Toshiba Personal Computer

TECRA M5

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-542

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Toshiba Personal Computer TECRA M5 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA M5.

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. 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 TECRA M5 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 assignments
- ❑ 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 computer that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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Chapter 1

Hardware Overview

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1.1   Features

The Toshiba TECRA M5 Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features.

There some models and options. Refer to the Parts List for the configuration of each model and options.

❑ Microprocessor

The TECRA M5 computer is equipped with an Intel® Core™ Duo Processor or Intel® Core™ Solo Processor. These processors incorporate a math co-processor, a 2MB L2 cache memory.
The PC comes in with one of the following speeds:

Intel® Core™ Duo Processor

- 1.66GHz (T2300) /1.83GHz (T2400)/2.00GHz (T2500)/2.16GHz (T2600)

Intel® Core™ Solo Processor

- 1.66GHz (T1300)

These processors operate at 667MHz bus clock.

❑ Chipset

The TECRA M5 is equipped with Intel 945PM, Intel ICH7-M (82801GBM) and TI PCI7412ZHK.

❑ GPU (Graphics Processing Unit)

An nVIDIA Quadro NVS 110M (G72) Graphics Processing Unit is used as for a GPU.

❑ Memory

The computer comes with two DDR2 SO-DIMM slots. Two memory modules of 256GB, 512MB, 1GB (1,024MB) or 2GB (2,048MB) can be installed.

❑ HDD

The computer has a 2.5-inch SATA HDD. The following capacities are available.

- 40/60/80/100/120 GB

❑ USB FDD

A 3.5-inch USB FDD accommodates 2HD (1.44MB) or 2DD (720KB) disks.

❑ Slim Bay

An Optical drive, 2nd HDD or 2nd Battery pack can be installed in the Slim Bay.

❑ Optical Drive

A CD-ROM drive, DVD-ROM drive, CD-R/W&DVD-ROM drive or DVD Super Multi drive can be installed in the Slim Bay.

❑ Display

The PC comes in with one of the following two types:

- 14.1" XGA-TFT color display, resolution 1,024×768
- 14.1" SXGA+TFT color display, resolution 1,400×1,050

A video controller and a 128MB VRAM enables an external monitor to display 16M colors at a resolution of 1,024×768 pixels or 1,400×1,050 pixels.

❑ Keyboard

An-easy-to-use 85(US)/87(UK)-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft® Windows® 2000/XP. It supports software that uses a 101- or 102-key enhanced keyboard.

❑ TOSHIBA Dual Pointing Device

The TOSHIBA Dual Pointing Device consists of Touch Pad and AccuPoint. The touch pad and control buttons enable control of the on-screen pointer and scrolling of windows. The pointer control stick and AccuPoint enables convenient control of the cursor.

❑ Batteries

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

❑ Universal Serial Bus (USB2.0)

Three USB ports are provided. 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.

❑ IEEE 1394 port

The computer comes with one IEEE 1394 port. It enables high-speed data transfer directly from external devices such as digital video cameras.

❑ Serial port

The serial port enables connection of serial devices such as an external modem, serial mouse or serial printer.

❑ External monitor (RGB) port

The port enables connection of an external monitor, which is recognized automatically by Video Electronics Standards Association (VESA) Display Data Channel (DDC) 2B compatible functions.

❑ PC card and ExpressCard slot

A PC card slot and an ExpressCard slot are provided. The PC card slot (PCMCIA) accommodates one Type II card and the ExpressCard slot accommodates an ExpressCard.

❑ SD Card slot

The SD Card Slot can accommodate Secure Digital flash memory cards with various capacities. SD cards let you easily transfer data from devices, such as digital cameras and Personal Digital Assistants, which use SD Card flash-memory.

❑ Fingerprint sensor

The computer is equipped with a fingerprint sensor and fingerprint authentication utility. They enable only person who has registered his/her fingerprint to use the computer.

❑ Docking interface port

The docking interface port enables connection of an optional Advanced Port Replicator III Plus. It provides additional features as follows:

- RJ45 LAN jack
- RJ11 Modem jack
- External monitor port
- Parallel port
- Serial port
- PS/2 mouse port
- PS/2 keyboard port
- DC IN 15V jack
- Security lock slot
- Audio line-in, line-out jacks
- Universal Serial Bus 2.0 port (four)
- LINK (IEEE 1394) port
- DVI port

❑ Sound system

The sound system is equipped with the following features:

- Stereo speakers
- Built-in microphone
- Volume control knob
- Stereo headphone jack
- External microphone jack
- Supports VoIP

❑ Video-out jack

The video jack enables to transfer NTSC or PAL data to external devices connected with S-Video cable.

❑ Internal modem

The computer contains a MDC, enabling data and fax communication. It supports ITU-T V.90 (V.92). The transfer rates are 56 Kbps for data reception, 33.6 Kbps for data transmission, and 14,400 bps for fax transmission. However, the actual speed depends on the line quality. The RJ11 modem jack is used to accommodate a telephone line. Both of V.90 and V.92 are supported only in USA, Canada and Australia. Only V.90 is available in other regions.

❑ Internal LAN

The computer is equipped with LAN circuits that support Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T). It also supports Wakeup on LAN (WOL), Magic Packet and LED.

 è Wireless LAN

The computer is equipped with PCI-Ex MiniCard type wireless LAN board that supports 802.11 a/b/g in the PCI-Ex MiniCard slot. This function can be switched on and off by a switch on the computer.

❑ Bluetooth

The computer is equipped with Bluetooth (V2.0+EDR) communications standard enable wireless connection between electronic devices such as computers and printers. It supports wireless communication switch.

❑ Presentation button

This button switches the display between internal display, external display, simultaneous display and multi-monitor display.

❑ TOSHIBA Assist button

When this button is pressed during power-on, the PC is connected to "Toshiba Assist". When this button is pressed during power-off, the PC is turned on and connected to "Toshiba Assist".

The front of the computer is shown in figure 1-1.
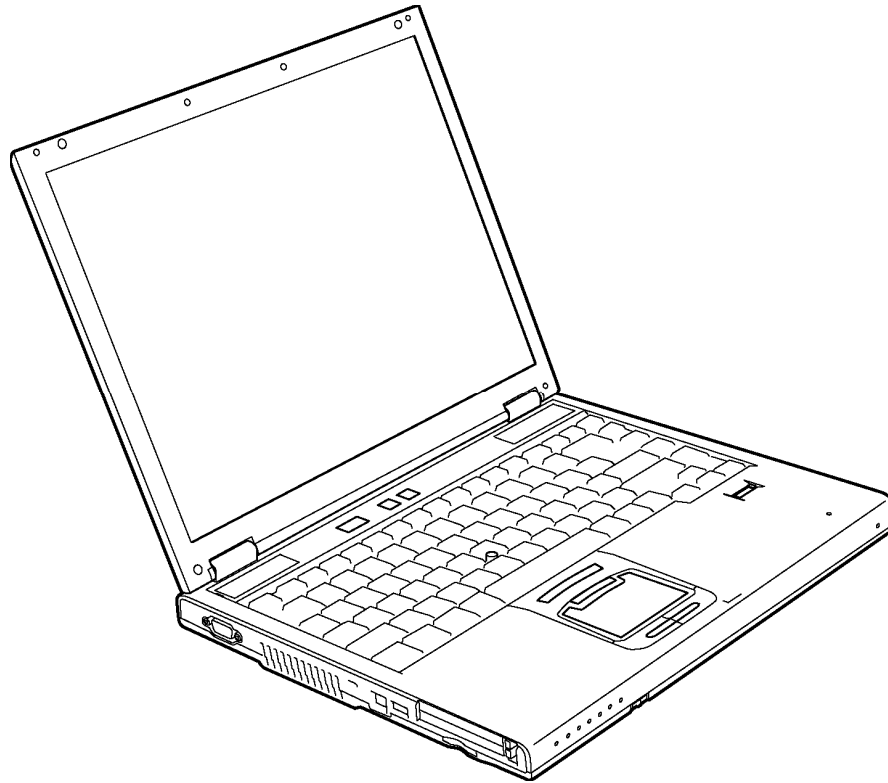
Figure 1-1   Front of the computer

The system unit configuration is shown in figure 1-2.
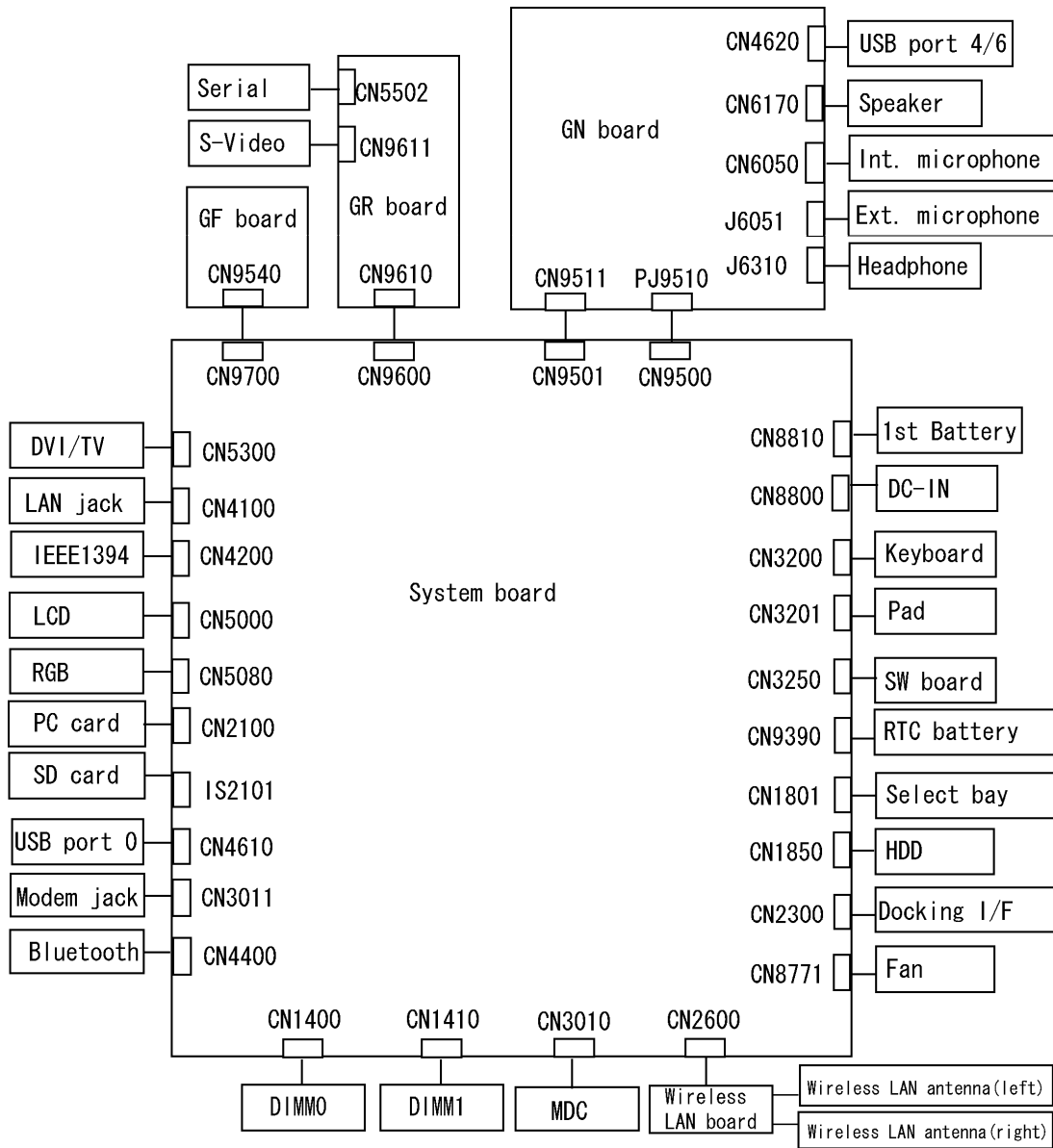
Figure 1-2   System unit configuration

1.2   System Unit Block Diagram

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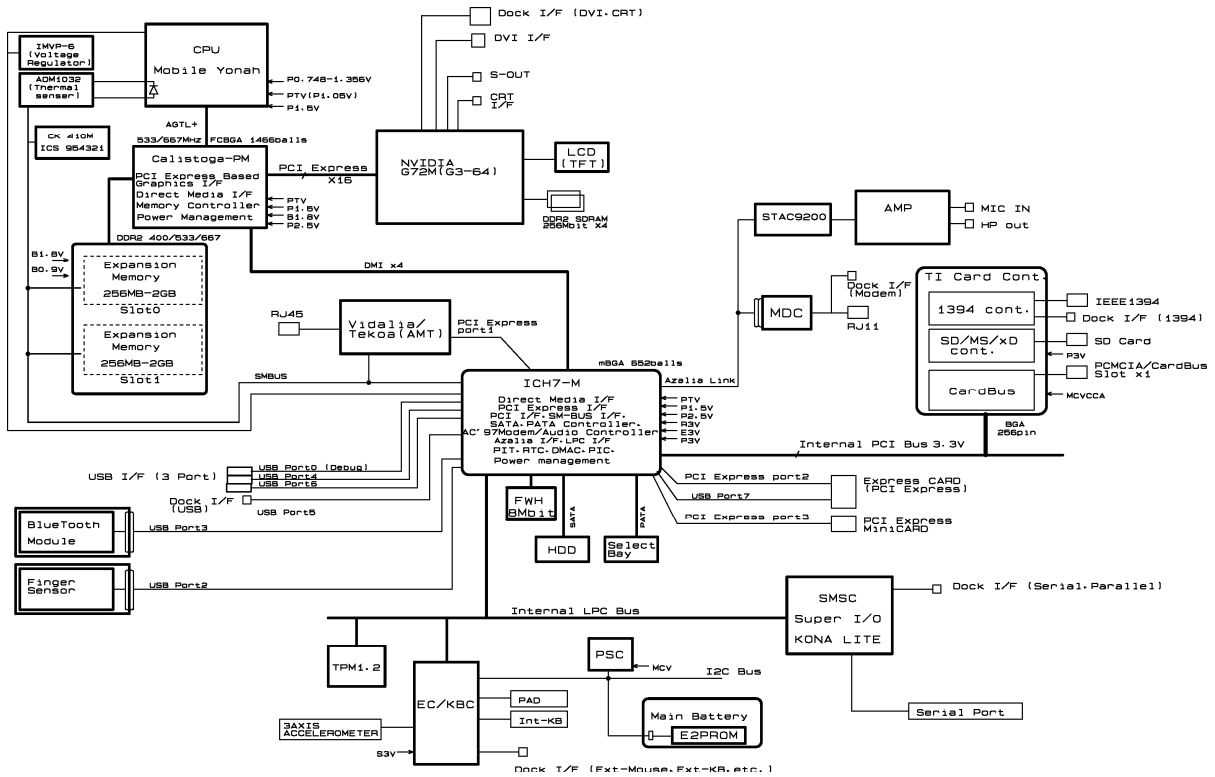
Figure 1-3   System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel® Core™ Duo Processor (dual core) or Intel® Core™ Solo Processor (single core)

- Core speed:
    Dual core: 1.66GHz (T2300) /1.83GHz (T2400)/2.00GHz (T2500)/
                    2.16GHz (T2600)

    Single core   1.66GHz (T1300)

                    (   ): Processor Number

    – Processor bus speed: 667MHz

    – Core voltage: 0.50 to 1.30V

    – Integrated L2 cache memory of 2MB

    – Integrated NDP

    – 478-pin Micro FC-PGA package

❑ Memory

Two memory slots are provided. Expansion up to 4GB (4,096MB) is available.

Memory

- DDR2-SDRAM

- 667/533MHz

- 1.8 volt operation

- FBGA

Memory Module

- 240 pin, SO Dual In-line Memory Module (SO-DIMM)

- PC 5300/PC4300

- 256MB/512MB/1GB (1,024MB)/2GB (2,048MB)

❑ Intel GMCH (North Bridge)

- One Intel 945PM is used.

- Features:

    – Supports Yonah Processor System Bus

    – System Memory Interface

    – Memory Control: supports DDR2-400／DDR2-533／DDR2-667, 4GB max.

    – DMI(Direct Media Interface)

    – Supports ICH.

    – 1466-ball 37.5×37.5×2.56mm FC-BGA package

❑ Intel ICH7-M (South Bridge)

- One Intel 82801 is used.

- Features:

    – DMI(Direct Media Interface)

    – PCI Express I/F (4 ports)

    – PCI Bus I/F Rev2.3（6 PCI REQ/GNT Pairs）

    – Integrated Serial ATA Host Controller (2 Prots,150MB/S)

    – Integrated IDE Controller（Ultra ATA 100/66/33）

    – AC'97 2.3 codecs

    – Intel High Definition controller (Azalia)

    – USB 1.1/2.0 Controller 8 ports

    – Built-in LAN controller (WfM 2.0 & IEEE 802.3 compliance)

    – Power Management (ACPI 2.0 compliance)

    – SMBus2.0 controller

    – FWH interface (BIOS)

    – LPC interface (EC/KBC, Super I/O)

    – IRQ controller

    – Serial Interrupt Function

    – Suspend/Resume control

    – Built –in RTC

    – GPIO

     – 652-ball 31×31×2.51mm BGA Package

❑ Firmware Hub (FWH)

- One STMicro M50FW080NB is used.

- 8Mbits of flash memory are used.

     – 288KB for System BIOS

     – 64KB for LAN BIOS

     – 64KB for VGA BIOS

     – 64KB for Finger Print PBA

     – 40KB for Logo & Hibernation

     – 32KB for Option Log

     – Others

❑ LED support Card controller (TI PCI7412ZHK)

     – PCI I/F

     – CardBus / Ultra media Controller (1 socket)

     – SD/MMC, Memory Stick, XD Card Controller

     – 1394 Controller (2 ports)

     – 288-ball, 16×16×1.4mm, BGA Package

❑ GPU

nVIDIA Quadro NVS 110M (G72)

     – VRAM DDR2 128MB

     – PCI Express Interface

     – LCD Interface

     – S-Video

     – 533-ball, 23×23×2.35mm, BGA Package

❑ Sound Controller

- Azalia Link (Intel High Definition Audio I/F) built in the Intel GMCH + STAC9200

- Amplifier: Mathushita made AN12941A

- Supports VoIP.

❑ EC/KBC (Embedded Controller/Keyboard Controller)

•   One Mitsubishi M306KA micon chip functions as both EC and KBC.

❑ PSC (Power Supply Controller)

•   One TMP86FS49AUG chip is used.

•   This controller controls the power sources.

❑ Clock Generator

•   One ICS L954321 is used.

•   This device generates the system clock.

❑ Modem Controller

•   One MDC is used.

•   This controller has the following functions:

   –   One RJ11 port
   –   V.92 (V.90) 56K Modem/FAX
   –   Ring wake up support

❑ Internal LAN Controller

•   Intel made GigaBit Ether (Vidalia) is used.

•   This controller has the following functions:
   –   PCI-Ex connection
   –   Supports Gigabit Ethernet
   –   One RJ45 port
   –   WOL support
   –   Magic Packet support
   –   LED support

❑ Wireless LAN

- One PCI-Ex MiniCard

- Intel Golan a/b/g

❑ Super I/O

- One LPC47N217 chip is used.

- This gate array has the following features:
  - Floppy Disk Controller
  - Infrared Communications Controller
  - Parallel Port Controller

❑ IEEE1394

- One TI PCI7412 is used.

❑ Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.

- LCD Sensor: One NRS-701-1015T chip is used.

- Acceleration Sensor: One ST Micro-made LIS3L02AQ chip is used.

1.3　3.5-inch Floppy Disk Drive (USB External)

The 3.5-inch FDD is a thin, high-performance reliable drive that supports 720KB (formatted) 2DD and 1.44MB (formatted) 2HD disks.

