Toshiba Personal Computer

Satellite R10

Maintenance Manual

TOSHIBA CORPORATION

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Toshiba Satellite R10 Maintenance Manual

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Disclaimer

Trademarks

Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite R10, referred to as Satellite R10 in this manual.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

> *DANGER: "Danger" indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.*

> *WARNING: "Warning" indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.*

> *CAUTION: "Caution" indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.*

> *NOTE: "Note" contains general information that relates to your safe maintenance service.*

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

❑ Be sure to fasten screws securely with the right screwdriver. Be sure to use the PH Point size "0" and "1" screwdrivers complying with the ISO/DIS 8764-1:1996. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

      Chapter 1   Hardware Overview describes the Satellite R10 system unit and each FRU.

      Chapter 2   Troubleshooting Procedures explains how to diagnose and resolve FRU problems.

      Chapter 3   Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.

      Chapter 4   Replacement Procedures describes the removal and replacement of the FRUs.

      Appendices   The appendices describe the following:

- Handling the LCD module
- Board layout
- Pin assignment
- Keyboard scan/character codes
- Key layout
- Wiring Diagrams
- BIOS Rewrite Procedures
- EC/KBC Rewrite Procedures
- Reliability

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the Satellite R10 that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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Chapter 4   Replacement Procedures

Appendices

Chapter 1

Hardware Overview

Chapter 1   Contents

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1.1   Features

The Satellite R10 is an ultra thin and lightweight tablet PC realizing cable-less environment on a table by wireless function with a Pentium-M/Celeron-M processor realizing high performance.

❑   Microprocessor

Microprocessor that is used will be different of the model.

➢   Intel $^®$ Mobile Pentium $^®$-M

Pentium-M   1.60GHz (Processor Number ; 725)
1.70GHz (Processor Number ; 735)
1.80GHz (Processor Number ; 745)
2.00GHz (Processor Number ; 755)

L1 cache : 64KB (32KB + 32KB)
L2 cache : 2MB

➢   Intel $^®$ Mobile Celeron $^®$-M

Celeron-M   1.30GHz (Processor Number ; 350)
1.40GHz (Processor Number ; 360)

L1 cache : 64KB (32KB + 32KB)
L2 cache : 1MB

❑   Chipset

Equipped with Intel 855GME (Montara-GM+) as North Bridge, Intel ICH4-M as South Bridge and Texas Instrument PCI7411ZHK as Card Controller.

❑   GPU Controller

Internal graphic controller in north bridge. VRAM 16-64MB

❑   Memory

Two DDR SO-DIMM slots support DDR333/DDR226. Memory modules can be installed to a maximum of 2GB (2,048MB). Memory modules in 256MB, 512MB and 1GB sizes are available.

❑   HDD

Single 40/60/80/100GB internal drive. 2.5-inch x 9.5mm height

❑ Selectable Bay

Supporting hotswap with DVD-ROM drive, DVD-ROM & CD-R/RW drive, DVD Super Multi drive and 2nd HDD adapter.

❑ USB FDD

3.5 inch USB FDD supports 720KB/1.44MB formats.

❑ Display

Display swivels automatically 0/90/180/270 degrees by display driver. LCD and CRT can be displayed at the same time.

LCD   Built-in 14.1 inch, 16M colors, XGA (1,024×768 dots), thin type low temperature poly-silicon TFT color display.

CRT   Supported via an RGB connector

TV-out Supported via an S-Video connector

❑ Digitizer

Digitizer is installed at the rear of LCD unit. The supplied tablet pen enables pen computing.

❑ Keyboard

Keyboard has 85(US)/86(UK)-key and supports Windows key and Hot key.

❑ Touch pad

Touch pad is installed as a pointing device.

❑ Tablet pen (Tablet PC pen)

Tablet pen can be used as a mouse by touching the display softly with the pen tip. Tablet button on the side of the pen corresponds to the right click of the mouse. Erase button on the pen tail can be used as an eraser depending on the application.

❑ Batteries

The computer has two batteries: a rechargeable Lithium-Ion main battery pack and an RTC battery (that backs up the Real Time Clock and CMOS memory).

❑ USB (Universal Serial Bus)

Three USB ports are usable. The ports comply with the USB2.0 standard, which enables data transfer speeds 40 times faster than USB1.1 standard. USB1.1 is also supported.

❑ PC card slot

The PC card slot (PCMCIA) accommodates one 5mm Type II card. (Based on PC Card Standard, supporting CardBus)

❑ SD card slot

A SD Card Slot can accommodate Secure Digital flash memory cards with various capacities. Supporting memory card and I/O card.

❑ Sound system

The sound system is equipped with the following features:

- Built in stereo speakers
- Built-in monaural microphone
- Stereo Headphone jack (3.5mm mini headphone jack)
- External microphone jack (3.5mm mini microphone jack)

❑ Switch/Button

Windows Security tablet button, ESC/Rotation button, Cross Function button, Toshiba Assist button and Wireless communication switch are available.

❑ Internal Modem

The internal modem is equipped as a modem daughter card (MDC).

The internal modem provides capability for data and fax communication and supports ITU-T V.90 standard. For data reception it operates at 56Kbps and for data transmission it operates at 33.6Kbps. For fax transmission, it operates at 14,4Kbps. The speed of data transfer and fax depends on analog telephone line condition. It has an RJ11 modem jack for connecting to a telephone line.

❑ LAN

The internal LAN supports 10/100Mbit Ethernet.

❑   Wireless LAN

Wireless LAN Card can be equipped with mini-PCI slot. Based on IEEE802.11b/g, a/b/g with 2.45GHz/5.0GHz Dual-band antenna.

❑   i.LINK (IEEE1394)

This port enables high-speed data transfer directly from external devices such as digital video cameras.

❑   Docking port

Advanced Port Replicator III can be connected through docking port on the bottom.

Figure 1-1 shows the front of the computer and Figure 1-2 shows the system units configuration.

Figure 1-1 Front of the computer
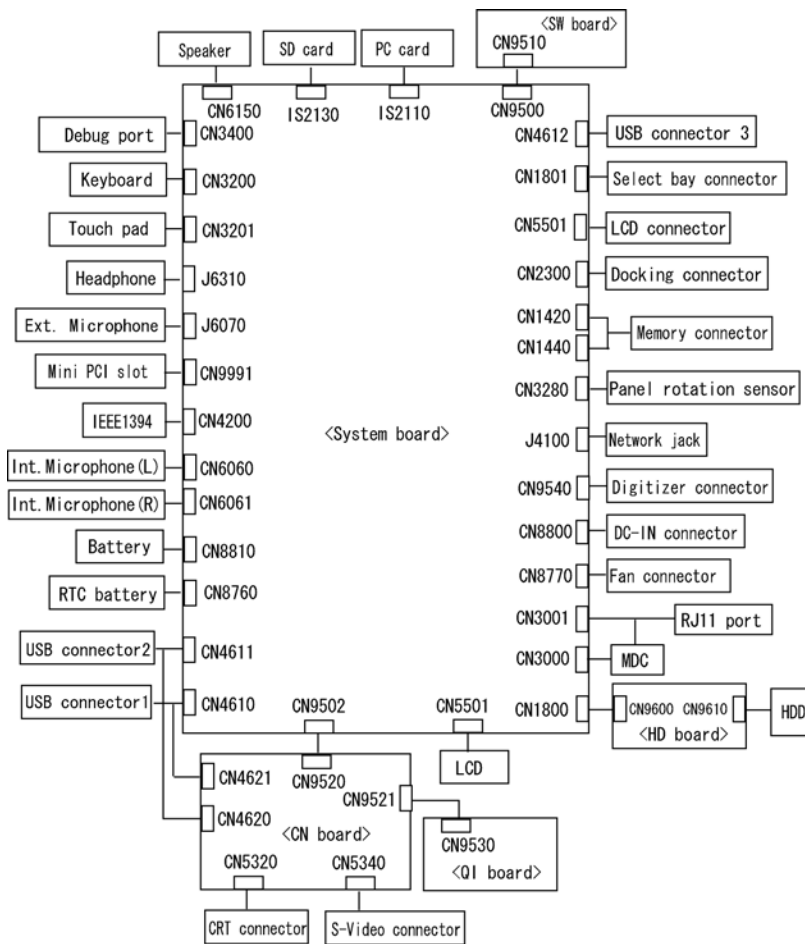
Figure 1-2 System units configuration

Figure 1-3 shows the system block diagram.
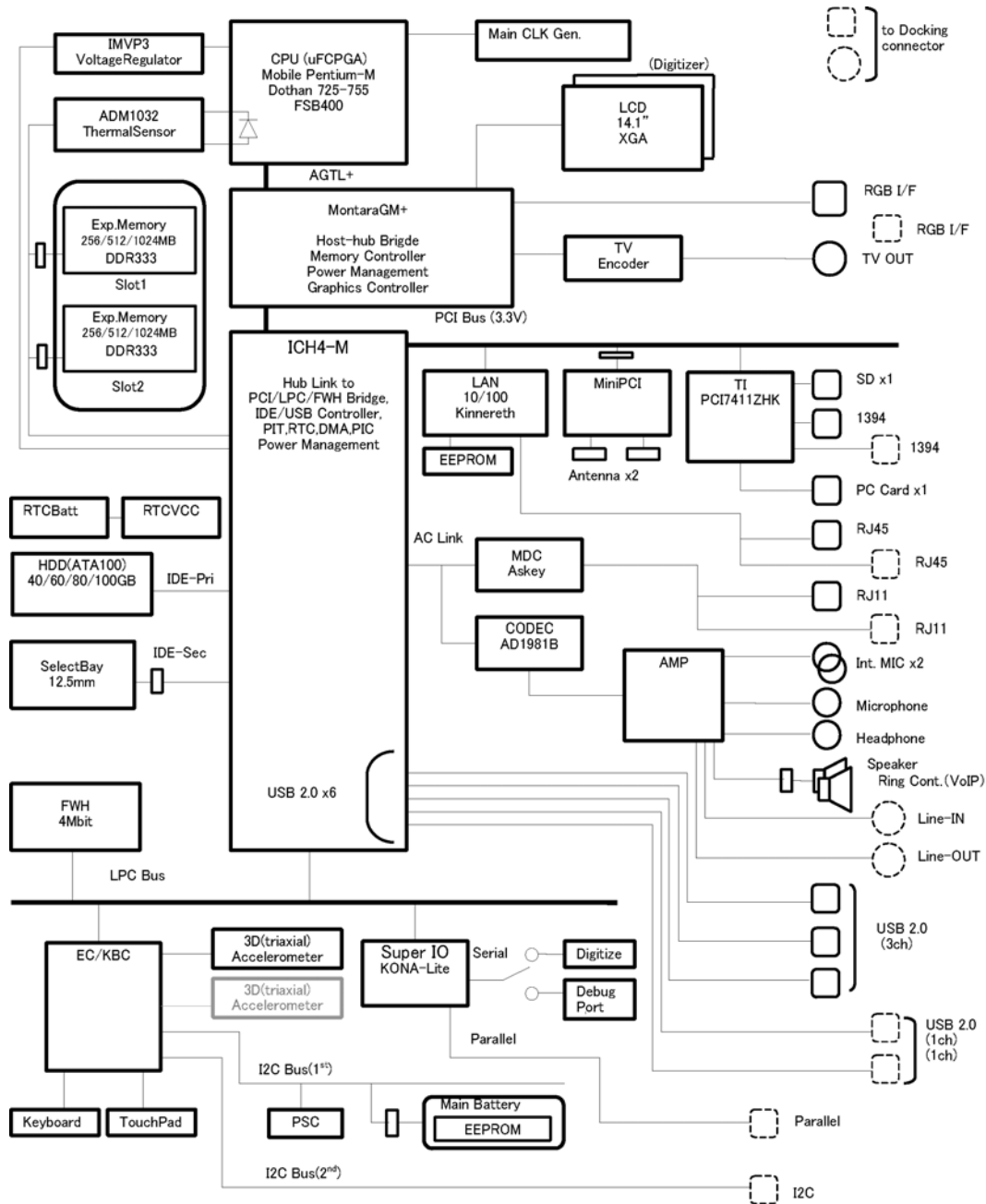
Figure 1-3 System Block Diagram

The PC contains the following components.

❑ CPU

➢ Intel ® Mobile Pentium ®-M Processor 1.60GHz (Processor Number ; 725)
1.70GHz (Processor Number ; 735)
1.80GHz (Processor Number ; 745)
2.00GHz (Processor Number ; 755)

     Core voltage   : 1.05V
     FSB   : 400MHz
     L1 cache   : 64KB [32KB (Code) + 32KB (Data)]
     L2 cache   : 2MB
     Support   : Enhanced Intel® SpeedStep technology

➢ Intel ® Mobile Celeron ®-M Processor 1.30GHz (Processor Number ; 350)
1.40GHz (Processor Number ; 360)

     Core voltage   : 0.748V
     FSB   : 400MHz
     L1 cache   : 64KB [32KB (Code) + 32KB (Data)]
     L2 cache   : 1MB

❑ Memory

Two DDR SO-DIMM slots support DDR333/DDR226. Memory modules in 256MB, 512 MB and 1GB can be installed to a maximum of 2GB (2,048MB).

     2.5V operation
     200 pin, SO Dual In-line Memory Modules (SO-DIMM)
     Supports PC2700/PC2100

❑ BIOS ROM (Flash memory)

     4Mbit (256K×16-bit chip)
         - 64KB used for logo
         - 64KB used for setup and checksum
         - 128KB used for system BIOS
         - 64KB used for VGA-BIOS
         - 64KB used for ACPI
         - 8KB used for PnP
         - 8KB used for password security
         - 16KB used for booting
         - 64KB used for LAN
         - 32KB are reserved
     5.0V operation
     Access time : 120 ns or 90 ns
     Data transfer: 8-bit

❑   PCI chipset

This gate array incorporates the following elements and functions

Intel 855GME (Montara-GM+) (North Bridge)
- Dothan Processor System Bus Support
- DRAM Controller supporting DDR333/DDR266, 2GB max
- Accelerated Graphics Port Interface: adheres to AGP2.0, AGP×4 mode
- Hub Link Interface
- 732-ball 37.5×37.5 mm FC-BGA package

Intel ICH4-M (South Bridge)
- Hub Link Interface
- PCI Rev2.2 Interface (6 PCI REQ/GNT Pairs)
- BusMaster IDE Controller (Ultra ATA 100/66/33)
- USB 1.1/2.0 Controller 6 Ports (EHCI: Enhanced Host Controller)
- I/O APIC (ACPI 1.06)
- SMBus2.0 Controller
- FWH Interface (BIOS)
- LPC Interface (EC/KBC, Super I/O)
- IRQ Controller
- Serial Interrupt Controller
- Power Management Controller
- Deeper Sleep (C4) Support
- Suspend/Resume Control
- AC'97 2.2 Interface
- Internal RTC
- Internal LAN Controller (WfM2.0)
- 421-ball 31×31mm BGA Package

❑   PC Card Controller (Texas Instruments-made PCI7411ZHK)

PCI interface
CardBus/Ultra Media controller
SD card controller
IEEEE1394 controller
288-ball (16x16x1.4) BGA package

❑   GPU controller (Internal graphic controller)

VRAM 16-64MB
AGP V2.0 standard x4 mode
LCD I/F LVDS 2ch
S-video support

❑ Batteries

The main battery is a detachable lithium-ion main battery (10.8V, 4700mAh, 6 cell) and the RTC battery is a lithium ion battery (2.4V-16mAh).

❑ Modem controller

Supported by MDC. Using of the secondary AC97 Line

❑ LAN controller (ICH4-M Kinnerth 82562EP)

Controls LAN and supports 100BASE-TX (Fast Ethernet)/10BASE-T (Ethernet).

❑ Other main system chips

- EC/KBC (Mitsubishi-made LPC microcontroller M306K5F8LRP)
- PSC (Toshiba-made TMP87PM48UG)
- Temperature sensor (ADM-made ADM1032ARMZ)
- Acceleration sensor (ST Micro-made LIS3L02AQ)
- Super I/O (SMSC-made LPC47N217-JN)
- SOUND CODEC (ADM-made AD1981B)
- AMP (Matsushita-made MM1667XHFE) + HP AMP (MAX4410)
- CLK Generator (ICS-made ICS950812CGLFT)

1.2   2.5-inch Hard Disk Drive

A compact, high-capacity HDD with a height of 9.5mm contains a 2.5-inch magnetic disk and magnetic heads.

Figure 1-4 shows a view of the 2.5-inch HDD and Tables 1-1 and 1-2 list the specifications.
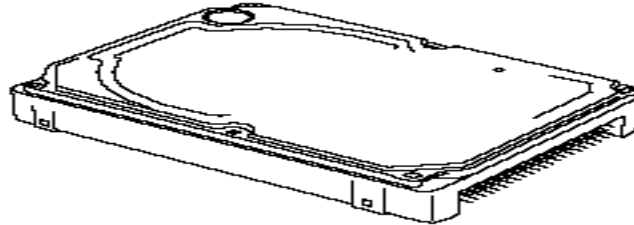
Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions

Parameter		Standard value			
		TOSHIBA HDD2188BZE02	TOSHIBA HDD2189BZE02	TOSHIBA HDD2190BZE02	TOSHIBA HDD2D08BZE02
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100			
	Weight (g)	99 (max)	95		102 (max)

Parameter		Standard value			
		HGST G8BC0001E411	HGST G8BC0001N611	HGST G8BC0001N811	HGST G8BC0001NA10
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	95 (max)			102 (max)

Table 1-2 2.5-inch HDD Specifications

Parameter	Specification			
	TOSHIBA HDD2190BZE02	TOSHIBA HDD2189BZE02	TOSHIBA HDD2188BZE02	TOSHIBA HDD2D08BZE02
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	4,200			5,400
Data transfer speed (Mbits/s)	175.0-341.7			230.6-445.9
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density(Kbpi)	735	-	735(max)	756
Track density (Ktpi)	96	88.1		110
Average seek time (Read) (ms)	12			
Average seek time (Write) (ms)	12			
Start time (sec)	4.0			

Parameter	Specification			
	HGST G8BC0001E411	HGST G8BC0001N611	HGST G8BC0001N811	HGST G8BC0001NA10
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	4,200			5,400
Data transfer speed (Mbits/s)	512	493		
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density(Kbpi)	702	717		764
Track density (Ktpi)	96	96.6		113.2
Average seek time (Read) (ms)	12			
Average seek time (Write) (ms)	14			
Start time (sec)	3.0	3.5		

1.3   Optical Drive

1.3.1 DVD-ROM Drive

The DVD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM and CD-R/RW and DVD-RAM (read-only).

The DVD-ROM drive is shown in Figure 1-5. The dimensions and specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-3, Table 1-4.

Figure 1-5 DVD-ROM drive

Table 1-3 DVD-ROM drive outline dimensions

Parameter		Standard value		
Outline dimensions	Maker (code)	TSST (G8CC0000R410)	TSST (G8CC0002B410)	TEAC (G8CC0002E410)
	Width (mm)	128±0.2		128
	Height (mm)	12.7±0.2 (excluding projections)		12.7
	Depth (mm)	126.1		129.4
	Mass (g)	200	170	180

Table 1-4 DVD-ROM drive specifications (1/3)

Parameter		Drive Specification
		TSST (G8CC0000R410)
Data transfer speed	Read	DVD-ROM(Single-L) MAX 8x(CAV) [MAX 10820KB/s] DVD-ROM(Double-L) MAX 6x(CAV) [MAX 8112KB/s] DVD-VIDEO(CSS) MAX 4x(CAV) [MAX 5408KB/s] DVD-R/RW MAX 4x(CAV) [MAX 5408KB/s] DVD-RAM(Ver1.0) MAX 2x(ZCLV) [MAX 2704KB/s] DVD-RAM(Ver2.1) MAX 1x(ZCLV) [MAX 2704KB/s] CD(Mode1) MAX 5.7x(PCAV) [MAX 855KB/s] MAX 24x(CAV) [MAX 3600KB/s] CD(Mode2) MAX 5.7x(PCAV) [MAX 975.3KB/s] MAX 24x(CAV) [MAX 4104KB/s] CD-RW MAX 8.6x(CLV) [MAX 1293KB/s]
	ATAPI interface (MB/s)	PIO mode16.7 MB/s PIO-MODE4 supported DMA mode16.7 MB/s MultiwordDMA-MODE2 supported Ultra DMA mode 33.3 MB/s UltraDMA-MODE2 supported
Access time (ms)	CD-ROM	95 (Random)
	DVD-ROM	100 (Random)
	DVD-RAM	170 (Random)
Buffer memory		192KByte
Supported disk format	CD	CD-Audio, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge(Photo-CD, Video-CD), Multi-session CD(Photo-CD, CD-EXTRA, CD-R, CD-RW), CD-R(read), CD-RW (read)
	DVD	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (read), DVD-RW (read), DVD-RAM (read, Version2.1), DVD-RAM (read, Version1.0)

Table 1-4 DVD-ROM drive specifications (2/3)

Parameter		Drive Specification
		TSST (G8CC0002B410)
Data transfer speed	Read	DVD-ROM(Single-L) MAX 8x(CAV) [MAX 10816KB/s] DVD-ROM(Double-L) MAX 6x(CAV) [MAX 8112KB/s] DVD-R/-RW MAX 4x(CAV) [MAX 5408KB/s] DVD+R/+RW MAX 4x(CAV) [MAX 5408KB/s] DVD-RAM(Ver2.1) MAX 2x(ZCLV) [MAX 2704KB/s] CD(Mode1) MAX 24x(CAV) [MAX 3600KB/s] CD(Mode2) MAX 24x(CAV) [MAX 4104KB/s] CD-DA(Mode1) MAX 10x(CLV) [MAX 1500KB/s] CD-DA(Mode2) MAX 10x(CLV) [MAX 1710KB/s]
	ATAPI interface (MB/s)	PIO mode16.7 MB/s PIO-MODE4 supported DMA mode16.7 MB/s MultiwordDMA-MODE2 supported Ultra DMA mode 33.3 MB/s UltraDMA-MODE2 supported
Access time (ms)	CD-ROM	110 (Random)
	DVD-ROM	110 (Random)
	DVD-RAM	140 (Random)
Buffer memory		256KByte
Supported disk format	CD	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge(Photo-CD, Video-CD), Multi-session CD(Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio),CD-R, CD-RW
	DVD	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (Ver1.0, Ver2.1), DVD-RW (Ver1.0, Ver1.1), DVD+R, DVD+RW, DVD-RAM (Version2.1)

Table 1-4 DVD-ROM drive specifications (3/3)

Parameter		Drive Specification
		TEAC (G8CC0002E410)
Data transfer speed	Read	DVD-ROM MAX 8x(CAV) [MAX 4594KB/s] DVD-VIDEO MAX 4x(CAV) [MAX 2297KB/s] DVD-R/RW MAX 8x(CAV) [MAX 4594KB/s] DVD-RAM(4.7GB) MAX 5x(CAV) [MAX 3246KB/s] DVD-RAM(2.6GB) MAX 2.5x(CAV) [MAX 1626KB/s] CD(Mode1) MAX 24x(CAV) [MAX 5137KB/s] CD(Mode2) MAX 20x(CAV) [MAX 4280KB/s] CD-RW MAX 24x(CLV) [MAX 5137KB/s]
	ATAPI interface (MB/s)	PIO mode16.7 MB/s PIO-MODE4 supported DMA mode16.7 MB/s MultiwordDMA-MODE2 supported Ultra DMA mode 33.3 MB/s UltraDMA-MODE2 supported
Access time (ms)	CD-ROM	120 (Random)
	DVD-ROM	130 (Random)
Buffer memory		-
Supported disk format	CD	CD-DA, CD-ROM MODE1, CD-ROM MODE2, Multi-session CD, CD, CD-I, Video-CD, Enhanced CD, CD-TEXT, Photo-CD, addressing Method 2
	DVD	DVD-R (General, Authoring, Single/Multi-boarder), DVD-Video, DVD-RW (Single/Multi-boarder, Packet), DVD-RAM (4.7GB, 2.6GB), DVD+R/RW (Single/Multi-boarder, Packet)

1.3.2 DVD-ROM & CD-R/RW Drive

The DVD-ROM & CD-R/RW drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM and CD-R/RW.

The DVD-ROM & CD-R/RW drive is shown in Figure 1-6. The dimensions and specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-5, Table 1-6.

Figure 1-6 DVD-ROM & CD-R/RW drive

Table 1-5 DVD-ROM & CD-R/RW drive outline dimensions

Parameter		Standard value	
Outline dimensions	Maker (code)	PCC (G8CC0001X410)	TEAC (G8CC0001Y411)
	Width (mm)	128	
	Height (mm)	12.7 (excluding projections)	
	Depth (mm)	129.0	
	Mass (g)	190±10	

Table 1-6 DVD-ROM & CD-R/RW drive specifications (1/2)

Parameter		Drive Specification
		PCC (G8CC0001X411)
Data transfer speed	Read	DVD-ROM MAX 8x(CAV) [MAX 10800 KB/s] CD-ROM MAX 24x(CAV) [MAX 3600 KB/s]
	Write	CD-R 4x/8x(CLV), 16x(PCAV), MAX24x(CAV) CD-RW 4x(CLV) High Speed CD-RW 4x/8x/10x(CLV) Ultra Speed CD-RW 10x(CLV), MAX24x(CAV)
	ATAPI interface (MB/s)	PIO mode16.6 MB/s PIO MODE4 supported DMA mode16.6 MB/s Multiword MODE2 supported Ultra DMA mode 33.3 MB/s Ultra DMA MODE2
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA,CD-ROM,CD-ROM XA Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-R (DVD-R Multi-boarder supported) DVD-RW(Ver.1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM(2.6GB/4.7GB), DVD+R, DVD+RW

Table 1-6 DVD-ROM & CD-R/RW drive specifications (2/2)

Parameter		Drive Specification
		TEAC (G8CC0001Y411)
Data transfer speed	Read	DVD-ROM MAX 8x(CAV) [MAX 10800 KB/s] CD-ROM MAX 24x(CAV) [MAX 3600 KB/s]
	Write	CD-R 4x/8x(CLV), 16x(PCAV), MAX 24x(CAV) CD-RW 4x(CLV) High Speed CD-RW 4x/8x/10x(CLV) Ultra Speed CD-RW 10x(CLV), MAX 24x(CAV)
	ATAPI interface (MB/s)	PIO mode16.6 MB/s PIO MODE4 supported DMA mode16.6 MB/s Multiword MODE2 supported Ultra DMA mode 33.3 MB/s Ultra DMA MODE2
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA,CD-ROM,CD-ROM XA Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-R (DVD-R Multi-boarder supported) DVD-RW(Ver.1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM(2.6GB/4.7GB)

1.3.3 DVD Super Multi Drive

The DVD Super Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW and DVD-RAM.

The DVD Super Multi drive is shown in Figure 1-7. The dimensions and specifications of the DVD Super Multi drive are described in Table 1-7, Table 1-8.

Figure 1-7 DVD Super Multi drive

Table 1-7 DVD Super Multi drive outline dimensions

Parameter		Standard value
Outline dimensions	Maker	PCC (G8CC00021410)
	Width (mm)	128
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129.0
	Mass (g)	210±10

Table 1-8 DVD Super Multi drive specifications

Parameter		Drive Specification
		PCC (G8CC00021410)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8x(CAV) [MAX 10800 KB/s] CD-ROM MAX 24x(CAV) [MAX 3600 KB/s]
	Write	CD-R 4x/8x (CLV), 24x (ZCLV) CD-RW 4x (CLV) High Speed CD-RW 4x/8x/10x (CLV) Ultra Speed CD-RW 10x (CLV) DVD-R 1x/2x (CLV), MAX 8x (CLV) DVD-RW 1x/2x (CLV), MAX 4x (CLV) DVD+R 2.4x (CLV), MAX 8x (CLV) DVD+RW 2.4x (CLV), MAX 4x (CLV) DVD-RAM 3x (ZCLV) (4.7GB/9.4GB)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-R(3.9GB), DVD-RW (Ver1.1), DVD Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.3.4 DVD Super Multi Drive (Double-layer)

The DVD Super Multi drive (Double-layer) accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW, DVD-RAM and DVD+R (Double-layer).

The DVD Super Multi drive (Double-layer) is shown in Figure 1-8. The dimensions and specifications of the DVD Super Multi drive (Double-layer) are described in Table 1-9, Table 1-10.

Figure 1-8 DVD Super Multi drive (Double-layer)

Table 1-9 DVD Super Multi drive (Double-layer) outline dimensions

Parameter		Standard value
Outline dimensions	Maker	PCC (G8CC00021411)
	Width (mm)	128
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129.0
	Mass (g)	210±10

Table 1-10 DVD Super Multi drive (Double-layer) specifications

Parameter		Drive Specification
		PCC (G8CC00021411)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8x(CAV) [MAX 10800 KB/s] CD-ROM MAX 24x(CAV) [MAX 3600 KB/s]
	Write	CD-R 4x/8x(CLV), 24x (ZCLV) CD-RW 4x(CLV) High Speed CD-RW 4x/8x/10x(CLV) Ultra Speed CD-RW 10x(CLV) DVD-R 1x/2x(CLV), MAX 8x(CLV) DVD-RW 1x/2x(CLV), MAX 4x(CLV) DVD+R 2.4x(CLV), MAX 8x(CLV) DVD+R Double Layer 2.4x(CLV) DVD+RW 2.4x(CLV), MAX 4x(CLV) DVD-RAM 3x(ZCLV) (4.7GB/9.4GB)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-R(3.9GB), DVD-RW (Ver1.1), DVD Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.4   Keyboard

The keyboard is mounted 85(US)/86(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure1-9 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-9 Keyboard

1.5　TFT Color Display

The TFT color display consists of a LCD module and FL inverter board.

1.5.1　LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display images and characters of 16M colors with 1024x768 resolution.

Figure 1-10 shows a view of the LCD module and Table 1-11 lists the specifications.
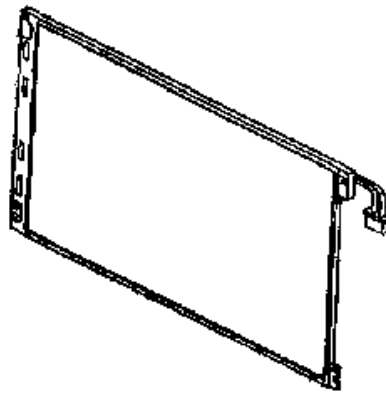
Figure 1-10 LCD module

Table 1-11 LCD module specifications (14.1 TFT)

Item	Specifications
	G33C0002J110
Number of Dots	1,024 (W) x 768 (H)
Dot spacing (mm)	0.279 (H) x 0.279 (V)
Display range (mm)	285.7 (H) x 214.3 (V)
Outline dimensions	299 (w) x 229 (H) x 7.7 (D)

1.5.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.

Table 1-12 lists the FL inverter board specifications.

Table 1-12 FL inverter board specifications

Item		Specifications
		G71C00011110
Input	Voltage (V)	5 (DC)
	Power (W)	7
Output	Voltage (V)	750 (r.m.s)
	Power	5.0W / 7VA
	Current (mA) (f=70KHz)	6.00 (r.m.s)

1.6   Power Supply

The power supply supplies 27 different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges that the DC power supply (AC adapter) is connected to the computer.

2. Detects DC output and circuit malfunctions.

3. Controls the battery icon, and DC IN icon.

4. Turns the battery charging system on and off and detects a fully charged battery.

5. Turns the power supply on and off.

6. Provides more accurate detection of a low battery.

7. Calculates the remaining battery capacity.

8. Controls the transmission of the status signal of the main battery.

Table 1-13 lists the power supply output specifications.

Table 1-13 Power supply output specifications (1/2)

Name	Power supply　（Yes/No）				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
PPV	1.340 - 0.748	No	No	No	CPU
PTV	1.05	No	No	No	CPU, GMCH, ICH4-M
1R25-B1V	1.25	**Yes**	No	No	DDR-SDRAM Termination
1R35-P1V	1.35	No	No	No	GMCH
1R5-S1V	1.5	**Yes**	**Yes**	No	ICH4-M
1R5-P1V	1.5	No	No	No	GMCH, ICH4-M, TV-Encoder
1R8-P1V	1.8	No	No	No	CPU
2R5-B2V	2.5	**Yes**	No	No	GMCH, DDR-SDRAM
S3V	3.3	**Yes**	**Yes**	No	ICH4-M, EC/KBC, Acceleration sensor
E3V	3.3	**Yes**	No	No	Card Cont, Mini-PCI, MDC
SD-E3V	3.3	No	No	No	SD Card
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, GMCH, SDRAM(SPD), ICH4-M, Mini-PCI , FWH, Super I/O, LAN, TV-Encoder,AD1981B, Headphone AMP, Digitizer
PNL-P3V	3.3	No	No	No	LCD
A4R7-P4V	4.7	No	No	No	AD1981B, MM1667
E5V	5	**Yes**	No	No	PC-Card
USB0PS-E5V	5	No	No	No	USB
USB1PS-E5V	5	No	No	No	USB
SND-P5V	5	No	No	No	MM1667
P5V	5	No	No	No	Mini-PCI, HDD, KB, T-PAD,
SB-P5V	5	No	No	No	Select Bay
FL-P5V	5	No	No	No	FL Inverter
IF-P5V	5	No	No	No	Dock

Table 1-13 Power supply output specifications (2/2)

Name	Power supply （Yes/No)				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
FANVCC	2.7-5	No	No	No	FAN
DSKDC	10.0 -15.0	No	No	No	Dock
MCV	5	**Yes**	**Yes**	No	PSC
M5V	5	**Yes**	**Yes**	No	System LED, Dock
R3V	2.0 - 3.6	**Yes**	**Yes**	**Yes**	ICH4-M(RTC)

1.7　Batteries

The PC has the following two batteries.

❑　Main battery

❑　Real time clock (RTC) battery

Table 1-14 lists the specifications for these two batteries.

Table 1-14 Battery specifications

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0004S110	Lithium ion (6 cell)	10.8 V	4,700 mAh
	G71C0004S210			
Real time clock (RTC) battery	P71035009115	Nickel hydrogen	2.4V	16mAh

1.7.1　Main Battery

The main battery is the primary power supply for the computer when the AC adapter is not connected. In standby (instant recovery) mode, the main battery maintains the current status of the computer.

1.7.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The power supply microprocessor controls power supply and detects a full charge when the AC adapter and battery are connected to the computer.

❑ Quick Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off or in standby mode. Table 1-15 lists the main battery charging time.

Table 1-15 Time required for charges of main battery

Battery Capacity	Charging Time	
	Normal charge	Quick charge
4700mAh	about 5.5 to 13.0	about 3.0

Quick battery charge is stopped in the following cases.

1. The main battery is fully charged

2. The main battery is removed

3. Main battery or AC adapter voltage is abnormal

4. Charging current is abnormal

❑ Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-16.

Table 1-16 Data preservation time

Condition		preservation time
4700mAh	Standby mode	About 3 days
	Boot mode	About 20 days

1.7.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory. Table 1-17 lists the battery charging time and data preservation times.

Table 1-17 RTC battery charging/data preservation time

		Time
Charging time	AC adapter or main battery in use (Power ON)	about 8 hours
Data preservation time (when fully charged)		about 30 days

1.8   AC Adapter

The AC adapter is also used to charge the battery.

Table 1-18 lists the AC adapter specifications.

Table 1-18 AC adapter specifications

Parameter	Specification	
	G71C0002S310	**G71C0004A210**
Power	60W	
Input rated voltage	100V/240V	
Input frequency range	50Hz/60Hz	
Input current	1.5A or less	
Output rated voltage	DC 15V	
Output current	0A to 4.0A	

Chapter 2

Troubleshooting Procedures

Chapter 2   Contents

Figures

Tables

2.1   Troubleshooting

Chapter 2 describes how to determine which Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. (The "FRU" means the replaceable unit in the field.) The FRUs covered are:

1. Power supply	8. Optical drive
2. System Board	9. Modem
3. 3.5" USB FDD	10. LAN
4. 2.5" HDD	11. Sound
5. Keyboard	12. SD card slot
6. Display	13. Tablet pen
7. Touch pad	14. Wireless LAN

The Detailed replacement procedures are given in Chapter 4. Test Program operations are described in Chapter 3.

> **NOTE:** *After replacing the system board or CPU, it is necessary to execute the subtest 01 Initial configuration of 3.3 Setting of the hardware configuration in Chapter 3.*

The following tools are necessary in addition to tools described in Chapter 3 for implementing the Diagnostics procedures:

1. Phillips screwdrivers
2. Toshiba MS-DOS system FD
3. Debug test cable (for debug port test)
4. RS-232C cross-cable (for debug port test)
5. Test board (for debug port test)
6. External monitor (for display check)

There are following two types of connections in the figures of board and module connection in and after 2.3 Power Supply Troubleshooting.

(1) Cable connection is described as line in the figures.
(2) Pin connection is described as arrow in the figure.
<e.g> Connection of modem
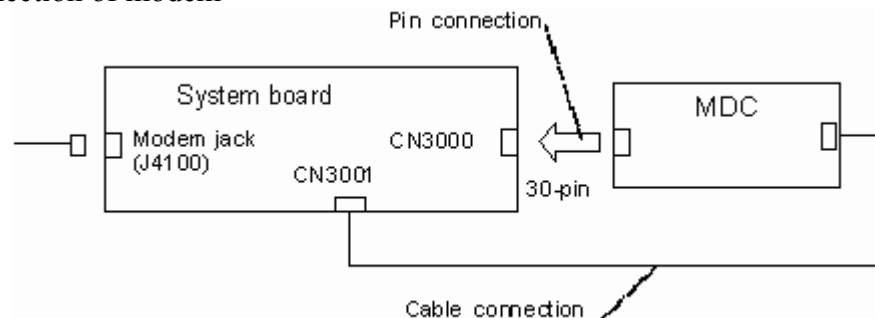
2.2   Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which FRU malfunctions. Before going through the flowchart steps, check the following:

❑   Make sure that Toshiba Windows® XP Tablet PC Edition is installed on the hard disk. Other operating systems can cause the computer malfunction.

❑   Make sure all optional equipment is removed from the computer.
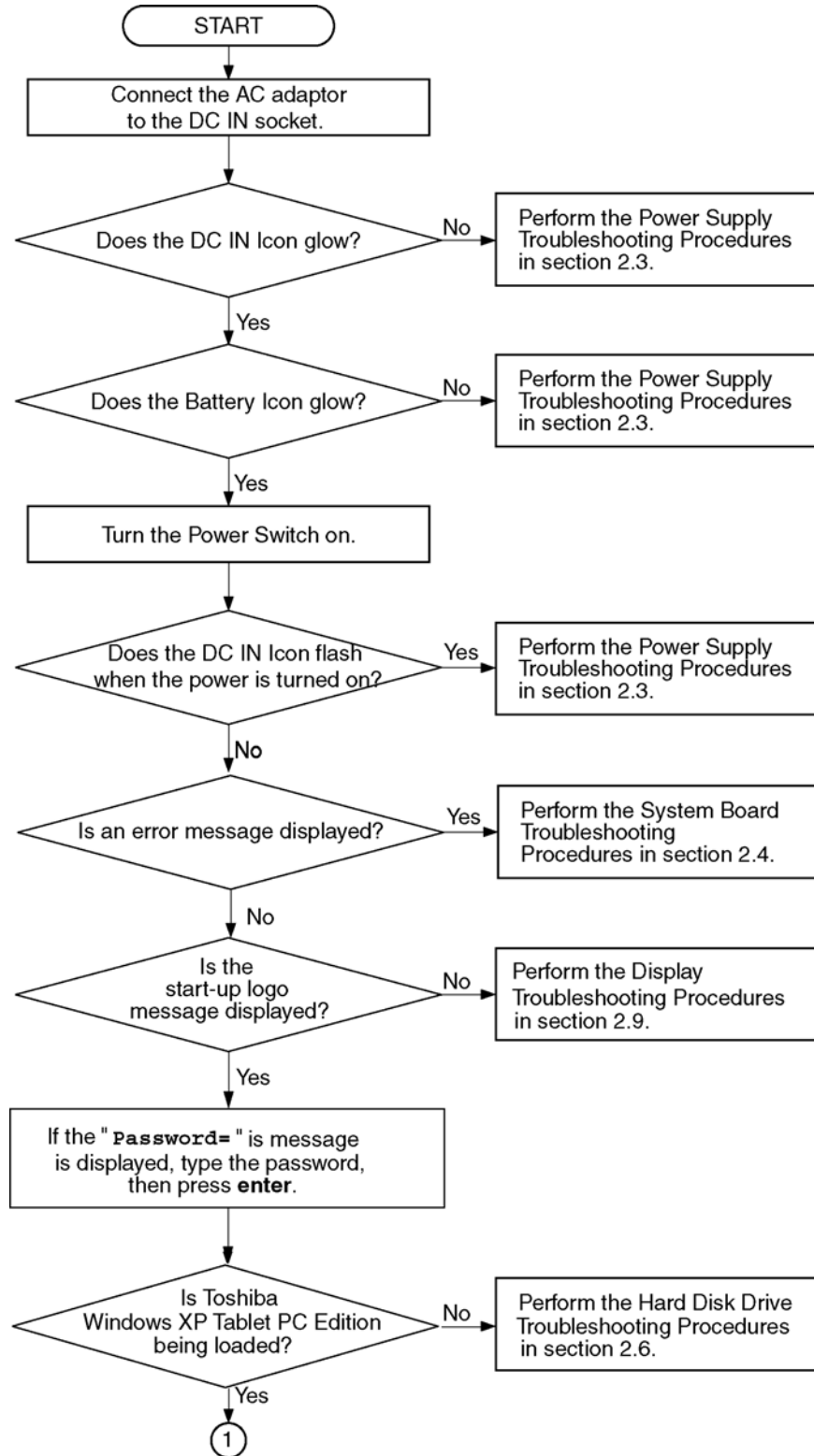
Figure 2-1 Troubleshooting flowchart (1/2)
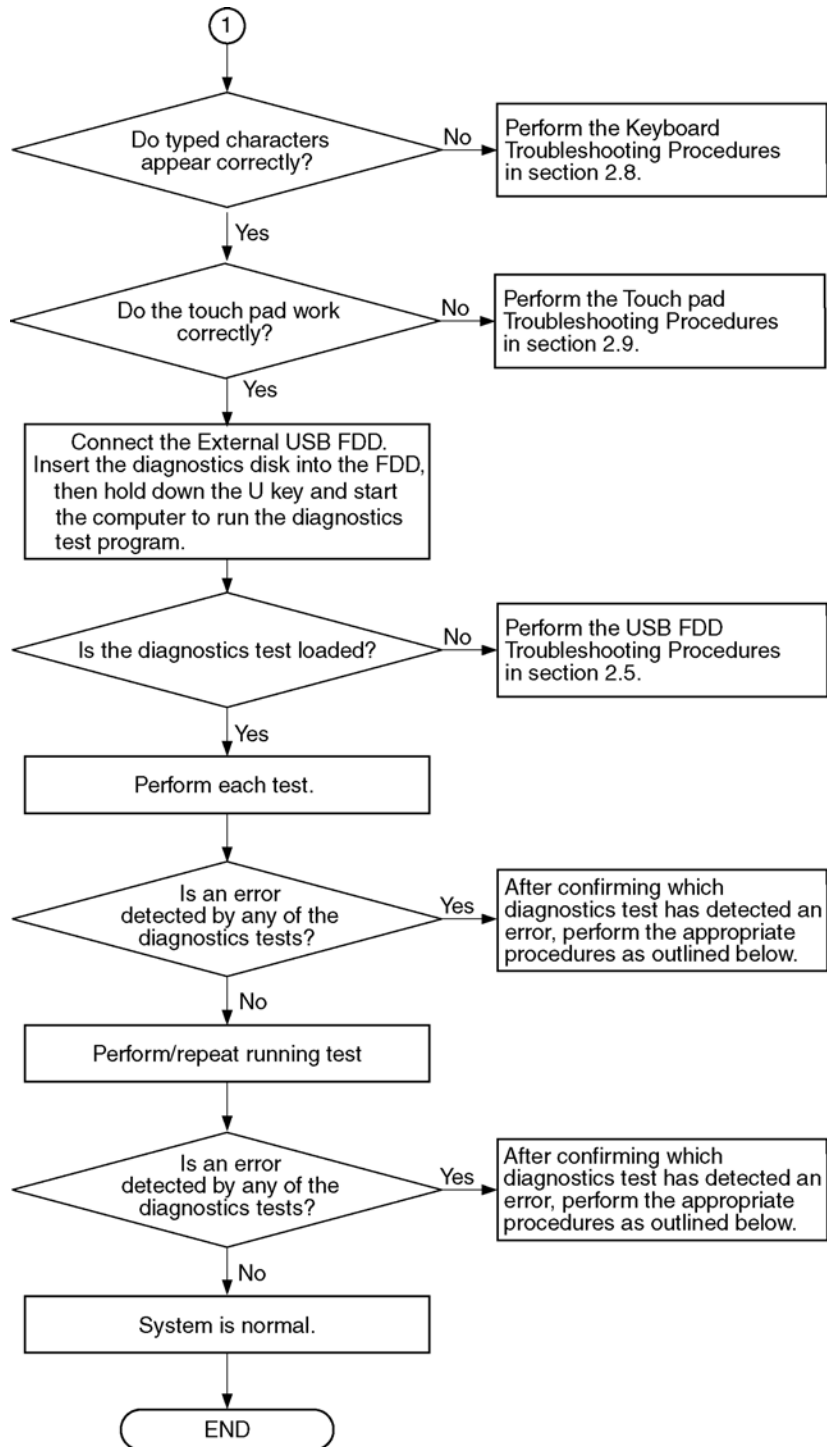
Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may occur intermittently. The 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), and perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the System test, Memory test, ASYNC test, Real timer test, NDP test or expansion test, perform the System Board Troubleshooting Procedures in Section 2.4.

2. If an error is detected on the Keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.

3. If an error is detected on the Display test, perform the Display Troubleshooting Procedures in Section 2.8.

4. If an error is detected on the Floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.

5. If an error is detected on the Hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.

6. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.

7. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.11.

8. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.12.

9. If an error is detected on the wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.15.

2.3   Power Supply Troubleshooting

The power supply controller 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 Supply Icon Check

        Procedure 2:   Error Code Check

        Procedure 3:   Connection Check

        Procedure 4:   Quick Charge Check

        Procedure 5:   Replacement Check

Procedure 1   Power Supply Icon Check

The following two icons indicate the power supply status:

❑ Battery icon

❑ DC IN icon

The power supply controller uses the power supply status with the Battery icon and the DC IN icon as listed in the tables below.

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights green	Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power.
Blinks orange (even intervals)	The battery level is low while the system power is ON.
Flashes orange (at being switched on)	The battery level is low and the power is turned on only with the battery.
Doesn't light	Any condition other than those above.

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights green	DC power is being supplied from the AC adapter.
Blinks orange	Power supply malfunction[*1]
Doesn't light	Any condition other than those above.

*1 When the power supply controller detects a malfunction, the DC IN icon blinks orange. It shows an error code.

When icons are blinking, perform the following procedure.

1. Remove the battery pack and the AC adapter and cut off the power supply to the computer by force.

2. Re-attach the battery pack and the AC adapter.

If icons are still blinking after the operation above, check the followings:

Check 1   If the DC IN icon blinks orange, go to Procedure 2.

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

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

CAUTION: *Use a recommended AC adapter (G71C0002S310 or G71C0004A210).*

Procedure 2   Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN icon blinks orange. 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   On for half second
The error code begins with LSB (Least Significant bit)
Example: Error code 11h (Error codes are given in hexadecimal format.)
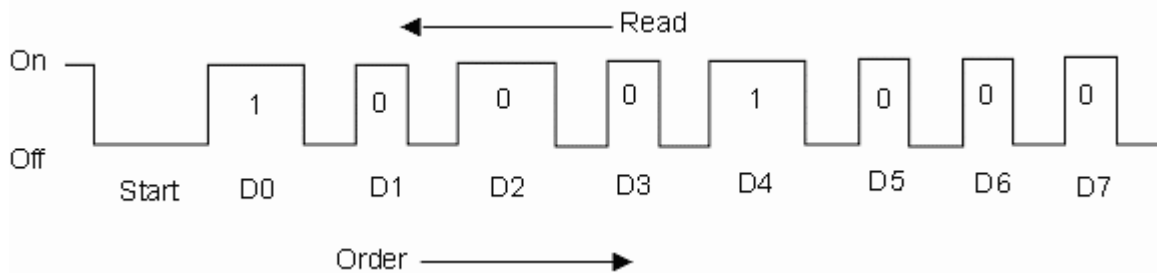
Check 1   Convert the DC IN icon blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

❑ DC power supply (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	Tablet multi dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 7.0A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Abnormal current has been sensed 0[A].

