRAM (V1.00) \*\*\*\*\*

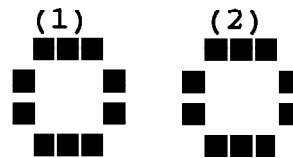
< POINTING >



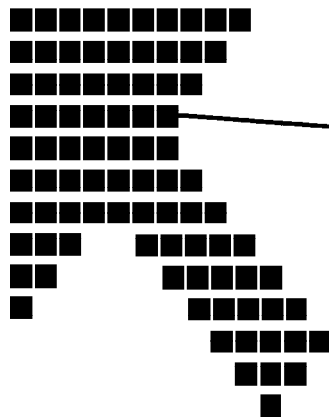
< PARAMETER >

STATUS: 0008h  
X-RATE: 0000h  
Y-RATE: 0000h

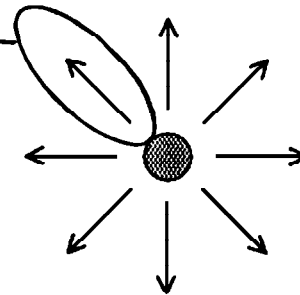
< BUTTON >



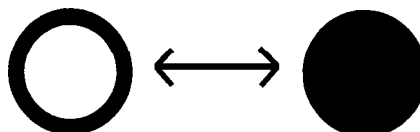
<< PRESS BUTTON1 + BUTTON2 THEN END >>



There are eight arrow directions as shown below.



When a button is pressed, the display alternates as shown below.



## 3.7 Display Test

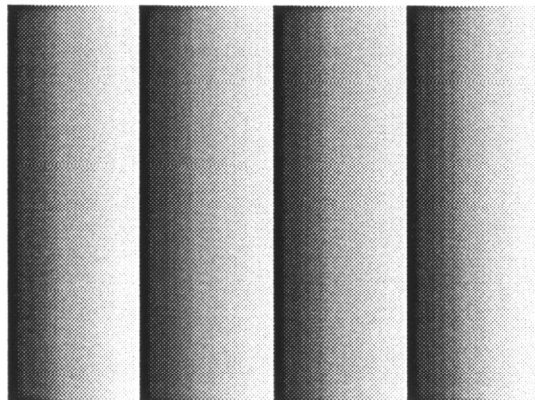
To execute the Display Test select **4** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The Display test contains six subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 VRAM Read/Write for VGA

This subtest writes constant data AAh and 55h and address data to video RAM (2MB: A0000h-AFFFFh). This data is then read from the video RAM and compared to the original data.

### Subtest 02 Gradation for VGA

This subtest displays four colors: red, green, blue, and white from left to right across the screen from black to maximum brightness. The display below appears on the screen when this subtest is executed.



To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.

### Subtest 03 Gradation for LCD

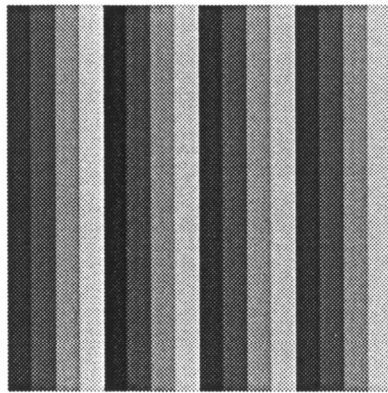
This subtest displays eight colors: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color is displayed full screen for three seconds.

Subtest 04 Gradation & Mode test for VGA

This subtest displays gradations for each mode. Execute the test, then press **Enter** to change the mode.

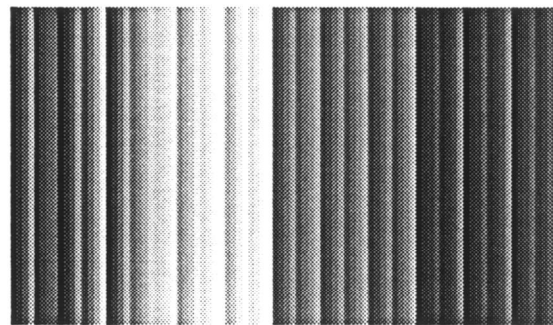
Resolution	Mode
800 x 600	3, 12, 13, 43, 52
1024 x 768	3, 12, 13, 45

The display below appears on the screen when this subtest is executed.



[ Mode 12 ]

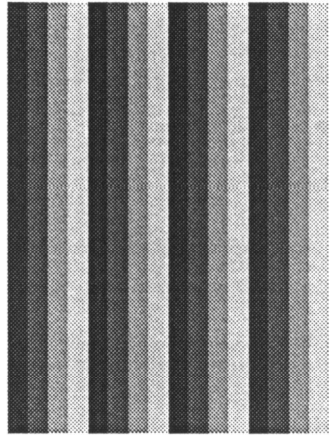
Pressing **Enter** changes the size of the displayed image.



[ Mode 13 ]

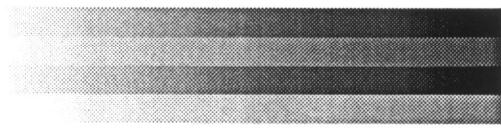
Pressing **Enter** changes the size of the displayed image.





[ Mode 3 ]

Pressing **Enter** changes the size of the displayed image.



Pressing **Enter** changes the size of the displayed image.

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.

#### Subtest 05 All dot on/off for LCD

This subtest displays an all-white screen (all dot on) for three seconds then an all-black screen (all dot off) for three seconds.

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.



## 3.8 Floppy Disk Test

***NOTE:** Before running the floppy disk test, prepare a formatted work disk. Remove the Diagnostics Disk and insert a work disk into the FDD. The contents of the floppy disk will be erased.*

To execute the Floppy Disk Test select **5** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The Floppy Disk test contains five subtests that test the FDD. The following messages will appear after selecting the Floppy Disk Test from the DIAGNOSTIC TEST MENU. Answer each question with an appropriate response to execute the test.

1. Select the test drive number of the floppy disk drive to be tested and press **Enter**.

```
Test drive number select (1:FDD#1,2:FDD#2,0:FDD1&2) ?
```

2. Select the media type of the floppy disk in the test drive to be tested, and press **Enter**.

```
Media in drive #X mode (0:2DD,1:2D,2:2D-2HD/2DD,3:2HD) ?
```

3. Select the track you want the test to start on and press **Enter**. Simply pressing **Enter** sets the start track to zero.

```
Test start track (Enter:0/dd:00-79) ?
```

4. The floppy disk test menu will appear after you select the start track number. Select the number of the subtest you want to execute and press **Enter**. The following message will appear during the floppy disk test.

```
FLOPPY DISK      XXXXXXXX
```

```
xxxx DIAGNOSTIC TEST VX.XX  
[Ctrl]+[Break] ; test end  
[Ctrl]+[C] ; key stop
```

Subtest 01 Sequential Read

This subtest performs a Cyclic Redundancy Check (CRC), that continuously reads all the tracks on a floppy disk. The following tracks are read according to the media type in the floppy disk drive:

Double-sided, double-density (2D): Tracks 0 to 39.

Double-sided, double-density, double-track (2DD) and double-sided, high-density, double-track (2HD): Tracks 0 to 79.

The start track is specified when the FDD test is started from the Diagnostic Test Menu. Refer to step 3 at the beginning of this section to set the start track.

Subtest 02 Sequential Read/Write

This subtest continuously writes data pattern B5ADADh to all the specified tracks selected in subtest 01. The data is then read and compared to the original data.

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on all tracks defined in subtest 01. The data is then read and compared to the original data.

Subtest 04 Write Specified Address

This subtest writes specified data to a specified track, head, and address.

Subtest 05 Read Specified Address

This subtest reads data from a specified track, head, and address.

### 3.9 Printer Test

To execute the Printer Test select **6** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The Printer Test contains three subtests that test the output of the printer connected to the computer.

*NOTE: An IBM compatible printer must be connected to the system to execute this test.*

The following message will appear when the printer test is selected:

```
channel#1 = XXXXh
channel#2 = XXXXh
channel#3 = XXXXh
Select the channel number (1-3) ?
```

The printer I/O port address is specified by the XXXXh number. The computer supports three printer channels. Select the printer channel number, and press **Enter** to execute the selected subtest.

#### Subtest 01 Ripple Pattern

This subtest prints characters for codes 20h through 7Eh line-by-line while shifting one character to the left at the beginning of each new line.

```
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvw
)++,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwxy
```

Subtest 02      Function

This subtest is for IBM compatible printers, and tests the following functions:

Normal print  
Double-width print  
Compressed print  
Emphasized print  
Double-strike print  
All characters print

This subtest prints the various print types shown below:

```
PRINTER TEST
1.        THIS LINE SHOWS NORMAL PRINT.
2.        THIS LINE SHOWS DOUBLE-WIDTH PRINT.
3.        THIS LINE SHOWS COMPRESSED PRINT.
4.        THIS LINE SHOWS EMPHASIZED PRINT.
5.        THIS LINE SHOWS DOUBLE-STRIKE PRINT.
6.        ALL CHARACTERS PRINT
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
stuvwxyz{|}~
```

Subtest 03      Wraparound

***NOTE:*** To execute this subtest, a printer wraparound connector must be connected to the computer's printer port. The printer wraparound connector (34M741986G01) wiring diagram is described in Appendix F.

This subtest checks the output and bidirectional modes of the data control and status lines through the printer wraparound connector.

### 3.10 Async Test

To execute the Async Test select **7** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The async test contains seven subtests that test the asynchronous communication functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

The subtests require the following data format:

Method: Asynchronous  
Speed: 9600BPS (Subtests 01 to 04)  
38400BPS (Subtests 05 to 07)  
Data: 8 bits and one parity bit (EVEN)  
Data pattern: 20h to 7Eh

The following message will appear at the bottom of the screen when subtests 01, 02, 03, 05, 06, and 07 are selected:

```
Channel#1 = XXXXh  
Channel#2 = XXXXh  
Channel#3 = XXXXh  
Select the Channel number (1/2/3)
```

The serial I/O port address is specified by the XXXXh number. Select the serial port channel number and press **Enter** to start the subtest.

Subtest 01    Wraparound (board)

**NOTE:** To execute this subtest an RS-232-C wraparound connector (34M741621G01) must be connected to the RS-232-C port. The RS-232-C wraparound connector wiring diagram is described in Appendix F.

This subtest checks the data send/receive function through the wraparound connector.

Subtest 02    Point to point (Send)

**NOTE:** To execute this subtest, two machines must be connected with an RS-232-C direct cable. One machine should be set as “send”(subtest 02) and the other set as “receive” (subtest 03). The wiring diagram for the RS-232-C direct cable is described in Appendix F.

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data.

Subtest 03 Point to point (Receive)

This subtest is used with subtest 02 described above. This subtest receives the data from the send side, then sends the received data.

Subtest 04 Interrupt test

This subtest checks the Interrupt Request Level of IRQ 4, 3, and 5 from the send side.

***NOTE:*** Before conducting subtests 05 to 07, you must execute *SIRDRV.COM* to enable the infrared communication port.

Subtest 05 SIR Wraparound test

This subtest checks the data send/receive function through the SIR port.

***NOTE:*** To execute subtests 06 and 07, each computer must have access to the other computer's infrared port.

Subtest 06 FIR/SIR point to point (Send)

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data through the SIR port.

Subtest 07 FIR/SIR point to point (Receive)

This subtest is used with subtest 06 described above. This subtest receives the data from the send side, then sends the received data through the SIR port.



### 3.11 Hard Disk Test

To execute the Hard Disk Test select **8** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions displayed on the screen. The hard disk test contains ten subtests that test the hard disk drive functions.

**NOTE:** *The contents of the hard disk will be erased when subtest 02, 03, 04, 05, 06, 08, 09, or 10 is executed. Before running a test, transfer the contents of the hard disk to a backup system (i.e., floppy disks).*

- 1. If MS-DOS 6.22/Windows for Workgroups is selected, use the Master Diskette Creator (MDC) utility in the Toshiba Utility folder to back up the preinstalled software. After backing up the preinstalled software, use the BACKUP command in the Toshiba Companion Utility to back up the entire disk, including the user's files.*
- 2. If Windows 95 is selected, check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the preinstalled software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files*  
*Refer to the appropriate instructions for each operating system.*

1. When you select the hard disk test from the DIAGNOSTIC TEST MENU, the following message will appear:

```
Test drive number select (1:HDD#1,2:HDD#2,0:HDD1&2) ?
```

2. Select the hard disk drive number to be tested and press **Enter**. The following message will appear:

```
HDC F/W error retry (1:yes,2:no) ?
```

3. This message is used to select the retry operation when the hard disk controller detects an error. Select **1** or **2** and press **Enter**. The following message will appear:

```
Data compare error dump (1:no,2:yes) ?
```

4. This message is used to select the error dump operation when a data compare error is detected. Select **1** or **2** and press **Enter**. The following message will appear:

```
Detail status display (1:no,2:yes) ?
```

5. This message is used to select whether or not the HDD status is displayed on the screen. The HDD status is described in section 3.19. Select **1** or **2** and press **Enter**.

6. The Hard Disk Test message will appear after you respond to the Detail Status prompt. Select the number of the subtest you want to execute and press **Enter**. The following message will appear during each subtest.

```
HARD DISK TEST      XXXXXXXX

SUB-TEST : XX
PASS COUNT: XXXXX  ERROR COUNT: XXXXX
WRITE DATA: XX  READ DATA : XX
ADDRESS : XXXXXX STATUS : XXX
```

The first three digits of the ADDRESS indicate which cylinder is being tested, the fourth digit indicates the head and the last two digits indicate the sector.

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in Table 3-2.

Subtest 01 Sequential Read

This subtest is a sequential reading of all the tracks on the HDD starting at track 0. When all the tracks on the HDD have been read, the test starts at the maximum track and reads the tracks on the HDD sequentially back to track 0.

Subtest 02 Address Uniqueness

This subtest writes unique address data to each sector of the HDD track-by-track. The data written to each sector is then read and compared with the original data. There are three ways the HDD can be read:

- Forward sequential
- Reverse sequential
- Random

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on the HDD cylinder, head, and sector. This data is then read and compared to the original data.

Subtest 04 Cross Talk & Peak Shift

This subtest writes eight types of worst pattern data (shown below) to a cylinder, then reads the data while moving from cylinder to cylinder.

<b>Worst pattern data</b>	<b>Cylinder</b>
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149249'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24924'	7 cylinder

Subtest 05 Write/read/compare (CE)

This subtest writes B5ADADh worst pattern data to the CE cylinder on the HDD, then reads the data from the CE cylinder and compares it with the original data.

Subtest 06 Write specified address

This subtest writes specified data to a specified cylinder and head on the HDD.

Subtest 07 Read specified address

This subtest reads data which has been written to a specified cylinder and head on the HDD.

Subtest 08 ECC circuit

This subtest checks the Error Check and Correction (ECC) circuit functions of the specified cylinder and head on the HDD.

Subtest 09 Sequential write

This subtest writes specified 2-byte data to all of the cylinders on the HDD.

Subtest 10 W-R-C specified address

This subtest writes data to a specified cylinder and head on the HDD, then reads the data and compares it to the original data.

## 3.12 Real Timer Test

To execute the Real Timer Test select **9** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen. The real timer test contains three subtests that test the computer's real timer functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 Real Time

A new date and time can be input during this subtest. To execute the real time subtest follow these steps:

1. Select subtest 01 and the following message will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX
```

```
Enter new date:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

2. If the current date is not correct, input the correct date at the "Enter new date" prompt and press **Enter**. The following prompt will appear:

```
Enter new time :
```

3. If the current time is not correct, input the correct time in 24-hour format.

Pressing **Enter** toggles between the time and the date. To exit, press **Ctrl + Break**.

### Subtest 02 Backup Memory

This subtest performs the following backup memory check:

```
Writes 1-bit of "on" data to address 01h through 80h
Writes 1-bit of "off" data to address 0Eh through 80h
Writes the data pattern AAh and 55h to the RTC 114-byte memory
(address 0Eh to 7Fh)
```

The subtest reads and compares this data with the original data.

To exit, press **Ctrl + Break**.

Subtest 03    Real Time Carry

**CAUTION:** *When this subtest is executed, the current date and time are erased.*

This subtest checks the real time clock increments, making sure the date and time are displayed in the following format:

```
Current date : 12-31-1995  
Current time : 23:59:58
```

Pressing **Enter** displays the following :

```
Current date : 01-01-1996  
Current time : 00:00:00
```

```
PRESS [Enter] KEY TO EXIT TEST
```

Press **Ctrl + Break** to exit.

### 3.13 NDP Test

To execute the NDP test select **10** from the DIAGNOSTICS TEST MENU, press **Enter**, and follow the directions on the screen. The NDP test contains one subtest that tests the NDP functions.

Subtest 01      NDP

This test checks the following functions of NDP:

- Control word
- Status word
- Bus
- Addition
- Multiplication

Press **Ctrl + Break** to exit.

### 3.14 Expansion Test

To execute the expansion test select **11** from the DIAGNOSTICS TEST MENU, press **Enter**, and follow the directions on the screen. The expansion test contains one subtest.

***NOTE:** To execute this subtest, the PC card wraparound connector is required.*

Subtest 01 PCMCIA wraparound (Main point to point (Receive))

This test checks the following signal line of the PC card slot:

- Address line
- REG#, CE#1, CE#2 line
- Data line
- Speaker line
- Wait line
- BSY#, BVD1 line

This subtest is executed in the following order:

Sub#	Address	Good	Bad	Contents
01	00001 00001	nn nn	xx xx	Address line REG#, CE#1, CE#2 nn=A0, 90, 80, 00
02	00002	ww	rr	Data line ww=write data, rr=read data
03	00003	—	—	Speaker line
04	00004	40, 80	xx	Wait line (40<xx<80)
05	00005	nn	xx	Other lines (BSY#, BVD1) nn=21, 00

***NOTE:** Subtests 02 through 05 are for the Desk Station V Plus. For procedures on those subtests, refer to the Desk Station V Plus Maintenance Manual.*

## 3.15 Sound Test

To execute the sound test select **12** from the DIAGNOSTICS TEST MENU, press **Enter**, and follow the directions on the screen. The sound test contains four subtests that test the sound functions.

**NOTE:** *To execute this subtest, the internal microphone and internal headphone (or internal speaker) are required.*

*The system is capable of producing high volume sound, so when you use the headphones be careful to set the volume low and adjust it as necessary. Using the headphones at full volume could damage your ears.*

### Subtest 01 CODEC (REC/PLAY)

Tests the functions of the Codec (AD1848) A/D, D/A converter and at the same time, tests the microphone terminals and headphone terminals. When you execute this subtest the following message is displayed.

```
[Quick REC & PLAY for AD1848]
Press any key to *** REC ***
```

Press any key, start recording, and immediately play the sound. (It takes three seconds.)

### Subtest 02 FM Synthesizer

Tests the OPL# (YMF262) functions. Connect the headphone and check the scale of the right and left side. Also, check the sound adjustment volume.

### Subtest 03 SINE-Wave playback

This subtest expands the sine-wave data table to 64KB and creates sine-wave data. The play data is transferred between DMA and CODEC and plays the sound. (It is a long beep.) Use the oscilloscope to observe the sine wave-form.

### Subtest 04 Codec line in/out (record sound/replay)

Load the file AD1848L.COM. Connect a sound source such as a CD player or stereo to the line-in port. Next, connect an output device such as an amplifier for the internal speaker or a radio/cassette player to the line-out port.

After making the connections, a dialogue box will be displayed. Press **Enter** to play a recorded sound. About three seconds after the recorded sound is played, the dialogue box will be displayed again.



### 3.16 CD-ROM Test

To execute the CD-ROM test select **13** from the DIAGNOSTICS TEST MENU, press **Enter**, and follow the directions on the screen. The CD-ROM test contains four subtests that test the CD-ROM functions.

***NOTE:** First, make sure the CD-ROM driver (CDROMDRV.COM) is installed then insert the test media CD (Toshiba-EMI Test Disk TDY-03).*

Subtest 01      Sequential Read

This subtest is a sequential reading of one block unit (2K bytes) of all logical addresses.

Subtest 02      Read Specified Address

This subtest reads one-block data from a specified address.

Subtest 03      Random Address/Data

This subtest reads one-block data and multi-block data from random addresses 200 times.

Subtest 04      Playback Music

***NOTE:** The Toshiba-EMI Test Disk TDY-03 cannot be used for Subtest 04. For this test, use an ordinary music CD.*

This subtest reads track data from a specified track and plays the sound.

## 3.17 Modem Test

*NOTE: First, use the Hardware Setup program to select COM2 (2F8H/IRQ3) for the modem COM port, I/O address, and IRQ.*

### 3.17.1 Operation Procedures

1. To execute this test highlight 14-MODEM TEST in the DIAGNOSTIC TEST menu, and press **Enter**. Next, highlight 1-MODEM in the SUBTEST menu and press **Enter**. The screen below will be displayed.

```

-----[ EXECUTION AREA ]-----
[ASYNC MODEM (FAX/DATA) INSPECTION]      :      VX.XX

1 .FVRMD* TEST
2 .LOOPBACK TEST
3 .SPEAKER (L) TEST
4 .SPEAKER (R) TEST
5 .TERMINAL
9 .END

PRESS [1] - [9] KEY?

                                           STOP=[ctrl]+[break]

-----[ ERROR MESSAGE ]-----
```

2. When you select any item from 1 to 5, the screen below will be displayed.

```

[XXXXX-X]          [XXXXXXXXXX]

-----[ EXECUTION AREA ]-----

Select the COM(1:COM1/3F8h,2:COM2/2F8h)?
```

3. When you set the COM port to the same one selected in the Hardware Setup program, the screen below will be displayed.

```

[XXXXX-X]          [XXXXXXXXXX]

-----[ EXECUTION AREA ]-----

Select the COM(1:COM1/3F8h,2:COM2/2F8h)?
Baud rate(2:300,,4:1200,5:2400,6:9600,7:14400,8:19200,9:38400)?
```

4. Enter the Baud rate and press **Enter**.

### 3.17.2 Program Explanation

Subtest 01 FVRMD\*TEST

Initializes the modem and sends an ATZ command.

Subtest 02 LOOPBACK TEST

A loopback signal is sent from board FVRMD\* to FLXDA.

Subtest 03 SPEAKER (L) TEST

A dial-tone sound is generated in the left speaker.

Subtest 04 SPEAKER (R) TEST

A dial-tone sound is generated in the right speaker.

Subtest 05 TERMINAL

*NOTE: Before you conduct test 05, connect the DAA module to a telephone.*

When you have connected the DAA module to a telephone, test the connection by calling the line from another phone.

### 3.18 Error Codes and Error Status Names

Table 3-2 lists the error codes and error status names for the Diagnostic Test.

*Table 3-2 Error codes and error status names (1/3)*

<b>Device name</b>	<b>Error code</b>	<b>Error status name</b>
(COMMON)	FF	Data Compare Error
SYSTEM	01	ROM Checksum Error
Memory	01	Parity Error
	02	Protected Mode Not Changed
	14	Memory Read/Write Error
	DD	Cache Memory Error
	DE	2nd Cache Error
	DF	TAGRAM Error
FDD	01	Bad Command
	02	Address Mark Not Found
	03	Write Protected
	04	Record Not Found
	06	Media Removed
	08	DMA Overrun Error
	09	DMA Boundary Error
	10	CRC Error
	20	FDC Error
	40	Seek Error
	60	FDD Error
	80	Time Out Error
	EE	Write Buffer Error
Printer	01	Time Out
	08	Fault
	10	Select Line
	20	Out Of Paper
	40	Power Off
	80	Busy Line
ASYNC	01	DSR On Time Out
	02	CTS On Time Out
	04	RX-READY Time Out

Table 3-2 Error codes and error status names (2/3)

Device name	Error code	Error status name
ASYNC (cont.)	08	TX-BUFFER Full Time Out
	10	Parity Error
	20	Framing Error
	40	Overrun Error
	80	Line Status Error
	88	Modem Status Error
HDD	01	Bad Command Error
	02	Address Mark Not Found
	04	Record Not Found
	05	HDC Not Reset Error
	07	Drive Not Initialized
	08	HDC Overrun (DRQ)
	09	DMA Boundary Error
	0A	Bad Sector
	0B	Bad Track Error
	10	ECC Error
	11	ECC Recover Enabled
	20	HDC Error
	40	Seek Error
	80	Time Out Error
	AA	Drive Not Ready
	BB	Undefined Error
	CC	Write Fault
E0	Status Error	
EE	Access Time Out Error	
NDP	01	No Co-Processor
	02	Control Word Error
	03	Status Word Error
	04	Bus Error
	05	Addition Error
	06	Multiply Error
PCMCIA	C1	Address Line Error
	C2	REG# Line Error
	C3	CE#1 Line Error
	C4	CE#2 Line Error
	C5	DATA Line Error
	C6	WAIT Line Error
	C7	BSY# Line Error
	C8	BVD1 Line Error
	CD	No PCMCIA

*Table 3-2 Error codes and error status names (3/3)*

<b>Device name</b>	<b>Error code</b>	<b>Error status name</b>
CD-ROM	01	Bad Command
	02	Illegal Length
	03	Unit Attention
	04	Media Change Request
	05	Media Detected
	06	Additional Sense
	09	Boundary Error
	11	Corrected Data Error
	20	Drive Not Ready
	40	Seek Error
	80	Time Out
	90	Reset Error
B0	Address Error	

### 3.19 Hard Disk Test Detail Status

When an error occurs in the hard disk test, the following message is displayed:

```
HDC status = XXXXXXXX
```

Detailed information about the hard disk test error is displayed on the screen by an eight-digit number. The first four digits represent the hard disk controller (HDC) error status number and the last four digits are not used.

The hard disk controller error status is composed of 2 bytes; the first byte displays the contents of the HDC status register in hexadecimal form and the second byte displays the HDC error register.

The contents of the HDC status register and error register are described in Tables 3-3 and 3-4.

*Table 3-3 Hard disk controller status register contents*

Bit	Name	Description
7	BSY (Busy)	"0" --- HDC is ready. "1" --- HDC is busy.
6	DRDY (Drive ready)	"0" --- Hard disk drive is not ready to accept any command. "1" --- Hard disk drive is ready to accept any command.
5	DWF (Drive write fault)	"0" --- DWF error is not detected. "1" --- Write fault condition occurs.
4	DSC (Drive seek complete)	"0" --- The hard disk drive heads are not settled over a track. "1" --- The hard disk drive heads are settled over a track.
3	DRQ (Data request)	"0" --- Drive is not ready for data transfer. "1" --- Drive is ready for data transfer.
2	CORR (Corrected data)	"0" --- Not used "1" --- Correctable data error is corrected.
1	IDX (Index)	"0" --- Not used "1" --- Index is sensed.
0	ERR (Error)	"0" --- Normal "1" --- The previous command was terminated with some error.

Table 3-4 Error register contents

Bit	Name	Description
7	BBK1 (Bad block mark)	"0" Not used "1" A bad block mark is detected.
6	UNC (Uncorrectable)	"0" There is no uncorrectable data error. "1" Uncorrectable data error has been detected.
5	—	Not used
4	IDNF (Identification)	"0" Not used "1" There was no ID field in the requested sector.
3	—	Not used
2	ABRT (Abort)	"0" Not used "1" Illegal command error or a drive status error occurs.
1	TK00 (Track 0)	"0" The hard disk has found track 0 during a recalibrate command. "1" The hard disk could not find track 0 during a recalibrate command.
0	—	Not used



## 3.20 Hard Disk Format

This command executes hard disk formatting. There are two types of hard-disk formatting:

- Low-level (physical) formatting
- MS-DOS (logical) formatting

This hard disk format function performs a low-level format of the hard disk and executes the following hard disk formats and check:

1. All track FORMAT
2. Good track FORMAT
3. Bad track FORMAT
4. Bad track CHECK

**NOTE:** *The contents of the hard disk will be erased when this program is executed. Before executing the function, transfer the contents of the hard disk to a backup system (i.e., floppy disks).*

1. *If MS-DOS 6.22/Windows for Workgroups is selected, use the Master Diskette Creator (MDC) utility in the Toshiba Utility folder to back up the preinstalled software. After backing up the preinstalled software, use the BACKUP command in the Toshiba Companion Utility to back up the entire disk, including the user's files.*
2. *If Windows 95 is selected, check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the preinstalled software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.*

*Refer to the appropriate instructions for each operating system.*

### 3.20.1 Function Description

#### 1. All track FORMAT

This option performs a low-level format of all the tracks on the hard disk as shown in Table 3-5 below:

**NOTE:** Before executing the all track format option, check for bad tracks using the Bad Track CHECK option or display a list of bad tracks on the HDD.

Table 3-5 Hard disk formatting sequence

Items	(MK2720FC)
Storage capacity Formatted (Byte)	1,358,880,768
Cylinders	2,358
Heads	16
Sectors	63
Bytes per sector	512
Rotation speed (rpm)	4,200
Recording method	8-9 RLL

#### 2. Good track FORMAT

This option formats a specified cylinder and track as a good track. If a good track is formatted as a bad track, use this option to change the track to a good track.

#### 3. Bad track FORMAT

This option formats a specified cylinder and track as a bad track. If a bad track is detected, use this option to label it as a bad track.

#### 4. Bad track CHECK

This option searches the hard disk for bad tracks by reading data to all the tracks on the hard disk. A list of bad tracks is displayed when the program is complete. If an error other than a bad track is detected, the program is automatically terminated.

### 3.20.2 Operations

***NOTE:** After the HDD has been formatted, execute the Toshiba MS-DOS FDISK command to partition the HDD. Next, execute the Toshiba MS-DOS FORMAT command. Refer to the Toshiba MS-DOS manual for more information about using these commands.*

Selecting **2** and pressing **Enter** on the DIAGNOSTIC MENU displays the following messages:

```
DIAGNOSTICS - HARD DISK FORMAT : VX.XX
```

```
1 - All track FORMAT
2 - Good track FORMAT
3 - Bad track FORMAT
4 - Bad track CHECK
9 - Go to TEST MENU
```

```
↑↓→← : Select items, Enter: Finish, Esc: Exit
```

#### 1. All track FORMAT

Pressing 1 selects All track FORMAT, which lets you format the entire disk.

```
[All track FORMAT]
```

```
Drive      :      #1 = HDD          #2 = Non
Cylinder   :      XXXX
Head       :      XX
Sector     :      XX
```

```
<<< Model name = >>>
```

The following selections also appear at the bottom of the screen in succession:

```
Drive number select (1:#1,2:#2) ?
```

Select a drive number and press **Enter**. The following message will appear:

```
Interleave number (1/1 ~ 8) ?
```

Select an interleave number, 1 ~ 8 and press **Enter**. Pressing only **Enter** selects 1.

(a) Bad track register

The Bad Track register prompt will appear as shown below. Enter the cylinder and head numbers of bad tracks and press **Enter**. Note that if there are no bad tracks, pressing **Enter** alone is the same as executing All Track Format described in item (c) below.

```
[ WARNING : Current DISK data will be
           completely destroyed ]
```

```
Press Bad cylinder number (dddd)] key ?
Press Bad head number (dd)] key ?
```

Enter the cylinder and head number in the format above in decimal notation. Repeat for each bad track you want to format.

After entering the bad tracks, press **Enter** to execute the format.

(b) All track format

All tracks are formatted as good tracks except those registered as bad tracks in item (a) above or those identified as bad tracks in track verification described in item (c) below.

(c) Track verification

A check is made of all tracks and if an ECC error, ECC-correctable-data error, or record-not-found error is detected at a track, that track is automatically formatted as a bad track.

2. Good track FORMAT

If a good track has been erroneously formatted as a bad track, you can use this subtest to reformat the track as a good track. To format a track as a good track, enter the number for drive, interleave, cylinder, and head as indicated in the screen prompt shown below.

```
Drive number select (1:#1, 2:#2) ?
Interleave number (1 / 1 - 8) ?
Press [Cylinder number (dddd)] ?
Press [Head number (dd)] ?
```

Press **Enter** to return to the Hard Disk Format menu.

### 3. Bad track FORMAT

To format a track as a bad track, enter the number for drive, interleave, cylinder, and head as indicated in the screen prompt shown below.

```
Drive number select (1:#1, 2:#2) ?  
Interleave number (1 / 1 - 8) ?  
Press [Cylinder number (dddd)] ?  
Press [Head number (dd)] ?
```

Press **Enter** to return to the Hard Disk Format menu.

### 4. Bad track CHECK

This subtest reads the entire disk and displays a list of bad tracks. The test is terminated in case of a bad track check error. To initiate the subtest enter the drive number at the prompt shown below.

```
Drive number select (1:#1, 2:#2) ?
```

Bad tracks will be displayed in the format shown below.

```
[[cylinder, head = 0123 03]]
```

Press **Enter** to return to the Hard Disk Format menu.

## 3.21 Head Cleaning

### 3.21.1 Function Description

This function cleans the heads in the FDD by executing a series of head load/seek and read operations. A cleaning kit is necessary to perform this program.

### 3.21.2 Operations

1. Selecting **4** on the DIAGNOSTIC MENU and pressing **Enter** displays the following messages:

```
DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX
```

```
Mount cleaning disk(s) on drive(s).
```

```
Press any key when ready.
```

2. Remove the Diagnostics Disk from the FDD. Insert the cleaning disk and press **Enter**.
3. When the "cleaning start" message appears, the FDD head cleaning has begun.
4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.



2. The error information displayed on the screen can be manipulated by the following number keys:

The **1** key scrolls the display to the next page.

The **2** key scrolls the display to the previous page.

The **3** key returns to the Diagnostic Menu.

The **4** key erases all error log information in RAM.

The **5** key outputs the error log information to a printer.

The **6** key reads the log information from a floppy disk.

The **7** key writes the log information to a floppy disk.

3. In the case of “error retry OK,” a capital “R” will be placed at the beginning of the error status. However, it is not added to the error count.



## 3.23 Running Test

### 3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest number 01)
2. Memory test (subtest number 01, 02, 04, 06)
3. Display test (subtest number 01 to 06)
4. FDD test (subtest number 02)
5. HDD test (subtest number 01, 05)
6. Real timer test (subtest number 02)
7. Printer test (subtest number 03), if selected
8. Async test (subtest number 01), if selected

The system automatically detects the number of floppy disk drives connected to the computer for the FDD test.

### 3.23.2 Operations

**NOTE:** Do not forget to load a work disk in the FDD. If a work disk is not loaded, an error will be generated during the FDD testing.

1. Remove the diagnostics disk from the floppy disk drive and insert the work disk.
2. Selecting **6** on the Diagnostic Menu and pressing **Enter** displays the following message:

```
Printer wrap around test (Y/N) ?
```

Selecting **Y (yes)** executes the printer wraparound test. A printer wraparound connector must be connected to the parallel port of the computer to properly execute this test.

3. Selecting **Y** or **N** and pressing **Enter** displays the following message:

```
Serial #A wrap around test (Y/N) ?
```

Selecting **Y (yes)** executes the ASYNC wraparound test. An RS-232-C wrap-around connector must be connected to the serial port of the computer to properly execute this test.

4. Select **Yes** or **No** and press **Enter**. The following message will appear:

```
Mount the work disk(s) on the drive(s),  
then press [Enter] key.  
[Warning : The contents of the disk(s),  
will be destroyed.]
```

5. This program is executed continuously. To terminate the program, press **Ctrl + Break**.

## 3.24 Floppy Disk Drive Utilities

### 3.24.1 Function Description

This function formats the FDD, copies the floppy disk, and displays the dump list for both the FDD and HDD.

#### 1. FORMAT

***NOTE:** This program is only for testing a floppy disk drive. The option is different from the Toshiba MS-DOS FORMAT command.*

This program can format a 5.25-inch or 3.5-inch floppy disk in the following formats:

- (a) 2D: Double-sided, double-density, 48/67.5 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (b) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (c) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

#### 2. COPY

This program copies data from a source floppy disk to a target floppy disk.

#### 3. DUMP

This program displays the contents of the floppy disk and the designated sectors of the hard disk on the display.

### 3.24.2 Operations

1. Selecting **7** on the DIAGNOSTIC MENU and pressing **Enter** displays the following message:

```
[ FDD UTILITIES ]  
  
1 - FORMAT  
2 - COPY  
3 - DUMP  
9 - EXIT TO DIAGNOSTICS MENU
```

## 2. FORMAT program

- (a) Selecting **FORMAT** displays the following message:

```
DIAGNOSTICS - FLOPPY DISK FORMAT : VX.XX  
Drive number select (1:A, 2:B) ?
```

- (b) Select a drive number to display the following message:

```
Type select (0:2DD-2DD,1:2D-2D,2:2D-2HD,3:2HD-2HD) ?
```

- (c) Select a media/drive type number and press **Enter**. A message similar to the one below will be displayed:

```
Warning : Disk data will be destroyed.  
Insert work disk into drive A:  
Press any key when ready.
```

- (d) Remove the Diagnostics Disk from the FDD, insert the work disk, and press any key.