The FDD is shown in figure 1-4. The specifications for the FDD are listed in Table 1-1.
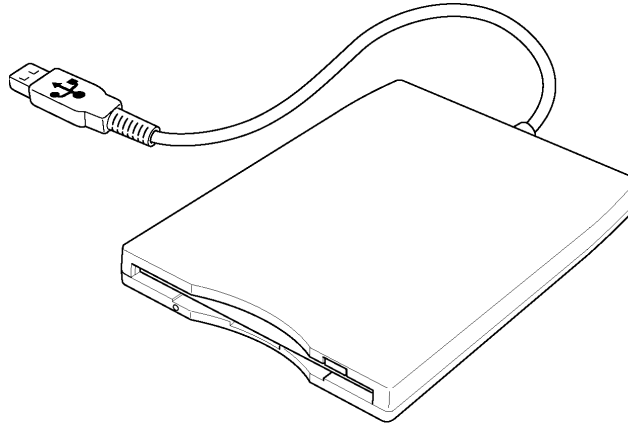
Figure 1-4　3.5-inch FDD (USB External)

Table 1-1　3.5-inch FDD specifications

Items		TEAC FD-05PUB-337 (G8AC0000B320)	
		720KB mode	**1.44MB mode**
Data transfer rate	FDD part	250K bits/second	500K bits/second
	USB	Full speed mode (12M bits/second)	
Disk rotation speed		300rpm	
Track density		5.3 track/mm (135TPI)	

1.4   2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable
2.5-inch magnetic disk and mini-Winchester type magnetic heads.
The computer supports a 40GB, 60GB, 80GB or 100GB.
The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.
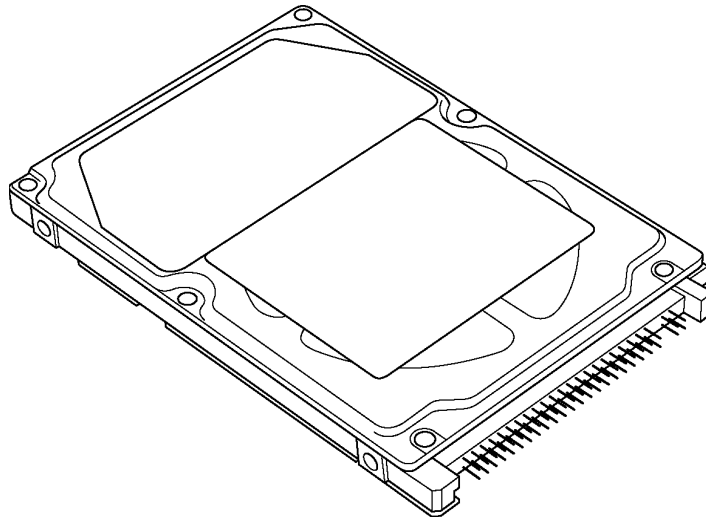
Figure 1-5   2.5-inch HDD

Table 1-2 2.5-inch HDD specifications (1/5)

Items		Specifications		
		TOSHIBA HDD2D34BZK01	**FUJITSU G8BC00028410**	**HITACH GST G8BC00029410**
Outline dimensions	Width (mm)	69.85	70	70
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100	100
	Weight (g)	95 max.	96 max.	96 max.
Storage size (formatted)		40GB	40GB	40GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mb/s)		175.0-341.7Mb/s	64MB/s max.	493 max.
Interface transfer rate (MB/s)		100 max (Ultra DMA mode)		
Track density (Ktpi)		88.1	-	-
Average random seek time (ms) Read		12	12 typ.	12
Motor startup time (s)		4 typ	4	4

Table 1-2   2.5-inch HDD specifications (2/5)

Items		Specifications		
		FUJITSU G8BC00028610	**HITACH GST G8BC00029610**	**TOSHIBA HDD2D35BZK01**
Outline dimensions	Width (mm)	70	69.85	69.85
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	102 max.	100
	Weight (g)	102 max.	95	97 typ.
Storage size (formatted)		60GB	60GB	60GB
Speed (RPM)		5,400	5,400	5,400
Data transfer rate To/From media (Mb/s)		64.0MB/s max.	493 max.	244.7-474.7
Interface transfer rate (MB/s)		100(Ultra DMA mode)		
Data buffer size (MB)		8	8	8
Average seek time (ms) Read		12 typ.	12	12
Motor startup time (s)		4	4	3.5 typ.

Table 1-2   2.5-inch HDD specifications (3/5)

Items		Specifications		
		TOSHIBA HDD2D32BZK01	**FUJITSU G8BC00028810**	**HITACHI GST G8BC00029810**
Outline dimensions	Width (mm)	69.85	70.0	69.85±0.25
	Height (mm)	9.5	9.5	9.5±0.2
	Depth (mm)	100	100	100.2±0.25
	Weight (g)	102 max.	101 max	102 max.
Storage size (formatted)		80GB	80GB	80GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mb/s)		218-429	64.0MB/s	493max
Data buffer size (MB/s)		8	8	8
Average seek time (ms) Read		12	12 typ	12 typ.
Motor Startup time (s)		4	4 typ.	3.5

Table 1-2   2.5-inch HDD specifications (4/5)

Items		Specifications		
		TOSHIBA HDD2D30BZK01	**FUJITSU G8BC00028A10**	**HITACHI GST G8BC00029A10**
Outline dimensions	Width (mm)	69.85	70	69.85±0.25
	Height (mm)	9.5	9.5	9.5±0.2
	Depth (mm)	100	100	100.2±0.25
	Weight (g)	102 max.	101 max.	102 max.
Storage size (formatted)		100GB	100GB	100GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mb/s)		236.1-456.0	-	493max
Data buffer size (MB/s)		16	8	8
Average seek time (ms) Read		12	12	12 typ.
Motor startup time (s)		4	4	3.5

Table 1-2   2.5-inch HDD specifications (5/5)

Items		Specifications		
		TOSHIBA HDD2D31BZK01	**HITACHI GST G8BC0002N810**	**HITACHI GST G8BC0002NA10**
Outline Dimensions	Width (mm)	69.85	69.85±0.25	69.85±0.25
	Height (mm)	9.5	9.5±0.2	9.5±0.2
	Depth (mm)	100	100.2±0.25	100.2±0.25
	Weight (g)	101 typ.	115 max.	115 max.
Storage size (formatted)		120GB	80GB	100GB
Speed (RPM)		5,400	7,200	7,200
Data transfer speed (Mb/s)		244.7-474.7	267-629	267-629
Interface transfer rate (MB/s)		100 (MAX Ultra DMA mode)		
Track density (Ktpi)		125	127	127
Average seek time (ms) Read Write		12 -	10 11	10 11
Motor startup time (s)		3.5 typ	4	4

1.5 CD-ROM Drive

The CD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CDs. They provide high-performance, 24-speed plays on a maximum (reads 3,600 KB per second).

The CD-ROM drive is shown in figure 1-6. Specifications are listed in Table 1-3.
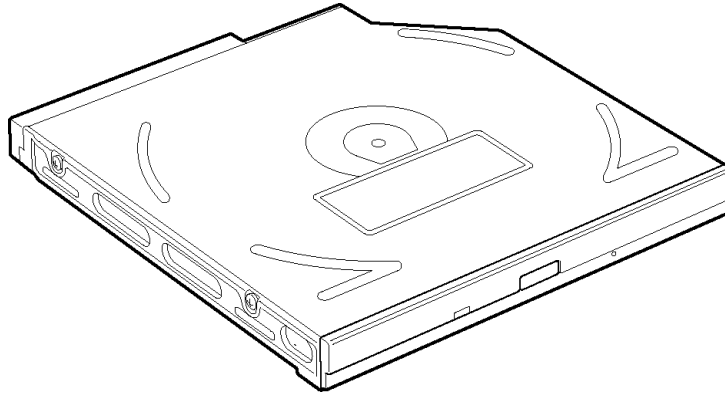
Figure 1-6   CD-ROM drive

Table 1-3   CD-ROM drive specifications

Item	TEAC CD-224EN (G8CC0002R420)
Data transfer rate (burst)	33.3Mbytes/sec max.
(sustained)	1,545 to 3,600kB/se
Access access time (ms)	110 average
Disc speed (rpm) (typ.)	5,136
Applicable discs	CD/CD-ROM (12cm, 8cm) CD-R,CD-R/W
Supported Format	CD-DA, CD-ROM Mode 1, Mode 2 CD-ROM XA Mode 2 (Form 1, Form 2) Photo CD (Single/multi-session), Enhanced CD

1.6   DVD-ROM Drive

The DVD-ROM drive accommodates either 12cm (4.72-inch) or 8cm (3.15-inch) DVDs.
This drive plays DVDs at maximum 8-speed and reads CDs at maximum 24-speed.

The specifications for the DVD-ROM drive are described in table 1-4.

Table 1-4 DVD-ROM drive specifications

Item	TSST DV-28EN (G8CC0002E410)
Data transfer rate (burst)	33.3 Mbytes/sec max
Average access time (ms)	120 (CD-ROM), 130 (DVD-ROM), (average TEAC standards)
Disc speed (rpm)	5,090 (24x CAV speed mode) approx.
Starting time (sec)	19 max.
Readable discs	CD/CD-ROM (12cm, 8cm), CD-R (Recorded), CD-RW (Recorded), DVD-ROM, DVD-R (Recorded) DVD-RW (Recorded), DVD-RAM (Recorded) DVD+R (Recorded), DVD+R (Recorded)
Applicable Format	CD CD-DA CD-ROM Mode1, Mode2 CD-ROM XA, Mode 2 (Form1, Form2) Photo-CD, Enhanced CD, CD-TEXT, Multisession CD Addressing method 2 DVD DVD-ROM, DVD-R (General, Authoring, Single/Multi-border) DVD-RW (Single/Multi-border, Packet) DVD-Video, DVD-RAM (4.7GB, 2.6GB) DVD-R/RW (Single/Multi-border, Packet)

1.7 CD-R/RW&DVD-ROM Drive

The CD-R/RW&DVD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CDs, CD-R/RW and DVDs. It is a high-performance drive that reads CD-ROM at maximum 24-speed, DVD-ROM at maximum 8-speed and writes CD-R at maximum 24-speed, CD-RW at maximum 4-speed.

The specifications are listed in Table 1-5.

Table 1-5   CD-R/RW&DVD-ROM drive specifications (1/2)

Item		Specifications
		PCC UJDA770 (G8CC0002J420)
ATAPI Burst (Mbytes/s)		16.6 (PIO Mode 4) 16.6 (Multiword Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec)	CD-ROM	150 typ. (Random)
	DVD-ROM	180 typ. (Random)
Data Buffer Capacity		2MB
Supported Discs		CD: CD/CD-ROM, CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-RW, DVD+R, DVD+RW, DVD+RAM, DVD+R DL
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, Photo CD, CD-Extra (CD+), CD-TEXT DVD: DVD-R, DVD-RW (Ver.1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

Table 1-5   CD-R/RW&DVD-ROM drive specifications (2/2)

Item		Specifications
		TSST TS-L462C (G8CC0002V420)
Burst Transfer rate(Mbytes/s)		16.6 (PIO Mode 4) 16.6 (Multiword Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec)	CD-ROM	130 typ.
	DVD-Single	130 typ
Data Buffer Capacity		2MB
Readable Discs		CD/CD-ROM, CD-R, CD-RW, DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+RW
Recordable Discs		CD-R/RW
Applicable Format		CD-DA (Red Book) - Standard Audio CD & CD-TEXT CD-ROM (Yellow Book Mode1 & 2) - Standard Data CD-ROM XA (Mode2 Form1 & 2) - Photo CD, Multi-Session CD-I (Green Book, Mode2 Form1 & 2, Ready, Bridge) CD-Extra/ CD-Plus (Blue Book) - Audio & Text/Video Video-CD (White Book) - MPEG1 Video CD-R (Orange Book Part II) CD-RW & HSRW (Orange Book Part III Volume1 & Volume2) Super Audio CD (SACD) Hybrid type US & US+ RW DVD-ROM (Book 1.02), DVD-Dual DVD-Video (Book 1.1) DVD-R (Book 1.0, 3.9G) DVD-R (Book 2.0, 4.7G) - General & Authoring DVD+R (Version 1.0), DVD+R DL DVD+RW DVD-RW (Non CPRM & CPRM) DVD-RAM

1.8 DVD-Super Multi Drive

This drive is a combination of DVD-ROM and DVD±R/±RW/-RAM Drive. It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. It reads DVDs at maximum 8-speed and CDs at maximum 24-speed. It also writes CD-R at maximum 24-speed, CD-RW at maximum 24-speed, DVD-R at maximum 8-speed, DVD-RW at maximum 8-speed, DVD+R at maximum 8-speed, DVD +RW at maximum 8-speed and DVD-RAM at maximum 5-speed.

The specifications are listed in Table 1-6.

Table 1-6   DVD Super Multi drive specifications(1/2)

Item	Pioneer DVR-K16 (G8CC0002U420)
IDE Data Transfer Mode	PIO Mode 4, Multi Word DMA Mode 2, Ultra DMA Mode2
ATAPI Interface	SFF-8020,SFF-8090 Ver.5
Data buffer (MB)	2
Supported format (Read)	KODAK Photo CD Single and Multi-session CD Extra (CD PLUS) Video CD CD text data (Read / Write) CD-R discs (Read/ Write) CD-RW discs (Read/ Write) DVD-ROM DVD-R Ver.2.00 for General(Read/ Write) DVD-R DL Ver.3.0 (Read/Write) DVD-RW Ver.1.0 &1.1 &1.2(Read/ Write) DVD+R Ver.1.0 & 1.11& 1.2 (Read/Write) DVD+RDL Ver1.0(Read / Write) DVD+RW Ver.1.1& 1.2 (Read/Write) DVD+RW high speed Ver.1.0 (Read/Write) DVD-RAM Ver.2.0 &2.1 (Read/ Write)

Table 1-6   DVD Super Multi drive specifications (2/2)

Item	PCC UJ-841 (G8CC0002T)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2)
	16.6 (PIO Mode 4, Multi word DMA mode 2)
Average access time (ms) DVD-ROM CD-ROM	180 typ 150 typ
Data Buffer Capacity (MB)	2

Supported Format	CD: CD-DA, CD-ROM, CD-ROM XA,
	     Photo CD, CD-Extra (CD+),
	     CD-TEXT
	
	DVD: DVD-R, DVD-RW(Ver. 1.1, Ver. 1.2)
	      DVD-Video, DVD+R, DVD-RW,
	      DVD-RAM(2.6GB/4.7GB)

1.9 Keyboard

The keyboard is mounted 85(US)/87(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.

Figure 1-7 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-7   Keyboard

1.10 TFT Color Display

The TFT color display consists of 14.1-inch XGA/SXGA+ LCD module and FL inverter board.

1.10.1   LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 262,144 colors with 1,024 x 768 or 1,400 x 1,050 resolution. The nVIDIA Quadro NVS 110M (G72) can control internal and external XGA or SXGA+ support displays simultaneously.

Figure 1-8 shows a view of the LCD module and Table 1-7 lists the specifications.
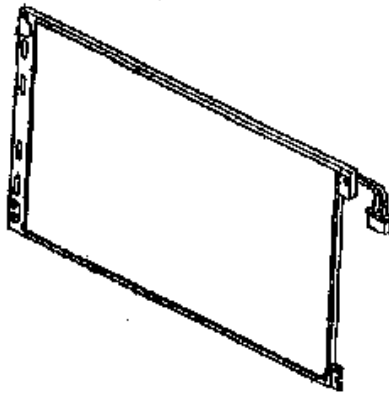
Figure 1-8   LCD module

Table 1-7   LCD module specifications (1/3)

Item	Specifications
	14.1-inch XGA TFT (G33C00039110)
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)

Table 1-7 LCD module specifications (2/3)

Item	Specifications
	14.1-inch XGA TFT (G33C00038110)
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)

Table 1-7 LCD module specifications (3/3)

Item	Specifications
	14.1-inch SXGA+ TFT (G33C00022210)
Number of Dots	1,400 (W) x 1,050 (H)
Dot spacing (mm)	0.204 (H) x 0.204 (V)
Display range (mm)	285.6 (H) x 214.2 (V)

1.10.2   FL Inverter Board

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

Table 1-8 lists the FL inverter board specifications.

Table 1-8   FL inverter board specifications

Item		Specifications
		G71C00011221
Input	Voltage (V)	DC 5
	Power (W)	7
Output	Voltage (V)	750
	Current (mA)	6.00
	Power (mA)	5W/7VA

1.11 Power Supply

The power supply supplies many different voltages to the system board and performs 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.

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

Table 1-9   Power supply output rating

Name	Voltage (V)	Use
PPV	0.300-1.500	CPU
PTV	1.05	CPU, MCH, ICH7-M
1R5-P1V	1.5	CPU, MCH, ICH7-M, PCI-E Mini Card
CRD1R5-P1V	1.5	Express Card
1R8-B1V	1.8	MCH, DDR2-SDRAM
2R5-P2V	2.5	MCH, CH7-M
LAN2R5-E2V	2.5	LAN
MR0R9-B0V	0.9	MCH, DDR2-SDRAM
0R9-P0V	0.9	DDR2-SDRAM
P3V	3.3	Clock Generator, Thermal Sensor, MCH, SDRAM(SPD), ICH7-M, HDD, PC CARD Power., PCI-E Mini Card, FWH, LED, TPM, Super I/O, RS232C, LCD, GPU, STAC9200
E3V	3.3	ICH7-M, PCI-E Mini Card, MDC
S3V	3.3	EC/KBC, 3AXIS Accelerometer
CRD-E3V	3.3V	Express Card
CRD-P3V	3.3V	Express Card
SD-P3V	3.3V	SD Card
BT-P3V	3.3	Bluetooth
LAN-E3V	3.3	LAN
PGV	1.2	IGPU
1R2-P1V	1.2	GPU
LAN1R2-E1V	1.2	LAN
P5V	5	ICH7-M, ODD, HDD, PC-Card Power, LED, KB, PAD, Parallel, CRT, FAN, FL-Inv
E5V	5	ICH7-M, USB Power
M5V	5	LED
MCV	5	PSC
SND-P5V	5	AN12941A
A4R7-P4V	4.7	STAC9200, AN12941A
R3V	2.0-3.5	ICH7-M (RTC)

1.12 Batteries

The computer has three types of batteries as follows:

❑ Main battery pack

❑ RTC battery

❑ Secondary battery pack (optional slim select bay module)

The battery specifications are listed in Table 1-10.

Table 1-10   Battery specifications

Battery name	Material	Output voltage	Capacity
1st battery	Lithium-Ion	10.8 V	4,700 mAh
High capacity battery	Lithium-Ion	10.8 V	8,800 mAh
Extended capacity battery	Lithium-Ion	10.8 V	7,050 mAh
2nd battery	Lithium-Ion	10.8 V	3,600 mAh
RTC battery	NiMH	2.4 V	16 mAh

1.12.1   Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. The main battery maintains the state of the computer when the computer enters in resume mode.

1.12.2   Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery.

Battery Charge

When the AC adaptor is attached, there are two types of charge: When the system is powered off and when the system is powered on. Table 1-11 lists the charging time required for charges.

Table 1-11   Time required for charges

Battery type	Power on (hours)	Power off (hours)
1st battery (4,700 mAh)	About 3.5 to 13.0	About 3.0
High capacity battery (8,800 mAh)	About 5.0 to 21.5	About 4.0
Extended capacity battery (7050 mAh)	About 5.0 to 17.5	About 3.5
2nd battery (3,600 mAh)	About 4.0 to 9.5	About 3.0

NOTE: The time required when the system is powered on is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

If any of the following occurs, the battery charge process stops.

1. The battery becomes fully charged.

2. The AC adaptor or battery is removed.

3. The battery or output voltage is abnormal.

❑ Detection of full charge

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

1. The current in the battery charging circuit drops under the predetermined limit.

2. The charging time exceeds the fixed limit.

1.12.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-12 lists the charging time and data preservation period of the RTC battery.

Table 1-12   RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	8 hours
Data preservation period (full charge)	30 days

1.13 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-13 lists the AC adapter specifications.