❑ Main Battery

Error code	Meaning
20h	Overvoltage is detected. (This is not supported.)
21h	Main battery charge current is over 7.00A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 3.9A when AC adapter is not connected.
24h	Abnormal current has been sensed 0[A].
25h	Main battery charge current is over 0.3A.

❑ Second Battery

Error code	Meaning
30h	Overvoltage is detected. (This is not supported.)
31h	Second battery charge current is over 7.00A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.1A when AC adapter is not connected.
34h	Abnormal current has been sensed 0[A].
35h	Second battery charge current is over 0.3A.

❑ S3V output (P60)

Error code	Meaning
40h	S3V voltage is 3.14V or less when the computer is powered on/off.
45h	S3V voltage is 3.14V or less when the computer is booting up. (CV support)

❑ 1R5-C1V output (P61)

Error code	Meaning
50h	1R5-C1V voltage is over 1.80V when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
54h	1R5-C1V voltage is abnormal during shutdown (CV support)
55h	1R5-C1V voltage is 1.275V or less when the computer is booting up. (CV support)

❑ 1 R5-C1V output (P62)

Error code	Meaning
60h	1R5-C1V voltage is over 1.50V when the computer is powered on/off.
61h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
62h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
63h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
64h	1R5-C1V voltage is abnormal during shutdown (CV support)
65h	1R5-C1V voltage is 1.275V or less when the computer is booting up. (CV support)

❑ PPV output (P63 : MUX_CH0)

Error code	Meaning
70h	PPV voltage is over 1.80V when the computer is powered on/off.
71h	PPV voltage is 0.56V or less when the computer is powered on.
72h	PPV voltage is 0.56V or less when the computer is booting up.
73h	PPV voltage is 0.56V or more when the computer is powered off.

❑ PTV output (P64)

Error code	Meaning
80h	PTV voltage is over 1.26V when the computer is powered on/off.
81h	PTV voltage is 0.89V or less when the computer is powered on.
82h	PTV voltage is 0.89V or less when the computer is booting up.
83h	PTV voltage is 0.89V or more when the computer is powered off.
84h	PTV voltage is 0.89V or less when the computer is suspended.

❑ E5V output (P65)

Error code	Meaning
90h	E5V voltage is over 6.00V when the computer is powered on/off.
91h	E5V voltage is 4.50V or less when the computer is powered on.
92h	E5V voltage is 4.50V or less when the computer is booting up.
93h	E5V voltage is 4.50V or more when the computer is powered off.
94h	E5V voltage is 4.50V or less while the computer is suspended.

❑ E3V output (P66)

Error code	Meaning
A0h	E3V voltage is over 3.96V when the computer is powered on/off.
A1h	E3V voltage is 2.81V or less when the computer is powered on.
A2h	E3V voltage is 2.81V or less when the computer is booting up.
A3h	E3V voltage is 2.81V or more when the computer is powered off.
A4h	E3V voltage is 2.81V or less while the computer is suspended.

❑ PPV output (P63 : MUX_CH1)

Error code	Meaning
B0h	PPV voltage is over 1.80V when the computer is powered on.
B1h	PPV voltage is 0.56V or less when the computer is powered on.
B2h	PPV voltage is 0.56V or less when the computer is booting up.
B3h	PPV voltage is 0.56V or more when the computer is powered off.

❑ PMV output (P64)

Error code	Meaning
C0h	PMV voltage is over 1.62V when the computer is powered on.
C1h	PMV voltage is 1.02V or less when the computer is powered on.
C2h	PMV voltage is 1.02V or less when the computer is booting up.
C3h	PMV voltage is 1.02V or more when the computer is powered off.
C4h	PMV voltage is 1.02V or less while the computer is suspended.

❑ 1R25-B1V output (P65 : MUX_CH1)

Error code	Meaning
D0h	1R25-B1V voltage is over 1.50V when the computer is powered on.
D1h	1R25-B1V voltage is 1.063V or less when the computer is powered on.
D2h	1R25-B1V voltage is 1.063V or less when the computer is booting up.
D3h	1R25-B1V voltage is 1.063V or more when the computer is powered off.
D4h	1R25-B1V voltage is 1.063V or less while the computer is suspended.

❑ 2R5-B2V output (P66 : MUX_CH1)

Error code	Meaning
E0h	2R5-B2V voltage is over 3.00V when the computer is powered on.
E1h	2R5-B2V voltage is 2.125V or less when the computer is powered on.
E2h	2R5-B2V voltage is 2.125V or less when the computer is booting up.
E3h	2R5-B2V voltage is 2.125V or more when the computer is powered off.
E4h	2R5-B2V voltage is 2.125V or less while the computer is suspended.

Check 2   In the case of error code 10h or 12h:

❑ Make sure the AC adapter and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:

❑ Connect a new AC adapter and AC power cord. If the error still exists, go to Procedure 5.

Check 3   In the case of error code 21h:

❑ Go to Procedure 3.

Check 4   For any other errors, go to Procedure 5.

Procedure 3   Connection Check

The wiring diagram related to the power supply is shown below:
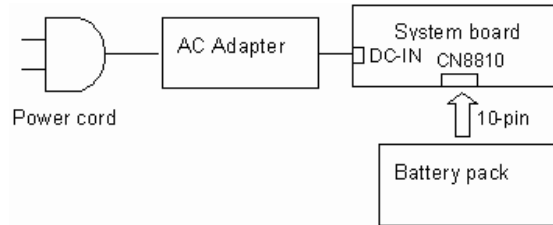
Any of the connectors may be disconnected. Perform starting from Check 1.

Check 1   Make sure the AC adapter and the AC power cord are firmly plugged into the DC
IN 15 V socket and wall outlet. If these cables are connected correctly, go to Check
2.

Check 2   Replace the AC adapter and the AC power cord with new ones.

- If the DC IN icon does not light, go to Procedure 5.
- If the battery icon does not light, 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 light, go to Procedure 4.

Procedure 4   Quick Charge Check

Check if the power supply controller charges the battery pack properly. Perform the following
procedures:

Check 1   Make sure the AC adapter is firmly plugged into the DC IN socket.

Check 2   Make sure the battery pack is properly installed to the PC. If the battery is properly
installed, go to Check 3.

Check 3   The battery pack may be completely discharged. Wait a few minutes to charge the
battery pack while connecting the battery pack and the AC adapter to the PC. If the
battery pack is still not charged, go to Check 4.

Check 4   The battery's temperature is too high or low. Return the temperature to normal
operating condition. If the battery pack is still not charged, go to Check 5.

Check 5   Replace the battery pack with a new one. If the battery pack is still not charged, go
to Procedure 5.

Procedure 5   Replacement Check

The power is supplied to the system board by the AC adapter. If either the AC adapter or the system board was damaged, perform the following Checks.

To disassemble the computer, follow the steps described in Chapter 4.

Check 1   Replace the AC adapter with a new one. If power is not supplied properly to the PC, perform Check 2.

Check 2   Replace the system board with a new one.

2.4   System Board Troubleshooting

This section describes how to determine if the system board is defective. 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:   Debug port (D port) Check on Boot Mode

       Procedure 3:   Diagnostic Test Program Execution Check

       Procedure 4:   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 MS-DOS or Windows XP Tablet PC Edition is properly loaded, go to Procedure 4.

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 SETUP screen appears to set the system configuration. If any other error message is displayed, perform Check 2.

```
(a)*** Bad HDD type ***
   Check system.  Then press [F1] key ......
(b)*** Bad configuration ***
   Check system.  Then press [F1] key ......
(c)*** Bad memory size ***
   Check system.  Then press [F1] key ......
(d)*** Bad time function ***
   Check system.  Then press [F1] key ......
(e)*** Bad check sum (CMOS) ***
   Check system.  Then press [F1] key ......
(f)*** Bad check sum (ROM) ***
   Check system.  Then press [F1] key ......
(g)RTC battery is low or CMOS checksum is inconsistent
   Press [F1] key to set Date/Time
```

Check 2   If the following error message is displayed on the screen press any key as the message instructs.
The following error 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.

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

If any other error message is displayed, 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,
go to Procedure 5.

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 2.5" HDD
Troubleshooting Procedures in Section 2.6.

```
(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) TIMER INTERRUPT ERROR
(23) RTC UPDATE ERROR
```

Procedure 2   Debug Port (D port) Check on Boot Mode

Check the D port status by a debug port test. The tool for debug port test is shown below.
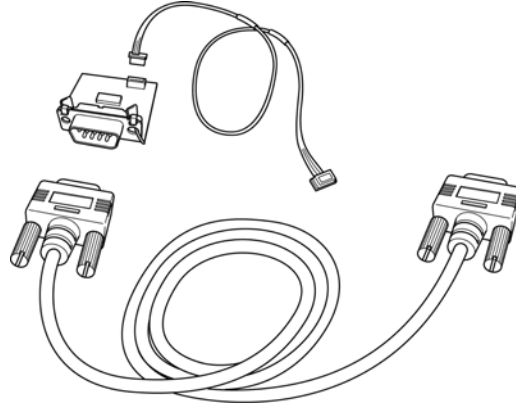
Figure 2-2 A set of tool for debug port test

The test procedures are follows;

1. Connect the debug test cable to the connector CN3400 of the system board. For disassembling the PC to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C cross-cable to the PC that displays the results.
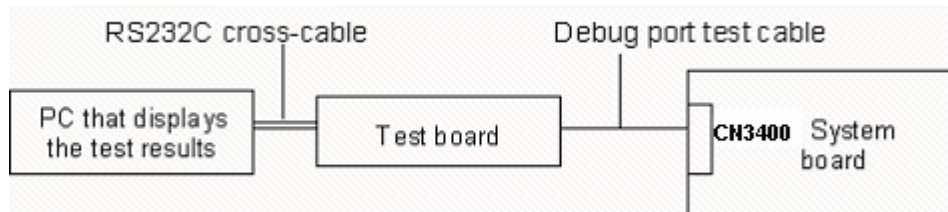
4. Boot the computer in MS-DOS mode.

5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into FDD and input "FD starting drive:>dport".)
    The D port status is displayed in the following form;

F100 : 000.000382   IRT_CHK_INI\SYSI_START

D port   Time (second) to   Contents of process
status   process

6. When the D port status is FFFFh (normal status), go to Procedure 3.

7. When the D port status falls into any status in Table 2-3, execute Check 1.

Table 2-3 Debug port (Boot mode) error status (1/9)

D port status	Inspection items	Details
	Permission of A20 and Clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCHM, ICHM	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of 3rd Bus data	
	Setting of printer port (for models supporting printer)	
B0h	PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite factor flag initialization	
	CHECK SUM CHECK	Transition to protected mode
		Boot block checksum (skipped when returned to S3)
		Halts when error occurs
		Checksum other than boot block (skip when returned to S3)
B1h	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process".
	Transition of process to System BIOS IRT when returned to S3	
	Key input	When a key is pressed, check if it is Tilde key or Tab key.
B2h	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
B3h	Transits to System BIOS IRT.	
	BIOS rewrite process	Initialization of ICHM. D31
		DRAM configuration
		Permission of cache (L1 cache only)
		Memory clear
		Transition to real mode and copy of BIOS to RAM

Table 2-3 Debug port (Boot mode) error status (2/9)

D port status	Inspection items	Details
B4h/B5h	Saving key scan code	
	Setting TASK_1ms_TSC	
	Controlling fan	
	Initializing sound items (for BEEP)	Enabling system speaker
		Releasing mute
		Making the volume max.
	When BIOS, EC/KBC rewriting is requested	Blinks green (cycle:2s, on:1s, off:1s)
	When BIOS ROM is abnormal	Blinks orange (cycle:2s, on:1s, off:1s)
	Key input	Temporary prohibition of USB
		BEEP
		Waiting for key input
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset
		Setting parameters for 2HD(1.44MB)
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.
		Setting of parameters for 2DD (720KB)
		Retrieval of "CHGBIOSA.EXE" from the root directory.
		Calculation of directory start head and sector
		Read 1 sector of the root directory
		Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.
		Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"
		Key input when error occurred.
		Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"
(B3h)		
00h	Cache control processing for HyperThreading	
	Prohibition of cache	

Table 2-3 Debug port (Boot mode) error status (3/9)

D port status	Inspection items	Details
(00h)	Initialization of H/W (before DRAM recognition)	Initialization of MCHM
		Initialization of ICH4M.D31.Func0
		Initialization of ICH4M.D31.Func1
		Initialization of USB.Func0,1,2,7
		Initialization of ICH4M.D31.Func3
		Initialization of ICH4M.D31.Func5
		Initialization of TI
	Initialization of PIT channel 1	(Setting the refresh interval to "30μs")
01h	Checking DRAM type and size (at cold boot)	When unsupported memory is connected, the system beeps and halts. When DRAM size = 0, halts.
	Testing the stack area of SM-RAM	When it can not be used as stack area, halts.
02h	Configuring cache memory	
	Permission of L1/L2 cache memory	
	Checking the access of a CMOS (Only in Cold Boot)	When error is detected, halts
	Examining the battery level of CMOS	
	Checksum check of CMOS	
	Initializing data in CMOS (1)	
	Setting up of IRT status	(Setting of boot status and IRT busy flag, The rest bits are set to 0)
	Storing the size of DRAM	
03h	Branch of resuming (only in Cold Boot)	When a CMOS error is detected, it does not resume.
		If "resume status code" is not set, no resume occurs.

Table 2-3 Debug port (Boot mode) error status (4/9)

D port status	Inspection items	Details

(03h)		Resume error check
		 S3 recovery error (ICH) Resume error 7AH
		 SM-RAM checksum check Resume error 73H
		 Memory configuration change check
		                              Resume error 73H
		 Checksum check of system BIOS RAM area
		                              Resume error 79H
		 Checksum check of expansion memory
		                              Resume error 76H
		 Checksum check of PnP RAM
		                              Resume error 77H
		
		To resume process (RESUME_MAIN)

	To resume error process	Returns the CPU clock to "Low"
		Prohibition of all SMIs
		Clears resume status
		Returns to ROM
		Forwards the area of C0000h to EFFFFh to PCI (prohibition of DRAM)
		Sets resume error request
	Copying ROM/RAM of system BIOS	Halts, when error occurred
04h	SMRAM initialization	
	Check if CPU corresponds to HyperThreading	
	Update of micro code	
	Initialization of APIC	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	

Table 2-3 Debug port (Boot mode) error status (5/9)

D port status	Inspection items	Details

05h	Initialization of devices which need initialization before PCI bus initialization	PIT test (at Cold boot only) and initialization
		 Setting of test pattern to channel 0 of PIT#0
		 Check whether the set test pattern can be
		  read.
		 Initialization of PIT channel 0 (Setting of timer
		  interruption interval to 55ms)
		 Initialization of PIT channel 2(Setting of the
		  sound generator frequency to 664Hz)
		 Test of PIT channel 1 (Check whether the refresh
		  signal works properly in 30 micro-s refresh
		   interval.) The system halts when the time is out.
		 Test of PIT channel 2 (Check whether the speaker
		  gate works properly)

		CPU clock measurement
		Check of parameter block A
		Permission of SMI except auto-off function
		Control of excess of rated input power
		Battery discharge current control (1CmA)
		AC adapter rated over current control
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		CPU Initialization Judging of CPU type Geyserville support check Setting of CPU clock to "high"
		Graphics Aperture Size setting
06h	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or except Japan) based on DMI data	
	CMOS default setting check	Sets default setting if bad battery or bad checksum (ROM, CMOS) is detected)
	ACPI table initialization (for execution of option ROM)	

Table 2-3 Debug port (Boot mode) error status (6/9)

D port status	Inspection items	Details
(06h)	Initialization of devices which need initialization before PCI bus initialization	AC'97 control
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Sound initialization
		PC multi-box status acquisition
		HC initialization, USB device connection recognition and initialization
		Control of built-in LAN permission/prohibition
	PIC initialization	
	PIC test	
	Password Initialization	
07h	PCI bus initialization (connection of DS Bus)	
	Initialization of LAN information	
	Check of WakeUp factor	
08h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
09H	Task generation for waiting PnP resource making completion	
	Serial interruption control	(before use of interruption) (for models supporting YEBISU)
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ

Table 2-3 Debug port (Boot mode) error status (7/9)

D port status	Inspection items	Details
(09h)		Configuration
		Saving of VGA configuration result
0Ah	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W needed after PCI configuration	Printer port setting (for models supporting printer)
		HDD initialization sequence start
		FDD initialization sequence start (for models supporting built-in FDD)
	Enabling power off	
	Output code generation	
0Bh	FIRST_64KB_CHECK	(Check of first 64KB memory)
0Ch	INIT_INT_VECTOR	(Initialization of vectors)
0Dh	INIT_NDP	(Initialization of NDP)
0Eh	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
0Fh	INIT_DISPLAY (Waiting for VGA chip initialization completion, VGA BIOS initialization)	
10h	Calling VGA BIOS	
11h/12h	DISP_LOGO	Displaying logo
13h	SYS_MEM_CHECK (boot mode)	Check of convention memory
14h	EXT_MEM_CHECK (boot mode)	Check of exception in the protected mode
15h	Check of exception in the protected mode	DPORT=16h when error occurs
	INIT_SYS_MEM (reboot mode)	Initialization of conventional memory
17h	CHK_DMA_PAGE (boot mode)	Check of DMA Page Register
18h	CHECK_DMAC (boot mode)	Check of DMAC
19h	INIT_DMAC (boot mode)	Initialization of DMAC

Table 2-3 Debug port (Boot mode) error status (8/9)

D port status	Inspection items	Details
1Ah	CHECK_PRT (for models supporting printer)	Check of printer port existence
1Bh	CHECK_SIO (for models supporting SIO)	Check of SIO
1Ch	BOOT_PASSWORD (password check)	Waiting for FDD initialization completion (for models supporting built-in FDD)

		(In the case of "Reboot")
		 Waiting for HDD initialization completion
		 Check of key input during IRT (waiting for
		   KBC initialization completion)
		 I/O LOCK process (for models supporting I/O lock)
		 ATA priority initialization
		(In the case of "Boot")
		 BM loading process (for models supporting
		   fingerprint authentication)
		 Initialization of BM (for models supporting
		   fingerprint authentication)
		 Check of key input during IRT (waiting for KBC
		   initialization completion)
		 Input of password
		 I/O LOCK process (for models supporting
		   I/O lock)
		BM open (for models supporting
		   fingerprint authentication)

1Dh	EX_IO_ROM_CHECK	Check of option I/O ROM
1Eh	PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource before boot
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion
		Renewal of table for DMI
		Copying ACPI table to uppermost of extension memory
		Waiting for completion of BIOS rewriting of PSC version
		Waiting for completion of setting clock generator When error occurred, halts at DPORT=1FH

Table 2-3 Debug port (Boot mode) error status (9/9)

D port status	Inspection items	Details
(1Eh)		Waiting for completion of initialization of Serial port (for models supporting SIO)
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (for models supporting Bluetooth)
		Check of existence of target maintenance card
		Prohibition of unused PC card
		Setting Wakeup status data for ACPI
		HW initialization before Boot, Waiting for initialization completion
		Notifies the DVI connection status to VGA BIOS (for models supporting DVI)
		Setting of battery save mode
		Setting of date
		Waiting for Bluetooth initialization completion (for models supporting Bluetooth)
		Update of DMI Wakeup factor, Update of SM-BIOS structure table
		PCI device configuration space close
		Cache control
		Update of parameter block A
		Process for CPU
		Make the CPU clock to be set by SETUP
		Waiting of motor-off completion of disabled HDD
		Final decision of USB FDD drive information
		Post processing of PRE_BOOT_SETUP
		Clear of PWRBTN_STS
		Enabling POWER Button
20h	Clear of IRT status	
	Update of check sum of Runtime side	
FFFFh	End	

Check 1   If the D port status error code F119h is displayed, go to the 3.5" USB FDD
           Troubleshooting Procedures in Section 2.5 or the 2.5" HDD Troubleshooting
           Procedures in Section 2.6.

Check 2   If any other D port status error code is displayed, perform Procedure 3.

D port error status is as follows:

Error code	Contents
F160h	Timer CH2 error
F161h	PIT error
F162h	PIC #1 error
F163h	PIC #2 error
F120h	Clock generator setting error

Procedure 3   Diagnostic Test Program Execution Check

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

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. USB Floppy Disk test
6. ASYNC test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. Wireless LAN test
12. Bluetooth test
13. Sound/LAN/Modem test

If an error is detected during these tests, go to Procedure 4.

Procedure 4   Replacement Check

The system board connectors may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform Check 1.

Check 1   Visually check for the following:

    a) Cracked or broken connector housing

    b) Damaged connector pins

       If connectors are in good condition, but there is still a problem, go to Check 2.

Check 2   The system board may be damaged. Replace the system board with a new one following the steps described in Chapter 4, *Replacement Procedures*.

2.5   USB 3.5" FDD Troubleshooting

This section describes how to determine if the USB 3.5" 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.

Insert the Diagnostics Disk in the USB floppy disk drive, turn on the computer and run the test.
And then clean the FDD heads using the cleaning kit. If the FDD still does not function
properly after cleaning, go to Procedure 2.

Detailed operation is given in Chapter 3, *Tests and Diagnostics*.

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-4. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-4   FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media replaced
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 by sliding the write protect tab to "write enable". 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

The USB FDD connector may be disconnected from the connector on the system board. Check visually that the connector is connected firmly.

Check 1   Make sure the USB FDD cable is firmly connected to the CN4611 (port 3) or CN4610 (port 0) of the system board, or CN4620 (port 5) of the CN board.
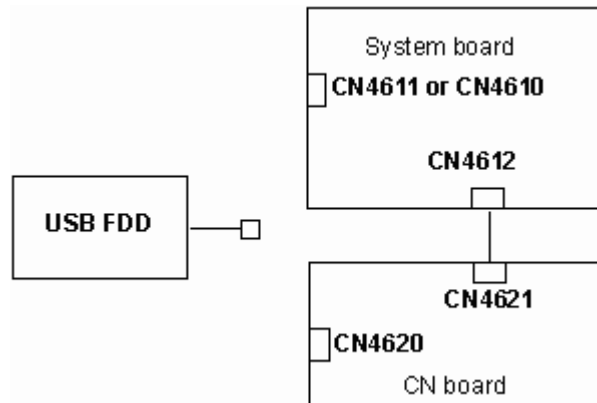
If any of the connections are loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2   The USB FDD may be defective or damaged. Replace it with a new one. If the FDD is still not functioning properly, perform Check 3.

Check 3   When the USB FDD is connected to CN4620 (port 5), connection between the CN board and the system board may be loose. Reconnect the cable between them firmly. If the FDD is still not functioning properly, perform Check 4.

Check 4   When the USB FDD is connected to CN4620 (port 5), the CN board may be defective or damaged. Replace it with a new one. If the FDD is still not functioning properly, perform Check 5.

Check 5   Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.6   2.5" HDD Troubleshooting

This section describes how to determine if the 2.5" HDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

> Procedure 1:   Partition Check
>
> Procedure 2:   Message Check
>
> Procedure 3:   Format Check
>
> Procedure 4:   Diagnostic Test Program Execution Check
>
> Procedure 5:   Connector Check and Replacement Check

CAUTION: The contents of the 2.5" hard disk will be erased when the 2.5" HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s). For the backup, refer to the User's Manual.

Procedure 1   Partition Check

Insert the Toshiba MS-DOS system disk and start the computer. 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 in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. 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. Then go to Procedure 2.

Check 4   Remove the system disk from the FDD and reboot the computer. If the problem still exists, go to Procedure 2. Otherwise, the HDD is operating normally.

Procedure 2   Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. When the test detects an error, an error message is displayed on the screen.

Make sure of no floppy disk in the FDD. Turn on the computer and check the message on the screen. When an OS starts from the 2.5" HDD, go to Procedure 3. Otherwise, start with Check 1 below and perform the other checks as instructed.

Check 1   If any of the following messages appear, go to Procedure 3. If the following messages do not appear, perform Check 2.

> ```
> HDC ERROR
>         or
> ```
>
> `HDD #X ERROR` (After 5 seconds this message will disappear.)

Check 2   If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 4.

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

Check 3   Using the SYS command of the MS-DOS, transfer the system to the 2.5" HDD. If the system is not transferred, go to Procedure 3. Refer to the MS-DOS Manual for detailed operation.

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

> ```
> System Transferred
> ```

If an error message appears on the display, perform Check 5.

Check 4   The 2.5" HDD, HD board and the connector of the system board may be disconnected (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling the PC.). Reconnect them firmly. If they are firmly connected, go to Procedure 3.

Procedure 3   Format Check

The computer's 2.5" HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 2.5" HDD, start with Check 1 below and perform the other steps as required.

Refer to the MS-DOS Manual for the operation of MS-DOS. For the format by the test program, refer to the Chapter 3.

Check 1   Format the 2.5" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

            If the 2.5" HDD can not be formatted, perform Check 2.

Check 2   Using the MS-DOS FDISK command, set the 2.5" HDD partition. If the partition is not set, go to Check 3. If it is set, format the 2.5" HDD using MS-DOS FORMAT command.

Check 3   Using the Diagnostic Disk, format the 2.5" HDD with a format option (physical format). If the 2.5" HDD is formatted, set the 2.5" HDD partition using MS-DOS FDISK command.

            If you cannot format the 2.5" HDD using the Tests and Diagnostic program, go to Procedure 4.

Procedure 4   Diagnostic Test Program Execution Check

The HDD test program is stored in 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. The error codes and statuses are described in Table 2-5. If an error code is not displayed but the problem still exists, go to Procedure 5.

Table 2-5 2.5" HDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	HDC overrun error (DRQ)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enable
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
DAh	No HDD

Procedure 5   Connector Check and Replacement Check

The HDD is connected to the HD board and the HD board is connected to the connector CN1800 of the system board. The connecting portions may be loose. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks to check the connecting portions:

Check 1   Make sure the HDD is firmly connected to the connector CN9610 of the HD board and the HD board is connected to the connector CN1800 of the system board.
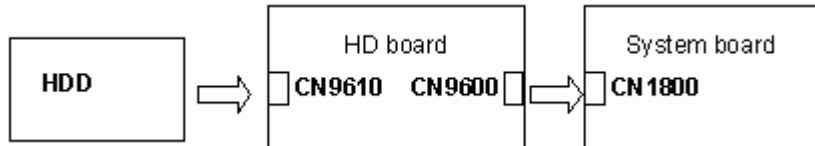
        If connection is loose, reconnect firmly and repeat Procedure 4. If there is still an error, go to Check 2.

Check 2   The 2.5" HDD may be damaged. Replace it with a new one and check the operation. If the problem still exists, perform Check 3.

Check 3   The HD board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 4.

Check 4   The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.7   Keyboard Troubleshooting

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

Procedure 1:   Diagnostic Test Program Execution Check

Procedure 2:   Connector Check 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 Check and Replacement Check

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

Check 1   Make sure the keyboard cable is firmly connected to the system board.
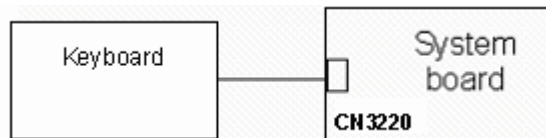
If the connection is loose, reconnect the cable firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3   The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.8   Display Troubleshooting

This section describes how to determine if the computer's 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 and Cable Check
>
>   Procedure 4:   Replacement Check

Procedure 1   External Monitor Check

Connect an external monitor to the computer's external monitor port, and then boot the computer. The computer automatically detects the external monitor.

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

If the same problem as the internal monitor appears on the external monitor, the system board may be damaged. Go to Procedure 2.

Procedure 2   Diagnostic Test Program Execution Check

The Display Test program is stored on the Diagnostics disk. Insert the Diagnostics disk in the USB floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

This program checks the display controller on the system board. If an error is detected, go to Procedure 3.

Procedure 3   Connector and Cable Check

The LCD module is connected to the system board through the LCD/FL cable. Also FL inverter is connected the system board through the LCD/FL cable. The cable may be disconnected from the board or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If the connection is loose, reconnect the cable firmly and repeat Procedure 2. If there is still an error, go to Procedure 4.
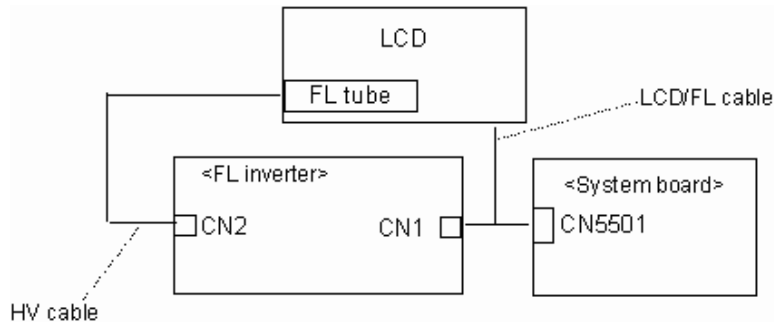
Procedure 4   Replacement Check

The display unit has an FL tube, FL inverter, LCD module, System board, LCD/FL cable and Display ON/OFF switch. Any of the components may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures,* and perform the following checks:

(1)   If characters or graphics are not displayed on the internal display, perform Check 1.

(2)   If characters or images are displayed on the internal display but the display is not normal, perform Check 2.

(3)   If characters or images are displayed on the internal display but the display is dark (the back-light does not light), perform Check 5.

Check 1   The display ON/OFF switch may be damaged. Remove the display ON/OFF switch and repeat Procedure 4. If there is still an error, go to Check 2.

Check 2   The LCD/FL cable may be damaged. Replace the damaged cable with a new one and repeat Procedure 4. If there is still an error, go to Check 3.

Check 3   The LCD module may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 4.

Check 4   The FL inverter may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 5.

Check 5   The FL tube may be damaged. Replace it with a new one and repeat Procedure 4.
            If there is still an error, go to Check 6.

Check 6   The display controller of the system board may be damaged. Replace the system
            board with a new one.

2.9   Touch Pad Troubleshooting

To determine whether the Touch Pad is faulty or not, perform the following procedures:

Procedure 1:   Diagnostic Test Program Execution Check

Procedure 2:   Connector and Cable Check

Procedure 3:   Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Execute the test for touch pad in ONLY ONE 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 touch pad keyboard is functioning properly.

Procedure 2 Connector and Cable Check

The touch pad is connected to the system board (CN3201) with a flexible cable. This cable may have come off the connector of the touch pad or of the system board. Disassemble the computer and check the cable connections. See Chapter 4 for the disassembly procedure. If the cable has come off, connect firmly it and make sure the operation. If there is still an error, go to Procedure 3.
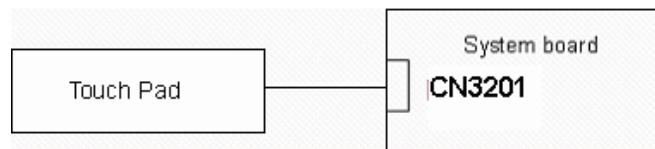
Procedure 3 Replacement Check

Check 1   The touch pad may be damaged. Replace it with a new one and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The system board may be damaged. Replace the system board with a new one according to the procedure in Chapter 4.

2.10 Selectable bay (optical drive) Troubleshooting

The Selectable bay can be installed in this model and the Selectable bay optical drive is installed as standard. Here explains the troubleshooting for the optical drive.

To check if the optical drive is defective or not, follow the troubleshooting procedures below as instructed.

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Prepare the tools before the test. (Refer to tools for implementing the Diagnostics procedures on Chapter 3.)

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

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The optical drive may be disconnected from the system board or faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the optical drive and the system board are firmly connected.
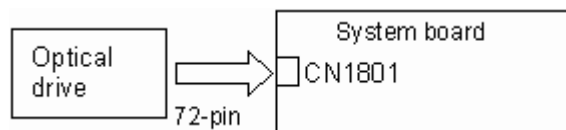
> If the connection is loose, reconnect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2   The optical drive may be faulty. Replace the optical drive with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 3.

Check 3   The system board may be faulty. Replace it with new one following the instructions in Chapter 4.

2.11 Modem Troubleshooting

To check if the modem is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the Modem test program available as part of the maintenance test program. This program checks the modem. See Chapter 3 for information on how to perform the test.

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The Modem jack (RJ11) is mounted on the system board and MDC is connected to the system board. If the modem malfunctions, the connection may be bad or the MDC or system board might be faulty.

Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the MDC is firmly connected to the PJ3020 and the MDC cable is connected to the PJ3021 on the system board.
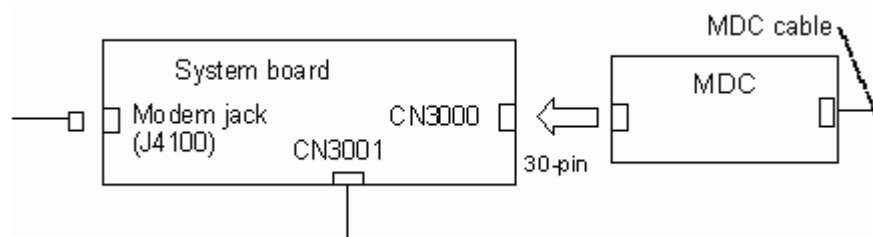
>   If any connector is disconnected, connect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2   The MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the modem is not still working properly, perform Check 3.

Check 3   The system board may be faulty. Replace it with a new one following the instructions in Chapter 4.

2.12 LAN Troubleshooting

To check if the computer's LAN is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

        Procedure 1:   Diagnostic Test Program Execution Check

        Procedure 2:   Connector Check and Replacement Check

### Procedure 1   Diagnostic Test Program Execution Check

To check the LAN function, execute the Sound/LAN/modem test program subtest 04 (LAN test). See Chapter 3 for information on how to perform the test.

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The LAN function is installed on the system board and the RJ45 jack and the controller is mounted on the system board. If the LAN malfunctions, the system board might be faulty.

Disassemble the computer following the steps described in Chapter 4 and replace the system board.
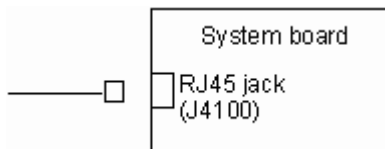
2.13 Sound Troubleshooting

To check if the sound function is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check
>
> Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the Sound test program available as part of the maintenance test program. See Chapter 3 for information on how to perform the test.

If any error is detected by the test, go to Procedure 2

Procedure 2   Connector Check

The speaker, internal microphones, external microphone and headphone are connected to the system board shown in the following figure. These connections may be loose or cables may come off. Disassemble the computer referring to the steps described in Chapter 4 and make sure each connection. If there is still an error, perform Procedure 3.
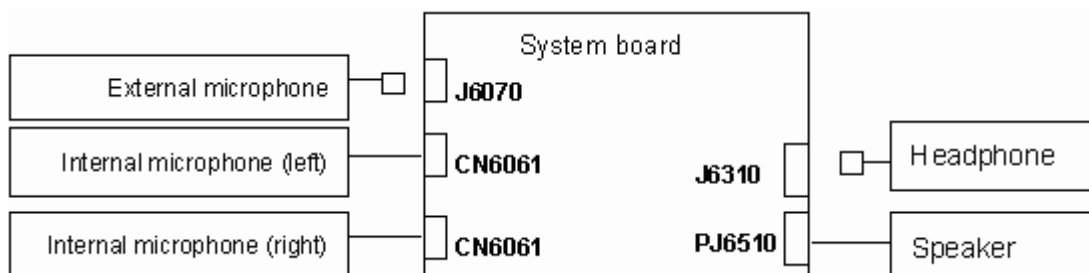
Procedure 3   Replacement Check

Check 1   If the speaker or internal microphones is not working properly, the part may be faulty. Replace it with a new one following the step in Chapter 4. If there is still an error, go to Check 2.

Check 2   The system board may be faulty. Replace it with a new one following the step in Chapter 4. If there is still an error, perform Check 3.

Check 3   The external speaker or headphone may be faulty. Replace it with a new one.

2.14 SD Card Slot Troubleshooting

To check if the SD card slot is good or no good, follow the troubleshooting procedures below as instructed.

        Procedure 1:   Check on Windows XP Tablet PC Edition

        Procedure 2:   Connector/Replacement Check

Procedure 1   Check on Windows XP Tablet PC Edition

Insert an SD card into the slot. Check if the installed Windows XP Tablet PC Edition recognizes automatically the SD card and the data in the SD card can be read.

If the card is not recognized or data are not read, go to Procedure 2.

Procedure 2   Connector/Replacement Check

The SD card is connected to the connector IS2130 of the connector board.
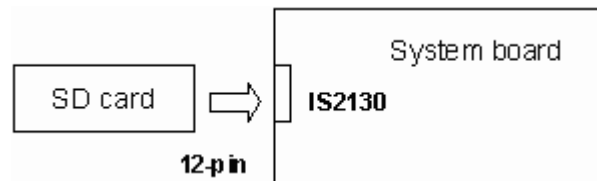
Check 1   The SD card and the system board may be disconnected. Make sure the SD card is firmly inserted to the IS2130 of the system board. If the SD card is still not functioning properly, perform Check 2.

Check 2   The SD card may be faulty. Replace it with a new one following the step in Chapter 4. If the problem continues, perform Check 3.

Check 3   The system board may be faulty. Replace it with a new one following the step in Chapter 4.

2.15 Tablet Pen Troubleshooting

To check if the Tablet Pen is defective or not, follow the troubleshooting procedures below as instructed.

CAUTION: *Use the Tablet Pen supplied to this model.*

Procedure 1:   Check on Windows XP Tablet PC Edition

Procedure 2:   Replacement Check

Procedure 3:   Connector/Replacement Check

Procedure 1   Check on Windows XP Tablet PC Edition

This procedure checks if the tablet pen is working properly by using the function of Windows XP Tablet Edition.

Check 1   Make sure the mouse cursor is following the tablet pen when you move the pen on the display. If it does not work properly, go to Procedure 2.

Check 2   Make sure the "click" function works properly when you tap (touch) the display with the tablet pen. If it does not work properly, go to Procedure 2.

When both the functions work correctly, the tablet pen is not defective.

Procedure 2   Replacement Check

Check 1   The core of the tablet pen might be worn out. Replace the core with a new one following the steps in the User's manual, and check the tablet pen is working properly. If there is still an error, go to Check 2.

Check 2   The tablet pen might be defective. Replace the tablet pen with a new one and check if the tablet pen is working properly. If there is still an error, execute Procedure 3.

Procedure 3   Connector/Replacement Check

The Digitizer and LCD are connected to the system board as below.
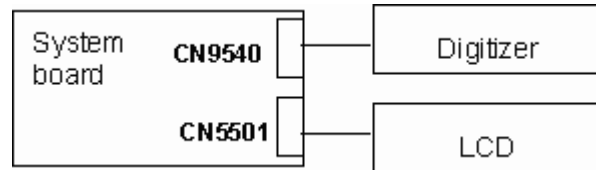
Check 1   The Digitizer might be disconnected. Make sure the Digitizer is connected to the CN9540 on the system board. If there is still an error, go to Check 2.

Check 2   The LCD might be disconnected. Make sure the LCD is connected to the CN5501 on the system board. If there is still an error, go to Check 3.

Check 3   The Digitizer, the LCD or the system board might be defective. Replace it with a new one following the steps in Chapter 4. Then check the tablet pen is working properly.

2.16 Wireless LAN Troubleshooting

To check if the Wireless LAN is defective or not, follow the troubleshooting procedures below as instructed.

> Procedure 1:   Transmitting-Receiving Check
>
> Procedure 2:   Antennas' Connection Check
>
> Procedure 3:   Replacement Check

Procedure 1 Transmitting-Receiving Check

Make sure the wireless communication switch on the computer is turned ON. If it is not, turn ON.

Check 1   Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need another computer that can communicate by the wireless LAN.

If the computer passes the test, the function is correctly working.

If the computer does not pass the test, perform Procedure 2.

Procedure 2 Antennas' Connection Check

The wireless LAN function wiring diagram is shown below:
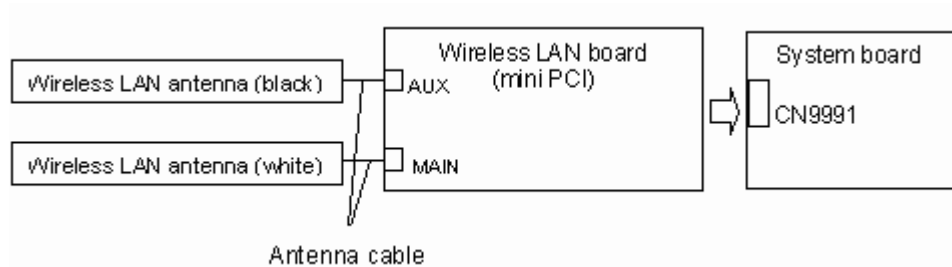
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, and perform the following checks:

Check 1   The wireless LAN board and the system board may be disconnected. Make sure the wireless LAN board is firmly connected to the CN9991 of the system board.

If the board connector is disconnected, connect it firmly and return to Procedure 1. If there is still an error, go to Check 2.

Check 2   Make sure the wireless LAN antennas (black and white) are firmly connected to the Wireless LAN board. If the antennas are disconnected, connect firmly then return to Procedure 1. If there is still an error, perform Procedure 3.

Procedure 3   Replacement Check

Check if the wireless LAN board and the system board are connected properly. If they are properly connected but there is stall an error, any of these components may be damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

Check 1   The wireless LAN board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 2.

Check 2   The wireless LAN antennas may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 3.

Check 3   The system board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

Chapter 3
Tests and Diagnostics

Chapter 3 Contents

Figures

Tables

3.1   The Diagnostic Test

This chapter explains how to use the Diagnostic Test programs to test the functions of the computer's hardware modules. The Diagnostics Programs are stored on some Diagnostic Disks. There are Service Program Modules (DIAGNOSTIC MENU) and the Test Program Modules (DIAGNOSTIC TEST MENU) on the Diagnostic Disk.

The Hardware Initial information Setting Tool consists of some programs which write the hardware information or displays the current information of the computer. It is also included in one of Diagnostic Disks.

The heatrun test is automatic test program which executes the some tests successively.

> *NOTE:*   *Before starting the diagnostics, be sure to follow these steps:*
>
> 1. *Check all cables are connected firmly.*
>
> 2. *Exit any application and close Windows.*
>
> 3. *Check if "ALL Device" is selected in the item [Device Config.] in SETUP menu. After checking the diagnostics, be sure to select "Setup by OS".*

3.1.1   Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions.

- ❑ DIAGNOSTIC TEST
- ❑ ONLY ONE TEST
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ EXIT TO MS-DOS

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
❑ CD-ROM/DVD-ROM TEST

Other tests are:

❑ Wireless LAN TEST (Wireless LAN test disk)
❑ LAN/Modem/Bluetooth/IEEE1394 TEST (LAN/Modem/Bluetooth/IEEE1394 test disk)
❑ Sound TEST (Sound test disk)

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

❑ USB FDD
❑ The Diagnostic Disks
   (T&D for maintenance, LAN/Modem/Bluetooth/IEEE1394 test disk for maintenance, Wireless LAN test disk for maintenance and Sound test disk for maintenance)
❑ A formatted working disk (Floppy disk test)
❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
❑ An external CRT monitor supporting monitor ID (Expansion test)
❑ A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
❑ A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
❑ A music CD (Sound test)
❑ A CD-RW test media (CD-ROM/DVD-ROM test)
❑ A USB test module (USB test)
❑ A USB cable (USB test)
❑ LAN wraparound connector (LAN test)
❑ Module cable and RJ11 connector checker (Modem test)
❑ Headphones (Sound test)
❑ A microphone (Sound test)
❑ A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)
❑ PC card wraparound connector (Expansion test)
❑ RS-232C wraparound connector (Async test)

3.1.2 H/W (Hardware) initial information setting tool

The H/W initial information setting tool consists of the following programs.

- ❑ Initial configuration
- ❑ Region write
- ❑ DMI information save
- ❑ DMI information recovery
- ❑ System configuration display
- ❑ E2PROM test (MAC/GUID/DMI)

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

- ❑ The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

 You will need the following equipment to perform this program.

- ❑ The Diagnostics Disk (Main T&D)

3.2   Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive.

2. Release the lock of the power switch and turn on the computer with pressing the **F12**.
    Select the FDD in the display for selecting booting unit. Then, press **Enter** and the
    following menu appears.

```
Microsoft Windows XX Startup Menu
-----------------------------------------------------------

1. Repair Main (T&D)
2. Repair initial config set
3. Repair Heatrun (T&D)

Enter a choice: 1
```

To start the Diagnostics menu (T&D), press **1** and **Enter** .
To start the H/W initial information setting tool, press **2** and **Enter**.
To start the Heatrun test, press **3** and **Enter**.

NOTE: When replacing the system board, be sure to execute the following procedures.

> *(1)Before replacing the system board, execute subtest03 "DMI information save"
> in 3.3 Setting of the hardware configuration in order to save the DMI information
> from system board to floppy disk.*
>
> *(2)After replacing the system board, execute the subtest04 "DMI information
> recovery" and subtest08 "System configuration display" in 3.3 Setting of the
> hardware configuration in order to copy the DMI information and system
> information from the floppy disk.*

3.2.1 Diagnostics menu (T&D)

After pressing **1** and **Enter** in the startup menu, the following menu appears.

```
TOSHIBA personal computer Common DIAGNOSTICS
Version X.XX (c) copyright TOSHIBA Corp. 20XX

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 - ONLY ONE TEST
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS

                              ↑↓→← : 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. If a test program is in progress, press* **Ctrl** *+* **C** *to stop the test program.*

Set the highlight bar to **1**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

```
TOSHIBA personal computer Common DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX

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 - CD-ROM/DVD-ROM TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU

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

Functions 1 through 12 are the Diagnostic Tests. Function 88 sets the floppy disk
drive and hard disk drive error retry count (0-255).

To exit the submenu of the Diagnostic Test and returns to the Diagnostics Menu, set
the highlight bar to function 99 and press **Enter**.

Select the option you want to execute and press **Enter**. When you select `1- SYSTEM
TEST`, the following message will appear:

```
SYSTEM TEST NAME    XXXXXX  xxxxxxx 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    : XXXXX    STATUS      : XXX

SUB-TEST MENU :

01 - ROM checksum
02 - Fan ON/OFF
03 - Geyserville
04 - Quick charge
05 - DMI read
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.*

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

```
TEST LOOP  : YES (or NO)
ERROR STOP : YES (or NO)
```

Use the right and left arrow keys to move the cursor to the desired option.

Selecting **YES** of TEST LOOP increases the pass counter by one, each time the test cycle
ends and restarts the test cycle.

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

Use the up and down arrow keys to move the cursor to "ERROR STOP".

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

Selecting **YES** of ERROR STOP 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. When an error occurred, the error status is displayed and one error is added to the error counter.

Table 3-1 in section 3.5 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.

3.2.2 H/W initial information setting tool

After selecting this test, the following menu appears in the display.