The following message will be displayed when the FDD format is executed:

```
[ FDD TYPE ] : TRACK  = XXX  
[ FDD TYPE ] : HEAD   = X  
[ FDD TYPE ] : SECTOR = XX  
  
Format start  
[[track, head = XXX X]]
```

After the floppy disk is formatted, the following message will appear:

```
Format complete  
Another format (1:Yes/2:No) ?
```

- (e) Typing **1** displays the message from step (c) above. Typing **2** returns the test to the **DIAGNOSTIC MENU**.

## 3. COPY program

- (a) When **COPY** is selected, the following message appears:

```
FLOPPY DISK FORMAT & COPY : VX.XX  
Type select (0:2DD-2DD,1:2D-2D,2:2D-2HD,3:2HD-2HD) ?
```

- (b) Selecting a media/drive type number will display a message similar to the one below:

```
Insert source disk into drive A:  
Press any key when ready.
```

- (c) Remove the Diagnostics Disk from the FDD, insert the source disk, and press any key. The following message will appear, indicating the program has started.

```
[ FDD TYPE ] : TRACK  = XXX
[ FDD TYPE ] : HEAD   = X
[ FDD TYPE ] : SECTOR = XX
```

Copy start

```
[[ track,head = XXX X ]]
```

- (d) Remove the source disk from the FDD, insert a formatted work disk, and press any key. The `[[ track, head = XXX X ]]` message will appear and start copying to the target disk. When the amount of data is too large to be copied in one operation, the message from step (b) is displayed again. After the floppy disk has been copied, the following message will appear:

```
Copy complete
Another copy (1:Yes/2:No) ?
```

- (e) To copy another disk, type **1** and the message from step (a) will be displayed again. Entering **2** returns the test program to the DIAGNOSTIC MENU.

#### 4. DUMP program

- (a) When dump is selected, the following message appears:

```
DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : VX.XX
Drive type select (1:FDD, 2:HDD) ?
```

- (b) Select a drive type. If **1** is selected in step (a), the following message displays.

```
Select drive number (1:A, 2:B) ?
```

If **2** is selected, the following message displays:

```
Select drive number (1:C, 2:D) ?
```

After selecting the HDD, the display will go to step (f).

- (c) The following message will be displayed:

```
Format type select (1:2DD, 2:2D, 3:2HD) ?
```

- (d) Select a format type. The following message will appear:

```
Insert source disk into drive A:
Press any key when ready.
```

- (e) Insert a source disk, press any key, and the following message will appear:

```
— Max. address —
[Track ] = 0079
[ Head ] = 01
[Sector] = 09
Track number ??
```

Set the track number you want to dump. The system will access the disk and dump a list.

## 3.25 System Configuration

### 3.25.1 Function Description

The System Configuration program contains the following configuration information for the computer:

1. BIOS ROM version
2. Boot ROM version
3. KBC version
4. PS Microprocessor Version
5. Base memory size
6. The number of floppy disk drives
7. The number of ASYNC ports
8. The number of hard disk drives
9. The number of printer ports
10. Extended Memory Size
11. The number of math co-processors

### 3.25.2 Operations

Selecting **8** on the DIAGNOSTIC MENU and pressing **Enter** displays the following system configuration:

```
SYSTEM CONFIGURATION :  
  
* - BIOS ROM VERSION = VX.XX  
* - BOOT ROM VERSION = VX.XX  
* - KBC VERSION      = VX.XX  
* - PS MICOM VERSION = VX.XX  
* - 639KB MEMORY  
* - 1 FLOPPY DISK DRIVE(S)  
* - 1 ASYNC ADAPTER  
* - 1 HARD DISK DRIVE(S)  
* - 1 PRINTER ADAPTER  
* - XXXMB + XXXXKB EXTENDED MEMORY  
* - 1 MATH CO-PROCESSOR
```

Press [Enter] Key

Press **Enter** to return to the DIAGNOSTIC MENU.

## 3.26 SETUP

### 3.26.1 Function Description

This program displays the current system setup information as listed below:

1. Memory
  - (a) Total
2. Display
  - (a) Display Adapter
  - (b) LCD Display Colors
  - (c) Power On Display
  - (d) Text Mode Stretch
3. Password
  - (a) User Password
  - (b) Eject Password
4. Hard Disk
5. Battery
6. Others
  - (a) Power-up Mode
  - (b) CPU Cache
  - (c) Level 2 Cache
  - (d) Auto Power On
  - (e) Alarm Volume
  - (f) System Beep
  - (g) Panel Power On/Off
  - (h) Keyboard
  - (i) Boot Priority
  - (j) Pointing Devices
  - (k) PC Card Controller Mode
7. Display
8. I/O Ports
  - (a) Serial Port
  - (b) Infrared Port
  - (c) Built-in Modem Port
  - (d) Parallel Port
  - (e) Sound System
9. PCI Bus
10. Drives I/O
11. Floppy Disk I/O

### 3.26.2 Accessing the SETUP Program

Selecting **0** on the DIAGNOSTICS MENU and pressing **Enter** displays the TSETUP screen. The TSETUP screen is divided into two pages SYSTEM SETUP (1/2) and SYSTEM SETUP (2/2).

SYSTEM SETUP (1/2)		BIOS version = x.xx
<p style="text-align: center; margin: 0;"><b>MEMORY</b></p> <p>Total = 16384 KB</p>	<p style="text-align: center; margin: 0;"><b>BATTERY</b></p> <p>Battery Save Mode = Full Power</p>	
<p style="text-align: center; margin: 0;"><b>DISPLAY</b></p> <p>Display Adapter = VGA Compatible            LCD Display Colors = 16M Colors            Power On Display = Internal/External            Text Mode Stretch = Disabled</p>	<p style="text-align: center; margin: 0;"><b>OTHERS</b></p> <p>Power-up Mode = Resume            CPU Cache = Enabled            Level 2 Cache = Enabled            Auto Power On = Disabled            Alarm Volume = High            System Beep = Enabled            Panel Power On/Off = Disabled</p>	
<p style="text-align: center; margin: 0;"><b>PASSWORD</b></p> <p>Not Registered</p>		
<p style="text-align: center; margin: 0;"><b>HARD DISK</b></p> <p>Internal HDD            Mode = Enhanced IDE (Normal)</p>	<p>Keyboard = Fn            Boot Priority = FDD→HDD            Pointing Devices = Auto-selected            PC Card Controller Mode = PCIC Compatible</p>	

SYSTEM SETUP (2/2)		BIOS version = x.xx
<p style="text-align: center; margin: 0;"><b>DISPLAY</b></p> <p>VGA Segment Address = E400H-EFFFH</p>	<p style="text-align: center; margin: 0;"><b>DRIVES I/O</b></p> <p>Internal HDD            = Primary IDE(1F0H/IRQ14)</p>	
<p style="text-align: center; margin: 0;"><b>I/O PORTS</b></p> <p>Serial = COM1(3F8H/IRQ4)            Built-in Modem = COM2(2F8H/IRQ3)            Parallel = LPT1(378H/IRQ7/CH3)            Sound = Enabled</p>	<p style="text-align: center; margin: 0;"><b>FLOPPY DISK I/O</b></p> <p>Floppy disk = Others(3F2H/IRQ6/CH2)</p>	
<p style="text-align: center; margin: 0;"><b>PCI BUS</b></p> <p>PCI BUS = IRQ 11</p>		

↑↓→← : Select items    Space, BkSp : Change values    PgDn, PgUp : Change pages  
 Esc: Exit without saving    Home: Set default values    End: Save changes and Exit

**NOTE:**

1. The Panel Power On/Off item appears only when the computer is in Resume mode.
2. The 500CS LCD Display colors options are 222K Colors and 4096 Colors.
3. The Built-in Modem item appears only when an internal modem is installed in the computer. The modem is an option in some marketing regions.



### 3.26.3 Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press ↑ and ↓ to move between items in a column.
2. Press either the **spacebar** or **BkSp** to change the value.

**NOTE:** 1. On either page, you can go directly to a specific group by pressing the first letter (highlighted) of the group's name. For example, **B** to go to the **Battery** group.

2. To change pages, press the **PgUp** (page up) or **PgDn** (page down) key.

### 3.26.4 Accepting Changes and Exiting the SETUP Window

1. Press **End** to accept the changes you made.

If the changed item does not require the system to reboot, the following message is displayed:

Are you sure? (Y/N)

If the changed item requires the system to reboot, the following message is displayed:

Are you sure? (Y/N)

The changes you made will cause the system to reboot.

- (a) To make other changes, press **N**. Repeat the steps above.
- (b) To accept the changes, press **Y**.

**NOTE:** You can press **Esc** to quit at any time without saving changes. **SETUP** asks you to confirm that you don't want to save your changes.

### 3.26.5 The Factory Preset Configuration

When you access **SETUP**, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.
2. To accept the default settings, press **End** and then press **Y**.

**NOTE:** When you execute the default setting, the following settings are not changed:

*HDD Mode*  
*Password*  
*Sound System*  
*Write Policy*

### 3.26.6 SETUP Options

The SETUP screen is divided into functionally related groups. This section describes each group and its options.

#### 1. Memory

This option lists the computer's memory allocation.

##### (a) Total

Displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

#### 2. Display

This option configures the computer's display.

##### (a) Display Adapter

Enables or disables the internal controller for the VGA internal display.

*VGA compatible* Enables the internal VGA controller. (Default)

*Not Used* Disables the internal VGA controller.

##### (b) LCD Display Colors

Selects the color palette of the internal TFT display when the LCD mode is set to **Color**.

*222K colors (500CS)* Displays 64k colors out of 226,981 colors, or 4096 which displays 4096 colors out of 4096 colors.

*16M colors (500CDT)* Displays up to 16,777,216 colors simultaneously. (This value cannot be changed.)

##### (c) Power On Display

Selects the display when booting up the computer.

*Internal/External* Selects an external CRT if one is connected, otherwise it selects the internal LCD. (Default)

*Simultaneous* Selects both the internal LCD and the external CRT for simultaneous display.

**NOTE:** When starting the computer in Resume mode, the last configuration is remembered. If data does not appear on the display you are using after starting in Resume mode, press **Fn+F5**. Pressing **Fn+F5** changes the display setting as follows: internal LCD to simultaneous to external CRT.

(d) Text Mode Stretch

Text mode stretch enables a larger display area of the screen.

*Enabled* Enables the text mode stretch feature.

*Disabled* Disables the text mode stretch feature. (Default)

3. Password

(a) User Password

Sets or resets the user password for power on and instant security.

*Registered* The user password has been registered.

*Not registered* The user password has not been registered.

(b) Eject Password

Prevents an unauthorized user from removing the computer from an optional Desk Station V Plus.

*Enabled* The eject password has been registered.

*Disabled* The eject password has not been registered.

For details on setting the user and eject password refer to your 500 Series User's Guide.

4. Hard Disk

Selects the internal hard disk mode.

*Enhanced IDE* Select this mode when using MS-DOS<sup>®</sup>, (Normal) Windows<sup>®</sup> for Workgroups, Windows 95, or OS/2<sup>®</sup>. (Default)

*Standard IDE* Select this mode when using Novell<sup>®</sup> NetWare<sup>®</sup> or UNIX<sup>®</sup>. When this mode is selected, up to 504MB is logically available even though the disk's capacity is larger than 504MB.

*No drive* An HDD is not installed.

To display the capacity of the hard disk, use the CHKDSK command. See your DOS documentation for details on using CHKDSK.

**NOTE:** Formats for Enhanced IDE and Standard IDE are different, so if you change the setting you will have to reformat the hard disk for the appropriate setting.

## 5. Battery

Selections include **Full Power**, **Low Power**, and **User Setting** of the **BATTERY SAVE OPTION**.

*Full Power* The following shows full power settings.

BATTERY SAVE OPTIONS		
Processing Speed	=	High
CPU Sleep Mode	=	Enabled
Display Auto off	=	30 Min. (500CDT)
	=	Disabled (500CS)
HDD Auto Off	=	30 Min.
System Auto Off	=	Disabled
LCD Brightness	=	Bright
Cooling Method	=	Performance

*Low Power* The following shows low power settings.

BATTERY SAVE OPTIONS		
Processing Speed	=	Low
CPU Sleep Mode	=	Enabled
Display Auto off	=	03 Min.
HDD Auto Off	=	03 Min.
System Auto Off	=	30 Min.
LCD Brightness	=	Semi-Bright
Cooling Method	=	Quiet

**NOTE:** In boot mode, the System Auto Off message does not appear.

*User Setting* Sets the battery save parameters on the subwindow, **BATTERY SAVE OPTIONS**. When you select this option, the automatic setting feature (Full Power or Low Power) is disabled and the user-preferred parameters become effective. The default setting in the subwindows depends on the **Battery Save Mode**: *Low Power* (Long Life) or *Full Power* (Normal Life). For details, see *Battery Save Options* below.

(a) Battery Save Options

The following set of options can be selected in the submenu of **User Setting** (one of the **Battery Save Mode** options).

(1) Processing Speed

This feature changes the CPU processing speed.

*High* CPU operates at high speed. (Default)

*Low* CPU operates at low speed.

(2) CPU Sleep Mode

Use this option to enable or disable the CPU sleep function.

*Enabled* Enables sleep mode.

*Disabled* Disables sleep mode.

(3) Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel illumination off if you make no entry for the set period of time.

*Disabled* Disables display automatic power off.

*xx Min.* Automatically turns off power to the LCD panel illumination if the panel is not used for the duration set. The duration **xx** can be set to 1, 3, 5, 10, 15, 20, or 30 minutes.

(4) HDD Auto Off

Use this option to set the duration of the HDD automatic power off function.

*Disabled* Disables the HDD automatic power off.

*xx Min.* Automatically turns off power to the hard disk drive if it is not used for the duration set. The duration **xx** can be set to 1, 3, 5, 10, 15, 20, 30, or 45 minutes.

(5) System Auto Off

Use this option to enable or disable the system automatic off function in Resume mode when you are working in DOS. In Boot mode, it is disabled and not displayed.

- Disabled* Disables system automatic power off.
- xx Min.* Automatically turns off power to the system if it is not used for the duration set. The duration **xx** can be set to 10, 20, 30, 40, 50, or 60 minutes.

(6) LCD Brightness

Use this option to set the level of LCD brightness.

*Bright* Full brightness for maximum visibility.

*Semi-Bright* Less than full brightness for saving power.

(7) Cooling method

*Performance* If the CPU becomes too hot, the fan turns on automatically. When the CPU temperature falls to a normal range, high-speed processing is resumed and the fan turns off.

*Quiet* If the CPU becomes too hot, the processing speed is lowered. If the temperature is still too high, the fan turns on. When the CPU temperature falls to a normal range, the fan turns off and the processing speed is increased.

6. Others

Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

(a) Power-up Modes

Lets you choose between AutoResume and boot mode. You can also set this option using hotkeys. AutoResume is effective with either the internal LCD or with an external monitor.

*Boot* Turns on boot mode. (Default)

*Resume* Turns on the AutoResume feature.

(b) CPU Cache

Use this feature to enable or disable the CPU cache.

*Enabled* Enables the CPU cache. (Default)

*Disabled* Disables the CPU cache.

When **enable** is selected, a subwindow similar to the one below is displayed to let you select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through**.

Option		
Write Policy	=	Write-back

Write-back policy provides better system performance, because main memory is accessed only when necessary to update the cache contents with changes in main memory. Write-through policy accesses main memory every time data is handled by the processor.

(c) Level 2 Cache

Use this feature to enable or disable the level 2 cache.

*Enabled* Enables the CPU cache. (Default)

*Disabled* Disables the CPU cache.

(d) Auto Power On

This option lets you set a time for automatic power on and lets you enable or disable the ring indicator feature. **Ring Indicator** is displayed only when the computer is in Resume mode and **Alarm Date Option** is displayed when **Alarm Time** is enabled.

Option		
Alarm Time	=	xx:xx:00
Ring Indicator	=	Enabled

**Alarm Time** is set using hours and minutes. Seconds cannot be changed. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the time.

- NOTE:**
1. Do not remove the AC cable and battery pack at the same time when you use this feature. If you do so, data saved by AutoResume will be lost. You must also reset this option.
  2. If you have set a password and the computer boots by the Auto Power On function and Resume is on, the computer will start with the instant security function enabled. The **password = message** is not displayed; however, you must enter the password to use the computer.

(e) Alarm Volume

This option disables or sets the volume level of the alarm. Setting this option to off disables the computer's sound function for alarms. This option can also be set with hotkeys.

- Off* Disables the alarm.
- Low* Sets the alarm volume to low.
- Medium* Sets the alarm volume to medium.
- High* Sets the alarm volume to high. (Default)

When Alarm Volume is selected, the subwindow below is displayed to let you enable or disable certain functions.

ALARM VOLUME OPTIONS	
Low Battery Alarm =	Enabled
Panel Close Alarm =	Enabled

- Enabled* Enables the feature. (Default)
- Disabled* Disables the feature.

(f) System Beep

Use this feature to enable or disable the system beep.

- Enabled* Enables the feature. (Default)
- Disabled* Disables the feature.

(g) Panel Power On/Off

This option allows you to automatically turn your computer on or off by opening or closing the display panel. If this feature is enabled when the computer is in Resume mode, the system is automatically powered off when the display panel is closed and powered on when the panel is opened. This option does not appear when the computer is in boot mode.

- Enabled* Enables the feature.
- Disabled* Disables the feature. (Default)

**NOTE:** Do not remove the AC cable and battery pack at the same time when you use this feature. If you do so, data saved by AutoResume will be lost. You must also reset this option.



(h) Keyboard

This option lets you change the keyboard layout and set the Fn key equivalent when you are using an external keyboard. Selecting this option displays the following subwindow.

KEYBOARD	
Ext. Keyboard "Fn" key equivalent	
=	Disabled

(1) Ext. Keyboard **Fn** key equivalent

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting an **Fn** key equivalent will enable you to use "Hot keys" by pressing the set combination in place of the **Fn** key.

*Disabled* No **Fn** key equivalent. (Default)

*Fn Equivalent*

Left Ctrl	+	Left Alt*
Right Ctrl	+	Right Alt*
Left Alt	+	Left Shift
Right Alt	+	Right Shift
Left Alt	+	Caps Lock

*\* If these selections are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.*

(i) Boot Priority

Use this option to select the disk drive priority for boot up.

*FDD HDD* The computer looks for bootable files first on the FDD and next on the HDD. (Default)

*HDD FDD* The computer looks for bootable files first on the HDD and next on the FDD.

You can reverse the order by holding down the **F10** key while the computer is booting. This procedure alternates the setup setting.

(j) Pointing Devices

This option enables or disables the AccuPoint.

*Auto selected* If the PS/2 mouse is connected to the computer when you turn on the power, the PS/2 mouse is enabled and the AccuPoint is disabled. Otherwise, the AccuPoint is enabled. (Default)

*Simultaneous* Enables both the AccuPoint and the PS/2 mouse.

(k) PC Card Controller Mode

Use this option to set the PC card controller mode.

*PCIC Compatible* For PCMCIA R2.01 and ZV port card. (Default)

*CardBus/16bit* For PC card 16 multi-function card, CardBus card, and ZV port card.

7. Display

Use this option to set the VGA segment address from the following options:

(a) VGA Segment Address

E000h-EFFFh  
E400h-EFFFh (Default)  
C000h-CBFFh  
E000h-EBFFh

8. I/O ports

This option controls settings for serial and parallel ports and for the sound system. It also controls the setting for the joystick on the optional Desk Station V Plus.

**NOTE:** Do not assign the same interrupt request level and I/O address to the serial port and PC card.

(a) Serial Port

This option allows you to set the COM level for the serial port. The serial port interrupt request level (IRQ) and I/O port base address for each COM level is shown below:

COM level	Interrupt level	I/O address
COM1	4	3F8H (Serial port default)
COM2	3	2F8H
COM3	4	3E8H
COM3	5	3E8H
COM3	7	3E8H
COM4	3	2E8H
COM4	5	2E8H
COM4	7	2E8H
Not used		(Disables port)
Others		(Made automatically by plug-and-play operating systems)

**NOTE:** If the setting for the serial port is the same as that for the infrared or Modem port, the infrared or Modem port is automatically set to disabled.

(b) Infrared Port

This option allows you to set the COM level for the infrared port. The infrared port interrupt request level (IRQ) and I/O port base address for each COM level is shown below.

COM level	Interrupt level	I/O address
COM1	4	3F8H
COM2	3	2F8H
COM3	4	3E8H
COM3	5	3E8H
COM3	7	3E8H
COM4	3	2E8H
COM4	5	2E8H
COM4	7	2E8H
Not used		(Disables port)(Infrared port default)
Others		(Made automatically by plug-and-play operating systems)

**NOTE:** If the setting for the infrared port is the same as that for the serial or Modem port, the serial or Modem port is automatically set to disabled.

(c) Built-in Modem

This option allows you to set the COM level for the modem port. The modem port interrupt request level (IRQ) and I/O port base address for each COM level is shown below:

**NOTE:** If an internal modem (optional in some markets) is not installed, this selection does not appear.

COM level	Interrupt level	I/O address
COM1	4	3F8H
COM2	3	2F8H (Modem port default)
COM3	4	3E8H
COM3	5	3E8H
COM3	7	3E8H
COM4	3	2E8H
COM4	5	2E8H
COM4	7	2E8H
Not used		(Disables port)
Others		(Made automatically by plug-and-play operating systems)

**NOTE:** If the setting for the modem port is the same as that for the serial or infrared port, the serial or infrared port is automatically set to disabled.

(d) Parallel Port

This option sets the address for the parallel port. When the Printer Port Type (see settings below) is set to Standard Bi-Directional, the options are:

LPT setting	Interrupt level	I/O address
LPT 1	7	378H
LPT 2	5	278H
LPT 3	7	3BCH
Not Used		(Parallel port default)
Others		(Made automatically by plug-and-play operating systems)

When the Printer Port Type (see settings below) is set to ECP, the DMA channel can also be set to 1, 2, or 3. The default is 3.

LPT setting	Interrupt level	I/O address	DMA Channel
LPT 1	7	378H	3 (Default)
LPT 2	5	278H	3
LPT 3	7	3BCH	3
Not Used			(Parallel port default)
Others			(Made automatically by plug-and-play operating systems)

When you select one of the above options, except for *Not used*, a subwindow similar to the one below appears to let you set the parallel port mode. The options for this setting are *ECP* (default) and *Standard Bi-Directional*.

OPTIONS		
Mode	=	ECP
DMA	=	Channel 3

For most printers, the port should be set to *ECP*. With some other parallel devices, the setting should be *Standard Bi-Directional*.

(e) Sound system

Allows you to enable or disable the sound system.

*Enabled* Enables the sound system. (Default)

*Disabled* Disables the sound system.

When **Enabled** is selected, a subwindow similar to the one below appears to let you set the **WSS I/O address**, **SBPro I/O address**, **Synthesizer I/O address**, **WSS & SBPro IRQ Level**, **WSS & SBPro DMA**, **Control I/O address**, **MPU401 IRQ Level**, and **Joystick I/O address**.

SOUND SYSTEM	
WSS I/O Address	= 534H
SBPro I/O Address	= 220H
Synthesizer I/O Address	= 388H
WSS & SBPro IRQ Level	= IRQ5
WSS & SBPro DMA	
Playback	= Channel 1
Record	= Channel 0
Control I/O Address	= 120H
MPU401 (MIDI I/F) IRQ Level	= Not Used
Joystick I/O Address	= 200H

(1) WSS I/O address

Use this option to set the WSS I/O address from among the following settings:

534h (default), 608h, E84h, F44h

(2) SBPro I/O address

Use this option to set the SBPro I/O address from among the following settings:

220h (default), 240h

(3) Synthesizer I/O address

You cannot change this value.

(4) WSS & SBPro IRQ level

This option sets the WSS & SBPro IRQ level for the sound system. The available settings are:

IRQ5 (default), IRQ7, IRQ9, IRQ11, IRQ15

(5) WSS & SBPro DMA

This option sets the WSS & SBPro DMA. The available settings are:

```
Playback: Channel 0
          Channel 1 (Default)
          Channel 3
Capture:  Channel 0 (Default)
          Channel 1
          Channel 3
```

(6) MPU401 (MIDI I/F) IRQ level

This option sets the MPU401 IRQ level for the sound system. The available settings are:

```
Not Used (Default)
330H/IRQ7
330H/IRQ9
330H/IRQ11
330H/IRQ15
```

(7) Joystick I/O address

You cannot change this value.

**NOTE:** When you set the **Playback** and **Record** option to the same channel, the **Record** option will display **Same as Playback**.

9. PCI Bus

This option displays the interrupt level for the CardBus in the computer and the PCI bus in the Desk Station V Plus. It is for information only and cannot be changed.

Under the following conditions:

- No PCI card is installed in the Desk Station V Plus.
- The system cannot assign an interrupt level to the PCI bus.
- The PC Card Controller Mode is not set to CardBus/16Bit in TSETUP.

The display will read:

```
PCI bus = IRQ Not Used.
```

**NOTE:** In this case, the system will sound a warning beep when you connect the Desk Station V Plus and turn on the computer. Also, the following cannot be used on the Desk Station V Plus: PCI bus slots, ISA bus slots, PC card slots, and SCSI port.

## 10. Drives I/O

Displays the installed hard disk drives and/or CD-ROM drives: internal standard, Selectable Bay, Desk Station V Plus, or no drive. It appears only in TESTUP.

### (a) Setting for hard disk drive

*Primary IDE*    The HDD is ready for use.  
(1F0H/IRQ14)

*Not used*      Disables the HDD.

*No drive*      The HDD is not installed.

Other settings are made automatically by plug-and-play operating systems.

### (b) Setting for CD-ROM (DS Selectable Bay)

*Secondary IDE*    Desk Station V Plus Selectable Bay  
(190H/IRQ5)      CD-ROM.

*Not used*      Disables the selected CD-ROM.

Other settings are made automatically by plug-and-play operating systems.

**NOTE:** *If the computer is attached to a Desk Station V Plus, you have access to two Selectable Bays. However, you cannot use two CD-ROM drives in the Selectable Bays at the same time. If two CD-ROM drives are installed in the Selectable Bays, the Desk Station V Plus Selectable Bay is set to **Not used** by default.*

## 11. Floppy Disk I/O

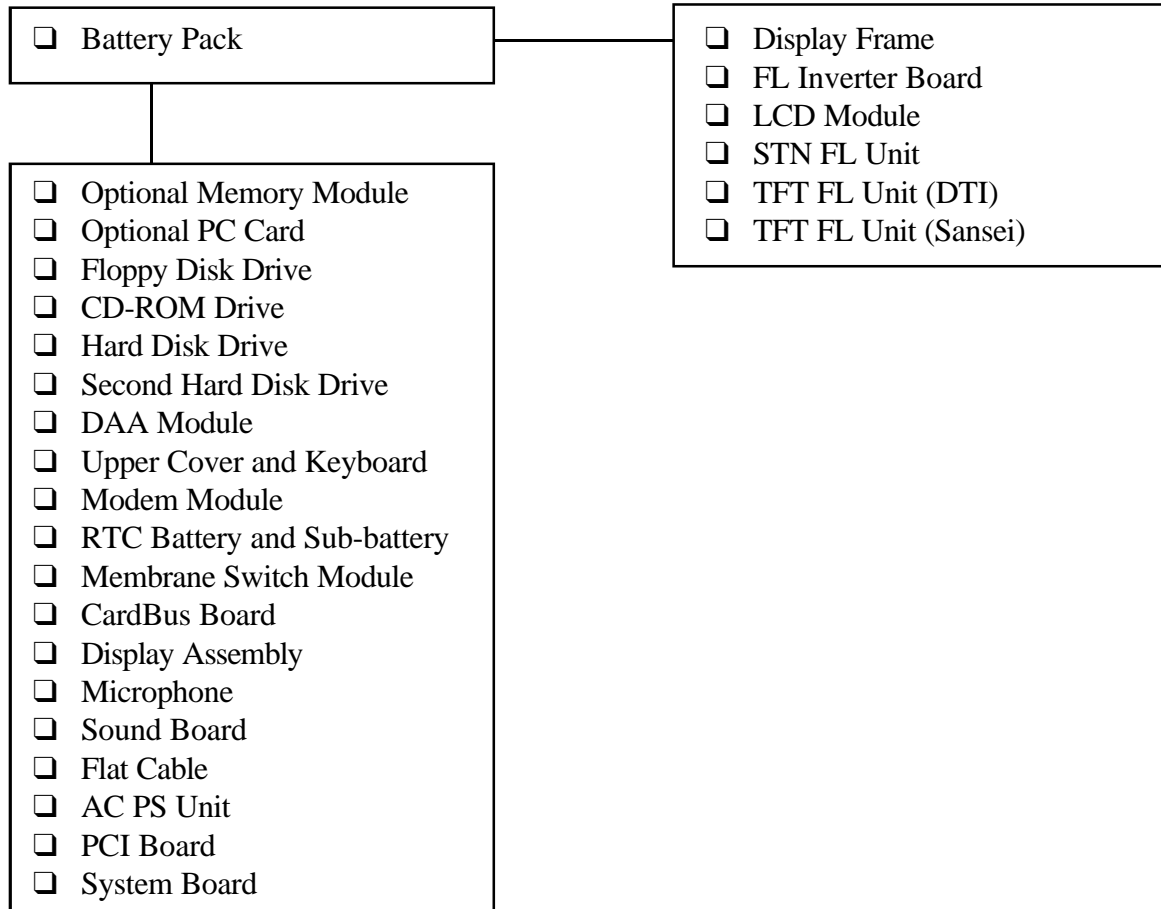
Displays the address, internal level, and channel settings for the diskette drive. It appears only in TSETUP.

(3F2H/IRQ6/CH2)    The FDD is ready for use.



## 4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, then follow the lines on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly.



## Safety Precautions

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

### **DANGER:**

1. *Always use the lithium ion battery pack or back-up battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode. Do not heat or disassemble the battery pack, as leakage of alkaline solution could result. Do not throw the battery pack into a fire, as that could cause the battery pack to explode.*
2. *The power supply, FL inverter, and other components carry high voltages. To avoid the risk of electric shock when you turn on the power of a partially disassembled computer to check its 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 electric shock or other injury:**

1. *Always turn the power off and disconnect the AC power cord from the power source.*
2. *Remove any metal jewelry or accessories such as necklaces, bracelets, or rings. Batteries in the computer retain electrical charge so there is danger of electrical shock even when the computer is disconnected from an AC power source.*
3. *Never work with wet or damp hands.*
4. *The computer contains many sharp edges and corners, so be careful not to injure yourself.*

### **CAUTION:**

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

1. *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts.*
2. *Be sure metal objects such as screws or paper clips do not fall into the unit, they can cause short-circuit, fire, or other internal damage.*
3. *Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, or fire.*
4. *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected.*
5. *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*
6. *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened.*

## Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC power cord and the battery pack as instructed in section 4.2, *Battery Pack*.

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer:
  - Dust and contaminants
  - Static electricity
  - Extreme heat, cold, and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer, make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in the corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. 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.

## Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Normal Pin Connectors
- Flexible Cable Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

## Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you hurry to assemble the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that no cables will be pinched by screws or the FRU.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can damage either the threads or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer confirm that the FRU and the computer are functioning properly.

## Tools and Equipment

The use of ElectroStatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 Phillips screwdriver to remove and replace screws.
- Tweezers, to lift out screws that you cannot grasp with your fingers.
- ESD mats for the floor and the table you are working on.
- An ESD wrist strap or heel grounder.
- Anti-static carpeting or flooring.
- Air ionizers in highly static sensitive areas.

## Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below. Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.

- M2        0.22 N•m (2.2 kgf•cm)
- M2.5     0.36 N•m (3.5 kgf•cm)
- FDD      0.22 N•m (2.2 kgf•cm)
- HDD      0.3 N•m (3.1 kgf•cm) or less

## 4.2 Battery Pack

### Removing the Battery Pack

To remove the battery pack, follow the steps below and refer to Figures 4-1 and 4-2.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Turn the computer upside down.
3. Slide the **battery cover lock** fully in the direction of the arrow on the lock, then slide out and remove the **battery cover**.

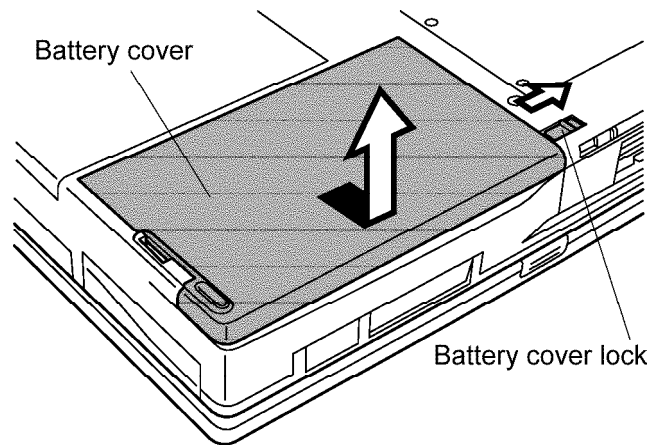


Figure 4-1 Removing the battery cover

4. Push the **battery lock** and the **battery** will pop up slightly.
5. Grasp the end of the **battery** and remove it.

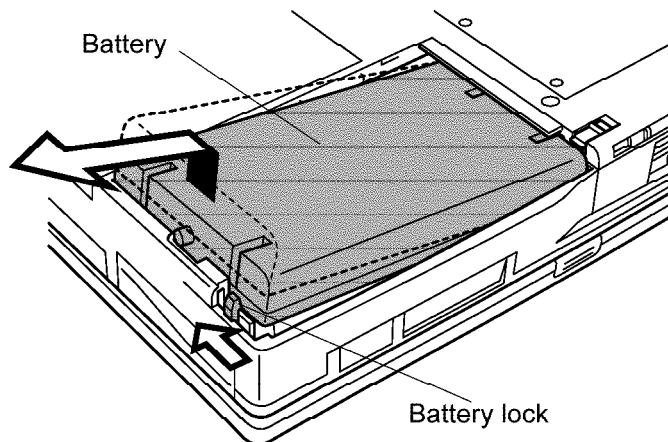


Figure 4-2 Removing the battery pack

**NOTE:** For environmental reasons, do not throw away a spent battery pack. Please return spent battery packs to Toshiba.

## Installing the Battery Pack

To install the battery pack, follow the steps below and refer to Figures 4-3 and 4-4.

**WARNING:** The battery is a lithium ion battery and can explode if not properly replaced, used, handled, or disposed of. Use only batteries recommended by Toshiba as replacements.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Push on the right end (near the battery lock) to set the **battery** in place.

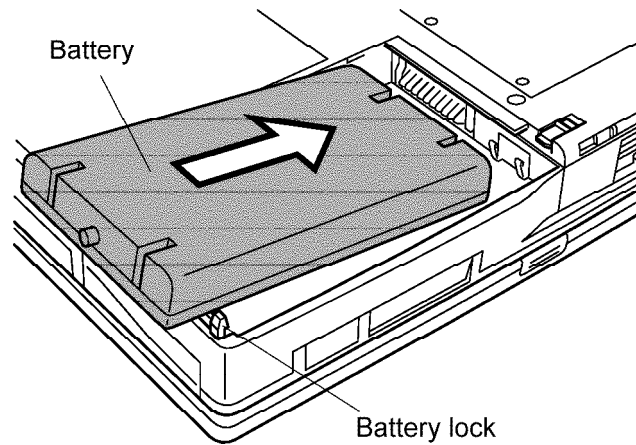


Figure 4-3 Installing the battery pack

3. Slide the **battery cover lock** fully in the direction of the arrow (Fig. 4-1). Lay the **battery cover** in place so that there is about a 1 cm gap between the edge of the cover and the computer. Slide the cover in until the locks click into place.