Table 1-13 AC adapter specifications

Parameter	Specification	
	G71C00043310 (2-pin)	G71C00049410/G71C00049510 (3-pin)
Power	75W (Peak 90W)	
Input voltage	100V/240V	
Input frequency	50Hz to 60Hz	
Input current	1.5A or less (100V-240V)	
Output voltage	15V	
Output current	0A to 5A (At constant voltage mode) 5A to 6A (At surge load mode)	

Chapter 2

Troubleshooting Procedures

Chapter 2 Contents

Figures

Tables

2.1   Troubleshooting

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

1. Power Supply	6. Display	11. Wireless LAN
2. System Board	7. Optical Drive	12. Sound components
3. USB Floppy Disk Drive	8. Modem	13. SD Card Slot
4. Hard Disk Drive	9. LAN	14. PCI ExpressCard Slot
5. Keyboard/Touch pad	10. Bluetooth	15. Fingerprint sensor

The Diagnostics Disk operations are described in Chapter 3. Detailed Replacement Procedures are given in Chapter 4, *Replacement Procedures*.
The following tools are necessary for implementing the troubleshooting procedures:

The following tools are necessary for implementing the Diagnostics procedures:
For tools required for executing the Test Program, refer to the Chapter3. For tools required for disassembling/assembling, refer to the Chapter 4.

1. A set of tools for debugging port test (test cable, test board, RS-232C cross cable, display, D port FD)

2. A PC with a serial port (for displaying debug port test result)

3. Toshiba MS-DOS system FD

4. An external CRT display(for Display trouble shooting)

5. A SD card(for SD card slot trouble shooting)

6. An external microphone(for Sound trouble shooting)

7. Headphone(for Sound trouble shooting)

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:

❑   Ask the user if a password is registered and, if it is, ask him or her to enter the password.

❑   Make sure that Toshiba Windows® XP is installed on the hard disk. Non-Toshiba operating systems can cause the computer malfunction.

❑   Make sure all optional equipment is removed from the computer.

❑   Make sure the USB FDD and optical drive are empty.

START

Connect the AC adapter to the DC IN socket.

Does the DC IN icon glow? — No → Perform the Power Supply Troubleshooting Procedures in section 2.3.

Yes ↓

Does the Battery icon glow? — No → Perform the Power Supply Troubleshooting Procedures in section 2.3.

Yes ↓

Turn the Power Switch on.

Does the DC IN icon flash when the power is turned on? — Yes → Perform the Power Supply Troubleshooting Procedures in section 2.3.

No ↓

Is an error message displayed? — Yes → Perform the System Board Troubleshooting Procedures in section 2.4.

No ↓

Is the "startup " logo message displayed? — No → Perform the Display Troubleshooting Procedures in section 2.8.

Yes ↓

If the "Password =" message displays, type the password.

Is Toshiba Windows XP being loaded? — No → Perform the Hard Disk Drive Troubleshooting Procedures in section 2.6.

Yes ↓

(1)

Figure 2-1 Troubleshooting flowchart (1/2)

①

┌─────────────────────────────┐   ┌──────────────────────────────┐
│   Do typed characters   │   No   │ Perform the Keyboard/Touch pad│
│   appear correctly?   │───────▶│ Troubleshooting Procedures   │
└─────────────────────────────┘   │ in section 2.7.   │
              │   └──────────────────────────────┘
              │ Yes
              ▼
┌─────────────────────────────┐   ┌──────────────────────────────┐
│ Insert the diagnostic disk │   │ Refer to section 3.2 to start │
│ into USB FDD   │   │ the   │
│ and run the diagnostics   │───────▶│ diagnostic terst program.   │
│ test program.   │   │   │
│ (The reboot of the PC is   │   └──────────────────────────────┘
│ needed.)   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐   ┌──────────────────────────────┐
│ Is the diagnostic test   │   No   │ Perform the USB Floppy Disk   │
│ loaded?   │───────▶│ DriveTroubleshooting   │
└─────────────────────────────┘   │ Procedures in section 2.5.   │
              │   └──────────────────────────────┘
              │ Yes
              ▼
┌─────────────────────────────┐
│ Perform each test of the   │
│ diagnostic test.   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐   ┌──────────────────────────────┐
│   Is an error   │ Yes   │ After conforming which   │
│   detected by any of the   │───────▶│ diagnostic test has detected │
│   diagnostic test?   │   │ an error, perform the   │
└─────────────────────────────┘   │ appropriate procedures as   │
              │   │ outlined below.   │
              │ No   └──────────────────────────────┘
              ▼
┌─────────────────────────────┐
│   System is normal.   │
└─────────────────────────────┘
              │
              ▼
         (END)

Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, real timer test, perform the
    System Board Troubleshooting Procedures in Section 2.4.

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

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

4. If an error is detected on the keyboard test, perform the Keyboard and Touch pad
    Troubleshooting Procedures in Section 2.7.

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

6. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive
    Troubleshooting Procedures in Section 2.9.

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

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

9. If an error is detected on the Bluetooth test, perform the Bluetooth Troubleshooting
    Procedures in Section 2.12.

10. If an error is detected on the Wireless LAN test, perform the Wireless LAN
    Troubleshooting Procedures in Section 2.13.

11. If an error is detected on the sound test, perform the Sound Troubleshooting
    Procedures in Section 2.14.

12. If an error is detected on SD card, perform the SD Card Slot Troubleshooting
    Procedures in Section 2.15.

13. If an error is detected on PCI ExpressCard, perform the PCI ExpressCard Slot
    Troubleshooting Procedures in Section 2.16.

14. If an error is detected on Fingerprint sensor, perform the Fingerprint sensor
    Troubleshooting Procedures in Section 2.17.

2.3   Power Supply Troubleshooting

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

> Procedure 1:   Icons in the LCD Check
>
> Procedure 2:   Error Code Check
>
> Procedure 3:   Connection Check
>
> Procedure 4:   Charge Check
>
> Procedure 5:   Replacement Check

Procedure 1   Icons in the LCD Check

The following Icons in the LCD indicate the power supply status:

❑ Battery icon

❑ DC IN icon

The power supply controller displays the power supply status through the Battery icon and the DC IN icon in the LCD as listed in the tables below. To check the power supply status, install a battery pack and connect an AC adaptor.

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery has been charging and AC adapter is connected.
Lights green	Battery is fully charged and AC adapter is connected.
Flashes orange	Battery charge is low. The AC adaptor must be connected to recharge 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.
Flashes orange	There is a problem with the power supply.
Doesn't light	Any condition other than those above.

Procedure 2   Error Code Check

If the power supply microprocessor detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Table 2-3 Error code

Error code	Where Error occurs
1*h	AC Adaptor
2*h	1st battery
3*h	2nd Battery
4*h	S3V output (P60)
5*h	E5V output (P61)
6*h	E3V output (P62)
7*h	1R5-E1V output (P63:CH0)
8*h	1R8-B1V output (P64:CH0)
9*h	PPV output (P65:CH0)
A*h	PTV output (P66:CH0)
B*h	1R5-E1V output (P63:CH1)
C*h	1R8-B1V output (P64:CH1)
D*h	PPV output (P65:CH1)
E*h	PTV output (P66:CH1)

Check 1   Compare the patterns in the hexadecimal error code to the tables below.

❑ AC Adaptor

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	Advanced Port Replicator III Plus voltage is over 16.5V.
12h	Current from the DC power supply is over 7.00A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Correction value of 0[A] is out of designed value.

❑ 1st Battery

Error code	Meaning
22h	1st battery discharge current over 0.5A when there is no load.
23h	1st battery charge current is over 4.3A in charging.
24h	Correction value of 0[A] is out of designed value.
25h	1st battery charge current is over 0.3A in not charging.

❑ 2nd Battery

Error code	Meaning
32h	Secondary battery discharge current is over 0.5A when there is no load.
33h	Secondary battery charge current is over 3.5A in charging.
34h	Correction value of 0[A] is out of designed value.
35h	Secondary battery charge current is over 0.3A in not charging.

❑ S3V output (P60)

Error code	Meaning
40h	S3V voltage is 3.47V or less when the computer is powered on/off.
45h	S3V voltage is 3.14V or less in normal conditions.
46h	S3V voltage is 3.14V or less at power on.

❑ E5V output (P61)

Error code	Meaning
50h	E5V voltage is over 6.00V when the computer is powered on/off.
51h	E5V voltage is 4.50V or less in normal conditions when the computer is powered on.
52h	E5V voltage is 4.50V or less at power on.
54h	E5V voltage is 4.50 V or less when EV is maintained and "OUTV1 power = EV power" is specified.

❑ E3V output (P62)

Error code	Meaning
60h	E3V voltage is over 3.96V when the computer is powered on/off.
61h	E3V voltage is 2.81V or less in normal conditions when the computer is powered on.
62h	E3V voltage is 2.81V or less at power on.
64h	E3V voltage is 2.81 V or less when EV is maintained and "OUTV2 power = EV power" is specified.

❑ 1R5-E1V output (P63:CH0)

Error code	Meaning
70h	1R5-E1V voltage is over 1.80V when the computer is powered on/off.
71h	PPV voltage is 0.56V or less in normal conditions when the computer is powered on.
72h	PPV voltage is 0.56V or less at power on.

❑ 1R8-B1V output (P64:CH0)

Error code	Meaning
80h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
81h	1R8-B1V voltage is 1.53V or less in normal conditions when the computer is powered on.
82h	1R8-B1V voltage is 1.53V or less at power on.
84h	1R8-B1V voltage is 4.50V or less when EV is maintained and "OUTV4 power = BV power" is specified.

❑ PPV output (P65: CH0)

Error code	Meaning
90h	PPV voltage is over 1.80V when the computer is powered on/off.
91h	PPV voltage is 0.32V or less in normal conditions when the computer is powered on.
92h	PPV voltage is 0.32V or less at power on.

❑ PTV output (P66:CH0)

Error code	Meaning
A0h	PTV voltage is over 1.32V when the computer is powered on/off.
A1h	PTV voltage is 0.85V or less in normal conditions when the computer is powered on.
A2h	PTV voltage is 0.85V or less at power on.

❑ 1R5-E1V output (P63:CH1)

Error code	Meaning
B0h	1R5-E1V voltage is over 1.80V when the computer is powered on/off.
B1h	1R5-E1V voltage is 1.275V or less in normal conditions when the computer is powered on.
B2h	1R5-E1V voltage is 1.275V or less at power on.
B3h	1R5-E1V voltage is 1.275V or less when EV is maintained and "OUTV7 power = EV power" is specified.

❑ 1R8-B1V output (P64:CH1)

Error code	Meaning
C0h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
C1h	1R8-B1V voltage is 1.53V or less in normal conditions when the computer is powered on.
C2h	1R8-B1V voltage is 1.53V or less at power on.
C4h	1R8-B1V voltage is 1.53V or less when BV is maintained and "OUTV8 power = EV power" is specified.

❑ PPV output (P65:CH1)

Error code	Meaning
D0h	PPV voltage is over 1.80V when the computer is powered on/off.
D1h	PTV voltage is 0.32V or less in nor mal conditions when the computer is powered on.
D2h	PTV voltage is 0.32V or less at power on.

❑ PTV output (P66:CH1)

Error code	Meaning
E0h	PTV voltage is over 1.32V when the computer is powered on/off.
E1h	PTV voltage is 1.53V or less in normal conditions when the computer is powered on.
E2h	PTV voltage is 1.53V or less at power on.

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

❑ Make sure the AC adaptor cord 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 adaptor and/or AC power cord, if necessary. If the error
still exists, go to Procedure 5.

Check 3   In the case of error code 2Xh:

❑ Make sure the battery pack is correctly installed in the computer. If the
battery pack is correctly installed, go to the following step:

❑ Replace the battery pack with a new one. If the error still exists, go to
Procedure 5.

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

Procedure 3   Connection Check

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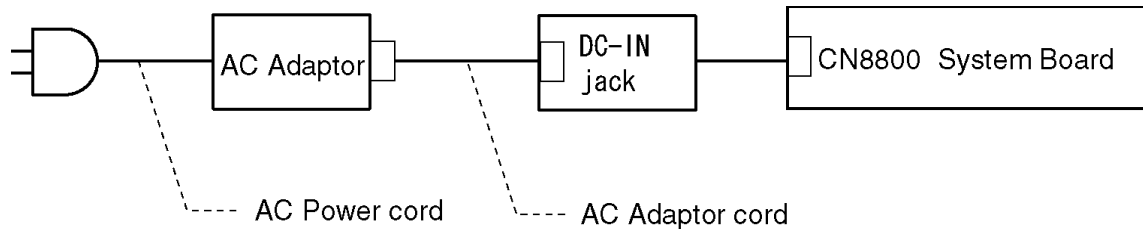
Any of the connectors may be disconnected. Perform Check 1.

Check 1   Disconnect the AC power cord from the wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2   Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN jack socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.

Check 3   Make sure the DC IN jack is firmly connected to the connector CN8800 on the system board.
  • If the DC IN jack is not firmly connected, go to Procedure 5.
  • If it is connected, go to Check 4.

Check 4   Use a multimeter to make sure the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.

Check 5   Connect a new AC adaptor or AC power cord.
  • If the DC IN icon does not light, go to Procedure 5.
  • If the battery icon does not light, go to Check 6.

Check 6   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   Charge Check

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

1. Reinstall the battery pack.

2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.

3. Run the Diagnostic test, go to System test and execute subtest 04 (Quick charge) described in Chapter 3.

4. When charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

Table 2-4   Result code

Result code	Contents	Check items
0	The battery is charging normally.	Normal
1	The battery is fully charged.	Normal
2	The AC adaptor is not attached.	Check 1
3	The AC adaptor's output voltage is not normal.	Check 1
4	The battery is not installed.	Check 2
5	The battery's output voltage is not normal.	Check 3
6	The battery's temperature is not normal.	Check 4
7	A bad battery is installed.	Check 2
8	Any other problems.	Check 5

Check 1   Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).

Check 2   Make sure the battery is properly installed. 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. If the battery pack is still not charged, go to Check 4.

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

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

Procedure 5　　Replacement Check

The system board processor module may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. Check the connection between the AC adaptor and system board and connection. After checking the connections, perform the following Check 1:

Check 1　Replace the AC adaptor with a new one. If the AC adaptor is still not functioning properly, perform Check 2.

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

2.4   System Board Troubleshooting

This section describes how to determine if the system board and CPU are defective or not functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

The procedures described in this section are:

        Procedure 1:   Message Check

        Procedure 2:   Printer Port LED Check on Boot Mode

        Procedure 3:   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 Toshiba MS-DOS or Windows XP is properly loaded, go to Procedure 3.

Check 1   If one of the following error messages appears on the screen, press **F1** 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 **F1** as the message instructs, returns all system settings to their default values. Then the system reboots.

If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message displays, perform Check 2.

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

Check 2   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), (22) or (23) appears, go to Procedure 4.

If the error message (18) appears, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If the error message (19), (20) or (21) appears, go to the HDD Troubleshooting Procedures in Section 2.6.

If the error message (21) appears, go to the Optical Drive Troubleshooting Procedures in Section 2.9.

(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)	Built-in HDD ERROR
(21)	Select Bay ERROR
(22)	TIMER INTERRUPT ERROR
(23)	RTC UPDATE ERROR

Procedure 2　　Printer Port LED Check on Boot Mode

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

> *NOTE: You need Advanced Port Replicator III Plus in this test.*
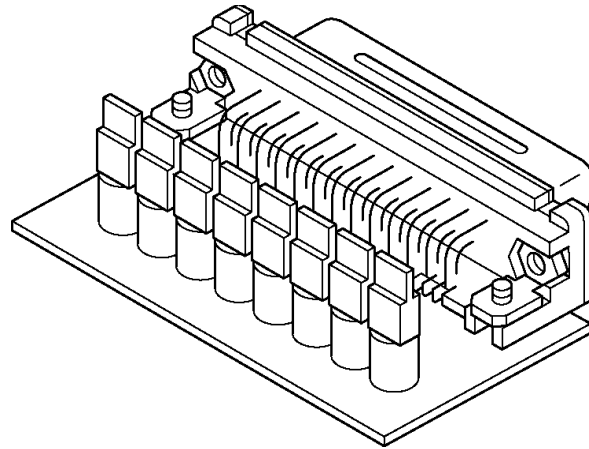
Figure 2-2 Printer port LED board

Figure 2-3 shows the function of the printer port LED.
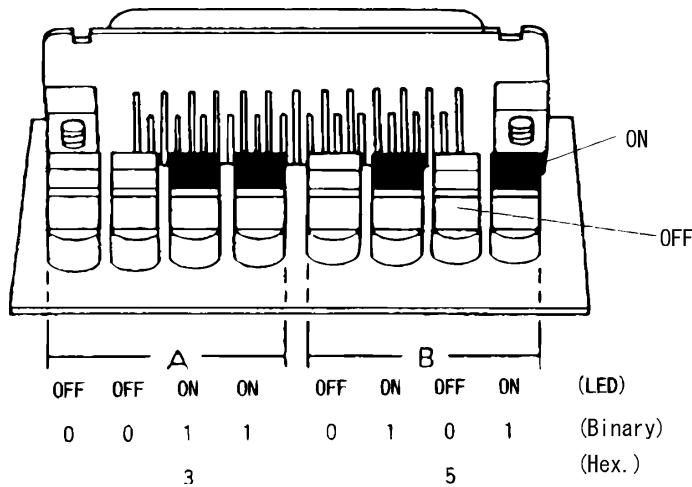
Figure 2-3 Function of Printer port LED

To use the printer port LED, follow the steps below:

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│              │      │Common Dock 3 Plus   │  TECRA M5    │
│ Printer port │  ⇒ ▯│ Printer      │  ▯ ⇒│              │
│     LED      │      │   port       │      │ Docking I/F  │
│              │      │              │      │              │
└──────────────┘      └──────────────┘      └──────────────┘
```
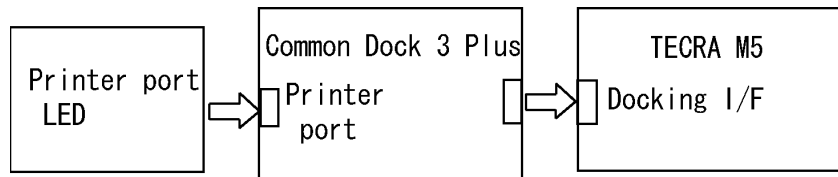
1. Turn on the computer's power and set it to boot mode.

2. Turn off the computer's power.

3. Connect Advanced Port Replicator III Plus to PC and plug the printer port LED into the parallel port of Advanced Port Replicator III Plus.

4. While holding down the space bar, turn on the computer's power.

5. Read the LED status from left to right.

6. Convert the status from binary to hexadecimal notation.

7. If the final LED status is FFh (normal status), go to Procedure 4.

8. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

NOTE: If an error condition is detected by the IRT test, the printer port LED displays the status for the last test item which ended correctly. For example, when the printer port LED displays 0Ch and halts, the IRT test has already completed the Vector initialization. In this instance, the IRT indicates an error has been detected during the NDP initialization.

Table 2-5 Printer port LED boot mode status (1/9)

LED Status	Test item	Contents
	Permission of A20 and clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCH, ICH	
	Initialization of Super I/O	
	Initialization of debug port (For models supporting debug port)	
	Dummy read of 3rd Bus data	
	Setting of printer port (For models supporting printer port)	
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 from S3) Halts when error occurs
		Checksum other than boot block (skipped when returned from S3)
B1h	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process".
B2h	Initialization of SC	HLT at LED=B3H or B4, when error occurs
	Key input (skipped when returned from S3)	When a key is pressed, check if it is Tilde key or Tab key. (skipped when returned from S3)
B5h	Enables CPU cache	
B6h	Security check	
	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
B7h	Transits to System BIOS IRT	
	BIOS rewrite process	
	Initialization of ICH. D31	
	DRAM configuration	
	Permission of cache (L1 cache only)	
	Memory clear	
	Transition to real mode and copy of BIOS to RAM	

Table 2-5 Printer port LED boot mode status (2/9)

LED Status	Test item	Contents
B9h	Saving of key scan code	
	Setting of TASK_1ms_TSC	
	FAN control	
	Sound initialization (for BEEP sound)	Cancel of sound mute
		Setting of volume to max (model that can control volume)
	When BIOS, EC/KBC rewriting is requested	Blinks green (cycle:2s, on:1s, off:1s)
	When BIOS renewal is prohibited	Blinks orange (cycle:8s, on:4s, off:4s) HLT after BEEP is sounded for 30s (LED=BBH))
	When BIOS ROM is abnormal	Blinks orange (cycle:2s, on:1s, off:1s)
	Key input	Prohibition of USB
		BEEP
		Waiting for Key input
	Reading of CHGBIOSA.EXE/CHGFIRMA.EXE	FDC RESET
		Setting of 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"

Table 2-5 Printer port LED boot mode status (3/9)

LED Status	Test item	Message
00h	Prohibition of cache	
	Permission of L1/L2 cache in FlashROM area	
	Initialization of H/W (before DRAM recognition)	Initialization of MCH
		Initialization of ICH.D30.Func0
		Initialization of ICH.D31.Func0
		Initialization of ICH.D31.Func1/2
		Initialization of USB Controller
		Initialization of ICH.D31.Func3
		Initialization of ICH Audio
		Initialization of TI Controller
	Initialization of PIT channel 1	(Setting the refresh interval to "30μs")
01h	Check of DRAM type and size (at cold boot)	When unsupported memory is connected, becoming HLT after beep sound
	SM-RAM stack area test	HLT when DRAM size is 0 HLT When it can not be used as a stack
02h	Cache configuration	
	Cache permission	
	CMOS access test (at cold boot)	(HLT when an error is detected)
	Battery level check of CMOS	
	CMOS checksum check	
	Initialization of CMOS data (1)	
	Setting of IRT status	(Setting of boot status and IRT busy flag, The rest bits are 0)
	Storing DRAM size in CMOS	
03h	Resume branch (at cold boot)	Not resume when a CMOS error occurred
		Not resume when resume status code is not set

		Resume error check
		  S3 returning error (1CH) (Resume error LED=7AH)
		  SM-RAM checksum check (Resume error LED=73H)
		  Check of memory configuration change (Resume error LED=73H)
		  RAM area checksum check in system BIOS (Resume error LED=79H)

Table 2-5 Printer port LED boot mode status (4/9)

LED Status	Test item	Contents
(03h)		Expansion memory checksum check resume error (Resume error LED=76H)
		PnP RAM checksum check (Resume error LED=77H)
		Transition to RESUME-MAIN
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Turning area of C0000h to EFFFFh to PCI (Prohibition of DRAM)
		Setting of resume error request
	Copying ROM/RAM of system BIOS	(HLT, when error occurs)
04h	Security check	
05h	SMRAM initialization	
	APIC initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
06h	Initialization of devices which need initialization before PCI bus initialization.	PIT test (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 normally in 30 micro-s refresh interval.) HLT, when the time is out.
		Test of PIT channel 2 (Check whether the speaker gate works normally.)
		CPU clock measurement
		Check of parameter block A
		Permission of SMI except auto-off function
		Judging of destination (Japan or except Japan) based on DMI data

Table 2-5 Printer port LED boot mode status (5/9)

LED Status	Test item	Contents
(06h)		Battery discharging current control (1CmA).
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		Check of CMOS default setting Default is set, when there are Bad Battery and Bad CheckSum (ROM, CMOS).
		Control of excess of rated input power
		AC adapter rated over current control

		CPU Initialization
		  Micro code update
		  Judging of CPU type
		  Geyserville support check
		  Setting of CPU clock to "high"

07h	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	ACPI table initialization (for execution of option ROM)	
	Initialization of devices which need initialization before PCI bus initialization	Setting of IDE device operation mode
		Setting of AC'97/Azalia operation mode
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Control of built-in LAN permission/ prohibition
		PCI Express initialization
		Sound initialization
		PC multi-box status acquisition (For models supporting Select Bay)
		HC initialization and Device recognition
	PIC initialization	
	PIC test	
	Password Initialization	

Table 2-5 Printer port LED boot mode status (6/9)

LED Status	Test item	Contents
08h	PCI bus initialization (connection of DS Bus)	
	Initialization of LAN information	
	WakeUp factor check	
09h	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	
0Ah	Task generation for waiting PnP resource making completion	
	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
		Configuration
		Saving of VGA configuration result
0Bh		Task generation for waiting PCI_CONFIGURATION completion
	Initialization of H/W needed after PCI configuration	Printer port setting (model supporting Printer port)
		HDD initialization sequence start
		FDD initialization sequence start (model supporting built-in FDD)
	Enabling power off	
	Output code generation	
0Ch	FIRST_64KB_CHECK	(Check of first 64KB memory)
0Dh	INIT_INT_VECTOR	(Initialization of vectors)
0Eh	INIT_NDP	(Initialization of NDP)

Table 2-5 Printer port LED boot mode status (7/9)

LED Status	Test item	Contents
0Fh	INIT_SYSTEM	(Initialization of system)
		Storing of CMOS error information to IRT_ERR_STS_BUF
		Controlling CD POWER SW (model supporting CD play)
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update EDID information for LCD)
10h	INIT_DISPLAY	(Waiting for VGA chip initialization completion, VGA BIOS initialization)
		Waiting for VGA power-on
		Waiting for Display access completion
11h	Calling VGA BIOS	
13h	DISP_LOGO	(Logo displaying) (Starting of logo display waiting LED=25H (unused))
14h	SYS_MEM_CHECK	(Check of conventional memory) (Boot)
15h	EXT_MEM_CHECK	(Exception check in protected mode) (Boot)
16h	INIT_SYS_MEM	(Initialization of conventional memory) (Reboot) (LED=17h if error occurred during exception check in protected mode)
18h	CHK_DMA_PAGE	(Check of DMA Page Register) (Boot)
19h	CHECK_DMAC	(Check of DMAC) (Boot)
1Ah	INIT_DMAC	(Initialization of DMAC) (Boot)
1Bh	CHECK_PRT	(Check of printer existence) (For models supporting Printer port)
1Ch	CHECK_SIO	(Check of SIO) (model supporting SIO)
1Dh	Process of DIAGNOSTIC inspection result display	(When DIAGNOSTIC mode is permitted)
1Eh	BOOT_PASSWORD	(Check of password)
		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 Processing (model supporting I/O LOCK)
		Initialization of ATA priority

Table 2-5 Printer port LED boot mode status (8/9)

LED Status	Test item	Contents
(1Eh)	(In the case of "Boot")	Check of key input during IRT (waiting for KBC initialization completion)
		Input of password (waiting for HDD initialization completion)
		I/O LOCK Processing (For models supporting I/O LOCK)
		TPM Initialization (model supporting TPM)
1Fh	EX_IO_ROM_CHECK	(Check of option I/O ROM)
20h	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
		Acquisition of keys pressed 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 (For models supporting AC-Link)
		Updating of table for DMI
		Copy of ACPI table to top of expansion memory
		Waiting for writing of PSC version to BIOS completion
		Waiting for clock generator setting completion When error occurred, halts at LED=21H
		Waiting for serial port initialization completion (For models supporting SIO)
		Cancel of NMI Mask
		Taking out TIT check sum
		Clear of the IRT flag on Runtime side
		Update of check sum on Runtime side
		Hibernation branch (For models supporting BIOS Hibernation)
		Initialization of Bluetooth (For models supporting Bluetooth)
		Check of existence of object maintenance cards
		Prohibition of unused PC cards
		Setting Wakeup status data for ACPI

Table 2-5 Printer port LED boot mode status (9/9)

LED Status	Test item	Contents
(20h)		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
		Process for CPU (Make the CPU clock to be set by SETUP)
		Waiting of motor-off completion of disabled HDD
		Final setting of FDD information

		Post processing of PRE_BOOT_SETUP
		  Clears PWRBTN_STS
		  Enables POWER Button

22h	Initialization of SC	
24h	Clearness of IRT status	
	Update of Checksum on Runtime side	
FFh	End	

Check 1   If error code 1Eh or 20h is displayed, go to the following Sections:
           Section 2.6 HDD Troubleshooting"

Check 2   If the final status of the LED are the followings, perform Procedure 4.

           Printer port LED error status

Error	Content
B3H or B4H	Initialization of SC error
BBH	Prohibition of BIOS update (*1)
17H	Exception check error
20H	Clock generator setting error

(*1) Check the situation of security because the setting of security may prohibit the renewal
      of BIOS when the LED status is BBh.

Procedure 3　　Diagnostic Test Program Execution Check

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

1. System test

2. Memory test

3. Keyboard test

4. Display test

5. Floppy Disk test

6. Async test

7. Hard Disk test

8. Real Timer test

9. NDP test

10. Expansion test

11. CD-ROM/DVD-ROM test

12. Wireless LAN test

13. Sound test

14. LAN/Modem/Bluetooth/IEEE1394 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 their 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 FDD Troubleshooting

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

Procedure 1:   USB FDD Head Cleaning Check

Procedure 2:   Diagnostic Test Program Execution Check

Procedure 3:   Connector Check and Replacement Check

Procedure 1   USB FDD Head Cleaning Check

USB FDD head cleaning operation details are given in Chapter 3, *Tests and Diagnostics*.

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

If the test program cannot be executed, 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.

Floppy disk drive test error codes and their status names are listed in Table 2-6. Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-6 FDD error code and status

Code	Status
01h	Bad command error
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	Not drive error
80h	Time out error
EEh	Write buffer error

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

```
Write protected
```

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

Procedure 3   Connector Check and Replacement Check

The USB FDD is connected to the System Board.

Check 1   When using the USB port, make sure the USB FDD cable is firmly connected to CN4620 on the GN board or CN4610 on the System Board and the cable is firmly connected to CN9501 on the system board and CN9511 on the GN board.
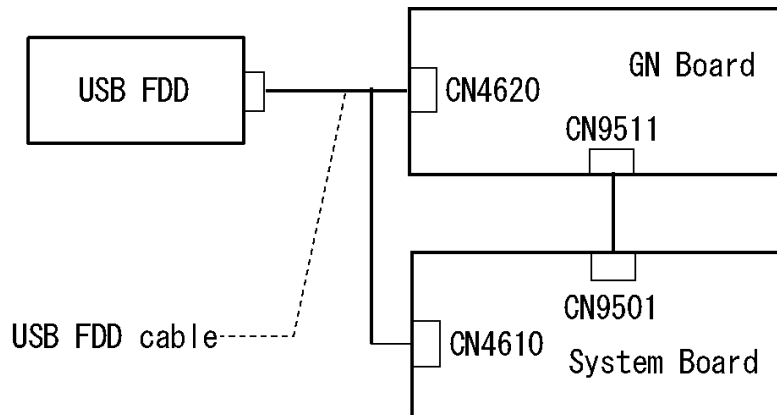
If any of the connections are loose, reconnect firmly and repeat Procedure 2.
If any of the connections is damaged, or there is still an error, go to Check 2.

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

Check 3   The GN board or GN cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the USB FDD is still not functioning properly, perform Check 4.

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

2.6 HDD Troubleshooting

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

Procedure 1:   Message Check

Procedure 2:   Partition Check

Procedure 3:   Format Check

Procedure 4:   Diagnostic Test Program Execution Check

Procedure 5:   Connector Check and Replacement Check

CAUTION: *The contents of the hard disk will be erased when you execute the HDD troubleshooting procedures. Transfer the contents of the hard disk to floppy disks or other storage media.*

Procedure 1   Message Check

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

Check 1   If any of the following messages appear, go to Procedure 5. If the following messages do not appear, perform Check 2.

```
HDC ERROR (After 5 seconds this message will disappear.)
               or
IDE #0 ERROR (After 5 seconds this message will disappear.)
               or
IDE #1 ERROR (After 5 seconds this message will disappear.)
```

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

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

Check 3   Make sure the Hard Disk option is set to not used. If it is set to not used, choose another setting and restart the computer. If the problem still exists, go to Procedure 2.

Procedure 2   Partition Check

Insert the Toshiba MS-DOS system disk and restart the computer with U key holding down. 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 Check 3.

Check 2   Type FDISK and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.

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. Restart the computer and then go to Procedure 3.

Check 4   Remove the FD and restart the computer. If the problem still exists, go to Procedure 3.

Check 5   Using the **SYS** command on the Toshiba MS-DOS system disk, install system files on the HDD.

If the following message appears on the display, the system files have been transferred to the HDD. Restart the computer. If the problem still exists, go to Procedure 3.

```
System transferred
```

NOTE: *If the computer is running Windows 2000, OSR2 or higher and the hard disk has more than 512 MB capacity, the FDISK program will ask if you need support for a partition larger than 2GB. Select Y for large partition support; however, be sure to read the precaution regarding access by other operating systems.*

Procedure 3   Format Check

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

Check 1   Format the HDD and transfer system files using **FORMAT C:/S/U**. If the following message appears on the display, the HDD is formatted.

         `Format complete`

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

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

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

         `Format complete`

         If you cannot format the HDD using the Tests and 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. Replace the HDD with a new one following the instructions in Chapter 4, *Replacement Procedures*. The error codes and statuses are listed in Table 2-7. If an error code is not generated or the problem still exists, go to Procedure 5.

Table 2-7 HDD error code and status

Code	Status
01h	Bad command error
02h	Address mark not found
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	Overrun error (DRQ ON)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enable
12h	DMA CRC error
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 error
DAh	No HDD

Procedure 5   Connector Check and Replacement Check

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

Check 1   Make sure the HDD is firmly connected to CN1850 on the system board.
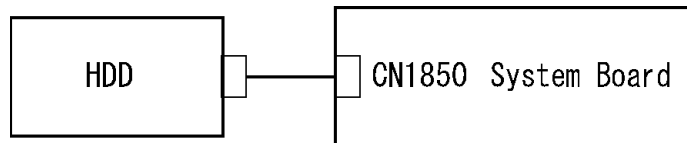
```
 ┌──────────────┐         ┌──────────────────────────┐
 │              │     ┌─┐ │                          │
 │     HDD      ├─────┤ ├─┤│ CN1850  System Board     │
 │              │     └─┘ │                          │
 └──────────────┘         └──────────────────────────┘
```

　　　　　　If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The HDD 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*.

2.7 Keyboard and Touch pad Troubleshooting

To determine if the computer's keyboard or touch pad 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, touch pad or sensor/switch board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures,* and perform the following checks:

1. If the keyboard or AccuPoint malfunctions, start with Check 1.

2. If the touch pad malfunctions, start with Check 3.

3. If the power switch, InTouch button or Presentation button malfunctions, start with Check 5.

Check 1   Make sure the keyboard cable is securely connected to CN3200 on the system board.
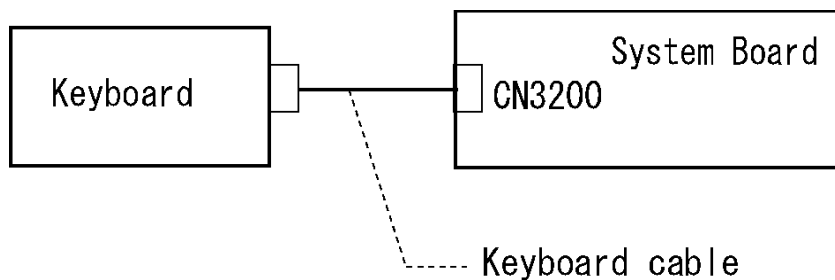
If the connection is loose, reconnect firmly. If there is still an error, go to Check 2.

Check 2   The keyboard or its cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.

Check 3   Make sure the touch pad cable is firmly connected to CN3201 on the system board.
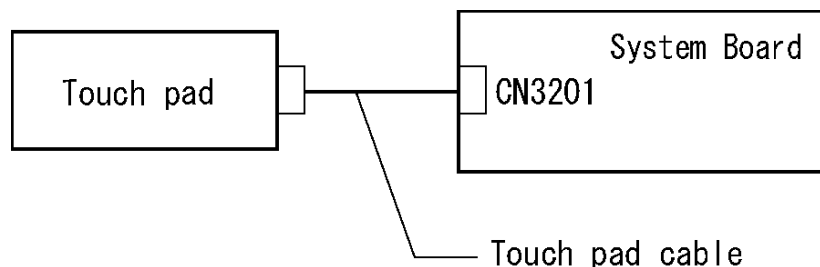
If the connection is loose, reconnect firmly. If there is still an error, go to Check 4.

Check 4   The touch pad or the touch pad cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.

Check 5   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 Check and Cable Check

Procedure 4:   Replacement Check

Procedure 1   External Monitor Check

Connect an external monitor and tun on the computer. If there is no problem on it, the internal LCD may be defective. Go to Procedure 3. If there is any problem on the external monitor, the system board may be defective. Go to Procedure 2.

Procedure 2   Diagnostic Test Program Execution Check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 3.

Procedure 3   Connector Check and Cable Check

Check 1   The LCD, FL, FL Inverter Board and System Board are connected by the HV cable and LCD/FL cable as shown bellow. Check the connections. The connectors may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*.
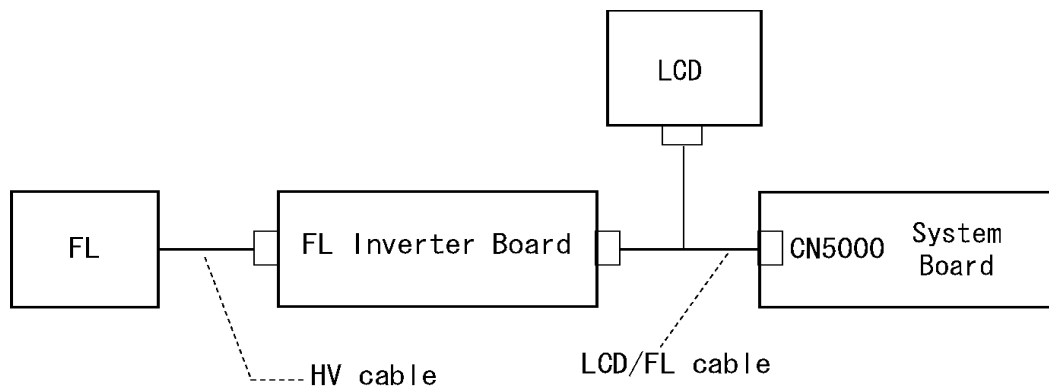
If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 4.

Procedure 4   Replacement Check

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

1. If the FL does not light, perform Check 1.

2. If characters or graphics are not displayed clearly, perform Check 1.

3. If some screen functions do not operate properly, perform Check 2.

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

Check 1   Replace the FL with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check2.

Check 2   Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 3.

Check 3   Replace the display cable (FL cable and LCD cable) with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 4.

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

2.9   Optical Drive Troubleshooting

This section describes how to determine if the optical drive (CD-ROM, DVD-ROM, CD-R/RW&DVD-ROM, DVD Super Multi drive) in the Slim Select Bay is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

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

Procedure 1   Diagnostic Test Program Execution Check

The CD-ROM/DVD-ROM test program is stored in the Diagnostics Disk.

For the test, prepare test Media.

Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics,* for more information about the diagnostics test procedures.

If any errors occur while executing the CD-ROM/DVD-ROM test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The optical drive (CD-ROM, DVD-ROM, CD-R/RW&DVD-ROM, DVD Super Multi drive) is connected to the system board. The connectors may be disconnected from the system board or may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1   Make sure the drive to test is firmly connected to CN1801 on the system board.
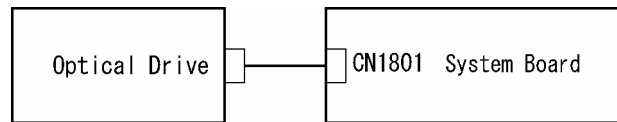
```
 ┌──────────────────┐        ┌──────────────────────────┐
 │                  │        │                          │
 │  Optical Drive  ─┤────────├─ CN1801  System Board    │
 │                  │        │                          │
 └──────────────────┘        └──────────────────────────┘
```

If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The drive may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 3.

Check 3   Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.10 Modem Troubleshooting

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

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

Procedure 1   Diagnostic Test Program Execution Check

Insert the LAN/Modem/Bluetooth/IEEEE1394 test program in the USB floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the Sound/Modem/LAN test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The Modem is installed as a MDC (Modem Daughter Card). If the modem malfunctions, there may be a bad connection between the MDC and the system board. Or the MDC, system board or their connectors might be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1   Make sure the MDC is firmly connected to CN3010 on the system board, and the MDC cable is connected to CN3011 on the system board and the connector of the MDC.
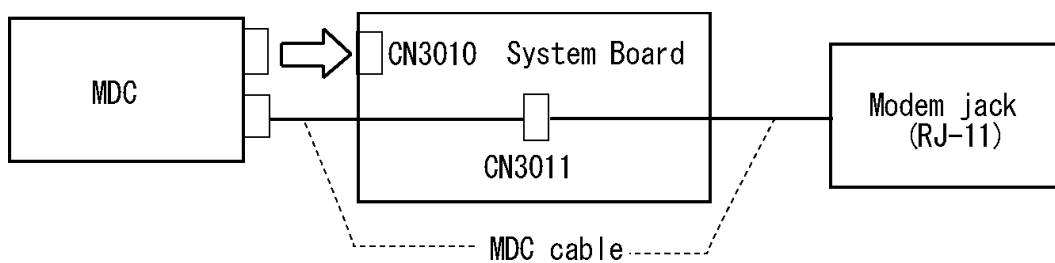
> If a connector is disconnected, connect it firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

Check 2   The MDC may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 3.

Check 3   The modem jack or MDC cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 4.

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

2.11 LAN Troubleshooting

This section describes how to determine if the computer's LAN is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

           Procedure 1:   Diagnostic Test Program Execution Check

           Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the LAN test program available as part of the LAN/Modem/Bluetooth/IEEE1394 test 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 RJ-45 jack with LAN cable is connected to the system board. If the LAN malfunctions, the system board might be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following check:

Check 1   Make sure the RJ-45 jack is firmly connected to CN4100 on the system board.