```
################################################################
######    H/W initial information setting tool  VX.XX     ######
################################################################
*     1 ............................ Initial configuration                  *
*     2 ............................ Region write                            *
*     3 ............................ DMI information save                    *
*     4 ............................ DMI information recovery                *
*     8 ............................ System configuration display            *
*     9 ............................ E2PROM test (MAC/GUID/DMI)               *
****************************************************************
... Press test number[1-4,8,9] ?
```

For more details on this test, refer to the section 3.3.

3.2.3 Heatrun test program

Heatrun test starts executing the same subtest as 3.23 RUNNING TEST.

For more details on this test, refer to the section 3.4.

3.3   Setting of the hardware configuration

To execute this program, select `2-Repair initial config test` in the startup menu, press **Enter** and follow the directions on the screen. The H/W initial information setting tool consists of four subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Initial configuration

This subtest executes the following items and shows their contents in the display. When an item ends normally, the program proceeds automatically to the next one. When an error is found, the program stops and waits for key input. (After solving the problem, the program executes the item again.)

Setting of the CPU set table
Setting of the microcode
Setting of the EHSS
Inputting and writing of DMI information

When the DMI information is displayed, the following messages appear in order. Input each information. (If you do not replace the PCB, the DMI information should not be changed.)

1. "Enter Model Name ?" is displayed. Input the computer's model name and press **Enter**. (e.g. PORTEGE)

2. "Enter Version Number ?" is displayed. Input the computer's version number and press **Enter**. (e.g. PC18070C313S)

3.   "Enter Serial Number ?" is displayed. Input the computer's serial number and press **Enter**. (e.g. 12345678)

4. "Enter Model Number ?" is displayed. Input the computer's sales model number and press **Enter**. (e.g. PP200-AAAAA)

5.   "Enter Bundle Number ?" is displayed. Input the computer's PCN/Bundle number and press **Enter**.
    (e.g. PMSREQ3Q34H/S0123456789)

6. "Write data OK (Y/N) ?" is displayed. To write the DMI information to the Flash ROM, press **Y**, and then **Enter**.

7. "Create DMIINFO TXT (Y/N) ?" is displayed. Press **Y,** then the DMI information (text data) is written to the Floppy disk, etc.

Setting of the HWSC
Setting of the UUID
Display of the DMI information (including UUID)
Setting of DVD region code (Yes/No)

After completion of the above settings, H/W configuration & DMI information are appeared in order. Check the contents and press **Enter**.

Following message appears in the display. Press any key, then return to the H/W initial information setting tool menu.

```
+-----------------------------------------------+
+  It switches off the power on automatically.  +
+-----------------------------------------------+
Press any key to continue...
```


Subtest 02   Region write

This subtest executes the setting of the region code for DVD drive based on the destination of the machine.

When the region code is already written, test ends without setting.

The following message appears in the display after setting the region code. Press any key to return to the H/W initial information setting tool menu.

```
***********************************
*******    It completed    *******
***********************************
*                                 *
Press any key to continue...
```

Subtest 03   DMI information save

NOTE: Before replacing the system board, be sure to execute this subtest and save the DMI information to the floppy disk.

This is one of tools to copy the DMI information to a new PCB after replacing.

This subtest saves all the DMI data in a floppy disk.

Subtest 04　　　DMI information recovery

NOTE: 1. After replacing the system board, be sure to execute this subtest and copy the
DMI information to a new system board.

2. Since the data of UUID is updated every time when this subtest, DMI
information recovery, is done, the saved UUID data is not written

This is one of tools to copy the DMI information to a new PCB after
replacing.

This subtest writes all the DMI data in the floppy disk into the new PCB.

Subtest 08　　　System configuration display

This subtest displays the information of the system configuration.

Confirm the contents and press **Enter**.

For more details on the system configuration information, refer to 3.25
"System configuration".

Subtest 09　　　E2PROM test (MAC/GUID/DMI)

It checks whether the MAC address, GUID of IEEE1394 and DMI
information are written.

3.4   Heatrun Test

To execute this program, select `3-Repair heatrun` in the startup menu, press **Enter**.

After selecting the test, the same subtests as 3.23 RUNNING TEST are executed successively.

For more details on the procedure and test content, refer to RUNNING TEST.

When the heatrun test ends, following message appears in the display.

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 HEATRUN TEST END
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
Press any key to continue...
```

Press any key and return to the startup menu.

NOTE: The test result (Errorlog.txt) is stored in the floppy disk. The result is displayed in the same way as 3.22 LOG UTILITIES. For more detail in the display, refer to LOG UTILITIES.

3.5   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 Name
1	SYSTEM	01	ROM checksum
		02	Fan ON/OFF
		03	Geyserville
		04	Quick charge
		05	DMI read
2	MEMORY	01	Conventional memory
		02	Protected Mode
		03	Protected Mode (cache off)
		04	Cache memory (on/off)
		05	Stress
3	KEYBOARD	01	Pressed key code display
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
		07	LCD Brightness
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wrap around
7	ASYNC	01	FIR/SIR Point to point (send)
		02	FIR/SIR Point to point (receive)
		03	Wrap around (board)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		05	Partial Read
		06	Write specified address
		07	Read specified address
		08	Sequential write
		09	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 wrap around [Not supported]
		03	RGB monitor ID
13	CD-ROM /DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	RW 1point W/R/C

3.6   System Test

To execute the System Test select **1** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions 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 (range: F0000h to FFFFFh, 64KB) on the System Board.

Subtest 02   Fan ON/OFF

This subtest turns on/off the fan motor by force with Fan ON/OFF commands.

The following message will appear.

```
Fan number select (1;FAN#1(CPU), 2;FAN#2(GPU), 0; FAN#1&#2)?
```

To check the CPU fan, press **1** and **Enter**.
To check the GPU fan, press **2** and **Enter**.
To check both CPU fan and GPU fan, press **0** and **Enter**.

The following message will appear.

```
*** Test Fan Revolution 0000RPM start
```

Make sure the fan does not rotate, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution Low speed Start
```

Make sure the fan rotates at low speed, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution High speed Start
```

Make sure the fan rotates at high speed, then press **Enter**.

After a while, the fan rotating will stop.

Subtest 03   Geyserville

If the CPU supports Gerserville (SpeedStep), this Subtest checks that the CPU operating clock speed can be changed.

Subtest 04   Quick Charge

This subtest checks the status for the quick charge.

Subtest 05   DMI read

This subtest displays the information in the Flash-ROM in the following format.

```
*** DMI Data Display Ver X.XX ***

Model Name       : XXXXXXXXXXX
Version Number   : XXXXXXXXXXXX
Serial Number    : XXXXXXXX
Model Number     : XXXXXX-XXXXX
UUID Number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

To exit this subtest and return to the SYSTEM test menu, press **Enter**.

3.7 Memory Test

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

Subtest 01   Conventional memory

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

Subtest 02   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 (from 1MB to maximum MB), and reads the new data and compares the result with the original data.

Subtest 03   Protected Mode (Cache off)

                     This subtest executes the same way as the subtest02 with the cache off.

Subtest 04   Cache Memory

                     To test the cache memory, a pass-through write-read comparison of '5Ah' 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 05   Stress

                     Data (from 1MB to the maximum MB) is written from the 16KB write buffer to the 16KB read buffer and compared the data in the buffers. The read buffer starts from 0001 and the comparison is continued with the following read buffer addresses: 0001, 0003, 0005, 0007, 0009, 000b, 000d and 000f.

3.8 Keyboard Test

To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Pressed key code display

When a key is pressed, the scan code, character code, and key top name are displayed on the screen in the format shown below. The **Ins Lock**, **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 key top 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
```

3.9   Display Test

To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   VRAM read/write for VGA

This subtest writes the constant data (AAh and 55h) to the video RAM. The data is read 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.
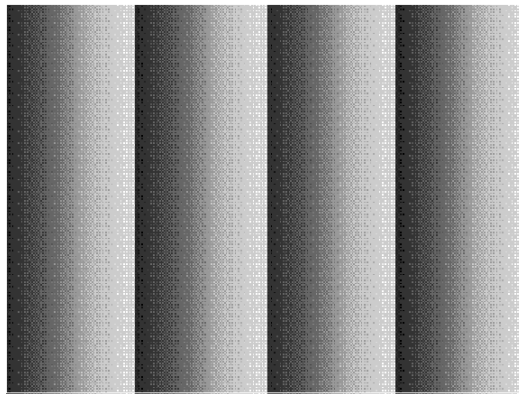
To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03   Gradation for LCD

This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

Subtest 04   Gradation & Mode test for VGA

This subtest displays gradations for following modes. To change the mode, press **Enter**.

```
[Mode 12]
[Mode 13]
[Mode 3]
[Mode 111   640*480  64K]
[Mode 112   640*480  16M]
[Mode 114   800*600  64K]
[Mode 115   800*600  16M]
[Mode 117  1024*768  64K]
[Mode 118  1024*768  16M]
```

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

[Mode 12]

(Display example: Mode 12)

To exit this subtest and return to the DISPLAY TEST menu, press **Enter** after displaying the Mode 118**.**

Subtest 05   All dot on/off for LCD

This subtest displays an all-white screen then an all-black screen. The display changes automatically every three seconds, then returns to the DISPLAY TEST menu.

Subtest 06   "H" Pattern Display

This subtest displays a full screen of "H" patterns.

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

To exit this subtest and return to the DISPLAY TEST menu, press **Enter.**

NOTE: The last row may not be completely filled. This condition does not indicate on error.

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

Super-Bright —> Bright —> Semi-Bright —> Bright —> Super-Bright

After displaying with Super-Bright of LCD brightness, return to the DISPLAY TEST menu.

3.10 Floppy Disk Test

> *CAUTION*: *Before running the floppy disk test, prepare a formatted work disk. Remove the Diagnostics Disk and insert the 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. After selecting the Floppy Disk Test from the DIAGNOSTIC TEST MENU, messages to execute the test drive number, media type and test start truck will be displayed successively. Answer each question with an appropriate response to execute the test.

1. The following message will appear. Select the media mode and start track to be tested, then press **Enter.**

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

2. The Floppy Disk test contains five subtests that test the FDD.
    The floppy disk test menu will appear after you select FDD test parameters.

```
FLOPPY DISK            XXXXXXX    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 - Sequential read
02 - Sequential read/write
03 - Random address/data
04 - Write specified address
05 - Read specified address
99 - Exit to DIAGNOSTIC TEST MENU




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

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  IN PROGRESS  XXXXXXX │ 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
```

When the subtest 04 or 05 is selected, the following messages will appear on the screen. Select the test data (subtest 04 only), track number and head number you want to test.

```
Test data      ?? (subtest 04 only)
Track No.      ??
Head No.        ?
```

Subtest 01   Sequential read

               This subtest performs a Cyclic Redundancy Check (CRC) that continuously reads all the tracks (track: 0 to 39/0 to 79) on a floppy disk.

Subtest 02   Sequential read/write

               This subtest continuously writes data pattern B5ADADh to all the tracks (track: 0 to 39/0 to 79) on a floppy disk. 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 (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 04   Write specified address

               This subtest writes the data specified by an operator to a specified track, head, and address.

Subtest 05   Read specified address

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

3.11 Printer Test

CAUTION*: Printer Test is not supported for this model.*

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The following messages will appear after selecting the Printer Test from the DIAGNOSTIC TEST MENU. Answer each of the questions with an appropriate response to execute the test.

NOTE*: An IBM compatible printer must be connected to the system to execute this test. Also, printer port wraparound connector must be connected.*

The following message will appear, after selecting the subtest 01 to 03 of the printer test:

```
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[\]^_`abcdefghijklmno
:"#$%£'()*+,-./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:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
opqrstuvwxyz{|}~
```

Subtest 03   Wraparound

NOTE: *To execute this subtest, a printer wraparound connector must be connected to the computer's printer port.*

        This subtest checks the output and bi-directional modes of the data control and status lines through the parallel port wraparound connector (34M741986G01). (Both output and bi-directional modes are tested.)

3.12 Async Test

To execute the Async Test, select **7** 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 and 02 require the following data format:

    Method: Asynchronous
    Speed: 38400BPS
    Data: 8 bits and one parity bit (EVEN)
    Data pattern: 20h to 7Eh

Subtest 01   FIR/SIR Point to point (send)

> ***NOTE:*** *To execute subtests 01 and 02, each computer must have access to the other computer's infrared port.*

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 FIR/SIR port.

Subtest 02   FIR/SIR Point to point (receive)

This subtest is used with subtest 01 described above. This subtest receives the data from the send side, then sends the received data through the FIR/SIR port.

Subtest 03   Wraparound (on board)

> ***NOTE:*** *To execute this subtest, an RS-232C wraparound connector must be connected to the RS-232C port.*

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

3.13 Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter,** and follow the directions on the screen.

> *CAUTION:*   *When executing subtest02, 03, 04, 06, 08 and 09, the message [The hard disk will be destroyed.] will be displayed. The contents of the hard disk will be erased when these tests are executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.*
>
> *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 pre-installed 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 operating system instructions.*

When a 2nd HDD is installed, the following messages will appear after selecting the hard disk test from the DIAGNOSTIC TEST MENU.

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

1. Input the number of HDD test and press **Enter**.

2. This message is used to select the error dump operation when a data compare error is detected. Select **1** or **2**.

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

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

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

4. 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 XXXXXXX        ┌─────────────────────────────────┐
                              │ 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
```

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 of the section 3.18.

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:

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03   Random address/data

This subtest writes random data in a random length to random addresses. 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 (listed below) to a cylinder, then reads the data while moving from cylinder to cylinder. (Test the data interference in the neighbor track)

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'150449'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D25044'	7 cylinder

Subtest 05   Partial Read

This subtest reads 1GB data which is in minimum, middle and maximum address of the HDD area.

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   Sequential write

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

Subtest 09   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.

3.14 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. 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 messages 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**.

3. The date is updated and the following messages will appear:

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

    Enter new time:

    PRESS [ENTER] KEY TO EXIT TEST
    ```

4. If the current time is not correct, input the correct time in 24-hour format. To enter "**:**", press **Shift + ;**. The time is updated.

To exit the test, press **Enter**.

Subtest 02   Backup memory

This subtest checks the following backup memories:

Writes 1-bit of "on" data (01h through 80h) to address 0Eh through 7Fh

Writes 1-bit of "off" data (FEh through 7Fh) to address 0Eh through 7Fh

Writes the data pattern AAh and 55h to the address 0Eh to 7Fh

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

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. Make sure the date and time are displayed in the following format:

```
Current date  :  12-31-1999
Current time  :  23:59:58
```

The real time increments are automatically executed and the following is displayed:

```
Current date :  01-01-2000
Current time :  00:00:00

PRESS [Enter] KEY TO EXIT TEST
```

To exit the test, press **Enter**.

3.15 NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

Subtest 01   NDP

This test checks the following functions of NDP:

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

3.16 Expansion Test

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

Subtest 01   PCMCIA wraparound

> *CAUTION*: *PCMCIA wraparound test is not supported for this model.*

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

This subtest 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*: *When selecting the subtest number01, the following message will appear:*
>   *Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?*

Subtest 02   RGB monitor ID

> ***NOTE:*** *To execute this subtest, an external monitor with monitor ID function is*
> *required.*

Connect the external monitor to the PC for the test of ID acquisition.

The judgment of acquisition is based on the panel data. In simultaneous display mode or internal display mode, in which the panel data is acquired, this subtest will fail. Therefore, make sure only the external display is selected when executing this subtest.

3.17 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

> *NOTE: For the subtest 01, 02 and 03, use the TOSHIBA CD-ROM TEST DISK TDY-01 or ABEX TEST CD-ROM TCDR-702 and DVD-ROM TEST DISK TSD-1. For the subtest 04, use a CD-RW media on the market.*

Subtest 01   Sequential read

This subtest is a sequential reading of one-block units (2K bytes) of all the 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   RW 1point W/R/C

This subtest writes, reads and compares data at one point on a CD-RW media.

3.18 Error Code 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)

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 03 04 05 06 07 08 09 10	ROM - CHECKSUM ERROR ROM - SERIAL ID WRITE ERROR ROM - NOT SUPPORTED PS-SYSTEM ROM - SENSING ERROR(AC-ADAPT) ROM - SENSING ERROR(1st Batt) ROM - SENSING ERROR(2nd Batt) ROM - THORMISTOR ERROR(1) ROM - THORMISTOR ERROR(2) ROM - THORMISTOR ERROR(3)
Memory	01 02 DD	RAM - PARITY ERROR RAM - PROTECTED MODE NO CHANGE' RAM - CACHE MEMORY ERROR
Keyboard	FE FD F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 FA EF ED	USB - GET DESCR.ERROR (FIRST) USB - SET ADDRESS ERROR HUB - GET DESCR.ERROR(Top 8B) HUB - GET DESCR.ERROR (Whole) HUB - SET CONFIGURATION ERROR HUB - GET DESCR.ERROR(DESCR.) HUB - SET FEATURE ERROR(P ON) HUB - GET STATUS ERROR HUB - SET FEATURE ERROR(RESET) HUB - CLEAR FEATURE ERROR HUB - CLEAR FEATURE1 ERROR HUB - SET FEATURE ERROR(Enab.) HUB - CLEAR FEATURE2 ERROR USB - OVER CURRENT ERROR USB - GET DESCR.ERROR(SECOND)'
Display	EE	VRAM SIZE NOT SUPPORT

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

Device name	Error code	Error status name
FDD	01	FDD - BAD COMMAND ERROR
	02	FDD - ADDRESS MARK NOT FOUND
	03	FDD - WRITE PROTECTED
	04	FDD - RECORD NOT FOUND
	08	FDD - DMA OVERRUN ERROR
	09	FDD - DMA BOUNDARY ERROR
	10	FDD - CRC ERROR
	20	FDD - FDC ERROR
	40	FDD - SEEK ERROR
	80	FDD - TIME OUT ERROR
	60	FDD - NOT DRIVE ERROR
	06	FDD - MEDIA REMOVED
	EE	FDD - WRITE BUFFER ERROR
Printer	01	PRT - TIME OUT
	08	PRT – FAULT
	10	PRT - SELECT LINE
	20	PRT - OUT OF PAPER
	40	PRT - POWER OFF
	80	PRT - BUSY LINE
ASYNC	01	RS232C - [DTR ON] TIME OUT
	02	RS232C - [CTS ON] TIME OUT
	04	RS232C - [RX READY] TIME OUT
	08	RS232C - [TX FULL] TIME OUT
	10	RS232C - PARITY ERROR
	20	RS232C - FRAMING ERROR
	40	RS232C - OVERRUN ERROR
	80	RS232C - LINE STATUS ERROR
	88	RS232C - MODEM STATUS ERROR
	05	SIR - TIME OUT ERROR
	06	FIR - TIME OUT ERROR
HDD	05	HDD - HDC NOT RESET ERROR
	07	HDD - DRIVE NOT INITIALIZE
	09	HDD - DMA BOUNDARY ERROR
	0B	HDD - BAD TRACK ERROR
	BB	HDD - UNDEFINED ERROR
	08	HDD - OVERRUN ERROR (DRQ ON)
	01	HDD - BAD COMMAND ERROR
	02	HDD - ADDRESS MARK NOT FOUND
	04	HDD - RECORD NOT FOUND ERROR
	10	HDD - ECC ERROR
	20	HDD - HDC ERROR
	40	HDD - SEEK ERROR
	80	HDD - TIME OUT ERROR
	11	HDD - ECC RECOVER ENABLE
	AA	HDD - DRIVE NOT READY

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

Device name	Error code	Error status name
(HDD)	CC E0 0A EE DA 12	HDD - WRITE FAULT HDD - STATUS ERROR HDD - BAD SECTOR HDD - ACCESS TIME ERROR HDD - NO HDD HDD - DMA CRC ERROR
NDP	01 02 03 04 05 06	NDP - NO CO-PROCESSOR NDP - CONTROL WORD ERROR NDP - STATUS WORD ERROR NDP - BUS ERROR NDP - ADDITION ERROR NDP - MULTIPLAY ERROR
EXPANSION	C1 C3 C4 C5 C6 C7 C8 CB CC CE CF	ADDRESS LINE ERROR CE#1 LINE ERROR CE#2 LINE ERROR DATA LINE ERROR WAIT LINE ERROR BSY# LINE ERROR BVD1 LINE ERROR ZV-Port ERROR NO PCMCIA CARD TYPE ERROR ZV_CONT# ERROR
CD-ROM /DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 B0	BAD COMMAND ILLEGAL LENGTH UNIT ATTENTION MEDIA CHANGE REQUEST MEDIA DETECTED ADDITIMAL SENSE BOUNDARY ERROR CORRECTED DATA ERROR DRIVE NOT READY SEEK ERROR TIME OUT RESET ERROR 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 two 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 listed 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	DRY (Drive ready)	"0" … Hard disk drive is not ready to accept any command. "1" … Hard disk drive is ready.
5	DWF (Drive write fault)	"0" … DWF error is not detected. "1" … Write fault condition occurred.
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	COR (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 an error.

Table 3-4 Error register contents

Bit	Name	Description
7	BBK (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	IDN (Identification)	"0" … Not used "1" … There is no ID field in the requested sector.
3	——	Not used
2	ABT (Abort)	"0" … Not used "1" … Illegal command error or command abort.
1	TK0 (Track 0)	"0" … The hard disk 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   Only One Test

3.20.1 Program Description

This program tests the unique functions of this model.

3.20.2 Operations

Select test **2** from the DIAGNOSTIC MENU and press **Enter**. The following menu appears in the display.

```
###############################################################
########           Only One Test Menu (XXXXXXXXX)       #######
###############################################################
*                                                             *
*    1 ............   Pressed Key Display                     *
*    2 ............   Touch Pad                               *
*    3 ............   Kill Switch                             *
*    4 ...........    USB                                     *
*    5 ...........    LED                                     *
*    6 ...........    Acceleration sensor                     *
*    7 ...........    Button                                  *
*                                                             *
*    9 ...........    Common Test                             *
*                                                             *
***************************************************************
.... Press test number[1-7, 9] ?
```

Input the subtest number you want to test and press **Enter**.

To return to the DIAGNOSTIC TEST menu, select **9** and press **Enter**.

Subtest 01   Pressed key display

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 the key character that was pressed. Holding a key down enables the auto-repeat function which causes the key's display character to blink.

Press **Del + Enter** to end the test.
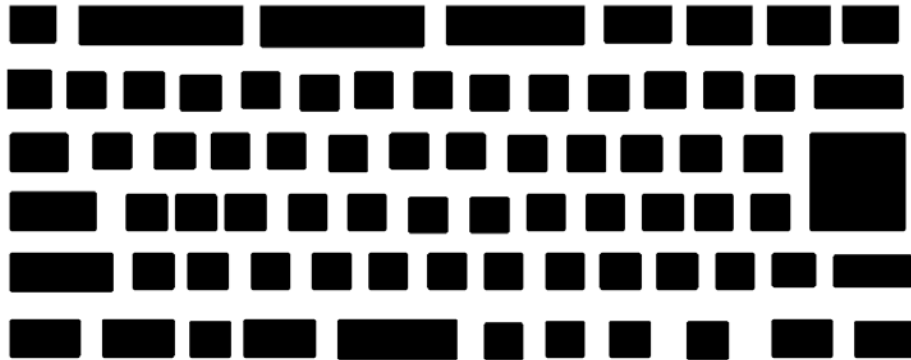
```
IF TEST OK, Press [Dell][Enter]key
```

Subtest 02   Touch Pad

This subtest checks the functions of the touch pad as shown below.
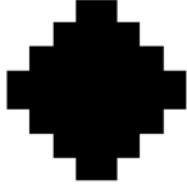
A) Direction and parameter
B) Switching function check.

This test displays the response from the touch pad and touch pad switch.
When moving your finger on the touch pad towards the upper left, the
`<POINTING>` display changes according to the following illustration. If a
touch pad switch is pressed, the `<BUTTONS>` displays appear on the right
side one by one. The parameters appear above the `<BUTTONS>` (1) or (2)
corresponding to the pressed touch pad switch highlights. To end this subtest,
press two touch pad switches at the same time.

```
         *** IPS(PAD) TEST PROGRAM (Vx.xx) ***

      <POINTING>                    <PARAMETER>
                                    STATUS:0000h
                                    X-RATE:0000h
             ◆                      Y-RATE:0000H

                                      <BUTTON>
                                     (1)     (2)

                                     ▢      ▢


             << PRESS BUTTON1+BUTTON2 THEN END >>


         *** IPS(PAD) TEST PROGRAM (Vx.xx) ***

      < POINTING >                  <PARAMETER>
                                    STATUS: 0018h
                                    X-RATE: OK
                                    Y-RATE: OK



                                      <BUTTON>
                                     (1)     (2)

                                     ▢      ▢

             << PRESS BUTTON1+BUTTON2 THEN END >>
```

Subtest 03   Kill Switch

This subtest checks if the Wireless communication switch works properly.

If the test is started with the switch ON, the following message appears in the display.

```
        Kill switch is set to a start position (OFF)
```

Slide the switch to OFF position. Then, the following message appears in the display.

```
        KILL SWITCH ON !!
```

Slide the switch to ON position. Then, the following message appears in the display.

```
        KILL SWITCH OFF !!
```

After Sliding the switch to OFF position, the screen returns to the Only One Test menu automatically.

Subtest 04   USB

NOTE: When executing this subtest, USB test module and USB cable must be connected.

This subtest checks if USB ports work properly.

The following menu appears in the display.

```
################################################################
########          USB Port Select (XXXXXXXX)          #######
################################################################
*                                                              *
*   0 ............   Port 0  (Back)                            *
*   1 ............   Port 1  (Left side back)                  *
*   2 ............   Port 2  (Left side front)                 *
*                                                              *
*   9 ............   EXIT to Only One Menu                     *
*                                                              *
****************************************************************
.... Press test number[0-2, 9] ?
```

Connect the USB test module and USB cable to the computer.

Input the test port number and press **Enter**.

OK message appears in the display if the test ends without an error.

NG message appears in the display if an error is found during the test. Confirm the connection of cable, and then execute the test again.

Press **9** and **Enter** to return to Only One Test menu.

Subtest 05   LED

This subtest checks if each LED lights properly.

The following message appears in the display in order. Follow the instructions in the display to execute the test.

```
[HDD Access LED test]
```

Confirm the LED of HDD status blinks properly.

Press any key and following message appears in the display.

```
[Caps/Num/Overlay BT/W-LAN LED test]

(1) Press [Caps Lock ] key ! ...Caps      (on/off)
(2) Press [Fn + F10  ] key ! ...Arrow     (on/off)
(3) Press [Fn + F11  ] key ! ...Num       (on/off)
(4) Slide [BT/W-LAN switch L&R]!          (on/off)
```

Confirm corresponding LED lights properly.

Press **Enter** and following message appears in the display.

```
Check [DC-IN]&[Power]&[Main Battery] LED= Green/Orange
```

Check if the each LED lights in the same color shown in the display (Message switches Green <-> Orange).

Press **Enter** to return to the Only One Test menu.

Subtest 06   Acceleration sensor

This subtest detects and corrects the each axis (X, Y, Z).

NOTE: *Make sure that this subtest is executed on the following condition:*

1.   *Flat desk with vertical plane to get the stability of machine.*

2.   *Prevent the machine from shake or shock.*

<Example>
Set the machine
against the vertical plane
with the Front upward

Vertical plane

Flat desk
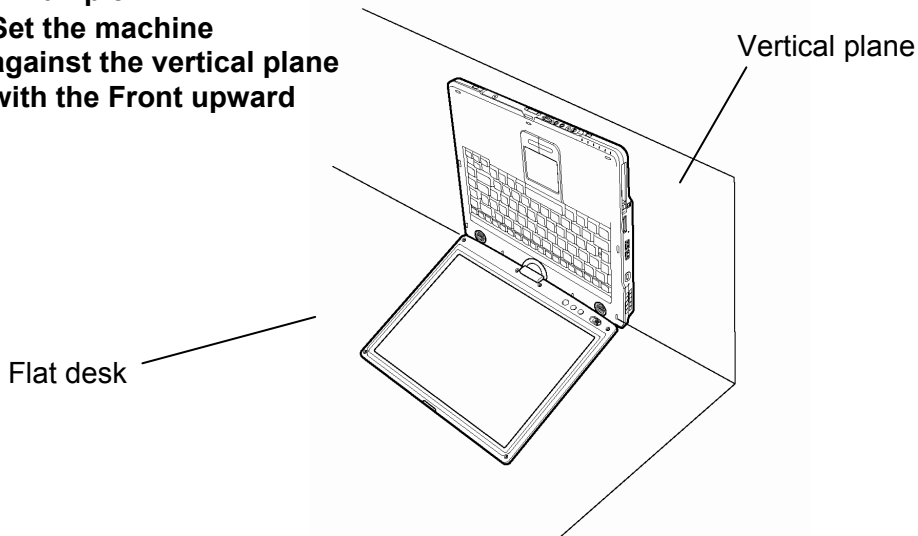
The figure below shows the name and position of each side.

Top
(heaven surface)

Back

Right side
(right)

Left side
(left)

Front
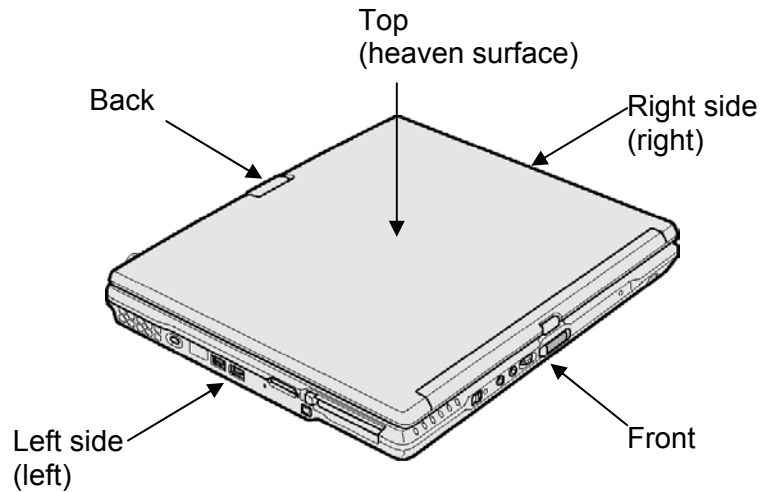
Figure 3-1 Name and positions of each side

When this subtest is selected, the following message appears in the display.

```
The heaven surface establishes in the upper direction
Press [Enter] key
```

NOTE: Be sure to execute the test with the display panel opened.

Set the machine on the flat desk. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The back establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the back of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The right establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the right side of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The front establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the front of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The left establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the left side of machine upward. Then press **Enter** to detect the data on this setting of machine.

When there is no defective during the all checks above, the following message appears in the display. Then press **Enter** and return to the Only One Test menu.

```
** Setting OK! **
Press [Enter] key
```

When a defective is found during the each check above, the following message appears in the display. The test is halted at the point when the defective is found.

```
** Setting ERROR! **
Press [Enter] key
```

Press **Enter** and return to the Only One Test menu. Then execute the test again.

Subtest 07   Button

This subtest checks if the buttons in the following figure work properly.
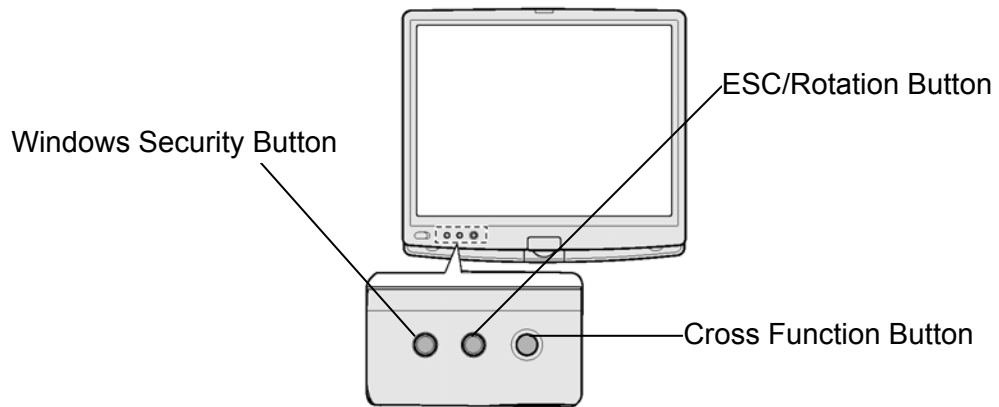
The following message appears in the display.

```
Press [Windows Security Button] key
```

Press Windows security button. Then the following message appears in the display.

```
Press [Escape/Rotation Button] key
```

Press Escape/Rotation button. Then the following message appears in the display.

```
Press [Cross Function Button] key
```

Press Cross Function button. If the test ends successfully, the screen returns to the ONLY ONE TEST menu automatically.

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 test **4** from 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, then 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.

3.22   Log Utilities

3.22.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can store data on a floppy disk, or output the data to a printer or the display.

The error information is displayed in the following order:

1. Error count (CNT)
2. Test name, Subtest number (TS-No)
3. Pass count (PASS)
4. Error status (STS)
5. FDD/HDD or memory address (ADDR)
6. Write data (WD)
7. Read data (RD)
8. HDC status (HSTS)
9. Error status name (ERROR STATUS NAME)

If the power switch is turned off, the error information will be lost.

3.22.2 Operations

1. Select **5** and press **Enter** in the DIAGNOSTIC MENU, the error information is displayed in the following format:

```
XXXXX ERRORS
CNT   TS-NO    PASS STS   ADDR     WD RD HSTS [ERROR STATUS NAME]

001   FDD 02   0000 103   00001    00 00 0000 FDD-WRITE PROTECTED
001   FDD 01   0000 180   00001    00 00 0000 FDD-TIME OUT ERROR
  |     |    |    |    |      |              |   |    |              |
  |     |    |    |    |      |    Address   |   |  HDC status       |
  |     |    |    |    |  Error status       |   |                   |
  |     |    |    |  Pass count              |  Read data            |
  |     |    | Subtest number               |             Error status name
  |     |  Test name               Write data
  | Error count
```

`[[1:Next,2:Prev,3:Exit,4:Clear,5:Print,6:FD Log Read,7:FD Log Write]]`

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 01)
2. Memory test (subtests 01, 02, 06)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtests 01)

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

3.23.2 Operations

1. Select **6** from the Diagnostic Menu and press **Enter,** the following messages for selectable tests will appear in the display in order.

    ```
    FDD write/read test (Y/N)?
    Printer wrap around test (Y/N)?
    Serial wrap around test (Y/N)?
    CD-ROM/DVD-ROM test (Y/N)?
    ```

2. To execute the test, press **Y** and **Enter**. To cancel the test, press **N** and **Enter**. If you select the selectable tests, follow the instruction message in the display.

3. After selecting the selectable tests, the running test starts automatically. 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. It is different from the Toshiba MS-DOS FORMAT command.*

This program can format a floppy disk in the following formats:

(a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.

(b) 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.

4. HDD ID READ

This program reads the hard disk ID and displays hard disk model number.

3.24.2 Operations

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

   ```
   [ FDD UTILITIES ]

   1 - FORMAT
   2 - COPY
   3 - DUMP
   4 - HDD-ID READ
   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, 3:2HD) ?
   ```

   (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,3:2HD) ?
```

    (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) The following message will appear.

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

    (e) Remove the source disk from the FDD, then insert a formatted work disk and press any key. The following message will appear and start copying to the target disk.

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

    (f) 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) ?
```

    (g) To copy another disk, type **1** and the message from step (a) is 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 2:HDD is selected, the display will go to step (h). If
1:FDD is selected, the following message will appear:

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

(c) Select a drive number and the following message will be displayed.

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

(d) If 3:2HD is selected, the following message will appear. Select a media mode.

```
2HD media mode (1:1.20MB, 2:1.44MB, 3:1.23MB)?
```

(e) The following message will appear:

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

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

```
──── Max. address ────
[Track ] = XXXX
[Head  ] = XX
[Sector] = XX

Track number ????
```

(g) Set the track number, head number and sector number you want to dump. The
system will access the disk and dump a list. Then the message shown in (k)
will appear.

(h) The following message will appear when selecting 2:HDD in (a).

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

(i) Select a drive number and the following message will be displayed.

```
---Max. address ---
[LBA ] = XXXXXXXX

LBA number ????????
```

(j) Set the LBA number you want to dump. The system will access the disk and
dump a list.

(k) The following message will appear. To finish the dump, select **3**.

```
Press number key (1:up,2:down,3:end) ?
```

(l) The following message will appear. Selecting **2** returns to the FDD UTILITIES MENU.

```
Another dump (1:Yes,2:No) ?
```

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #1]    [Drive #2]
Model No.              = XXXXXXX   =  YYYYYYY
```

Press **Enter** to return to the FDD UTILITIES MENU.

3.25 System Configuration

3.25.1 Function Description

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

1. Processor Type [Code/L2 cache]
2. Chip set [VRAM]
3. BIOS ROM version [1st ID, 2nd ID]
4. Boot ROM version
5. EC/KBC version
6. PS Microprocessor version
7. SVP parameter version [Panel/Manufacture code/Product code]
8. Microcode revision [Processor number]
9. Total Memory Size [Conventional memory]
10. Battery code
11. HWSC
12. FSB [Voltage]
13. The number of printer ports
14. The number of ASYNC ports
15. Math co-processors
16. Floppy Disk Drive [Track/Head/Sector]
17. Hard Disk Drive [Sector/Drive size/Manufacture code]
18. Optical Disk Drive [Maker/Drive type/Manufacture code/Product code]
19. T&D total version
20. Date/Time

3.25.2 Operations

Select **8** from the DIAGNOSTIC MENU and press **Enter.** Then, the following system configuration appears in the display.

```
System Configuration Display : Ver X.XX [Machine Name ???]

*  - Processor Type     = XXXXXX-XXXXXMHz      Code = XX     L2 Cache = XXXXXKB
*  - Chip set           = XXXXXX                 VRAM = XXXXXXMB
*  - BIOS ROM Version   = VX.XX    1st ID = XXH, 2nd ID = XXH
*  - BOOT ROM Version   = VX.XX
*  - EC/KBC Version     = VX.XX
*  - PS Micom Version   = VX.XX
*  - SVP Par. Version   = VX.XX    (Panel=XXXXXXXXX, Manu=XXXX, Prod=XXXX)
*  - Microcode Revision = VX.XX    (Processor=XXXh)
*  - Total Memory Size  = XXXXXXMB (Conventional Memory = XXXKB)
*  - Battery Code       = XXXXXXXXXXXX
*  - HWSC               = XXXXXXX
*  - FSB                = XXXXXMHz (Voltage = XEh)
*  - X Printer Adapter    LPT1 = XXXX  LPT2 = XXXX  LPT3 = XXXX
*  - X ASYNC Adapter      COM1 = XXXX  COM2 = XXXX  COM3 = XXXX
*  - X Math CO-Processor
*  - X Floppy Disk Drive(s) Track = XX  Head = XX, Sector = XX
*  - X Hard Disk Drive(s)  #1 Sectors  = XXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXX]
                           #2 Sectors  = XXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXX]
*  - ODD Drive          = XXXX XXXXXXXX XXXXXXXXX [XXXXXXXXXXXX]

*  - T&D Total Version  = VX.XX

Press [Enter] Key        [Date = XXXX-YY-ZZ, XX:YY:ZZ]
```

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

3.26 Wireless LAN Test Program (Intel-made b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Diagnostics disk for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U.**

The following menu appears in the display.

```
******Intel Calexico 11b/g Card Maintenance test Menu******
*                                                          *
*     1 : SKU check of Module                              *
*                                                          *
*     2 : MAC Address Check                                *
*                                                          *
*     3 : Antenna Check & communication test of 11b mode   *
*                                                          *
*     4 : Communication test of 11g mode                   *
*                                                          *
*     5 : All the tests of Calexico 11g Card               *
*         (SKU & MAC Check, 11b/g communication test)      *
*                                                          *
************************************************************

SELECT TEST No, (1-5) :
```

To execute the subtest, input the subtest number and press **Enter**.

Subtest01   SKU check of module

               This subtest displays SKU information on the wireless LAN card installed.
               Selecting this subtest, following message will appear in the display. Confirm
               if the right information on the wireless LAN card is described.

```
               ************************************************************
               *                                                          *
               *     Module  : Intel Calexico 802.11b/g (MoW)             *
               *     G-code  : G36C0000X310                               *
               *     PBA No. : C55369                                     *
               *                                                          *
               ************************************************************
```

               If a defective is found during the test, **NG** message will appear in the display.

               Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
*************************************************************
         MAC = XXXXXXXXXXXX
*************************************************************
*************************************************************
*                                                           *
*      MAC Address Check : OK !!                            *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

If a defective is found during the test, following message will appear in the display.

```
*************************************************************
         ERROR: MAC all 0
         MAC = XXXXXXXXXXXX
*************************************************************
*************************************************************
*                                                           *
*      MAC Address Check : NG !!                            *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Antenna check & communication test of 11b mode

Caution: *To execute subtest 03-05, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11b and 802.11g)*

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
Connect the responder machine to the access points (for 802.11b and 802.11g) with a cross cable and turn on the access points.

Insert the floppy disk containing the wireless LAN test program into the FDD of the responder machine and turn on the responder machine.

This subtest checks the connection and communication of wireless LAN antenna of Calexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
*************************************************************
*                                                           *
*              Main Antenna Test : NG !!                    *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11g mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11g mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
*************************************************************
*                                                           *
*              11g Communication Test : NG !!               *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest05   All the tests of Calexico 11b/g Card

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Calexico 802.11b/g card. The test stops at when a defective is found. For more details, refer to each subtest.

3.27 Wireless LAN Test Program (Intel-made a/b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11a/b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Diagnostics disk for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U.**

The following menu appears in the display.

```
************************************************************
*       Intel Calexico2 11a/g Maintenance T&D Menu         *
*                                                          *
*       1 : SKU check of Module                            *
*                                                          *
*       2 : MAC Address Check                              *
*                                                          *
*       3 : Antenna Check & communication test of 11b mode *
*                                                          *
*       4 : Communication test of 11a mode                 *
*                                                          *
*       5 : Communication test of 11g mode                 *
*                                                          *
*       6 : All the tests of Calexico2 11a/g Card          *
*           (SKU & MAC Check, 11a/b/g communication test)  *
*                                                          *
************************************************************

SELECT TEST No, (1-6) :
```

To execute the subtest, input the subtest number and press **Enter**.

Subtest01   SKU check of module

This subtest displays SKU information on the wireless LAN card installed. Selecting this subtest, following message will appear in the display. Confirm if the right information on the wireless LAN card is described.

```
************************************************************
*                                                          *
*       Module  : Intel Calexico 802.11a/g (MoW)           *
*       G-code  : G36C00018510                             *
*       PBA No. : C67287                                   *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display.

Press any key and following message will appear in the display.

```
***************************************************************
*                                                             *
*                     SKU NG !!                               *
*                                                             *
*           Other Card or Module not found                    *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
***************************************************************

        MAC = XXXXXXXXXXXX

***************************************************************

***************************************************************
*                                                             *
*       MAC Address Check : OK !!                             *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

If a defective is found during the test, following message will appear in the display.

```
***************************************************************

        ERROR: MAC all F
        MAC = XXXXXXXXXXXX

***************************************************************

***************************************************************
*                                                             *
*       MAC Address Check : NG !!                             *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Antenna check & communication test of 11b mode

Caution: *To execute subtest 03-06, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11a, 802.11b and 802.11g)*

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
Connect the responder machine to the access points (for 802.11a, 802.11b and 802.11g) with a cross cable and turn on the access points.

Insert the floppy disk containing the wireless LAN test program into the FDD of the responder machine and turn on the responder machine.

This subtest checks the connection and communication of wireless LAN antenna of Calexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
************************************************************
*                                                          *
*              Aux Antenna Test : NG !!                    *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11a mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11a mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
**************************************************************
*                                                            *
*              11a Communication Test : NG !!                *
*                                                            *
**************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest05   Communication test of 11g mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11g mode.

For more details on procedure and contens of this subtest, refer to Subtest04 Communication test of 11a mode.

Subtest06   All the tests of Calexico 11a/b/g Card

This subtest checks SKU information, MAC address of Calexico 802.11a/b/g card, antenna connection and communication test of Calexico 802.11b card and communication test of Calexico 802.11a and Calexico 802.11g. The test stops at when a defective is found. For more details, refer to each subtest.

3.28 Wireless LAN Test Program (Askey-made)

This section describes how to perform the wireless LAN transmitting-receiving test (Askey-made Atheros b/g, a/b/g).

Caution: *To execute subtest 03-07, use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests.*

Another wireless communication tool with 2.4GHz like Bluetooth is interfering with the test. Execute this test in the condition where no interference around the computer.

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
To execute subtest 03-07, responder machine with wireless LAN communication function (Atheros-made) is required. To set the responder machine, follow the procedures below.

1. Insert the test program disk to the FDD of responder machine and turn on the power.

2. Start the program for responder machine automatically.

3. The program for responder machine is set.

Setting the tester (DUT) machine

1. Insert the test program disk 1 to the FDD of tester machine and turn on the power.

2. The program disk 1 is executed and following message will appear in the display.

```
*************************************************************
*                                                           *
*              Atheros MB4x Maintenance T&D (DUT)           *
*                                                           *
*              Please exchange for DUT media 2              *
*************************************************************

Please input the "S" key and push the "Enter" key :
```

3. Take out the program disk 1 and insert program disk 2. Then, press **S** and **Enter**.

4. Executing program disk 2, following menu will appear in the display. To execute the subtest, press test number and **Enter**.

```
*************************************************************
*      Atheros MB4x(MB44ag/43g) Maintenance T&D Menu        *
*                                                           *
*      1 : SKU check of Module                              *
*                                                           *
*      2 : MAC Address Check                                *
*                                                           *
*      3 : Communication test of 11a mode(MB44ag)           *
*                                                           *
*      4 : Communication test of 11b mode(MB44ag/MB43g)     *
*                                                           *
*      5 : Communication test of 11g mode(MB44ag/MB43g)     *
*                                                           *
*      6 : All the tests of MB43g Module                    *
*          (SKU & MAC Check, 11b/g communication test)      *
*                                                           *
*      7 : All the tests of MB44ag Module                   *
*          (SKU & MAC Check, 11a/b/g communication test)    *
*                                                           *
*************************************************************

SELECT TEST No, (1-7) :
```

Subtest01   SKU check of module

This subtest displays SKU information on the wireless LAN card installed. Selecting this subtest, following message will appear in the display. Confirm if the right information on the wireless LAN card is described.

```
*************************************************************
*                                                           *
*      Module  : Atheros MB44ag (RoW)                       *
*      G code  : G36C00010310                               *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
*************************************************************
*                                                           *
*        MAC Address Check : OK !!                          *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Communication test of 11a mode (MB44ag)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11a mode. Check the packet, throughput and RSSI and compare them with the standard.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
*************************************************************
*                                                           *
*                11a Communication Test : NG !!             *
*                                                           *
*                Please refer to log. txt                   *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

Open the log file (log.txt) and check the result.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11b mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11b mode.

For more details on the contents, refer to subtest 03.

Subtest05   Communication test of 11g mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11g mode.

For more details on the contents, refer to subtest 03.

Subtest06   All the tests of MB43g Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

Subtest07   All the tests of MB44ag Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11a mode, Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

3.29 LAN/Modem/Bluetooth/IEEE1394 Test Program

This section describes how to perform the LAN/Modem/Bluetooth/IEEE1394 test with the test program.

Insert the test program disk for LAN/Modem/Bluetooth/IEEE1394 test in FDD and turn on the power. The following message will appear:

```
Microsoft Windows XX Startup Menu
---------------------------------

        1.   LAN

        2.   Modem

        3.   Bluetooth

        4.   IEEE1394

Enter a choice:
```

Press the number you want to test and press **Enter**.

> *NOTE: It is impossible to go back to startup menu once you choose the test. Therefore, LAN/Modem/Bluetooth/IEEE1394 test can not be executed successively.*

3.29.1   LAN test

To execute LAN test, press **1** and **Enter**. The following message will appear:

```
###################################################################
#########   i82562 ICHx Gbe (i82540) Diagnostics program    #####
###################################################################
*                                                                 *
*   1 ............   (i82562 + ICHx)                              *
*                                                                 *
*   2 ...........    (Gbe)                                        *
*                                                                 *
*******************************************************************
.... Press test number[1-2] ?
```

Press the number you want to test and press **Enter**.

Subtest01   (i82562 + ICHx)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip.

The following message will appear:

```
[LAN transmit & receive test !]