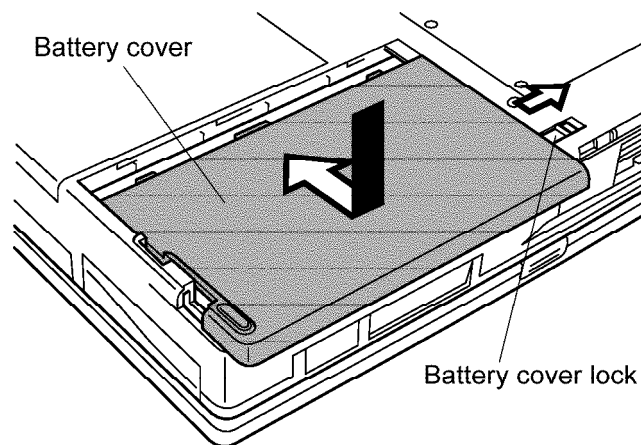


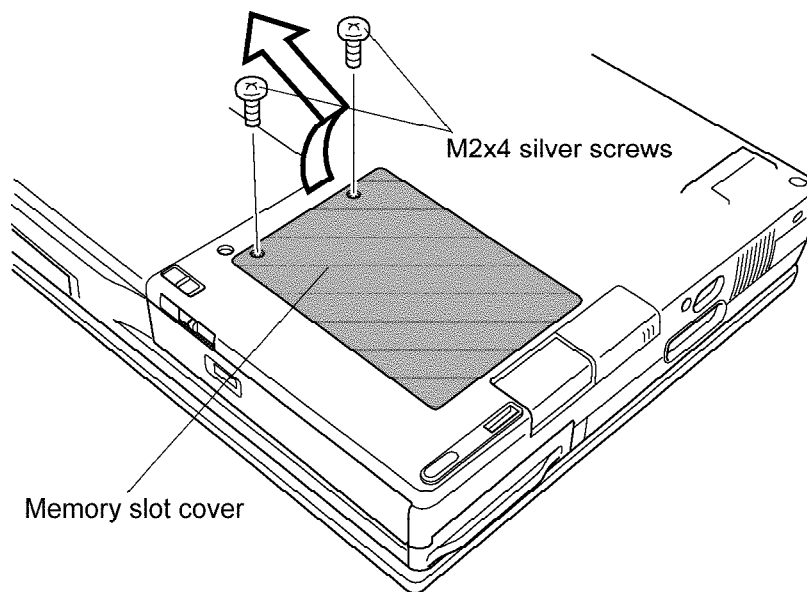
Figure 4-4 Installing the battery cover

## 4.3 Optional Memory Module

### Removing the Optional Memory Module

To remove the optional memory module, make sure the computer is in boot mode, then follow the steps below and refer to Figures 4-5 and 4-6.

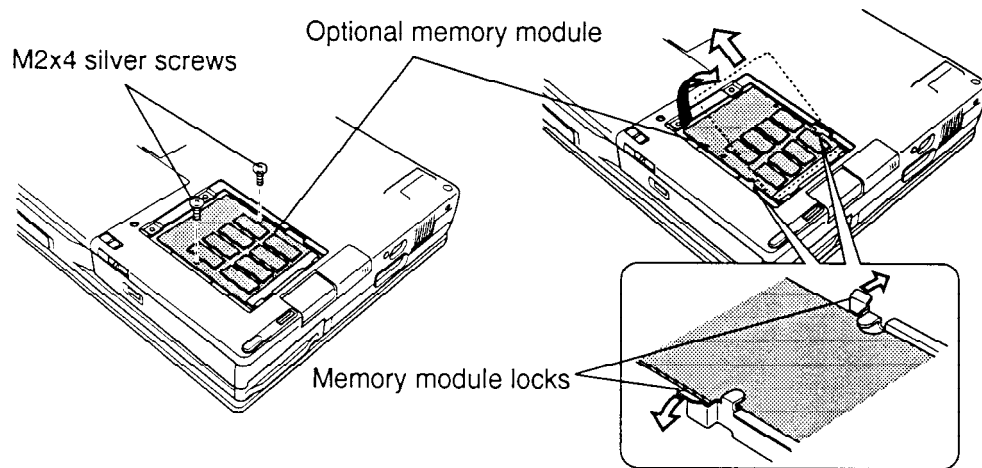
1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack as described in Section 4.2.
3. Make sure the computer is upside down.
4. Remove **two M2x4 silver screws** securing the **memory slot cover** and lift off the cover.



*Figure 4-5 Removing the memory slot cover*



5. Remove **two M2x4 silver screws** securing the **optional memory module** (the half-size memory module is not secured with screws so you can skip this step).
6. Push the **memory module locks** on both sides of the module outwards. The module is unlocked and is lifted up partially by springs.
7. Grasp the edges of the module and remove it.



*Figure 4-6 Removing the optional memory module*

**CAUTION:** Do not touch the connectors or circuits on the memory module or on the computer. Debris on the connectors may cause memory access problems.

## Installing the Optional Memory Module

To install the optional memory module, make sure the computer is in boot mode, then follow the steps below and refer to Figures 4-7 and 4-8.

1. Put the **optional memory module** into the memory slot, firmly inserting the connector on the module into the corresponding connector.

**CAUTION:** Do not touch the connectors or circuits on the memory module or on the computer. Debris on the connectors may cause memory access problems.

2. Place your fingertips on the screw holes on the module, and press the module firmly but gently to secure the **memory module locks**.
3. Fasten **two M2x4 silver screws** (the half-size memory module is not secured with screws so you can skip this step).

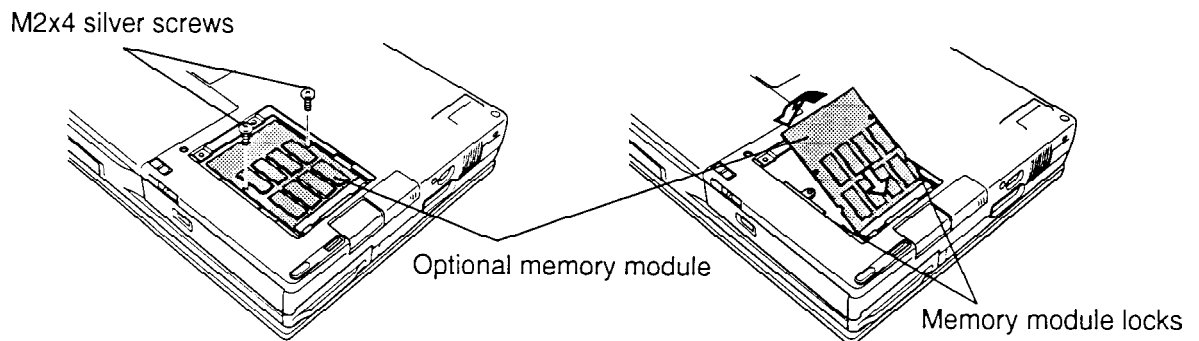


Figure 4-7 Installing the optional memory module

4. Put the **memory slot cover** in place and secure it with **two M2x4 silver screws**.

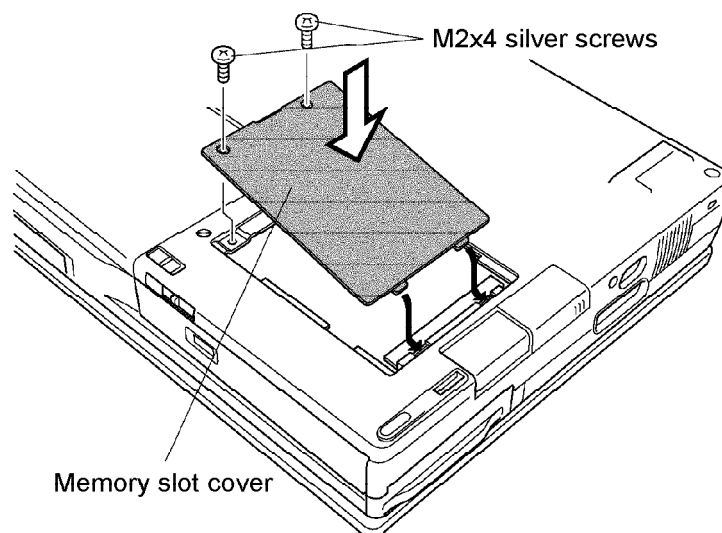


Figure 4-8 Installing the memory slot cover

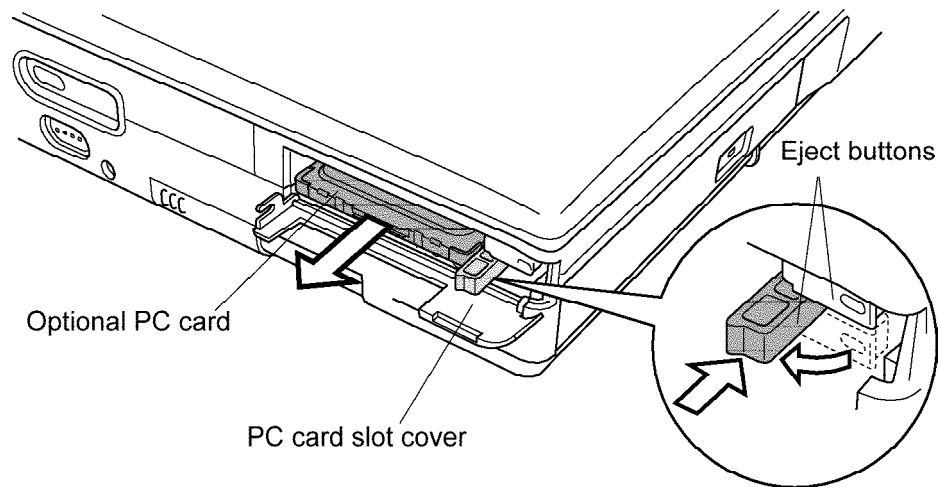
5. Install the battery pack as described in Section 4.2.

## 4.4 Optional PC Card

### Removing the Optional PC Card

To remove the optional PC card, make sure the computer is in boot mode, then follow the steps below and refer to Figure 4-9.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack and optional memory module as described in Sections 4.2 and 4.3.
3. Open the **PC card slot cover**.
4. Pull out the **eject button** for the upper or lower card.
5. Grasp the **optional PC card** and remove it.

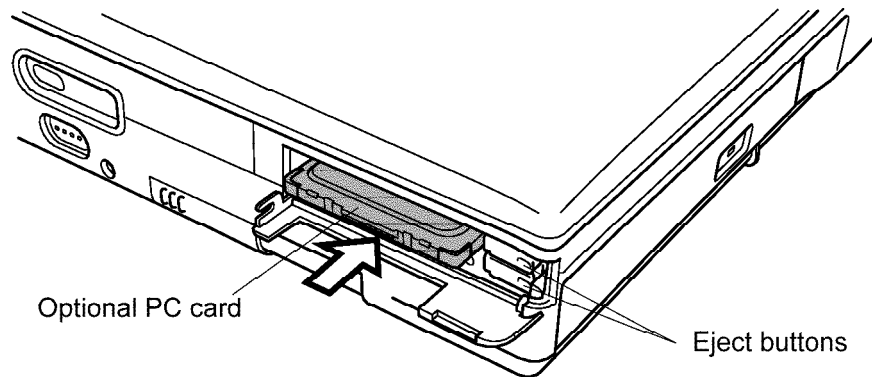


*Figure 4-9 Removing the optional PC card*

## Installing the Optional PC Card

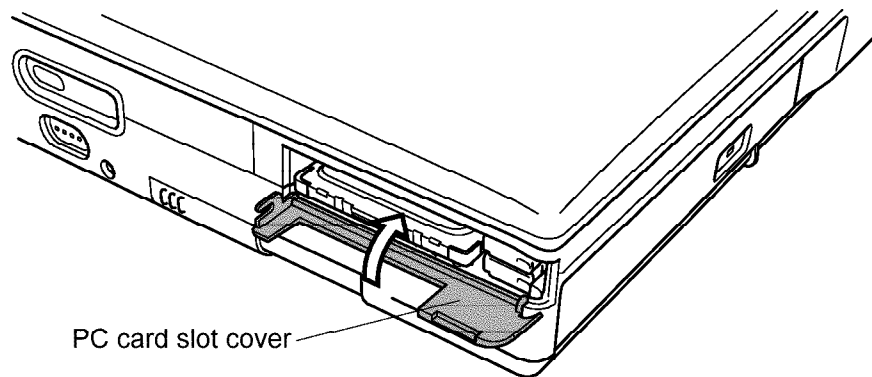
To install the optional PC card, make sure the computer is in boot mode, then follow the steps below and refer to Figures 4-10 and 4-11.

1. Insert the **optional PC card**. Press gently to ensure a firm connection.
2. Press the **eject button** down to lock the card into the slot.



*Figure 4-10 Installing the optional PC card*

3. Close the **PC card slot cover**.



*Figure 4-11 Installing the PC card slot cover*

4. Install the optional memory module and battery pack as described in Sections 4.3 and 4.2.

## 4.5 Floppy Disk Drive

### Removing the Floppy Disk Drive

To remove the Floppy Disk Drive, follow the steps below and refer to Figures 4-12 to 4-15.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, and optional PC card as described in Sections 4.2 through 4.4.
3. Turn the computer upside down.
4. Slide the **lock switch** in the direction of the arrow so that the red mark appears.
5. Push the **release handle** so that it comes out of its hole.
6. Turn the **release handle** down to pop the **FDD** out slightly.
7. Grasp the drive and pull it out.

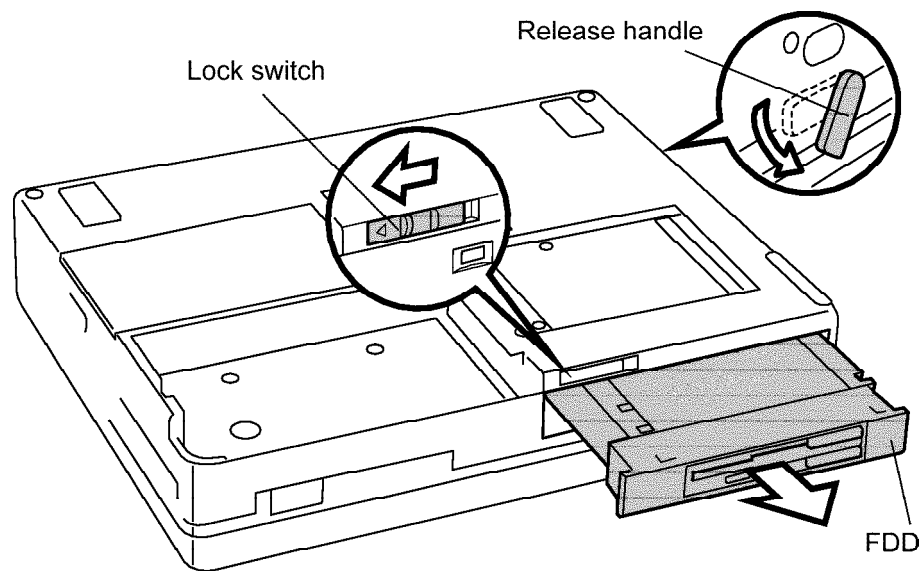
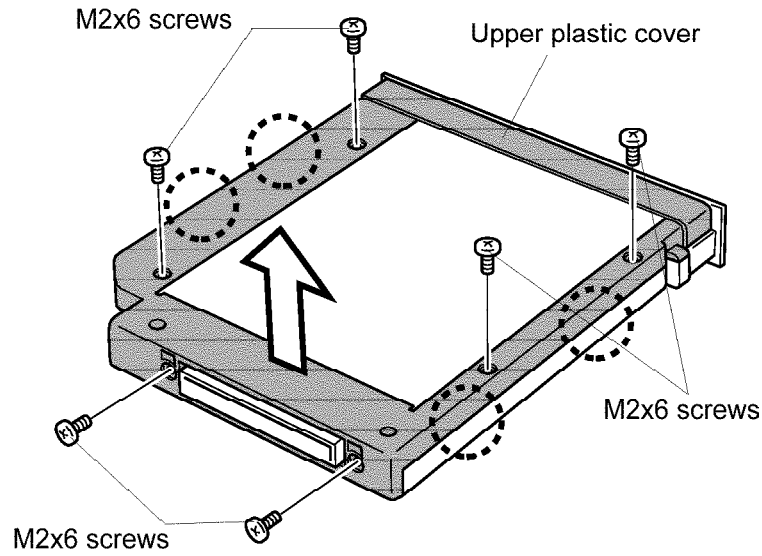


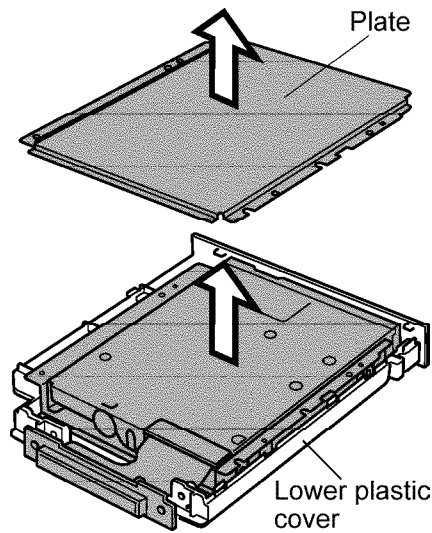
Figure 4-12 Removing the FDD

- Remove **six M2x6 screws** and take off the **upper plastic cover** by releasing **four latches**.



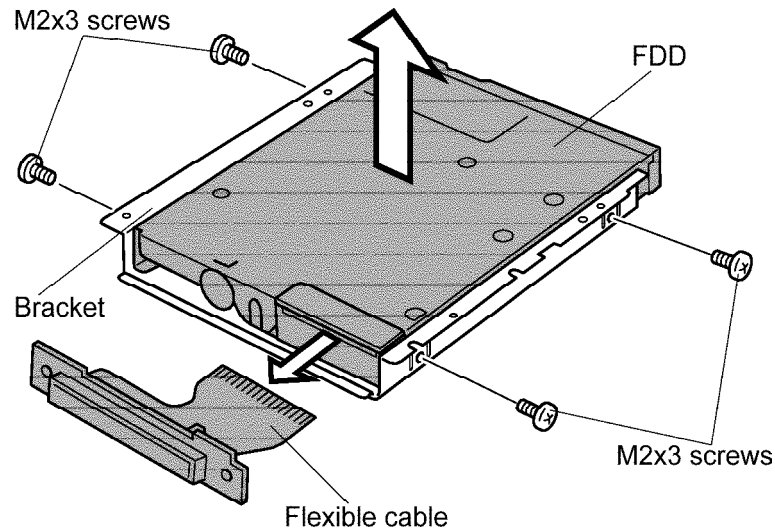
*Figure 4-13 Removing the screws*

- Lift off the **plate** and remove the **lower plastic cover**.



*Figure 4-14 Removing the plate*

10. Disconnect the **flexible cable**.
11. Remove **four M2x3 screws** and remove the **FDD** from the **bracket**.



*Figure 4-15 Removing the bracket*

## Installing the Floppy Disk Drive

To install the Floppy Disk Drive, follow the steps below and refer to Figures 4-12 to 4-15.

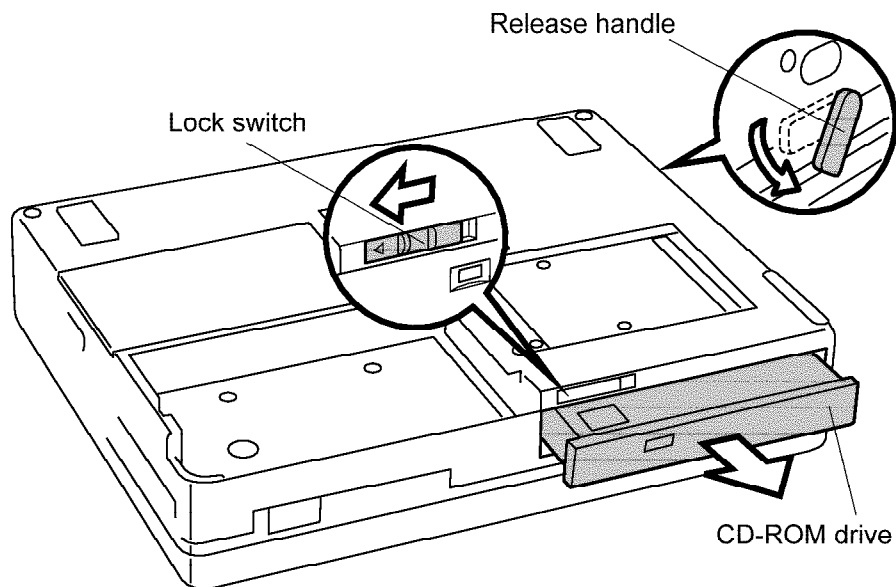
1. Seat the **FDD** in the **bracket** and secure it with **four M2x3 screws**.
2. Connect the **flexible cable**.
3. Seat the **FDD** in the **lower plastic cover** and set the **plate** in place.
4. Set the **upper plastic cover** in place by securing the **latches** and fasten **six M2x6 screws**.
5. Turn the computer upside down.
6. Insert the **FDD** into the slot until the **release handle** returns to the locked position.
7. Push the **release handle** back into its hole.
8. Slide the **lock switch** to the opposite direction of the arrow so that the red mark is covered.
9. Install the optional PC card, optional memory module, and battery pack as described in Sections 4.4, 4.3, and 4.2.

## 4.6 CD-ROM Drive

### Removing the CD-ROM Drive

To remove the CD-ROM drive, follow the steps below and refer to Figures 4-16 to 4-18.

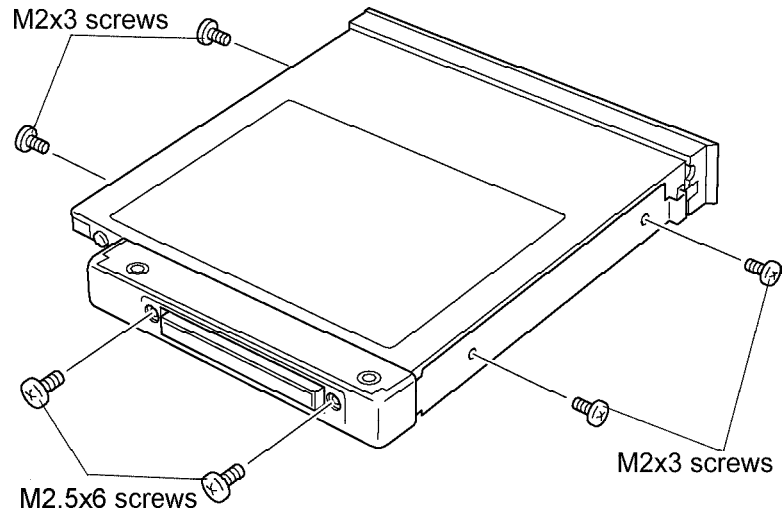
1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, and optional PC card as described in Sections 4.2 through 4.4.
3. Turn the computer upside down.
4. Slide the **lock switch** in the direction of the arrow so that the red mark appears.
5. Push the **release handle** so that it comes out of its hole.
6. Turn the **release handle** down to pop the **CD-ROM drive** out slightly.
7. Grasp the drive and pull it out.



*Figure 4-16 Removing the CD-ROM drive*

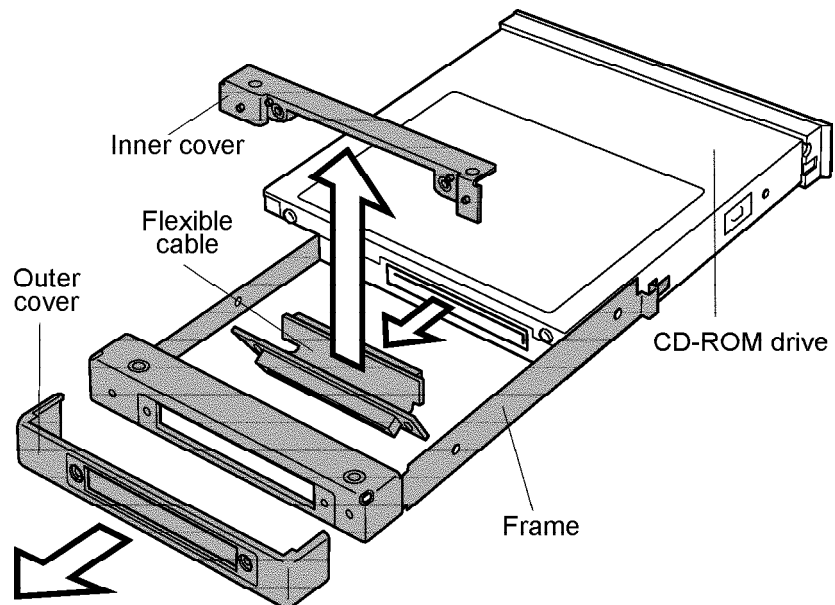


- Remove **four M2x3 screws** and **two M2.5x6 screws** securing the frame to the CD-ROM drive.



*Figure 4-17 Removing the screws*

- Slide the **CD-ROM drive** partially out of the **frame**.
- Disconnect the flexible cable.
- Remove the inner and outer **covers**.



*Figure 4-18 Removing the covers and frame*

## Installing the CD-ROM Drive

To install the CD-ROM drive, follow the steps below and refer to Figures 4-16 to 4-18.

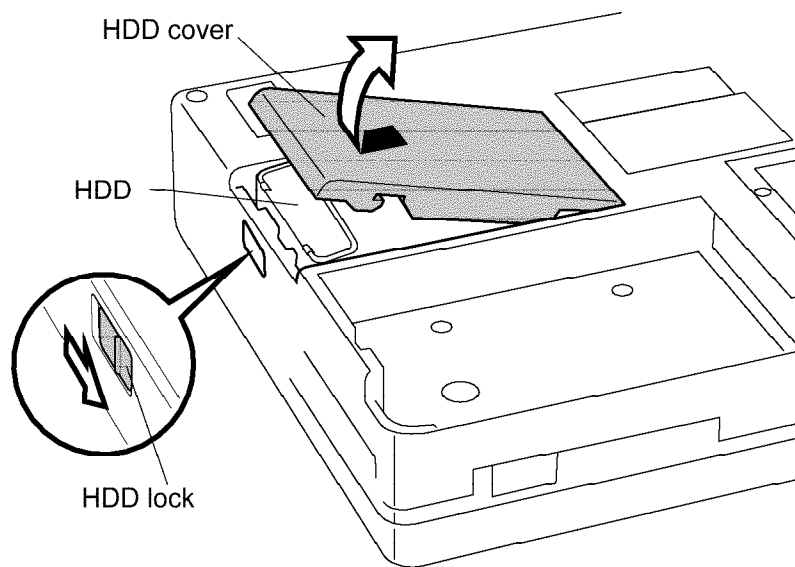
1. Seat the **inner cover**. Be sure the extensions on the inner cover are inserted into the corresponding holes on the flexible cable.
2. Seat the **outer cover**.
3. Push the **CD-ROM drive** fully into the **frame**.
4. Secure the **frame** to the drive with **four M2x3 screws** and **two M2.5x6 screws**.
5. Turn the computer upside down.
6. Insert the **CD-ROM drive** into the slot until the **release handle** returns to the locked position.
7. Push the **release handle** back into its hole.
8. Slide the **lock switch** to the opposite direction of the arrow so that the red mark is covered.
9. Install the optional PC card, optional memory module, and battery pack as described in Sections 4.4, 4.3, and 4.2.

## 4.7 Hard Disk Drive

### Removing the Hard Disk Drive

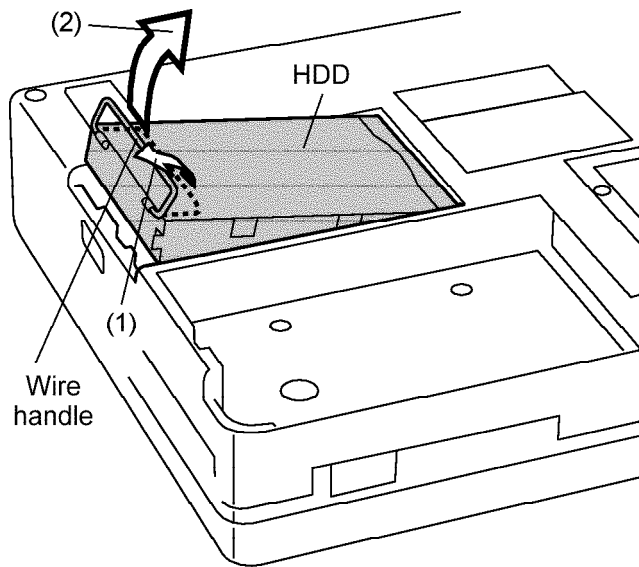
To remove the hard disk drive, follow the steps below and refer to Figures 4-19 to 4-21.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, and FDD or CD-ROM drive as described in sections 4.2 through 4.6.
3. Make sure the computer is upside down.
4. While sliding the **HDD lock** fully in the direction of the arrow, slide the **HDD cover** out until it stops (about 0.5 cm).
5. Grasp the cover and remove it.



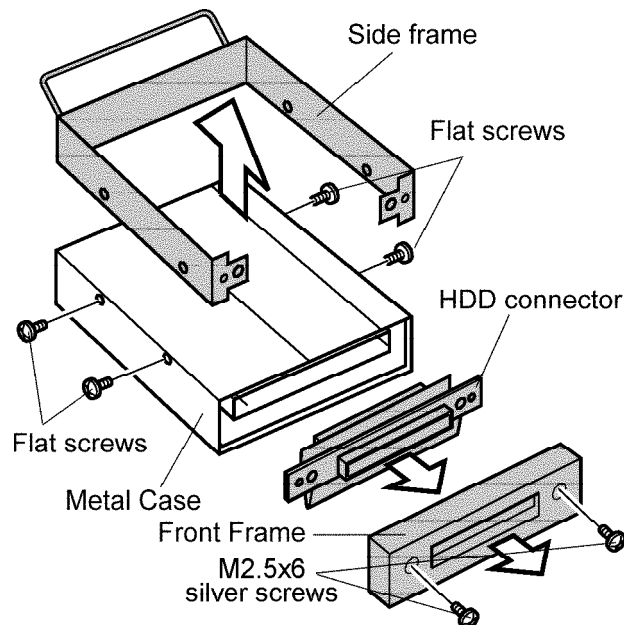
*Figure 4-19 Removing the HDD cover*

6. Grasp the **wire handle**, turn it 180 degrees, and pull it to disconnect the **HDD** from the computer.
7. Hold the handle and pull it up to remove the **HDD**.



*Figure 4-20 Removing the HDD*

8. Remove **two M2.5x6 silver screws** securing the plastic **front frame** and remove it.
9. Remove **four flat screws** securing the metal **side frame** and remove it.
10. Carefully pull off the **HDD connector** and remove the **HDD** from the **metal case**.



*Figure 4-21 Removing the HDD connector*

## Installing the Hard Disk Drive

To install the hard disk drive, follow the steps below and refer to Figures 4-19 to 4-21.

1. Seat the **metal case** and attach the **HDD connector** to the **HDD**. Be sure to set the position of the connector by matching the width of the **HDD** front with that of the connector. The number of the pins on the **HDD** is different from the number on the connector.

**CAUTION:** *Make sure to put the connector straight into the corresponding connector, otherwise the connectors' pins may bend and cause problems.*

2. Set the metal **side frame** so that its front parts are in between the folded board of the connector, and secure it with **four flat screws**.
3. Put the plastic **front cover** in place, making sure that its top and bottom are oriented correctly, and secure it with **two M2.5x6 silver screws**.
4. Make sure the computer is upside down, insert the **HDD** into the computer, and slide the **HDD lock** in the direction of the arrow to let the **HDD** drop into place.
5. Push the **HDD** to secure the HDD's connector to the corresponding connector on the computer.
6. Lay the **HDD cover** in place, being sure to leave a narrow gap (about 0.5 cm) as described in step 4 of "Removing the Hard Disk Drive," and slide the cover in until it clicks.
7. Install the CD-ROM drive or FDD, optional PC card, optional memory module, and battery pack as described in Sections 4.6 back through 4.2.

## 4.8 Second Hard Disk Drive

### Removing the Second Hard Disk Drive

To remove the second hard disk drive, follow the steps below and refer to Figures 4-22 to 4-25

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, and HDD as described in Sections 4.2 through 4.4, and 4.7.
3. Turn the computer upside down.
4. Slide the **lock switch** in the direction of the arrow so that the red mark appears.
5. Push the **release handle** so that it comes out of its hole.
6. Turn the **release handle** down to pop the second HDD out slightly.
7. Grasp the drive and pull it out.

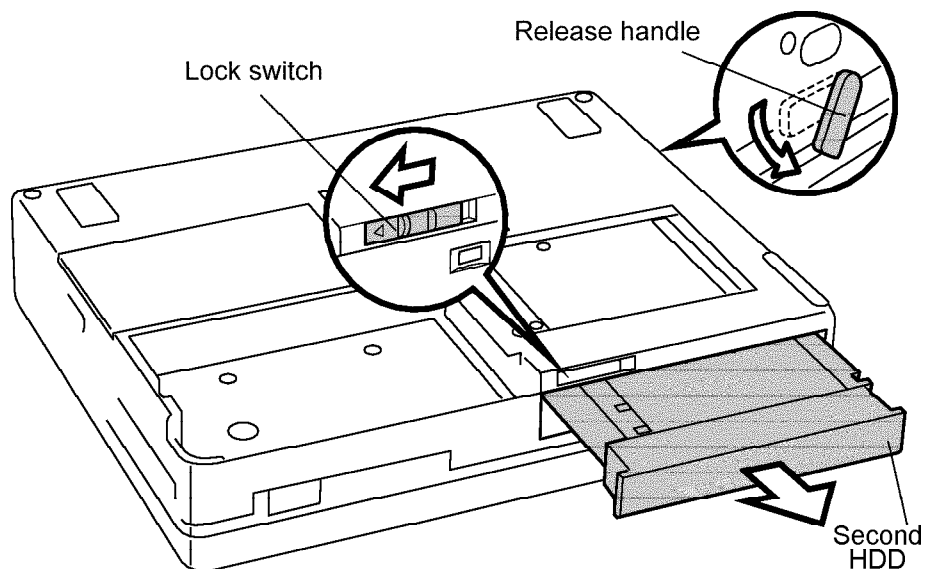
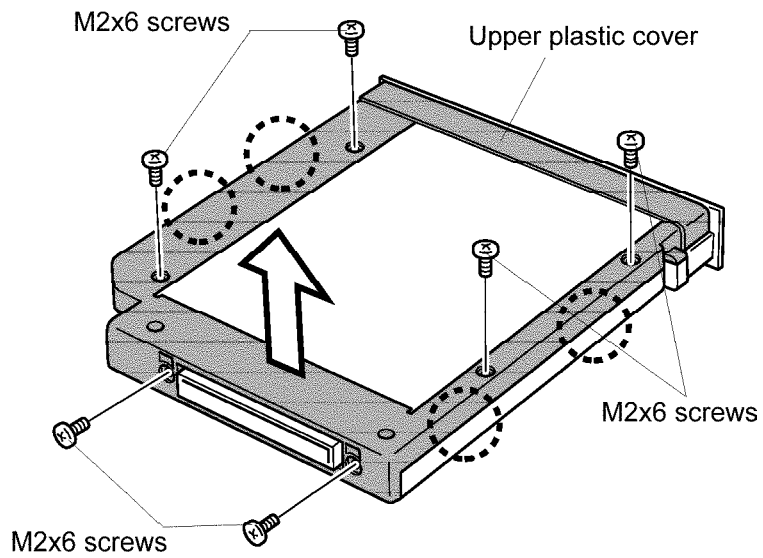


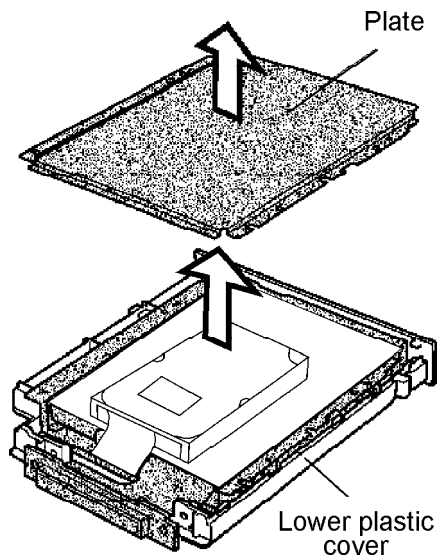
Figure 4-22 Removing the second HDD

- Remove **six M2x6 screws** and take off the **upper plastic cover** by releasing **four latches**.



*Figure 4-23 Removing the screws*

- Lift the **plate** off and remove the **lower plastic cover**.



*Figure 4-24 Removing the plate*

10. Remove **four M3x4 screws** securing the HDD to the lower plate and carefully disconnect the **second HDD** from the **flexible cable**.

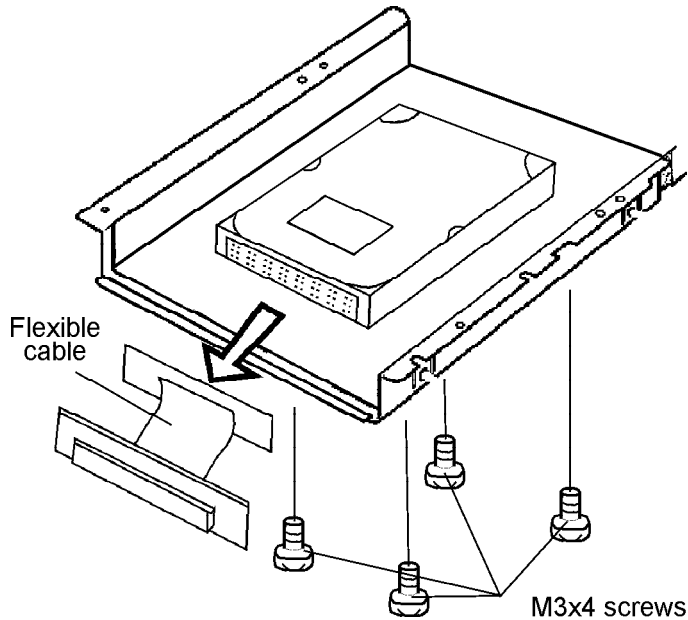


Figure 4-25 Removing the second HDD pack

### Installing the Second Hard Disk Drive

To install the second Hard Disk Drive, follow the steps below and refer to Figures 4-22 to 4-25.