```
  ┌──────────────────┐          ┌────────────────────────────┐
  │                  │          │ ☐ CN4100  System Board      │
  │   LAN jack       │──────────│                            │
  │   (RJ-45)        │          │                            │
  │                  │          │                            │
  └──────────────────┘          └────────────────────────────┘
```

     If the connector is disconnected, connect it firmly and repeat Procedure 1. If the LAN port is still not functioning properly, perform Check 2.

Check 2   The RJ-45 jack may be defective or damaged. Replace the RJ-45 jack with a new one. If the LAN port is still not functioning properly, perform Check 3.

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

2.12 Bluetooth Troubleshooting

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

         Procedure 1:   Diagnostic Test Program Execution Check

         Procedure 2:   Connection Check

         Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Make sure the wireless switch on the left side of the computer is turned "On". If it is not, slide the switch toward the back of the computer to turn it on.

Check 1   Execute Bluetooth test program. Perform the test following the instructions described in Chapter 3, Bluetooth Test Program. You will need a second computer that can communicate by the Bluetooth.
If the computer passes the test, the function is correctly working. If the computer does not pass the test, go to check 2.

Check 2   The Bluetooth module may be defective or damaged. Replace it with a new one. Then perform the test program again.
If the computer still does not pass the test, go to Procedure 2.

Procedure 2   Connection Check

The Bluetooth function wiring diagram is shown below:
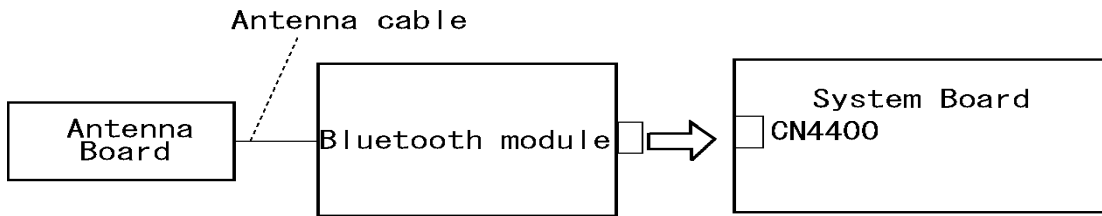
```
                    Antenna cable
                         /
  +----------+         +----------------+          +------------------+
  | Antenna  |---------|Bluetooth module|□ ⇨     □ | System Board     |
  |  Board   |         |                |          |CN4400            |
  +----------+         +----------------+          +------------------+
```

Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the Bluetooth module is firmly connected to CN4400 on the sound board.

If the connector is disconnected, connect it firmly. If the Bluetooth module is still not functioning properly, perform Check 2.

Check 2   Make sure the Bluetooth antenna cable is firmly connected to the Bluetooth module.

If the Bluetooth antenna cable is disconnected, connect it firmly. If the Bluetooth module is still not functioning properly, go to Procedure 3.

Procedure 3   Replacement Check

The Bluetooth antenna, Bluetooth module, sound board and system board are connected to the circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

Check 1   The Bluetooth module may be defective or damaged. Replace the Bluetooth module with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 2.

Check 2   The Bluetooth antenna may be defective or damaged. Replace the Bluetooth antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 3.

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

2.13 Wireless LAN Troubleshooting

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

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

Procedure 1   Transmitting-Receiving Check

Make sure the wireless switch on the left side of the computer is turned "On". If it is not, slide the switch toward the back of the computer to turn it on.

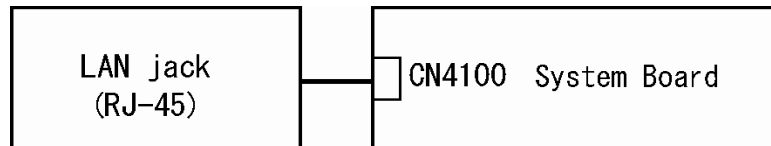Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

Check 1   Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second 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   Antenna Connection Check

The wireless LAN wiring diagram is shown below:
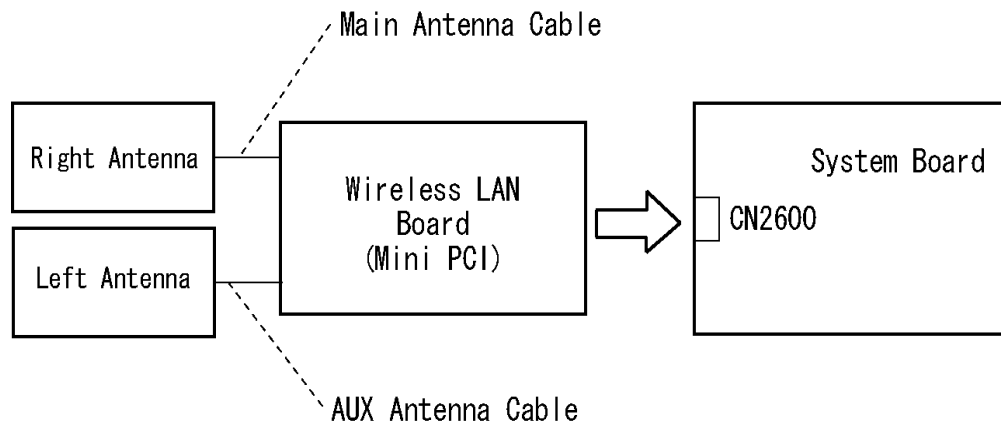
```
                              Main Antenna Cable
                             /
    ┌──────────────┐    ┌──────────────┐         ┌────────────────────────┐
    │ Right Antenna│    │              │         │      System Board      │
    │              │────│ Wireless LAN │   ⇨   ┌┐                         │
    ├──────────────┤    │    Board     │       └┘ CN2600                  │
    │ Left Antenna │────│  (Mini PCI)  │         │                        │
    │              │    │              │         │                        │
    └──────────────┘    └──────────────┘         └────────────────────────┘
                             \
                              AUX Antenna Cable
```

Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the wireless LAN board is firmly connected to CN2600 on the system board.

              If the connector is disconnected, connect it firmly. If the wireless LAN board is still not functioning properly, perform Check 2.

Check 2   Make sure the wireless LAN antenna cables are firmly connected to the wireless LAN board.

              If the wireless LAN antenna cables are disconnected, connect them firmly. If the wireless LAN board is still not functioning properly, go to Procedure 3.

Procedure 3   Replacement Check

The wireless LAN antenna, wireless LAN board and the system board are connected to the circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

Check 1   The wireless LAN board may be defective or damaged. Replace the board with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.

Check 2   The wireless LAN antenna may be defective or damaged. Replace the antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3   The system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

2.14 Sound Troubleshooting

This section describes how to determine if the computer's sound functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1:   Diagnostic Test Program Execution Check

Procedure 2:   Connecor Check

Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

If an error is detected, go to Procedure 2.

Procedure 2   Connector Check

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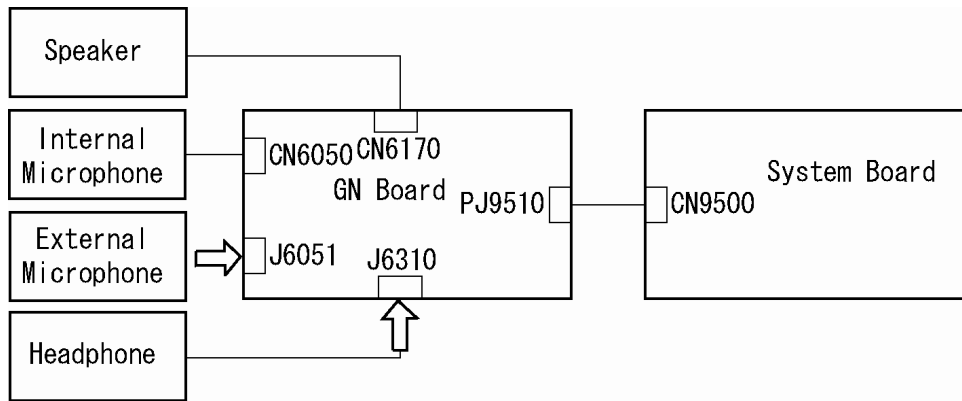
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

1. If the stereo speakers do not work correctly, perform Check 1.

2. If the headphone does not work correctly, perform Check 2.

3. If the microphones do not work correctly, perform Check 3.

Check 1   If the stereo speakers do not work properly, the speaker cable may be disconnected. Make sure the speaker cable is firmly connected to CN6170 on the GN board. If the stereo speakers are still not functioning properly, go to Check 4.

Check 2   If the headphone does not work properly, the headphone cable may be disconnected. Make sure the headphone cable is firmly connected to J6310 on the GN board. If the sound function still does not work properly, go to Check 4.

Check 3   If the microphones do not work properly, the internal microphone cable or external microphone cable may be disconnected. When the internal microphone malfunctions, make sure the internal microphone cable is firmly connected to CN6050 on the GN board. When using the external microphone, make sure the external microphone cable is firmly connected to J6051 on the GN board. If the microphones are still not functioning properly, go to Check 4.

Check 4   Make sure the GN board flexible cable is firmly connected to PJ9510 on the GN board and to CN9500 on the system board.

             If the GN board flexible cable is disconnected, connect it firmly. If the sound function is still not functioning properly, go to procedure 3.

Procedure 3   Replacement Check

Check 1   If the stereo speakers do not sound properly, the right or left speaker may be defective or damaged. Replace it with a new one. If the stereo speakers still do not work properly, go to Check 4.

Check 2   If the headphone does not sound properly, the headphone jack may be defective or damaged. Replace it with a new one. If the sound function still does not work properly, go to Check 4.

Check 3   If the microphones do not work properly, the microphone cable may be defective or damaged. Replace it with a new one. If the microphone still does not work properly, go to Check 4.

Check 4   The GN board may be defective or damaged. Replace it with a new one. If the problem still exists, perform Check 5.

Check 5   The system board may be defective or damaged. Replace it with a new one.

2.15 SD Card Slot Troubleshooting

This section describes how to determine if the computer's SD card functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1:   Check on Windows XP

Procedure 2:   Connector Check and Replacement Check

Procedure 1   Check on Windows XP

Insert an SD card into the slot. Check if the installed Windows 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 red, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The SD card is connected to IS2101 on the System Board.

```
  ┌──────────────────┐          ┌──────────────────────────┐
  │                  │          │      System Board        │
  │     SD card      │  ═══▷  ▯ │ IS2101                   │
  │                  │          │                          │
  └──────────────────┘          └──────────────────────────┘
```
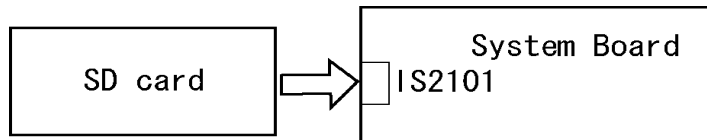
Check 1   The SD card and the System Board may be disconnected. Make sure the SD card is firmly inserted to IS2101 on the System Board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

Check 2   The SD card may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. 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 *Replacement Procedures*.

2.16 PCI ExpressCard Slot Troubleshooting

This section describes how to check PCI ExpressCard slot by inspecting a card with PCI Express interface and a card with USB 2.0 interface.

> 1. Gigabit Ether ExpressCard
>
> 2. USB2.0 5in1 ExpressCard

1. Gigabit Ether ExpressCard

(1) Insert the Gigabit Ether ExpressCard into the ExpressCard slot.

(2) On Windows, open System Property → Hardware → Device Manager window.

(3) Make sure that the following device is recognized on the Device Manager window.

```
Marvell Yukon 88E8053E PCI-E Gigabit Ethernet Controller #2
```

("#2" is displayed in the PC with a built-in LAN of Gigabit, because the controller is the same one. "#2" is not displayed in the PC with a built-in LAN of 10/100 Megabit.)

(4) After making sure, take a "Safety Remove" procedure and pull out the Gigabit Ether ExpressCard

2. USB2.0 5in1 ExpressCard

(1) Insert the USB2.0 5in1 ExpressCard into the ExpressCard slot.

(2) On Windows, open System Property →Hardware → Device Manager window.

(3) Make sure that the following device is recognized on the Device Manager window.