                       COMPLETED  Repeat count  =    00000
                                  Error count   =    00000

LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
 Destination Address    = xxxxxxxxxxxx
 Source Address         = xxxxxxxxxxxx

   ** 100Base-TX Full-Duplex **
   < TRANSMIT >
   < RECEIVE >
```
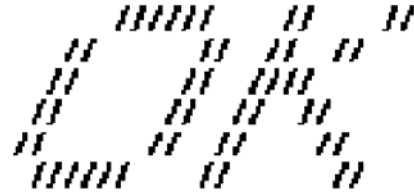
```
   ######   ##    ##
  ##       ##  ##  ##
  ##       ##  ####
  ##       ##  ## ##
  ##       ##  ##   ##
   ######   ##       ##
```

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

If a defective is found, **NG** message will appear in the display.

Subtest02   (GbE)

CAUTION: *Gigabit Ethernet test is not supported for this model.*

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip. Select **2** to execute and press **Enter**.

The following message will appear:

```
Testing adaptor...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
*  1000Base Auto-negotiation TxRx Test
*
*  CE Test Complete
```
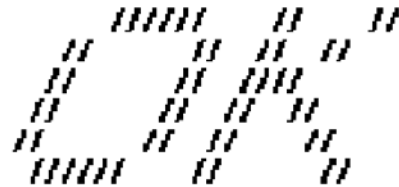
NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

If a defective is found, **NG** message will appear in the display.

3.29.2   Modem test

For this subtest, connect the modem PCB and RJ11 connector with a harness. Use the dedicated "FAT-MODE inspection device (product code: QE2000P01 made by Nitto Denki Seisakusyo)" for the tests.

To execute Modem test, press **2** and **Enter**. Following message will appear:

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize        :OK
* Digital Loopback Test           :OK
* RJ11 Connector Check (LED)      :(Operator's Check!!)
```

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

RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

```
...Press Key (Y = OK , N =NG)
```

If the color in the LED of the connection checker is orange, press **Y**, otherwise, press **N**.

3.29.3   Bluetooth test

┌───┐
│ *CAUTION*: *Bluetooth test is not supported for this model.*   │
└───┘

To execute this test, input **3** and press **Enter**.

┌───┐
│ *Note*: Use another computer that can communicate by the Bluetooth as a reference │
│   machine to perform this test.   │
└───┘

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The following Bluetooth test menu will appear:

```
######################################################################
####           Bluetooth sub system test program VX.XX           ####
######################################################################
*                                                                    *
*              1....BD_ADDR check                                    *
*                                                                    *
*              3... Communications test (DUT mode)                   *
*                                                                    *
*              T....communications test (TEST mode)                  *
*                                                                    *
**********************************************************************
....Press test number [1, 3, T] ? _
```

Press **1** or **3** key to perform the corresponding subtest. To quit the Bluetooth test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest01   BD_ADDR check

This subtest checks the BD_ADDR functions. When the Bluetooth test menu is displayed, press **1** to select the test and press **Enter**. The following message will appear:

```
--------------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------------




   Initializing …
```

When the machine has passed the test, it displays BD_ADDR. If BD_ADDR has no problem, the following message is displayed.

```
--------------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------------


              My BD_ADDR = XXXXXXXXXXXX [h]


              PPPPPP    A      SSSSS     SSSSS
              P     P  A A   S     S S      S
              P     P  A  A  S            S
              PPPPPP  A    A SSSSS     SSSSS
              P       AAAAAA       S         S
              P       A    A S     S S      S
              P       A    A SSSSS     SSSSS
```

If the target machine has any problem, it displays Error CODE. The following message is displayed.

```
------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
------------------------------------------------------------------------


                     My BD_ADDR = XXXXXXXXXXXX [h]



                     FFFFFF    A      III   L
                     F        A A      I    L
                     F       A   A     I    L
                     FFFFFF  A   A     I    L
                     F       AAAAAAA   I    L
                     F       A    A    I    L
                     F       A    A   III   LLLLLLL
```

Table 3-5 Error message

Message	Contents
Invalid BD_ADDR (all 00)	0x000000000000
Invalid BD_ADDR (all FF)	0xFFFFFFFFFFFF
Invalid BD_ADDR (bit0=1)	bit40=1b
Invalid BD_ADDR (bit1=1)	bit41=1b
Invalid BD_ADDR (define in the file)	Defined BD_ADDR

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-6 Error code for Bluetooth test (BD_ADDR) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System for details.

Table 3-6 Error code for Bluetooth test (BD_ADDR) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

** See the Specification of the Bluetooth System in detail.

Subtest03   Communication test (DUT mode)

This subtest checks the Bluetooth communication functions. Preparing the tester machine for the Bluetooth test program. Insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Bluetooth test menu will appear:

Press **3** to select the test and press **Enter** in the target machine. The following message will appear:

When the test begins, the machine displays `BD_ADDR of the DUT`. The progress bar stops when the test is completed. The following message is displayed.

```
---------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
---------------------------------------------------------------------------
+--------------------+
|        DUT         |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+--------------------+



    Ready>>>>>>>>>>>>>>>>>>>>>>>         <- Progress Bar



                              [ESC] : Stop
```

When the Bluetooth test menu is displayed, press **T** to select the test and press **Enter** in the test machine. The following message will appear:

```
--------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------
+-----------------+
|                 |
|     Tester      |
|                 |
+-----------------+




                           [ESC]:Finish Tester  [SPACE]:Start
                           Is DUT ready?

```

Then press **Space** to start the Bluetooth communication test.

When the machine has passed the test, it displays BD_ADDR of the DUT. If the connection with the tester is completed, the progress bar stops. The following message is shown.

```
--------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------
+--------------------+
|        DUT         |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+--------------------+

   CCCC    OOO   M     M PPPPPP  L        EEEEEE TTTTTTT EEEEEE DDDDD
  C    C  O   O  MM   MM P    P  L        E         T    E      D    D
  C      O     O M M M M P    P  L        E         T    E      D     D
  C      O     O M   M M PPPPPP  L        EEEEE     T    EEEEEE D     D
  C      O     O M     M P       L        E         T    E      D     D
   C   C  O   O  M     M P       L        E         T    E      D    D
   CCCC    OOO   M     M P       LLLLLLL EEEEE      T    EEEEEE DDDDD


                        Testing is finished

A>_
```

If the target machine has any problem, the following message "INCOMPLETE" is displayed with the Error Code.

```
--------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------


+--------------------+
|        DUT         |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+--------------------+



III  N    N   CCCC    OOO   M     M PPPPPP  L       EEEEE TTTTTTT EEEEEEE
 I   NN   N  C    C  O   O  MM   MM P     P L       E        T    E
 I   N N  N  C      O     O M M M M P     P L       E        T    E
 I   N  N N  C      O     O M  M  M PPPPPP  L       EEEEE    T    EEEEEEE
 I   N   NN  C      O     O M     M P       L       E        T    E
 I   N    NN C    C  O   O  M     M P       L       E        T    E
III  N    N   CCCC    OOO   M     M P       LLLLLLL EEEEE    T    EEEEEEE



                         Testing is finished



_Press any key to continue. . .
```

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System in detail.

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

** See the Specification of the Bluetooth System in detail.

3.29.4   IEEE1394 test

To execute this test, input **4** and press **Enter**.

> *NOTE:*   *Use another computer that can communicate by IEEE1394 (i. Link) cable as a*
> *reference machine to perform this test.*

The following menu will appear:

```
********************************************************************
********      IEEE1394[XXXXX] Diagnostics program     **************
********************************************************************
*                                                                  *
*          1 ....(Transmit & Receive test)                         *
*                                                                  *
*          2 ....(Responder set)                                   *
*                                                                  *
*          3 ....(1394 GUID Display)                               *
*                                                                  *
********************************************************************
.... Press test number[1-3] ?
```

To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest01   Transmit & Receive test

> *NOTE:*   *Before executing subtest 01, be sure to execute subtest 02 in the responder*
> *machine.*

This program checks the data transporting between responder machine and target machine and compare them with the original data through the IEEE1394 cable.

Subtest02   Responder set

This program is executed in the responder machine to initialize the responder machine with the IEEE1394 cable connected to the target machine before executing subtest 01.

Subtest03   IEEE1394 GUID Display

This program checks the GUID of IEEE1394.

3.31 Sound Test program

This section describes how to perform the Sound test. To execute the sound test, refer to the following description.

Insert the test program disk for Sound test in the floppy disk drive and turn on the power. The following message will appear:

```
################################################################
######     WSS, Sound blaster pro Diagnostics program     ######
################################################################
*                                                              *
*      1 ............    Sound (Standard)                      *
*                                                              *
*      2 ...........     Sound (Legacy)                        *
*                                                              *
*      3 ...........     CD Sound (Standard)                   *
*                                                              *
*      4 ...........     CD Sound (Legacy)                     *
*                                                              *
*           ---It outputs at the speaker and lineout---        *
*                                                              *
****************************************************************
.... Press test number[1-4] ?
```

Input the test number and press **Enter**.

3.31.1 Sound (Standard) test

To execute the Sound (Standard) test, press **1** and **Enter**. The following menu will appear in the display.

```
################################################################
######      ICH4-M + AD1981A Diagnostics program      ######
################################################################
*                                                              *
*      1 ...........     ( Microphone recording & play )       *
*      2 ...........     ( Sine wave )                         *
*      3 ...........     ( Line IN recording & play )          *
*                                                              *
*      9 ...........     Exit to Main                          *
*                                                              *
****************************************************************
.... Press test number[1-3, 9] ?
```

To return to the Sound test menu, Press **9** and **Enter**. Then following message will appear in the display.

```
***********************************
********   May I Restart ?  *******
***********************************
Press any key to continue…
```

After pressing any key, the machine starts rebooting and sound test menu will appear in the display.

Subtest01   Microphone recording & play

        This subtest checks the function of the CODEC A/D, D/A converter.

        When this subtest is selected, the following message will appear.

```
[Recording & play test !]
```

        And the following message will appear.

```
DOS/4GW Protected Mode Run-time Version X.XX
Copyright (c) Tenberry Software, Inc. XXXX
```

        After this message appears, display stops briefly. In this timing, sound is recorded from internal microphone.

        After the recording is completed, the computer plays back the sound recorded after the following message.

```
STACWAVE Version X.XX
Build data: XXX XX XXXX at XX:XX:XX
Loading "mic.wav".
```

NOTE: *The message in the display might have slight difference from those above.*

        The display returns to the Sound (Standard) test menu after the test ends.

Subtest02   Sine Wave

This subtest is executed by loading the COM file (ADSIN.COM). The program expands sine wave data table from 16KB to 64KB, and creates the play data. Then it transfers the data between the DMA and the CODEC to play the sine wave. (It sounds like a continuous beep). By using wave measurable devices such as an oscilloscope, the data can be measured as a sine wave.

When the subtest is executed, the sine wave is played while expanding sine wave from 16KB to 64KB.

The display returns to the Sound (Standard) test menu after the test ends.

Subtest03   Line IN recording & play

This subtest executes the same test as the subtest01 by recorded sound from the different port (Line-in port).

For more details on the subtest, refer to the subtest01 Microphone recording & play.

The display returns to the Sound (Standard) test menu after the test ends.

3.31.2 Sound (Legacy) test

To execute the Sound (Legacy) test, select **2** and press **Enter**.

> *CAUTION*: *Sound (Legacy) test is not supported in this model.*

3.31.3 CD Sound (Standard) test

To execute the CD Sound (Standard) test, press **3** and **Enter**. Insert the test media (TOSHIBA TEST CD-ROM or ABEX TEST CD-ROM) or music CD on the market (if the test media can not be prepared). Following menu appears in the display.

For details on use of test media, refer to (1) Test media (Toshiba-made test media).
For details on use of audio CD on the market, refer to (2) Audio CD.

(1) Test media (Toshiba-made test media)

```
   CD/DVD TEST   IN PROGRESS XXXXXXXX ┌─────────────────────────────┐
                                      │ xxxxxxx 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


   01 – Japanese Narration
   02 – English Narration
   03 – Test Tone A (100Hz – 20Hz)
   04 - Test Tone B (400Hz – 3KHz L-R)


                                  Drive # = 0, ATAPI status =00
                                  Command = XX
                                  [[Block address = XXXXXXXX]]
                                  [[Block length  = XXXXXXXX]]
                                  Final : Block address = XXXXXXXXX
```

Subtest01   Japanese Narration

        Selected this subtest, narration in Japanese starts and following message appears in the display.

```
        Play start CD sound !
        Press any key <Play stop>.
```

        Press any key and stop the narration. Then return to the CD Sound (Standard) test menu.

Subtest02   English Narration

           Selected this subtest, narration in English starts.

           For more details on the procedure, refer to the subtest01.

Subtest03   Test Tone A

> *Caution: Before starting subtest03, be sure to set the sound at proper volume.*

           This subtest plays sine wave while changing its table from 100Hz to 20Hz.

           Return to the CD Sound (Standard) menu after the test ends.

Subtest 04   Test Tone B

           This subtest plays sine wave while changing its table from 400Hz to 3KHz and also changing the channel from left speaker to right speaker.

           Return to the CD Sound (Standard) menu after the test ends.

(2) Audio CD

Insert an audio CD and the following menu appears in the display.

```
CD/DVD TEST  IN PROGRESS XXXXXXXX   xxxxxxx 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




CD Sound track number (01-98 : Track) ?
                             Drive # = 0, ATAPI status =00
                             Command = XX
                             [[Block address = XXXXXXXX]]
                             [[Block length  = XXXXXXXX]]
                             Final : Block address = XXXXXXXXX
```

Select the track number you want to test and press **Enter** twice.

The following message appears in the display and selected track is played.

```
            Play start CD sound !
            Press any key <play stop>
```

After pressing any key, the music stops and the display returns to the selection menu of the track number.

> *NOTE:*   *When the CD-ROM test is executed, "ALL DEVICE" must be selected in the [Device Config.] of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.*

3.31.4 CD Sound (Legacy) test

To execute the CD Sound (Legacy) test, select **4** and press **Enter**.

> *CAUTION: Sound (Legacy) test is not supported in this model.*

3.32 SETUP

3.32.1 Function Description

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

1. Memory

2. System Date/Time

3. Battery

4. Password

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority
    (c) Network Boot Protocol

7. Others

    (a) Power-up Mode
    (b) CPU Cache
    (c) Level 2 Cache
    (d) Dynamic CPU Frequency Mode
    (e) Auto Power On
    (f) Panel power On/Off
    (g) Performance/Battery Life Setting

8. Configuration

9. I/O Ports

    (a) Serial
    (b) Parallel

10. Drives I/O

    (a) Built-in HDD
    (b) CD-ROM

11. PCI Bus

12. Display

    (a) Power On Display
    (b) LCD Display Stretch

13. Peripheral

    (a) Internal Pointing Device
    (b) External keyboard "Fn"
    (c) Parallel Port Mode

14. LEGACY EMULATION

      (a)   USB KB/Mouse Legacy Emulation

      (b)   USB-FDD Legacy Emulation

15. PCI LAN

3.32.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the followings:

```
                      SYSTEM SETUP (1/2)        ACPI BIOS version = X.XX
       ┌── MEMORY ──────────┐      ┌── BOOT PRIORITY ──────────────┐
       │ Total        = XXXXX KB │  │ Boot Priority = HDD→FDD→CD-ROM→LAN │
       └────────────────────┘      │ HDD Priority  = Built-in HDD→Second HDD │
                                    │ Network Boot Protocol = PXE    │
       ┌── SYSTEM DATE/TIME ──┐     └────────────────────────────────┘
       │ Date(MM-DD-YY)  = XX-XX-XXXX │
       │ Time(HH:MM:SS)  = XX:XX:XX   │ ┌── OTHERS ──────────────────┐
       └──────────────────────┘       │ Power-up mode      = Boot    │
                                       │ CPU Cache          = Enabled │
       ┌── BATTERY ───────────┐        │ Level 2 Cache      = Enabled*1 │
       │ Battery Save Mode = Full Power │ Dynamic CPU Frequency Mode *2 │
       └──────────────────────┘        │              = Dynamically Switchable │
                                       │                               │
       ┌── PASSWORD ──────────┐        │ Auto Power On      = Disabled │
       │ Not Registered       │        │ Panel Power On/Off = Disabled*3 │
       └──────────────────────┘        │ Standby            = Fast    │
                                       │ Language During Bootup = English*4 │
                                       └────────────────────────────────┘


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


                      SYSTEM SETUP (2/2)        ACPI BIOS version = X.XX
       ┌── CONFIGURATION ─────┐       ┌── DISPLAY ──────────────────┐
       │ Device Config. = Setup by OS │ │ Power On Display    = Auto-Selected │
       └──────────────────────┘       │ LCD Display Stretch = Enabled │
                                       │ TV Type             = NTSC (JAPAN) │
       ┌── I/O PORTS ─────────┐        └─────────────────────────────┘
       │ Parallel    = LPT1(378H/IRQ7/CH3)*5 │
       └──────────────────────┘        ┌── PERIPHERAL ───────────────┐
                                       │ Internal Pointing Device = Enabled │
       ┌── DRIVERS I/O ───────┐        │ Parallel Port Mode     = ECP *6 │
       │ Built-in HDD         │        │ Hard Disk Mode = Enabled IDE (Normal) │
       │      = Primary IDE(1F0H/IRQ14) │ └───────────────────────────┘
       │ Select Bay           │
       │      = Secondary IDE(170H/IRQ15) │ ┌── LEGACY EMULATION ─────┐
       └──────────────────────┘        │ USB KB/Mouse Legacy Emulation │
                                       │                   = Enabled │
       ┌── PCI BUS ───────────┐        │ USB-FDD Legacy Emulation = Enabled │
       │ PCI BUS    = IRQ10, IRQ11 │    └─────────────────────────────┘
       └──────────────────────┘
                                       ┌── PCI LAN ──────────────────┐
                                       │ Built-in LAN    = Enabled   │
                                       └─────────────────────────────┘


    ↓↑←→: 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. This item is displayed only when "Enabled" is set as [CPU Cache].*
>
> *2. This item is displayed only when Pentium model is used for CPU.*
>
> *3. This item is displayed only when "Resume" is set as [Power-up mode] in [OTHERS] menu box.*
>
> *4. This item is displayed only for the computer for TCL (Canada).*
>
> *5. *6. These items are displayed only when Advanced Port Replicator III is connected to the computer.*

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. Press **Fn**+↑ **(PgUp)** and **Fn** + ↓ **(PgDn)** to move between the two pages.

2. Press either the **Space bar** or **Back Space** to change the value.

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.
   ```

2. To make other changes, press **N**. Repeat the steps above.

3. 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 do not want to save your changes. When SETUP is displayed at the next time, the current configuration appears.*

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:
(1) HDD Mode
(2) Password
(3) Write Policy

SETUP Options

The SETUP screen is divided into 15 functionally related groups. This section describes each group and its options.

1. Memory

    This group of options displays the computer's memory.

    > This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

    Sets the date and time.

    > **System Date**   Sets date.
    >
    > **System Time**   Sets time.

3. Battery

    This option is used to select **Full Power**, **Low Power** or **User Setting** of the battery save mode. When you select the battery save mode, the followings will appear.

    > **Full Power**   The following shows full power settings.

    ```
    ┌──────── BATTERY SAVE OPTIONS ────────┐
    │ Processing Speed       = High         │
    │                                       │
    │ CPU Sleep Mode         = Enabled      │
    │ Display Auto off       = 30Min.       │
    │ HDD Auto off           = 30Min.       │
    │ System Auto off        = Disabled     │
    │ LCD Brightness         = Bright (*1)  │
    │                        = Super-Bright (*2) │
    │ Cooling Method         = Maximum Performance │
    └───────────────────────────────────────┘
    ```

    > **Low Power**   The following shows low power settings.

    ```
    ┌──────── BATTERY SAVE OPTIONS ────────┐
    │ Processing Speed       = Low          │
    │                                       │
    │ CPU Sleep Mode         = Enabled      │
    │ Display Auto off       = 03Min.       │
    │ HDD Auto off           = 03Min.       │
    │ System Auto off        = 30Min.       │
    │ LCD Brightness         = Semi-Bright (*1) │
    │                        = Bright (*2)  │
    │ Cooling Method         = Battery Optimized │
    └───────────────────────────────────────┘
    ```

NOTE: Display of the LCD Brightness will be changed in the condition below:
        (*1) Operating the battery
        (*2) Using the AC adapter

User Setting   Use this option to set the battery save parameters on
                          the sub-window, **BATTERY SAVE OPTIONS**.

Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

High   CPU operates at 1.6/1.7/1.8/2.0GHz (Pentium-M),
                                    at 1.3/1.4GHz (Celeron-M)
                          (Default in Full Power Mode)

Low   CPU operates at half processing speed.
                          (Default in Low Power Mode)

CPU Sleep Mode

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

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

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's
illumination off if you make no entry (including no operation of a mouse or
touch pad) for the set period of time.

Disabled   Disables display automatic power off function.

xx Min.   Automatically turns off the power to the LCD panel's
                          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.

HDD Auto Off

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

xx Min.   Automatically turns off the 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** or **30** minutes.

System Auto Off

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

It can be set only when the "Resume" id selected in [Power-up mode].

Disabled   Disables system automatic off function.

xx Min.   Automatically turns off the system if it is not used for the
                      duration set. The duration **xx** can be set from **10** to **60**
                      minutes.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility.

Semi-Bright   Less than full brightness for saving power.

Cooling Method

Maximum Performance   If the CPU becomes too hot, the fan turns on
                             automatically in a high speed to cool down the
                             CPU.

Performance   If the CPU becomes too hot, the fan turns on
                             automatically. When the CPU temperature falls
                             to a normal range, the fan turns off.

Battery optimized   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 is
                             turned off and the processing speed is increased.

NOTE: *Too hot condition may cause defect on the CPU. When the hot condition
continues, the power is automatically turned off in resume mode.*

---

4. Password

    This option sets or resets the user password for power on and instant security
    (**Fn+F1**).

    Registered   The user password has been registered.

    Not registered   The user password has not been registered.

    For details on setting the user password, refer to the User's Manual.

5.   Boot Priority

  (a) Boot Priority

       Use this option to set the priority for booting of the computer and the priority
       for the HDD for booting.

FDD→HDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: FDD, HDD, CD-ROM (*1) and LAN
HDD→CD-ROM→LAN→FDD:	The computer looks for bootable files in the following order: HDD, CD-ROM, LAN and FDD.
FDD→CD-ROM→LAN→HDD:	The computer looks for bootable files in the following order: FDD, CD-ROM, LAN and HDD.
CD-ROM→LAN→HDD→FDD:	The computer looks for bootable files in the following order: CD-ROM, LAN, HDD and FDD.
CD-ROM→LAN→FDD→HDD:	The computer looks for bootable files in the following order: CD-ROM, LAN, FDD and HDD.
HDD→FDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: HDD, FDD, CD-ROM and LAN. (Default)

       (*1) CD-ROM refers to a Optical Disk Drive.

---

*NOTE: When a floppy disc drive is not connected, it boots up from SD memory card
         in spite of selecting FDD.*

  (b) HDD Priority

       Use this option to set the starting method from hard disk drive.

       Built-in HDD → Second HDD

          : Detecting boot command from Built-in HDD (Default)

       Second HDD → Built-in HDD

          : Detecting boot command from Second HDD

---

*NOTE: If the boot command can not be detected from the prior HDD, booting
         target changes to other devices.*

 (c) Network Boot Protocol

   Use this option to set the starting method via a network.

   PXE Sets to PXE protocol. (Default)

   RPL Sets to RPL protocol.

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 Mode

   Use this option to choose between resume and boot mode.

   Boot   Turns on boot mode. (Default)

   Resume   Turns on resume mode.

 (b) CPU Cache

   Use this option to enable or disable the CPU cache.

   Enabled   Enables the CPU cache. (Default)

   Disabled   Disables the CPU cache.

 (c) Level 2 Cache

   Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option cannot be changed.

   Enabled   Enables the level 2 cache. (Default)

   Disabled   Disables the level 2 cache.

 (d) Dynamic CPU Frequency mode

   Use this option to choose a setting from the followings. When the CPU of the computer is Celeron-M, this option is not displayed.

   Dynamically Switchable

        Enables Pentium-M processor featuring Intel SpeedStep technology. (Default)

   Always High Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.

> **Always Low**   Disables Pentium-M processor featuring Intel
> SpeedStep technology and always runs the processor at
> its default speed.

(e) Auto Power On

This option displays setting for Auto Power On.

Disabled   Indicates auto power on is not set.

Enabled   Indicates auto power on is set.

When "Enabled" is selected, the following sub-window appears.

```
  ┌── OPTIONS ──────────────────────┐
  │                                 │
  │ Alarm Time          = 00:00:00  │
  │ Alarm Date Option   = Disabled  │
  │ Ring Indicator      = Disabled  │
  │                                 │
  └─────────────────────────────────┘
```

Set the parameters for the Auto Power On (automatic power on) function in
the "OPTIONS" window. To set the time, use **Space** or **BackSpace**. Press
↓ to move the cursor to the right and ↑ to move the cursor to the left when
you set the date and time.

For the **Alarm Time**, set the time to turn on the power automatically. The
"second" cannot be set. When it is set to "Disabled", the time to turn on
automatically is not set.

For the **Alarm Date Option**, set the date to turn on the power automatically.
When it is set to "Disabled", the time to turn on automatically is not set.

The **Ring Indicator** is displayed only when the computer is in Resume mode
and this function cannot be used for a PC card-type modem. When any
modem is not installed, it is not displayed.

NOTE: *1.* *Do not remove the AC adaptor and battery pack at the same time when you*
use this feature. If you do so, data saved by the resume function 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 Standby 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.

3. *This option is enabled only once, the setting is reset, after booting up.*

(f) Panel Power On/Off

This option is displayed only in the resume mode.

Enabled   Enables the Panel Power On/Off.

Disabled   Disables the Panel Power On/Off. (Default)

(g) Standby mode

Use this option to set the start speed of operation from standby mode.

Normal   Normal speed of start to Windows operation. (Default)

Fast   Quick start to Windows operation. It consumption more electricity than normal mode. It lights orange during standby mode.

NOTE: You can not choose standby mode with the setting [Fast] when the PC is running with battery.

---

7. Configuration

This option lets you set the device configuration.

All Devices   BIOS sets all devices.

Setup by OS   Initializes devices, which is needed to load an operating system. Operating system initializes other devices.

NOTE: (1)   When using installed OS, selecting "Setup by OS" is recommended.

(2)   When executing test programs, be sure to select "ALL Device.

---

8. I/O ports

    (b) Parallel

        This option sets the interrupt request level and I/O port base address for the
        parallel port. When the parallel port mode is set to **Std. Bi-direct**, the options
        are as follows:

LPT setting	Interrupt level	I/O address
LPT 1	7	378H
LPT 2	5	278H
LPT 3	7	3BCH
Not Used		Disables port

        When the parallel port mode (see settings below) is set to **ECP**, the DMA
        channel can also be set to **1** 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		Disables port	

        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 DMA. The options for this
        setting are Channel 1and Channel 3 (Default).

        ```
         ┌──── OPTIONS ────┐
         │ DMA       = Channel 3 (Default) │
         └─────────────────┘
        ```

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

9. Drives I/O

    This option displays the address and interrupt level for hard disk drive and optical
    disk drive. It is for information only and cannot be changed.

    Built-in HDD   This item cannot be changed.

    Select Bay   This item cannot be changed.

10. PCI Bus

This option displays the interrupt level for the Card Bus in the computer. It is for information only and cannot be changed.

```
PCI BUS   = IRQ10, IRQ11
```

11. Display

This group of options configures the computer's display.

   (a) Power On Display

   This option is used to select the display when booting up.

Auto-Selected	Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)
LCD+AnalogRGB	Selects both the internal LCD and the external CRT for simultaneous display.
System LCD only	Selects only internal LCD display.

NOTE: When starting the computer in Standby or Hibernation, the last configuration is saved. If data does not appear on the display you are using after starting in Standby or Hibernation, pressing **Fn+F5**.

Pressing **Fn+F5** *changes the display setting as follows in order: the internal LCD, the external CRT, both the internal LCD and the external CRT.*

When an external CRT display, which does not support SVGA mode is connected and "LCD+AnalogRGB" is selected, the external display is not displayed.

   (b) LCD Display Stretch

   LCD Display Stretch enables or disables a larger display area of the screen.

Enabled	Enables the LCD display stretch feature. (Default)
Disabled	Disables the LCD display stretch feature.

   (c) TV type

   This option allows you to select the type of TV.

NTSC (Japan)	; TV in Japanese system
NTSC (US)	; TV in the U.S. system
PAL	; TV in Europe etc. system

12. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

Enabled   Enables the touch pad. (Default)

Disabled   Disables the touch pad.

(b) Parallel Port Mode

Use this option to set information of Parallel Port Mode.

ECP   Sets the port mode to Extended Capabilities Port (ECP).
                          For most printers, the port should be set to ECP. (Default)

Std. Bi-Direct.   Sets the bi-directional setting. This setting should be used
                          with some other parallel devices.

---

*NOTE: When using Windows, the setting of "Toshiba HW setup" is enabled and the
setting of "Parallel Port Mode" is disabled.*

(c) Hard Disk Mode

Use this option to select the hard disk mode.

Enhanced IDE (normal)

Select this mode when the HDD is used for MS-DOS®,
Windows 95/98/2000/XP, or OS/2®.   (Default)

Standard IDE   Select this mode when using an OS which does not
                          support the Enhanced IDE. When this mode is selected,
                          up to 528MB is logically available and the rest of the
                          capacity is not usable.

---

*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.*

---

13. LEGACY EMULATION

    (a) USB KB/Mouse Legacy Emulation

        This option sets the Legacy support condition of the USB keyboard and the USB mouse.

        Enabled   Enables LEGACY support. (Default)
                           USB keyboard/USB mouse are available without the driver.

        Disabled   Disables LEGACY support

    (b) USB-FDD Legacy Emulation

        This option sets the Legacy support condition of the USB floppy disk drive.
        When a computer is FDD built-in model, this option is not displayed.

        Enabled   Enables LEGACY support. (Default)
                           USB floppy disk is available without the driver.

        Disabled   Disables LEGACY support

14. PCI LAN

    This option sets the Enable / Disable of the built-in LAN functions.

        Enabled   Enables built-in LAN functions. (Default)

        Disabled   Disables built-in LAN functions.

Chapter 4
Replacement Procedures

Chapter 4   Contents

Figures

4.1 Overview

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.
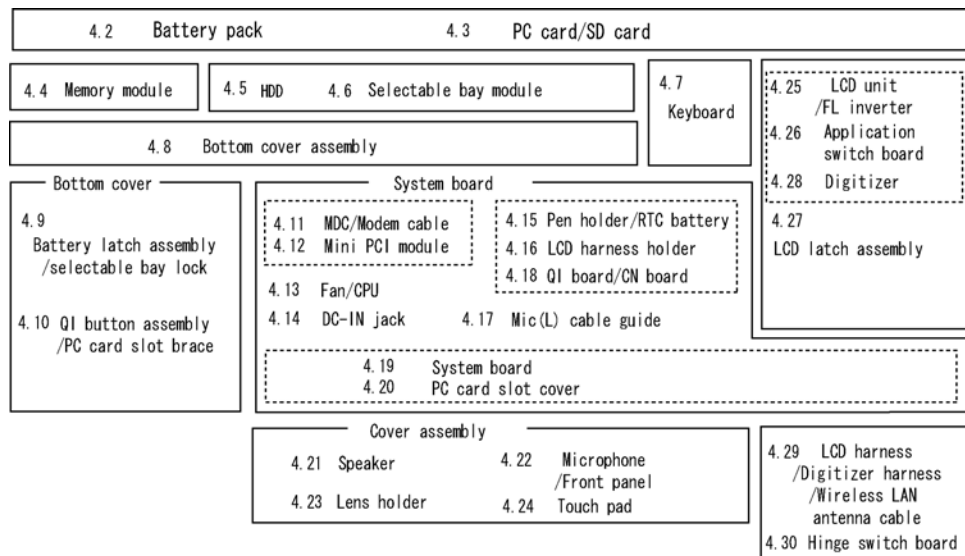
■Chart Notation

The chart shows the case for the following example:

◆Removing the Mini PCI module

All FRUs down to the "4.11 MDC/ Modem cable" unit immediately above the Mini PCI module must be removed.

Similarly, as this requires the removal of all the units from "4.2 PC card/SD card" to "4.8 Bottom cover assembly" must be also removed.
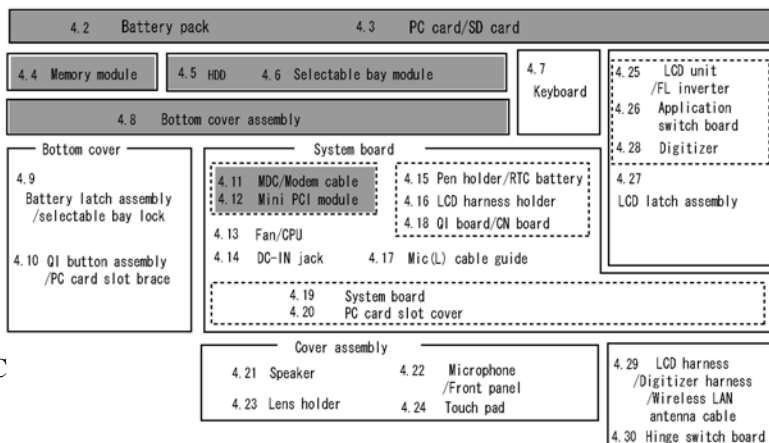
Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

Danger: 1. *In the case of the battery, always use authentic parts or equivalent parts approved by Toshiba. Other batteries may have different specifications that are incompatible with the computer and may result in fire or explosion.*
Due to the risk of alkali fluid leaks, never attempt to heat or disassemble the battery. Similarly, due to the risk of explosion, never expose the battery to flame.

2. *Some parts including the power supply and FL inverter generate high voltages. If you need to turn on the power while disassembling the computer, do not touch any connectors or other components due to the risk of electric shock. Also, do not disassemble individual parts when performing routine maintenance.*

---

*Warning:*1. *To prevent electric shock, turn off the power and unplug the AC adapter from the power source.*

2. *As the battery installed to the computer is typically already charged, the risk of electric shock remains even when the AC adapter is unplugged from the socket. To prevent electric shock, always take off any metal jewelry or accessories such as necklaces, bracelets or rings before working on the computer. Never work with wet or moist hands.*

3. *Take care not to injury yourself on any edges or corners.*

Caution: 1. *Confirm that replacement parts have compatible specifications before replacing on the computer. Never use incorrect parts as these may cause faults on the computer.*

2. *To prevent internal damage such as short circuits or burning, do not allow any screws, paper clips, or other metal objects to fall into the computer. When removing screws, always replace with the same size screw. Ensure that all screws are fully tightened. Loose screws may result in short circuits leading to overheating, smoke or flame.*

3. *To prevent electric shock, check that you have disconnected all cables from a part before removing the part.*

4. *When connecting to the AC power supply, use only an AC adapter and cable approved by Toshiba.*

5. *To prevent electric shock, ensure that all replacement parts are compatible with the computer and that all cables and connectors are securely connected.*

Before You Begin

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section "4.2.1 Battery Pack".

1. Do not disassemble the computer unless it is operating abnormally.

2. Use the designated tools.

3. Ensure that the environment for working on and storing parts does not contain any of the following.

   ❑ Dust or dirt
   ❑ Static electricity
   ❑ Extremely hot, cold, or humid conditions

4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.

5. Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly procedures in this manual.

6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.

7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.

8. When reassembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.

9. As all parts have sharp edges and corners, take care not to cut yourself.

10. After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedure

Three main types of cable connector are used.

- Pressure plate connector

- Spring connector

- Normal pin connector

When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector. Press down on both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you lift the pressure plate high enough to insert fully the cable.

For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

For back flip connectors, lifting up the flip plate frees the cable and allows it to be pulled out. To reconnect, hold the flip plate in the up position and insert the cable, then lower the flip plate to secure the cable.

Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.
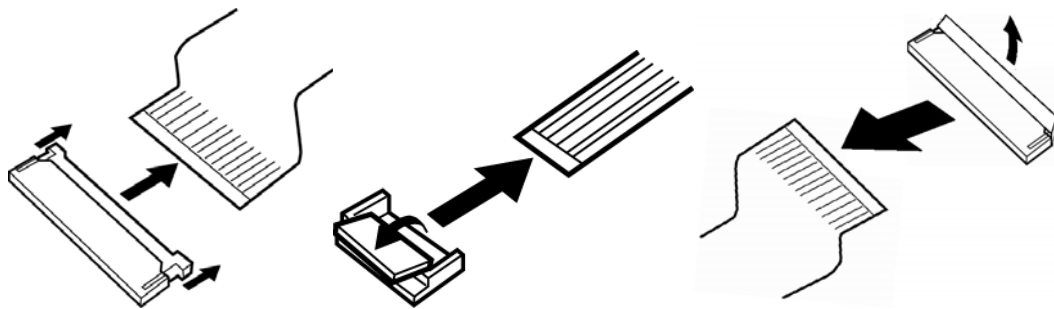
Pressure plate connector   Spring connector   Back flip connector

Assembly Procedure

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

❑ Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.

❑ Check that all cables and connectors are securely connected.

❑ Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.

❑ Check that all latches are securely closed.

❑ Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

❑ One Philips screwdriver with type 0 bit (for THIN HEAD screws)

❑ One Philips screwdriver with type 1 bit (for screws other than above)

❑ Tweezers (for lifting screws)

❑ ESD mats (lay on work table or floor)

❑ An ESD wrist strap and heel grounder

❑ Anti-static carpet or flooring

❑ A pair of needle-nose pliers

❑ Air-ionizers in highly static sensitive areas

❑ Antenna coaxial cable disconnector

Screw Tightening Torque

Use the following torque when tightening screws.

> ***Caraion***: *Overtightening may damage screws or parts. Undertightening may allow screws to loosen (and possibly fall out) causing a short circuit or other damage.*

> ***Note***: *To tighten screws quickly and accurately, an electric screwdriver is recommended.*

- ❑ M2 (2mm)   0.167 N•m (1.7 kgf •cm)

- ❑ M2.5 (2.5mm) 0.294 N•m(3.0 kgf•cm)

- ❑ M3 (3mm)   0.549 N•m(5.6 kgf•cm)

> ***Note:*** *To prevent damage to THIN HEAD screws, use type 0 pit philips screwdriver. Use, however, the PH point size "1" screwdriver for screws fixing the expansion memory slot cover and the keyboard.. Press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).*
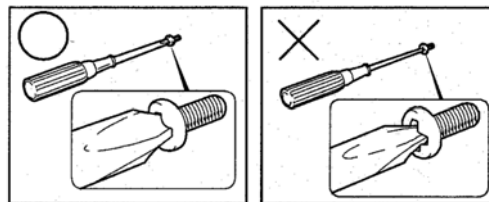
Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

- ❑ Even numbered length screws: Brown

- ❑ Odd numbered length screws: White

- ❑ Special length screw: Blue

"Special length screw" means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.6 mm and so on.

Grip area

Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Format:

Screw shape + Screw length (mm)

Screw shape

   B: Bind screw
   F: Flat head screw
   S: Super thin head screw
   T: Tapping screw
   U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm BIND screw

4.2   Battery pack

Removing the battery pack

The following describes the procedure for removing the battery pack. (See Figure 4-1.)

> **Caution:** *Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.*

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all other external devices from the computer.

3. Turn the computer upside down.

4. Release the **battery lock switch**.

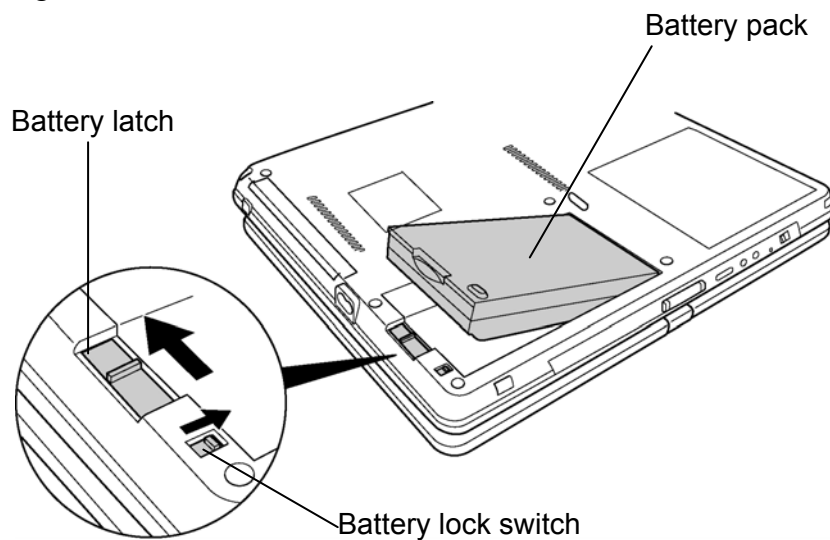5. Pull out the **battery pack** while sliding the **battery latch** toward the arrow pointing.

Figure 4-1 Removing the battery pack

> **Note**: *Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.*

Installing the battery pack

The following describes the procedure for installing the battery pack. (See Figure 4-1.)

> ***Caution:*** *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispostickerways the used batteries pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

> ***Note:*** *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all other external devices from the computer.

3. Inset the connector of the battery pack to the connector of the computer. Press the **battery pack** until the battery is locked.

4. Slide the **battery lock** into the lock position.

4.3   PC card/SD card

4.3.1 PC card

Removing a PC card

The following describes the procedure for removing a PC card. (See Figure 4-2.)

> ***Caution:*** *Insert or remove the PC card in accordance with any instructions in the PC card manual or the manuals of the computer system you are using.*

1. Push the **ejection button**. It will pop out when you release it. Press it once more to eject a PC card.

2. Pull out a **PC card** and remove it.

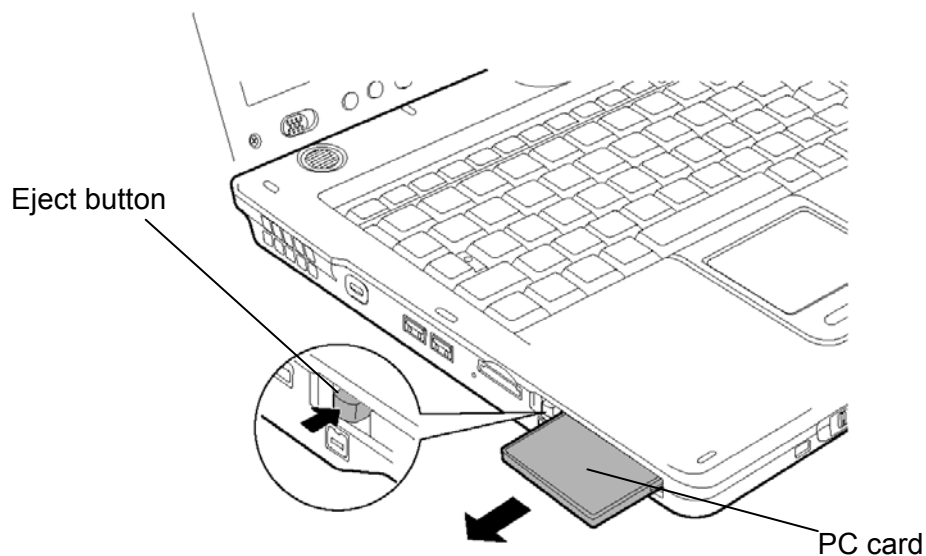3. Push in the ejection button again.

Eject button

PC card

Figure 4-2 Removing a PC card

Installing a PC card

The following describes the procedure for installing a PC card. (See Figure 4-2.)

1. Make sure the eject button does not stick out.

2. Insert a **PC card** carefully to ensure a firm connection.

4.3.2 SD card

Removing a SD card

The following describes the procedure for removing a SD memory card. (See Figure 4-3.)

> *Caution: Insert or remove a SD card in accordance with any instructions in the SD card manual or the manuals of the computer system you are using.*

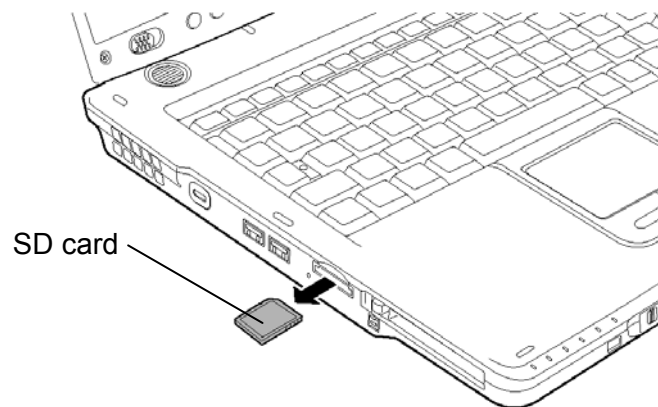1. Push a **SD card**. It will pop out partly when you release, so pull out the card.

SD card

Figure 4-3 Removing a SD card

Installing a SD card

The following procedure describes the procedure for installing a SD card. (See Figure 4-3.)

1. Insert a SD card and press it until it securely connected.

4.4 Memory module

> **Caution:** *The power must be turned off when you remove the memory module. Removing a memory module with the power on risks damaging the module or the computer itself.*
>
> *Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.*
>
> *Never press hard or bend the memory module.*

Removing the memory module

To remove the memory module(s), confirm that the computer is in boot mode. Then perform the following procedure. (See Figure 4-4.)

1. Turn the computer upside down.

2. Loosen the **screw** (with e-ring) fixing the memory slot cover.

3. Remove the **memory slot cover**.

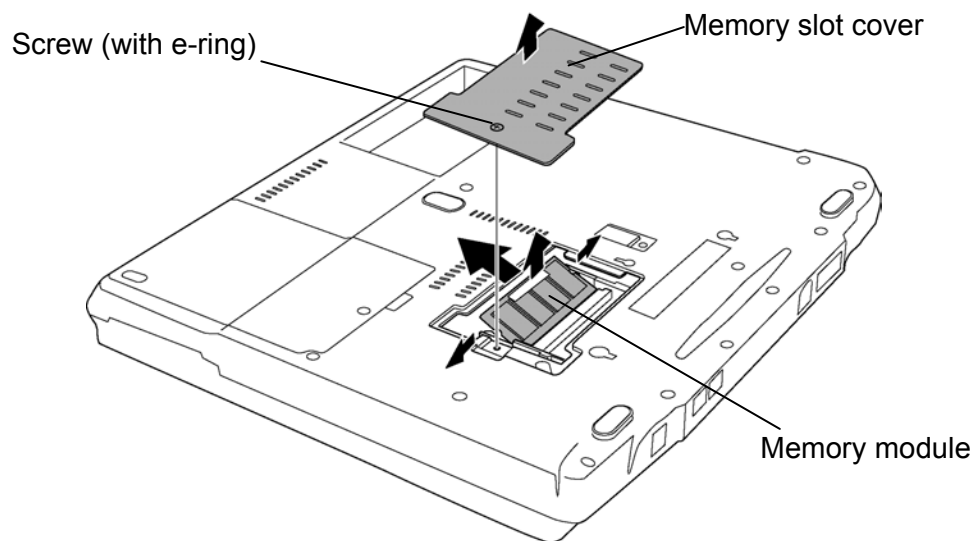4. Open the left and right **latches** and remove the **memory module(s)**.

Figure 4-4 Removing the memory module

Installing the memory module

To install the memory module(s), confirm that the computer is in boot mode. Then perform the following procedure. (See Figure 4-4.)

1. Insert the **memory module** into the connector of the computer slantwise (terminal side first) and press it to connect firmly.

Caution: *The power must be turned off when you insert the memory module. Inserting a memory module with the power on risks damaging the module or the computer itself.*

Never press hard or bend the memory module.

When installing a memory module, be careful not to insert a memory module into the expansion memory slot (inner slot).

---

2. Install the **memory slot cover**.

3. Secure the **screw** (with e-ring) to fix the memory slot cover.

4.5 HDD

Removing the HDD

The following describes the procedure for removing the HDD. (See Figure 4-5 and 4-6.)