1. Attach the **flexible cable** to the **second HDD**. Be sure to set the position of the connector.
2. Secure the **lower plate** with **four M3x4 screws** and seat it in the **lower plastic cover**.
3. Set the upper plate and plastic cover. Secure **four latches** and fasten **six M2x6 screws**.
4. Turn the computer upside down.
5. Insert the **second HDD** into the slot until the release handle returns to the locked position.
6. Push the **release handle** back into its hole.
7. Slide the **lock switch** to the opposite direction of the arrow so that the red mark is covered.
8. Install the HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.7, 4.4, 4.3, and 4.2.



## 4.9 DAA Module

### Removing the DAA Module

To remove the DAA module, follow the steps below and refer to Figures 4-26 and 4-27.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, and HDD as described in Sections 4.2 through 4.8.
3. Remove the **modem slot cover**. Insert a thin object on the right side of the cover near the latch and press in, then pull out and to the right to remove the cover.
4. Remove **two M2.5x4 silver screws**.
5. Slide a thin object under the edge of the DAA module near the screw holes and gently work the DAA module loose. Grasp both sides of the **DAA module** and pull it out of the connector.

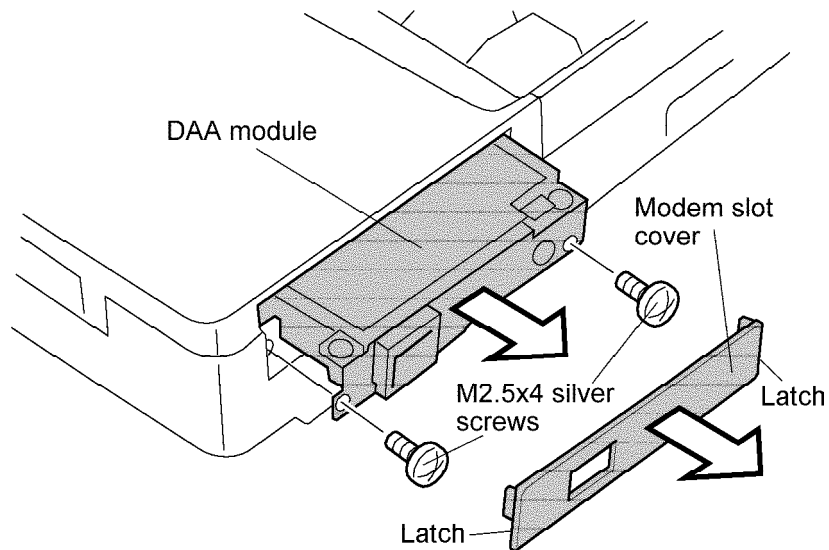
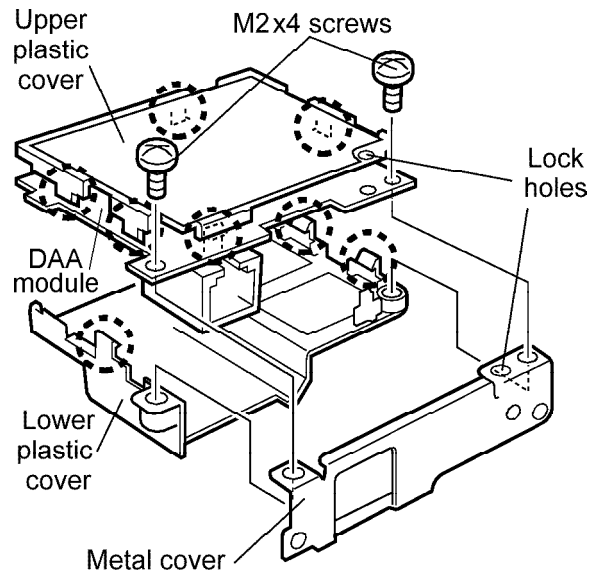


Figure 4-26 Removing the DAA module

6. Remove **two M2x4 screws**.
7. Slightly lift the **upper plastic cover** off the **lock hole** in the **metal cover**, then remove the **metal cover**.
8. Release **four latches** and remove the **lower plastic cover**.
9. Release **four latches** and remove the **DAA module** from the **upper plastic cover**.



*Figure 4-27 Removing the DAA covers*

## Installing the DAA Module

To install the DAA module, follow the steps below and refer to Figures 4-26 and 4-27.

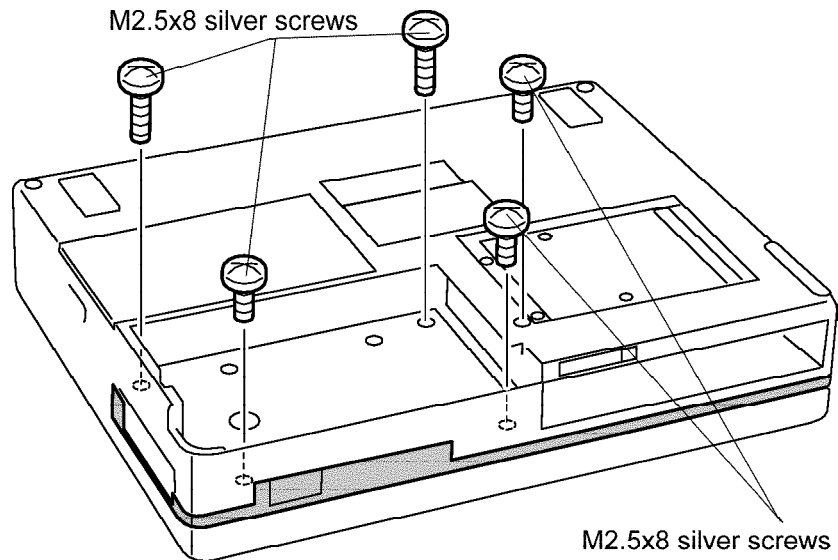
1. Put the **DAA module** and **upper plastic cover** together and secure **four latches**.
2. Fit the **lower plastic cover** into the module and secure **four latches**.
3. Fit the **metal cover** into the module, making sure that the **lock hole** part of the **metal cover** is put in between the **upper plastic cover** and **DAA module** and that the projected part on the **lower plastic cover** is put into the hole.
4. Fasten **two M2x4 screws**.
5. Insert the **DAA module** into the slot and press it in to ensure a firm connection.
6. Fasten **two M2.5x4 silver screws** and replace the **DAA slot cover**.
7. Install the HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.8 back through 4.2.

## 4.10 Upper Cover and Keyboard

### Removing the Upper Cover and Keyboard

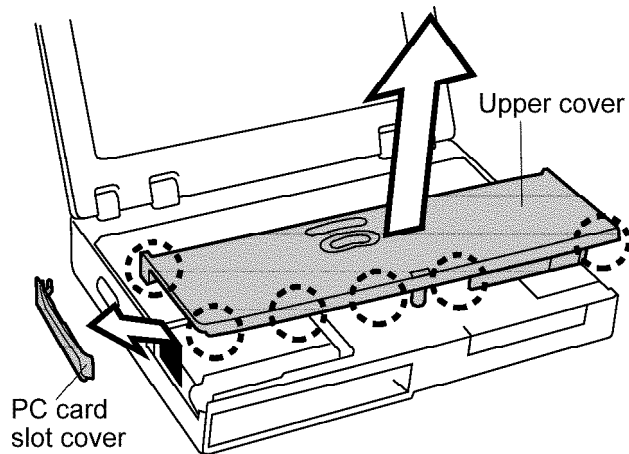
To remove the upper cover and keyboard, follow the steps below and refer to Figures 4-28 to 4-30.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, and DAA module as described in Sections 4.2 through 4.9.
3. Make sure the computer is upside down.
4. Remove **five M2.5x8 silver screws** (four inside the battery pack slot at the bottom and one on the bottom of the computer).



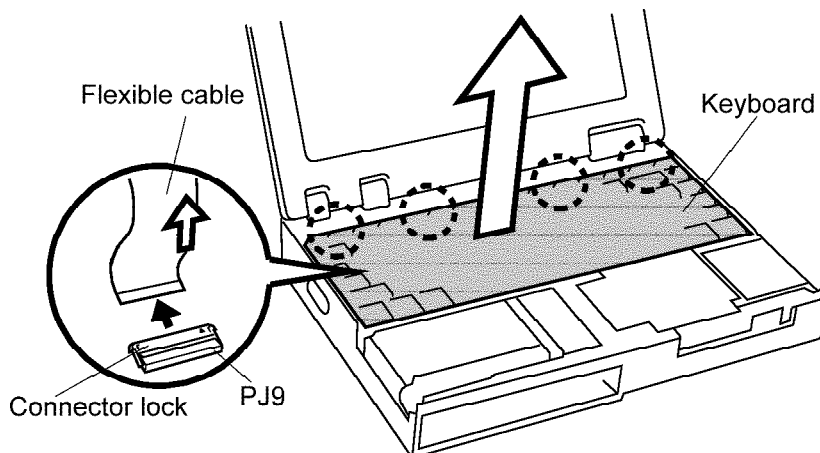
*Figure 4-28 Removing the screws*

5. Turn the computer over and open the display panel.
6. Remove the **upper cover** by releasing **six latches**. Start with the **latch** at the back of the cover, then continue with **five latches** at the front.
7. Release the **PC card slot cover** from the projecting parts on both sides by bending it gently and slightly. Be careful not to apply too much force as it may damage the cover.



*Figure 4-29 Removing the upper cover*

8. Lift up and hold the front side of the **keyboard**.
9. Release the **connector lock** by pulling out slightly in the direction of the arrow, then disconnect the cable from **PJ9**.
10. Remove the **keyboard**, being careful that the **projections** at the back of the **keyboard** are not caught under the speaker cover.



*Figure 4-30 Removing the keyboard*

## Installing the Upper Cover and Keyboard

To install the upper cover and keyboard, follow the steps below and refer to Figures 4-28 to 4-30.

1. Open the **connector lock** by lifting the side latches and raising the flap, then insert the **flexible cable** into **PJ9**. Hold the cable in place, press the lock down, and push it into the connector.
2. Put the **keyboard** in place, inserting the **four projections** into the corresponding holes on the speaker cover. Be careful that the cable is not caught between the keyboard and the speaker cover.
3. Seat the **upper cover** and press to secure **six latches**.
4. Replace the **PC card slot cover** by bending it gently and slightly so that the projecting parts fit into the holes on both sides. Be careful not to apply too much force as it may damage the cover.
5. Turn the computer upside down and fasten **five M2.5x8 silver screws**.
6. Install the DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.9 back through 4.2.

## 4.11 Modem Module

### Removing the Modem Module

To remove the modem module, follow the steps below and refer to Figure 4-31.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, and upper cover and keyboard as described in Sections 4.2 through 4.10.
3. Remove **four M2.5x6 screws** and take off the **metal cover**.
4. Disconnect **PJ601** on the **modem module** from **PJ6** and take the module out.

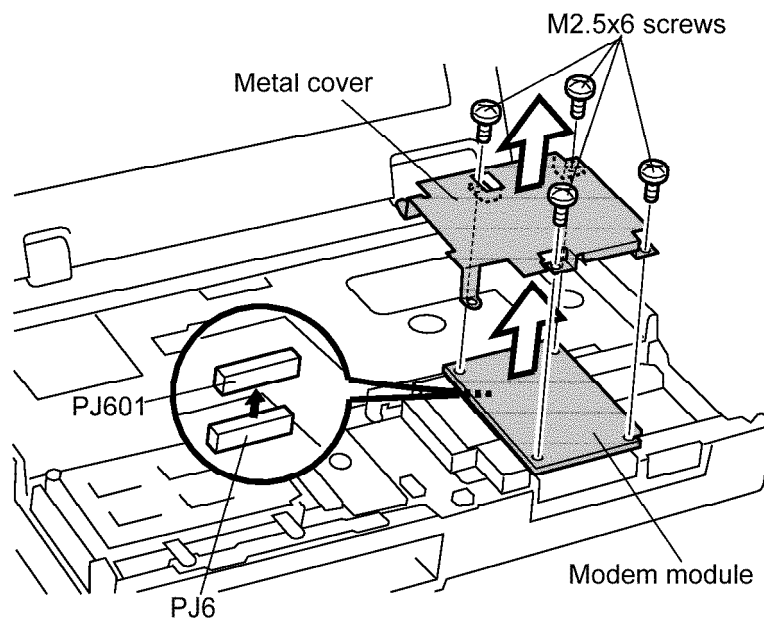


Figure 4-31 Removing the modem module

## Installing the Modem Module

To install the modem module, follow the steps below and refer to Figure 4-31.

1. Put the **modem module** in place, firmly connecting **PJ601** on the module to **PJ6**.
2. Seat the **metal cover** and secure it with **four M2.5x6 screws**.
3. Install the upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.10 back through 4.2.

## 4.12 RTC Battery and Sub-battery

**WARNING:** If you replace the RTC battery and/or sub-battery, be sure to use only batteries recommended by Toshiba. Installation of the wrong battery can cause the battery to explode or otherwise cause damage.

### Removing the RTC Battery and Sub-battery

To remove the RTC battery and sub-battery, follow the steps below and refer to Figure 4-32.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, CD-ROM drive or FDD or second HDD, HDD, DAA module, upper cover and keyboard, and modem module as described in Sections 4.2 through 4.11.
3. Remove the **tape** holding the batteries.
4. Disconnect the **RTC battery cable** from **PJ11** and remove the RTC battery.
5. Disconnect the **sub-battery cable** from **PJ502** and remove the sub-battery.
6. Remove **two M2x4 screws** and lift out the **battery case**.

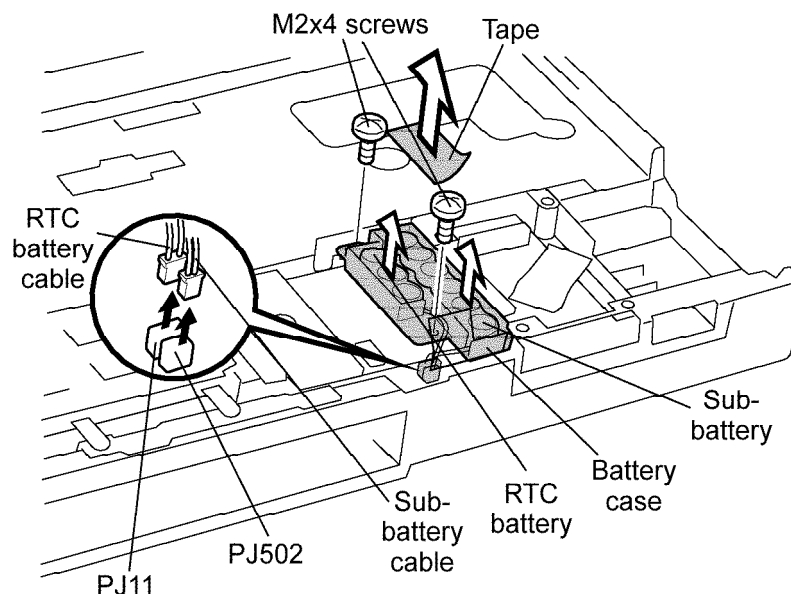


Figure 4-32 Removing the RTC battery and sub-battery



## Installing the RTC Battery and Sub-battery

To install the RTC battery and sub-battery, follow the steps below and refer to Figure 4-32.

1. Put the **battery case** in place and secure it with **two M2x4 screws**.
2. Put the **RTC battery** and **sub-battery** in the case.
3. Carefully run the battery cables in their respective grooves on the case.
4. Connect the **RTC battery cable** to **PJ11** and the **sub-battery cable** to **PJ502**.
5. Secure the batteries with **tape**.
6. Install the modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.11 back through 4.2.

## 4.13 Membrane Switch Module

### Removing the Membrane Switch Module

To remove the membrane switch module, follow the steps below and refer to Figure 4-33.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, upper cover and keyboard, modem module, and RTC battery and sub-battery as described in Sections 4.2 through 4.12.
3. Pull the **connector lock** out slightly and remove the **membrane switch cable** from **PJ302**.
4. Remove **two M2.5x4 screws**.
5. Take out the **membrane switch module**.

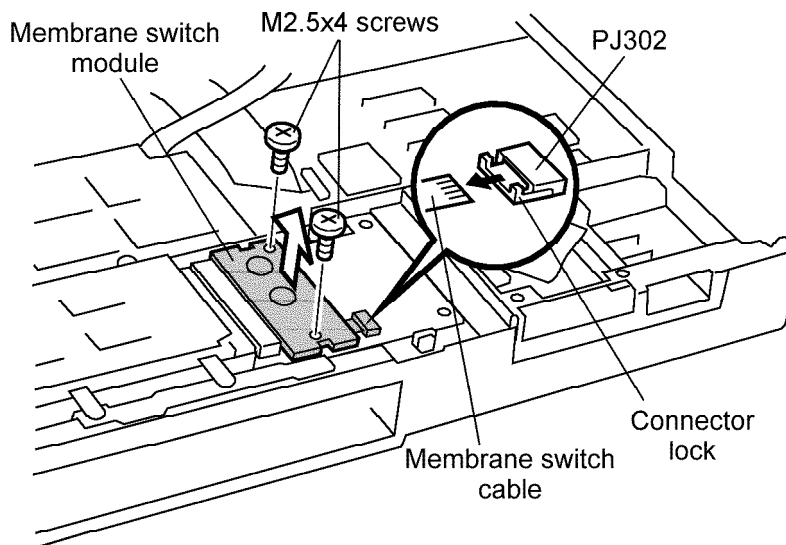


Figure 4-33 Removing the membrane switch module

## Installing the Membrane Switch Module

To install the membrane switch module, follow the steps below and refer to Figure 4-33.

1. Put the **membrane switch module** in place and secure it with **two M2.5x4 screws**.
2. Insert the **membrane switch cable** into **PJ302** (into the opening between the **connector lock** and the connector itself), and push in the **connector lock** to secure the cable.
3. Install the RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.12 back through 4.2.

## 4.14 CardBus Board

### Removing the CardBus Board

To remove the CardBus board, follow the steps below and refer to Figure 4-34.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, upper cover and keyboard, modem module, RTC battery and sub-battery, and membrane switch module as described in Sections 4.2 through 4.13.
3. Remove **four M2.5x4 screws**.
4. Disconnect **PJ301** on the **cardbus board** from **PJ1** and remove the board.

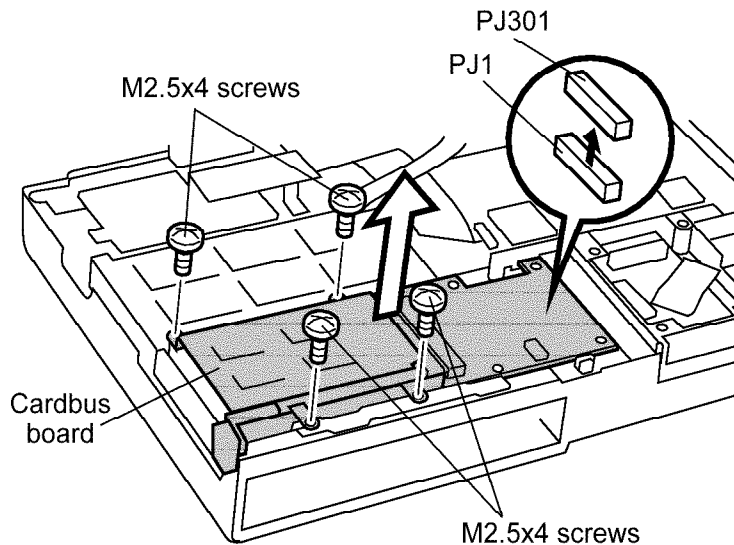


Figure 4-34 Removing the cardbus board

## Installing the CardBus Board

To install the cardbus board, follow the steps below and refer to Figure 4-34.

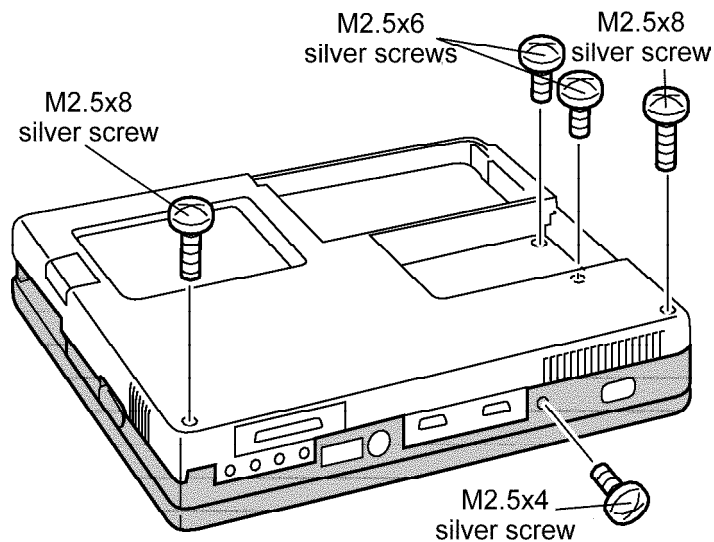
1. Put the **cardbus board** in place and press it gently, but firmly, to connect **PJ301** on the board to **PJ1**.
2. Secure the board with **four M2.5x4 screws**.
3. Install the membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.13 back through 4.2.

## 4.15 Display Assembly

### Removing the Display Assembly

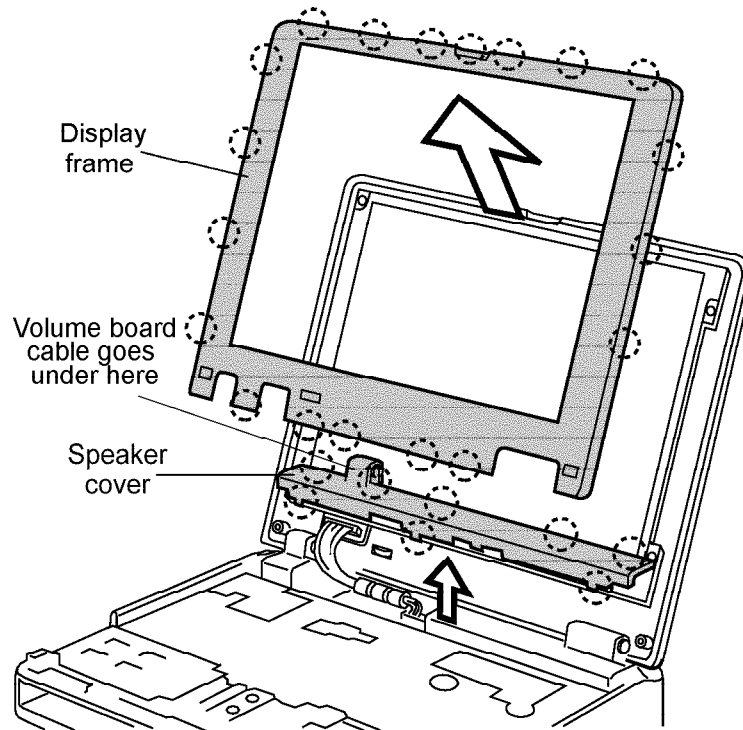
To remove the display assembly, follow the steps below and refer to Figures 4-35 to 4-38.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, and cardbus board as described in Sections 4.2 through 4.14.
3. Turn the computer upside down and remove **one M2.5x4 silver screw** (at the rear of the computer), **two M2.5x6 silver screws** (inside the HDD slot at the bottom), and **two M2.5x8 silver screws** (on the bottom of the computer).



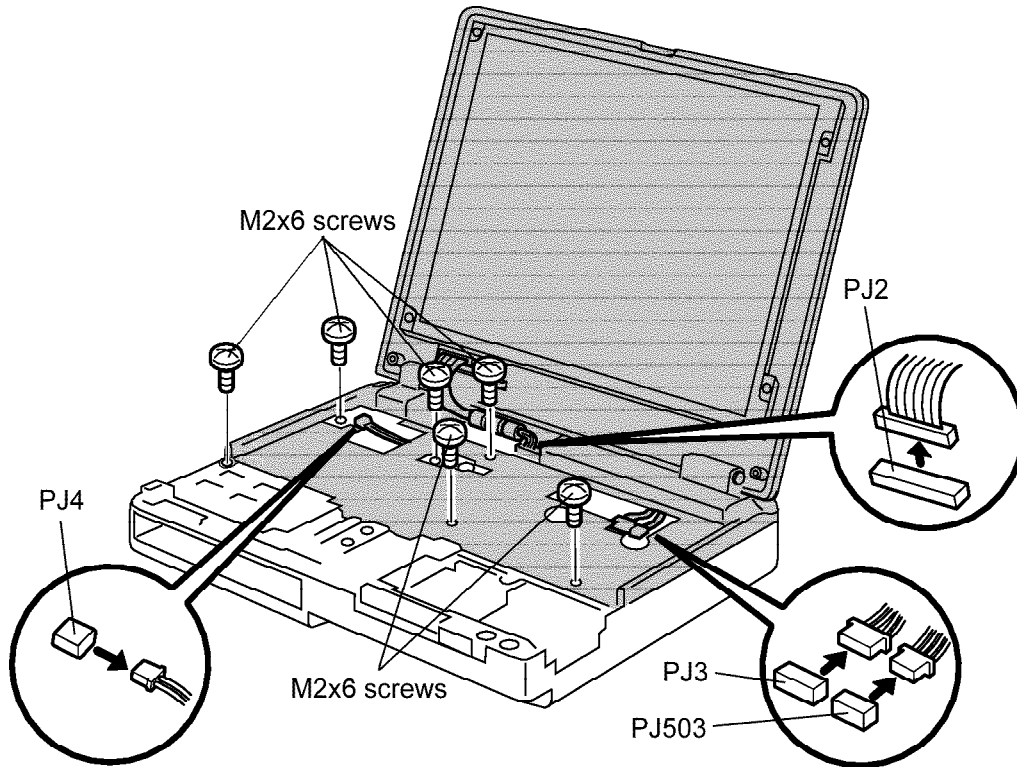
*Figure 4-35 Removing the screws*

4. Turn the computer over and open the display panel.
5. Remove the **display frame** as described in Section 4.22.
6. Release **eight latches** and remove the **speaker cover**. Start with releasing the **latch** at the front-left side by pushing on the cover near the **latch**.



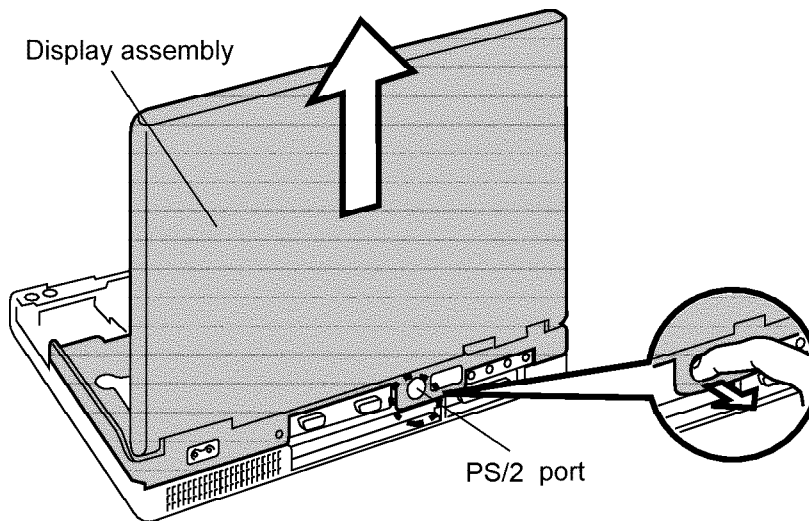
*Figure 4-36 Removing the speaker cover*

7. Disconnect the cables from **PJ4**, **PJ2**, **PJ3**, and **PJ503** respectively.
8. Remove **six M2x6 screws**.



*Figure 4-37 Removing the cables and screws*

9. Release the **latch** located just below the **PS/2 port** at the rear by pushing and pulling near the **latch** with your finger. Lift off the **display assembly**.



*Figure 4-38 Removing the display assembly*



## Installing the Display Assembly

To install the display assembly, follow the steps below and refer to Figures 4-35 to 4-38.

1. Put the **display assembly** in place and secure it with the **latch** at the rear.
2. Fasten **six M2x6 screws**.
3. Connect the cables to **PJ4, PJ2, PJ3, and PJ503** respectively.
4. Put the **speaker cover** in place and secure it with **eight latches**. Start with the front **latches**. Be sure to thread the volume board cable carefully. It should lay smoothly under the "hump" on the speaker cover.
5. Install the **display frame** as described in Section 4.22.
6. Close the **display panel** and turn the computer upside down.
7. Fasten **one M2.5x4 silver screw** at the rear, and **two M2.5x6 silver screws** and **two M2.5x8 silver screws** on the bottom of the computer.
8. Install the cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.14 back through 4.2.

## 4.16 Microphone

### Removing the Microphone

To remove the microphone, follow the steps below and refer to Figure 4-39.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, and display assembly as described in Sections 4.2 through 4.15.
3. Remove the **metal cover** and **frame**.
4. Remove the **tape** and disconnect the **microphone cable** from **PJ12**.
5. Take out the **microphone**.

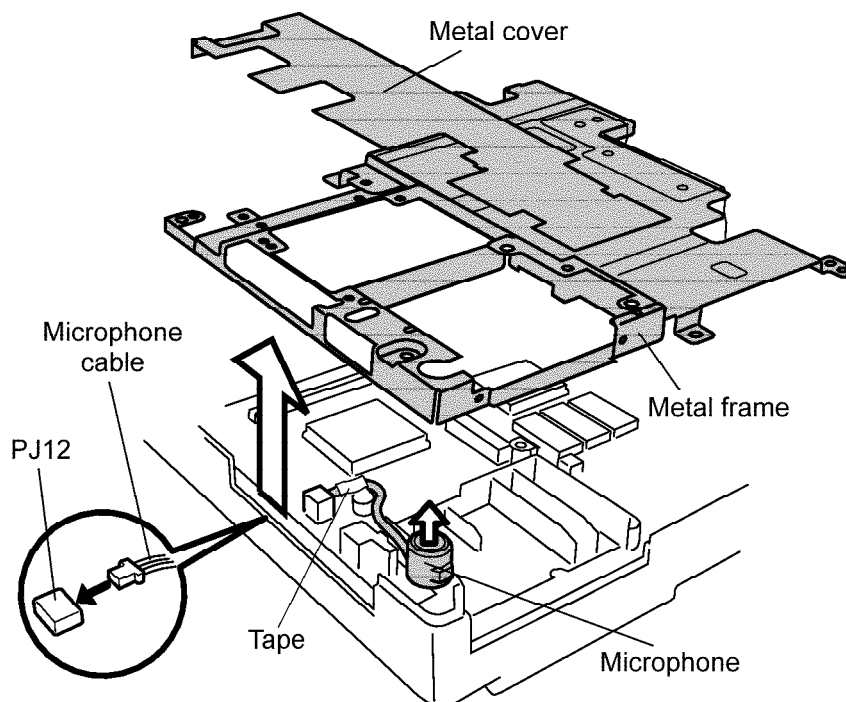


Figure 4-39 Removing the microphone

## Installing the Microphone

To install the microphone, follow the steps below and refer to Figure 4-39.

1. Put the **microphone** in place so that the two projecting parts on the computer are inserted into the holes of the microphone's rubber cushion.
2. Connect the **microphone cable** to **PJ12**.
3. Put the **metal cover** and **frame** in place.
4. Install the display assembly, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.15 back through 4.2.

## 4.17 Sound Board

### Removing the Sound Board

To remove the sound board, follow the steps below and refer to Figure 4-40.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, HDD, DAA module, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, display assembly, and microphone as described in Sections 4.2 through 4.16.
3. Remove **one M2.5x6 screw** and take off the **metal cover**.
4. Push the **connector lock** up to release the **sound board cable** and pull the cable out.
5. Remove the **sound board** and disconnect **PJ11** on the board from **PJ8**. When removing the board be careful that the projecting parts on the board, such as the control dial, are not caught in between the computer frame.

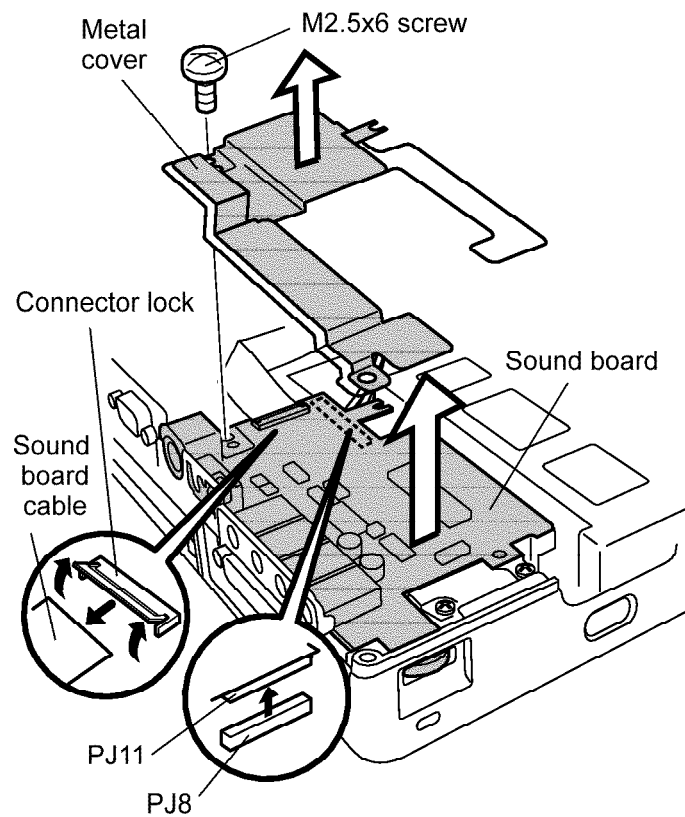


Figure 4-40 Removing the sound board

## Installing the Sound Board

To install the sound board, follow the steps below and refer to Figure 4-40.

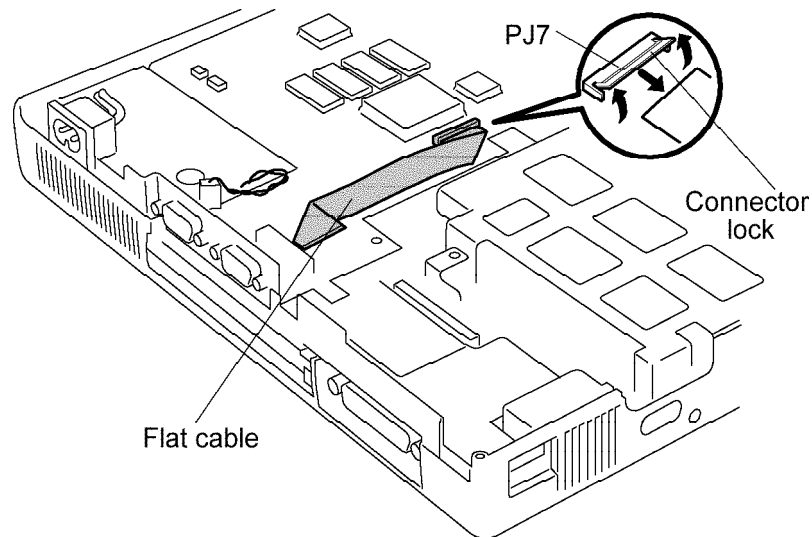
1. Put the **sound board** in place. With the computer frame pulled out slightly insert the projecting parts on the board, such as the control dial, into the corresponding holes on the computer frame. Press the board gently but firmly to connect **PJ11** on the board to **PJ8**.
2. Insert the **sound board cable** into the connector and secure it by pushing the **connector lock** down.
3. Put the **metal cover** in place and secure it with **one M2.5x6 screw**.
4. Install the display assembly, microphone, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.16 back through 4.2.

## 4.18 Flat Cable

### Removing the Flat Cable

To remove the flat cable, follow the steps below and refer to Figure 4-41.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, DAA module, HDD, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, display assembly, microphone, and sound board as described in Sections 4.2 through 4.17.
3. Push the **connector lock** up and disconnect the **flat cable** from **PJ7**.



*Figure 4-41 Removing the flat cable*

## Installing the Flat Cable

To install the flat cable, follow the steps below and refer to Figure 4-41.