```
USB 2.0 5in1 ExpressCard USB Device
```

(4) After making sure, take a "Safety Remove" procedure and pull out the USB2.0 5in1 ExpressCard.

2.17 Fingerprint sensor Troubleshooting

CAUTION: *To delete the account for confirming the fingerprint operation, it is necessary to log on by the account with the management authority. If the password has been set to log on, ask the Log-ON password to the user.*

To check if the Fingerprint sensor works correctly or not, follow the troubleshooting procedures below as instructed.

When failed in Procedure 1 to Procedure 3, execute Procedure 4.

       Procedure 1:   Setting Windows Log-ON password

       Procedure 2:   Registration of fingerprint

       Procedure 3:   Authentication of fingerprint

       Procedure 4:   Connector Check and Replacement Check

CAUTION: *Scan your finger shown below.*
            1. Put your finger in parallel to the sensor.
            2. Put your finger on the centerline of the sensor.
            3. Make sure the first joint of your finger is on the sensor.
            4. Slide slowly your finger from the first joint to fingertip at constant speed.
              When not recognized, adjust the speed.

Fingerprint sensor

Fingerprint sensor
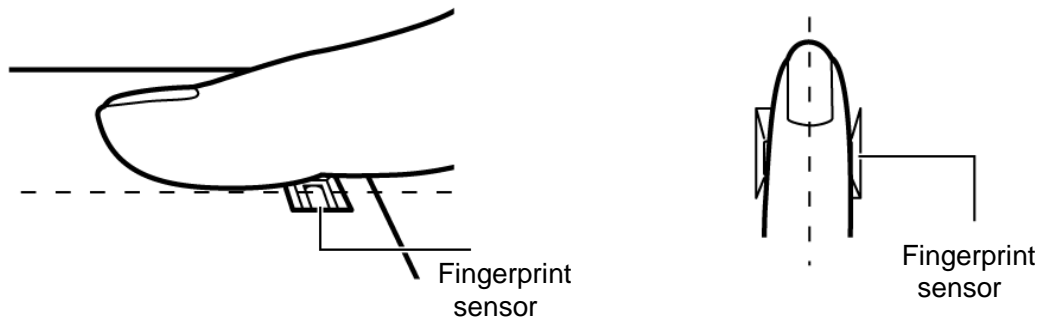
Procedure 1   Setting Windows Log-ON password

1. Open [User Account] from [Control Panel].

2. Select "Create a new account" in [User Account].

3. Input the name of Account (e.g. "TOSHIBA") in [Name the new account] and click [NEXT] button.

4. Click "Create Account" button in the (default) condition that the "Computer administrator" is selected in [Pick an account type].

5. Select the icon of Account (e.g. "TOSHIBA") that has been made in item 2 to item 4 in [User Accounts] display.

6. Select "Create a password" after displaying [What do you want to change about ****'s account?].

7. Input a password (e.g. "password") in the box under the message of "Type a new password" and "Type the new password again to confirm" after displaying [Create a password for ****'s account]. Click [Create Password] button.

8. In the [Create a password for ****"'s account] display, click ⊠ to close the window.

Procedure 2   Registration of fingerprint

1. Open [Start] → [All Programs] → [Protector Suite QL] → [User Enrollment].

2. After displaying [User Enrollment], click [Next].
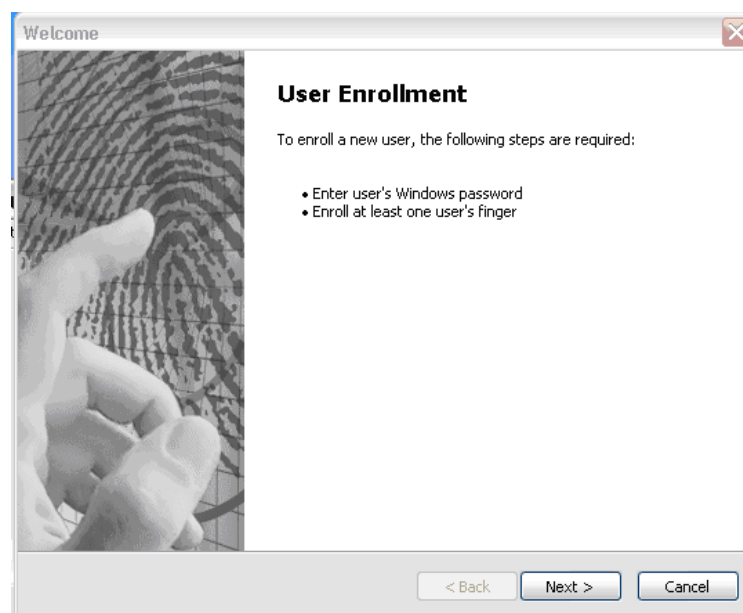
3. In the box of [Enter your password] on [User's Password] display, input the password (e.g. password) which has been input in item 7 of Procedure1. Click [Next].
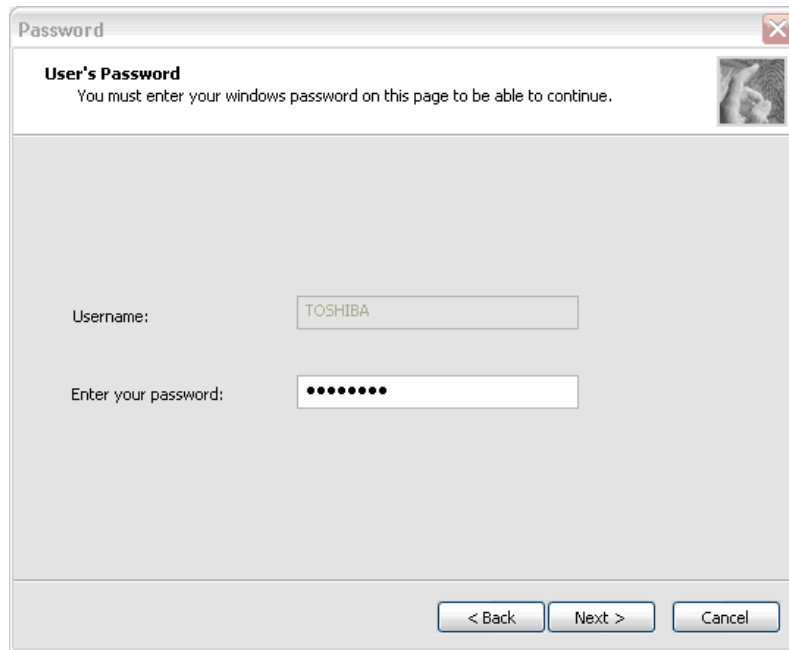
4. After displaying [Enrollment Hints], check off in the box of [Run interactive tutorial] (when proceeding without seeing Tutorial). The display of "if you want really skip or not the Tutorial" appears, and then click [Skip Tutorial].
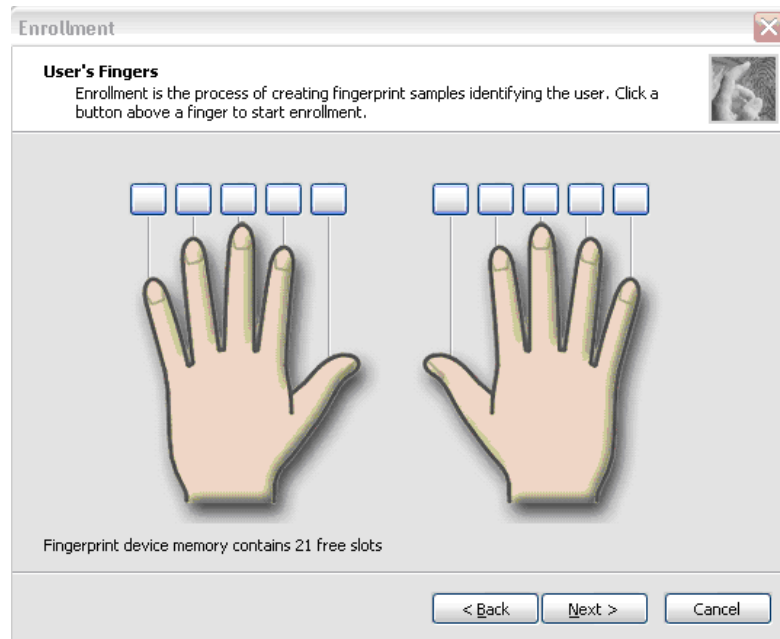
5. After displaying [User's Fingerprint], click the box of thumb of right hand. A small window of "Swipe finger" appears, then swipe three times.
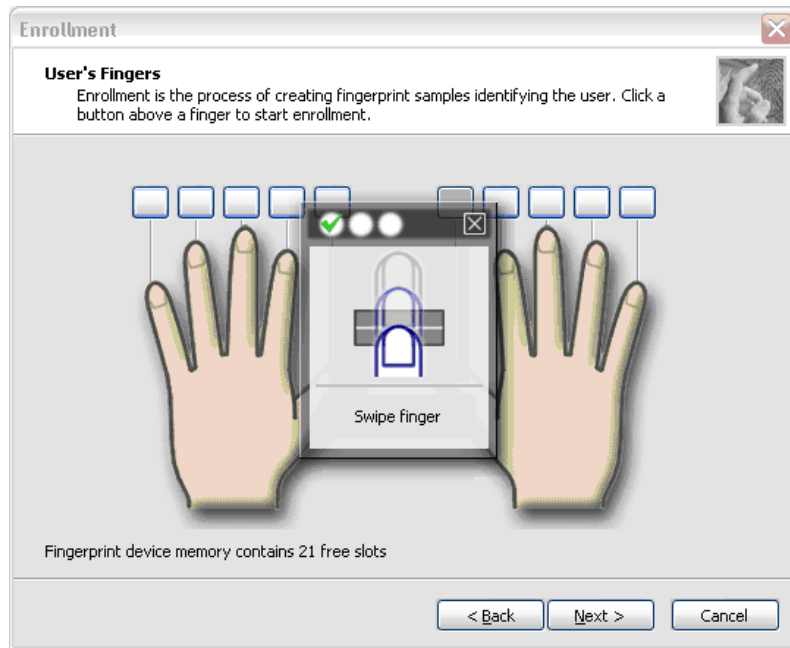
6. The display becomes as follows when the fingerprint is registered correctly. Click [Next].
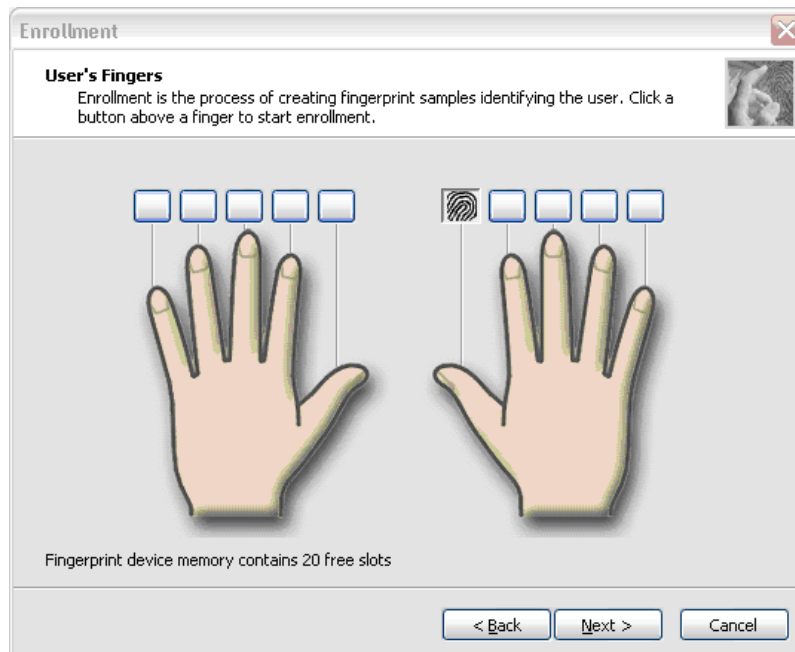
7. After displaying [User Enrollment] dialog, you are asked if you want to register one more finger. Click [No] when you do not want to register one more.

8. When [Advanced Security] is displayed, click [Next].
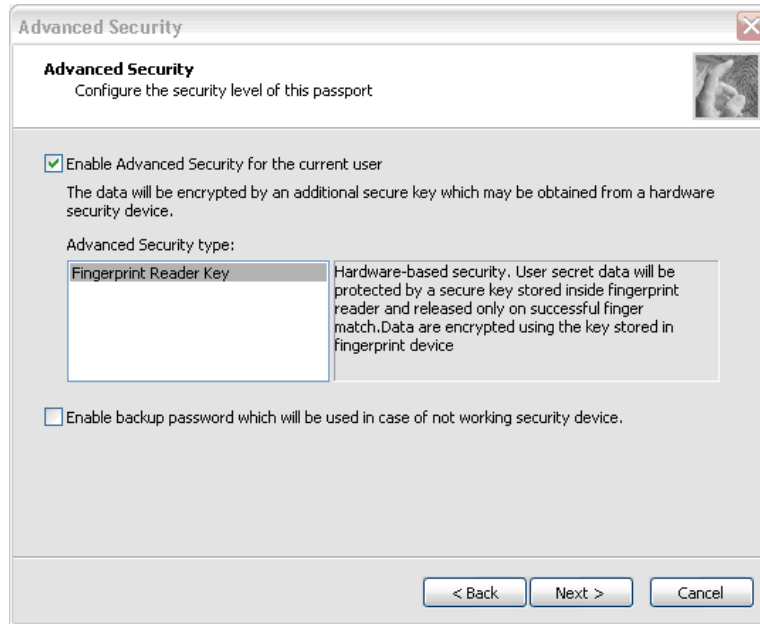
9. When [Finish] is displayed, click [Finish].
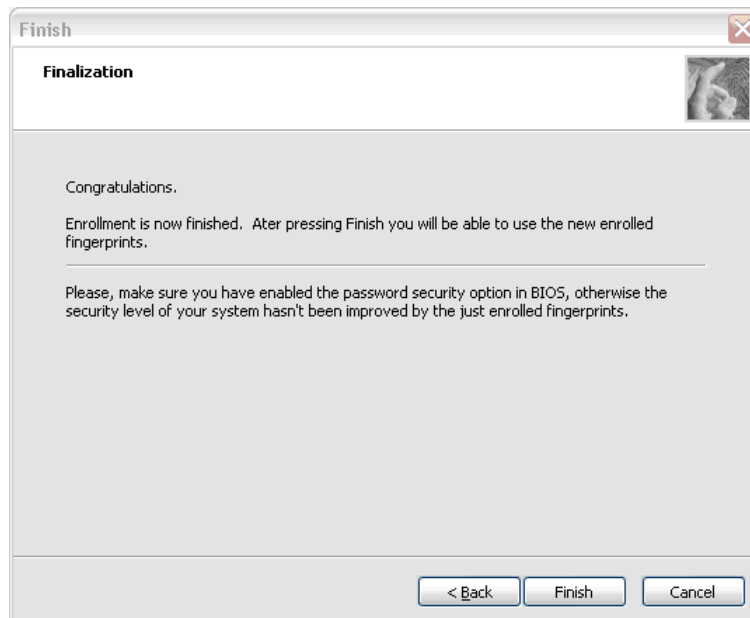
10. The display of "Protector Suite - QL Edition" appears in [Fingerprint Software] window, click [Close].
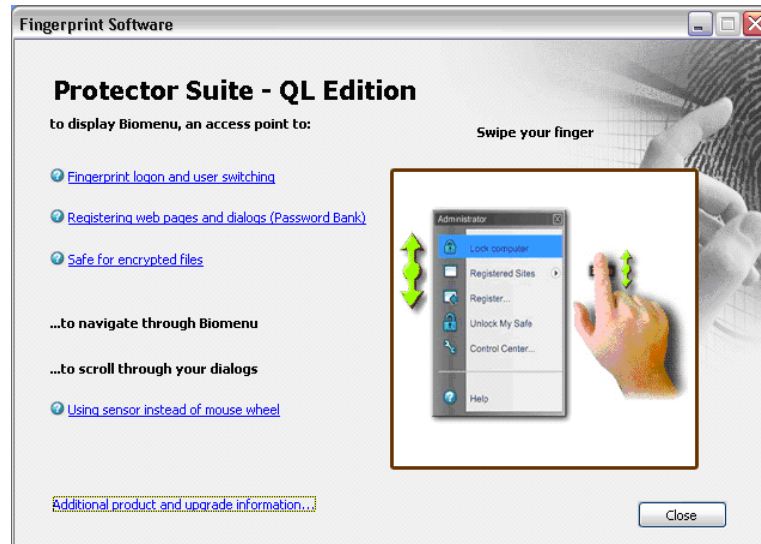
Procedure 3   Authentication of fingerprint

1. Turn on the computer. Windows starts up.

2. In the Windows Log-ON window, scan the fingerprint of registered finger. Make sure that a green check mark is displayed in the box (It means you have logged on).
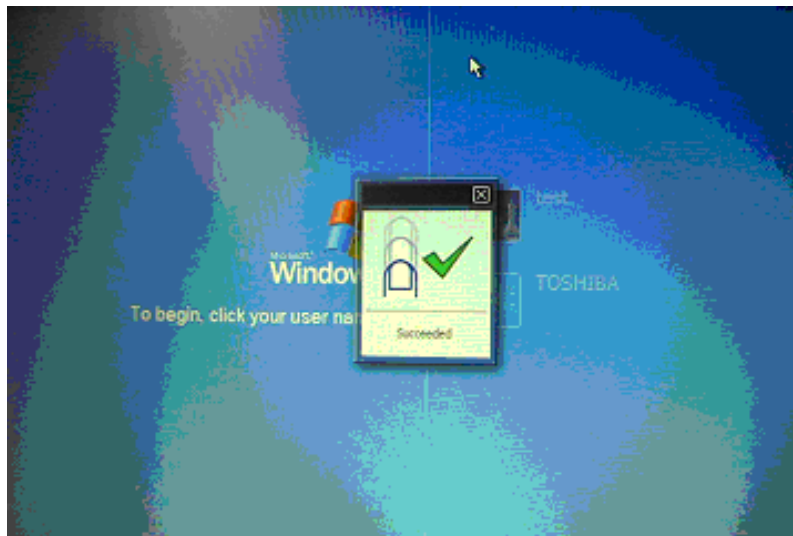
3. After starting Windows, make sure that the name of Account (e.g. "TOSHIBA"), which has been inputted in item 3 in Procedure 1 at the top of [Start].

Procedure 4   Connector Check and Replacement Check

The connector CN9540 on the GF board is connected to the connector CN9700 on the system board.
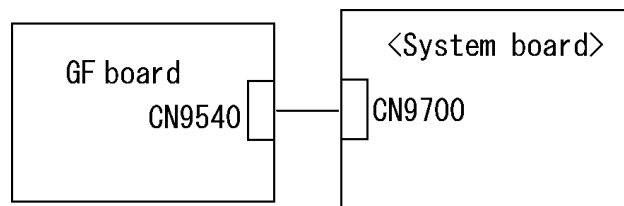
Check 1   Check the GF cable is firmly connected to the connector CN9540 on the GF board and connector CN9700 on the system board. If not, connect it firmly. If the finger sensor is still not functioning properly, perform Check 2.

Check 2   The GF cable may be faulty. Replace it with a new one. If the problem persists, perform Check 3.

Check 3   The GF board may be faulty. Replace it with a new one. If the problem persists, perform Check 4.

Check 4   The system board may be faulty. Replace it with a new one.

Chapter 3

Tests and Diagnostics

Chapter 3　　Contents

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 Devices] is selected in the "Device Config." in SETUP menu.*

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.

❑ The Diagnostic Disks (T&D for maintenance for Main, LAN/Modem/Bluetooth/IEEE1394, wireless LAN and Sound)
❑ A formatted working disk (Floppy disk test)
❑ USB FDD (for all tests)
❑ A USB test module (USB test)
❑ A USB cable (USB test)
❑ An external CRT monitor (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 store-bought CD-RW media (CD-ROM/DVD-ROM test)
❑ A microphone (Sound test)
❑ Headphones (Sound test)
❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
❑ An exclusive modem test jig (Nitto Electric Manufacture Co.,Ltd-made QE2000P01) (Modem test)
❑ A module cable and RJ11 connector checker (Modem test)
❑ A LAN wraparound connector (LAN test)
❑ PC card wraparound connector (Expansion test)
❑ A display with monitor ID function (Expansion test)
❑ RS232C wraparound connector (Async test)
❑ A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 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
- ❑ 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. Insert the Diagnostics disk in the USB floppy disk drive and turn on the computer while pressing **U** key. Then, press **Enter** and the following menu appears.

```
TOSHIBA Diagnostics Startup Menu
---------------------------------------------------------

(M) Main
(I) Initial config set
(H) Heatrun

Enter a choice: M
```

To start the Diagnostics menu (T&D), press **M** or **m** and **Enter**.
To start the H/W initial information setting tool, press **I** or **i** and **Enter**.
To start the Heatrun test, press **H** or **h** and **Enter**.

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

3.2.1 Diagnostics menu (T&D)

To execute this program, press **M** or **m** in the startup menu, press **Enter**. The following menu appears.

```
TOSHIBA personal computer XXXXXX 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 XXXXXX 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
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - 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. Table 3-2 in section 3.18 describes the error codes and error status names for each error.

Details of tests in DIAGNOSTIC TEST MENU are described on and after section 3.6. As for other service programs, refer to section 3.20 to 3.25

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                      *
*      3 ........................... DMI information save                       *
*      4 ........................... DMI information recovery                   *
*      8 ........................... System configuration display               *
*      9 ........................... E2PROM test (MAC/GUID/DMI)                  *
*****************************************************************
... Press test number [1,3,4,8,9] ?
```

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

3.2.3 Heatrun test program

After selecting this test, the 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, press **I** or **i** 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 micro code
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. DynaBook)

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**.

Subtest 03   DMI information save

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

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.

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

Subtest 08   System configuration display

This subtest displays the information of the system configuration.

When the following message appears, confirm the contents and press **Enter**.

```
Press [Enter] key
```

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, press **H** or **h** in the startup menu, press **Enter**.

After selecting this 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 format as Log Utilities. For more details of the format, refer to 3.22 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 [Not supported]	01	Ripple pattern
		02	Function
		03	Wraparound
7	ASYNC [Not supported]	01	FIR/SIR Point to point (send)
		02	FIR/SIR Point to point (receive)
		03	Wraparound (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
11	EXPANSION	01	PCMCIA wraparound [Not supported]
		02	RGB monitor ID
12	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.

```
*** Test Fan Revolution 0000RPM Start

Press [Enter] key
```

Press **Enter**. The following message will appear.

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

Make sure the fan rotates at low speed and the message of fan revolution for it changes. Then press **Enter**.

The following message will appear.

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

Make sure the fan rotates at high speed and the message of fan revolution for it changes. Then press **Enter**.

After a while, the fan rotating will stop and return to subtest menu.

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 subtest 02 with the cache off.

Subtest 04   Cache memory (on/off)

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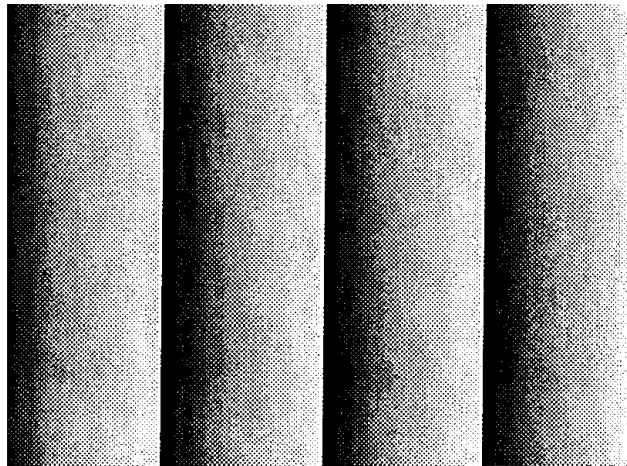
           To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

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.
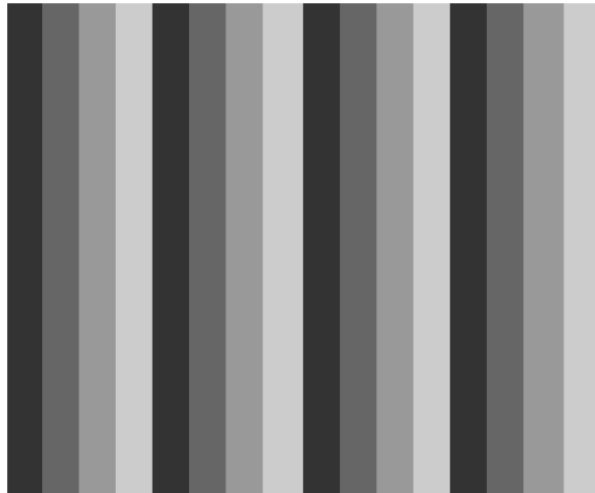
(Display example: Mode 12)

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 and the screen returns to the DISPLAY TEST menu.

Subtest 06   "H" pattern display

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

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

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, the screen returns 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 because 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.

1. The following message will appear. Select the media mode and start track to be tested and 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

---

NOTE: 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.

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

NOTE: Printer Test is not supported for this model.

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 (board)

NOTE: To execute this subtest, a 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: *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 08 or 09 is 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 can not 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.

---

1. The following message appears for the error dump operation when a data compare error is detected. Select **1** or **2**.

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

2. The following message appears for 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)
   ```

3. 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 number and the last two digits indicate the sector number.

The first digit of the STATUS indicates the drive being tested and the last two digits indicate the error status code as explained in the 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 and then reads the data while moving from cylinder to cylinder. (Tests the data interference in the neighbor track.)

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149749'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24974'	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 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, making 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: Select 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 **12** 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 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 ............   GP Button                               *
*     4 ...........    Kill Switch                             *
*     5 ............   USB                                     *
*     6 ...........    Docker Dock/Undock                      *
*     7 ............   LED                                     *
*     8 ............   PC-Card Device Lock                     *
*     A ............   Acceleration sensor                     *
*                                                              *
*     9 ............   Exit to Common Test                     *
*                                                              *
**************************************************************
.... Press test number [1-A] ?
```

Select 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 that causes the key's display character to blink.

Press **Del + Enter** to end the test.