Caution: *Take care not to press on the top or bottom of the HDD. Pressure may cause data loss or damage to the device.*

---

1. Turn the computer upside down.

2. Loosen the **screw** (with e-ring) fixing the HDD slot cover and remove the **HDD slot cover**.

3. Pull out the **HDD assembly** from the slot of the computer.

Note: *When removing the HDD assembly, be careful not to tear the laminate. If the laminate is torn, replace it with a new one.*

---

4. Disconnect the **HDD FPC** from the connector **CN1800** of system board and the connector of HDD assembly.
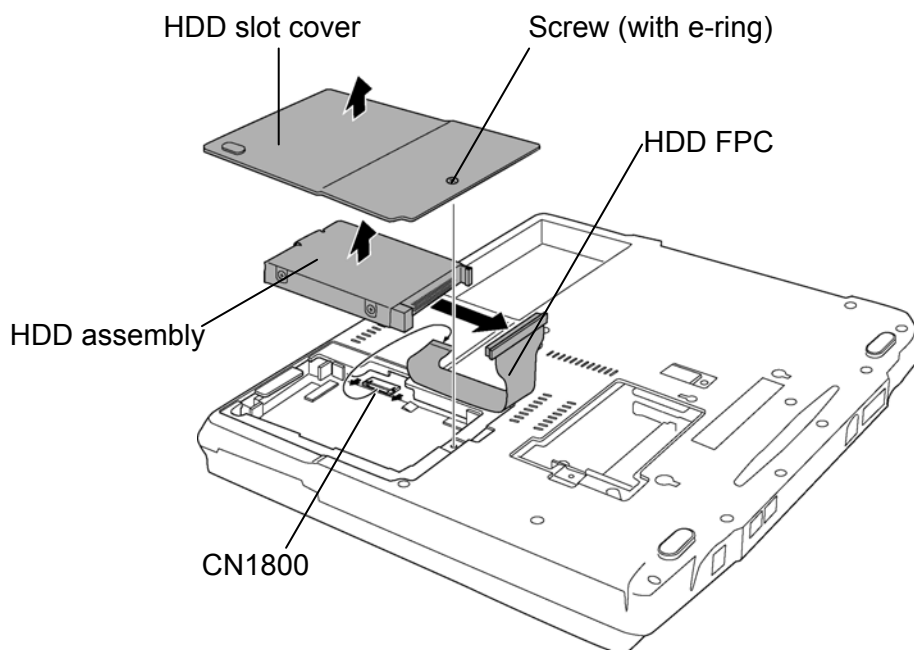

Figure 4-5 Removing the HDD FPC

5. Remove the following **screws** fixing the HDD holder.

   ❑ M3.0x4.0S   FLAT BIND screw   x4

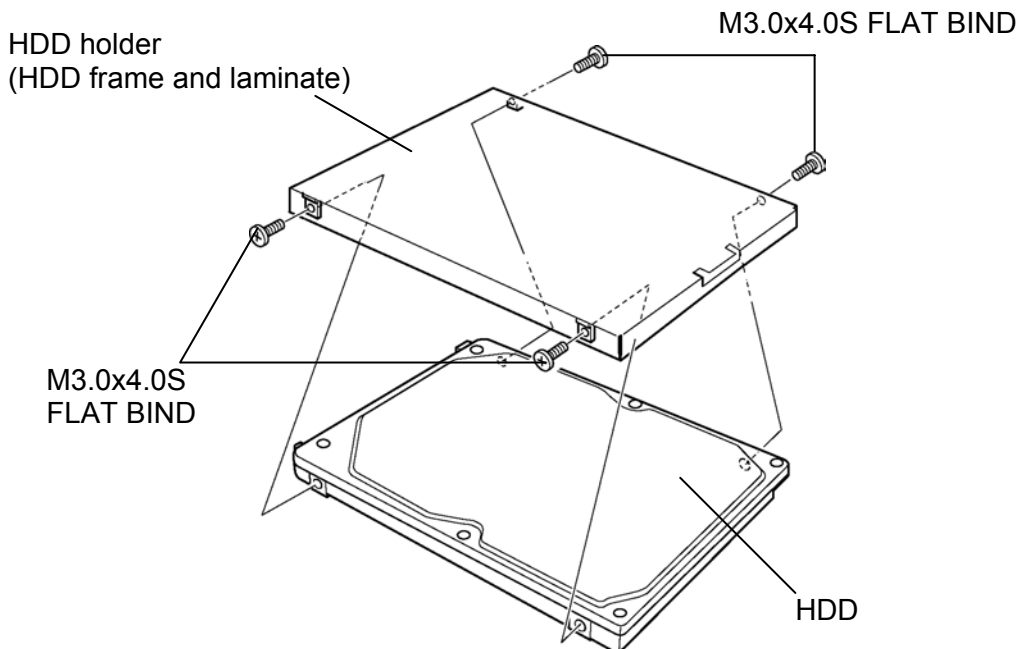6. Detach the **HDD holder** from the **HDD**.

Figure 4-6 Removing the HDD holder

Installing the HDD

The following describes the procedure for installing the HDD. (See Figure 4-5 and 4-6.)

> *CAUTION:* *HDD frame and laminate can not be reused. If you detach the laminate package from HDD frame, be sure to use a new HDD frame and laminate package when replacing.*

1. Install the **HDD holder** to the **HDD** and secure it with the following **screws**.

   ❑ M3.0x4.0S   FLAT BIND screw   x4

2. Connect the **HDD FPC** to the connector **CN1800** on the system board and the connector of the HDD assembly.

3. Set the HDD assembly to the HDD slot from the opposite side of the connector.

4. Insert the **HDD assembly** into the HDD slot of computer.

5. Install the **HDD slot cover** and secure it with the **screw** (with e-ring).

4.6   Selectable bay module

Removing a selectable bay module

The following describes the procedure for removing a selectable bay module. (See Figure 4-7 and 4-8.)

1. Turn the computer upside down.

2. Move the following **screw** (if the screw is secured in the lock screw hole) from **lock position** to **unlock position**.

   ❏ M2.5x4.0B   FLAT BIND screw   x1

3. Pull out a **selectable bay module** from the selectable bay while sliding the **lever**.
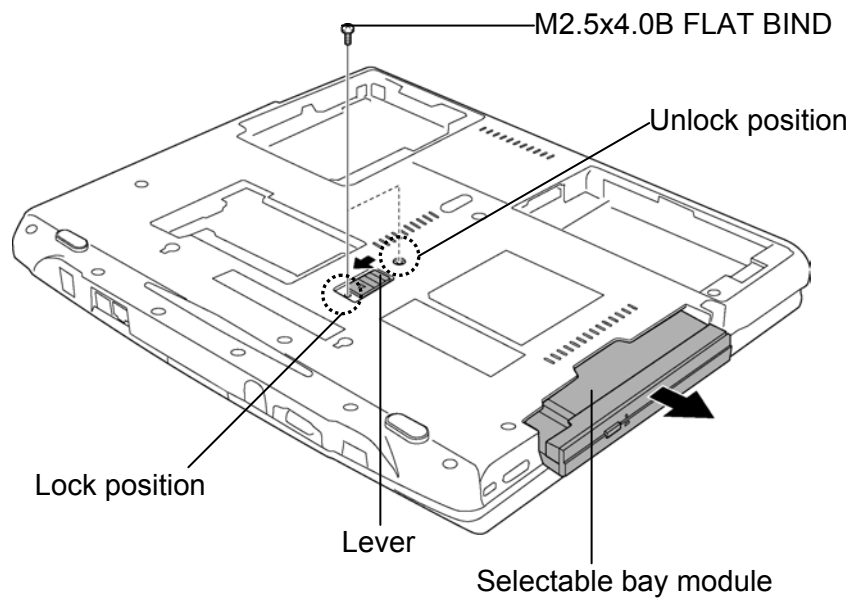

Figure 4-7 Removing a selectable bay module

4. Remove the following **screws** securing the **plastic brace** and the **OD board** and remove them.

   ❑ M2.0x8.0S   BIND screw   x2

5. Remove the following **screws** securing the **plastic frame** and remove it.

   ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x5
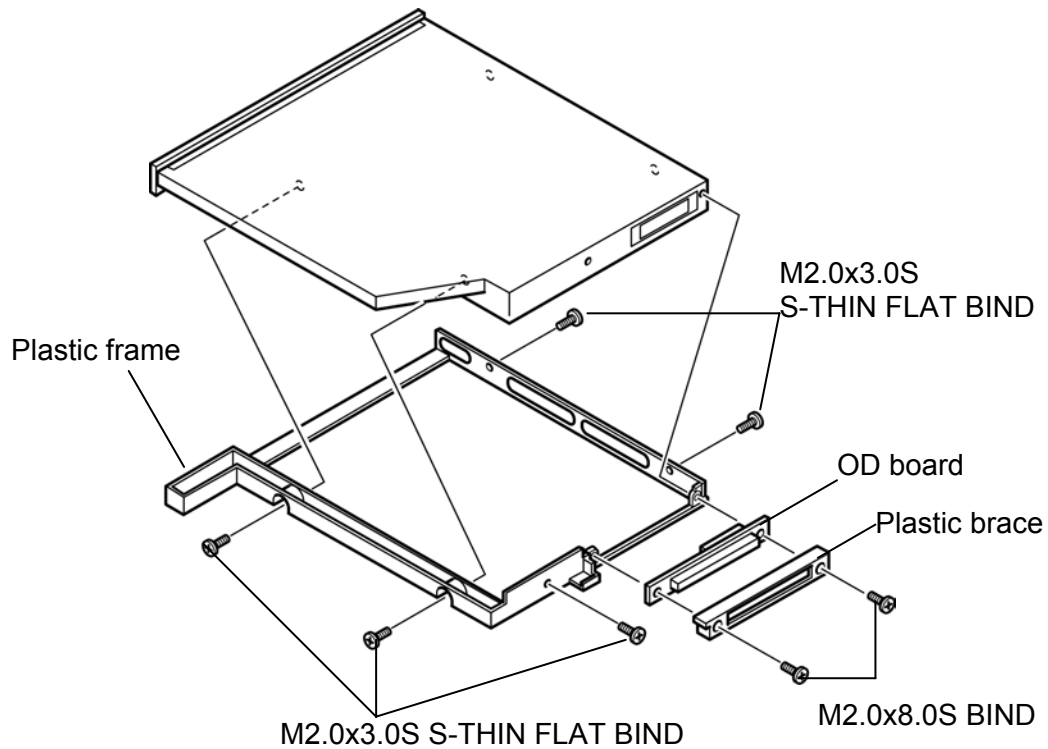
Figure 4-8 Removing the plastic frame

Installing a selectable bay module

The following describes the procedure for installing a selectable bay module. (See Figure 4-7 and 4-8.)

1. Install the **plastic frame** to the selectable bay module and secure them with following **screws**.

   ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x5

2. Install the **OD board** and **plastic brace** to the selectable bay module and secure them with following screws.

   ❑ M2.0x8.0S   BIND screw   x2

3. Insert a **selectable bay module** into the selectable bay of the computer.

4. Turn the following **screw** (if you want to lock the selectable bay) from **unlock position** to **lock position**.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

4.7   Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard. (See Figure 4-9.)

1. Open the display.

2. Insert your nails in the slot of both sides of the **keyboard holder** and lift it up.

3. Remove the following **screws** securing the keyboard.

   ❑ M2.5x2.8B   FLAT BIND screw   x2

4. Lift the top edge of the keyboard and bring the edge to the front to lay on the computer. Unlock the connector and disconnect the **keyboard flexible cable** from the connector **CN3200** on the system board.

5. Remove the **keyboard**.
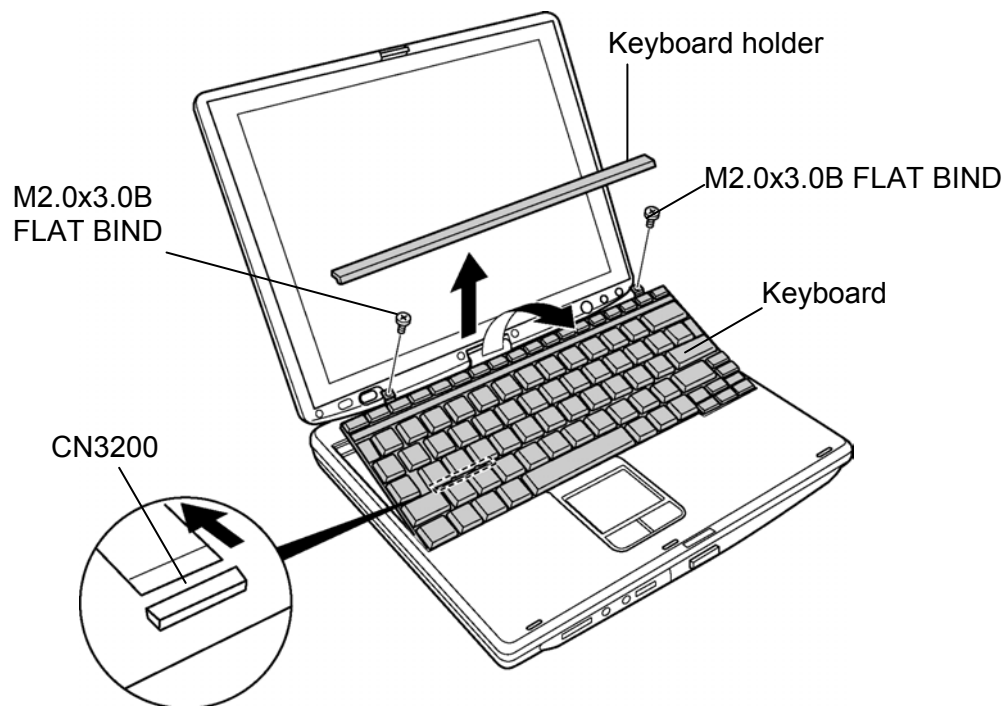
Figure 4-9 Removing the keyboard

Installing the keyboard

The following describes the procedure for installing the keyboard. (See Figure 4-9.)

1. Put the keyboard on the palm rest as its face is down. Connect **the keyboard flexible cable** to **CN3200** on the system board and lock the connector.

2. Hook the bottom edge of the keyboard to the palm rest. Place the **keyboard** on the computer and secure it with the following **screws**.

    ❑ M2.5x2.8B   FLAT BIND screw   x2

3. Fit to install the **keyboard holder**.

4.8　Bottom cover assembly

Removing the bottom cover assembly

The following describes the procedure for removing the bottom cover assembly. (See Figure 4-10 and 4-11.)

1. Disconnect the **touch pad cable** from the connector **CN3201** on the system board.
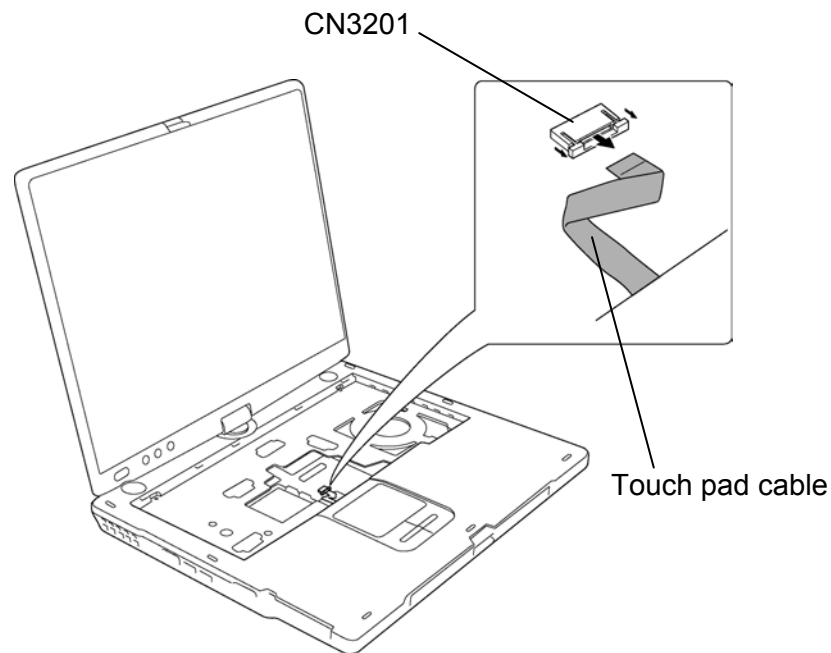
Figure 4-10　Removing the touch pad cable

2. Close the display and turn the computer upside down.

3. Remove the following **screws** securing the bottom cover assembly.

    ❑ M2.0x6.0B　　FLAT BIND screw　　　　　　x19 (Described as "6" in figure)

    ❑ M2.0x3.0B　　S-THIN FLAT BIND screw　x2　(Described as "3" in figure)

4. Pull up to remove the **bottom cover assembly** from the computer.
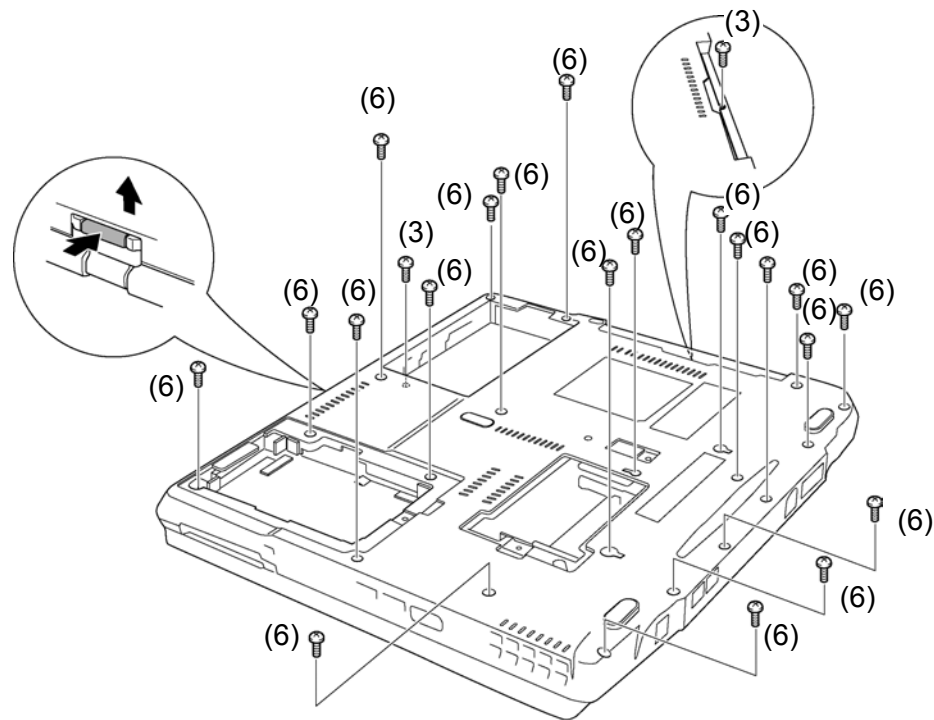
Figure 4-11 Removing the bottom cover assembly

Installing the bottom cover assembly

The following describes the procedure for installing the bottom cover assembly. (See Figure 4-10 and 4-11.)

1. Install the **bottom cover assembly** to the computer.

Note: Install the bottom cover assembly from the i.LINK (IEEE1394) slot first.

2. Secure the bottom cover assembly with the following screws

    ❑ M2.0x6.0B   FLAT BIND screw   x19 (Described as "6" in figure)

    ❑ M2.0x3.0B   S-THIN FLAT BIND screw   x2   (Described as "3" in figure)

3. Turn over the computer and open the display.

4. Connect the **touch pad cable** to the connector **CN3201** on the system board.

4.9   Battery latch assembly / Selectable bay lock

4.9.1 Battery latch assembly

Removing the battery latch assembly

The following describes the procedure for removing the battery latch assembly. (See Figure 4-12.)

1. Remove the following **screw** securing the battery latch assembly.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Pull up to remove the **battery latch assembly** from the bottom cover assembly.

M2.5x4.0B FLAT BIND   Battery latch assembly
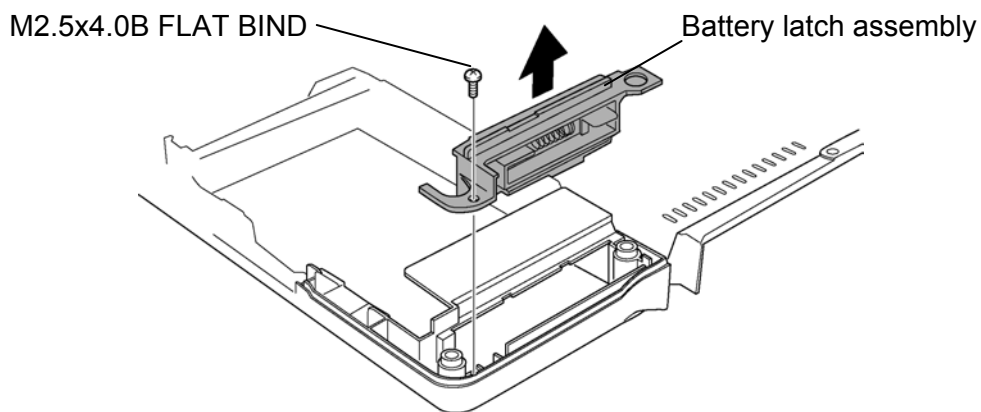
Figure 4-12 Removing the battery latch assembly

Installing the battery latch assembly

The following describes the procedure for installing the battery latch assembly. (See Figure 4-12.)

1. Install the **battery latch assembly** to the bottom cover assembly.

2. Secure the battery latch assembly with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.9.2 Selectable bay lock

Removing the selectable bay lock

The following describes the procedure for removing the selectable bay lock. (See Figure 4-13.)

1. Release the **tabs** (2 points) and detach the selectable bay lock.

2. Remove the **selectable bay lock** from the bottom cover assembly.
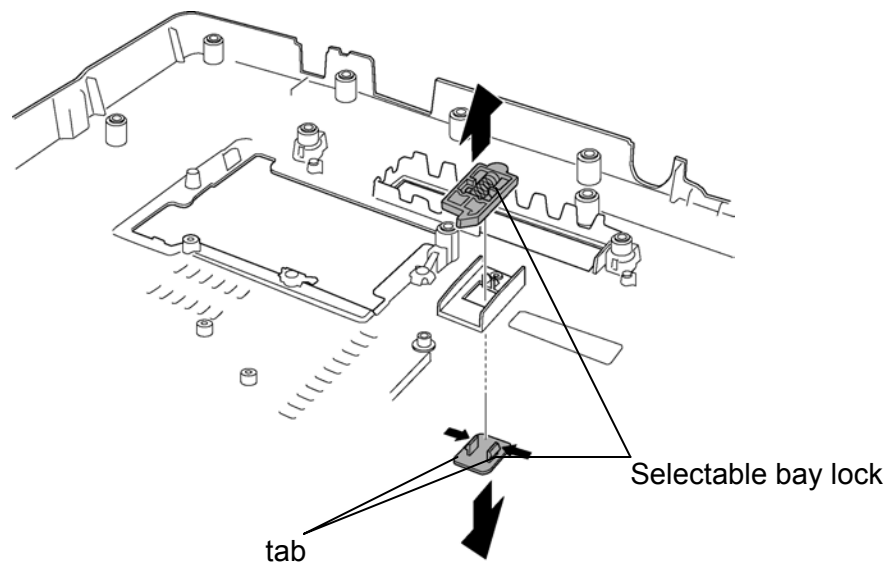
Figure 4-13 Removing the selectable bay lock

Installing the selectable bay lock

The following describes the procedure for installing the selectable bay lock. (See Figure 4-13.)

1. Hook the **tabs** (2 points) and install the **selectable bay lock** to the bottom cover assembly.

Caution: Selectable bay lock has different shapes of tabs for each side (2 points). Therefore, be sure to fit their shapes for installation.

4.10 QI button assembly / PC card slot brace

4.10.1 QI button assembly

Removing the QI button assembly

The following describes the procedure for removing the QI button assembly. (See Figure 4-14.)

1. Remove the following **screw** securing the QI button assembly and remove the **QI button assembly**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

M2.5x4.0B FLAT BIND
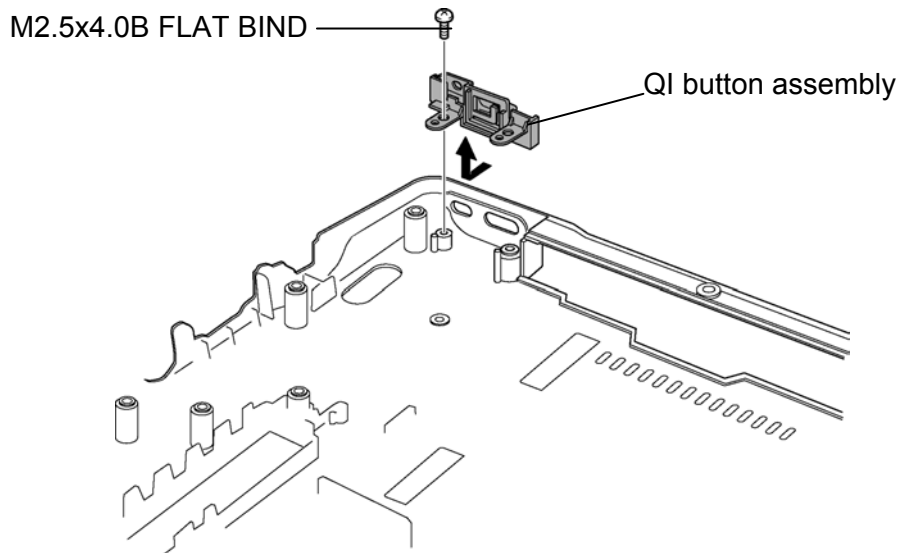
QI button assembly

Figure 4-14 Removing the QI button assembly

Installing the QI button assembly

The following describes the procedure for installing the QI button assembly. (See Figure 4-14.)

1. Install the **QI button assembly** to the slot of bottom cover assembly and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

Note: *When installing the QI button assembly, be sure to fit the button portion to the slot of bottom cover assembly.*

4.10.2 PC card slot brace

Removing the PC card slot brace

The following describes the procedure for removing the PC card slot brace. (See Figure 4-15.)

1. Remove the following **screws** securing the PC card slot brace and remove the **PC card slot brace**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2
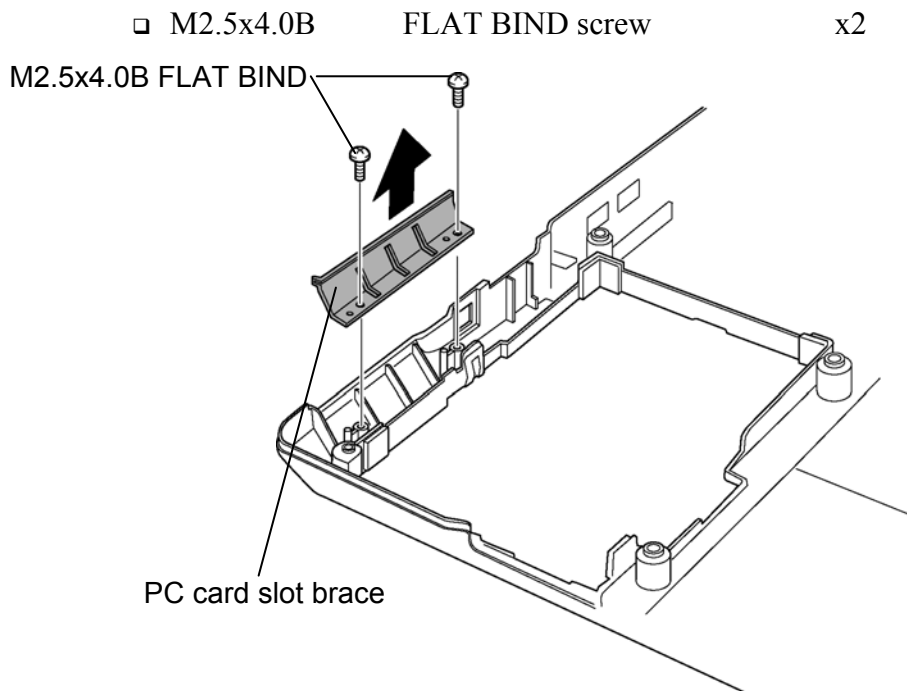
Figure 4-15 Removing the PC card slot brace

Installing the PC card slot brace

The following describes the procedure for installing the PC card slot brace. (See Figure 4-15.)

1. Install the **PC card slot brace** to the bottom cover assembly.

2. Secure the PC card slot brace with the following **screws**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2

4.11 MDC / modem cable

Removing the MDC / modem cable

The following describes the procedure for removing an MDC / modem cable. (See Figure 4-16 and 4-17.)

1. Remove the following **screws** securing the MDC.

   ❑ M2.0x4.0Z   BIND screw   x2

2. Pull up the **MDC** straight and remove it from the connector **CN3000** on the system board.

3. Disconnect the **modem cable** from the connector of MDC.
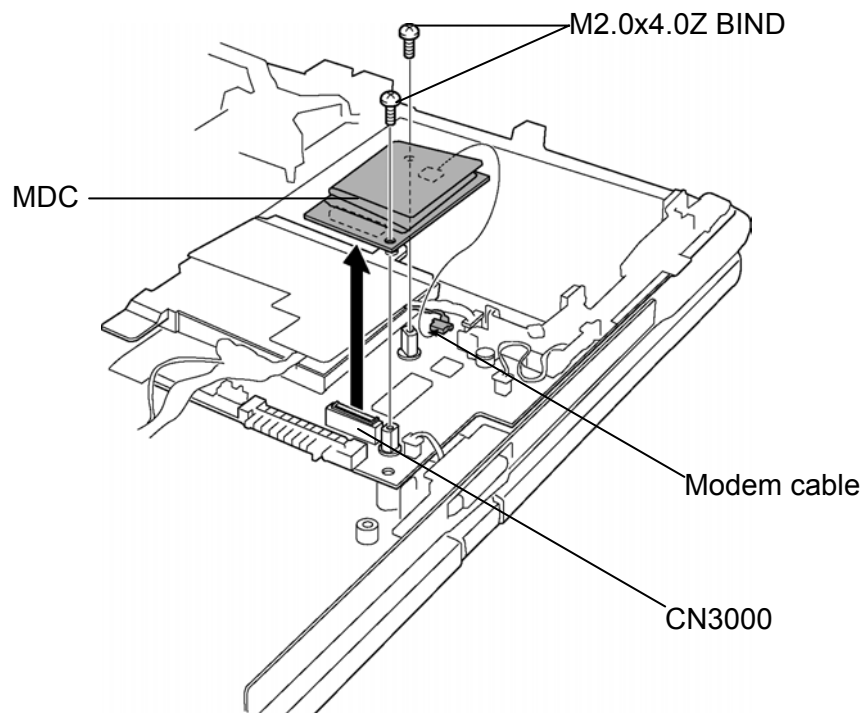
Figure 4-16 Removing the MDC

4. Pull out the modem cable from the guide of mini PCI cover.

5. Remove the following **screw** and disconnect the **drain cable 1** from the stud of system board.

   ❑ M2.0x4.0Z   BIND screw   x1

                                  or

   ❑ M2.0x4.0B   LH STICK   x1

6. Open the **insulators** and pull out the modem cable from the insulators.

7. Remove the following **screw** and disconnect the **drain cable 2** from the stud of hinge assembly.

    ❑ M2.0x4.0Z   BIND screw   x1

8. Disconnect and remove the **modem cable** from the connector **CN3001** on the system board.

Figure 4-17 Removing the modem cable

Installing the MDC / modem cable

The following describes the procedure for installing an MDC / modem cable. (See Figure 4-16 and 4-17.)

1. Connect the **modem cable** to the connector **CN3001** on the system board.

2. Secure the **drain cable 2** to the stud of hinge assembly with the following **screw**.

   ❑ M2.0x4.0Z   BIND screw   x1

3. Arrange the modem cable inside the **insulators** and close the insulators.

4. Arrange the modem cable along the guide of mini PCI cover.

5. Secure the **drain cable 1** to the stud of system board with the following **screw**.

   ❑ M2.0x4.0Z   BIND screw   x1

                   or

   ❑ M2.0x4.0B   LH STICK   x1

6. Connect the **modem cable** to the connector of MDC.

7. Install the **MDC** to the connector **CN3000** on the system board and secure it with the following **screws**.

   ❑ M2.0x4.0Z   BIND screw   x2

4.12 Mini PCI module

Removing the Mini PCI module

The following describes the procedure for removing a Mini PCI module. (See Figure 4-18.)

1. Disconnect the **speaker cable** from the connector **CN6150** on the system board and pull out the cable from the guide of mini PCI cover.

2. Remove the following **screws** securing the mini PCI cover and remove the **mini PCI cover**.

   ❑ M2.0x4.0Z   BIND screw   x1

3. Disconnect the **wireless LAN antenna cables** from the connectors on the wireless LAN card.

4. Open the left and right latches securing the wireless LAN card and remove the **wireless LAN card** from the connector **CN9991** of mini PCI.

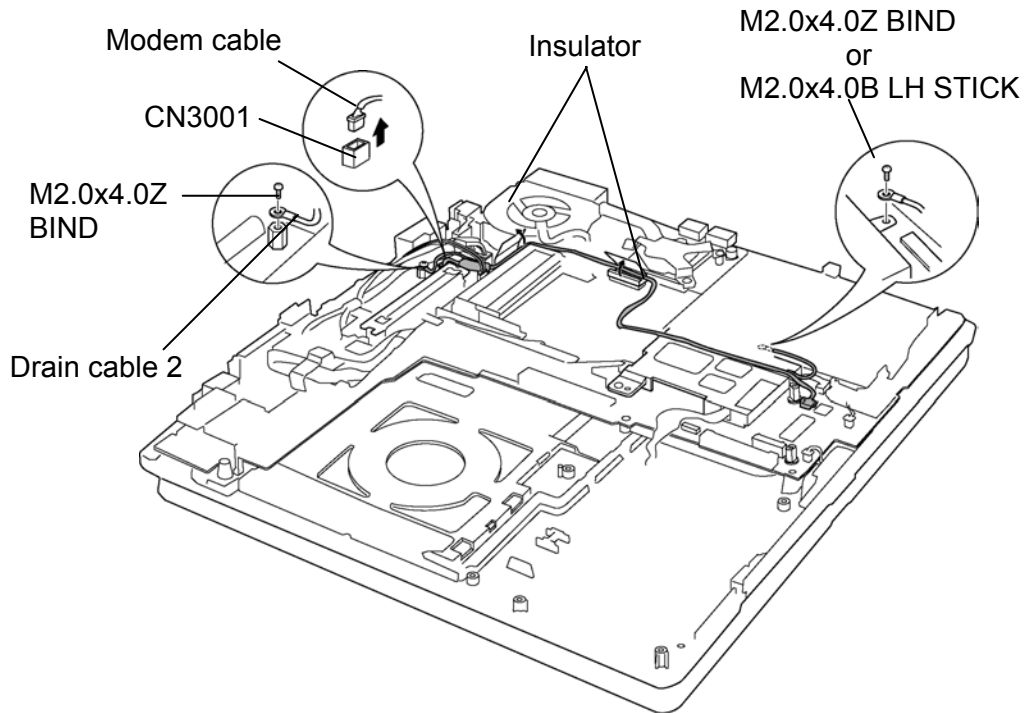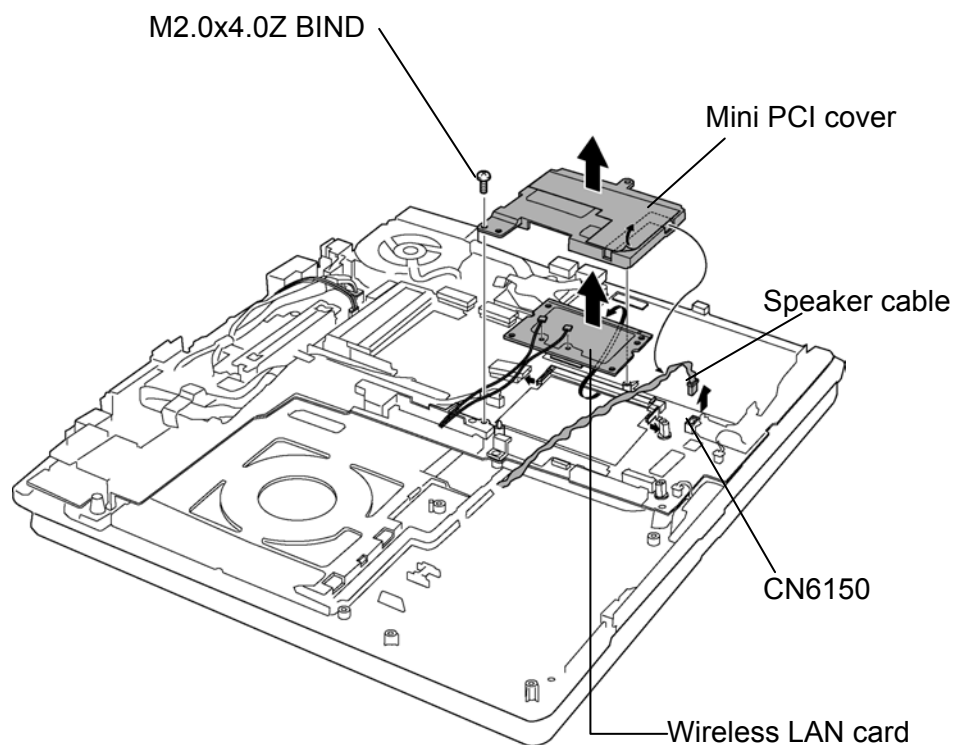*Figure 4-18 Removing the Mini PCI module*

Installing the Mini PCI module

The following describes the procedure for removing a Mini PCI module. (See Figure 4-18.)

1. Insert the **wireless LAN card** slantwise into the connector **CN9991** of mini PCI. Press the wireless LAN card until it hooks surely.

2. Connect the **wireless LAN antenna cables** to the connectors of wireless LAN card. (White cable to MAIN connector, Black cable to AUX connector)

3. Secure the mini PCI cover with the following **screws**.

   ❑ M2.0x4.0Z   BIND screw   x1

4. Arrange the **speaker cable** along the guide of mini PCI cover and connect the speaker cable to the connector **CN6150** on the system board.

4.13 Fan / CPU

4.13.1 Fan

Removing the fan

The following describes the procedure for removing the fan. (See Figure 4-19.)

1. Disconnect the **fan cable** from the connector **CN8770** on the system board.

2. Remove the following **screws** securing the fan and remove the **fan**.

    ❑ M2.0x4.0B   FLAT BIND screw   x2
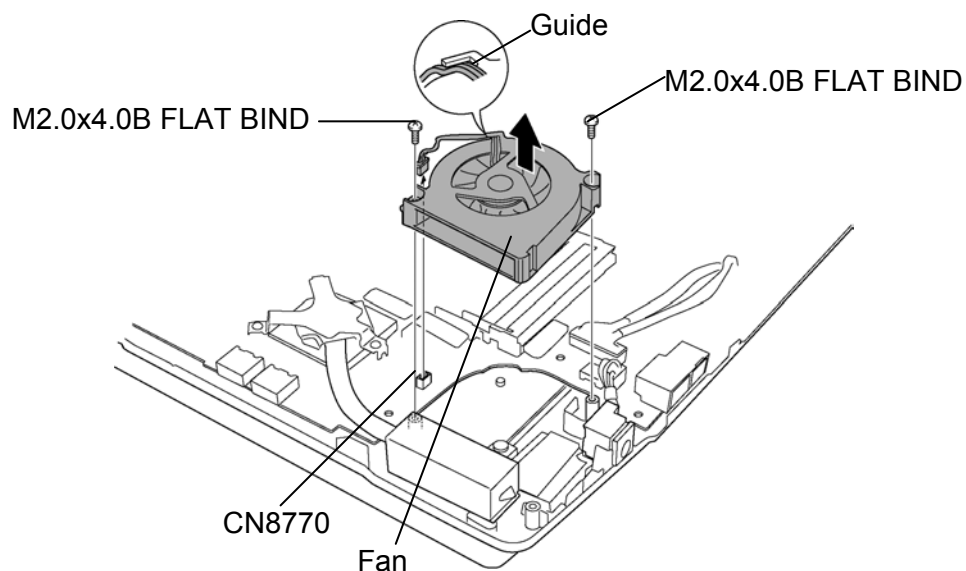
Figure 4-19 Removing the fan

Installing the fan

The following describes the procedure for installing the fan. (See Figure 4-19.)

1. Install the fan while fitting the screw holes and secure it with the following **screws**.

    ❑ M2.0x4.0B   FLAT BIND screw   x2

2. Hook the **fan cable** to the guide and connect it to the connector **CN8770** on the system board.

4.13.2 CPU

Removing the CPU

The following describes the procedure for removing the CPU. (See Figure 4-20 and 4-21.)

1. Remove the following **screws** securing the CPU hold plate in the reverse order of the number (3→1) on the CPU hold plate and remove the **CPU hold plate**.

    ❏ M2.0x4.0B   BIND screw   x3

2. Remove the **heat sink** on the CPU.
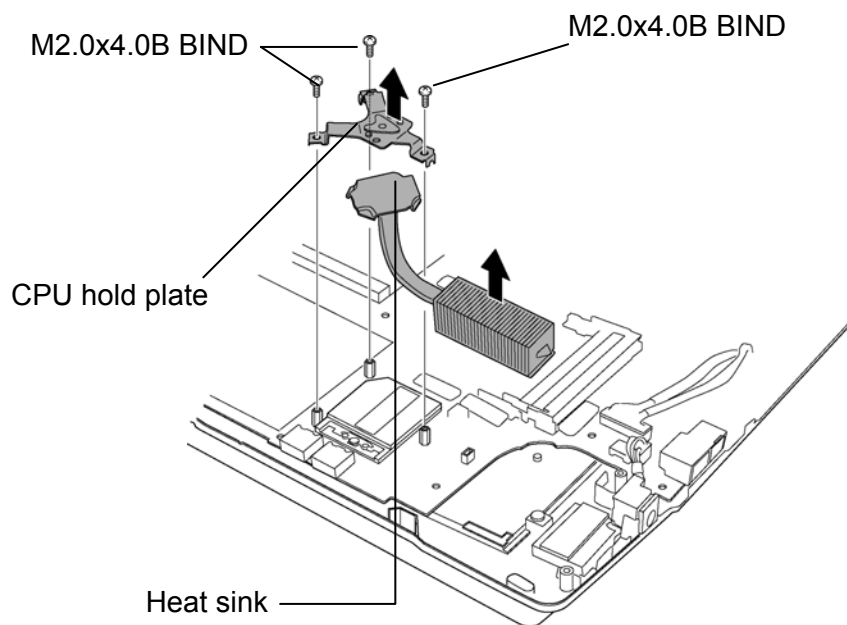
Figure 4-20 Removing the heat sink

3. Unlock the CPU by rotating counterclockwise the cam on the CPU socket by 90 degrees with a flat-blade driver.

4. Remove the **CPU**.
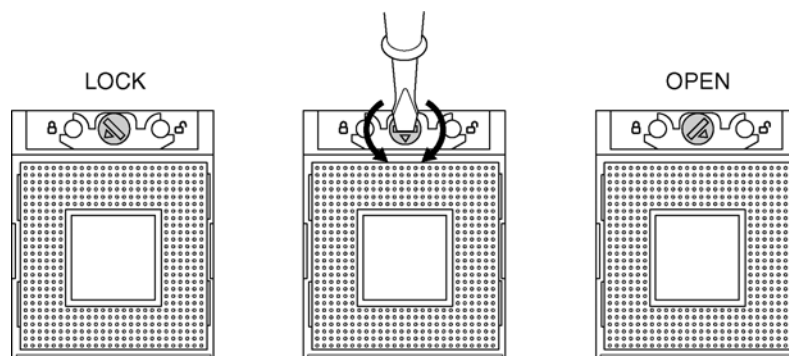
Figure 4-21 Removing the CPU

Installing the CPU

The following describes the procedure for installing the CPU. (See Figure 4-20 to 4-22.)

1. Make sure that the cam of the CPU socket is in the unlock position.

2. Install the CPU on the CPU socket and check the CPU is installed on the right position.

3. Lock the CPU by rotating clockwise the cam on the CPU socket by 90 degrees with a flat-blade driver.

4. If there is already silicon grease on the CPU and FIN, clean it with a cloth. Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.

> *Note*:   *Apply the silicon grease enough to cover the chip surface using the special applicator.*
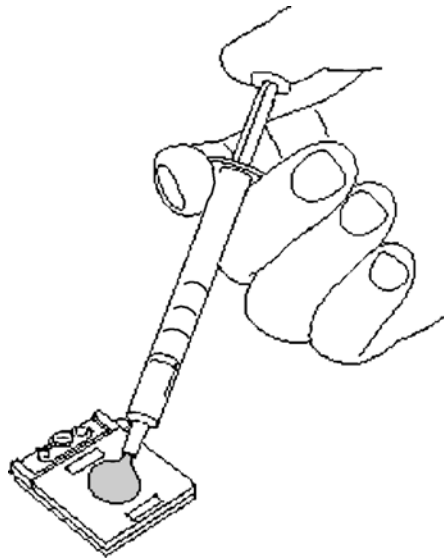
Figure 4-22 Applying silicon grease

5. Install the heat sink on the CPU.

6. Install the CPU hold plate and secure it with the following screws in the order of the number (1→3) on the CPU hold plate.

    ❑ M2.0x4.0B   BIND screw   x3

4.14 DC-IN jack

Removing the DC-IN jack

The following describes the procedure for removing the DC-IN jack. (See Figure 4-23.)

1. Pull up the **DC-IN jack** straight from the slot of cover assembly.

2. Disconnect the DC-IN jack from the connector **CN8800** on the system board
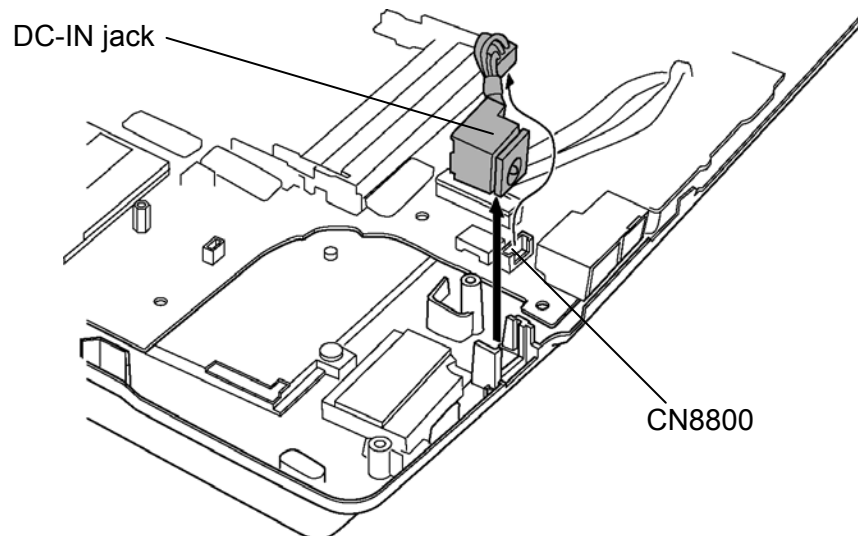
Figure 4-23 Removing the DC-IN jack

Installing the DC-IN jack

The following describes the procedure for installing the DC-IN jack. (See Figure 4-23.)

1. Connect the DC-IN jack to the connector **CN8800** on the system board.

2. Install the **DC-IN jack** by fitting guide of slot of cover assembly.

4.15 Penholder / RTC battery

4.15.1 Penholder

Removing the penholder

The following describes the procedure for removing the penholder. (See Figure 4-24.)