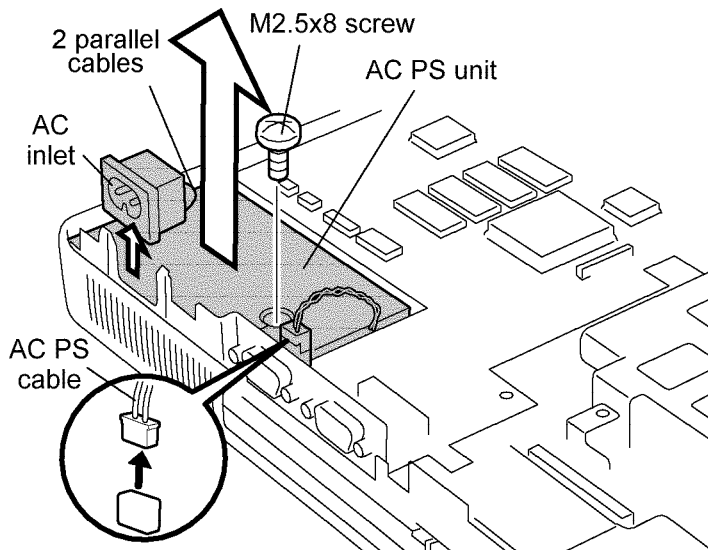
1. Insert the **flat cable** into **PJ7** and secure it by pushing down on the **connector lock**. Be sure the blue-printed side is facing up.
2. Install the sound board, microphone, display assembly, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.17 back through 4.2.

## 4.19 AC PS Unit

### Removing the AC PS Unit

To remove the AC PS unit, follow the steps below and refer to Figure 4-42.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, DAA module, HDD, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, display assembly, microphone, sound board, and flat cable as described in Sections 4.2 through 4.18.
3. Remove the **AC PS cable** from the connector.
4. Remove the **tape** and lift up the **AC inlet**.
5. Remove **one M2.5x8 screw**.
6. Pull the computer metal frame out slightly and take the **AC PS unit** out.



*Figure 4-42 Removing the AC PS unit*



## Installing the AC PS Unit

To install the AC PS unit, follow the steps below and refer to Figure 4-42.

1. Put the **AC PS unit** in place and secure it with **one M2.5x8 screw**.
2. Set the **AC inlet** so that the computer metal frame is in the openings between the front part and side wings of the **AC inlet**. Make sure that the **two cables** run parallel to each other; they should not cross.
3. Replace the tape.
4. Insert the **AC PS cable** into the connector.
5. Install the flat cable, sound board, microphone, display assembly, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.18 back through 4.2.

## 4.20 PCI Board

### Removing the PCI Board

To remove the PCI board, follow the steps below and refer to Figure 4-43.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, DAA module, HDD, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, display assembly, microphone, sound board, flat cable, and AC PS unit as described in Sections 4.2 through 4.19.
3. Remove **one M2.5x6 screw** (on the board) and **one M2.5x4 silver screw** (at the rear of the computer).
4. Lift off the **PCI board** while holding it by the metal frame and edge, then disconnect **PJ10** on the board from **PJ7**.

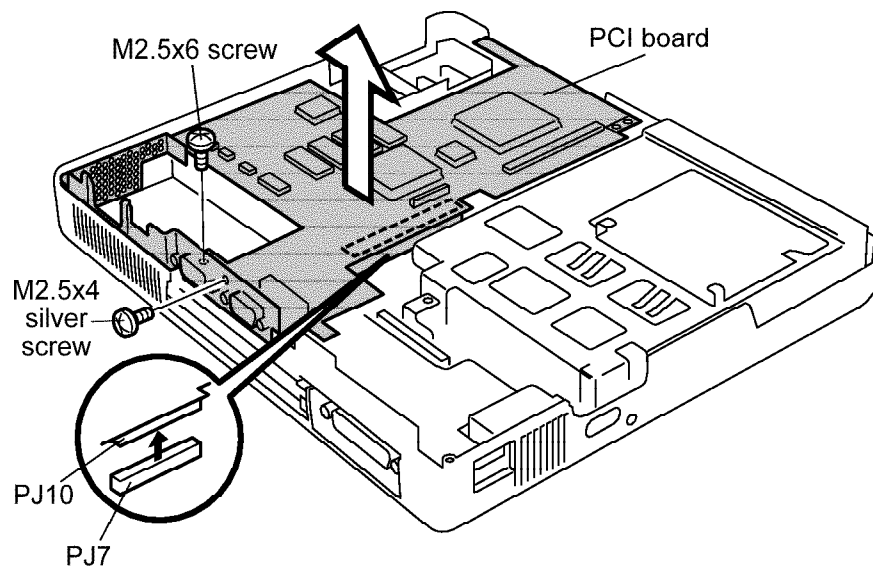


Figure 4-43 Removing the PCI board

## Installing the PCI Board

To install the PCI board, follow the steps below and refer to Figure 4-43.

1. Put the **PCI board** in place, firmly connecting **PJ10** on the board to **PJ7**.
2. Fasten **one M2.5x6 screw** and **one M2.5x4 silver screw** to secure the board.
3. Install the AC PS unit, flat cable, sound board, microphone, display assembly, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.19 back through 4.2.

## 4.21 System Board

### Removing the System Board

To remove the system board, follow the steps below and refer to Figure 4-44.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, optional memory module, optional PC card, FDD or CD-ROM drive or second HDD, DAA module, HDD, upper cover and keyboard, modem module, RTC battery and sub-battery, membrane switch module, cardbus board, display assembly, microphone, sound board, flat cable, AC PS unit, and PCI board as described in Sections 4.2 through 4.20.
3. Remove **two M2.5x4 screws** (and **two M2.5x6 screws** on the CDT), then take the **metal cover** off.
4. Remove **two M2.5x6 screws** and take the **HDD top cover** off.
5. Remove **five M2.5x6 screws** and **one hexagonal stud** securing the **system board**.
6. Tilt the **system board** up slightly while holding it by the metal frame.
7. Remove the **system board** by releasing **five latches**. When lifting the board off, be careful that it does not catch on the FDD/CD-ROM drive lock bar.

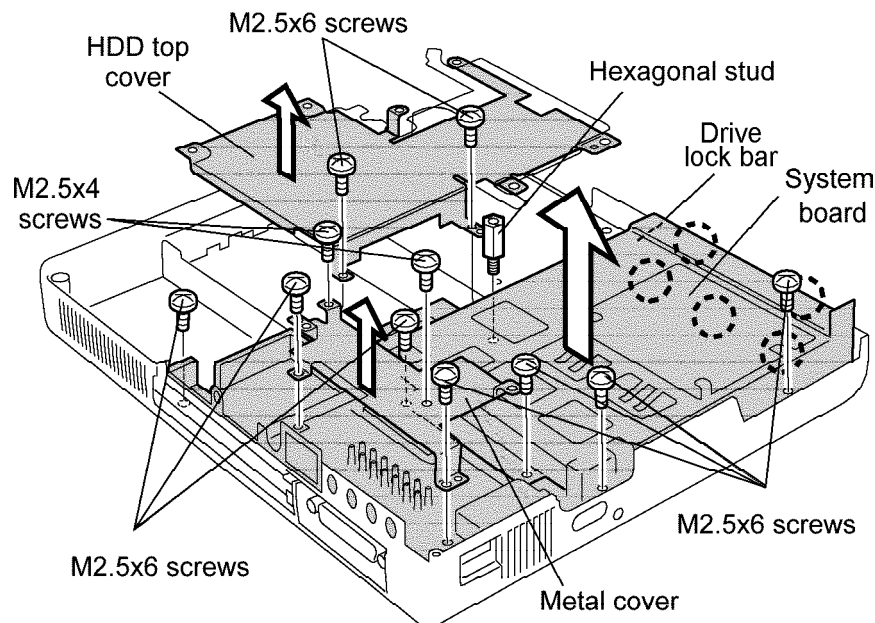


Figure 4-44 Removing the system board

## Installing the System Board

To install the system board, follow the steps below and refer to Figure 4-44.

1. Put the **system board** in place and secure the **latches**. When placing the board, make sure that the FDD/CD-ROM drive lock bar is put through the hole on the board.
2. Fasten **five M2.5x6 screws** and **one hexagonal stud** to secure the board.
3. Put the **HDD top cover** in place and secure it with **two M2.5x6 screws**.
4. Put the **metal cover** in place and secure it with **two M2.5x4 screws** (and **two M2.5x6 screws** on the CDT).
5. Install the PCI board, AC PS unit, flat cable, sound board, microphone, display assembly, cardbus board, membrane switch module, RTC battery and sub-battery, modem module, upper cover and keyboard, DAA module, HDD, CD-ROM drive or FDD or second HDD, optional PC card, optional memory module, and battery pack as described in Sections 4.20 back through 4.2.

## 4.22 Display Frame

### Removing the Display Frame

To remove the display frame, follow the steps below and refer to Figure 4-45 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack as described in Section 4.2.
3. Remove **two seals** and **two M2.5x6 screws**. When removing them, support the display panel by the back so it will not be damaged.
4. Carefully insert your fingers between the **display frame** (inner side) and the LCD panel, and pull out the frame to release **nineteen latches** (four at the left side, three at the right side, five at the lower side, and seven at the upper side). Start with the **latches** at the left and right sides.

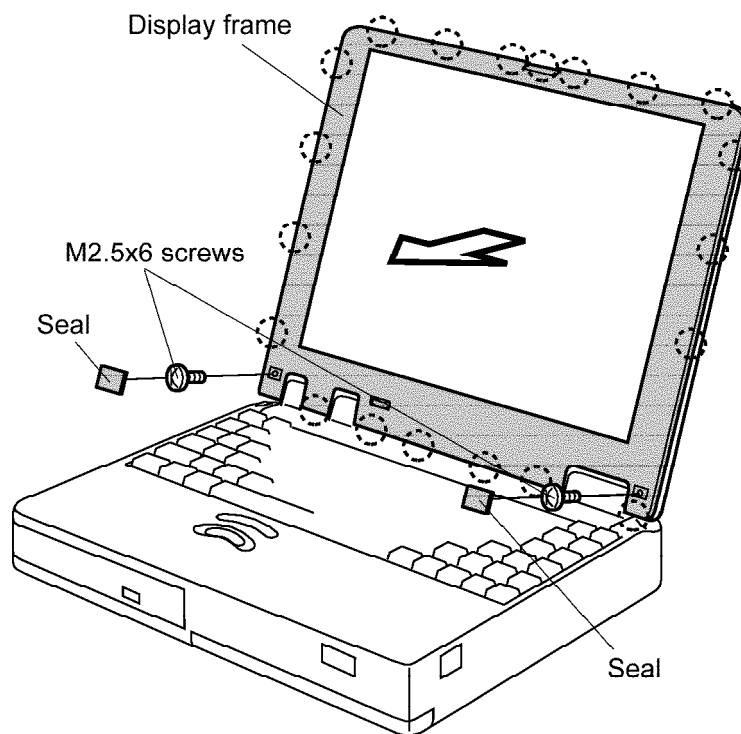


Figure 4-45 Removing the display frame (STN display screen)

## Installing the Display Frame

To install the display frame, follow the steps below and refer to Figure 4-45 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Put the **display frame** in place and secure the **latches**.
2. Fasten **two M2.5x6 screws** and attach **two seals**. When fastening them, support the display panel by the back so it will not be damaged.
3. Install the battery pack as described in Section 4.2.

**NOTE:** *The speaker cover must be in place before you install the display frame. See Section 4.15, Display Assembly.*

## 4.23 FL Inverter Board

### Removing the FL Inverter Board

To remove the FL inverter board, follow the steps below and refer to Figure 4-46 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack and display frame as described in Sections 4.2 and 4.22.
3. Remove **two M2.5x6 screws**. When removing them, support the display panel by the back so it will not be damaged.
4. Lift up the plastic protector and raise the **FL inverter board** slightly, then disconnect the **FL inverter cable** from **CN1** and the **FL cable** from **CN2** (in that order).

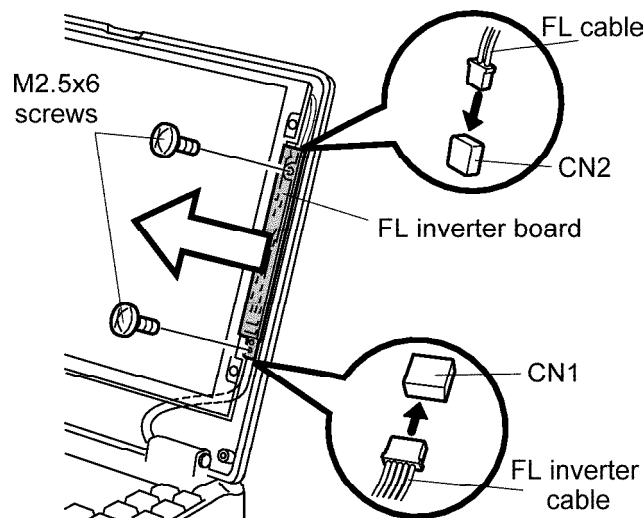


Figure 4-46 Removing the FL inverter board (STN display screen)



## Installing the FL inverter board

To install the FL inverter board, follow the steps below and refer to Figure 4-46 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Connect the **FL cable** to **CN2** first, then connect the **FL inverter cable** to **CN1**.
2. Put the **FL inverter board** in place and secure it with **two M2.5x6 screws**. When fastening the screws, support the display panel by the back so it will not be damaged.
3. Install the display frame and battery pack as described in Sections 4.22 and 4.2.

## 4.24 LCD Module

### Removing the LCD Module

To remove the LCD module, follow the steps below and refer to Figure 4.47 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, display frame, and FL inverter board as described in Sections 4.2, 4.22, and 4.23.
3. Remove **four M2.5x6 screws**. When removing them, support the display panel by the back so it will not be damaged.
4. Disconnect the **LCD cable** from the connector (the connector position of the TFT display screen is not exactly the same as illustrated, but the location is the same), and lift off the **LCD module**.

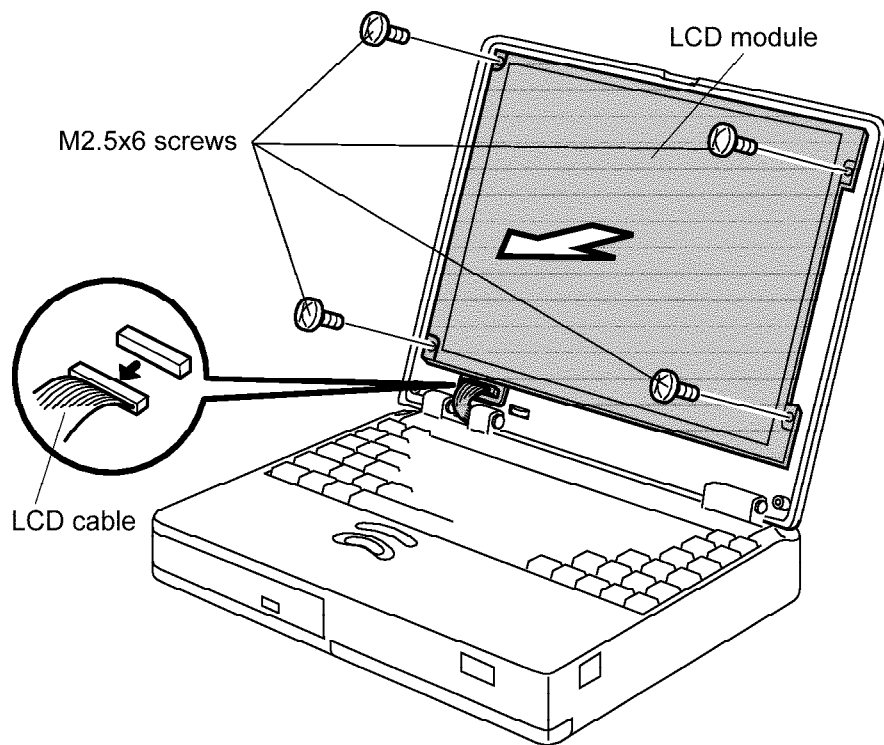


Figure 4-47 Removing the LCD module (STN display screen)

## Installing the LCD Module

To install the LCD module, follow the steps below and refer to Figure 4-47 (the illustration is based on the STN display screen, but the procedure is the same for the TFT display screen).

1. Connect the **LCD cable** (the connector position of the TFT display screen is not the same as illustrated).
2. Seat the **LCD module** and secure it with **four M2.5x6 screws**. When fastening the screws, support the display panel by the back so it will not be damaged.
3. Install the FL inverter board, display frame, and battery pack as described in Sections 4.23, 4.22, and 4.2.

## 4.25 STN FL Unit

**CAUTION:** When you remove the **FL**, be careful not to let any dust or other foreign matter enter the display panel components.

### Removing the STN FL Unit

To remove the STN FL unit, follow the steps below and refer to Figures 4-48 to 4-51.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, display frame, FL inverter board, and LCD module as described in Sections 4.2, 4.22, 4.23, and 4.24.
3. Remove three PET tapes (one at the rear of the LCD panel and two along the upper and lower edges of the LCD panel).
4. Release **twelve latches** and remove the **frame**.

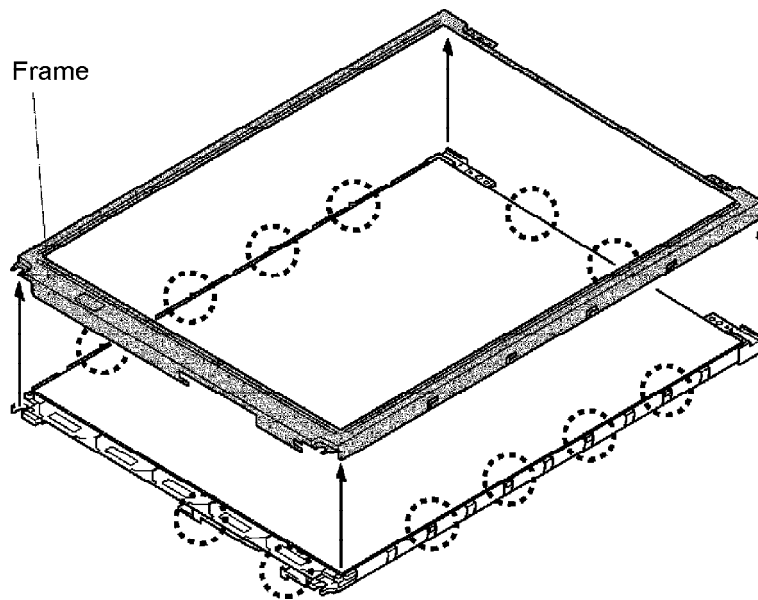
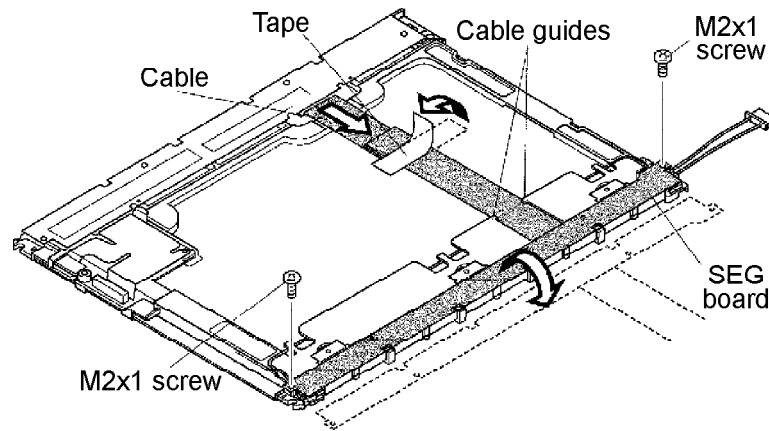


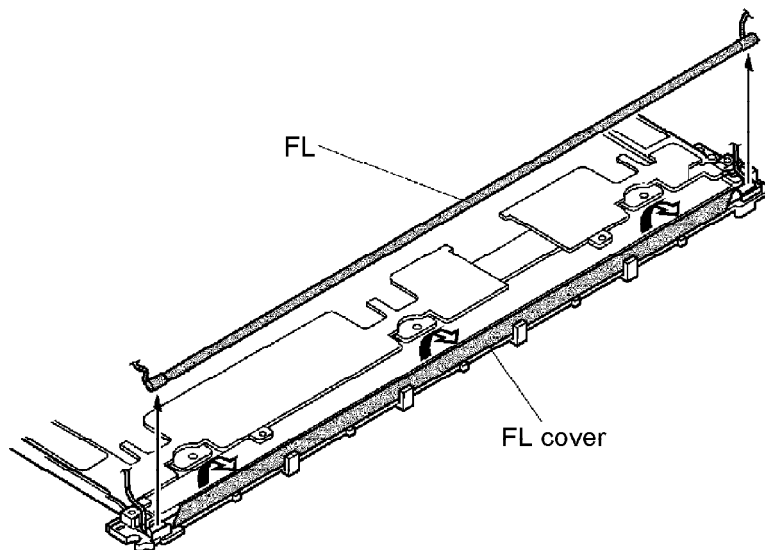
Figure 4-48 Removing the frame

5. Remove **two M2x1 screws**.
6. Remove the **tape** securing the **cable**.
7. Remove the **cable** from the connector and lift the **cable** up by releasing it from the **cable guides**.
8. Rotate the **SEG board** out so that it lies flat.



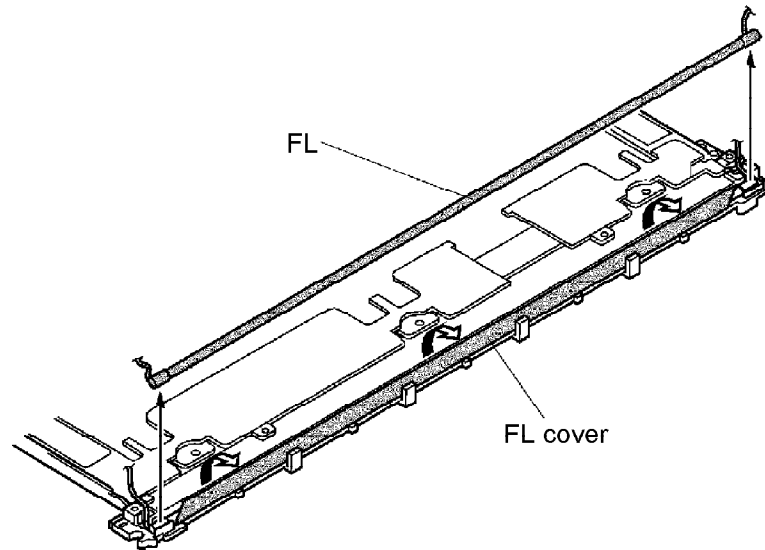
*Figure 4-49 Removing the SEG board*

9. Release **five latches** and **three projections**, then remove the **BL holder**.



*Figure 4-50 Removing the BL holder*

10. Tilt the **FL cover** and remove the **FL**. Be sure to note how the FL is threaded.



*Figure 4-51 Removing the FL*

### **Installing the STN FL Unit**

To install the STN FL unit, follow the steps below and refer to Figures 4-48 to 4-51.

1. Set the **FL** in place, rethread the FL cable, and replace the **FL cover**.
2. Seat the **BL holder** in place by securing **five latches** and **three projections**. Make sure that the **projections** of the holder are engaged with the corresponding projections at the rear of the LCD panel.
3. Rotate the **SEG board** back into place.
4. Lay the **cable** under the **cable guides** and insert the **cable** into the connector.
5. Secure the **cable** with **tape**.
6. Secure the **SEG board** with **two M2x1 screws**.
7. Set the **frame** in place and secure the **latches**.
8. Replace the **three PET tapes**.
9. Install the LCD module, FL inverter board, display frame, and battery pack as described in Sections 4.24, 4.23, 4.22, and 4.2.

## 4.26 TFT FL Unit (DTI)

**CAUTION:** When you remove the **TFT FL**, be careful not to let any dust or other foreign matter contaminate the **LCD panel**. Any contamination can affect the performance of the unit.

### Removing the TFT FL Unit (DTI)

To remove the TFT FL unit (DTI), follow the steps below and refer to Figure 4-52.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, display frame, FL inverter board, and LCD module as described in Sections 4.2, 4.22, 4.23, and 4.24.
3. Remove **one gold flat screw** and **one black flat screw** at the rear of the LCD panel.
4. Slide the **metal cover** to the left to remove it.
5. Take out the white flat **FL cable** that is set between the **metal frame** and the **FL cover**.
6. Tilt the **FL cover** and remove the **FL**.

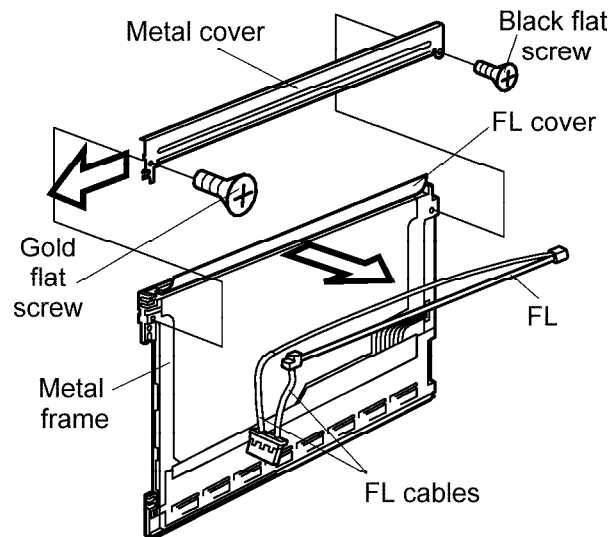


Figure 4-52 Removing the TFT FL (DTI)

## Installing the TFT FL Unit (DTI)

To install the TFT FL unit (DTI), follow the steps below and refer to Figure 4-52.

1. Set the **FL** in place and put the **FL cover** on top of it.
2. Set the white flat **FL cable** between the **metal frame** and the **FL cover**.
3. Run the **FL cables** in their respective grooves.
4. Slide the **metal cover** into the frame, making sure that it is engaged with the **metal frame**.
5. Secure the **metal cover** with **one gold flat screw** and **one black flat screw**.
6. Install the LCD module, FL inverter board, display frame, and battery pack as described in Sections 4.24, 4.23, 4.22, and 4.2.



## 4.27 TFT FL Unit (Sansei)

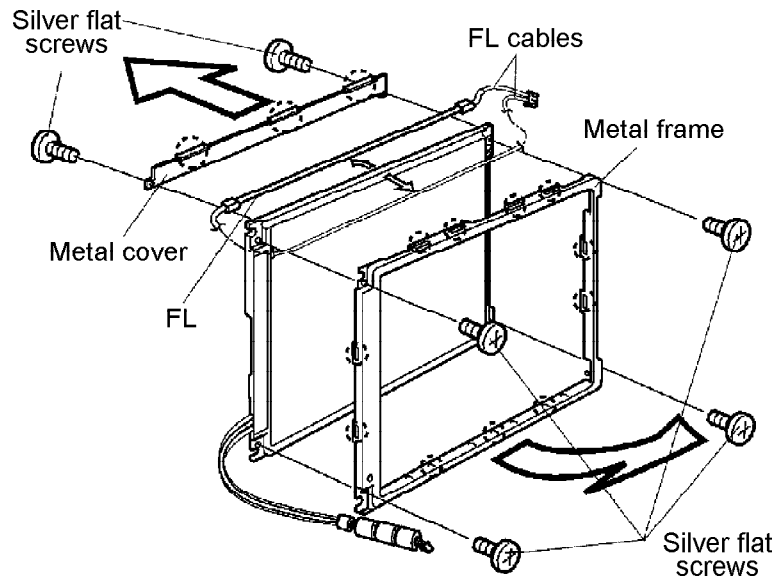
**CAUTION:** When you remove the **TFT FL**, be careful not to let any dust or other foreign matter contaminate the **LCD panel**. Any contamination can affect the performance of the unit.

### Removing the TFT FL Unit (Sansei)

To remove the TFT FL unit (Sansei), follow the steps below and refer to Figure 4-53.

1. Turn off the power to the computer, then disconnect the AC power cord and all external cables connected to the computer.
2. Remove the battery pack, display frame, FL inverter board, and LCD module as described in Sections 4.2, 4.22, 4.23, and 4.24.
3. Remove **four silver flat screws** securing the **metal frame**.
4. Release **eleven latches** and remove the frame. Start with **four latches** at the upper side.
5. Turn the LCD panel over.
6. Remove **two silver flat screws** securing the **metal cover**.
7. Release **three latches** and gently lift off the **metal cover** while holding the left side of the **metal cover**.
8. Remove the white **FL cable** from the groove on the front side of the LCD panel.
9. Tilt the FL cover and remove the **FL** along with the pink **FL cable**.

**NOTE:** Be sure to observe how the FL cables are threaded.



*Figure 4-53 Removing the TFT FL (Sansei)*

### **Installing the TFT FL Unit (Sansei)**

To install the TFT FL unit (Sansei), follow the steps below and refer to Figure 4-53.

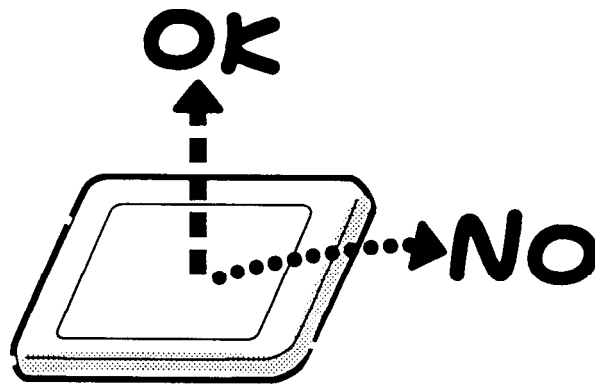
1. Seat the **FL**, run the pink **FL cable** in the groove, and put the FL cover over it.
2. Run the white **FL cable** in the groove at the front side of the LCD panel.
3. Seat the **metal cover** and press to secure the **latches**.
4. Fasten **two silver flat screws**.
5. Seat the **metal frame** and press to secure the **latches**. Start with the **latches** at the bottom.
6. Fasten **four silver flat screws**.
7. Install the LCD module, FL inverter board, display frame, and battery pack as described in Sections 4.24, 4.23, 4.22, and 4.2.

## Appendix A Handling the LCD Module

### Precautions for Handling the LCD Module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module.

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



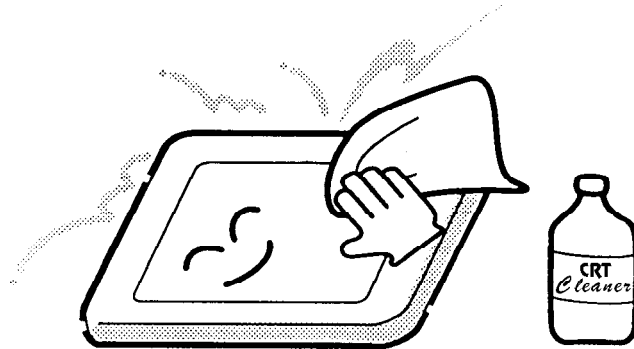
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.

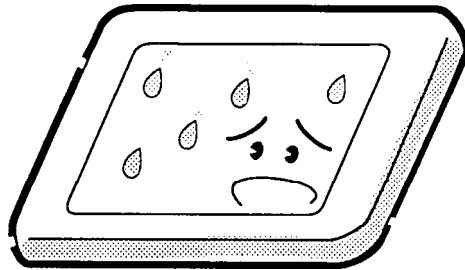


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

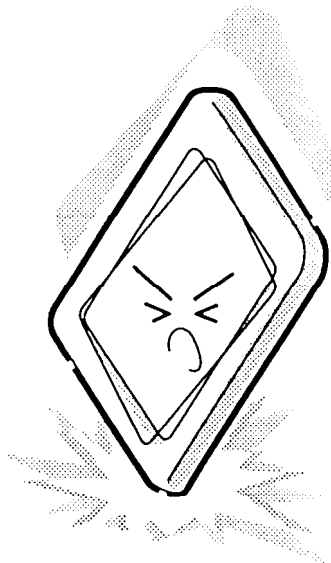
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



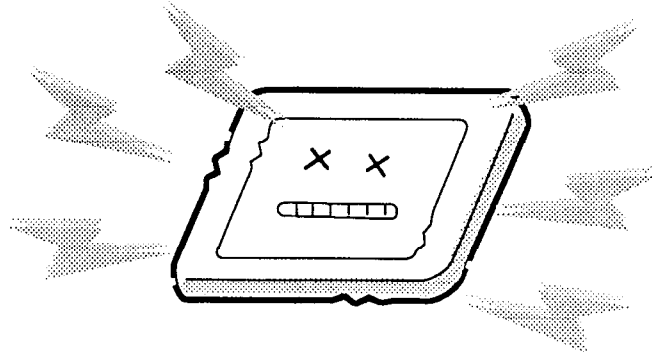
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



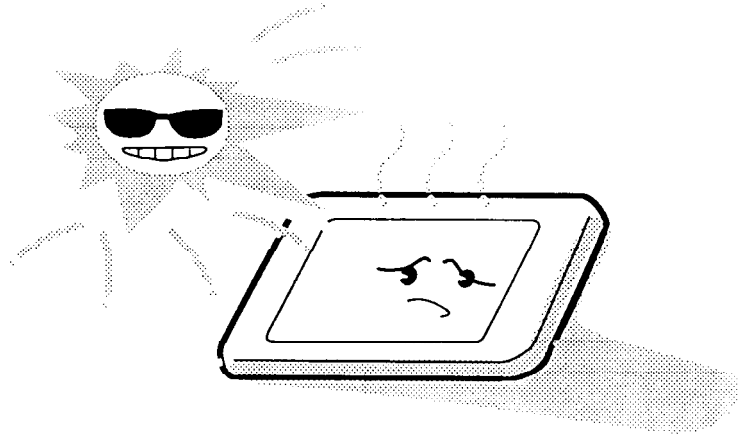
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



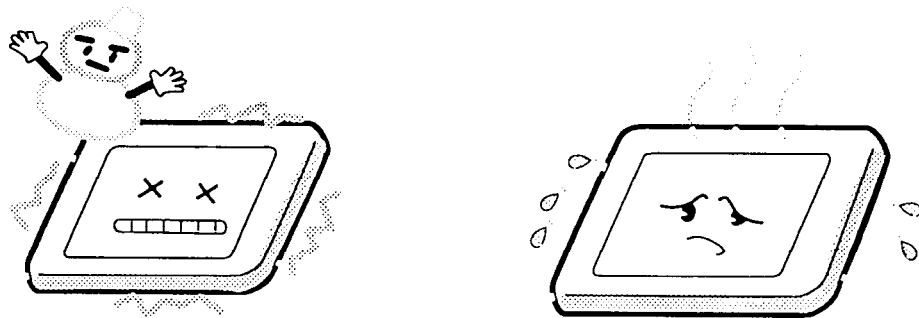
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



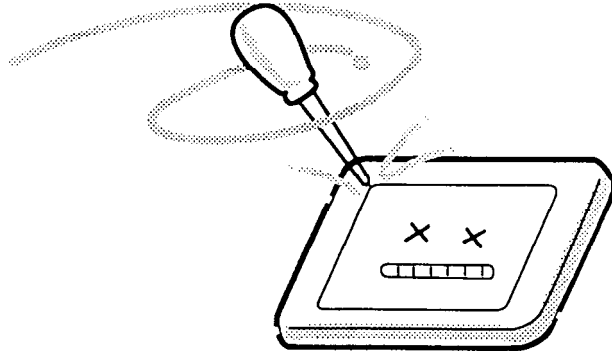
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



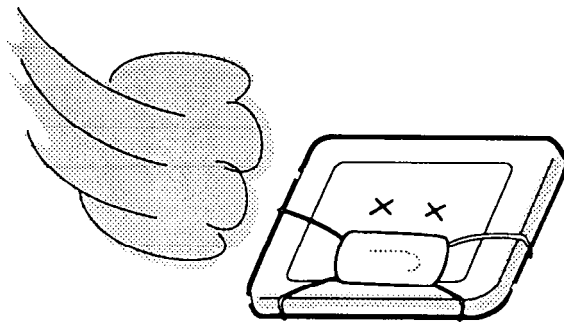
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