```
<<<<<<    Press Key Display    >>>>>>
```
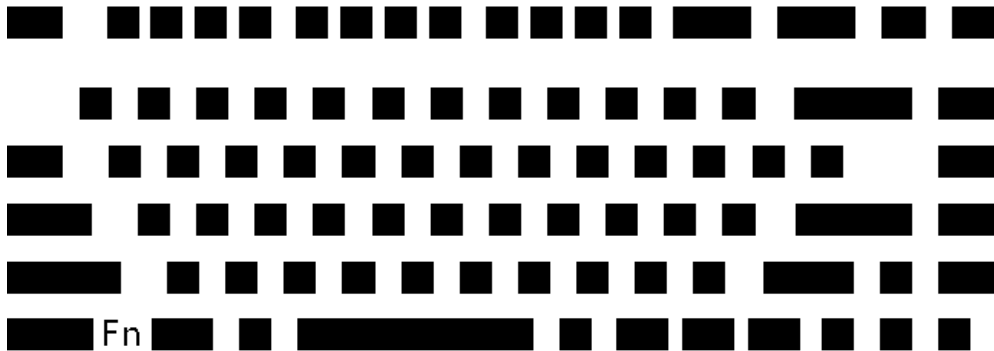
```
IF TEST OK, Press [Del] [Enter] key
```

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 TEST PROGRAM (Vx.xx) ***

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

                                    <BUTTON>
                                    (1)    (2)




          << PRESS BUTTON1+BUTTON2 THEN END >>

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

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


                                    <BUTTON>
                                    (1)    (2)



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

Subtest 03   GP Button

> This subtest checks the moving of the of the front operation panel button.
>
> Press the Toshiba Presentation button after the following message appears.
>
> ```
> Press [ Assist ] button
> ```
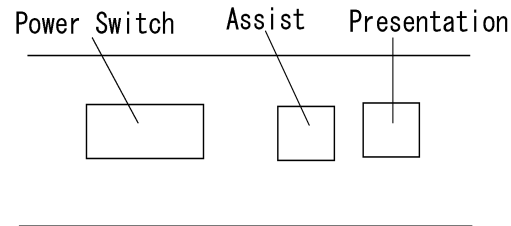

> Press the Toshiba Assist button after the following message appears.
>
> ```
> Press [ Presentation ] button
> ```
>
> If the test ends successfully, the display returns to the ONLY ONE TEST menu.

Subtest 04   Kill Switch

> This subtest checks if the Wireless communication switch works properly.
>
> If the test is started with the switch ON, following message appears in the display.
>
> ```
> Kill switch is set to a start position (OFF)
> ```
>
> Slide the switch to OFF position. Then, following message appears in the display.
>
> ```
> KILL SWITCH ON !!
> ```
>
> Slide the switch to ON position. Then, following message appears in the display.
>
> ```
> KILL SWITCH OFF !!
> ```
>
> After Sliding the switch to OFF position, return to the ONLY ONE TEST menu automatically.

Subtest 05   USB

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

This subtest checks if USB port works properly.

The following menu appears in the display.

```
################################################################
########            ONLY ONE TEST Menu (XXXXXXXXX)       ######
################################################################
*                                                              *
*    0 ............   Port 0  (Left side)                      *
*    1 ............   Port 1  (Right side front)               *
*    9 ............   EXIT 2  (Right side back)                *
*                                                              *
****************************************************************
.... Press test number[0-1, 9] ?
```

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

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

OK message appears in the display if the test ends without fail.

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 06   Docker Dock/Undock

This subtest is executed with an Advanced Portreplicator III Plus installed.

Press **Enter** while pushing the eject button of the Advanced Portreplicator III Plus after the following message appears.

```
Slide Eject-SW, and press [Enter] Key
```

Press **Enter** without pushing the eject button of the Advanced Portreplicator III Plus after the following message appears.

```
Release Eject-SW, and press [Enter] Key
```

If the test ends successfully, the display returns to the ONLY ONE TEST menu.

When the display returns to the ONLY ONE TEST menu, remove the Advanced Port Replicator III Plus from the computer.

Subtest 07   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]
```

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 [PowerSW-LED]= Green
```

Check if the Power Switch LED lights in the following order.
 (Green → Orange → Blue → OFF)

Press any key 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** and return to the ONLY ONE TEST menu.

Subtest 08   PC-Card Device Lock

NOTE: PC card wraparound test is not tested on this subtest.

This subtest checks the device lock function. This test needs a PC card, not a PC wraparound card. Before this test, inset a PC card.

Turn on the computer and select **8** from the only one test menu.

When it passes the test, following message appears.

```
Device Lock TEST OK
```

When a PC card is not inserted or a PC wraparound card is inserted, following message appears.

```
PC Card Not Inserted
```

When it does not pass the test, following message appears.

```
Device Lock TEST NG
```

Press **Enter** and return to the ONLY ONE TEST menu.

Subtest 0A   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
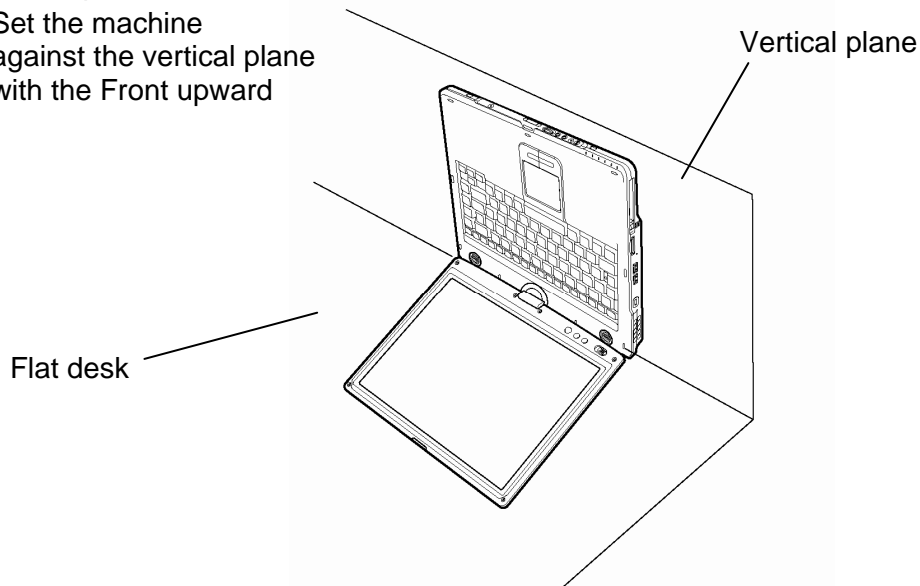
The figure below shows the name and position of each side.

Top
(heaven surface)

Back

Right side

Left side

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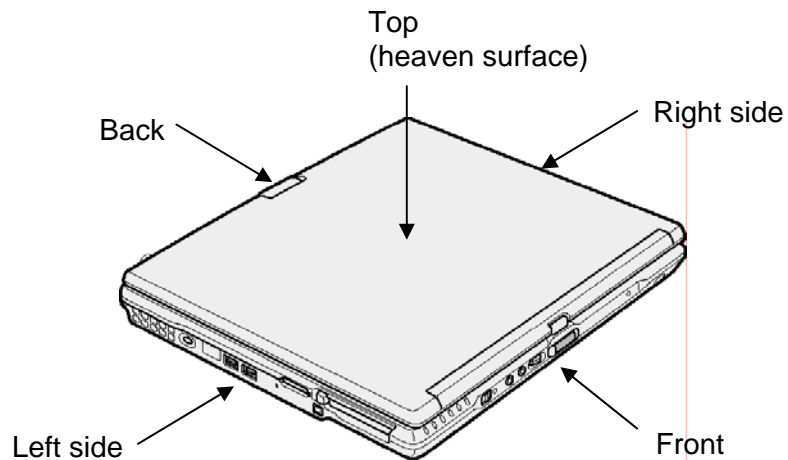
When this subtest is selected, the following message appears in the display.

```
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 any trouble in the above setting is found, the following message appears and the test halts. Then press **Enter** and return to the Only One Test menu.

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

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
  |    |                         Write data
  |  Test name
 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 (subtest 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 information.

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 ] = XXXXXXXXX

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]
Model No.              = XXXXXXX
```

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

3.25 System Configuration

3.25.1 Function Description

NOTE: To display the system configuration, the write protect tab should be OFF position. If the tab is ON position, move the tab to OFF position and restart the test. Otherwise the correct information cannot be acquired.

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 total version
6. PS Microprocessor version
7. Micro code revision [Processor number]
8. Total Memory Size [Conventional memory]
9. Battery code
10. HWSC
11. FSB [Voltage]
12. The number of printer ports
13. The number of ASYNC ports
14. Math co-processors
15. Floppy Disk Drive [Track/Head/Sector]
16. Hard Disk Drive [Sector/Drive size/Manufacture code]
17. Optical Disk Drive [Maker/Drive type/Manufacture code/Product code]
18. T&D total version
19. 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 = XXXXMB
*  - BIOS ROM Version     = VX.XX     1st ID = XXH, 2nd ID = XXH
*  - BOOT ROM Version     = VX.XX
*  - EC Total Version     = VX.XX
*  - PS Micon Version     = VX.XX

*  - Micro code 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 USB Floppy Disk Drive(s) Track = XX  Head = XX, Sector = XX
*  - X Hard Disk Drive(s)      #1 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXX]
                               #2 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXX]

*  - 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 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.

3.27 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.*

3.27.1   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**.

Subtest 01   (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 >
```
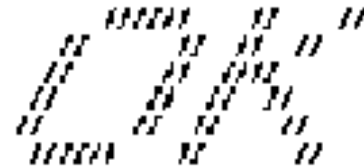

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

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

Subtest 02   (GbE)

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 adapter...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
*  1000Base Auto-negotiation TxRx Test
*
*  CE Test Complete
```

OK (displayed in stylized ASCII art)

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.

3.27.2   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 Electric Manufacture Co.,Ltd)" 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**.

3.27.3 Bluetooth test

To execute this test, press **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.

Subtest 01   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       AAAAAAA        S        S
                   P       A    A S    S  S      S
                   P       A    A  SSSSS     SSSSS


```

If the target machine has any problem, it displays Error message. 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.

Table 3-6 Error code for Bluetooth test (BD_ADDR) (2/2)

Error code	Meaning
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.
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.

Subtest 03   Communication test (DUT mode)

Subtest T   Communication test (TEST mode)

This subtest checks the Bluetooth communication functions. Set the responder machine to DUT mode and tester machine to TEST mode.

Insert a floppy disk containing the test program into the responder machine and turn on the power. The Bluetooth test menu will appear.

Press **3** to select the test and press **Enter** of the responder machine. The following message will appear:

When the test begins, the machine displays BD_ADDR of the DUT. The progress bar appears when the preparation 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
```

Insert a floppy disk containing the test program into the tester machine and turn on the power. When the Bluetooth test menu is displayed on the tester machine, press **T** and **Enter** to select the subtest. 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 communication test has been completed without fail, the DUT
machine displays BD_ADDR. 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        EEEEE TTTTTTT EEEEEEE 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     EEEEEEE 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      EEEEEEE DDDDD



                     Testing is finished


A>_
```

If the DUT machine has any problem or **S** of the DUT machine is pressed before connection to tester machine, the following message "INCOMPLETE" 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]
+---------------------+



III  N     N   CCCC     OOO    M     M PPPPPP  L        EEEEEE 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    EEEEEE
 I   N   N N  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    EEEEEE



                          Testing is finished



A>
```

If any problem is detected during the test, the massage **FAIL** is displayed on the tester machine with 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.

3.27.4   IEEE1394 test

To execute this test, press **4** and **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.

Subtest 02   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.

Subtest 03   1394 GUID Display

         This program checks the GUID of IEEE1394.

3.28 Sound Test program

This section describes how to perform the Sound test. To execute the sound test, refer to the following description.

Prepare a HDD and format it on DOS. Copy all files in the floppy disk in which the Sound test program is stored to the HDD. Reboot the computer from the HDD. 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**.

3.28.1 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.

Subtest 01   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.

Subtest 02   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.

Subtest 03   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.

3.28.2 Sound (Legacy) test

To execute the Sound (Legacy) test, select **2** and press **Enter**.

NOTE: *Sound (Legacy) test is not supported in this model.*

3.28.3 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 3.28.3.1 Test media (Toshiba-made test media).
For details on use of audio CD on the market, refer to 3.28.3.2 Audio CD.

3.28.3.1 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
```

Subtest 01   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.

Subtest 02   English Narration

Selected this subtest, narration in English starts.

For more details on the procedure, refer to the subtest01.

Subtest 03   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.

The test returns 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.

The test returns to the CD Sound (Standard) menu after the test ends.

CAUTION: This model does not support the CD Sound (Standard) test.

3.28.3.2 Audio CD

CAUTION: This test is not supported in this model.

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.

3.28.4 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.

3.29 SETUP

3.29.1 Function Description

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

1. Memory

    (a) Total

2. System Date/Time

    (a) Date (MM-DD-YYYY)
    (b) Time (HH:MM:SS)

3. Battery

    (a) Battery Save Mode
    (b) PCI Express Link ASPM
    (c) Enhanced C-States

4. Password

5. HDD Password

    (a) HDD
    (b) HDD Password Mode
    (c) User Password
    (d) Master Password

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority

7. Others

    (a) Core Multi-Processing
    (b) Dynamic CPU Frequency Mode
    (c) Execute-Disable Bit Capability
    (d) Virtualization Technology
    (e) Auto Power On
    (f) Diagnostic Mode
    (g) Language During Bootup

8. Configuration

    (a) Device Config.

9. I/O Ports

    (a) Serial
    (b) Parallel

10. Drives I/O

    (a) Built-in HDD
    (b) Select Bay

11. PCI Bus

    (a) PCI Bus

12. Security Controller

    (a) TPM
    (b) Clear TPM Owner

13. Display
    (a) Power On Display
    (b) LCD Display Stretch
    (c) TV type
14. Peripheral

    (a) Internal Pointing Device
    (b) Ext keyboard "Fn"
    (c) Parallel Port Mode
15. Legacy Emulation

    (a) USB KB/Mouse Legacy Emulation
    (b) USB-FDD Legacy Emulation
    (c) USB Memory BIOS Support Type

16. PCI LAN

    (a) Built-in LAN

3.29.2 Accessing the SETUP Program

While pressing **ESC**, turn on the power. Then press **F1**. The following display appears.

```
                    SYSTEM SETUP (1/2)    ACPI BIOS version = X.XX

        ┌──── MEMORY ─────────────┐        ┌──────── BOOT PRIORITY ────────┐
        │ Total           = XXXXXX KB │     │ Boot Priority = HDD→FDD→CD-ROM→LAN │
        └─────────────────────────┘        │ HDD Priority                  │
                                           │     = Built-in HDD→ Second HDD │
        ┌──── SYSTEM DATE/TIME ────┐        └───────────────────────────────┘
        │ Date(MM-DD-YY)    = XX-XX-XXXX │   ┌──────────── Others ───────────────┐
        │ Time(HH:MM:SS)    = XX:XX:XX │   │ Core-Multi Processing   = Enabled │
        └─────────────────────────┘        │                                   │
                                           │ Dynamic CPU Frequency Mode        │
        ┌──── BATTERY ────────────┐        │            = Dynamically Switchable│
        │ Battery Save Mode  = Full Power │ │ Execute-Disable Bit Capability    │
        │ PCI Express Link ASPM = Enabled │ │            = Not Available │
        │ Enhanced C-States = Enabled │    │ Virtualization Technology = Disabled│
        └─────────────────────────┘        │ Auto Power On           = Disabled │
                                           │ Diagnostic Mode         = Disabled │
        ┌──── PASSWORD ───────────┐        └───────────────────────────────────┘
        │ Not Registered │
        └─────────────────────────┘

        ┌──── HDD PASSWORD ───────┐
        │ HDD               = Built-in HDD │
        │ HDD Password mode = User Only │
        │ User Password     = Not registered │
        │ Master Password   = Not registered │
        └─────────────────────────┘

↑↓←→: 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 │
        ┌──── I/O PORTS ──────────┐        │ TV Type            = NTSC (US) │
        │ Serial          = COM1(3F8H/IRQ4) │ └───────────────────────────────┘
        │ Parallel        = LTP1(378H/IRQ7/CH3) │ ┌──── PERIPHERAL ───────────────┐
        └─────────────────────────┘        │ Internal Pointing Device = Enabled │
        ┌──── DRIVES I/O ─────────┐        │ Ext Keyboard "Fn"     = Disabled │
        │ Built-in HDD │                    │ Parallel Port Mode    = ECP │
        │       = Primary IDE(1F0H/IRQ14) │ └───────────────────────────────┘
        │ Select Bay │                      ┌──── LEGACY EMULATION ─────────┐
        │       = Secondary IDE(170H/IRQ15) │ │ USB KB/Mouse Legacy Emulation │
        └─────────────────────────┘        │                     = Enabled │
        ┌──── PCI BUS ────────────┐        │ USB-FDD Legacy Emulation │
        │ PCI BUS         = IRQ10, IRQ11 │  │                     = Enabled │
        └─────────────────────────┘        │ USB Memory BIOS Support Type = HDD │
        ┌──── SECURITY CONTROLLER ─┐        └───────────────────────────────┘
        │ TPM             = Enabled │       ┌──── 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. *The item of Language During Boot up is only for TCL model.*

2. *The SECURITY CONTROLLER window is displayed when the SETUP is booted during IRT.*

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. Press **End** and then press **Y** to accept the factory preset settings.

NOTE: *When you execute the default setting, the following settings are not changed:*
HDD Mode
Password
Write Policy in the CPU Cache

SETUP Options

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

1. Memory

    This group of options displays the computer's memory.

    (a) Total

    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

    Use this option to set the computer's system date/time. Press ↓ to move the cursor to the right and press ↑ to move the cursor to the left. Press the **space bar** to increase the number and press **BkSp** to decrease the number.

    (a) Date

    Use this option to set the system date of the computer.

    (b) Time

    Use this option to set the system time of the computer.

3. Battery

    This option is used to select Full Power, Low Power or User Setting of the battery save mode.

    Full Power   The following shows full power settings.

```
┌─  BATTERY SAVE OPTIONS  ─────┐
│ Processing Speed   = High    │
│ CPU Sleep Mode     = Enabled │
│ LCD Brightness     = Bright (*2) │
│                      Super-Bright (*3) │
│ Cooling Method               │
│          = Maximum Performance │
└──────────────────────────────┘
```

Low Power   The following shows low power settings.