1. Disconnect the **RTC batter cable** from the connector **CN8760** on the system board.

2. Remove the following **screws** securing the penholder and remove the **penholder** from the cover assembly.

   ❑ M2.0x4.0B   FLAT BIND screw   x2
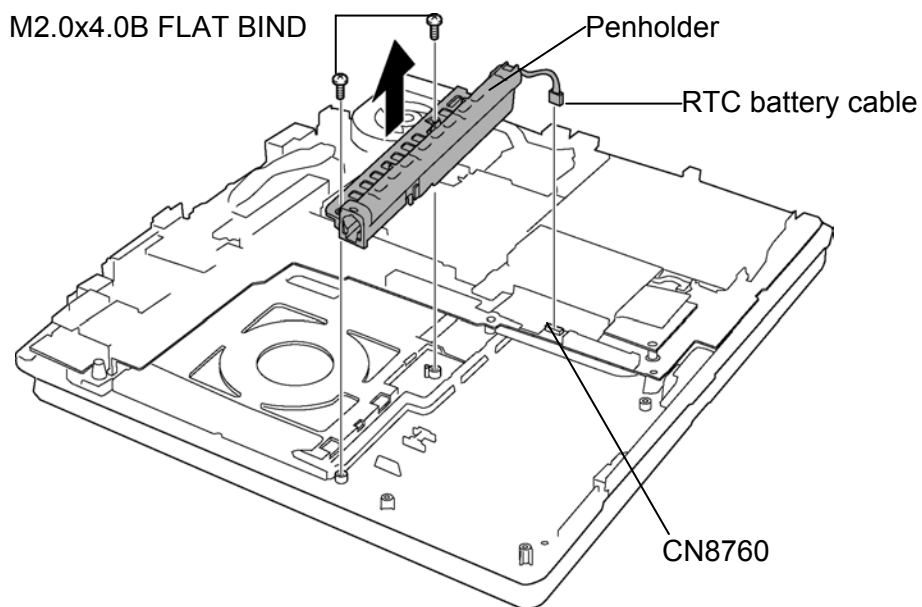
Figure 4-24 Removing the penholder

Installing the penholder

The following describes the procedure for installing the penholder. (See Figure 4-24.)

1. Install the **penholder** to the cover assembly and secure it with the following **screws**.

   ❑ M2.0x4.0B   FLAT BIND screw   x2

Caution: *When installing the penholder, be careful not to catch the wireless LAN antenna cables and speaker cable arranged on the cover assembly.*

---

2. Connect the **speaker cable** to the connector **CN8760** on the system board.

4.15.2 RTC battery

Removing the RTC battery

The following describes the procedure for removing the RTC battery. (See Figure 4-25.)

1. Pull out the **RTC batter cable** from the guide of penholder.

2. Remove the **RTC battery** from the slot of penholder.
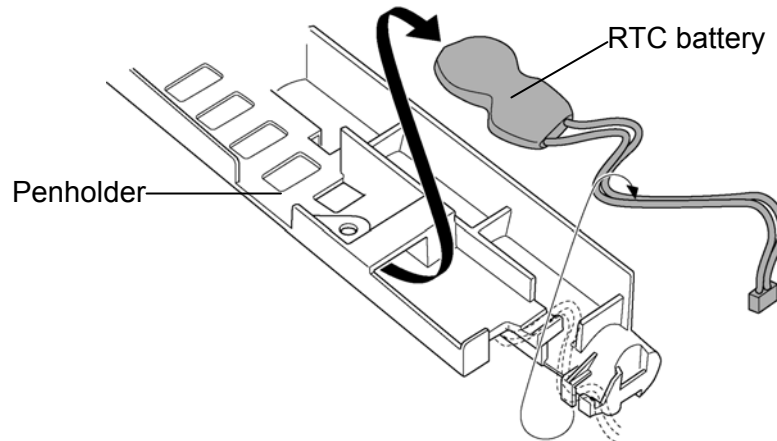
Figure 4-25 Removing the RTC battery

Installing the RTC battery

The following describes the procedure for installing the RTC battery. (See Figure 4-25.)

1. Install the **RTC battery** to the slot of penholder.

2. Arrange the **RTC battery cable** to the guide of penholder.

4.16 LCD harness holder

Removing the LCD harness holder

The following describes the procedure for removing the LCD harness holder. (See Figure 4-26.)

1. Disconnecting the **USB harness** from the connector **CN4612** on the system board and from **CN4612** on the CN board, turn up the **insulator** and pull out the USB harness from the guide of LCD harness holder.

2. Disconnect the **LCD harness** from the connector **CN5501** on the system board and pull out the LCD harness from the LCD harness holder.

3. Disconnecting the **CN board harness** from the connector **CN9512** on the system board and from the connector **CN9520** on the CN board, pull out the CN board harness from the guide of LCD harness holder.

4. Disconnecting the **QI board cable** from the connector **CN9521** on the CN board and from the connector **CN9530** on the QI board, pull out the QI board cable from the guide of LCD harness holder.

5. Remove the following **screws** securing and remove the **LCD harness holder**.

   ❑ M2.0x6.0B   FLAT BIND screw   x2

QI board cable

CN9530

Insulator

CN9521

CN board harness
(Connected to CN9502)

USB harness
(Connected to CN4612)

M2.0x6.0B
FLAT BIND

CN board harness
(Connected to CN9520)

LCD harness
(Connected to CN5501)

USB harness
(Connected to CN4621)
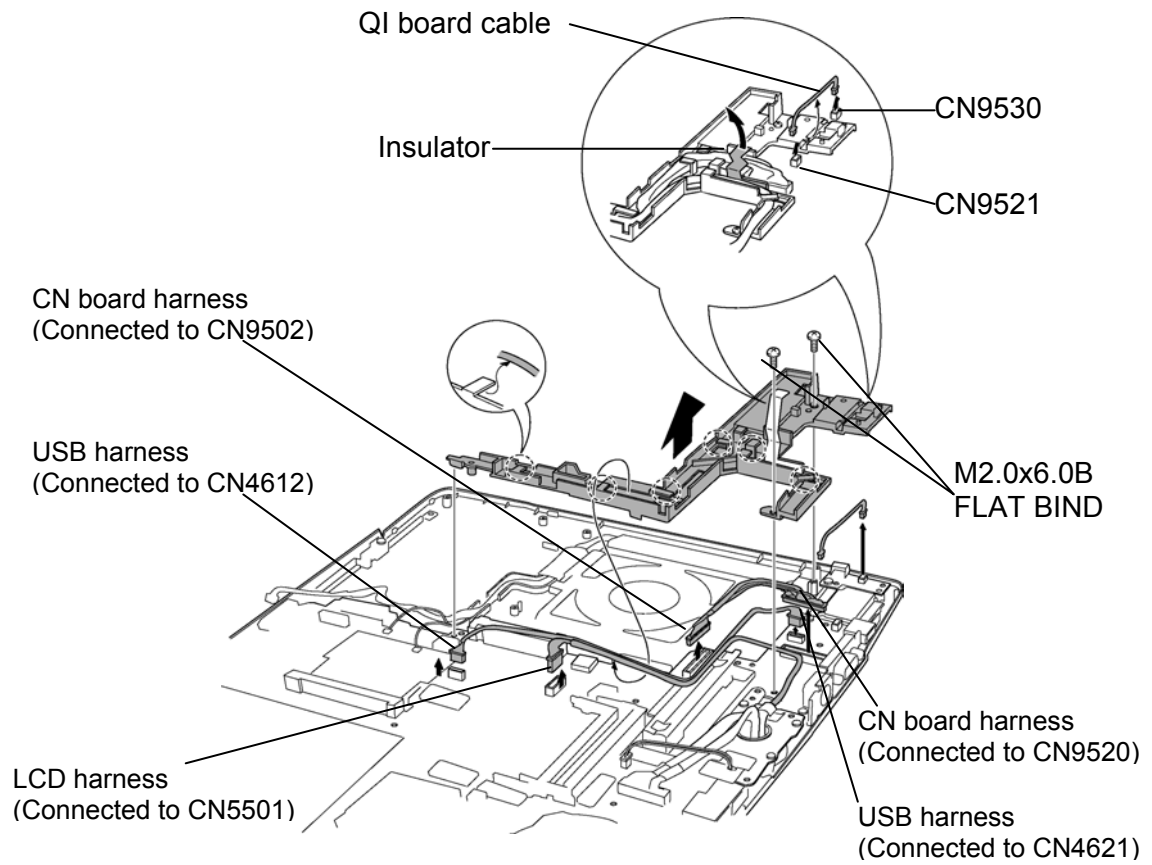
Figure 4-26 Removing the LCD harness holder

Installing the LCD harness holder

The following describes the procedure for installing the LCD harness holder (See Figure 4-26).

1. Install the **LCD harness holder** to the cover assembly by fitting the boss and secure it with the following **screws**.

    ❑ M2.0x6.0B   FLAT BIND screw   x2

2. Connecting the **QI board cable** to the connector **CN9521** on the CN board and to the connector **CN9530** on the QI board, arrange the QI board cable along the guide of LCD harness holder.

3. Connecting the **CN board harness** to the connector **CN9502** on the system board and to the connector **CN9520** on the CN board, arrange the CN board harness along the guide of LCD harness holder.

NOTE: When connecting the CN board harness, make sure that the connector with core side is connected to the CN board.

---

4. Connect the **LCD harness** to the connector **CN5501** on the system board and arrange the LCD harness along the guide of LCD harness holder.

5. Connecting the **USB harness** to the connector **CN4612** on the system board and to the connector **CN4621** on the CN board, arrange the USB harness along the guide of LCD harness holder.

4.17 Mic (L) cable guide

Removing the mic (L) cable guide

The following describes the procedure for removing the mic (L) cable guide. (See Figure 4-27.)

1. Disconnect the **mic (L) cable** from the connector **CN6060** on the system board and pull it out from the mic (L) cable guide.

2. Remove the following **screws** and **mic (L) cable guide**.

    ❑ M2.0x6.0B   FLAT BIND screw   x2
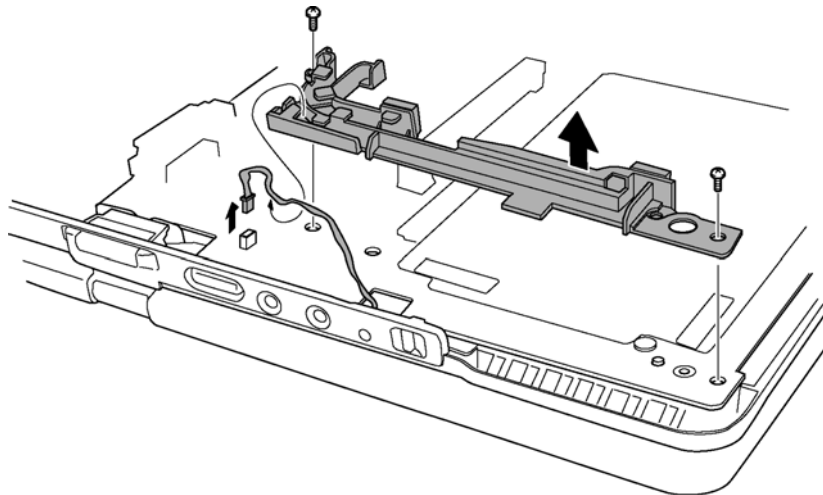
Figure 4-27 Removing the mic (L) cable guide

Installing the mic (L) cable guide

The following describes the procedure for installing mic (L) cable guide (See Figure 4-27).

1. Install the **mic (L) cable guide** to the system board and secure it with the following **screws**.

    ❑ M2.0x6.0B   FLAT BIND screw   x2

2. Connecting the **mic (L) cable** to the connector **CN6060** on the system board, arrange the cable along the mic (L) cable guide.

4.18 QI board / CN board

4.18.1 QI board

Removing the QI board

The following describes the procedure for removing the QI board. (See Figure 4-28.)

1. Remove the following **screws** securing the QI board.

    ❑ M2.0x6.0B   FLAT BIND screw   x2

2. Pull up the QI board straight and remove the **QI board** from the cover assembly.
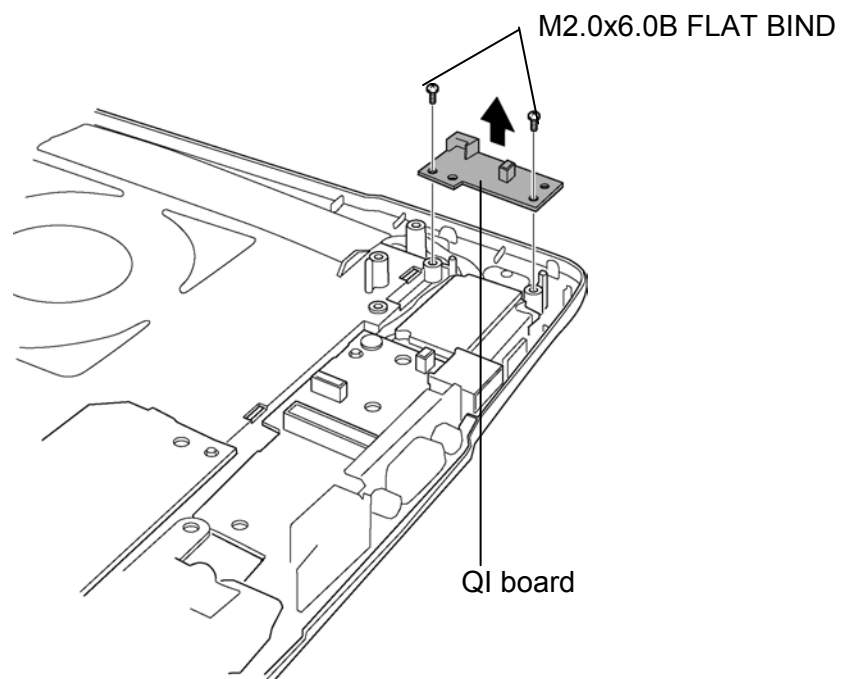
Figure 4-28 Removing the QI board

Installing the QI board

The following describes the procedure for installing the QI board. (See Figure 4-28.)

1. Install the **QI board** to the cover assembly and secure it with the following **screws**.

    ❑ M2.0x6.0B   FLAT BIND screw   x2

4.18.2 CN board

Removing the CN board

The following describes the procedure for removing the CN board. (See Figure 4-29.)

1. Remove the following **screws** securing the CN board.

   ❑ M2.0x6.0B   FLAT BIND screw   x2

2. Pull up to remove the **CN board** from the cover assembly.
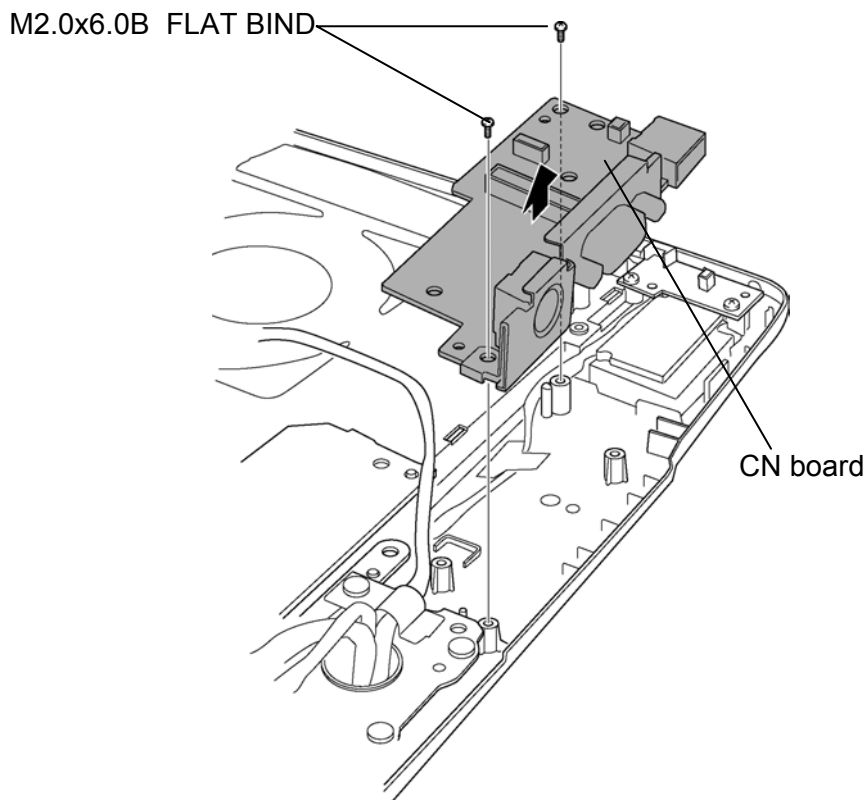
Figure 4-29 Removing the CN board

Installing the CN board

The following describes the procedure for installing the CN board. (See Figure 4-29.)

1. Install the **CN board** to the cover assembly and secure it with the following **screws**.

   ❑ M2.0x6.0B   FLAT BIND screw   x2

4.19 System board

Removing the system board

The following describes the procedure for removing the system board. (See Figure 4-30.)

1. Disconnect the **mic (R) cable** from the connector **CN6061** on the system board

2. Disconnect the **rotation sensor cable** from the connector **CN3280** on the system board

3. Disconnect the **digitizer cable** from the connector **CN9540** on the system board

4. Remove the following **screws** securing the system board.

   ❑ M2.0x6.0B   FLAT BIND screw   x1

5. Remove the **system board** from the cover assembly while pulling it up toward arrow pointing.
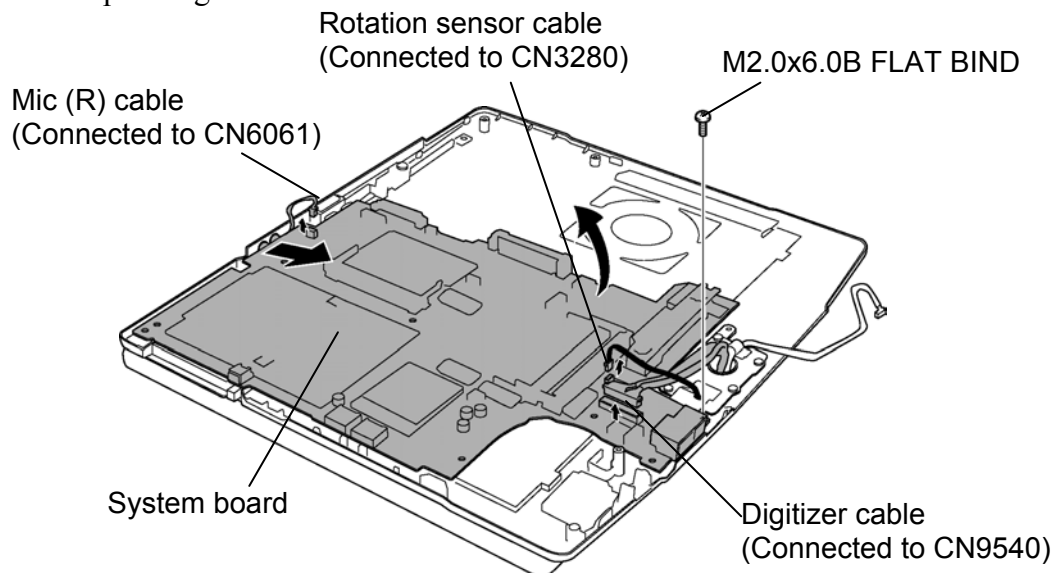
Figure 4-30 Removing the system board

Installing the system board

The following describes the procedure for installing the system board. (See Figure 4-30.)

1. Install the **system board** to the cover assembly and secure it with the following **screw**.

   ❑ M2.0x6.0B   FLAT BIND screw   x1

NOTE: When installing the system board, be careful not to catch the mic (L&R) cable, rotation sensor cable and digitizer cable between the system board and cover assembly. Also confirm that these cables are not hidden under the system board.

---

2. Connect the **digitizer cable** to the connector **CN9540** on the system board.

3. Connect the **rotation sensor cable** to the connector **CN3280** on the system board.

4. Connect the **mic (R) cable** to the connector **CN6061** on the system board.

4.20 PC card slot cover

Removing the PC card slot cover

The following describes the procedure for removing the PC card slot cover. (See Figure 4-31.)

1. Remove the following **screws** securing the PC card slot cover.

    ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2

2. Release the **hook** (2 points) and remove the **PC card slot cover**.
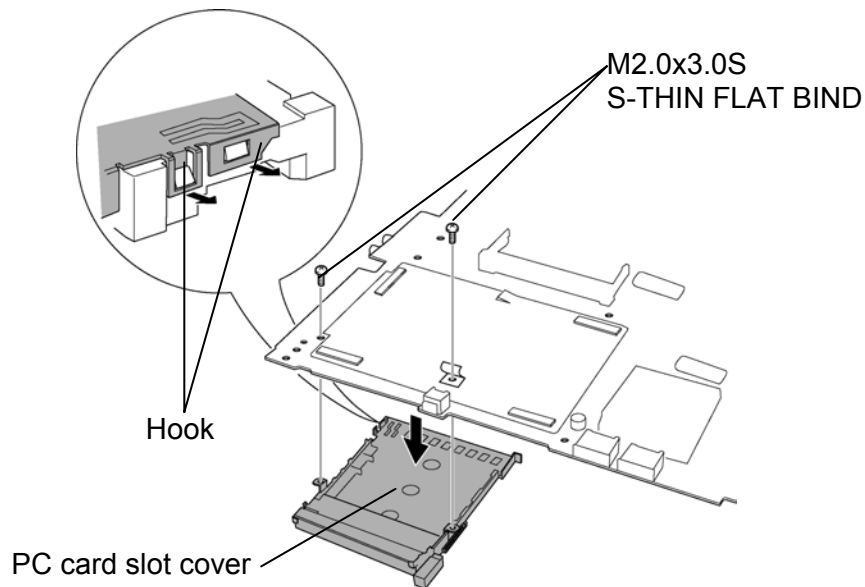
Figure 4-31 Removing the PC card slot cover

Installing the PC card slot cover

The following describes the procedure for installing the PC card slot cover. (See Figure 4-31.)

1. Secure the **hook** (2 points) and install the **PC card slot cover**.

2. Secure the PC card slot cover with the following **screws**.

    ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2

4.21 Speaker

Removing the speaker

The following describes the procedure for removing the speaker. (See Figure 4-32.)

1. Turn up the **insulator**.

2. Pull out the **speaker cable** from the **guide insulator** of cover assembly.

3. Pull out the speaker from the slot of cover assembly.
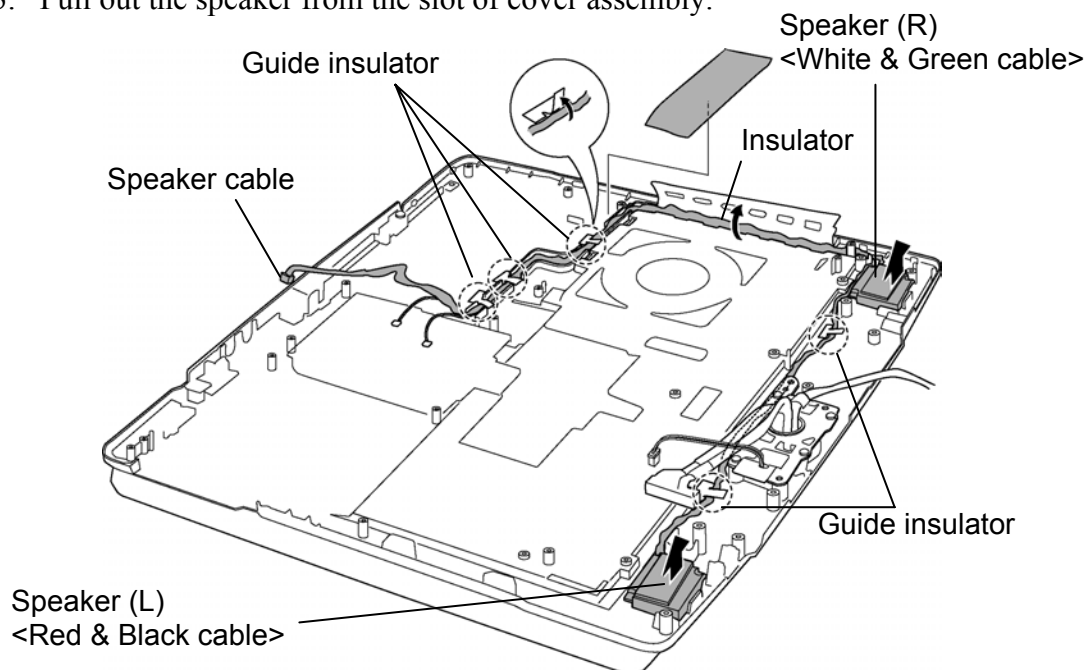
Figure 4-32 Removing the speaker

Installing the speaker

The following describes the procedure for installing the speaker. (See Figure 4-32.)

1. Install the **speaker** to the slot of cover assembly.

NOTE: When installing the speaker, confirm the right installation of right and left speaker. (Right = Red and Green cable, Left = White and Green cable).

2. Arrange the **speaker cable** along the **guide insulator**.

3. Stick the **insulator** over the guide of speaker cable.

4.22 Microphone / Front panel

4.22.1 Microphone

Removing the microphone

The following describes the procedure for removing the speaker. (See Figure 4-33.)

1. Remove the following **screws** securing the both right and left mic holder.

    ❑ M2.0x4.0B   FLAT BIND screw   x2 (x1 for each side)

2. Pull up the **mic holder** straight and remove the mic holder from the cover assembly.

3. Remove the **microphone** from the slot of cover assembly.
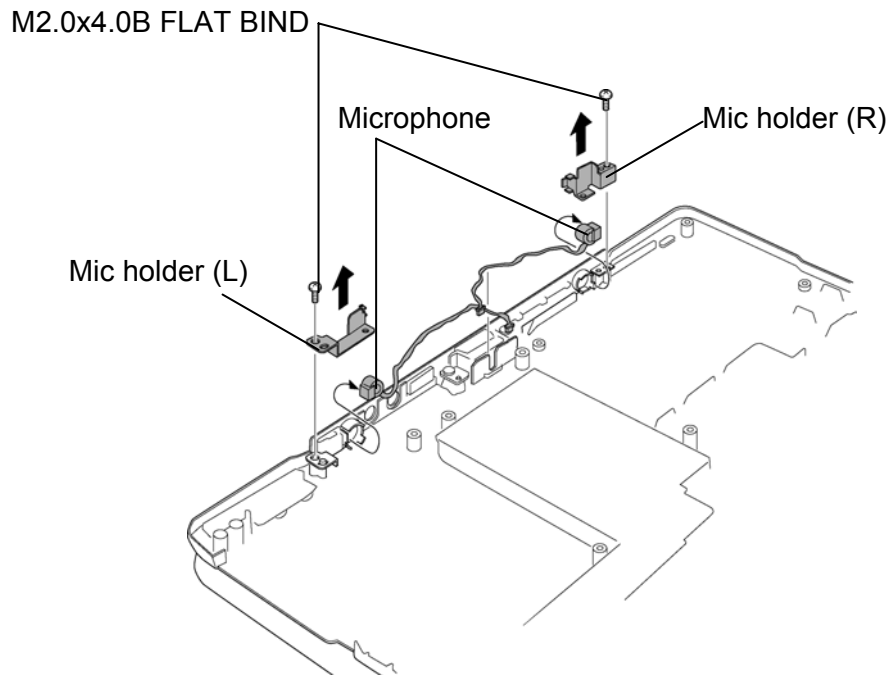
Figure 4-33 Removing the microphone

Removing the microphone

The following describes the procedure for removing the speaker. (See Figure 4-33.)

1. Fitting the microphone to the shapes of slot, install the **microphone** to the cover assembly.

Install the **mic holder** to the cover assembly while fitting it to the slit of cover assembly and secure them with the following **screws**.

    ❑ M2.0x4.0B   FLAT BIND screw   x2 (x1 for each side)

4.22.2 Front panel

Removing the front panel

The following describes the procedure for removing the front panel. (See Figure 4-34.)

1. Remove the following **screws** and **front panel** from the cover assembly.

   ❑ M2.5x6.0B   FLAT BIND screw   x2

2. Detach the **display latch** from the front panel.
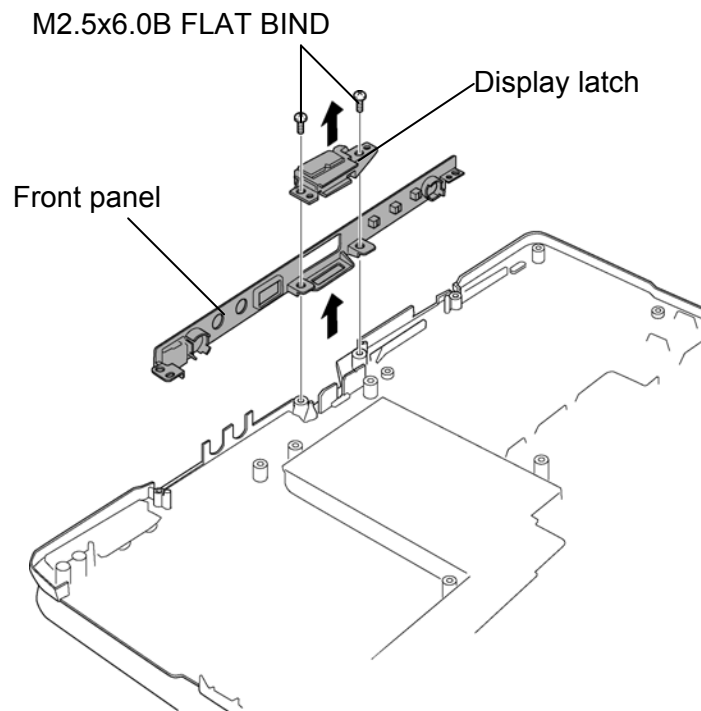
Figure 4-34 Removing the front panel

Installing the front panel

The following describes the procedure for installing the front panel. (See Figure 4-34.)

1. Install the display latch to the **front panel**.

2. Install the **front panel** to the cover assembly and secure it with the following **screws**.

   ❑ M2.5x6.0B   FLAT BIND screw   x2

4.23 Lens holder

Removing the lens holder

The following describes the procedure for removing the lens holder. (See Figure 4-35.)

1. Remove the following **screw** securing the lens holder.

   ❑ M2.5x4.0B   S-THIN FLAT BIND screw   x1

Remove the **lens holder** from the cover assembly.
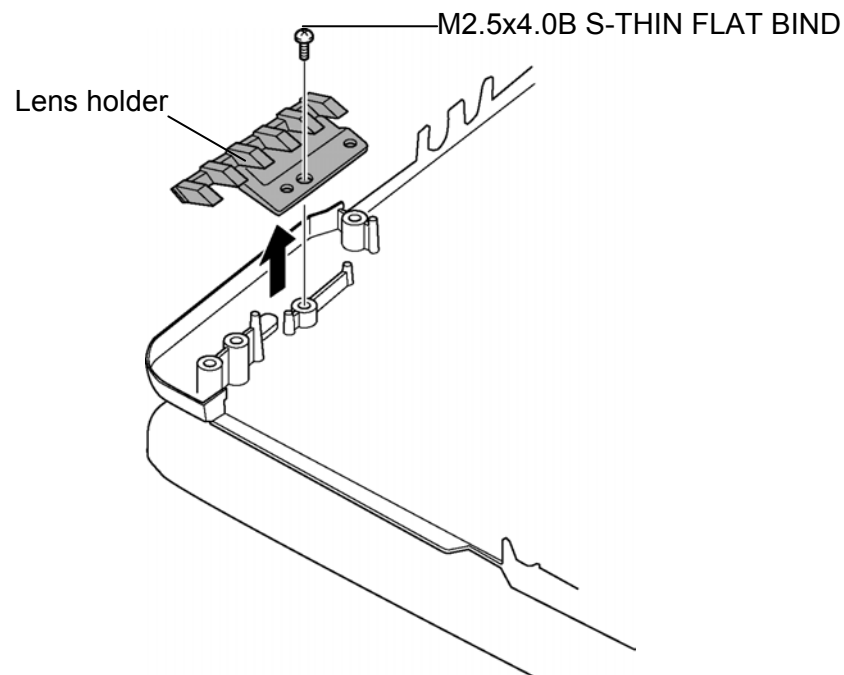
Figure 4-35 Removing the lens holder

Installing the lens holder

The following describes the procedure for installing the lens holder. (See Figure 4-35.)

1. Install the **lens holder** to the cover assembly.

2. Secure the lens holder with the following **screw**.

   ❑ M2.5x4.0B   S-THIN FLAT BIND screw   x1

4.24 Touch pad

Removing the touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-36.)

1. Remove the following **screws** securing the touch pad.

    ❑ M2.0x4.0B   S-THIN FLAT BIND screw   x3

2. Remove the **touch pad holder** and **touch pad** from the cover assembly.

3. Peel off the **glass tape** and disconnect the **touch pad cable** from the touch pad.
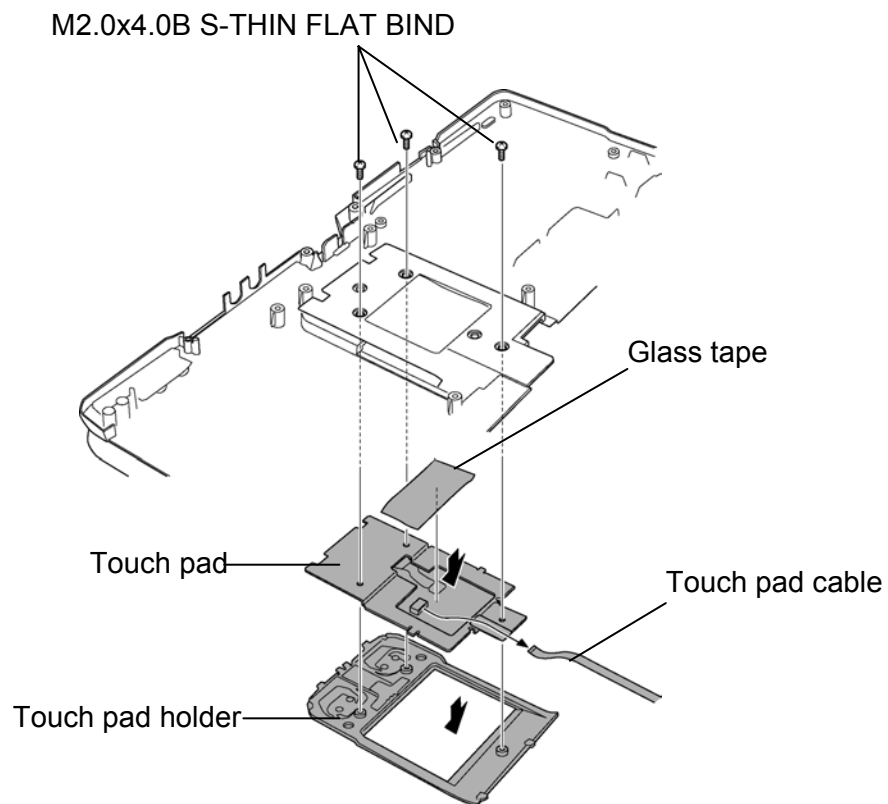
Figure 4-36 Removing the touch pad

Installing the touch pad

The following describes the procedure for installing the touch pad (See Figure 4-5.).

1. Connect the **touch pad cable** to the touch pad and stick the **glass tape**.

Install the touch pad and touch pad holder to the cover assembly.

Secure the touch pad with the following screws.

    ❑ M2.0x4.0B   S-THIN FLAT BIND screw   x3

4.25 LCD unit & FL inverter

Removing the LCD unit & FL inverter

The following describes the procedure for removing the LCD unit & FL inverter. (See Figure 4-37 to 4-39.)

NOTE: When replacing the LCD unit, do not give the hinge portion a strong press. It may cause the breakage of the hinge assembly.
Also, Use a stand or something under the LCD part to keep the LCD part level while replacing it.

---

1. Peel off the **mask seals** (6 points) from the LCD mask.

2. Remove the following **screws** securing the LCD mask.

    ❑ M2.0x6.0B   FLAT BIND screw   x6

3. Laying down the LCD to make the LCD and the cover assembly flat, release the latches and remove the **LCD mask**.

4. Remove the **cross function button** from the application switch board.

NOTE: When removing the LCD mask, be careful not to lose the cross function button because the button is easily removed.
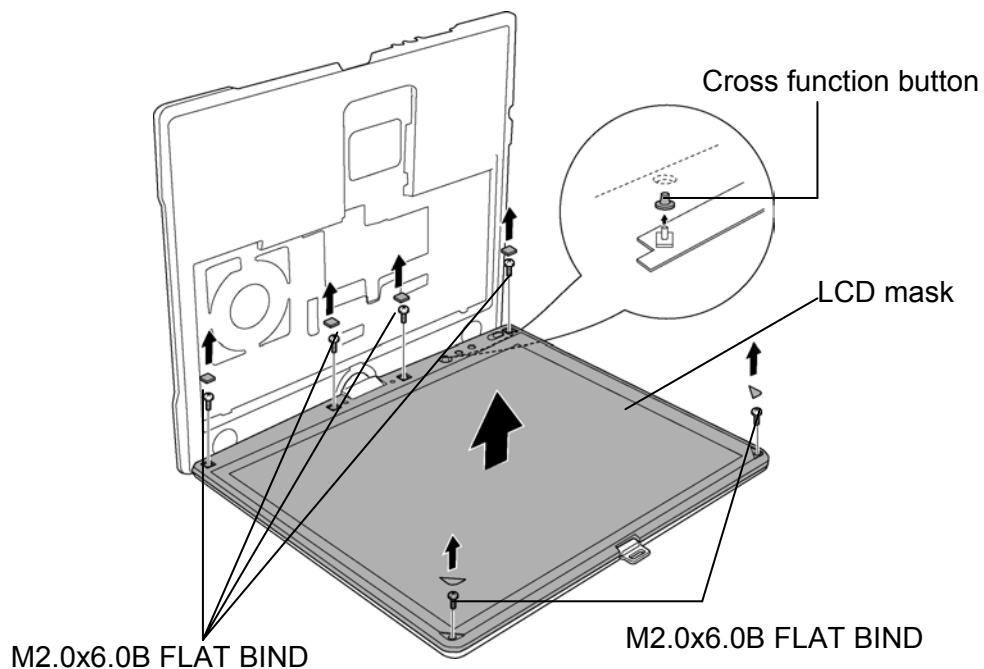
Figure 4-37 Removing the LCD mask

5. Turn up the **insulator** and disconnect the **HV cable** from the connector of FL inverter.

6. Remove the following **screws** securing the LCD unit.

   ❑ M2.0x4.0B   FLAT BIND screw   x4

7. With the bottom edge of the LCD unit on the display cover, raise the top edge of the LCD unit.

NOTE: When putting the LCD unit on the display cover, lay a mat or something under the LCD unit to protect the computer and the LCD from a scratch or breakage.

---

8. Peeling off the **glass tapes** (2 tapes), disconnect the **LCD harness** and **digitizer harness** from the connectors on the back of LCD unit.

9. Remove the **LCD unit** from the display cover.
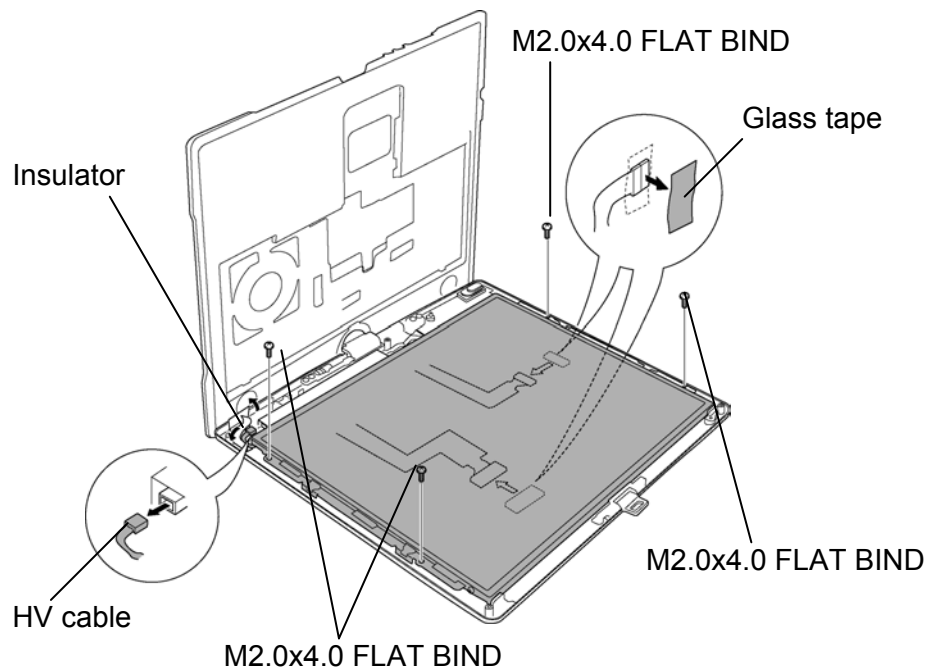
Figure 4-38 Removing the LCD unit

10. Pull up the FL inverter while peeling off the double-sided tape.

CAUTION: *The removed FL inverter is not reusable. Therefore when installing the FL inverter, it must be a new one.*

---

11. Disconnect the **inverter harness** and remove the **FL inverter** from the display cover.
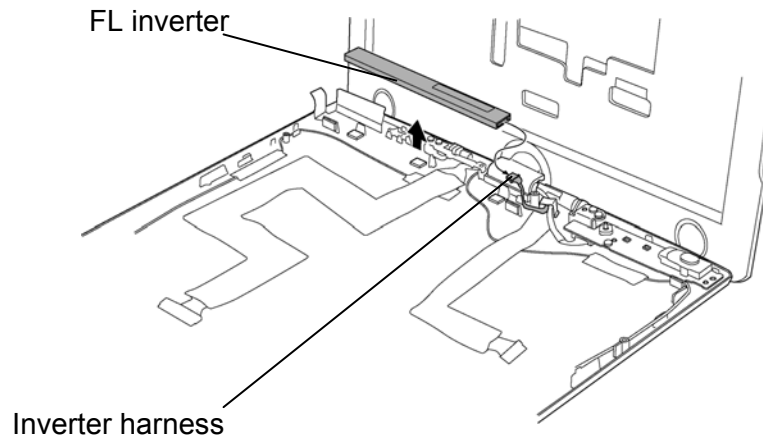
Figure 4-39 Removing the FL inverter

Installing the LCD unit & FL inverter

The following describes the procedure for installing the LCD unit & FL inverter. (See Figure 4-37 to 4-39.)

1. Connecting the **inverter harness** to the connector of FL inverter, install the **FL inverter** to the display cover.

CAUTION: The FL inverter once removed from the computer is not reusable. When installing the FL inverter, be sure to use a new one.

---

2. Standing the LCD unit on the display cover, connect digitizer harness and LCD harness on the back of LCD and secure them with two glass tapes.

3. Stick the **glass tapes** (2 tapes) on the each connector.

4. Install the **LCD unit** on the display cover and secure it with the following **screws**.

   ❑ M2.0x4.0B   FLAT BIND screw   x4

5. Connect the **HV cable** to the connector of FL inverter and stick the **insulator**.

6. Set the **cross function button** to the application switch board by fitting the cross slit of the button.

7. Install the **LCD mask** to the display cover while securing the latches.

NOTE: When installing the LCD mask, wipe the LCD with a soft cloth and make the back of the LCD mask clean with an ionizer.
And also, confirm that the cross function button is installed.

---

8. Secure the LCD mask with the following **screws** and stick the **mask seal**s (6 points).

   ❑ M2.0x6.0B   FLAT BIND screw   x6

4.26 Application switch board

Removing the application switch board

The following describes the procedure for removing the application switch board. (See Figure 4-40.)

1. Remove the following **screws** securing the application switch board and pull up the **application switch board**.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

2. Disconnect the **switch harness** from the connector **CN9510** on the application switch board.
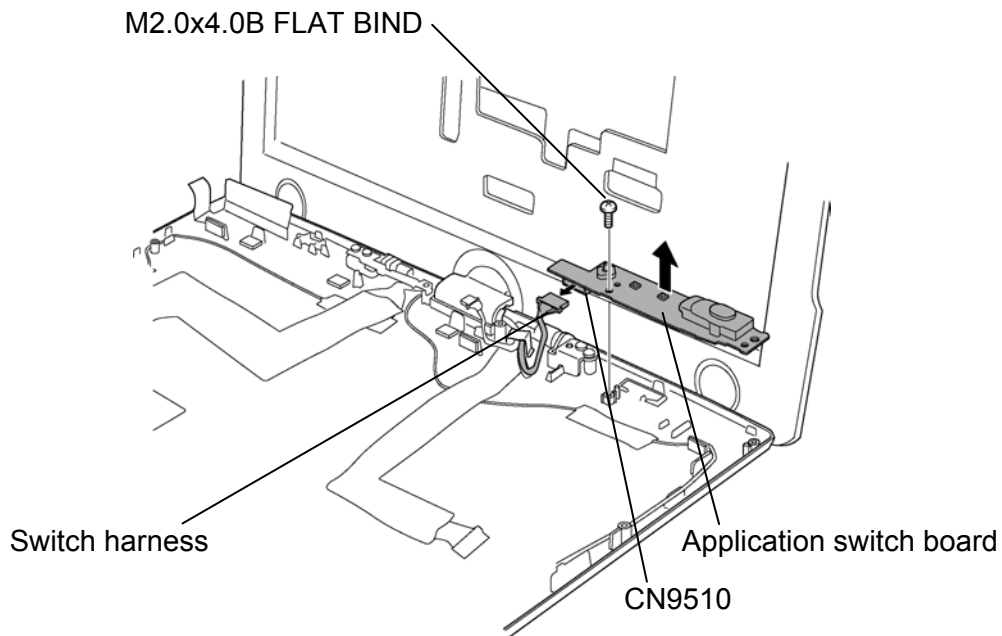
Figure 4-40 Removing the application switch board

Installing the application switch board

The following describes the procedure for installing the application switch board. (See Figure 4-40.)

1. Connect the **switch harness** to the connector **CN9510** on the application switch board.

2. Install the **application switch board** to the display cover and secure it with the following **screws**.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

4.27 LCD latch assembly

Removing the LCD latch assembly

The following describes the procedure for removing the LCD latch assembly. (See Figure 4-41.)

1. Remove the following **screw** and **LCD latch assembly** from the display cover.

   ❑ M2.0x4.0B   FLAT BIND screw   x1
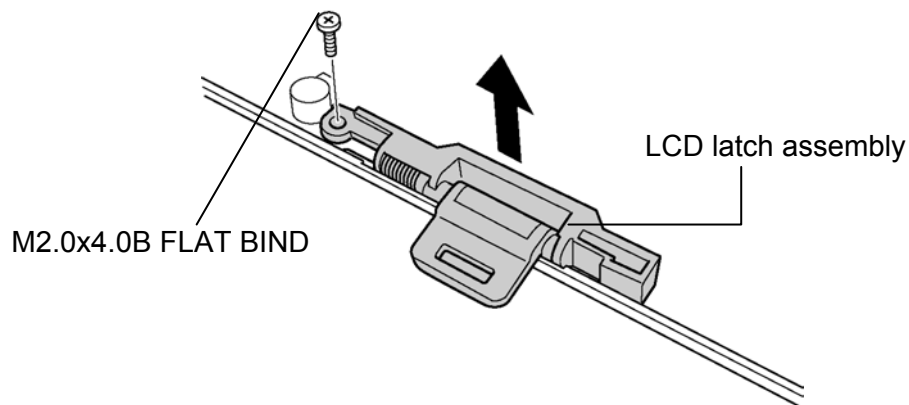
Figure 4-41 Removing the LCD latch assembly

Installing the LCD latch assembly

The following describes the procedure for installing the LCD latch assembly. (See Figure 4-41.)

1. Install the **LCD latch assembly** and secure it with the following **screw**.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

4.28 Digitizer

Caution: Read following instructions before handling the Digitizer.

Do not carry the LCD module by holding the FL cable in one's hand because it may result to cut the FL cable, and cause display function failure or lighting failure.

NO
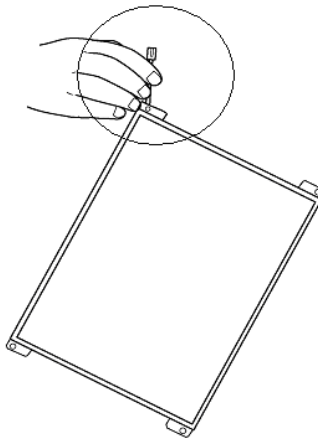
Do not carry the LCD module by holding the FL cable in one's hand.