# Appendix B Board Layouts

## B.1 PCI Board Front View (TFT)

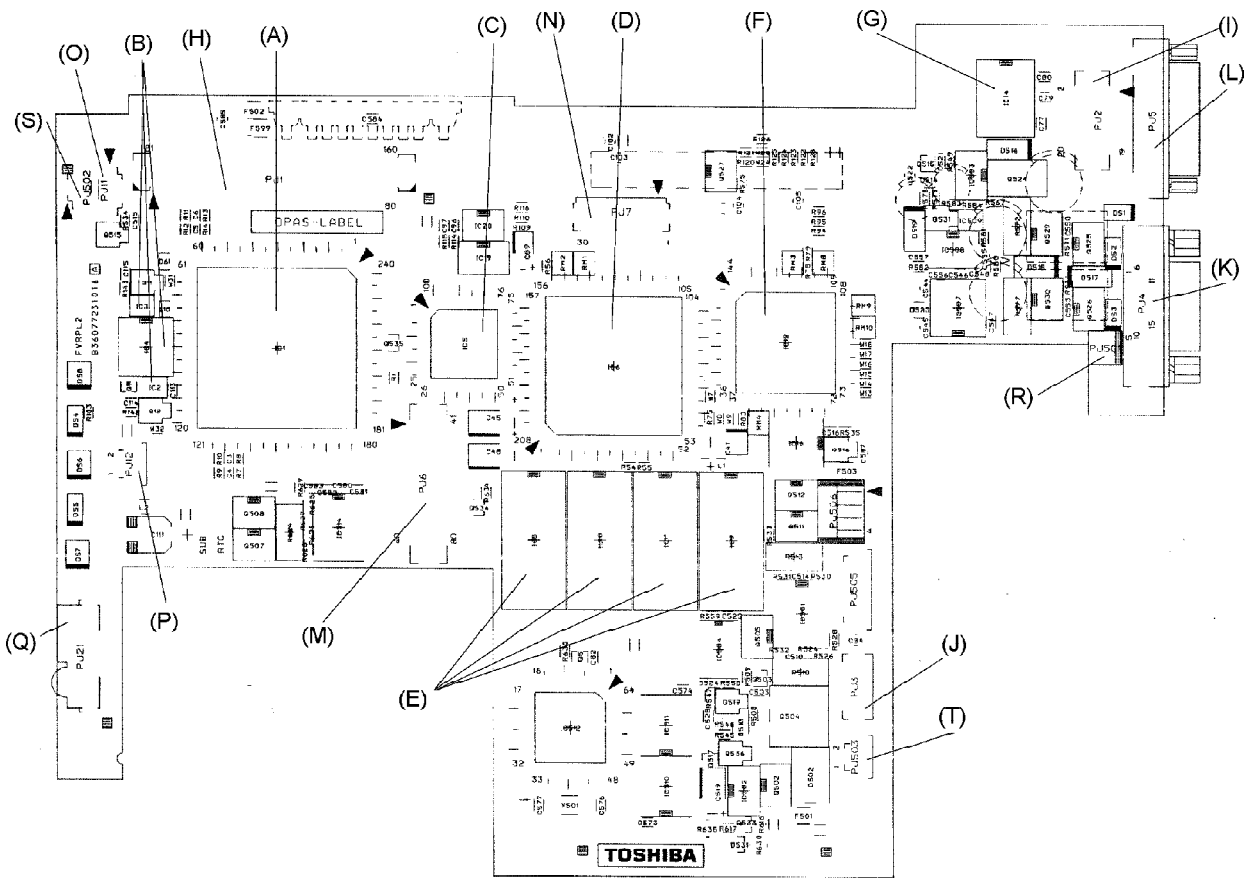


Figure B-1 Board layout (front)





*Table B-1 PCI board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC1	Violin GA
(B)	IC2 to IC4	Card Slot Power driver
(C)	IC5	Banjo GA
(D)	IC6	VGA Controller
(E)	IC8 to IC11	VRAM
(F)	IC12	LCD I/F GA
(G)	IC14	LVDS driver
(H)	PJ1	Card Bus Board I/F Connector
(I)	PJ2	LCD (TFT) I/F Connector
(J)	PJ3	FL Inverter I/F Connector
(K)	PJ4	CRT I/F Connector
(L)	PJ5	Serial I/F Connector
(M)	PJ6	Modem I/F Connector
(N)	PJ7	Sound I/F Connector
(O)	PJ11	RTC battery Connector
(P)	PJ12	Internal MIC Connector
(Q)	PJ21	FIR module
(R)	PJ501	DC IN Connector
(S)	PJ502	Sub-battery I/F Connector
(T)	PJ503	Panel switch Connector

*Table B-2 PCI board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC15	LVDS driver
(B)	PJ10	System board I/F Connector
(C)	PJ504	Battery Connector

### B.3 PCI Board Front View (STN)

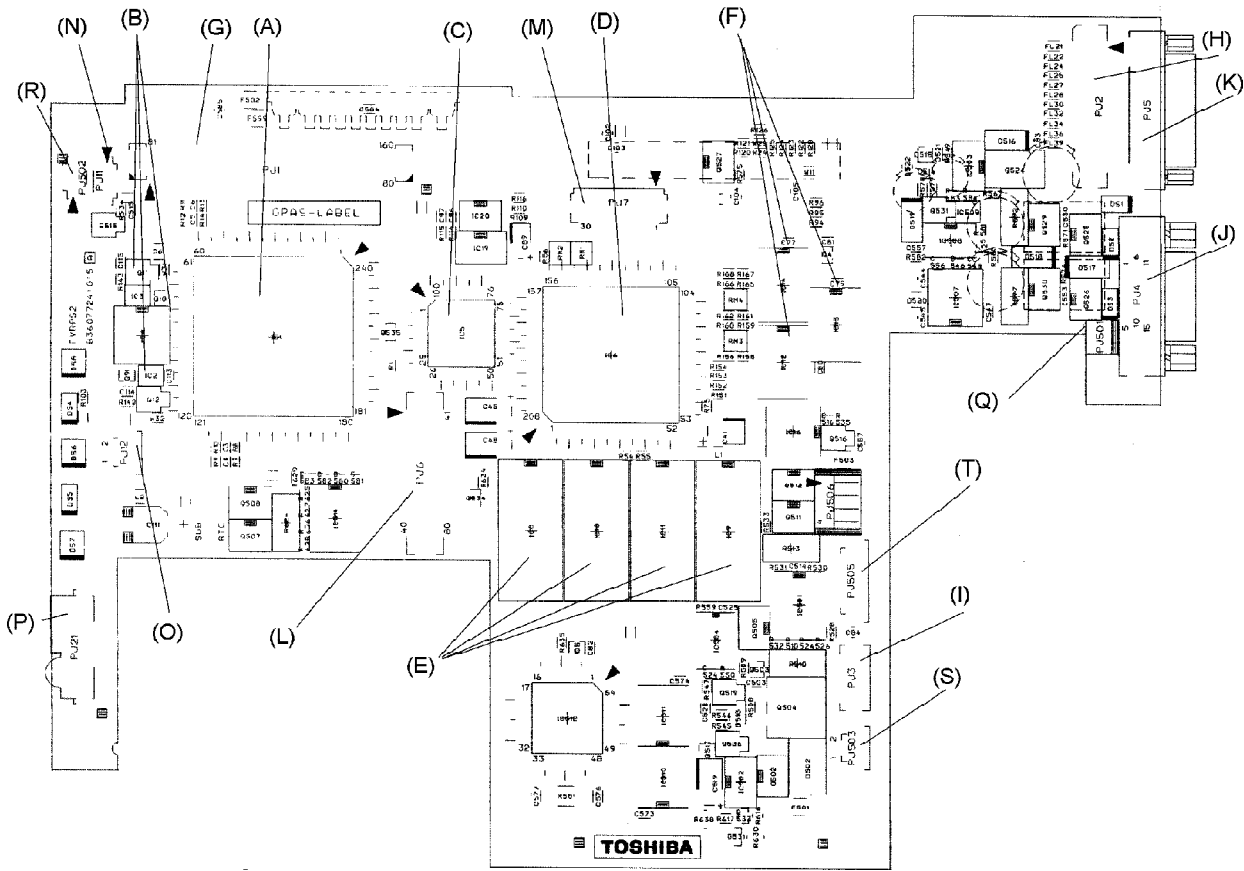


Figure B-3 Board layout (front)

## B.4 PCI Board Back View (STN)

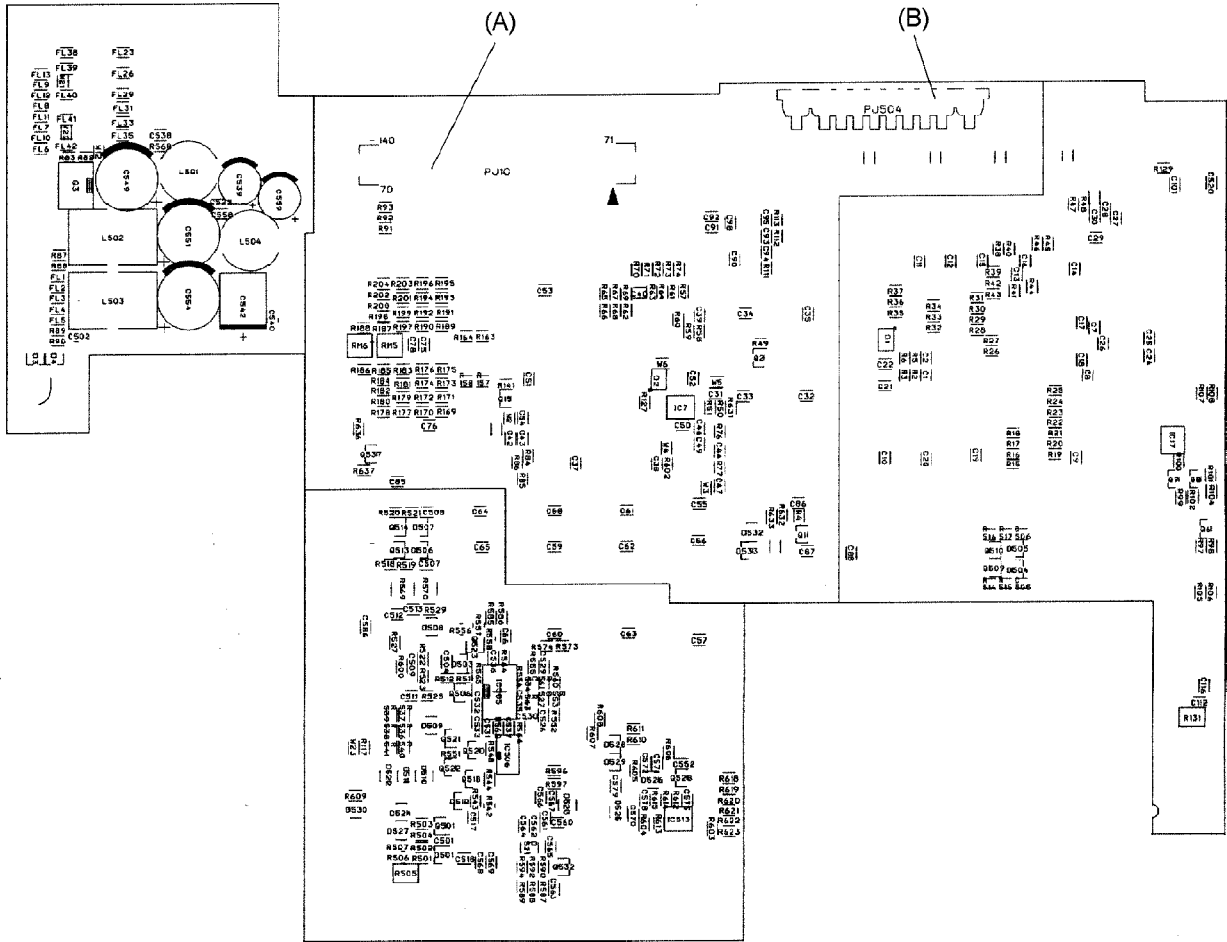


Figure B-4 Board layout (back)

*Table B-3 PCI board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC1	Violin GA
(B)	IC2 to IC4	Card Slot Power driver
(C)	IC5	Banjo GA
(D)	IC6	VGA Controller
(E)	IC8 to IC11	VRAM
(F)	IC12 to IC14	LCD I/F driver
(G)	PJ1	Card Bus Board I/F Connector
(I)	PJ2	LCD (TFT) I/F Connector
(J)	PJ3	FL Inverter I/F Connector
(K)	PJ4	CRT I/F Connector
(L)	PJ5	Serial I/F Connector
(M)	PJ6	Modem I/F Connector
(N)	PJ7	Sound I/F Connector
(O)	PJ11	RTC battery Connector
(P)	PJ12	Internal MIC Connector
(Q)	PJ21	FIR module
(R)	PJ501	DC IN Connector
(S)	PJ502	Sub-battery I/F Connector
(T)	PJ503	Panel switch Connector

*Table B-4 PCI board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	PJ10	System board I/F Connector
(B)	PJ504	Battery Connector

## B.5 System Board and CardBus Board Front View

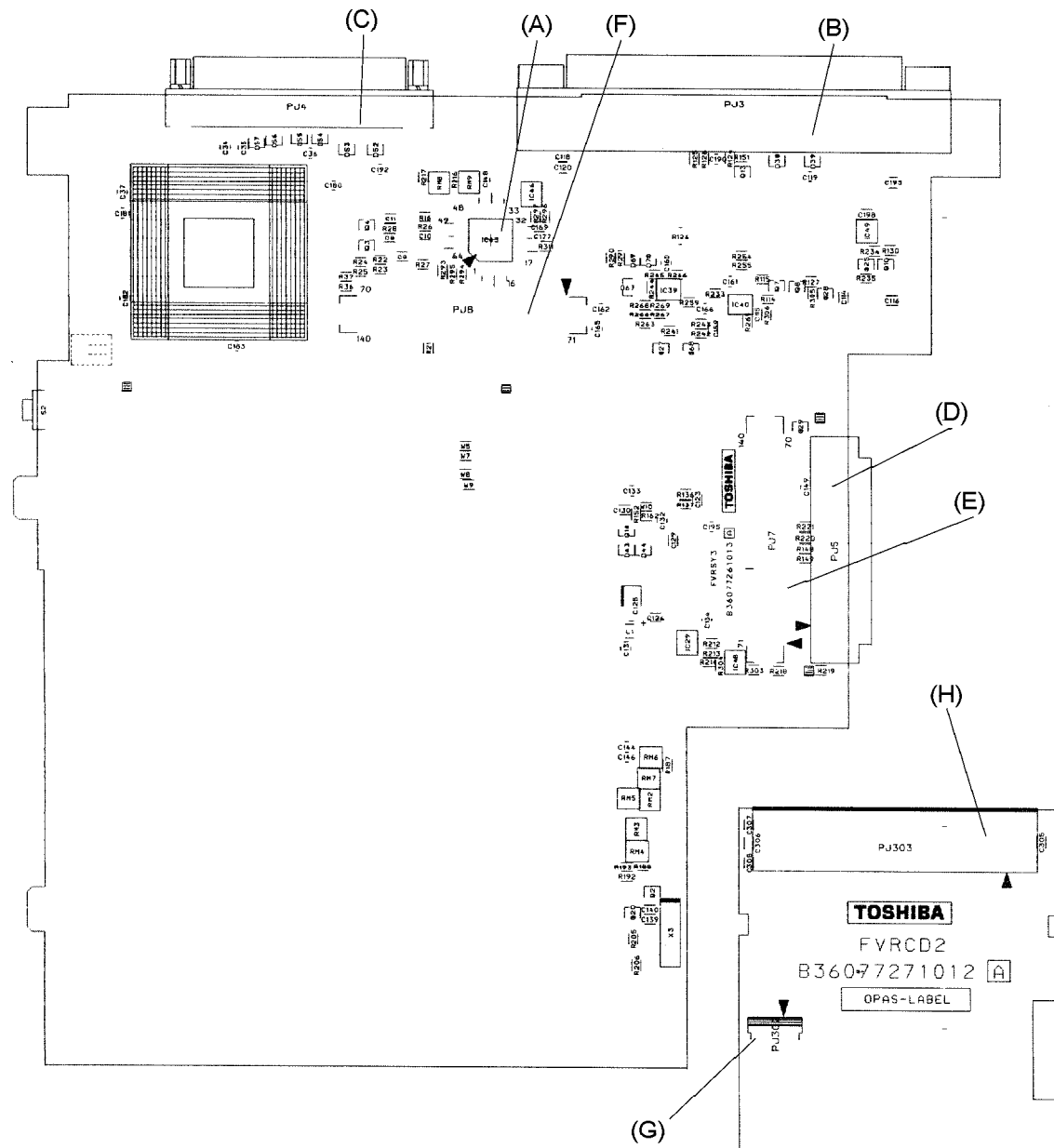


Figure B-5 Board layout (front)

## B.6 System Board and CardBus Board Back View

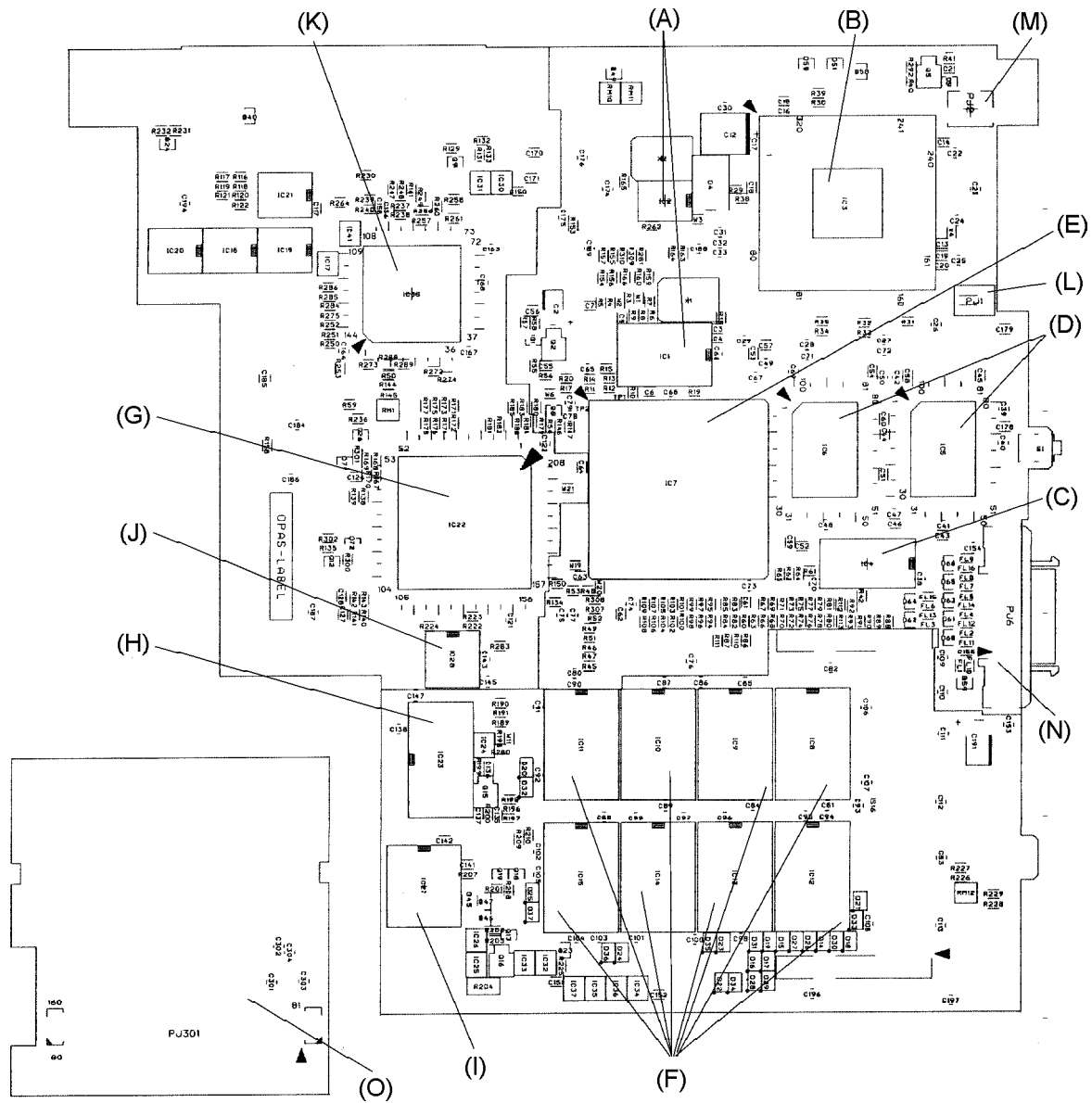


Figure B-6 Board layout (back)

*Table B-5 System board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC43	FIR I/F Controller
(B)	PJ3	Docking I/F Connector
(C)	PJ4	Parallel I/F Connector
(D)	PJ5	HDD Pack I/F Connector
(E)	PJ7	PCI Board I/F Connector
(F)	PJ8	Sound Board I/F Connector

*Table B-6 System board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC1 to IC2	Clock Generator
(B)	IC3	CPU
(C)	IC4	TAG RAM
(D)	IC5 to IC6	L2 Cache
(E)	IC7	Cello GA
(F)	IC8 to IC15	DRAM
(G)	IC22	Flute GA
(H)	IC23	BIOS ROM
(I)	IC27	RTC Controller
(J)	IC28	Serial I/F driver
(K)	IC38	Piano GA
(L)	PJ1	DC Fan I/F Connector
(M)	PJ2	CPU Thermistor I/F Connector
(N)	PJ6	External FDD I/F Connector

*Table B-7 CardBus Board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(G)	PJ302	PCI Board I/F Connector
(H)	PJ303	Card Slot I/F Connector

*Table B-8 CardBus Board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(O)	PJ301	PCI Board I/F Board Connector

## B.7 Sound Board Front View

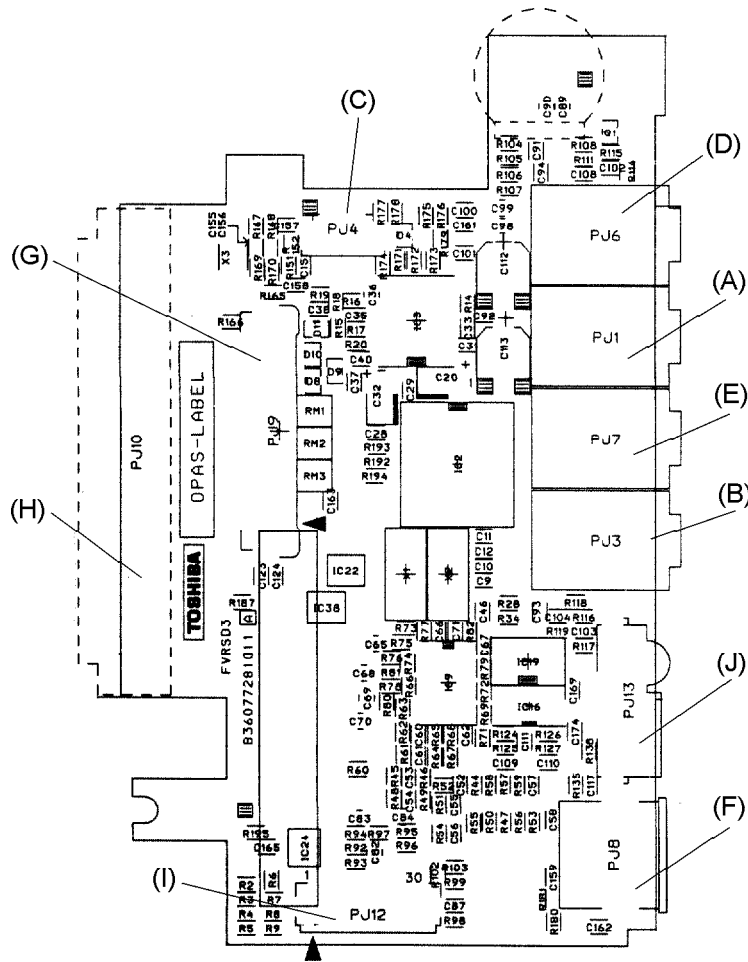


Figure B-7 Board layout (front)



## B.8 Sound Board Back View

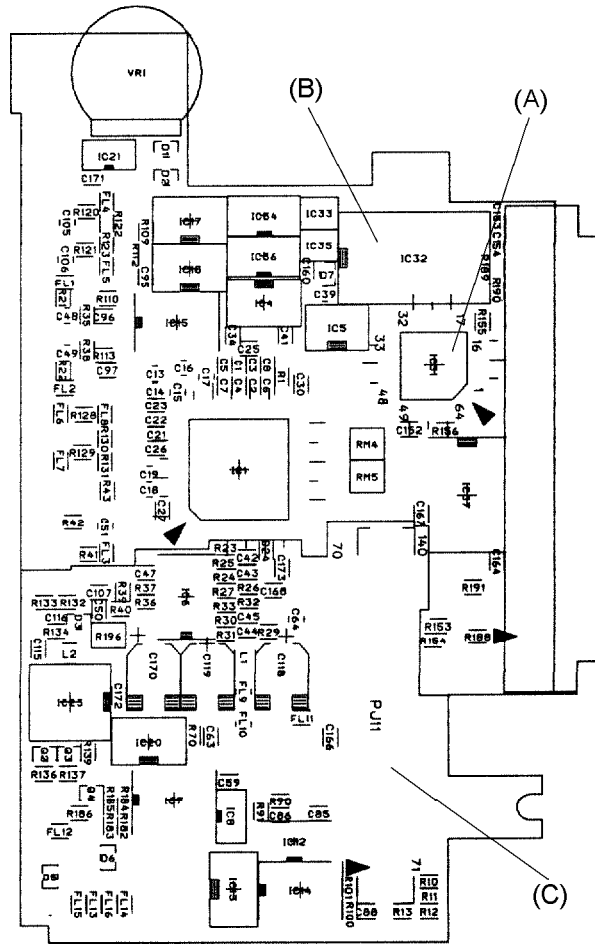


Figure B-8 Board layout (back)

*Table B-9 Sound board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	PJ1	LINE IN I/F Connector
(B)	PJ3	External MIC Connector
(C)	PJ4	Speaker Connector
(D)	PJ6	LINE OUT Connector
(E)	PJ7	Headphone Connector
(F)	PJ8	PS2 I/F Connector
(G)	PJ9	Internal Keyboard I/F Connector
(H)	PJ10	Selectable Bay I/F Connector
(I)	PJ12	TO PCI Board I/F Connector
(J)	PJ13	FIR Module

*Table B-10 Sound board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	IC31	KBC Controller
(B)	IC32	IPS Controller
(C)	PJ11	System board I/F Connector

## Appendix C Pin Assignments

### C.1 PJ1 DC Fan I/F Connector (2-pin) on the System Board

Table C-1 PJ1 DC fan I/F connector pin assignments (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	FANPON	-	2	GND	-

### C.2 PJ2 CPU Thermistor I/F Connector (3-pin) on the System Board

Table C-2 PJ2 CPU thermistor I/F connector pin assignments (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	CPUTMP;100	I	2	NC	-
3	GND	-			

### C.3 Expansion Memory Connector (144-pin) on the System Board

Table C-3 Expansion memory connector pin assignments (144-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	MD0;100	I/O
3	MD1;100	I/O	4	MD2;100	I/O
5	MD3;100	I/O	6	B3VDRM	-
7	MD4;100	I/O	8	MD5;100	I/O
9	MD6;100	I/O	10	MD7;100	I/O
11	GND	-	12	CAS0;002	O
13	CAS1;002	O	14	B3VDRM	-
15	MA08;101	O	16	MA18;101	O
17	MA2;102	O	18	GND	-
19	MD8;100	I/O	20	MD9;100	I/O
21	MD10;100	I/O	22	MD11;100	I/O
23	B3VDRM	-	24	MD12;100	I/O
25	MD13;100	I/O	26	MD14;100	I/O
27	MD15;100	I/O	28	GND	-
29	NC	-	30	NC	-
31	NC	-	32	B3VDRM	-
33	NC	-	34	WEC;001	O

Table C-3 Expansion memory connector pin assignments (144-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
35	RAS2;001	O	36	RAS3;001	O
37	B3VDRM	-	38	B3VDRM	-
39	NC	-	40	NC	-
41	B3VDRM	-	42	MD16;100	I/O
43	MD17;100	I/O	44	MD18;100	I/O
45	MD19;100	I/O	46	GND	-
47	MD20;100	I/O	48	MD21;100	I/O
49	MD22;100	I/O	50	MD23;100	I/O
51	B3VDRM	-	52	MA6;102	O
53	MA8;102	O	54	GND	-
55	MA9;102	O	56	MA10;102	O
57	B3VDRM	-	58	CAS2;002	O
59	CAS3;002	O	60	GND	-
61	MD24;100	I/O	62	MD25;100	I/O
63	MD26;100	I/O	64	MD27;100	I/O
65	B3VDRM	-	66	MD28;100	I/O
67	MD29;100	I/O	68	MD30;100	I/O
69	MD31;100	I/O	70	GND	-
71	NC	-	72	B3VDRM	-
73	GND	-	74	MD32;100	I/O
75	MD33;100	I/O	76	MD34;100	I/O
77	MD35;100	I/O	78	B3VDRM	-
79	MD36;100	I/O	80	MD37;100	I/O
81	MD38;100	I/O	82	MD39;100	I/O
83	GND	-	84	CAS4;002	O
85	CAS5;002	O	86	B3VDRM	-
87	MA3;102	O	88	MA4;102	O
89	MA5;102	O	90	GND	-
91	MD40;100	I/O	92	MD41;100	I/O
93	MD42;100	I/O	94	MD43;100	I/O
95	B3VDRM	-	96	MD44;100	I/O
97	MD45;100	I/O	98	MD46;100	I/O
99	MD47;100	I/O	100	GND	-
101	NC	-	102	NC	-
103	NC	-	104	B3VDRM	-
105	WED;001	O	106	RAS4;001	O
107	RAS5;001	O	108	RAS6;001	O

Table C-3 Expansion memory connector pin assignments (144-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
109	RAS7;001	O	110	GND	-
111	NC	-	112	NC	-
113	B3VDRM	-	114	MD48;100	I/O
115	MD49;100	I/O	116	MD50;100	I/O
117	MD51;100	I/O	118	GND	-
119	MD52;100	I/O	120	MD53;100	I/O
121	MD54;100	I/O	122	MD55;100	I/O
123	B3VDRM	-	124	MA7;102	O
125	MA11;102	O	126	GND	-
127	MA0C;101	O	128	MA1C;101	O
129	B3VDRM	-	130	CAS6;002	O
131	CAS7;002	O	132	GND	-
133	MD56;100	I/O	134	MD57;100	I/O
135	MD58;100	I/O	136	MD59;100	I/O
137	B3VDRM	-	138	MD60;100	I/O
139	MD61;100	I/O	140	MD62;100	I/O
141	MD63;100	I/O	142	GND	-
143	NC	-	144	B3VDRM	-

#### C.4 PJ3 Docking I/F Connector (240-pin) on the System Board

Table C-4 PJ3 Docking I/F connector pin assignments (240-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	DOCDT1;000	-	4	DSKDC	-
5	DSKDC	-	6	DSKDC	-
7	DSKDC	-	8	GND	-
9	PINT;000	O	10	PD1;100	I/O
11	PD0;100	I/O	12	AUTFD;000	O
13	DAD8;100	I/O	14	DAD6;100	I/O
15	GND	-	16	DAD4;100	I/O
17	DAD2;100	I/O	18	DAD0;100	I/O
19	GND	-	20	DREFRH;000	O
21	DHFRAM;000	I/O	22	DBUSY;000	O
23	GND	-	24	DSTOP;000	I/O
25	DTRDY;000	I/O	26	DCBE2;000	I/O

Table C-4 PJ3 Docking I/F connector pin assignments (240-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
27	GND	-	28	DCBE0;000	I/O
29	DIOCHK;000	O	30	DSERR	O
31	GND	-	32	DINTC;000	I
33	GND	-	34	DINTB;000	I
35	GND	-	36	DINTA;000	I
37	DPREQ;000	I	38	DPGNT;000	O
39	MIDIIN;100	I	40	MIDIOT;100	O
41	VCC	-	42	VCC	-
43	VCC	-	44	VCC	-
45	SNDMUT;010	O	46	SPKDIS;100	O
47	MIKDIS;100	I	48	LINEIR;100	I
49	LINEIR;000	I	50	CDR;000	I
51	CDR;100	I	52	CDL;100	I
53	MIKR;000	I	54	MIKR;100	I
55	MIKL;000	I	56	LINEOR;100	O
57	LINEOL;000	O	58	LINEOR;000	O
59	LINEOL;100	O	60	MIKL;100	I
61	GND	-	62	GND	-
63	GND	-	64	DSKDC	-
65	DSKDC	-	66	DSKDC	-
67	PD3;100	I/O	68	GND	-
69	PD4;100	I/O	70	ERROR;000	I
71	ACK;000	I	72	STROB;000	O
73	DAD7;100	I/O	74	DAD5;100	I/O
75	GND	-	76	DAD3;100	I/O
77	DAD1;100	I/O	78	RCLR;100	I/O
79	GND	-	80	DDEVSL;000	I/O
81	DPAR;100	I/O	82	DPERR	I
83	GND	-	84	DIRDY;000	I/O
85	DCBE3;000	I/O	86	DCBE1;000	I/O
87	GND	-	88	DIRQCK;100	O
89	DIRQDT;000	I/O	90	DINTD;000	I
91	GND	-	92	GND	-
93	GND	-	94	DGNT;000	O
95	GND	-	96	GND	-
97	DFRAME;000	I/O	98	NC	-
99	IFLD2A;000	O	100	EXKBCK;100	I/O

Table C-4 PJ3 Docking I/F connector pin assignments (240-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
101	NC	-	102	EXKBDT;100	I/O
103	GND	-	104	MOUSCK;100	I/O
105	QSWON;100	O	106	MOUSDT;100	I/O
107	PCM2SP;100	I	108	LINEIL;000	I
109	GND	-	110	LINEIL;100	I
111	DOCSMI;100	I	112	CDL;000	I
113	EJCTRQ;100	I	114	JOYDTO;100	I
115	GND	-	116	JOYDT2;100	I
117	JOYDT3;100	I	118	JOYDT5;100	I
119	GND	-	120	JOYDT7;100	I
121	GND	-	122	GND	-
123	NC	-	124	GND	-
125	NC	-	126	DSKDC	-
127	PD5;100	I/O	128	SLIN;000	O
129	PD6;100	I/O	130	GND	-
131	MCV	-	132	PE;100	I
133	DAD31;100	I/O	134	DAD17;100	I/O
135	GND	-	136	DAD16;100	I/O
137	DAD28;100	I/O	138	DAD15;100	I/O
139	GND	-	140	DAD14;100	I/O
141	DAD25;100	I/O	142	DAD13;100	I/O
143	GND	-	144	DAD12;100	I/O
145	DAD22;100	I/O	146	DAD11;100	I/O
147	GND	-	148	DAD10;100	I/O
149	DAD19;100	I/O	150	DAD9;100	I/O
151	GND	-	152	GND	-
153	GND	-	154	DREQ;000	I
155	GND	-	156	GND	-
157	NC	-	158	NC	-
159	DCD1;100	I	160	SCL;100	I/O
161	RXD1;000	I	162	SDA;100	I/O
163	GND	-	164	DCRIOT;100	I
165	CTS1;100	I	166	DSCREQ;000	I
167	GND	-	168	DSCGNT;000	O
169	DTR1;110	O	170	DCPCLR;010	O
171	MONID0;100	I/O	172	GND	-
173	MONID1;100	I/O	174	DSKCHG;000	I

Table C-4 PJ3 Docking I/F connector pin assignments (240-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
175	MONID2;100	I/O	176	JOYDT1;100	I
177	MONID3;100	I/O	178	JOYDT4;100	I
179	NC	-	180	JOYDT6;100	I
181	GND	-	182	SELCT;100	I
183	GND	-	184	BUSY;100	I
185	GND	-	186	PD7;100	I/O
187	GND	-	188	PD2;100	I/O
189	GND	-	190	PCONF;100	I
191	GND	-	192	DOCPWR;100	O
193	GND	-	194	DAD30;100	I/O
195	GND	-	196	DAD29;100	I/O
197	GND	-	198	DAD27;100	I/O
199	GND	-	200	DAD26;100	I/O
201	GND	-	202	DAD24;100	I/O
203	GND	-	204	DAD23;100	I/O
205	GND	-	206	DAD21;100	I/O
207	GND	-	208	DAD20;100	I/O
209	GND	-	210	DAD18;100	I/O
211	GND	-	212	GND	-
213	GND	-	214	DSCLK;100	O
215	GND	-	216	GND	-
217	GND	-	218	RI1;100	I
219	GND	-	220	DSR1;100	I
221	GND	-	222	RTS1;110	O
223	GND	-	224	TXD1;010	O
225	GND	-	226	SIRRX;100	I
227	GND	-	228	FIRTXB;100	O
229	GND	-	230	CHSYNC;100	O
231	GND	-	232	CVSYNC;100	O
233	GND	-	234	CRED;100	O
235	GND	-	236	CGREEN;100	O
237	GND	-	238	CBLUE;100	O
239	GND	-	240	DOCDT2;000	I