Be careful to use the bezel guide.

There is a portion where the bezel is sticking out because of the digitizer guide. Do not press and rub the portion with bare hands or it may result cut your finger.

NO
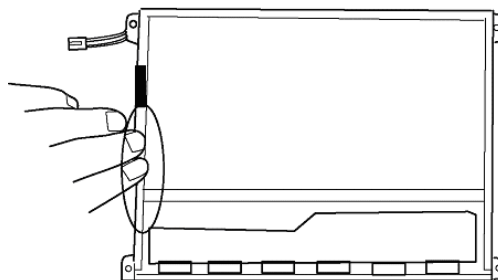
Be careful to use the bezel guide.

Do not make any scratches on the B/L and TAB by the edge of the digitizer when installing the digitizer because it may result to break the TAB or make scratches on the B/L and cause display function failure.

NO

Digitizer

Do not hit the corner of the digitizer

Do not pull up the PCB hardly when installing the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.

NO

Digitizer

PCB

Do not pull up the PCB.

Make sure that three latches fit the digitizer securely.

If the latches are not locked securely, it may result to move the digitizer and give stress on the TAB or PCB and cause the display function failure.

Do not turn up the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.

NO
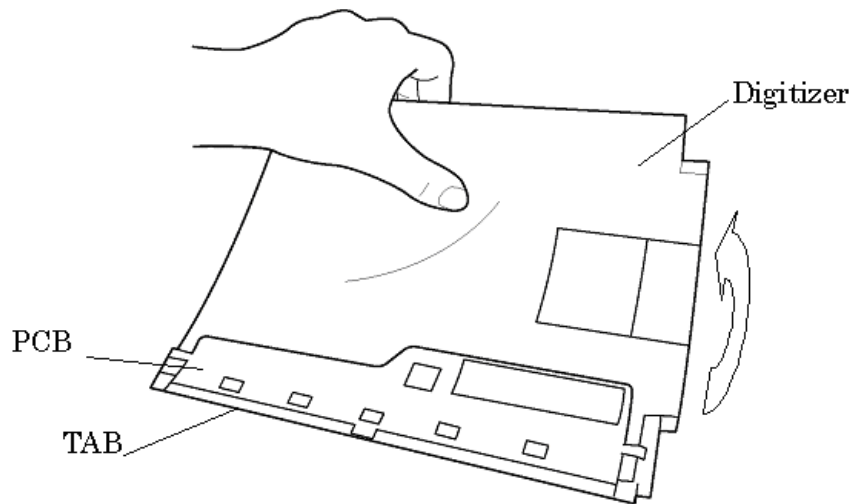
Do not turn up the digitizer to avoid the warp of the PCB.

Do not put any instrument on the LCD module because it may result to make scratch on the cell, polarization sheet or B/L and break the TAB and may cause the display function failure.

NO
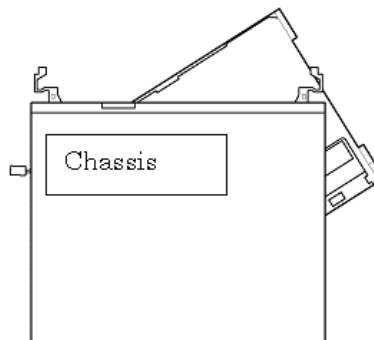
Do not put the chassis on the LCD.
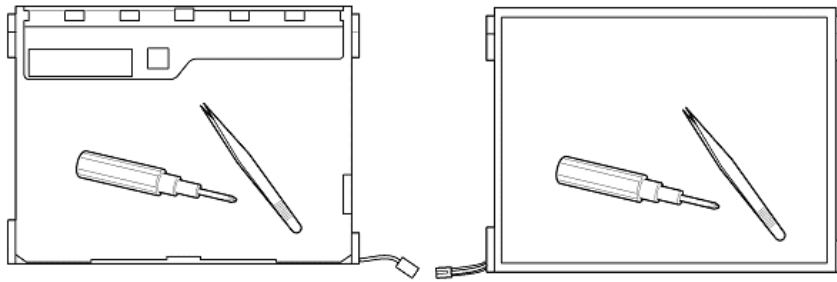
Do not put the instrument on the LCD.

Do not hold, press and rub the TAB because it may result to break the TAB and cause the display function failure.

NO

TAB

PCB
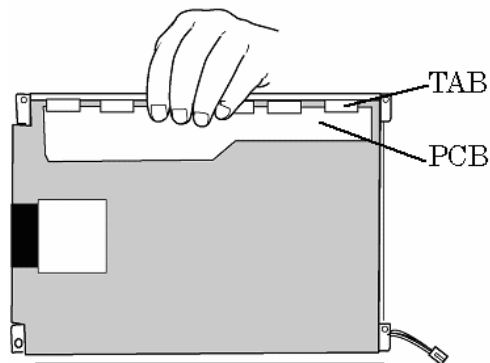
Do not hold the TAB.

TAB
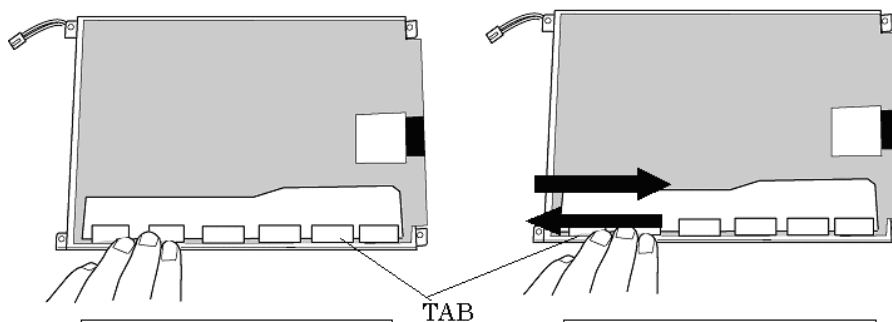
Do not press the TAB.   Do not rub the TAB.

Make sure to put the LCD module on the flat place. If the LCD module is put on the uneven place, it may result to break the TAB, make scratch on the B/L or polarization sheet and cause the display function failure.

NO

Do not put the LCD on the chassis when the LCD is not installed to the computer.

FL inverter

Do not put the LCD on the FL inverter.
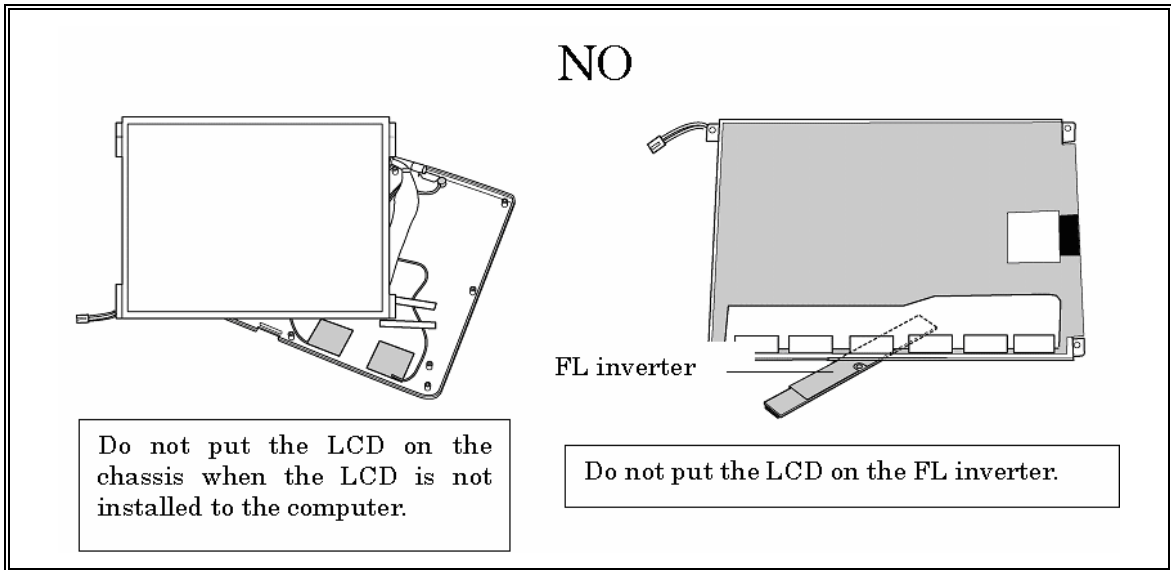
Removing the Digitizer

The following describes the procedure for removing the digitizer. (See Figure 4-42.)

1. Remove the following **screws** securing the digitizer.

   ❑ M2.0x3.0Z   BIND screw   x3

2. Slide out the **digitizer** toward the arrow pointing.
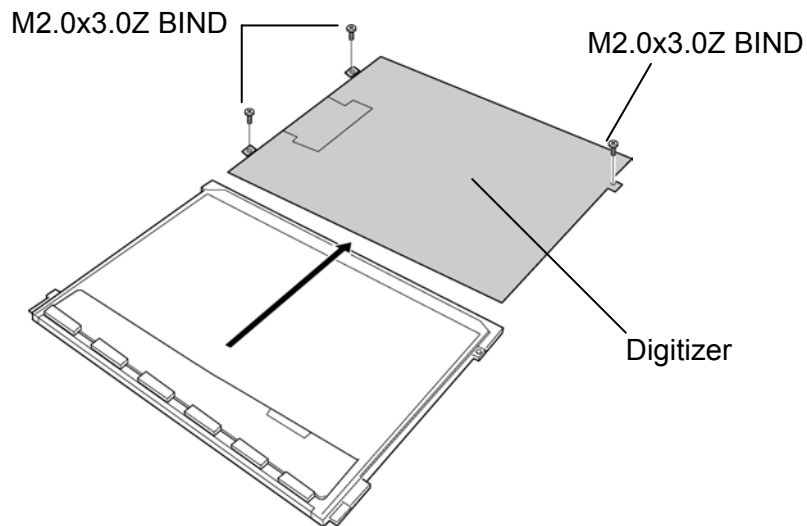
Figure 4-42 Removing the digitizer

Installing the digitizer

The following describes the procedure for installing the digitizer. (See Figure 4-42.)

1. Slide the **digitizer** into the back pocket of LCD.

Caution: *When replacing the digitizer, fit the digitizer into the back of LCD toward the arrow pointing.*

---
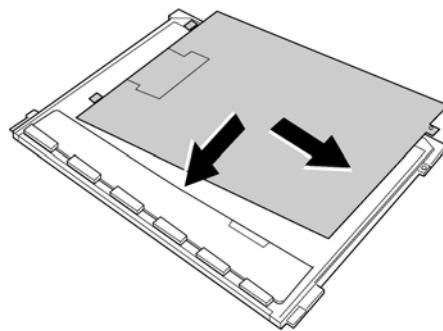
2. Secure the digitizer with the following **screws**.

   ❑ M2.0x3.0Z   BIND screw   x3

4.29 LCD/digitizer harness & Wireless LAN antenna cables

Removing the LCD/digitizer harness & wireless LAN antenna cables

The following describes the procedure for removing the LCD/digitizer harness & wireless LAN antenna cables. (See Figure 4-43 and 4-44.)

1. Pull out the **wireless LAN antenna cables** from the guide.

2. Remove the following **screws** and **LCD harness holder**.

    ❏ M2.5x2.8B   FLAT BIND screw   x1

3. Remove the following **screws** and **digitizer harness holder**.

    ❏ Unique screw CPU stud screw   x1

    ❏ M2.5x6.0S   PSP TIGHT screw   x1

4. Remove the following **screws** securing the hinge assembly.

    ❏ M2.5x6.0B   FLAT BIND screw   x1

    ❏ M2.5x6.0S   PSP TIGHT screw   x1

5. Remove the **hinge rear cover** from the hinge assembly.

6. Detach the **cover assembly** from the display cover.
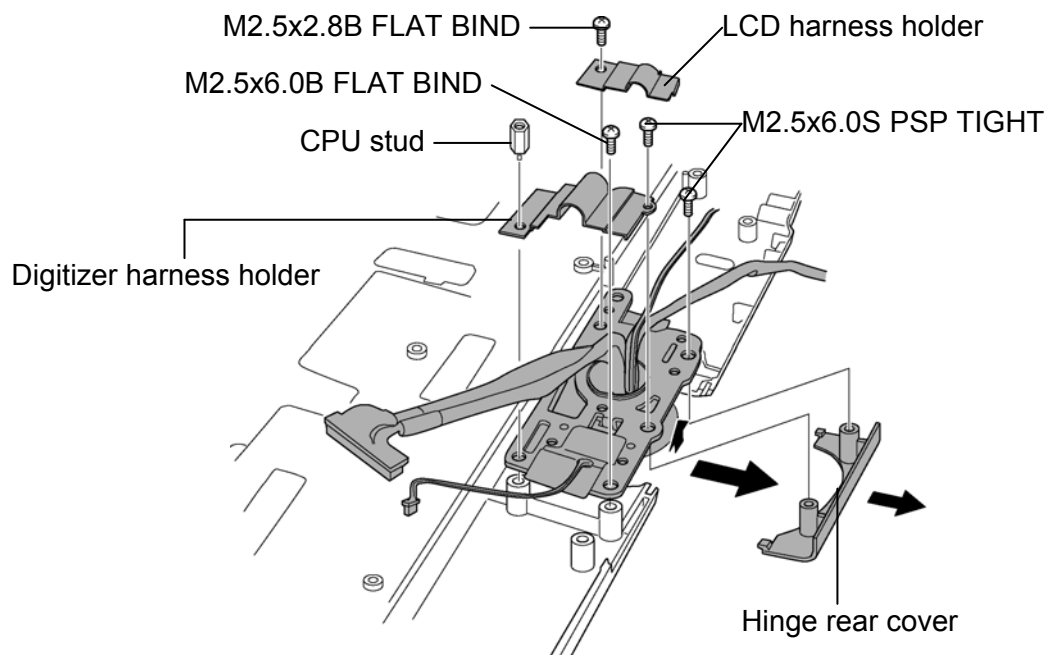
Figure 4-43 Removing the cover assembly

7. Remove the **LCD harness ground plate** from the display cover.

8. Remove the following **screws** and **LCD harness hold plate** from the display cover.

   ❑ M2.5x6.0B   FLAT BIND screw   x2

9. Remove the following **screws** securing the hinge assembly.

   ❑ M2.5x6.0B   FLAT BIND screw   x2

10. Detaching the **hinge assembly** from the display cover, remove the **hinge cap** from the hinge assembly.
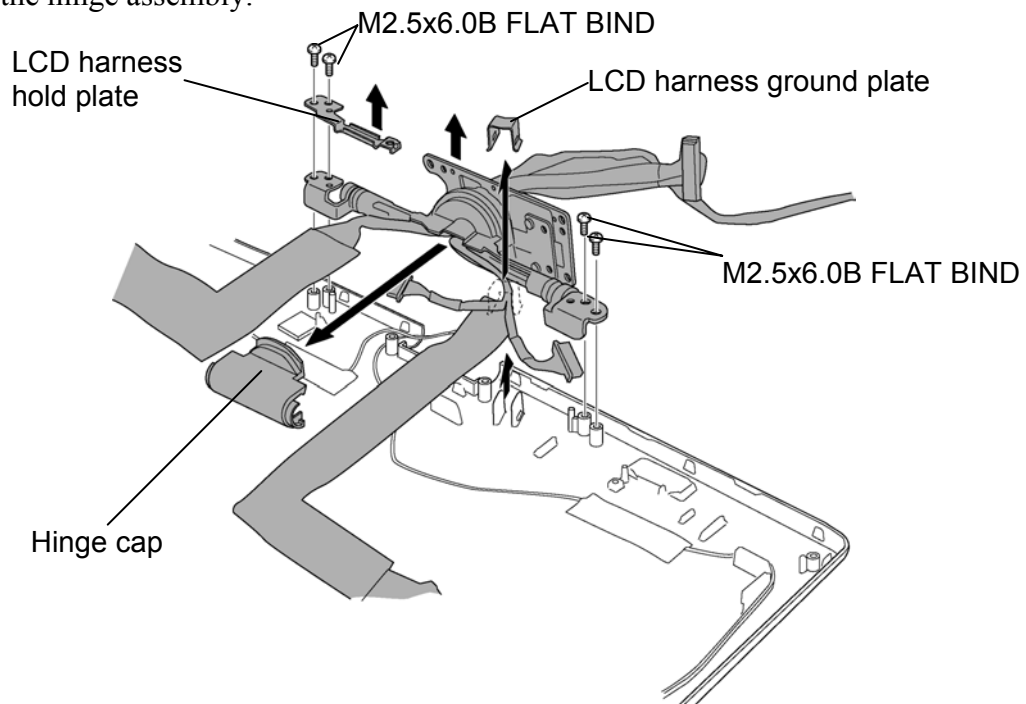
Figure 4-44 Removing the hinge assembly

11. Pull out the **LCD harness** through the hole of hinge assembly.

12. Pull out the **digitizer harness** through the hole of hinge assembly

13. Pull out the **wireless LAN antenna cables** through the hole of hinge assembly

14. Peel off the wireless LAN antennas and remove them from the display cover.

Installing the LCD/digitizer harness & wireless LAN antenna cables

The following describes the procedure for installing the LCD/digitizer harness & wireless LAN antenna cables. (See Figure 4-43 and 4-45.)

1. Stick the **wireless LAN antennas** on the display cover and arrange their cables.

2. Stick the **acetate tape** (5 points) on the display cover.
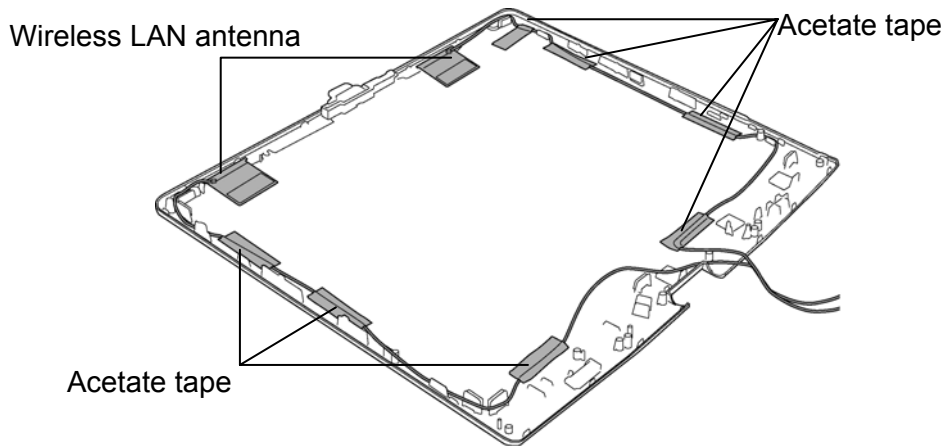
Figure 4-45 Arranging the wireless LAN antenna cables

3. Pass the **LCD harness** through the hole of hinge assembly.

4. Pass the **digitizer harness** through the hole of hinge assembly.

5. Pass the **wireless LAN antenna cables** through the hole of hinge assembly.

6. Installing the **hinge cap** to the hinge assembly, secure the hinge assembly to the display cover with the following **screws**.

   ❏ M2.5x6.0B   FLAT BIND screw   x2

Caution: *Before installing the hinge cap, confirm the right arrangement of each harnesses and cables.*

---

7. Arranging the **LCD harness** on the display cover, secure the **LCD harness ground plate** with the following **screws**.

   ❏ M2.5x6.0B   FLAT BIND screw   x2

8. Arranging the **digitizer harness** on the display cover, install the **digitizer harness hold plate**.

9. Install the **cover assembly** and **hinge rear cover** to the display cover.

10. Secure the cover assembly to the hinge assembly with the following **screws**.

     ❑ M2.5x6.0B   FLAT BIND screw   x1

     ❑ M2.5x6.0S   PSP TIGHT screw   x1

11. Install the **digitizer harness holder** to the hinge assembly and secure it with the following **screws**.

     ❑ M2.5x6.0B   FLAT BIND screw   x1

     ❑ M2.5x6.0S   PSP TIGHT screw   x1

12. Install the **LCD harness holder** to the hinge assembly and secure it with the following **screws**

     ❑ M2.5x2.8B   FLAT BIND screw   x1

13. Arrange the **wireless LAN antenna cables** along the guide of cover assembly.

4.30 Hinge Switch Board

Removing the hinge switch board

The following describes the procedure for removing the hinge switch board. (See Figure 4-46.)

1. Remove the following **screws** and **hinge switch board**.

   ❑ M2.0x3.0B   FLAT BIND screw   x2

2. Remove the plate placed under the hinge switch board.
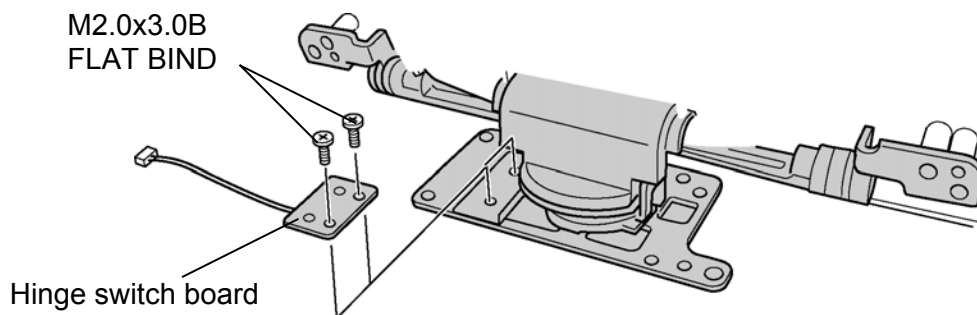
Figure 4-46 Removing the hinge switch board

Installing the hinge switch board

The following describes the procedure for installing hinge switch board. (See Figure 4-46.)

1. Install the plate fitting to the bosses on the hinge assembly.

2. Install the hinge switch board and secure it with the following **screws**.

   ❑ M2.0x3.0B   FLAT BIND screw   x2

Appendices

Appendix   Contents

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CN Board

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HD Board

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.
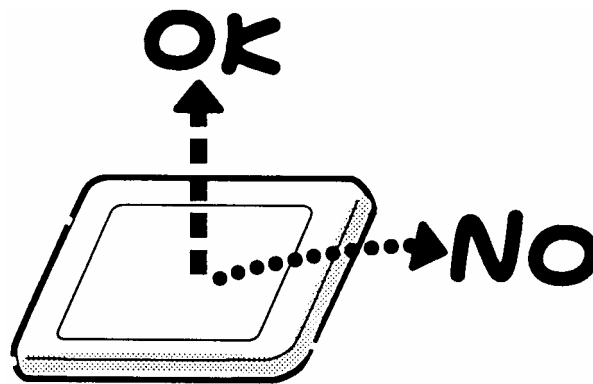
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

    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.
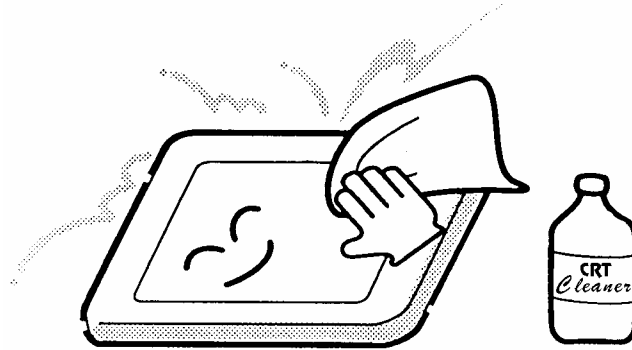
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.
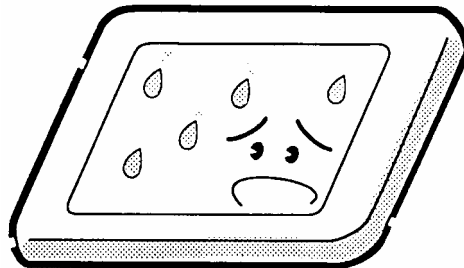
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.
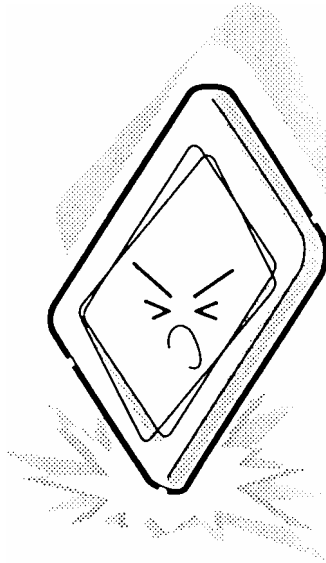
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
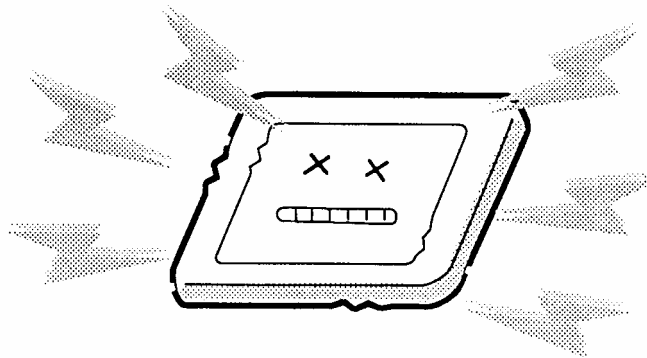
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.
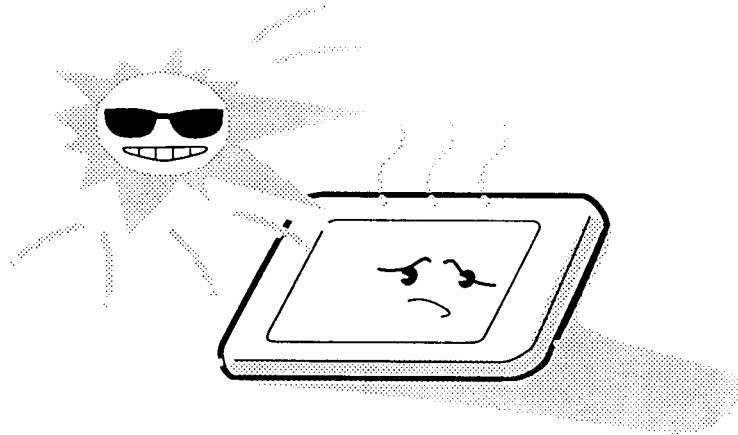
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
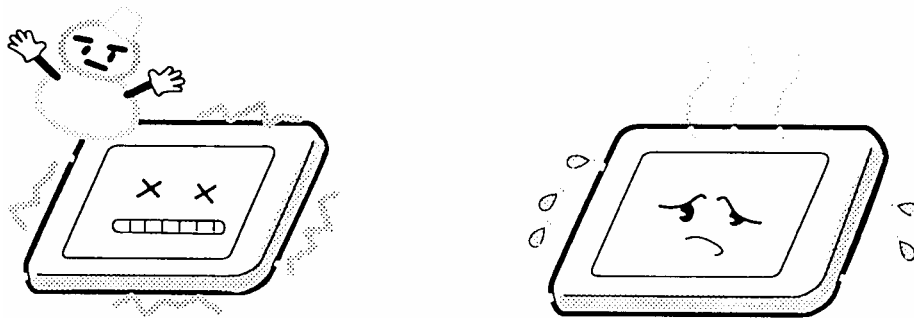
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
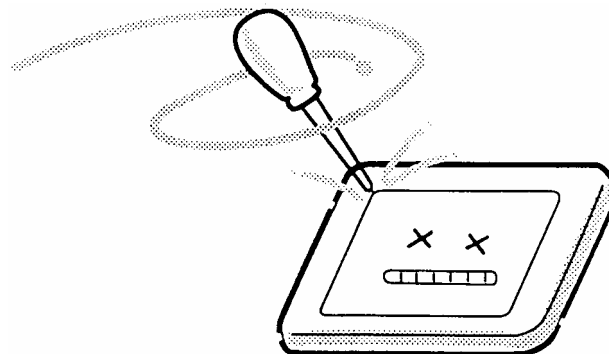
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
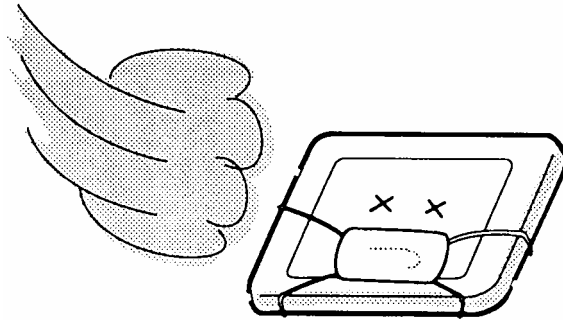
Appendix B Board Layout

B.1 System Board Front View
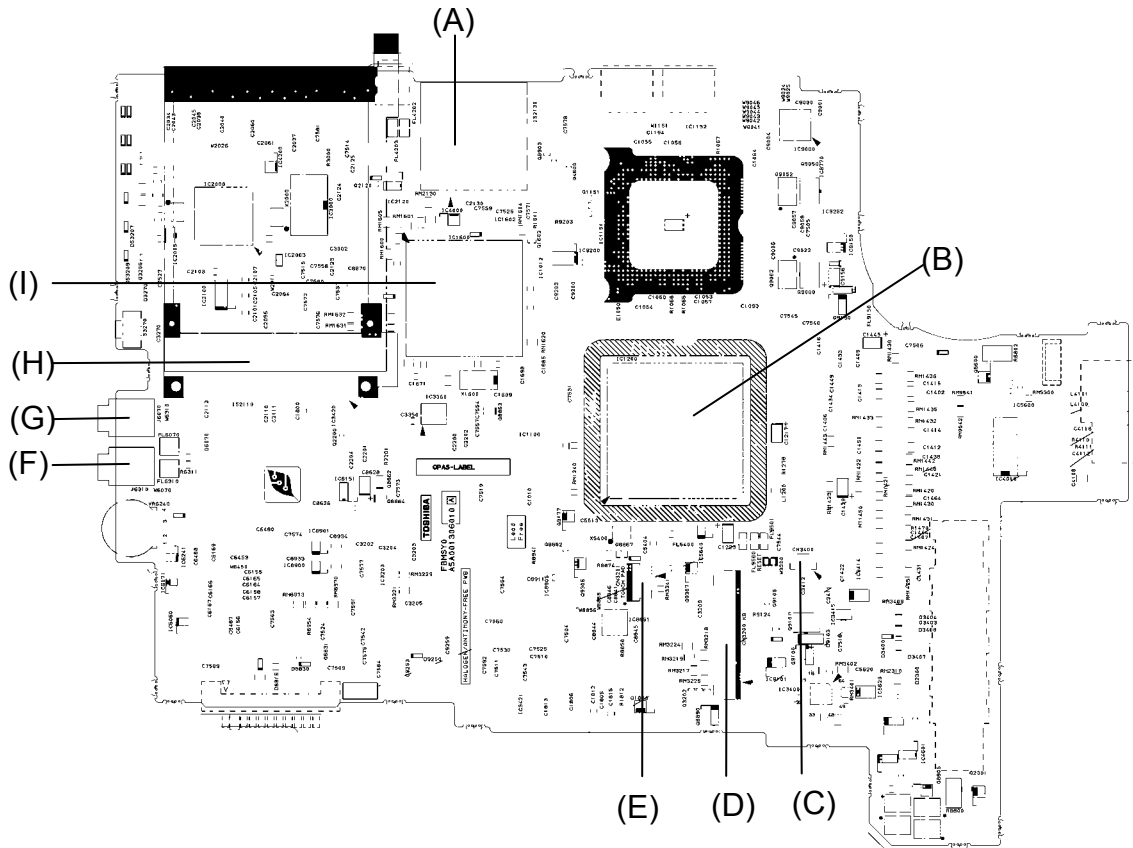
Figure B-1 System board layout (front)

Table B-1 System board (front)

Mark	Number	Part's name
(A)	IS2130	SD card slot
(B)	IC1200	Montara-GM+
(C)	CN3400	Debug port (D port) connector
(D)	CN3200	Keyboard connector
(E)	CN3201	Touch pad connector
(F)	J6310	Headphone jack
(G)	J6070	External microphone jack
(H)	IS2110	PC card connector
(I)	IC1600	ICH4-M

B.2 System board Back View
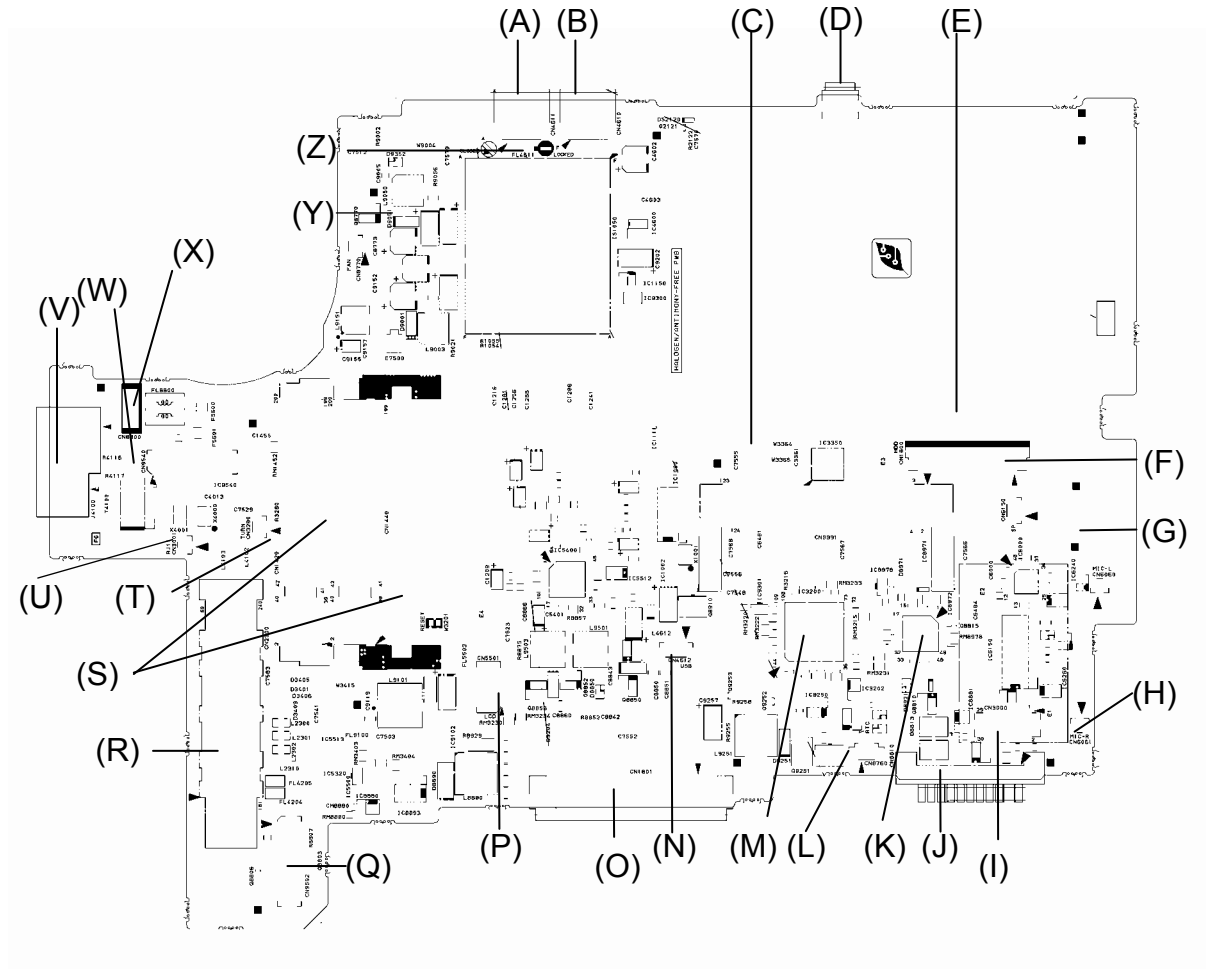
Figure B-2 System board layout (back)

Table B-2 System board (back)

Mark	Number	Name
(A)	CN4611	USB connector 2
(B)	CN4610	USB connector 1
(C)	CN9991	Mini PCI connector
(D)	CN4200	IEEE1394 connector
(E)	CN1800	HDD I/F connector
(F)	CN6150	Speaker connector
(G)	CN6060	Internal microphone (left) connector
(H)	CN6061	Internal microphone (right) connector
(I)	CN3000	MDC connector
(J)	CN8810	Battery connector
(K)	IC8972	PSC
(L)	CN8760	RTC battery connector
(M)	IC3200	EC/KBC
(N)	CN4612	USB connector 3
(O)	CN1801	Selectable bay connector
(P)	CN5501	LCD connector
(Q)	CN9502	CN board I/F connector
(R)	CN2300	Docking connector
(S)	CN1420, CN1440	Memory connector
(T)	CN3280	Panel sensor connector
(U)	CN3001	RJ11 relay connector
(V)	J4100	Network jack
(W)	CN9540	Digitizer connector
(X)	CN8800	DC IN connector
(Y)	CN8770	FAN connector
(Z)	IS1050	CPU

B.3   CN Board Front and Back View

<Front layout>

<Back layout>
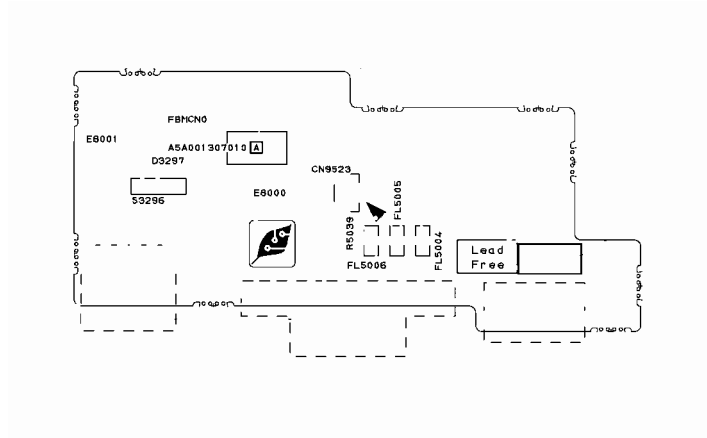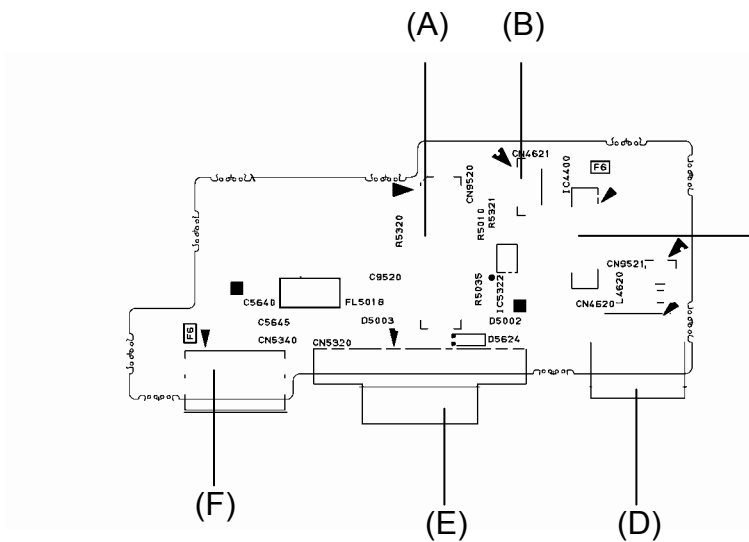
Figure B-3 CN board layout

Table B-3 CN Board

Mark	Number	Name
(A)	CN9520	System board I/F connector
(B)	CN4621	USB 1 relay connector
(C)	CN9521	QI board I/F connector
(D)	CN4620	USB 2 connector
(E)	CN5320	CRT connector
(F)	CN5340	S-VIDEO connector

B.4   QI Board Front and Back View

<Front layout>

<Back layout>

(A)
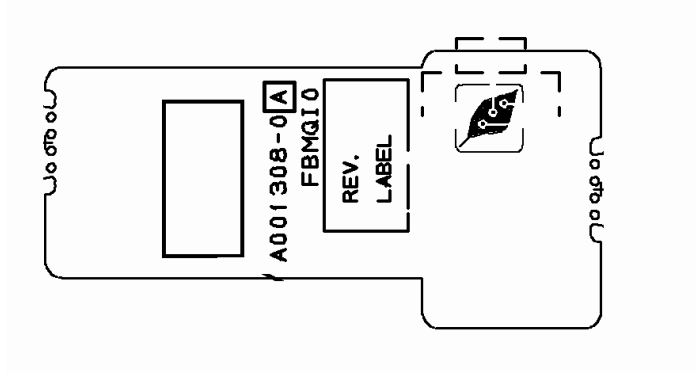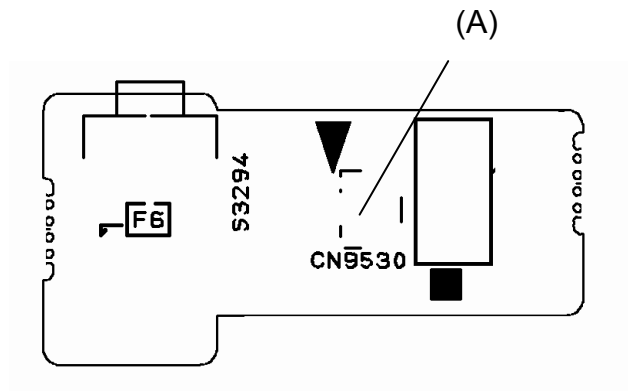
Figure B-4 QI Board layout

Table B-4 QI Board

Mark	Number	Name
(A)	CN9530	CN board I/F connector

B.5   SW Board Front and Back View

<Front layout>

<Back layout>
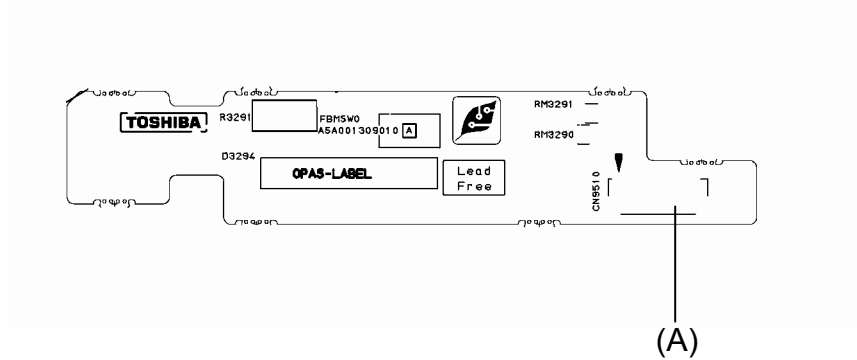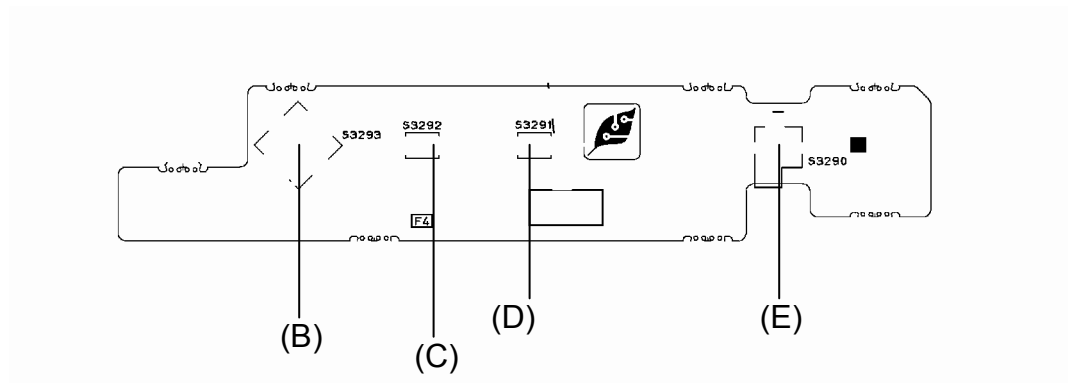
Figure B-5   SW Board layout

Table B-5 SW Board

Mark	Number	Name
(A)	CN9510	System board I/F connector
(B)	S3293	Direction button
(C)	S3292	ESC button
(D)	S3291	SAS button
(E)	S3290	POWER-ON switch

B.6   HD Board

(A)

(B)
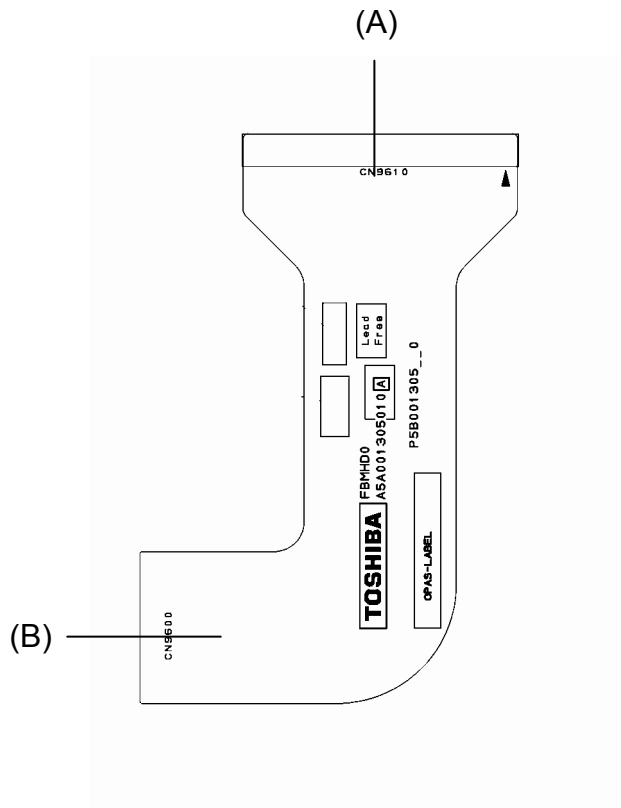
Figure B-6 HD Board layout

Table B-6 HD Board

Mark	Number	Name
(A)	CN9610	HDD I/F connector
(B)	CN9600	System board I/F connector

Appendix C   Pin Assignment

System Board

C.1   CN1420 Memory 1 connector (200-pin)

Table C-1 Memory 1 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-B1V	I	2	MRVREF-B1V	I
3	GND	-	4	GND	-
5	SDQ05-B2P	I/O	6	SDQ04-B2P	I/O
7	SDQ01-B2P	I/O	8	SDQ00-B2P	I/O
9	2R5-B2V	I	10	2R5-B2V	I
11	SDQS0-B2P	I/O	12	SDM00-B2P	I
13	SDQ03-B2P	I/O	14	SDQ07-B2P	I/O
15	GND	-	16	GND	-
17	SDQ02-B2P	I/O	18	SDQ06-B2P	I/O
19	SDQ15-B2P	I/O	20	SDQ09-B2P	I/O
21	2R5-B2V	I	22	2R5-B2V	I
23	SDQ12-B2P	I/O	24	SDQ13-B2P	I/O
25	SDQS1-B2P	I/O	26	SDM01-B2P	I
27	GND	-	28	GND	-
29	SDQ11-B2P	I/O	30	SDQ08-B2P	I/O
31	SDQ10-B2P	I/O	32	SDQ14-B2P	I/O
33	2R5-B2V	I	34	2R5-B2V	I
35	SCK0-B2P	I	36	2R5-B2V	I
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ16-B2P	I/O	42	SDQ20-B2P	I/O
43	SDQ17-B2P	I/O	44	SDQ21-B2P	I/O
45	2R5-B2V	I	46	2R5-B2V	I
47	SDQS2-B2P	I/O	48	SDM02-B2P	I/O
49	SDQ19-B2P	I/O	50	SDQ23-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18-B2P	I/O	54	SDQ22-B2P	I/O
55	SDQ24-B2P	I/O	56	SDQ25-B2P	I/O