## C.5 PJ4 Parallel I/F Connector (25-pin) on the System Board

Table C-5 PJ4 Parallel I/F connector pin assignments (25-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	STRO8;000	I/O	2	PD0;100	I/O
3	PD1;100	I/O	4	PD2;100	I/O
5	PD3;100	I/O	6	PD4;100	I/O
7	PD5;100	I/O	8	PD6;100	I/O
9	PD7;100	I/O	10	ACK;000	I
11	BUSY;100	I	12	PE;100	I
13	SELCT;100	I	14	AUTFD;000	O
15	ERROR;000	I	16	PINT;000	O
17	SLIN;000	O	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	GND	-			

## C.6 PJ5 HDD Pack I/F Connector (50-pin) on the System Board

Table C-6 PJ5 HDD pack I/F connector pin assignments (50-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	HDIN;000	I
7	GND	-	8	ISARST;000	O
9	SA8;100	I/O	10	SD7;100	I/O
11	SA9;100	I/O	12	SD6;100	I/O
13	SA10;100	I/O	14	SD5;100	I/O
15	SA11;100	I/O	16	SD4;100	I/O
17	SA12;100	I/O	18	SD3;100	I/O
19	SA13;100	I/O	20	SD2;100	I/O
21	SA14;100	I/O	22	SD1;100	I/O
23	SA15;100	I/O	24	SD0;100	I/O
25	NC	-	26	GND	-
27	GND	-	28	NC	-
29	GND	-	30	FLOW;000	O
31	GND	-	32	FIOR;000	O
33	NC	-	34	IOCRDY;100	I

Table C-6 PJ5 HDD pack I/F connector pin assignments (50-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
35	GND	-	36	NC	-
37	IOCS16;000	O	38	HDDIRQ;100	I
39	NC	-	40	SA1;100	O
41	SA2;100	O	42	SA0;100	O
43	SA5;100	O	44	SA4;100	O
45	GND	-	46	HDDLED;000	I
47	VCC	-	48	VCC	-
49	NC	-	50	GND	-

### C.7 PJ6 External FDD I/F Connector (26-pin) on the System Board

Table C-7 PJ6 External FDD I/F connector pin assignments (26-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	VCC	-	2	IFINDX;000	I
3	VCC	-	4	IFDASL;011	O
5	VCC	-	6	DSKCHG;000	I
7	VCC	-	8	IFRADY;000	I
9	IFHMED;000	I	10	IFAMON;011	O
11	IFLOWD;000	O	12	IFDIRC;000	O
13	SLFDLD;100	I	14	IFSTEP;000	O
15	GND	-	16	IFWDAT;000	O
17	GND	-	18	IFWEN;000	O
19	GND	-	20	IFTRKO;000	I
21	GND	-	22	IFWPRO;000	I
23	GND	-	24	IFRDAT;000	I
25	GND	-	26	IFSSEL;000	O

### C.8 PJ7 PCI Board I/F Connector (140-pin) on the System Board

Table C-8 PJ7 PCI board I/F connector pin assignments (140-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	DSR1;100	I
3	TXD1;100	O	4	RTS1;110	O
5	DTR;110	O	6	C32PBK;100	O
7	IRQ8;101	O	8	INTA;000	I

Table C-8 PJ7 PCI board I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
9	INTB;000	I	10	INTC;000	I
11	GND	-	12	PGNTF;000	O
13	REQF;000	I	14	RCLR;100	I
15	AD15;100	I/O	16	AD14;100	I/O
17	AD13;100	I/O	18	AD12;100	I/O
19	AD11;100	I/O	20	AD10;100	I/O
21	GND	-	22	AD9;100	I/O
23	AD8	I/O	24	AD7	I/O
25	AD6	I/O	26	AD5	I/O
27	AD4	I/O	28	AD3	I/O
29	AD2	I/O	30	AD1	I/O
31	GND	-	32	AD0	I/O
33	CBE3;000	I/O	34	CBE2;000	I/O
35	CBE1;000	I/O	36	CBE0;000	I/O
37	VCC	-	38	VCC	-
39	VCC	-	40	GND	-
41	S1SEL;100	I	42	B3V	-
43	B3V	-	44	S0SEL;100	I
45	CBCLK;100	O	46	PBCLK;102	O
47	PBCLK;105	O	48	PBCLK;101	O
49	C14P3M;102	O	50	GND	-
51	ONVCC;100	I	52	PCLR;000	I
53	PSUPDT;100	O	54	PSRST;000	O
55	PCMSMI;100	I	56	SCL;100	I/O
57	SDA;100	I/O	58	PSREQ;000	I/O
59	PSGNT;000	O	60	GND	-
61	PNLOFF;000	I	62	PCMSPK;100	I
63	PSBEEP;000	I	64	DSKDC	-
65	DSKDC	-	66	DSKDC	-
67	DSKDC	-	68	DSKDC	-
69	DSKDC	-	70	GND	-
71	GND	-	72	DCD1;100	I
73	CTS1;100	I	74	RXD1;000	I
75	RI1;100	I	76	DISKLED	O
77	RTCBAT	-	78	B5V	-
79	B5V	-	80	REQC;000	I
81	GND	-	82	BUFOFF;100	I

Table C-8 PJ7 PCI board I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
83	PGNTC;000	O	84	IRQOT;000	I/O
85	IRQCLK;101	O	86	PAR;100	I/O
87	STOP;000	I/O	88	DEYSEL;000	I/O
89	TRDY;000	I/O	90	IRDY;000	I/O
91	GND	-	92	FRAME;000	I/O
93	AD31;100	I/O	94	AD30;100	I/O
95	AD29;100	I/O	96	AD28;100	I/O
97	AD27;100	I/O	98	AD26;100	I/O
99	AD25;100	I/O	100	AD24;100	I/O
101	GND	-	102	AD23;100	I/O
103	AD22;100	I/O	104	AD21;100	I/O
105	AD20;100	I/O	106	AD19;100	I/O
107	AD18;100	I/O	108	AD17;100	I/O
109	AD16;100	I/O	110	GND	-
111	B3V	-	112	B3V	-
113	B3V	-	114	B3V	-
115	NC	-	116	FIRTXF;100	O
117	FIRRXF;100	I	118	RSTSW;000	I
119	MCV	-	120	GND	-
121	PNL0;100	I	122	PNL1;100	I
123	FLTEN;000	O	124	CRTEN;000	O
125	PONVGA;000	O	126	RSTVGA;000	O
127	MONID3;100	I/O	128	MONID2;100	I/O
129	MONID1;100	I/O	130	GND	-
131	MONID0;100	I/O	132	PCONF;100	O
133	DOCPWR;100	I	134	DOCPWN;100	O
135	CVSYNC;100	I	136	CHSYNC;100	I
137	CGREEN;100	I	138	CBLYE;100	I
139	CRED;100	I	140	GND	-

## C.9 PJ8 Sound Board I/F Connector (140-pin) on the System Board

Table C-9 PJ8 Sound board I/F connector pin assignments (140-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	LINEOL;100	O
3	LINEOL;000	O	4	LINEOR;000	O

Table C-9 PJ8 Sound board I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
5	LINEOR;100	O	6	MIKL;100	I
7	MIKL;000	I	8	MIKR;100	I
9	MIKR;000	I	10	CDL;100	I
11	GND	-	12	CDL;000	I
13	CDR;100	I	14	CDR;000	I
15	LINEIL;100	I	16	SA0;100	I
17	SA1;100	I	18	SA2;100	I
19	SA3;100	I	20	SA4;100	I
21	GND	-	22	SA5;100	I
23	SA6;100	I	24	SA7;100	I
25	SD7;100	I/O	26	SD6;100	I/O
27	SD5;100	I/O	28	SD4;100	I/O
29	SD3;100	I/O	30	SD2;100	I/O
31	GND	-	32	SD1;100	I/O
33	SD0;100	I/O	34	SA8;100	I/O
35	SA9;100	I/O	36	SA10;100	I/O
37	SA11;100	I/O	38	SA12;100	I/O
39	SA13;100	I/O	40	GND	-
41	SA14;100	I/O	42	SA15;100	I/O
43	SPKVOL;100	I	44	IORST;000	I
45	IOR;000	I	46	IOW;000	I
47	AEN;100	I	48	SNDRST;000	I
49	SNDMUT;000	I	50	GND	-
51	ISARST;100	I	52	ATBEEP;100	I
53	ALARM;100	I	54	MBSTS1;100	O
55	MBSTSO;100	O	56	ALE;100	I
57	FIRRXB;100	I	58	FIRTXB;100	O
59	SDACKD;000	I	60	GND	-
61	SDREQC;100	O	62	SDREQD;100	O
63	KBCCLK;100	I	64	GND	-
65	CPUTMP;100	I	66	VCC	-
67	VCC	-	68	VCC	-
69	VCC	-	70	GND	-
71	GND	-	72	JOYDT0;100	I
73	JOYDT1;100	I	74	JOYDT2;100	I
75	JOYDT3;100	I	76	JOYDT4;100	I
77	JOYDT5;100	I	78	JOYDT6;100	I

Table C-9 PJ8 Sound board I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
79	JOYDT7;100	I	80	MIKDIS;100	I
81	GND	-	82	SPKDIS;100	I
83	MOUSDT;100	I/O	84	MOUSCK;100	I/O
85	EXKBDT;100	I/O	86	EXKBCK;100	I/O
87	MIDIOT;100	O	88	MIDIIN;100	I
89	LINEIL;000	I	90	LINEIR;000	I
91	GND	-	92	LINEIR;100	I
93	KBDT05;000	I/O	94	KBDT04;000	I/O
95	KBDT03;000	I/O	96	KBDT02;000	I/O
97	KBDT01;000	I/O	98	KBDT00;000	I/O
99	KBDT06;000	I/O	100	KBDT07;000	I/O
101	GND	-	102	KEYPRS;100	O
103	KBUPDT;100	I	104	KBTMG;100	O
105	KBRW;000	O	106	CDRIRQ;100	O
107	SDTRQB;100	O	108	SDIRQA;100	O
109	IRQ12;100	O	110	GND	-
111	KBCCS;000	I	112	CDACKA;000	I
113	CDREQA;100	O	114	FIOW;001	I
115	FIOR;001	I	116	IOCS16;000	O
117	IOCRDY;100	O	118	SDACKC;000	I
119	C14P3M;103	I	120	GND	-
121	KA20M;000	O	122	IRQ1;100	O
123	RSTCPN;000	O	124	IFHMED;000	O
125	IFWPRD;000	O	126	IFLD2A;000	I
127	DSKCHG;000	O	128	IFINDEX;000	O
129	IFDASL;000	I	130	GND	-
131	IFRADY;000	O	132	IFWDAT;000	I
133	IFRDAT;000	O	134	IFAMON;000	I
135	IFDIRC;000	I	136	IFSTEP;000	I
137	IFWEN;000	I	138	IFTRKO;000	O
139	IFSSEL;000	I	140	GND	-

## C.10 PJ1 Card Slot I/F Connector (160-pin) on the PCI Board

Table C-10 PJ1 Card slot I/F connector pin assignments (160-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	BCVPP	-	6	GND	-
7	BCVCC	-	8	BCVCC	-
9	ACVPP	-	10	ACVCC	-
11	AVCCC	-	12	BCCD1;000	O
13	BCCD2;000	O	14	BCINT;000	O
15	BCREQ;000	O	16	GND	-
17	BCAUDT;100	O	18	BCSTSC;100	O
19	BCGNI;000	I/O	20	BCAD11;100	I/O
21	BCVS1;100	I/O	22	BCVS2;100	I/O
23	BCCBE0;000	I/O	24	BCAD10;100	I/O
25	BCAD13;100	I/O	26	GND	-
27	BCAD15;100	I/O	28	BCRST;000	I
29	BCCLKR;000	I/O	30	BCSERR;000	I/O
31	BCCBE3;000	I/O	32	BCAD27;100	I/O
33	BCAD29;100	I/O	34	BCD2;100	I/O
35	BCAD0;100	I/O	36	GND	-
37	BCAD1;100	I/O	38	BCAD3;100	I/O
39	BCAD5;100	I/O	40	BCAD7;100	I/O
41	BCAD26;100	I/O	42	BCAD25;100	I/O
43	BCAD24;100	I/O	44	BCAD23;100	I/O
45	GND	-	46	BCAD22;100	I/O
47	BCAD21;100	I/O	48	BCAD20;100	I/O
49	BCAD18;100	I/O	50	BCAD28;100	I/O
51	BCAD30;100	I/O	52	BCAD31;100	I/O
53	BCAD2;100	I/O	54	BCAD4;100	I/O
55	GND	-	56	BCAD6;100	I/O
57	BCD14;100	I/O	58	BCAD8;100	I/O
59	BCCBE1;000	I/O	60	BCAD14;100	I/O
61	BCAD9;100	I/O	62	BCAD12;100	I/O
63	BCCBE2;000	I/O	64	BCPAR;100	I/O
65	GND	-	66	BCPERR;000	I/O
67	BCIRDY;000	I/O	68	BCCLK;100	I/O
69	BCAD16;100	I/O	70	BCA18;100	I/O

Table C-10 PJI Card slot I/F connector pin assignments (160-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
71	BCLOCK;000	I/O	72	BCSTOP;000	I/O
73	BCDEVS;000	I/O	74	BCTRDY;000	I/O
75	GND	-	76	BCFRAM;000	I/O
77	BCAD17;100	I/O	78	BCAD19;100	I/O
79	NC	-	80	IPSSWR;000I/O	
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	BCVPP	-	86	GND	-
87	BCVCC	-	88	BCVCC	-
89	ACVPP	-	90	ACVCC	-
91	ACVCC	-	92	ACCD1;000	O
93	ACCD2;000	O	94	ACINT;000	O
95	ACREQ;000	O	96	GND	-
97	ACAUDI;100	O	98	ACSTSC;100	O
99	ACGNT;000	I/O	100	ACAD11;100	I/O
101	ACVS1;100	I/O	102	ACVS2;100	I/O
103	ACCBEO;000	I/O	104	ACAD10;100	I/O
105	ACAD13;100	I/O	106	GND	-
107	ACAD15;100	I/O	108	ACRST;000	I
109	ACCLKR;000	I/O	110	ACSERR;000	I/O
111	ACCBE3;000	I/O	112	ACAD26;100	I/O
113	ACAD25;100	I/O	114	ACAD24;100	I/O
115	ACAD23;100	I/O	116	GND	-
117	ACAD22;100	I/O	118	ACAD21;100	I/O
119	ACAD20;100	I/O	120	ACAD18;100	I/O
121	ACAD28;100	I/O	122	ACAD30;100	I/O
123	ACAD31;100	I/O	124	ACAD2;100	I/O
125	GND	-	126	ACAD4;100	I/O
127	ACAD6;100	I/O	128	ACD14;100	I/O
129	ACAD8;100	I/O	130	ACAD27;100	I/O
131	ACAD29;100	I/O	132	ACD2;100	I/O
133	ACAD0;100	I/O	134	ACAD1;100	I/O
135	GND	-	136	ACAD3;100	I/O
137	ACAD5;100	I/O	138	ACAD7;100	I/O
139	ACCBE1;000	I/O	140	ACAD14;100	I/O



Table C-10 PJI Card slot I/F connector pin assignments (160-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
141	ACAD9;100	I/O	142	ACAD12;100	I/O
143	ACCBE2;000	I/O	144	ACPAR;100	I/O
145	GND	-	146	ACPERR;000	I/O
147	ACIRDY;000	I/O	148	ACCLK;100	I/O
149	ACAD16;100	I/O	150	ACA18;100	I/O
151	ACLOCK;000	I/O	152	ACSTOP;000	I/O
153	ACDEVS;000	I/O	154	ACTRDY;000	I/O
155	GND	-	156	ACFRAM;000	I/O
157	ACAD17;100	I/O	158	ACAD19;100	I/O
159	NC	-	160	IPSSWL;000	I/O

### C.11 PJ2 LCD (STN) I/F Connector (40-pin) on the PCI Board

Table C-11 PJ2 LCD (STN) I/F connector pin assignments (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	SCLK;102	O
3	GND	-	4	LP;102	O
5	FP;102	O	6	ENDATA;102	O
7	GND	-	8	PD4;102	O
9	GND	-	10	PD5;102	O
11	PD22;102	O	12	PD6;102	O
13	GND	O	14	PD7;102	O
15	GND	O	16	PD12;102	O
17	PD13;102	-	18	PD14;102	O
19	GND	-	20	PD15;102	O
21	GND	-	22	PD11;102	O
23	GND	-	24	PD10;102	O
25	PD9;102	O	26	PD8;102	O
27	GND	-	28	PD3;102	O
29	GND	-	30	PD2;102	O
31	PD23;102	O	3	PD1;102	O
33	GND	-	34	PD0;102	O
35	GND	-	36	GND	-
37	GND	-	38	GND	-
39	GND	-	40	GND	-

## C.12 PJ2 LCD (TFT) I/F Connector (20-pin) on the PCI Board

Table C-12 PJ2 LCD (TFT) I/F connector pin assignments (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TECLK;100	O	2	TODD0;000	O
3	TECLK;000	O	4	TODD0;100	O
5	TEVEN2;100	O	6	TODD1;000	O
7	TEVEN2;000	O	8	TODD1;100	O
9	TEVEN1;100	O	10	TODD2;000	O
11	TEVEN1;000	O	12	TODD2;100	O
13	TEVEN0;100	O	14	TOCLK;000	O
15	TEVEN0;000	O	16	TOCLK;100	O
17	GND	-	18	GND	-
19	LCD POW	-	20	LCD POW	-

## C.13 PJ3 FL Inverter I/F Connector (7-pin) on the PCI Board

Table C-13 PJ3 FL inverter I/F connector pin assignments (7-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	FL POW	-	2	FL POW	-
3	GND	-	4	GND	-
5	BRI0	O	6	BRI1	O
7	GND	-			

## C.14 PJ4 CRT I/F Connector (15-pin) on the PCI Board

Table C-14 PJ4 CRT I/F connector pin assignments (15-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	CRED;100	O	2	CGREEN;100	O
3	CBLUE;100	O	4	MONID2	I/O
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	NC	-	10	GND	-
11	MONID0	I/O	12	MONID1	I/O
13	HSYNC	O	14	VSYSN	O
15	MONID3	I/O			

## C.15 PJ5 Serial I/F Connector (9-pin) on the PCI Board

Table C-15 PJ5 Serial I/F connector pin assignments (9-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD1;100	I	2	RXD1;000	I
3	TXD1;010	O	4	DTR1;110	O
5	GND	-	6	DSR1;100	I
7	RTS1;110	O	8	CTS1;100	I
9	RI1;100	I			

## C.16 PJ6 Modem I/F Connector (80-pin) on the PCI Board

Table C-16 PJ6 Modem I/F connector pin assignments (80-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	CBE3;000	I/O	2	CBE2;000	I/O
3	CBE1;000	I/O	4	CBE0;000	I/O
5	DEVSEL;000	I/O	6	GND	-
7	STOP	I/O	8	TRDY;000	I/O
9	IRDY;000	I/O	10	FRAME;000	I/O
11	PAR;100	I/O	12	AD15;100	I/O
13	AD14;100	I/O	14	AD13;100	I/O
15	AD12;100	I/O	16	GND	-
17	AD11;100	I/O	18	AD10;100	I/O
19	AD9;100	I/O	20	AD8;100	I/O
21	AD7;100	I/O	22	AD6;100	I/O
23	AD5;100	I/O	24	AD4;100	I/O
25	GND	-	26	AD3;100	I/O
27	AD2;100	I/O	28	AD1;100	I/O
29	AD0;100	I/O	30	PBCLK;105	O
31	INTC;000	I/O	32	IRQCLK;100	O
33	IRQDT;000	I/O	34	NC	-
35	GND	-	36	NC	-
37	VCC	-	38	VCC	-
39	VCC	-	40	VCC	-
41	AD31;100	I/O	42	AD30;100	I/O
43	AD29;100	I/O	44	AD28;100	I/O
45	AD27;100	I/O	46	GND	-

Table C-16 PJ6 Modem I/F connector pin assignments (80-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
47	AD26;100	I/O	48	AD25;100	I/O
49	AD24;100	I/O	50	AD23;100	I/O
51	AD22;100	I/O	52	AD21;100	I/O
53	AD20;100	I/O	54	AD19;100	I/O
55	AD18;100	I/O	56	GND	-
57	AD17;100	I/O	58	AD16;100	I/O
59	B3V	-	60	B3V	-
61	B3V	-	62	B3V	-
63	MDSL0L;100	O	64	MDSL0R;100	O
65	GND	-	66	MDMSD0;100	O
67	MIC	O	68	MDMSL1;100	I
69	SE	-	70	B5V	-
71	B5V	-	72	B5V	-
73	B5V	-	74	AVCC	-
75	GND	-	76	NC	-
77	IRI;100	I	78	BUFOF3;000	O
79	RCLR3;100	O	80	PCLR3;000	O

### C.17 PJ7 Sound I/F Connector (30-pin) on the PCI Board

Table C-17 PJ7 Sound I/F connector pin assignments (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	CAPLED;100	I	2	ARWLED;100	I
3	NUMLED;100	I	4	CDRLED;000	I
5	NC	-	6	PWRSW;000	O
7	ACPUTR	O	8	INTMIC	O
9	IPSSWL;000	O	10	IPSSWR;000	O
11	AOUTL	O	12	AOUTR	O
13	AUDIO	O	14	MDSL0L;100	O
15	MDSL0R;100	O	16	MDMSD0;100	O
17	MIC	O	18	MDMSL1;100	O
19	SE	-	20	SE	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	AVCC	-	26	AVCC	-
27	NC	-	28	NC	-
29	NC	-	30	NC	-

## C.18 PJ10 Stacking I/F Connector (140-pin) on the PCI Board

Table C-18 PJ10 Stacking I/F connector pin assignments (140-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	DSR1;100	O
3	TXD1;010	I	4	RTS1;110	I
5	DTR1;110	I	6	C32PBK;100	I
7	RTCTRQ;100	I	8	INTA;000	O
9	INTB;000	O	10	INTC;000	O
11	GND	-	12	PGNTF;000	I
13	REQF;000	I/O	14	RCLR;100	O
15	AD15;100	I/O	16	AD14;100	I/O
17	AD13;100	I/O	18	AD12;100	I/O
19	AD11;100	I/O	20	AD10;100	I/O
21	GND	-	22	AD9;100	I/O
23	AD8;100	I/O	24	AD7;100	I/O
25	AD6;100	I/O	26	AD5;100	I/O
27	AD4;100	I/O	28	AD3;100	I/O
29	AD2;100	I/O	30	AD1;100	I/O
31	GND	-	32	AD0;100	I/O
33	CBE3;000	I/O	34	CBE2;000	I/O
35	CBE1;000	I/O	36	CBE0;000	I/O
37	VCC	-	38	VCC	-
39	VCC	-	40	GND	-
41	S1SEL;100	O	42	B3V	-
43	B3V	-	44	S0SEL;100	O
45	CBCLK;100	I	46	PBCLK;102	I
47	PBCLK;105	I	48	PBCLK;101	I
49	C14P3M;102	I	50	GND	-
51	ONVCC;100	O	52	PCLR	O
53	PSUPUT;100	I	54	PSRST;000	I
55	PCMSMI;100	O	56	SCL;100	I/O
57	SDA;100	I	58	PSREQ;000	O
59	PSGNT;000	I	60	GND	-
61	PNLOFF;000	O	62	PCMSPK;100	O
63	PSBEEP;000	O	64	DSKDC	-
65	DSKDC	-	66	DSKDC	-
67	DSKDC	-	68	DSKDC	-

Table C-18 PJ10 Stacking I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	DSKDC	-	70	GND	-
71	GND	-	72	DCD1;100	O
73	CTS1;100	O	74	RXD1;000	O
75	RI1;100	O	76	INLED;100	I
77	RTCBAT	-	78	B5V	-
79	B5V	-	80	REQC;000	O
81	GND	-	82	BUFOFF;100	O
83	PGNTC;000	I	84	IRQDT;000	I/O
85	IRQCLK;100	I	86	PAR;100	I/O
87	STOP;000	I/O	88	DEVSEL;000	I/O
89	TRDY;000	I/O	90	IRDY;000	I/O
91	GND	-	92	FRAME;000	I/O
93	AD31;100	I/O	94	AD30;100	I/O
95	AD29;100	I/O	96	AD28;100	I/O
97	AD27;100	I/O	98	AD26;100	I/O
99	AD25;100	I/O	100	AD24;100	I/O
101	GND	-	102	AD23;100	I/O
103	AD22;100	I/O	104	AD21;100	I/O
105	AD20;100	I/O	106	AD19;100	I/O
107	AD18;100	I/O	108	AD17;100	I/O
109	AD16;100	I/O	110	GND	-
111	B3V	-	112	B3V	-
113	B3V	-	114	B3V	-
115	NC	-	116	FIRTXF;100	I
117	FIRRXF;100	O	118	RSTSW;000	I
119	MCV	-	120	GND	-
121	PNL0;100	I	122	PNL1	O
123	FLTEN;000	I	124	CRTEN;000	I
125	PDNVGA;000	I/O	126	RSTVGA;000	I
127	MONID3;100	I/O	128	MONID2;100	I/O
129	MONID1;100	I/O	130	GND	-
131	MONID0;100	I/O	132	PCONF;100	I
133	DOCPWN;100	O	134	SRING;000	I
135	CVSYNC;100	O	136	CRSYNC;100	O
137	CGREEN;100	O	138	CBLUE;100	O
139	CRED;100	O	140	GND	-

### C.19 PJ11 Stacking I/F Connector (3-pin) on the PCI Board

Table C-19 PJ11 Stacking I/F connector pin assignments (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RTC BAT	-	2	NC	-
3	GND	-			

### C.20 PJ12 Sound I/F Connector (2-pin) on the PCI Board

Table C-20 PJ12 Sound I/F connector pin assignments (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	INTMIC	I	2	SE	-

### C.21 PJ501 DC IN I/F Connector (2-pin) on the PCI Board

Table C-21 PJ501 DC IN I/F connector pin assignments (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DC IN	-	2	GND	-

### C.22 PJ502 Sub-battery I/F Connector (2-pin) on the PCI Board

Table C-22 PJ502 Sub-battery I/F connector pin assignments (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SUB BAT	-	2	GND	-

### C.23 PJ503 $\mu$ -COM I/F Connector (2-pin) on the PCI Board

Table C-23 PJ503  $\mu$ -COM I/F connector pin assignments (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF;000	I	2	GND	-

### C.24 PJ504 Battery I/F Connector (10-pin) on the PCI Board

Table C-24 PJ504 Battery I/F connector pin assignments (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	BATOV1	I	4	GND	-
5	SDA;100	I/O	6	SCL;100	I/O
7	MCV	-	8	DCG1	I/O
9	ATBAT1	I/O	10	BATT1	-

### C.25 PJ505 Battery I/F Connector (8-pin) on the PCI Board

*Table C-25 PJ505 Battery I/F connector pin assignments (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MCV	-	2	BATOV2	I
3	GND	-	4	SDA;100	I/O
5	SCL;100	I/O	6	MCV	-
7	DCG2	I/O	8	ATBAT2	I/O

### C.26 PJ506 Battery I/F Connector (4-pin) on the PCI Board

*Table C-26 PJ506 Battery I/F connector pin assignments (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BATT2	-	2	BATT2	-
3	GND	-	4	GND	-



## C.27 PJ301 PCI Board I/F Connector (160-pin ) on the CardBus Board

Table C-27 PJ301 PCI board I/F connector pin assignments (160-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	BCVPP	-	6	GND	-
7	BCVCC	-	8	BCVCC	-
9	ACVPP	-	10	ACVCC	-
11	ACVCC	-	12	BCCD1;000	I
13	BCCD2;000	I	14	BCINT;000	I
15	BCREQ;000	I	16	GND	-
17	BCAUDI;100	I	18	BCSTSC;100	I
19	BCGNT;000	I/O	20	BCAD11;100	I/O
21	BCVS1;100	I/O	22	BCVS2;100	I/O
23	BCCBE0;000	I/O	24	BCAD10;100	I/O
25	BCAD13;100	I/O	26	GND	-
27	BCAD15;100	I/O	28	BCRST;000	O
29	BCCLKR;000	I/O	30	BCSERR;000	I/O
31	BCCBE3;000	I/O	32	BCAD27;100	I/O
33	BCAD29;100	I/O	34	BCD2;100	I/O
35	BCAD0;100	I/O	36	GND	-
37	BCAD1;100	I/O	38	BCAD3;100	I/O
39	BCAD5;100	I/O	40	BCAD7;100	I/O
41	BCAD26;100	I/O	42	BCAD25;100	I/O
43	BCAD24;100	I/O	44	BCAD23;100	I/O
45	GND	-	46	BCAD22;100	I/O
47	BCAD21;100	I/O	48	BCAD20;100	I/O
49	BCAD18;100	I/O	50	BCAD28;100	I/O
51	BCAD30;100	I/O	52	BCAD31;100	I/O
53	BCAD2;100	I/O	54	BCAD4;100	I/O
55	GND	-	56	BCAD6;100	I/O
57	BCD14;100	I/O	58	BCAD8;100	I/O
59	BCCBE1;000	I/O	60	BCAD14;100	I/O
61	BCAD9;100	I/O	62	BCAD12;100	I/O
63	BCCBE2;000	I/O	64	BCPAR;100	I/O
65	GND	-	66	BCPERR;000	I/O
67	BCIRDY;000	I/O	68	BCCLK;100	I/O

Table C-27 PJ301 PCI board I/F connector pin assignments (160-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	BCAD16;100	I/O	70	BCA18;100	I/O
71	BCLOCK;000	I/O	72	BCSTOP;000	I/O
73	BCDEVS;000	I/O	74	BCTRDY;000	I/O
75	GND	-	76	BCFRAM;000	I/O
77	BCAD17;100	I/O	78	BCAD19;100	I/O
79	NC	-	80	IPSSWR	I/O
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	BCVPP	-	86	GND	-
87	BCVCC	-	88	BCVCC	-
89	ACVPP	-	90	ACVCC	-
91	ACVCC	-	92	ACCD1;000	I
93	ACCD2;000	I	94	AACINT;000	I
95	ACREQ;000	I	96	GND	-
97	ACAUDI;100	I	98	ACSTSC;100	I
99	ACGNT;000	I/O	100	ACAD11;100	I/O
101	ACVS1;100	I/O	102	ACVS2;100	I/O
103	ACCBE0;000	I/O	104	ACAD10;100	I/O
105	ACAD13;100	I/O	106	GND	-
107	ACAD15;100	I/O	108	ACRST;000	I/O
109	ACCLKR;000	I/O	110	ACSERR;000	I/O
111	ACCBE3;000	I/O	112	ACAD26;100	I/O
113	ACAD25;100	I/O	114	ACAD24;100	I/O
115	ACAD23;100	I/O	116	GND	-
117	ACAD22;100	I/O	118	ACAD21;100	I/O
119	ACAD20;100	I/O	120	ACAD18;100	I/O
121	ACAD28;100	I/O	122	ACAD30;100	I/O
123	ACAD31;100	I/O	124	ACAD2;100	I/O
125	GND	-	126	ACAD4;100	I/O
127	ACAD6;100	I/O	128	ACD14;100	I/O
129	ACAD8;100	I/O	130	ACAD27;100	I/O
131	ACAD29;100	I/O	132	ACD2;100	I/O
133	ACAD0;100	I/O	134	ACAD1;100	I/O
135	GND	-	136	ACAD3;100	I/O
137	ACAD5;100	I/O	138	ACAD7;100	I/O
139	ACCBE1;000	I/O	140	ACAD14;100	I/O

Table C-27 PJ301 PCI board I/F connector pin assignments (160-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
141	ACAD9;100	I/O	142	ACAD12;100	I/O
143	ACCBE2;000	I/O	144	ACPAR;100	I/O
145	GND	-	146	ACPERR;000	I/O
147	ACIRDY;000	I/O	148	ACCLK;100	I/O
149	ACAD16;100	I/O	150	ACA18;100	I/O
151	ACLOCK;000	I/O	152	ACSTOP;000	I/O
153	ACDEVS;000	I/O	154	ACTRDY;000	I/O
155	GND	-	156	ACFRAM;000	I/O
157	ACAD17;100	I/O	158	ACAD19;100	I/O
159	NC	-	160	IPSSWL	-

### C.28 PJ302 PCI Board I/F Connector (4-pin ) on the CardBus Board

Table C-28 PJ302 PCI board I/F connector pin assignments (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	IPSSWR	I
3	GND	-	4	IPSSWL	I

### C.29 PJ303 Card Slot I/F Connector (152-pin ) on the CardBus Board

Table C-29 PJ303 Card slot I/F connector pin assignments (152-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A01	GND	-	A02	BCAD0;100	I/O
A03	BCAD1;100	I/O	A04	BCAD3;100	I/O
A05	BCAD5;100	I/O	A06	BCAD7;100	I/O
A07	BCCBE0;000	I/O	A08	BCAD9;100	I/O
A09	BCAD11;100	I/O	A10	BCAD12;100	I/O
A11	BCAD14;100	I/O	A12	BCCBE1;000	I/O
A13	BCPAR;100	I/O	A14	BCPERR;000	I/O
A15	BCGNT;000	I	A16	BCINT;000	O
A17	BCVCC	-	A18	BCVPP	-
A19	BCCLK;100	I	A20	BCIRDY;000	I/O
A21	BCCBE2;000	I/O	A22	BCAD18;100	I/O
A23	BCAD20;100	I/O	A24	BCAD21;100	I/O
A25	BCAD22;100	I/O	A26	BCAD23;100	I/O
A27	BCAD24;100	I/O	A28	BCAD25;100	I/O

Table C-29 PJ303 Card slot I/F connector pin assignments (152-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A29	BCAD26;100	I/O	A30	BCAD27;100	I/O
A31	BCAD29;100	I/O	A32	BCD2;100	I/O
A33	BCCLKR;000	I/O	A34	GND	-
A35	GND	-	A36	BCCD1;000	O
A37	BCAD2;100	I/O	A38	BCAD4;100	I/O
A39	BCAD6;100	I/O	A40	BCD14;100	I/O
A41	BCAD8;100	I/O	A42	BCAD10;100	I/O
A43	BCVS1;100	I/O	A44	BCAD13;100	I/O
A45	BCAD15;100	I/O	A46	BCAD16;100	I/O
A47	BCA18;100	I/O	A48	BCLOCK;000	I/O
A49	BCSTOP;000	I/O	A50	BCDEVS;000	I/O
A51	BCVCC	-	A52	BCVPP	-
A53	BCTRDY;000	I/O	A54	BCFARM;000	I/O
A55	BCAD17;100	I/O	A56	BCAD18;100	I/O
A57	BCVS2;100	I/O	A58	BCRST;000	I
A59	BCSERR;000	O	A60	BCREQ;000	O
A61	BCCBE3;000	I/O	A62	BCAUDI;100	O
A63	BCSTSC;100	O	A64	BCAD28;100	I/O
A65	BCAD30;100	I/O	A66	BCAD31;100	I/O
A67	BCCD2;000	I/O	A68	GND	-
A69	GND	-	A70	GND	-
A71	GND	-	A72	GND	-
A73	GND	-	A74	GND	-
A75	GND	-	A76	GND	-
B01	GND	-	B02	ACAD0;100	I/O
B03	ACAD1;100	I/O	B04	ACAD3;100	I/O
B05	ACAD5;100	I/O	B06	ACAD7;100	I/O
B07	ACCBEO;000	I/O	B08	ACAD9;100	I/O
B09	ACAD11;100	I/O	B10	ACAD12;100	I/O
B11	ACAD14;100	I/O	B12	ACCBE1;000	I/O
B13	ACPAR;100	I/O	B14	ACPERR;000	I/O
B15	ACGNT;000	I	B16	ACINT;000	O
B17	ACVCC	-	B18	ACVPP	-
B19	ACCLK;100	I	B20	ACIRDY;000	I/O
B21	ACCBE2;000	I/O	B22	ACAD18;100	I/O
B23	ACAD20;100	I/O	B24	ACAD21;100	I/O
B25	ACAD22;100	I/O	B26	ACAD23;100	I/O

Table C-29 PJ303 Card slot I/F connector pin assignments (152-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
B27	ACAD24;100	I/O	B28	ACAD25;100	I/O
B29	ACAD26;100	I/O	B30	ACAD27;100	I/O
B31	ACAD29;100	I/O	B32	ACD2;100	I/O
B33	ACCLKR;000	I/O	B34	GND	-
B35	GND	-	B36	ACCD1;000	O
B37	ACAD2;100	I/O	B38	ACAD4;100	I/O
B39	ACAD6;100	I/O	B40	ACD14;100	I/O
B41	ACAD8;100	I/O	B42	ACAD10;100	I/O
B43	ACVS1;100	I/O	B44	ACAD13;100	I/O
B45	ACAD15;100	I/O	B46	ACAD16;100	I/O
B47	ACA18;100	I/O	B48	ACLOCK;000	I/O
B49	ACSTOP;000	I/O	B50	ACDEVS;000	I/O
B51	ACVCC	-	B52	ACVPP	-
B53	ACTRDY;000	I/O	B54	ACFARM;000	I/O
B55	ACAD17;100	I/O	B56	ACAD19;100	I/O
B57	ACVS2;100	I/O	B58	ACRST;000	I
B59	ACSERR;000	I/O	B60	ACREQ;000	O
B61	ACCB3;000	I/O	B62	ACAUDI;100	O
B63	ACSTSC;100	I/O	B64	ACAD28;100	I/O
B65	ACAD30;100	I/O	B66	ACAD31;100	I/O
B67	ACCD2;000	I/O	B68	GND	-
B69	GND	-	B70	GND	-
B71	GND	-	B72	GND	-
B73	GND	-	B74	GND	-
B75	GND	-	B76	GND	-

### C.30 PJ1 LINE IN I/F Connector (6-pin) on the Sound Board

Table C-30 PJ1 LINE IN I/F connector pin assignments (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	AGND0	-	2	LININL	I
3	LINEINR	I	4	AGND0	-
5	AGND0	-	6	AGND0	-

### C.31 PJ3 External I/F Connector (6-pin) on the Sound Board

Table C-31 PJ3 External I/F connector pin assignments (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	AGND0	-	2	EXVMIC;020	I
3	NC	-	4	INTMIK	O
5	EXTMIC;000	I	6	EXTMIC;010	O

### C.32 PJ4 Speaker I/F Connector (4-pin) on the Sound Board

Table C-32 PJ4 Speaker I/F connector pin assignments (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPKLP	-	2	SPKRP	-
3	SPKLM	-	4	SPKRM	-

### C.33 PJ6 LINE OUT I/F Connector (6-pin) on the Sound Board

Table C-33 PJ6 LINE OUT I/F connector pin assignments (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	AGND0	-	2	LINOUTR	O
3	LINOUTL	O	4	AGND0	-
5	AGND0	-	6	AGND0	-

### C.34 PJ7 Headphone I/F Connector (6-pin) on the Sound Board

Table C-34 PJ7 Headphone I/F connector pin assignments (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	AGND0	-	2	HDPHNL	O
3	HDPHNR	O	4	NC	-
5	HPON	O	6	AGND0	-

### C.35 PJ8 PS2 I/F Connector (6-pin) on the Sound Board

Table C-35 PJ8 PS2 I/F connector pin assignments (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MOUSDT	I/O	2	EXKBDT	I/O
3	GND	-	4	VCC	-
5	MOUSCK	I/O	6	EXKBCK	I/O

### C.36 PJ9 Internal Keyboard I/F Connector (25-pin) on the Sound Board

Table C-36 PJ9 Internal keyboard I/F connector pin assignments (25-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ISPX;100	I	2	VCC	-
3	ISPY;100	I	4	ISPX;100	I
5	GND	-	6	ISPY;100	I
7	KBOT00	O	8	KBOT01	O
9	KBOT08	O	10	KBOT07	O
11	KBOT06	O	12	KBOT05	O
13	KBOT04	O	14	KBOT03	O
15	KBOT10	O	16	KBOT09	O
17	KBOT02	O	18	KBRT4	O
19	KBRT7	O	20	KBRT3	O
21	KBRT1	O	22	KBRT0	O
23	KBRT5	O	24	KBRT2	O
25	KBRT6	O			

### C.37 PJ10 Multibox I/F Connector (80-pin) on the Sound Board

Table C-37 PJ10 Multibox I/F connector pin assignments (80-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ISARST;011	O	2	IFHMED;000	I
3	IFWPRO;000	I	4	IFLD2A;000	O
5	AGND0	-	6	MBSTS1;100	I
7	INCDR	I	8	CDRLED	I
9	AGND0	-	10	MBSTS0;100	I
11	INCDL	I	12	DSKCHG;000	I
13	VCC	-	14	VCC	-

Table C-37 PJ10 Multibox I/F connector pin assignments (80-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
15	VCC	-	16	VCC	-
17	VCC	-	18	IFINDX;000	I
19	SA7;100	O	20	IFDASL;000	O
21	GND	-	22	SA6;100	O
23	SA2;100	O	24	GND	-
25	GND	-	26	IFRADY;000	I
27	SA0;100	O	28	IFWDAT;000	O
29	GND	-	30	SA1;100	O
31	IOCS16;000	I	32	GND	-
33	GND	-	34	CDRIRQ;100	I
35	CDACKA	O	36	IFRDAT;000	I
37	GND	-	38	IOCRDY;100	I
39	FIOR;001	I	40	GND	-
41	GND	-	42	FIOW;001	O
43	CDREQA; 100	O	44	IFAMON;000	O
45	GND	-	46	SD0;100	I/O
47	SA15;100	I/O	48	GND	-
49	GND	-	50	SD1;100	I/O
51	SA14;100	I/O	52	IFDIRC;000	O
53	GND	-	54	SD2;100	I/O
55	SA13;100	I/O	56	GND	-
57	GND	-	58	SD3;100	I/O
59	SA12;100	I/O	60	IFSTEP;000	O
61	GND	-	62	SD4;100	I/O
63	SA11;100	I/O	64	GND	-
65	GND	-	66	SD5;100	I/O
67	SA10;100	I/O	68	IFWEN;000	O
69	GND	-	70	SD6;100	I/O
71	SA9;100	I/O	72	GND	-
73	GND	-	74	SD7;100	I/O
75	SA8;100	I/O	76	IFTRK0;000	I
77	GND	-	78	IFSSEL;000	O
79	IORST	O	80	GND	-



### C.38 PJ11 Stacking I/F Connector (140-pin) on the Sound Board

Table C-38 PJ11 Stacking I/F connector pin assignments (140-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	LINEOL;100	O
3	LINEOL;000	O	4	LINEOR;000	O
5	LINEOR;100	O	6	MIKL;100	I
7	MIKL;000	I	8	MIKR;100	I
9	MIKR;000	I	10	CDL;100	I
11	GND	-	12	CDL;000	I
13	CDR;100	I	14	CDR;000	I
15	LINEIL;100	I	16	SA0;100	I
17	SA1;100	I	18	SA2;100	I
19	SA3;100	I	20	SA4;100	I
21	GND	-	22	SA5;100	I
23	SA6;100	I	24	SA7;100	I
25	SD7;100	I/O	26	SD6;100	I/O
27	SD5;100	I/O	28	SD4;100	I/O
29	SD3;100	I/O	30	SD2;100	I/O
31	GND	-	32	SD1;100	I/O
33	SD0;100		34	SA8;100	I/O
35	SA9;100	I/O	36	SA10;100	I/O
37	SA11;100	I/O	38	SA12;100	I/O
39	SA13;100	I/O	40	GND	-
41	SA14;100	I/O	42	SA15;100	I/O
43	SPKVOL;100	I	44	IORST;000	I
45	IOR;000	I	46	IOW;000	I
47	AEN;100	I	48	SNDRST;000	I
49	SNDMUT;000	I	50	GND	-
51	ISARST;100	I	52	ATBEEP;100	I
53	ALARM;100	I	54	MBSTS1;100	O
55	MBSTS0;100	O	56	ALE;100	I
57	FIRRXB;100	O	58	FIRTXB;100	I
59	SDACKD;000	I	60	GND	-
61	SDREQC;100	O	62	SDREQD;100	O
63	KBCCLK;100	I	64	PWRSW;000	I
65	CPUTMP	I	66	VCC	-
67	VCC	-	68	VCC	-

Table C-38 PJ11 Stacking I/F connector pin assignments (140-pin)(continued)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	VCC	-	70	GND	-
71	GND	-	72	JOYDT0;100	I
73	JOYDT1;100	I	74	JOYDT2;100	I
75	JOYDT3;100	I	76	JOYDT4;100	I
77	JOYDT5;100	I	78	JOYDT6;100	I
79	JOYDT7;100	I	80	MIKDIS;100	I
81	GND	-	82	SPKDIS;100	I
83	MOUSDT;100	I/O	84	MOUSCK;100	I/O
85	EXKBDT;100	I/O	86	EXKBCK;100	I/O
87	MIDIOT;100	I/O	88	MIDIIN;100	I
89	LINEIL;000	I	90	LINEIR;000	I
91	GND	-	92	LINEIR;100	I
93	KBOT05;000	I/O	94	KBOT04;000	I/O
95	KBOT03;000	I/O	96	KBOT02;000	I/O
97	KBOT01;000	I/O	98	KBOT00;000	I/O
99	KBOT06;000	I/O	100	KBOT07;000	I/O
101	GND	-	102	KEYPRS;100	O
103	KBUPOT;100	I	104	KBTMG;100	O
105	KBRW;000	O	106	CDRIRQ;100	O
107	SDIRQB;100	O	108	SDIRQA;100	O
109	IRQ12;100	O	110	GND	-
111	KBCCS;000	I	112	CDACKA;000	I
113	CDREQA;100	O	114	FIOW;001	I
115	FIOR;001	I	116	IOCS16;000	O
117	IOCRDY;100	O	118	SDACKC;000	I
119	C14P3M;103	I	120	GND	-
121	KA20M;000	O	122	IRQ1;100	O
123	RSTCPN;000	O	124	IFMMED;000	O
125	IFWPRO;000	O	126	IFLD2A;000	I
127	DSKCHG;000	O	128	IFINDX;000	O
129	IFDASL;000	I	130	GND	-
131	IFRADY;000	O	132	IFWDAT;000	I
133	IFRDAT;000	O	134	IFAMON;000	I
135	IFDIRC;000	I	136	IFSTEP;000	I
137	IFWEN;000	I	138	IFTRKO;000	O
139	IFSSEL;000	I	140	GND	-

### C.39 PJ12 TO PCI Board I/F Connector (30-pin) on the Sound Board

Table C-39 PJ12 TO PCI board I/F connector pin assignments (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	AVCC	-	6	AVCC	-
7	GND	-	8	GND	-
9	GND	-	10	GND	-
11	AGND0	-	12	AGND0	-
13	MDMSDI;100	I	14	MIK	O
15	MDMSDO;100	I	16	MSPKRO;100	I
17	MSPKLO;100	I	18	CAUDIO	I
19	ZVAUXR	I	20	ZVAUXL	I
21	IPSSWR;000	I	22	IPSSWL;000	I
23	INTMIK	I	24	CPUTMP	O
25	PWRSW;000	O	26	NC	-
27	CDRLED;000	O	28	NUMLED;100	O
29	ARWLED;100	O	30	CAPLED;100	O

## Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/3)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
01	' ~	29	A9	0E	F0 0E	
02	1 !	02	82	16	F0 16	
03	2 @	03	83	1E	F0 1E	
04	3 #	04	84	26	F0 26	
05	4 \$	05	85	25	F0 25	
06	5 %	06	86	2E	F0 2E	
07	6 ^	07	87	36	F0 36	
08	7 &	08	88	3D	F0 3D	*2
09	8 *	09	89	3E	F0 3E	*2
10	9 (	0A	8A	46	F0 46	*2
11	0 )	0B	8B	45	F0 45	
12	- _	0C	8C	4E	F0 4E	
13	= +	0D	8D	55	F0 55	
15	BkSp	0E	8E	66	F0 66	
16	Tab	0F	8F	0D	F0 0D	
17	Q	10	90	15	F0 15	
18	W	11	91	1D	F0 1D	
19	E	12	92	24	F0 24	
20	R	13	93	2D	F0 2D	
21	T	14	94	2C	F0 2C	
22	Y	15	95	35	F0 35	
23	U	16	96	3C	F0 3C	*2
24	I	17	97	43	F0 43	*2
25	O	13	98	44	F0 44	*2
26	P	19	99	4D	F0 4D	*2
27	[ {	1A	9A	54	F0 54	
28	] }	1B	9B	5B	F0 5B	
29 (42)	\	2B	AB	5D	F0 5D	*5
30	Caps Lock	3A	BA	58	F0 58	
31	A	1E	9E	1C	F0 1C	
32	S	1F	9F	1B	F0 1B	
33	D	20	A0	23	F0 23	
34	F	21	A1	2B	F0 2B	
35	G	22	A2	34	F0 34	
36	H	23	A3	33	F0 33	
37	J	24	A4	3B	F0 3B	*2
38	K	25	A5	42	F0 42	*2
39	L	26	A6	4B	F0 4B	*2
40	; :	27	A7	4C	F0 4C	*2

Table D-1 Scan codes (set 1 and set 2) (2/3)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
41	' "	28	A8	52	F0 52	
43	Enter	1C	9C	5A	F0 5A	
44	Shift (L)	2A	AA	12	F0 12	
45	No.102 key	56	D6	61	F0 61	
46	Z	2C	AC	1A	F0 1A	
47	X	2D	AD	22	F0 22	
48	C	2E	AE	21	F0 21	
49	V	2F	AF	2A	F0 2A	
50	B	30	B0	32	F0 32	
51	N	31	B1	31	F0 31	
52	M	32	B2	3A	F0 3A	*2
53	, <	33	B3	41	F0 41	*2
54	. >	34	B4	49	F0 49	*2
55	/ ?	35	B5	4A	F0 4A	*2
57	Shift (R)	36	B6	59	F0 59	
58	Ctrl	1D	9D	14	F0 14	*3
60	Alt (L)	38	B8	11	F0 11	*3
61	Space	39	B9	29	F0 29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0 11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0 70	*1
76	Del	E0 53	E0 D3	E0 71	E0 F0 71	*1
79	←	E0 4B	E0 CB	E0 6B	E0 F0 6B	*1
80	Home	E0 47	E0 C7	E0 6C	E0 F0 6C	*1
81	End	E0 4F	E0 CF	E0 69	E0 F0 69	*1
83	↑	E0 48	E0 C8	E0 75	E0 F0 75	*1
84	↓	E0 50	E0 D0	E0 72	E0 F0 72	*1
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0 7D	*1
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0 7A	*1
89	→	E0 4D	E0 CD	E0 74	E0 F0 74	*1
110	Esc	01	81	76	F0 76	

Table D-1 Scan codes (set 1 and set 2) (3/3)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
112	F1	3B	3B	05	F0 05	
113	F2	3C	BC	06	F0 06	
114	F3	3D	BD	04	F0 04	
115	F4	3E	BE	0C	F0 0C	
116	F5	3F	BF	03	F0 03	
117	F6	40	C0	0B	F0 0B	
118	F7	41	C1	83	F0 83	
119	F8	42	C2	0A	F0 0A	
120	F9	43	C3	01	F0 01	
121	F10	44	C4	09	F0 09	
122	F11	57	D7	78	F0 78	*3
123	F12	58	D8	07	F0 07	*3
124	PrintSc	*6	*6	*6	*6	*6
126	Pause	*7	*7	*7	*7	*7
202	Fn	—	—	—	—	*4

**Notes:**

- 1\* Scan codes differ by mode.
- 2\* Scan codes differ by overlay function.
- 3\* Combination with **Fn** key makes different codes.
- 4\* **Fn** key does not generate a code by itself.
- 5\* This key corresponds to key No. 42 in 102-key model.
- 6\* Refer to table D-6, scan codes with **Ctrl** key.
- 7\* Refer to table D-7, scan codes with **Alt** key.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12
80	Home	E0 A E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12

*Note: The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as below:*

	<i>With left <b>Shift</b></i>	<i>With right <b>Shift</b></i>
<i>Set 1</i>	<i>E0 AA</i>	<i>E0 B6</i>
	<i>E0 2A</i>	<i>E0 36</i>
<i>Set 2</i>	<i>E0 F0 12</i>	<i>E0 F0 59</i>
	<i>E0 12</i>	<i>E0 59</i>

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
75	INS	E0 2A E0 52	E0 02 E0 AA	E0 12 E0 70	E0 F0 70 E0 F0 12
76	DEL	E0 2A E0 53	E0 D3 E0 AA	E0 12 E0 71	E0 F0 71 E0 F0 12
79	←	E0 2A E0 4B	E0 CB E0 AA	E0 12 E0 6B	E0 F0 6B E0 F0 12
80	Home	E0 2A E0 47	E0 C7 E0 AA	E0 12 E0 6C	E0 F0 6C E0 F0 12
81	End	E0 2A E0 4F	E0 CF E0 AA	E0 12 E0 69	E0 F0 69 E0 F0 12
83	↑	E0 2A E0 48	E0 C8 E0 AA	E0 12 E0 75	E0 F0 75 E0 F0 12
84	↓	E0 2A E0 50	E0 D0 E0 AA	E0 12 E0 72	E0 F0 72 E0 F0 12
85	PgUp	E0 2A E0 49	E0 C9 E0 AA	E0 12 E0 7D	E0 F0 7D E0 F0 12
86	PgDn	E0 2A E0 51	E0 D1 E0 AA	E0 12 E0 7A	E0 F0 7A E0 F0 12
89	→	E0 2A E0 4D	E0 CD E0 AA	E0 12 E0 74	E0 F0 74 E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2		
		Make	Break	Make	Break	
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A	
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14	
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11	
121	ARROW	05	C5	77	F0 77	
122	NUMERIC	05	C5	7E	F0 7E	

Table D-5 Scan codes in overlay mode

Cap No.	Keytop	Code set 1		Code set 2		
		Make	Break	Make	Break	
08	7 (7)	47	C7	6C	F0 6C	
09	8 (8)	48	C8	75	F0 75	
10	9 (9)	49	C9	7D	F0 7D	
11	0 (*)	37	B7	7C	F0 7C	
23	U (4)	4B	CB	6B	F0 6B	
24	I (5)	4C	CC	73	F0 73	
25	O (6)	4D	CD	74	F0 74	
26	P (-)	4A	CA	7B	F0 7B	
37	J (1)	4F	CF	69	F0 69	
38	K (2)	50	D0	72	F0 72	
39	L (3)	51	D1	7A	F0 7A	
40	; (+)	4E	CE	79	F0 79	
52	M (0)	52	D2	70	F0 70	
53	, (.)	33	B3	41	F0 41	
54	(.)	53	D3	71	F0 71	
55	/ (/)	E0 35	E0 B5	40 4A	E0 F0 4A	

Table D-6 Scan codes with Ctrl key

Key top	Shift	Code set 1		Code set 2		
		Make	Break	Make	Break	
Prt Sc	Common	E0 2A E0 37	E0 B7 E0 AA	E0 12 E0 7C	E0 F0 7C E0 F0 12	
	Ctrl*	E0 37	E0 B7	E0 7C	E0 F0 7C	
	Shift*	E0 37	E0 B7	E0 7C	E0 F0 7C	
	Alt*	54	D4	84	F0 B4	

Table D-7 Scan codes with Alt key

Key top	Shift	Code set 1			Code set 2			
		Make			Make			
Pause	Common	E1 ID 45	E1 SD C5	E1 14 77	E1 F0 14	F0 77		
	Ctrl*	E0 46	E0 C6	E0 7E	E0 F0 7E			

\*: This key generates only make codes.



# Appendix E Key Layout

## E.1 United States (US) Keyboard

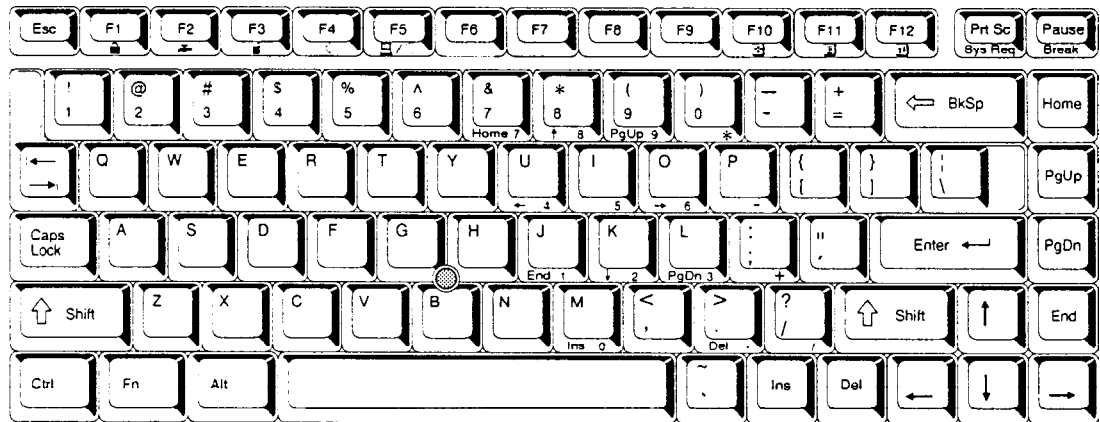


Figure E-1 US keyboard

## E.2 United Kingdom (UK) Keyboard

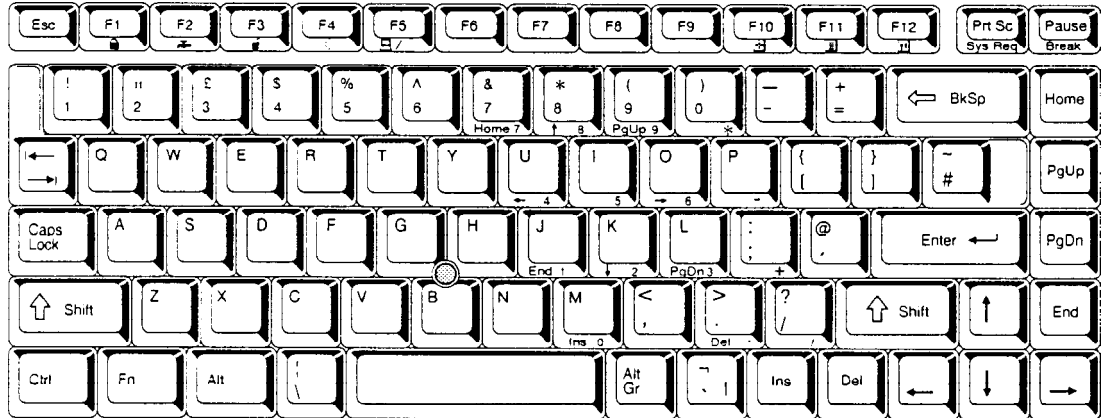


Figure E-2 UK keyboard

### E.3 German (GR) Keyboard

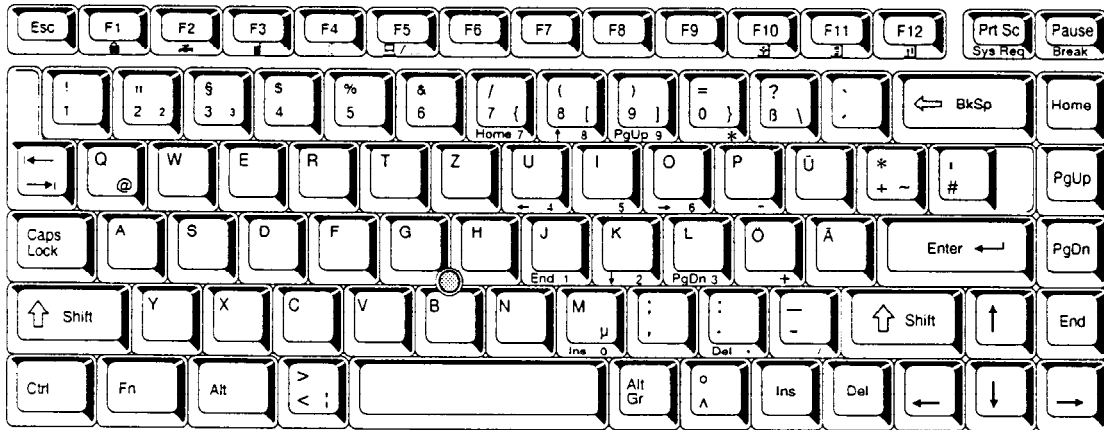


Figure E-3 GR keyboard

### E.4 French (FR) Keyboard

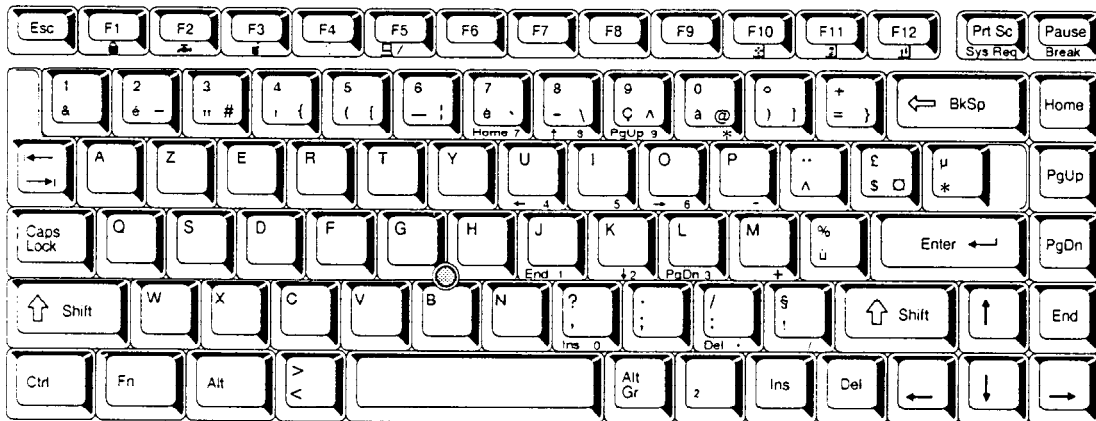
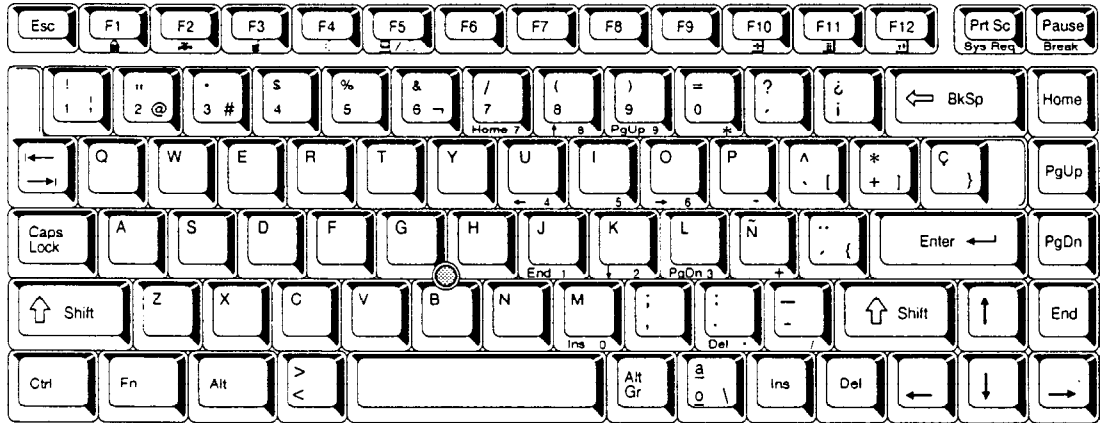


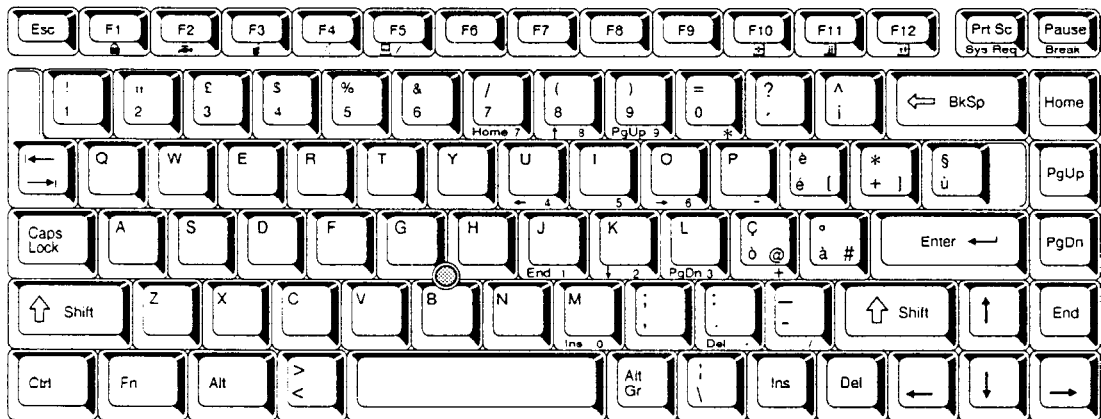
Figure E-4 FR keyboard

## E.5 Spanish (SP) Keyboard



*Figure E-5 SP keyboard*

## E.6 Italian (IT) Keyboard



*Figure E-6 IT keyboard*

## E.7 Scandinavian (SC) Keyboard

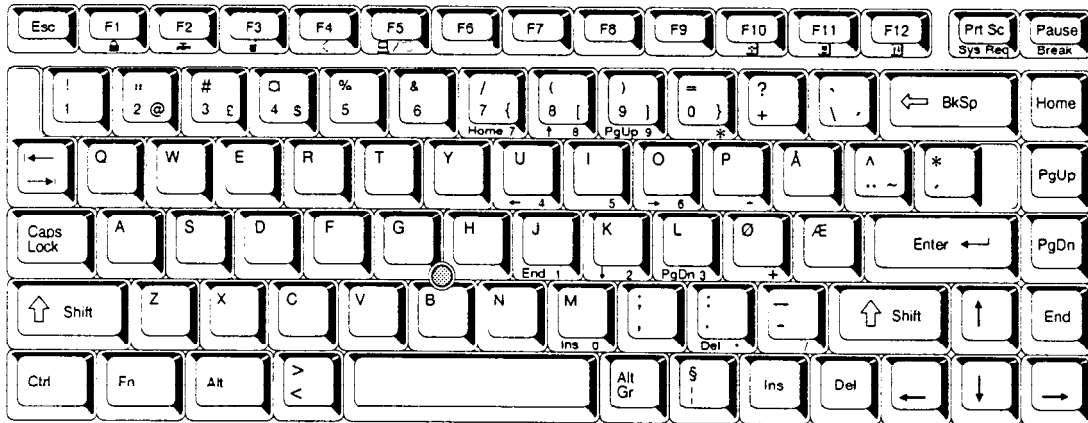


Figure E-7 SC keyboard

## E.8 Swiss-German (SL) Keyboard

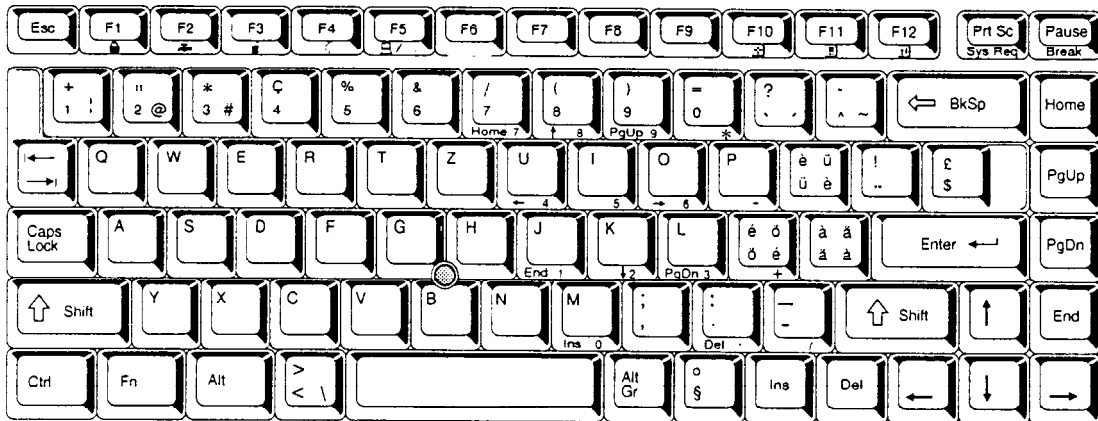
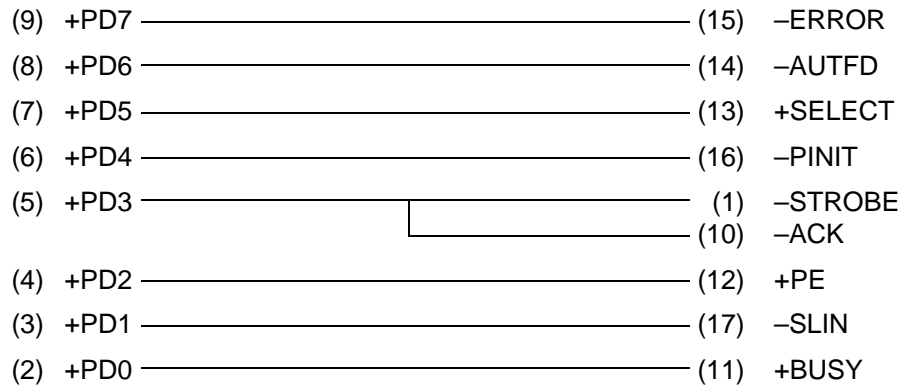


Figure E-8 SL keyboard

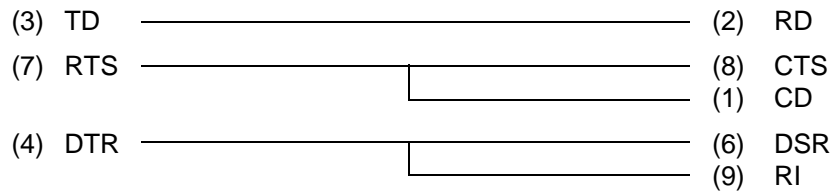
## Appendix F Wiring Diagrams

### F.1 Printer Wraparound Connector



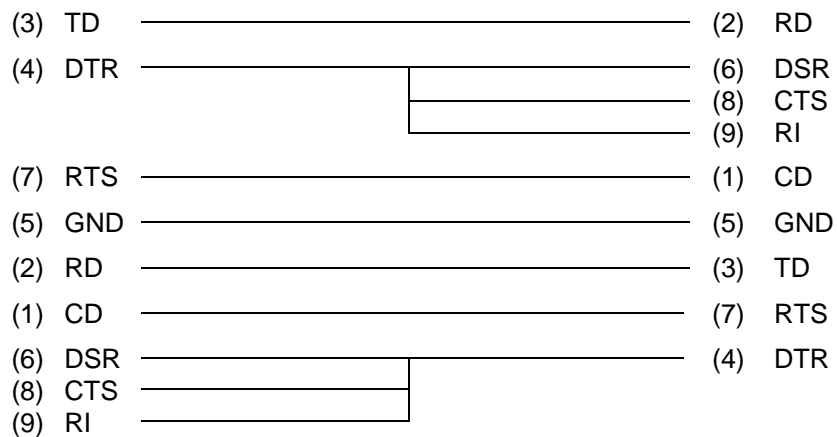
*Figure F-1 Printer wraparound connector*

### F.2 RS-232-C Wraparound Connector



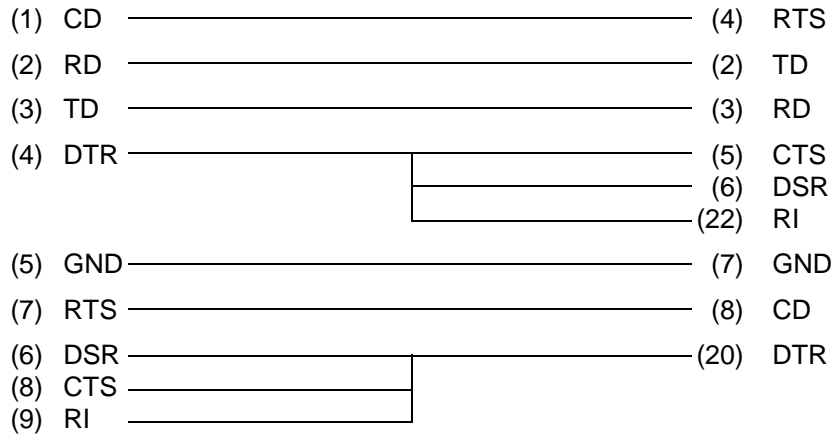
*Figure F-2 RS-232-C wraparound connector*

### F.3 RS-232-C Direct Cable (9-Pin to 9-Pin)



*Figure F-3 RS-232-C direct cable (9-pin to 9-pin)*

#### F.4 RS-232-C Direct Cable (9-Pin to 25-Pin)



*Figure F-4 RS-232-C direct cable (9-pin to 25-pin)*

## Appendix G BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

### Tools

To rewrite the BIOS, you need the following tool:

- Diagnostics disk for the computer

### Rewriting the BIOS

***NOTE:** To rewrite the BIOS, use the FDD either in the Selectable Bay or attached to the external FDD port.*

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Turn on the power while holding down the **F12** key. (Keep holding the key down until the system speaker sounds a beep.)
5. When the message is displayed, insert the diagnostics disk into the FDD. Press **Enter** to start the BIOS rewrite.
6. When the BIOS rewrite is finished, eject the diagnostics disk and press the reset switch to restart the system.