Table C-1 Memory 1 connector (200-pin)(2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
57	2R5-B2V	I	58	2R5-B2V	I
59	SDQ28-B2P	I/O	60	SDQ29-B2P	I/O
61	SDQS3R-B2P	I/O	62	SDM03-B2P	I
63	GND	-	64	GND	-
65	SDQ26-B2P	I/O	66	SDQ27-B2P	I/O
67	SDQ30-B2P	I/O	68	SDQ31-B2P	I/O
69	2R5-B2V	I	70	2R5-B2V	I
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	I
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	I	90	GND	-
91	GND	-	92	2R5-B2V	I
93	2R5-B2V	I	94	2R5-B2V	I
95	SCKE1-B2P	I	96	SCKE0-B2P	I
97	N.C.	-	98	N.C.	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMA05-B2P	I	108	SMA04-B2P	I
109	SMA03-B2P	I	110	SMA02-B2P	I
111	SMA01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	I	114	2R5-B2V	I
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS0-B2N	I	122	SCS1-B2N	I
123	N.C.	-	124	N.C.	-
125	GND	-	126	GND	-
127	SDQ36-B2P	I/O	128	SDQ33-B2P	I/O

Table C-1 Memory 1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
129	SDQ37-B2P	I/O	130	SDQ32-B2P	I/O
131	2R5-B2V	I	132	2R5-B2V	I
133	SDQS4-B2P	I/O	134	SDM04-B2P	I
135	SDQ34-B2P	I/O	136	SDQ38-B2P	I/O
137	GND	-	138	GND	-
139	SDQ39-B2P	I/O	140	SDQ35-B2P	I/O
141	SDQ45-B2P	I/O	142	SDQ41-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	I
145	SDQ40-B2P	I/O	146	SDQ46-B2P	I/O
147	SDQS5-B2P	I/O	148	SMD05-B2P	I
149	GND	-	150	GND	-
151	SDQ44-B2P	I/O	152	SDQ43-B2P	I/O
153	SDQ47-B2P	I/O	154	SDQ42-B2P	I/O
155	2R5-B2V	I	156	2R5-B2V	I
157	2R5-B2V	I	158	SCK1-B2N	I
159	GND	-	160	SCK1-B2P	I
161	GND	-	162	GND	-
163	SDQ48-B2P	I/O	164	SDQ52-B2P	I/O
165	SDQ49-B2P	I/O	166	SDQ53-B2P	I/O
167	2R5-B2V	I	168	2R5-B2V	I
169	SDQS6-B2P	-	170	SDM06-B2P	I
171	SDQ50-B2P	I/O	172	SDQ51-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55-B2P	I/O	176	SDQ54-B2P	I/O
177	SDQ56-B2P	I/O	178	SDQ61-B2P	I/O
179	2R5-B2V	I	180	2R5-B2V	I
181	SDQ60-B2P	I/O	182	SDQ57-B2P	I/O
183	SDQS7-B2P	I/O	184	SDM07-B2P	I
185	GND	-	186	GND	-
187	SDQ58-B2P	I/O	188	SDQ62-B2P	I/O
189	SDQ59-B2P	I/O	190	SDQ63-B2P	I/O
191	2R5-B2V	I	192	2R5-B2V	I
193	SMBDT1-P3P	I/O	194	GND	-
195	SMBCK1-P3P	I	196	GND	-
197	P3V	I	198	GND	-
199	N.C	-	200	N.C	-

C.2   CN1440 Memory 2 connector (200-pin)

Table C-2 Memory 2 connector (200-pin)(1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B1V	I	2	MRVREF-B1V	I
3	GND	-	4	GND	-
5	SDQ05-B2P	I/O	6	SDQ04-B2P	I/O
7	SDQ01-B2P	I/O	8	SDQ00-B2P	I/O
9	2R5-B2V	I	10	2R5-B2V	I
11	SDQS0-B2P	I/O	12	SDM00-B2P	I
13	SDQ03-B2P	I/O	14	SDQ07-B2P	I/O
15	GND	-	16	GND	-
17	SDQ02-B2P	I/O	18	SDQ06-B2P	I/O
19	SDQ15-B2P	I/O	20	SDQ09-B2P	I/O
21	2R5-B2V	I	22	2R5-B2V	I
23	SDQ12-B2P	I/O	24	SDQ13-B2P	I/O
25	SDQS1-B2P	I/O	26	SDM01-B2P	I
27	GND	-	28	GND	-
29	SDQ11-B2P	I/O	30	SDQ08-B2P	O
31	SDQ10-B2P	I/O	32	SDQ14-B2P	I/O
33	2R5-B2V	I	34	2R5-B2V	I
35	SCK3-B2P	I	36	2R5-B2V	I
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ16-B2P	I/O	42	SDQ20-B2P	I/O
43	SDQ17-B2P	I/O	44	SDQ21-B2P	I/O
45	2R5-B2V	I	46	2R5-B2V	I
47	SDQS2-B2P	I/O	48	SDM02-B2P	I
49	SDQ19-B2P	I/O	50	SDQ23-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18-B2P	I/O	54	SDQ22-B2P	I/O
55	SDQ24-B2P	I/O	56	SDQ25-B2P	I/O
57	2R5-B2V	I	58	2R5-B2V	I
59	SDQ28-B2P	I/O	60	SDQ29-B2P	I/O
61	SDQS3-B2P	I/O	62	SDM03-B2P	I
63	GND	-	64	GND	-
65	SDQ26-B2P	I/O	66	SDQ27-B2P	I/O
67	SDQ30-B2P	I/O	68	SDQ31-B2P	I/O

Table C-2   Memory 2 connector (200-pin)(2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	2R5-B2V	I	70	2R5-B2V	I
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	I	82	2R5-B2V	I
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	I	90	GND	-
91	GND	-	92	2R5-B2V	I
93	2R5-B2V	I	94	2R5-B2V	I
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	N.C.	-	98	N.C.	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMAB05-B2P	I	108	SMAB04-B2P	I
109	SMA03-B2P	I	110	SMAB02-B2P	I
111	SMAB01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	I	114	2R5-B2V	I
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS2-B2N	I	122	SCS3-B2N	I
123	N.C.	-	124	N.C.	-
125	GND	-	126	GND	-
127	SDQ36-B2P	I/O	128	SDQ33-B2P	I/O
129	SDQ37-B2P	I/O	130	SDQ32-B2P	I/O
131	2R5-B2V	I	132	2R5-B2V	I
133	SDQS4-B2P	I/O	134	SDM04-B2P	-
135	SDQ34-B2P	I/O	136	SDQ38-B2P	I/O
137	GND	-	138	GND	-
139	SDQ39-B2P	I/O	140	SDQ35-B2P	I/O

Table C-2   Memory 2 connector (200-pin)(3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
141	SDQ45-B2P	I/O	142	SDQ41-B2P	I/O
143	2R5-B2V	I	144	2R5-B2V	I
145	SDQ40-B2P	I/O	146	SDQ46-B2P	I/O
147	SDQS5-B2P	I/O	148	SDM05-B2P	I
149	GND	-	150	GND	-
151	SDQ44-B2P	I/O	152	SDQ43-B2P	I/O
153	SDQ47-B2P	I/O	154	SDQ42-B2P	I/O
155	2R5-B2V	I	156	2R5-B2V	I
157	2R5-B2V	I	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ48-B2P	I/O	164	SDQ52-B2P	I/O
165	SDQ49-B2P	I/O	166	SDQ53-B2P	I/O
167	2R5-B2V	I	168	2R5-B2V	I
169	SDQS6-B2P	I/O	170	SDM06-B2P	I
171	SDQ50-B2P	I/O	172	SDQ51-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55-B2P	I/O	176	SDQ54-B2P	I/O
177	SDQ56-B2P	I/O	178	SDQ61-B2P	I/O
179	2R5-B2V	I	180	2R5-B2V	I
181	SDQ60-B2P	I/O	182	SDQ57-B2P	I/O
183	SDQS7-B2P	I/O	184	SDM07-B2P	I
185	GND	-	186	GND	-
187	SDQ58-B2P	I/O	188	SDQ62-B2P	I/O
189	SDQ59-B2P	I/O	190	SDQ63-B2P	I/O
191	2R5-B2V	I	192	2R5-B2V	I
193	SMBDT1-P3P	I/O	194	P3V	I
195	SMBCK1-P3P	I	196	GND	-
197	P3V	I	198	GND	-
199	N.C	-	200	N.C	-

C.3   CN5501 LCD connector (20-pin)

Table C-3 LCD connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	TXCLKA-PYP	I	4	TXCLKB-PYP	I
5	TXCLKA-PYN	I	6	TXCLKB-PYN	I
7	TXDTA0-PYP	I	8	TXDTB1-PYN	I
9	TXDTA0-PYN	I	10	TXDTB1-PYP	I
11	TXDTA2-PYN	I	12	TXDTB0-PYN	I
13	TXDTA2-PYP	I	14	TXDTB0-PYP	I
15	TXDTA1-PYN	I	16	TXDTB2-PYN	I
17	TXDTA1-PYP	I	18	TXDTB2-PYP	I
19	GND	-	20	GND	-

C.4   CN4610 USB 1 connector (Port0) (4-pin)

Table C-4 USB 1 connector (Port0) (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB0PS-E5V	I	2	USBP0-S3N	I
3	USBP0-S3P	I	4	GND	-

C.5   CN4611 USB 2 connector (Port3) (4-pin)

Table C-5 USB 2 connector (Port3) (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB0PS-E5V	I	2	USBP3-S3N	I
3	USBP3-S3P	I	4	GND	-

C.6   CN4612 USB 3 connector (Port5) (6-pin)

Table C-6 USB 3 connector (Port5) (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	USBP5-S3N	I	4	USBP5-S3P	I
5	GND	-	6	GND	-

C.7   CN3400 Debug port connector (4-pin)

Table C-7 Debug port connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P3V	-	2	DBGRX-P3P	O
3	DBGTX-P3P	I	4	GND	-

C.8   CN1800 HDD I/F connector (50-pin)

Table C-8 HDD I/F connector (50-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	IDRSTA-P5N	I
3	PDD07-P3P	I/O	4	GND	-
5	PDD08-P3P	I/O	6	PDD06-P3P	I/O
7	PDD09-P3P	I/O	8	GND	-
9	PDD05-P3P	I/O	10	PDD10-P3P	I/O
11	PDD04-P3P	I/O	12	GND	-
13	PDD11-P3P	I/O	14	PDD03-P3P	I/O
15	PDD12-P3P	I/O	16	GND	-
17	PDD02-P3P	I/O	18	PDD13-P3P	I/O
19	PDD01-P3P	I/O	20	GND	-
21	PDD14-P3P	I/O	22	PDD00-P3P	I/O
23	PDD15-P3P	I/O	24	GND	-
25	PDDREQ-P3P	I	26	PDIOW-P3N	I
27	GND	-	28	PDIOR-P3N	I
29	GND	-	30	PIORDY-P3P	I
31	GND	-	32	PDDACK-P3N	I
33	IRQ14-P3P	I	34	GND	-
35	PDA1-P3P	I	36	PDA0-P3P	I
37	PDA2-P3P	O	38	GND	-
39	PDCS1-P3N	I	40	PDCS3-P3N	O
41	P5V	-	42	P5V	-
43	P5V	-	44	P5V	-
45	P5V	-	46	HDDLED-P5N	I
47	GND	-	48	GND	-
49	GND	-	50	GND	-

C.9   IS2110 PC card I/F connector (70-pin)

Table C-9 PC card I/F connector (70-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ACAD00-EYP	I/O
3	ACAD01-EYP	I/O	4	ACAD03-EYP	I/O
5	ACAD05-EYP	I/O	6	ACAD07-EYP	I/O
7	ACCBEO-EYN	I/O	8	ACAD09-EYP	I/O
9	ACAD11-EYP	I/O	10	ACAD12-EYP	I/O
11	ACAD14-EYP	I/O	12	ACCBE1-EYN	I/O
13	ACPAR-EYP	I/O	14	ACPERR-EYN	I/O
15	ACGNT-EYN	I/O	16	ACINT-EYN	I/O
17	MCVCCA-EYV	I/O	18	MCVPPA-EYV	I/O
19	ACCLK-EYP	I/O	20	ACIRDY-EYN	I/O
21	ACCBE2-EYN	I/O	22	ACAD18-EYP	I/O
23	ACAD20-EYP	I/O	24	ACAD21-EYP	I/O
25	ACAD22-EYP	I/O	26	ACAD23-EYP	I/O
27	ACAD24-EYP	I/O	28	ACAD25-EYP	I/O
29	ACAD26-EYP	I/O	30	ACAD27-EYP	I/O
31	ACAD29-EYP	I/O	32	ACD02-EYP	I/O
33	ACCLKR-EYN	I/O	34	GND	-
35	GND	-	36	ACCD1-E3N	I/O
37	ACAD02-EYP	I/O	38	ACAD04-EYP	I/O
39	ACAD06-EYP	I/O	40	ACD14-EYP	I/O
41	ACAD08-EYP	I/O	42	ACAD10-EYP	I/O
43	ACVS1-E3P	I/O	44	ACAD13-EYP	I/O
45	ACAD15-EYP	I/O	46	ACAD16-EYP	I/O
47	ACA18-EYP	I/O	48	ACLOCK-EYN	I/O
49	ACSTOP-EYN	I/O	50	ACDEVS-EYN	I/O
51	MCVCCA-EYV	I	52	MCVPPA-EYV	I/O
53	ACTRDY-EYN	I/O	54	ACFRAM-EYN	I/O
55	ACAD17-EYP	I/O	56	ACAD19-EYP	I/O
57	ACVS2-E3P	I/O	58	ACRST-EYN	I/O
59	ACSERR-EYN	I/O	60	ACREQ-EYN	I/O

Table C-10 PC card I/F connector (70-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
61	ACCBE3-EYN	I/O	62	ACAUDI-EYP	O
63	ACSTSC-EYP	O	64	ACAD28-EYP	I/O
65	ACAD30-EYP	I/O	66	ACAD31-EYP	I/O
67	ACCD2-E3N	O	68	GND	-
69	GND	-	70	GND	-

C.10 CN3200 Keyboard connector (34-pin)

Table C-11 Keyboard connector (34-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	I
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	O
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	O
17	KBRT02-S3N	O	18	KBRT03-S3N	O
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	O	22	KBRT05-S3N	O
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	O	26	KBRT07-S3N	O
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	P5V	I	30	SP-P5V	I
31	SPX-PXP	I	32	SP-GND	I
33	SPY-PXP	I	34	P5V	I

C.11 CN3201 PAD connector (8-pin)

Table C-12   PAD connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SP-P5V	O	2	SPX-PXP	O
3	SPY-PXP	O	4	SP-GND	O
5	GND	-	6	IPDCLK-P5P	I/O
7	IPDDAT-P5P	I/O	8	P5V	I

C.12 CN3280 Panel sensor connector (3-pin)

Table C-13   Panel sensor connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND.	-	2	PNLTRN-S3N	O
3	GND	-			

C.13 J4100 Network I/F connector (14-pin)

Table C-14   Network I/F connector (14-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	TDP-P3P/ BIDAP-PXP	I	A2	TDN-P3N/ BIDAN-PXN	I
A3	RDP-P3P/ BIDBP-PXP	I	A4	CND/ BIDCP-PXP	-
A5	GND/ BIDCN-PXP	-	A6	RDN-P3N/ BIDBN-PXN	I
A7	GND/ BIDDP-PXP	-	A8	N.C./ BIDDN-PXN	-
A9	LNK-P3N	I	A10	P3V	I
A11	ACT-P3N	I	A12	P3V	I
B1	MDMTIP-E3P	I/O	B2	MDMRNG-E3P	I/O

C.14 CN9991 Mini PCI I/F connector (124-pin)

Table C-15　　Mini PCI I/F connector (124-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	WLON-S3N	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIRQD-P3N	I	18	P5V	I
19	P3V	I	20	PIRQG-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	E3V	I
25	X33MPC-P3P	I	26	PCIRS3-P3N	O
27	GND	-	28	P3V	I
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	I	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	O
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD21-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	I	64	FRAME-P3N	I/O

65	CLKRUN-P3N	I/O	66	TDRY-P3N	I/O

Table C-14   Mini PCI I/F connector (124-pin)(2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
67	SERR-P3N	I/O	68	STOP-P3N	I/O
69	GND	-	70	P3V	I
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	I
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	I	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	N.C.	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	E3V	I

C.15 CN8800 DC-IN connector (4-pin)

Table C-16   DC-IN connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PVL	O	2	PVL	O
3	GND	-	4	GND	-

C.16 CN8810 1st battery connector (10-pin)

Table C-17   1st battery connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PVBH1	I	2	BTMP1	I
3	PVBL1	I	4	M5V	I
5	PSCL-S5P	I	6	PSDA-S5P	I
7	GND	-	8	DBT10V-S5N	I
9	GND	-	10	GND	-

C.17 CN8760 RTC battery connector (3-pin)

Table C-18   RTC battery connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	R3V	O	2	N.C.	-
3	R3V	O			

C.18 CN8770 FAN connector (3-pin)

Table C-19   FAN connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	I	2	GND	-
3	FANG0-P3P	I			

C.19 CN6150 Speaker connector (4-pin)

Table C-20   Speaker connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SP OUT (L-)	I	2	SP OUT (L+)	I
3	SP OUT (R-)	I	5	SP OUT (R+)	I

C.20 J6070 External microphone connector (6-pin)

Table C-21   External microphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	4	A-GND	I
2	MICINR-PXP	O	5	A4R7-P4V	I
3	MICBIS-P2V	O	6	MICBIS-P2V	O

C.21 CN6060 Internal microphone (left) connector (2-pin)

Table C-22   Internal microphone (left) connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	IMICL-PXP	O	2	A-GND	-

C.22 CN6061 Internal microphone (right) connector (2-pin)

Table C-23   Internal microphone (right) connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	IMICR-PXP	O	2	A-GND	-

C.23 J6310 Headphone connector (6-pin)

Table C-24   Headphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	4	A-GND	-
2	HEADL-PXP	I	5	A4R7-P4V	I
3	HEADR-PXP	I	6	N.C.	-

C.24 IS2130 SD card I/F connector (12-pin)

Table C-25   SD card I/F connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SDAT3-E3P	I/O	2	SDCMD-E3P	I/O
3	GND	-	4	SD-E3V	I
5	SDCLK-E3P	I	6	GND	-
7	SDAT0-E3P	I/O	8	SDAT1-E3P	I/O
9	SDAT2-E3P	I/O	10	SDCD-E3N	O
11	SDWP-E3P	O	12	GND	-

C.25 CN3000 MDC I/F connector (30-pin)

Table C-26   MDC I/F connector (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	N.C.	-	2	GND	-
3	GND	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	GND	-
9	N.C.	-	10	N.C	-
11	N.C.	-	12	N.C	-
13	N.C.	-	14	N.C	-
15	GND	-	16	E3V	I
17	E3V	I	18	N.C	-
19	GND	-	20	GND	-
21	N.C.	-	22	M97SY2-P3P	I
23	M97OT2-P3P	I	24	N.C	-
25	M97RS2-S3N	I	26	M97IN2-E3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O

C.26 CN3001 RJ11 connector (2-pin)

Table C-27   RJ11 connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MDMRNG	I/O	2	MDMTIP	I/O

C.27 CN2300 Docking I/F connector (240-pin)

Table C-28   Docking I/F connector (240-pin) (1/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	DSKDC	I	A2	GND	-
A3	DSKDC	I	A4	GND	-
1	DCOUT	I	2	DCOUT	I
3	DOCDT1-S3N	O	4	P5V	I
5	N.C.	-	6	N.C.	-
7	GND	-	8	PHYRST-E3N	I-
9	DPCONF-S5P	O	10	GND	-
11	GND	-	12	DDCACK-P3P	I/O
13	DRED-PXP	I	14	DGREEN-PXP	I
15	DBLUE-PXP	I	16	DVSYNC-P3P	I
17	(DVISC-P3P)	I/O	18	Reserved	-
19	GND	-	20	(DVI-PRTCT2)	-
21	(DVI-PRTCT1)	-	22	(DVITX2-P3P)	-
23	(DVITX2-P3N)	-	24	(DVITX1-P3P)	-
25	(DVITX1-P3N)	-	26	(DVITX0-P3P)	-
27	(DVITX0-P3N)	-	28	GND	-
29	GND	-	30	(DVITXC-P3P)	I
31	(DVITXC-P3N)	-	32	(DVIDET-S3N)	-
33	(DVIPD0)	-	34	Reserved	-
35	(QSWON-B3P)	-	36	(DIRQD-S3N)	-
37	GND	-	38	(PCM2SP-B3P)	-
39	(DPMRST-S3N)	-	40	(DADOO-P3P)	-
41	GND	-	42	(DADO0-P3P)	-
43	(DADO2-P3P)	-	44	(DADO6-P3P)	-
45	GND	-	46	(XDPCI-P3P)	-
47	(DAD09-P3P)	-	48	(DAD11-P3P)	-
49	GND	-	50	(DAD11-P3P)	-
51	(DAD15-P3P)	-	52	(DINTA-P3N)	-
53	VOID	-	54	VOID	-
55	BIDDP-PXP	I/O	56	BIDDN-PXN	I/O
57	VOID	-	58	VOID	-
59	MDMRNG-E3P	I/O	60	MDMTIP-E3P	I/O

Table C-27   Docking I/F connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	I
65	(EXMSDT-P5P)	-	66	(EXKBDT-P5P)	-
67	GND	-	68	GND	-
69	DILSON-S3P	I/O	70	(NVPCNF-S3P)	O
71	GND	-	72	DDCADA-P3P	I/O
73	GND	-	74	GND	-
75	GND	-	76	DHSYNC-P3P	I
77	(DVISD-P3P)	-	78	(DVI_PRTCT3)	-
79	GND	-	80	(DVITX5-P3P)	-
81	(DVITX5-P3N)	-	82	(DVITX4-P3P)	-
83	(DVITX4-P3N)	-	84	(DVITX3-P3P)	-
85	(DVITX3-P3N)	-	86	(DVI16)	-
87	(DVI17)	-	88	GND	-
89	GND	-	90	(DOC_ON_LED1)	-
91	Reserved	-	92	(DOC_ON_LED2)	-
93	(DVIPD1)	-	94	(DVI_PRTCT4)	-
95	(DCADIO-S3P)	-	96	(DSMI-B3P)	-
97	GND	-	98	(DCKRUN-P3N)	-
99	(PME-S3P)		100	(DADO1-P3P)	-
101	GND	-	102	(DADO3-P3P)	-
103	(DADO5-P3P)	-	104	(DADO7-P3P)	-
105	GND	-	106	(DADO8-P3P)	-
107	(DAD10-P3P)	-	108	(DAD12-P3P)	-
109	GND	-	110	(DAD14-P3P)	-
111	(DCBE1-P3N)	-	112	(DPAR-P3P)	-
113	VOID		114	VOID	-
115	BIDCN-EXN	I/O	116	VOID	-
117	BIDCP-EXP	I/O	118	VOID	-
119	VOID	-	120	VOID	-

Table C-27   Docking I/F connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
121	DCOUT	I	122	DCOUT	I
123	DSSCL-S5P	I/O	124	IF-P5V	I
125	M5V	I	126	DTPA-E3P	I/O
127	GND	-	128	DTPB-E3P	I/O
129	(USBON1-E5N)	-	130	(USBOC1-E5N)	-
131	GND	-	132	(USBON2-E5N)	I
133	(USBOC2-E5N)	-	134	SNDMUT-S3N	I
135	DMBCHG-S3P	O	136	DOUTL-PXP	I/O
137	DINL-PXP	I/O	138	DINR-PXN	I/O
139	GND	-	140	PWRSW-S3N	O
141	(DCD-PYP)	-	142	(DSR-PYP)	-
143	(TXD-EYN)	-	144	(RING-PYP)	-
145	PE-P5P	O	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	I
155	(DPGNT-P3N)	-	156	(DAD30-P3P)	-
157	GND	-	158	(DAD28-P3P)	-
159	(DAD26-P3P)	-	160	(DAD24-P3P)	-
161	GND	-	162	(DIDSL-P3P)	-
163	(DAD22-P3P)	-	164	(DAD20-P3P)	-
165	GND	-	166	(DCBE0-P3N)	-
167	(DAD18-P3P)	-	168	(DAD16-P3P)	-
169	GND	-	170	(DCBE2-P3N)	-
171	(DTRDY-P3N)	-	172	(DSTOP-P3N)	-
173	GND	-	174	VOID	-
175	P3V	I	176	VOID	-
177	VOID	-	178	N.C.	-
179	BIDAP-PXP	O	180	BIDAN-PXN	O

Table C-27   Docking I/F connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
181	DCOUT	I	182	DCOUT	I
183	DSSDA-S5P	I/O	184	IF-P5V	I
185	Reserved	-	186	DTPA-E3N	I/O
187	GND	-	188	DTPB-E3N	I/O
189	USBP1-S3P	I/O	190	USBP1-S3N	I/O
191	GND	-	192	USBP2-S3P	I/O
193	USBP2-S3N	I/O	194	DOUTR-PXP	I/O
195	DOUTR-PXN	-	196	DOUTL-PXN	I/O
197	DINL-PXN	-	198	DINR-PXP	I/O
199	GND	-	200	(RXD-PYN)	-
201	(RTS-EYP)	-	202	(CTS-PYP)	-
203	(DTR-EYP)	-	204	SELCT-P5P	O
205	BUSY-P5P	O	206	ACK-P5N	O
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	I	212	-PINIT-P5N	I
213	ERROR-P5N	O	214	AUTFD-P5N	I
215	(DPREQ-P3N)	-	216	(DAD31-P3P)	-
217	GND	-	218	(DAD29-P3P)	-
219	(DAD27-P3P)	-	220	(DAD25-P3P)	-
221	GND	-	222	(DCBE23-P3N)	-
223	(DAD23-P3P)	-	224	(DAD21-P3P)	-
225	GND	-	226	(DCPCLR-P3P)	-
227	(DAD19-P3P)	-	228	(DAD17-P3P)	-
229	GND	-	230	(DFRAME-P3N)	-
231	(DIRDY-P3N)	-	232	(DDEVSL-P3N)	-
233	GND	-	234	ACT-P3N	O
235	LINK-P3N	O	236	DOCDT2-S3N	O
237	VOID	-	238	VOID	-
239	BIDBP-PXP	I	240	BIDBN-PXN	I

C.28 CN9540 Digitizer switch I/F connector (40-pin)

Table C-29   Digitizer switch I/F connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	21	GND	-
2	GND	-	22	DGDTR-P3N	I
3	GND	-	23	DGRTS-P3N	I
4	GND	-	24	DGRXD-P3P	O
5	GND	-	25	DGTXD-P3P	I
6	GND	-	26	GND	-
7	GND	-	27	PCIRS1-S3N	I
8	GND	-	28	P3V	I
9	GND	-	29	GND	-
10	GND	-	30	PWRSW-S3N	O
11	GND	-	31	GND	-
12	PNL2-P3P	O	32	KBRT00-S3N	O
13	BRT1-P5P	I	33	KBRT01-S3N	O
14	BRT2DA-S3P	I	34	KBRT02-S3N	O
15	BRT0-P5P	I	35	KBRT03-S3N	O
16	FL-P5V	I	36	KBRT04-S3N	O
17	PNL-P3V	I	37	KBRT05-S3N	O
18	FL-P5V	I	38	KBRT06-S3N	O
19	PNL-P3V	I	39	GND	-
20	FL-P5V	I	40	KBSC16-S3N	I

C.29 CN1801 Selectable bay I/F connector (72-pin)

Table C-30   Selectable bay I/F connector (72-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	37	GND	-
2	GND	-	38	SIORDY-P3P	O
3	N.C.	-	39	(CSEL)	-
4	N.C.	-	40	SDDACK	I
5	GND	-	41	GND	-
6	N.C.	-	42	IRQ15	O
7	IDRSTB-P5N	I	43	N.C.	-
8	GND	-	44	SDA1-P3P	I
9	GND	-	45	MBVON-E5N	I
10	SDD07-P3P	I/O	46	MBVON-E5N	I
11	SDD08-P3P	I/O	47	MBVON-E5N	I
12	SDD06-P3P	I/O	48	SDA0-P3P	I
13	SDD09-P3P	I/O	49	SDA2-P3P	I
14	SDD05-P3P	I/O	50	SDCS1-P3N	I
15	SDD10-P3P	I/O	51	SDCS3-P3N	I
16	GND	-	52	CDRLED-P5N	O
17	GND	-	53	GND	-
18	SDD04-P3P	I/O	54	MSSTS2-S3N	I
19	SDD11-P3P	I/O	55	MSSTS1-S3N	I
20	SDD03-P3P	I/O	56	MSSTS0-S3N	I
21	SDD12-P3P	I/O	57	GND	-
22	SDD02-P3P	I/O	58	N.C.	-
23	SDD13-P3P	I/O	59	N.C.	-
24	MBVON-E5N	I	60	N.C.	-
25	MBVON-E5N	I	61	N.C.	-
26	SDD01-P3P	I/O	62	N.C.	-
27	SDD14-P3P	I/O	63	N.C.	-
28	SDD00-P3P	I/O	64	GND	-
29	SDD15-P3P	I/O	65	GND	-
30	GND	-	66	N.C.	-
31	GND	-	67	GND	-
32	SDDREQ-P3P	O	68	N.C.	-

Table C-31   Selectable bay I/F connector (72-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
33	GND	-	69	GND	-
34	SDIOW-P3N	I	70	GND	-
35	GND	-	71		
36	SDIOR-P3N	I	72	N.C.	-

C.30 CN4200 IEEE1394 connector (4-pin)

Table C-32   EEE1394 connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TPB0-E3N	I/O	2	TPB0-E3P	I/O
3	TPA0-E3N	I/O	4	TPA0-E3P	I/O

C.31 CN9502 CN board I/F connector (40-pin)

Table C-33   CN board I/F connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	21	GPBTNA-S3N	I
2	GND	-	22	GND	-
3	GND	-	23	GND	-
4	GND	-	24	GND	-
5	MRED-PXP	I	25	GND	-
6	LUMINA-PYP	I	26	GND	-
7	VGAGND	-	27	PNLOFF-S3N	I
8	TV-GND	-	28	GND	-
9	MGREEN-PXP	I	29	USB1PS-E5V	I
10	CHROMA-PYP	I	30	N.C.	-
11	VGAGND	-	31	USB1PS-E5V	I
12	TV-GND	-	32	N.C.	-
13	MBLUE-PXP	I	33	N.C.	-
14	SHSYNC-P3P	I	34	GND	-
15	VGAGND	-	35	N.C.	-
16	SVSYNC-P3P	I	36	N.C.	-
17	PVON-S5P	I	37	N.C.	-
18	CRTSCL-P5P	I	38	N.C.	-
19	E5V	I	39	GND	-
20	CRTSDA-P5P	I	40	GND	-

CN board

C.32 CN4621 USB I/F connector 1 (6-pin)

Table C-34   USB I/F connector 1 (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	(CN4620-2)	I/O	4	(CN4620-3)	I/O
5	GND	-	6	GND	-

C.33 CN4620 USB I/F connector 2 (4-pin)

Table C-35   USB I/F connector 2 (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	I	2	(CN4621-3)	I/O
3	(CN4621-4)	I/O	4	GND	-

C.34 CN5320 CRT I/F connector (15-pin)

Table C-36   CRT I/F connector (15-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRED-PXP	I	2	MGREEN-PXP	I
3	MBLUE-PXP	I	4	N.C	-
5	GND	-	6	VGAGND	-
7	GND	-	8	GND	-
9	DDC-P5V	I	10	GND	-
11	N.C	-	12	CRTSDA-P5P	I
13	SHSYNC-P3P	I	14	SVSYNC-P3P	I
15	CRTSCL-P5P	I			

C.35 CN5340 S-VIDEO I/F connector (4-pin)

Table C-37   S-VIDEO I/F connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	LUMINA-PYP	I	4	CHROMA-PYP	I

C.36 CN9520 System board I/F connector (40-pin)

Table C-38   System board I/F connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	21	GPBTNA-S3N	O
2	GND	-	22	GND	-
3	GND	-	23	GND	-
4	GND	-	24	GND	-
5	MRED-PXP	O	25	GND	-
6	LUMINA-PYP	O	26	GND	-
7	VGAGND	-	27	PNLOFF-S3N	O
8	TV-GND	-	28	GND	-
9	MGREEN-PXP	O	29	USB1PS-E5V	O
10	CHROMA-PYP	O	30	(USBP4-S3N)	-
11	VGAGND	-	31	USB1PS-E5V	O
12	TV-GND	-	32	(USBP4-S3N)	-
13	MBLUE-PXP	O	33	(BTMDL-P3N)	-
14	SHSYNC-P3P	O	34	GND	-
15	VGAGND	-	35	(BT-P3V)	-
16	SVSYNC-P3P	O	36	(BTRST-S3N)	-
17	PVON-S5P	O	37	(WCHDAT-P3P)	-
18	CRTSCL-P5P	O	38	(WCHCLK-P3P)	-
19	E5V	I	39	GND	-
20	CRTSDA-P5P	O	40	GND	-

C.37 CN9521 QI board I/F connector (2-pin)

Table C-39   QI board I/F connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GPBTNA-S3N	I	2	GND	-

QI board

C.38 CN9530 CN board I/F connector (2-pin)

Table C-40   CN board I/F connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GPBTNA-S3N	I	2	GND	-

SW board

C.39 CN9510 System board I/F connector (12-pin)

Table C-41   System board I/F connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PWRSW-S3N	I	7	KBRT03-S3N	O
2	GND	-	8	KBRT04-S3N	O
3	KBSC16-S3N	I	9	KBRT05-S3N	O
4	KBRT00-S3N	O	10	KBRT06-S3N	O
5	KBRT01-S3N	O	11	GND	-
6	KBRT02-S3N	O	12	GND	-

HD board

C.40 CN9600 System board I/F connector (50-pin)

Table C-42   System board I/F connector (50-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	IDRSTA-P5N	O
3	PDD07-P3P	I/O	4	GND	-
5	PDD08-P3P	I/O	6	PDD06-P3P	I/O
7	PDD09-P3P	I/O	8	GND	-
9	PDD05-P3P	I/O	10	PDD10-P3P	I/O
11	PDD04-P3P	I/O	12	GND	-
13	PDD11-P3P	I/O	14	PDD03-P3P	I/O
15	PDD12-P3P	I/O	16	GND	-
17	PDD02-P3P	I/O	18	PDD13-P3P	I/O
19	PDD01-P3P	I/O	20	GND	-
21	PDD14-P3P	I/O	22	PDD00-P3P	I/O
23	PDD15-P3P	I/O	24	GND	-
25	PDDREQ-P3P	I	26	PDIOW-P3N	O
27	GND	-	28	PDIOR-P3N	O
29	GND	-	30	PIORDY-P3P	I
31	GND	-	32	PDDACK-P3N	O
33	IRQ14-P3P	O	34	GND	-
35	PDA1-P3P	O	36	PDA0-P3P	O
37	PDA2-P3P	O	38	GND	-
39	PDCS1-P3N	O	40	PDCS3-P3N	O
41	P5V	I	42	P5V	I
43	P5V	I	44	P5V	I
45	P5V	I	46	DASP-P5N	O
47	P3V	-	48	P3V	-
49	P3V	-	50	P3V	-

C.41 CN9610 HDD I/F connector (44-pin)

Table C-43   HDD I/F connector (44-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	IDRSTA-P5N	I	2	GND	-
3	PDD07-P3P	I/O	4	PDD08-P3P	I/O
5	PDD06-P3P	I/O	6	PDD09-P3P	I/O
7	PDD05-P3P	I/O	8	PDD10-P3P	I/O
9	PDD04-P3P	I/O	10	PDD11-P3P	I/O
11	PDD03-P3P	I/O	12	PDD12-P3P	I/O
13	PDD02-P3P	I/O	14	PDD13-P3P	I/O
15	PDD01-P3P	I/O	16	PDD14-P3P	I/O
17	PDD00-P3P	I/O	18	PDD15-P3P	I/O
19	GND	-	20	N.C.	-
21	PDDREQ-P3P	O	22	GND	-
23	PDIOW-P3N	I	24	GND	-
25	PDIOR-P3N	I	26	GND	-
27	PIORDY-P3P	O	28	GND	-
29	PDDACK-P3N	O	30	GND	-
31	IRQ14-P3P	I	32	N.C.	-
33	PDA1-P3P	I	34	N.C.	-
35	PDA0-P3P	I	36	PDA2-P3P	I
37	PDCS1-P3N	I	38	PDCS3-P3N	I
39	DASP-P5N	I	40	GND	-
41	P5V	I	42	P5V	I
43	GND	-	44	N.C.	-

Appendix D   Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break		Note
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	*2
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	18	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	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\ |	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
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
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	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break			Note
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	
112	F1		3B		BB		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	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2						Note
		Make		**Break**		**Make**		**Break**				
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
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F		
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F		

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combination with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1								Code set 2								
		Make				Break				Make					Break			
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
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	AA	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
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	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 listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

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	D2	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
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	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	45		C5		77		F0	77	
122	NUMERIC	45		C5		77		F0	77	
123	Scrl	46		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
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0 4A	

Table D-6 No.124 key scan code

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 No.126 key scan code

Key top	Shift	Code set 1						Code set 2						
		Make						**Make**						
Pause	Common*	E1	1D	45	E1	9D	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
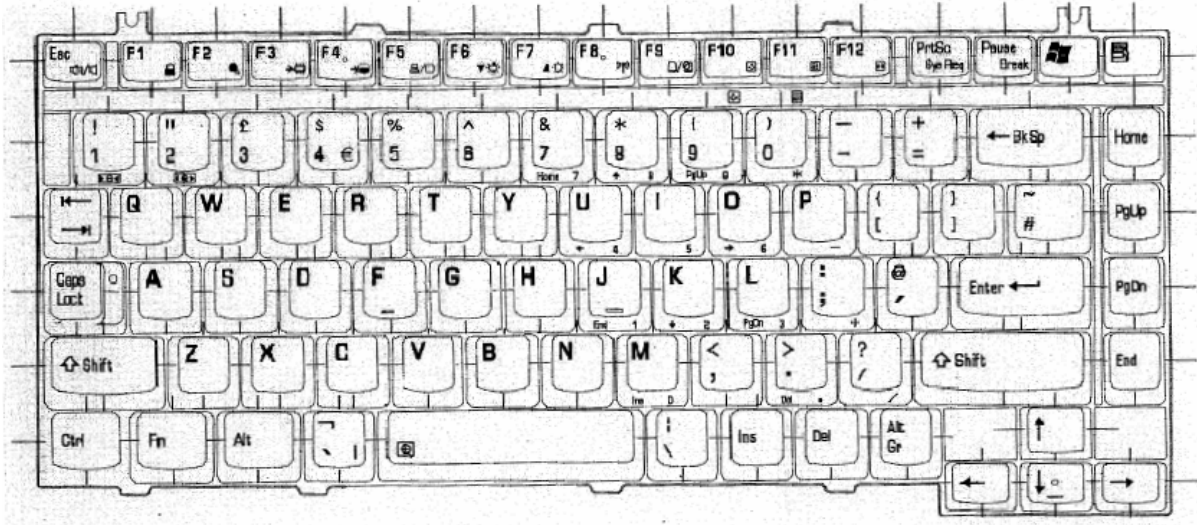
Figure E-1 Key layout (UK)
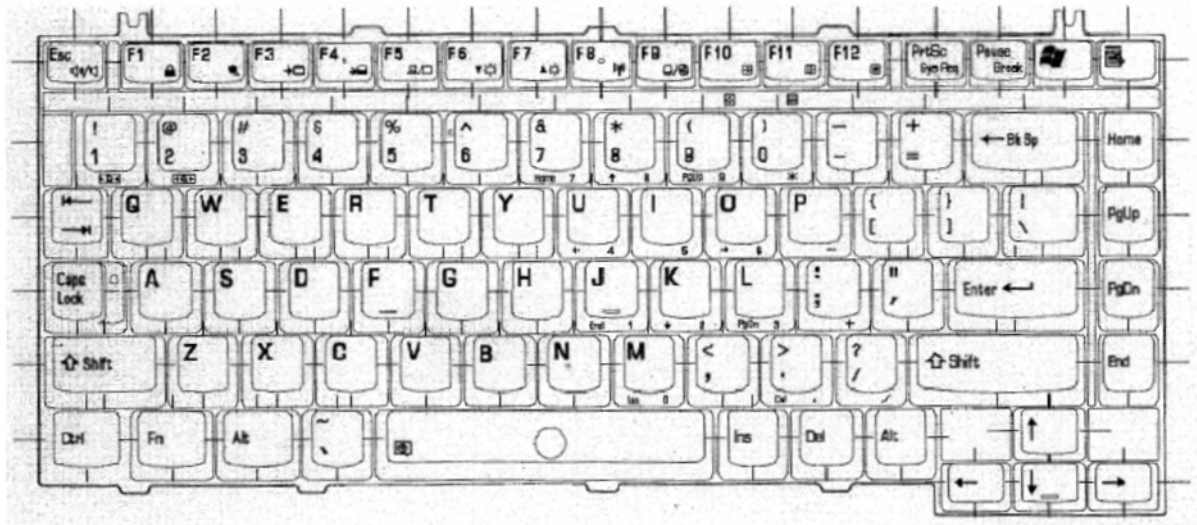
Figure E-2 Key layout (US)

Appendix F   Wiring Diagrams
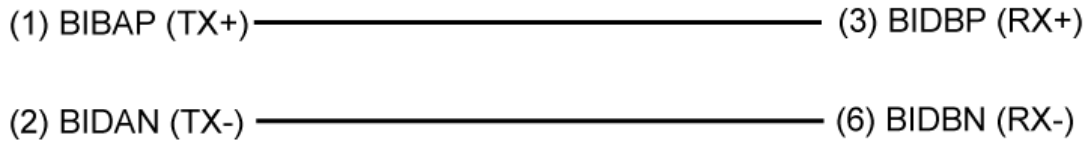
F.1 LAN Loopback Connector

(1) BIBAP (TX+) ——————————————— (3) BIDBP (RX+)

(2) BIDAN (TX-) ——————————————— (6) BIDBN (RX-)

Figure F-1 LAN loopback Connector

F.2 RS-232C Cable (9-pin to 9-pin)

(3) TD ——————————————— (2) RD
(4) DTR ——————————————— (6) DSR
                                          (8) CTS
                                          (9) RI

(7) RTS ——————————————— (1) CD
(5) GND ——————————————— (5) GND
(2) RD ——————————————— (3) TD
(1) CD ——————————————— (7) RTS
(6) DSR ——————————————— (4) DTR
(8) CTS
(9) RI
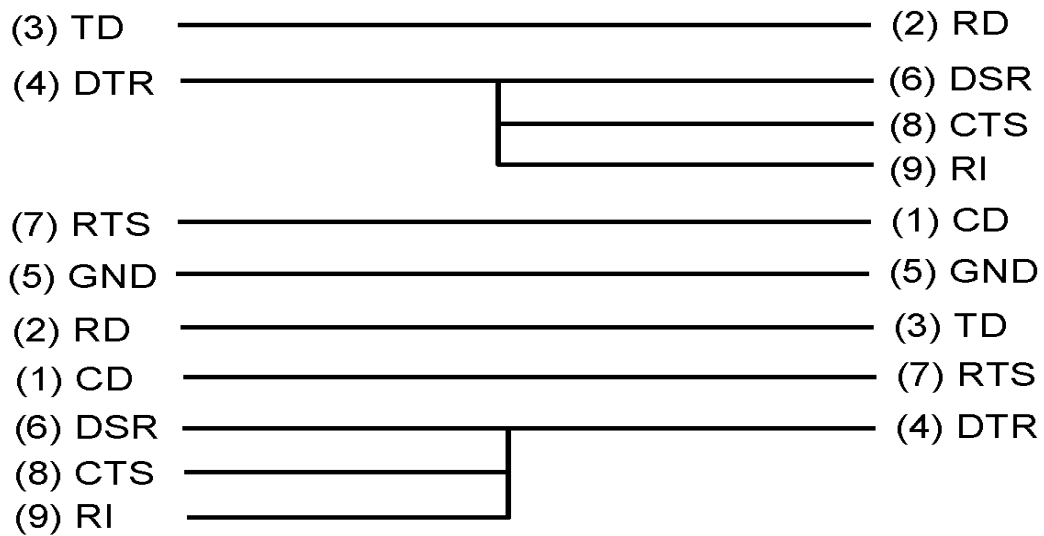
Figure F-2 RS232C cable (9-pin to 9-pin)

F.3 RS-232C Cable (9-pin to 25-pin)

```
(1) CD    ──────────────────────    (4) RTS
(2) RD    ──────────────────────    (2) TD
(3) TD    ──────────────────────    (3) RD
(4) DTR   ──────────────┐           (5) CTS
                        ├───────────(6) DSR
                        └───────────(22) RI

(5) GND   ──────────────────────    (7) GND
(7) RTS   ──────────────────────    (8) CD
(6) DSR   ──────────────┐           (20) DTR
(8) CTS   ──────────────┤
(9) RI    ──────────────┘
```
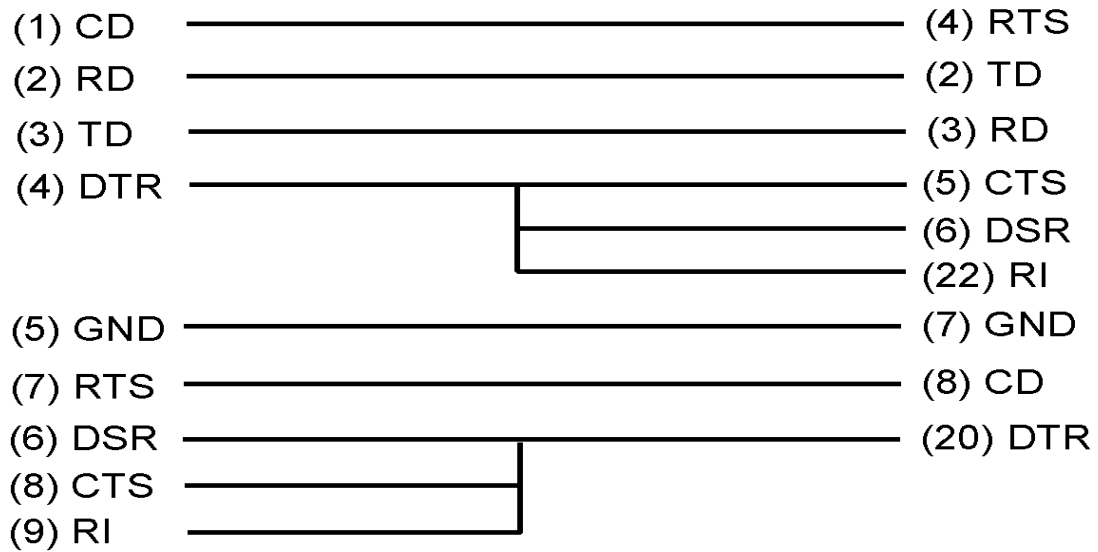
Figure F-3 RS232C cable (9-pin to 25-pin)

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:

❑ BIOS rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

> *Note:*   *1.*   *Connect the AC adaptor to the computer when you rewrite the BIOS.*
>
> *2.*   *Do not turn off the power while you are rewriting the BIOS.*
> *If the rewrite fails, it might be impossible to start up the computer.*
>
> *3.*   *If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been damaged. In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.*

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Connect a USB FDD and insert the BIOS rewriting disk into either the USB FDD.
5. Turn on the power while holding down the [~] key (US) or [~#] key (UK).
   The BIOS rewriting starts.
6. When the process is completed, eject the BIOS rewriting disk and the system is reset.
   The

Appendix H   EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

❑ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

> *NOTE:*   1. *Rewrite the EC/KBS only when instructed by a diagnostic disk release notice.*
>
>   2. *Be sure to connect both battery and AC adapter to the computer when you rewrite the EC/KBC.*
>
>   3. *Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.*
>
>   4. *If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the content of the EC/KBC has been erased. In this case, insert the EC/KBC rewriting disk, and the EC/KBC will be rewritten.*
>
>   5. *The time of rewriting EC/KBC depends on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.*

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC Card.
4. Connect a USB FDD and insert the EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the **Tab** key. The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I   Reliability

The following table shows MTBF (Mean Time between Failures).

Table I-1 MTBF

MTBF	Time (hours)
System	6,625