```
┌──  BATTERY SAVE OPTIONS  ──────────┐
│ Processing Speed  = Low            │
│ CPU Sleep Mode    = Enabled        │
│ LCD Brightness     =  Super-Bright (*3)│
│                                    │
│ Cooling Method                     │
│          = Maximum Performance     │
└────────────────────────────────────┘
```

(a) Battery Save Mode

When "User Setting" is selected, the sub-window, BATTERY SAVE OPTION is displayed. The following set of options can be selected in the submenu.

Processing Speed

This feature changes the CPU processing speed.

High   CPU operates at high speed. (Default)

Low   CPU operates at low speed.

CPU Sleep Mode

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

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

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. (Default)

Semi-Bright   Less than full brightness for saving power.

Cooling Method

If the CPU becomes too hot, the fan turns on or the processing speed is lowered automatically. When the CPU temperature falls to a normal range, the fan turns off.

Maximum performance   Turns on the fan first, and if necessary, lowers CPU processing speed. (Default)

Battery optimized   Lowers the CPU processing speed first, and if necessary, turns on the fan.

(b) PCI Express Link ASPM

Enabled   Saves power consumption, when the PCI Express device is not used. (Default)

Auto   Saves power consumption, when the PCI Express device is not used while the battery is working.

Disabled   Disables the power saving function and gives priority to the performance.

(c) Enhanced C-States

This feature enables or disables the Enhanced C-States.

Enabled   This lowers the power consumption.

Disabled   This does not lower the power consumption.

4. Password

This option allows you to set or reset the user password for power on.

Not Registered   Change or remove the password. (Default)

For details on setting the user password, refer to the User's Manual.

5. HDD Password

This option sets HDD password. HDD password is a security function to protect the built-in HDD.

(a) HDD

This item selects the hard disk to set HDD password.

Built-in HDD   Sets HDD password for the built-in HDD (Default)

Second HDD   Sets HDD password for the second HDD

(b) HDD Password Mode

This item registers HDD password and can be selected only for registering HDD password. To change HDD Password Mode when HDD password is registered, delete the registered HDD password first, and then register new password.

User Only   Sets only User HDD Password (Default)

Master+User   Sets Master HDD Password and User HDD Password

(c) User Password

This item sets User password.
For details on setting user password, refer to the User's Manual.

(d) Master Password

This item sets the Master HDD password.
This can be set **Master**+**User** is set in the HDD password Mode. For details, refer to the User's Manual.

6. Boot Priority

This tab sets the priority for booting the computer and the priority for the built-in HDD or optional secondary HDD.

(a) Boot Priority

HDD→FDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: HDD, FDD, CD-ROM and LAN. (Default)
FDD→HDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: FDD, HDD, CD-ROM 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.

NOTE: *CD-ROM refers to also a DVD-ROM, CD-RW/DVD, DVD±R/±RW or DVD Super Multi drive.*

(b) HDD Priority

This option enables to select the priority for the Built-in HDD, optional second HDD.

Built-in HDD→Second HDD→USB (Default)

Second HDD→Built-in HDD→USB

Built-in HDD→ USB → Second HDD

Second HDD→ USB → Built-in HDD

USB → Built-in HDD → Second HDD

USB → Second HDD → Built-in HDD

7. 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) Core-Multi Processing

The Core Multi-Processing sets the CPU operating mode.

Enabled	Enables Core Multi-Processing functions. (Default)
Disabled	Disables Core Multi - Processing functions.

(b) Dynamic CPU Frequency Mode

Use this option to choose a setting from the followings.

Dynamically Switchable

> Enables Intel SpeedStep technology. When the computer is in use, the CPU power consumption and clock speed are automatically switched when necessary. (Default)

Always High	Disables Intel SpeedStep technology and always runs the processor at its fastest speed.
Always Low	Disables Intel SpeedStep technology and always runs the processor at low power consumption and low speed.

(c) Execute-Disable Bit Capability

Selects the function to reports whether the CPU Execute-Disable Bit is available or not to OS. When the CMOS is damaged, the default is **Available**. When **Home** is pressed, the setting is not changed and the setting is kept.

Available   Reports that the function is available.

Not Available   Reports that the function is not available. (Default)

(d) Virtualization Technology

Virtualization Technology sets enable or disable of the Intel Virtualization Technology installed in the CPU.

Intel Virtualization Technology is the technique that allows one machine to operate as multiple virtual machines.

Enabled   Enables Virtualization Technology.

Disabled   Disables Virtualization Technology. (Default)

(e) Auto Power On

Use this option to set a time and date for automatic power on and enable or disable the ring indicator feature. **Alarm Date Option** appears only when **Alarm Time** is enabled.

```
┌──────── OPTIONS ────────┐
│ Alarm Time           = 00:00:00  │
│ Alarm Date Option    = Disabled  │
│ Wake-up on LAN       = Disabled* │
└──────────────────────────┘
```

*Only for LAN Model

Alarm Time is set in the sequence of hours and minutes. Seconds cannot be changed. **Alarm Date Option** is set in the sequence of month and day. If Alarm Date is set to Disabled, the computer will be powered on at the same time every day. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

NOTE: *Do not remove the AC adapter 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.*

(f) Diagnostic Mode

This option sets whether the BIOS Setup Diagnostic test is enabled.

Disabled   The Diagnostic test is disabled. (Default)

Enabled   The Diagnostic test is enabled.

(g) Language During Bootup

This option selects the language during bootup. This message appears only on the model for TCL (Canada).

English   The message is displayed in English. (Default)

French   The message is displayed in French.

8. Configuration

This option displays the configuration method.

(a) Device Config.

The devices are initialized when the PNP OS loads.

Setup by OS   First, devices necessary for loading the OS will be initialized. After the PNP OS loads, the OS will initialize other devices. In this case, setup of PC Cards will be fixed to "Auto-Selected" and cannot be changed. (Default)

All Devices   All devices will be initialized.

If you are using an OS that does not have PNP capacity, select "All Devices." The Display shows the following message:

Device Config. = All Devices

9. I/O ports

   This option controls settings for the parallel port.

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

(a) Serial

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

COM level	Interrupt level	I/O address	
COM1	4	3F8H	(Serial port default)
COM2	3	2F8H	
COM3	4	3E8H	
COM3	5	3E8H	
COM3	7	3E8H	
COM4	3	2E8H	
COM4	5	2E8H	
COM4	7	2E8H	
Not Used	Disables port		

(b) Parallel

This option sets the interrupt request level (IRQ) and I/O port base address for the parallel port. When the "Parallel Port Mode" is set to **Std. Bi-direct**, the options are:

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 (Parallel port default)
LPT 2	5	278H	3
LPT 3	7	3BCH	3
Not Used	Disables the port		

When you select one of the above options, except for **Not Used**, a sub window 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**.

10. Drives I/O

This option displays the address and interrupt level for hard disk drive, optical drive and PC card. It is for information only and cannot be changed.

(a) Built-in HDD

Primary IDE (1F0H/IRQ14)   The Built-in HDD is ready for use.

No Drive   The Built-in HDD is not installed.

(b) Select Bay

This option is displayed only when the hard disk drive or optical disk drive is installed to the select bay. **Secondary IDE (170H/IRQ15)** computer selectable bay HDD.

11. PCI Bus

This item displays the interrupt level for the Card Bus. It is for information only and cannot be changed.

PCI BUS = IRQ10, IRQ11

12. Security controller

    (a) TPM

        Disables the security controller called TPM (Trusted Platform Module).
        When the cursor is on the **Enable** (**Disable**) and the **Space** is pressed,
        message is displayed and the PC waits **Y** or **N** key input by the user.
        When Y is pressed, it is sets to **Enable** (**Disable**). After changing, the cursor
        could not be moved on the **TPM** tem. This option can be changed after
        rebooting.

        Disabled   Disables the TPM. (Default)

        Enabled   Enables the TPM.

    (b) Clear TPM Owner

        This is not displayed when the **TPM** is set to **Disabled**. This is executed,
        when the PC is disposed or the owner of the PC changes.
        When the cursor is on this item and the **Space** is pressed, message is
        displayed and the PC waits **Y**, **E**, **S** and **Enter** key inputs by the user.
        When **Y**, **E**, **S** and **Enter** keys are pressed, the data is disposed.
        After changing, the display of **TPM** item is changed to **Disabled** and this item
        becomes not displayed and the cursor could not be moved on the **TPM** item.

13. 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 monitor
                               for simultaneous display.

---

*NOTE: Pressing **Fn+F5** changes the display setting in the order of internal LCD to
simultaneous to external monitor.*

    (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 lets you make settings for television display.

NTSC (Japan)   TV in Japanese system

NTSC (US)   TV in the U.S. system (Default)

PAL   TV in Europe system

14. Peripheral

Use this option to select the parallel port mode and hard disk mode.

(a) Internal Pointing Device

This option enables and disables the Touch Pad.

Enabled   Enables the Touch Pad. (Default)

Disabled   Disables the Touch Pad.

(b) Ext Keyboard "Fn"

Use this option to set the Fn key equivalent when you are using an external keyboard. Selecting this option displays the following subwindow.

Enabled   Enables the feature.

```
 ┌──── KEYBOARD ─────────────────┐
 │ Ext Keyboard "Fn" key equivalent │
 │        = Left Ctrl + Left Alt    │
 └──────────────────────────────┘
```

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting a **Fn** key equivalent will enable you to use "Hotkeys" by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

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

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

Disabled   Disables the feature. (Default)

(c) Parallel Port Mode

The options in this tab are ECP and Standard Bi-directional.

ECP   Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default)

Std. Bi-Direct.
               This setting should be used with some other parallel devices.

15. Legacy Emulation.

(a) USB KB/Mouse Legacy Emulation.

Use this option to enable or disable USB KB/Mouse Legacy Emulation. If your operating system does not support USB, you can still use a USB mouse and keyboard by setting the **USB KB/Mouse Legacy Emulation** item to **Enabled**.

Enabled   USB Legacy Support can be used. (Default)

Disabled   USB Legacy Support cannot be used.

(b) USB-FDD Legacy Emulation.

Use this option to enable or disable USB-FDD Legacy Emulation.

Enabled   USB Legacy Support can be used. (Default)

Disabled   USB Legacy Support cannot be used.

(c) USB Memory BIOS Support Type

Sets the type of the USB memory as a startup device.

HDD   Set the type of the USB memory to be equivalent to the HDD (Default).

               Based on the [HDD] order in the [Boot Priority Options] item. The order with respect to the other HDD can be set in the [HDD Priority Options] item.

FDD   Set the type of the USB memory to be equivalent to the FDD.

               Based on the [FDD] order in the [Boot Priority Options] item.

16. PCI LAN

This option enables/disables the Built-in LAN functions.

(a) Built-in LAN

Enabled   Enables Built-in LAN functions. (Default)

Disabled   Disables Built-in LAN functions.

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card and optional SD card, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.

```
┌──────────────────────────────────────────────────────────────────┐
│ 4.2  Battery Pack                                                  │
│ ┌────────────────────────────────┐  ┌────────────────────────────┐│
│ │ 4.3  PC card/Express Card  4.4 SD Card │ 4.24 LCD unit /FL inverter││
│ │ 4.5  HDD                        │  │ 4.32 Fluorescent Lamp      ││
│ │ 4.6  Slim select bay module     │  │                            ││
│ │ 4.7  Memory module              │  │                            ││
│ │ ┌──────────────────────────┐    │  │                            ││
│ │ │ 4.8  Keyboard            │    │  │                            ││
│ │ │ 4.9  SW Membrane         │    │  │                            ││
│ └────────────────────────────────┘  └────────────────────────────┘│
│ ┌────────────────────────────────────────────────────────────────┐│
│ │ 4.10 Display assembly                                           ││
│ │ 4.11 MDC(Modem Daughter Card)  │  4.25 Touch pad                ││
│ │ 4.12 Wireless LAN board        │  4.26 Fingerprint sensor board ││
│ │                                │  4.27 Bluetooth module         ││
│ │ 4.13 Internal microphone  4.14 Sound board                      ││
│ │ 4.15 RTC battery          4.16 Video board  4.28 Hinge          ││
│ │ 4.17 GPU heat sink                          4.29 Speaker        ││
│ │ 4.18 CPU heat sink/CPU                                           ││
│ │ 4.19 Fan                       4.30 Wireless LAN /Bluetooth antenna││
│ │                                4.31 LCD cover latch             ││
│ │ 4.20 System board/DC-IN jack                                    ││
│ │ 4.21 LAN/Modem jack                                             ││
│ │ 4.22 PC Card holder                                             ││
│ │ 4.23 Battery lock/Batterylatch/ODD latch                        ││
│ └────────────────────────────────────────────────────────────────┘│
└──────────────────────────────────────────────────────────────────┘
```

How to see the chart:
This chart shows which unit(s) you need to remove in advance when you replace one unit.
Example:
When you wan to replace MDC, you need to remove units, in the hatched boxes above the boxes in which the MDC is.

```
┌──────────────────────────────────────────────────────────┐
│ 4.2  Battery Pack                                         │
│ 4.3  PC card/Express Card  4.4 SD Card │ 4.24 LCD unit /FL inverter│
│ 4.5  HDD                               │ 4.32 Fluorescent Lamp     │
│ 4.6  Slim select bay module            │                           │
│ 4.7  Memory module                     │                           │
│ 4.8  Keyboard                          │                           │
│ 4.9  SW Membrane                       │                           │
│ 4.10 Display assembly                                    │
│ 4.11 MDC(Modem Daughter Card)  │  4.25 Touch pad          │
│ 4.12 Wireless LAN board        │  4.26 Fingerprint sensor board│
│                                │  4.27 Bluetooth module   │
│ 4.13 Internal microphone  4.14 Sound board               │
│ 4.15 RTC battery          4.16 Video board  4.28 Hinge   │
│ 4.17 GPU heat sink                          4.29 Speaker │
│ 4.18 CPU heat sink/CPU                                    │
│ 4.19 Fan                   4.30 Wireless LAN /Bluetooth antenna│
│                            4.31 LCD cover latch          │
│ 4.20 System board/DC-IN jack                             │
│ 4.21 LAN/Modem jack                                      │
│ 4.22 PC Card holder                                      │
│ 4.23 Battery lock/Batterylatch/ODD latch                 │
└──────────────────────────────────────────────────────────┘
```

Safety Precautions

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

DANGER: 1) *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.*
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.

2) *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock.*
Also, do not disassemble individual components in first-level maintenance.

WARNING: 1) *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*

2) *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*

3) *Be careful of edges and corners as these may cut.*

CAUTION: 1) *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*

2) *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*

3) *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*

4) *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*

5) *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*

6) *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.

2. Use only the correct and approved tools.

3. Make sure the working environment is free from the following elements whether you are using or storing the computer.

    - Dust and contaminates
    - Static electricity
    - Extreme heat, cold and humidity

4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.

5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.

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

7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.

8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.

9. The computer contains many sharp edges and corners, so be careful not to injure yourself.

10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors

- Coaxial Cable Connectors

- Normal Pin Connectors

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

Coaxial cables should be disconnected with an antenna coaxial disconnector.

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

Assembly Procedures

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

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.

- Make sure all cables and connectors are securely fastened.

- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.

- Check that all latches are closed securely in place.

- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

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

Tools and Equipment

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

- One M2 point size 0 Phillips screwdriver
- One M2.5/M3 point size 1 Phillips screwdriver
- One screw driver for stud screw
- One 4 mm flat-blade screwdriver
- Tweezers, to lift out screws that you cannot grasp with your fingers
- ESD mats for the floor and the table you are working on
- An ESD wrist strap or heel grounder
- Anti-static carpeting or flooring
- Air ionizers in highly static sensitive areas
- Plastic card of the size of credit card
- Antenna coaxial cable disconnector

Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

CAUTION: *Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.*

NOTE: *Toshiba recommends that you use an electric screw driver for quick and easy operations.*

- M2   0.167 N·m (1.7 kgf·cm)

- M2.5   0.294 N·m (3.0 kgf·cm)

- M3   0.549 N·m (5.6 kgf·cm)

NOTE: *The computer contains several flat head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.*

Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- ❏ Even number length screw: brown

- ❏ Odd number length screw: white

- ❏ Special length screw: blue

Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.

Marking of Screws on the Computer Body

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.

Kind of screws	Symbol
❏ BIND screw	B
❏ FLAT HEAD screw	F
❏ SUPER THIN HEAD screw	S
❏ TAPPING screw	T
❏ Other screws (Unique screws, STUD, etc.)	U

Examples:

- ❏ 6 mm BIND screw   B6

- ❏ 12 mm BIND screw   B12

- ❏ 4 mm FLAT HEAD screw   F4
(Indicates the screwed length in round number regardless the length of the stud.)

4.2   Battery pack

Removing the Battery pack

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

> *CAUTION:*   *When handling battery packs, be careful not to short circuit the terminals.*
> *Also do not drop, hit or apply impact, do not scratch, break, twist or bend*
> *the battery pack.*

1. Turn off the power of the computer.

2. Disconnect the AC adapter and other external devices from the computer.

3. Turn the computer face down.

4. Release the **battery lock**. Pull out the **battery pack** while sliding the **battery latch** as shown in the following figure.

> *NOTE:* *For environmental reasons, do not throw away a spent battery pack.*
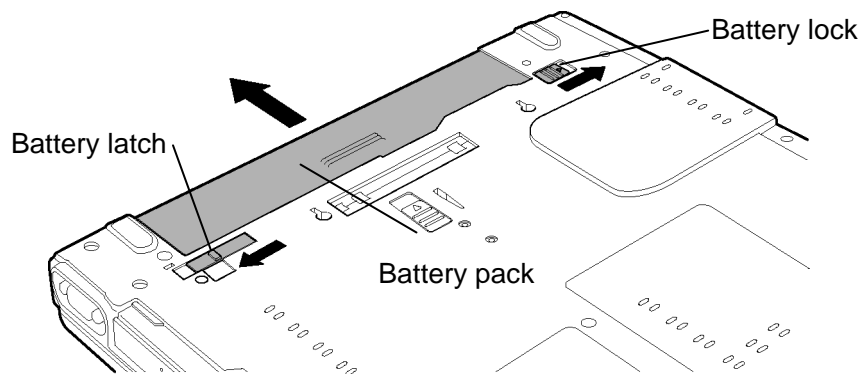
Figure 4-1   Removing the battery pack

Installing the Battery pack

To install the battery pack, follow the steps below and refer to Figure 4-1.

CAUTION: *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba for replacements.*

NOTE: *Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.*

---

1. Turn off the power of the computer.

2. Connect the AC adapter and all other external devices to the computer.

3. Push the **battery pack** into the battery slot. Make sure the battery pack is installed securely.

4. Slide the **battery lock** into the lock position.

4.3　Express card/PC card

Removing the Express card/PC card

To remove the Express card/ PC card follow the steps below and refer to Figure 4-2 and 4-3.

CAUTION: *Before you remove the Express card PC card, refer to the car's documentation and to your operating system documentation for proper procedures and precautions.*

---

1. Turn the computer face up.

2. Press the **eject button** for the Express card you want to remove to extend the button.

3. Press the extended eject button to pop the Express card out.

4. Grasp the **Express card** and pull it out.
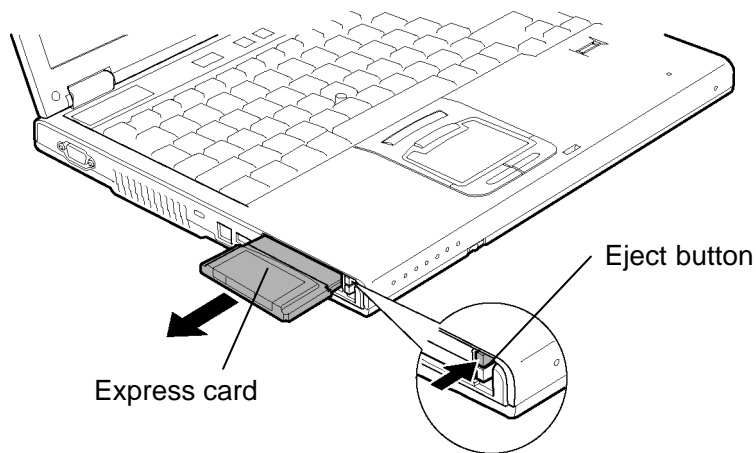
Figure 4-2   Removing the Express card

5. Press the **eject button** for the PC card you want to remove to extend the button.

6. Press the extended eject button to pop the PC card out.

7. Grasp the **PC card** and pull it out.
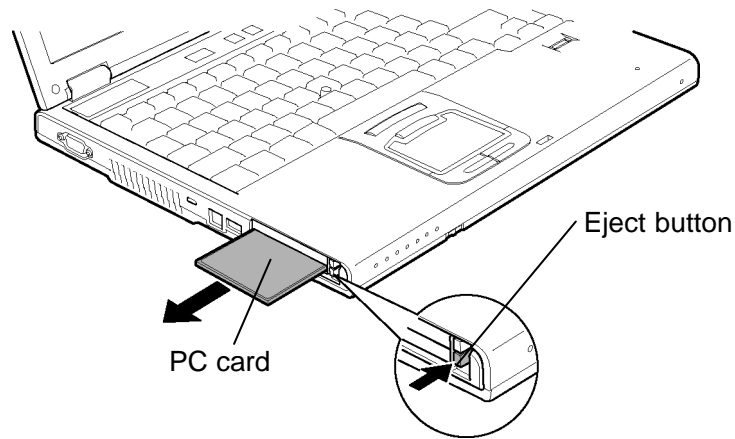
Figure 4-3   Removing the PC card

Installing the Express card/PC card

To install the Express card/PC card, follow the steps below and refer to Figure 4-2 and 4-3.

> *CAUTION:* *The upper slot is for only an Express card and the lower slot is for only a PC card. Do not insert a PC card in the upper slot.*

1. Insert the **PC card**/**Express card** into the card slot.

2. Push it carefully to ensure a firm connection.

4.4 SD card

Removing the SD card

To remove the SD card, follow the steps below and refer to Figure 4-4.

CAUTION: *Before you remove the SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.*

---

1. Push the **SD card** in and release it to pop the card out.

2. Grasp the **SD card** and pull it out.
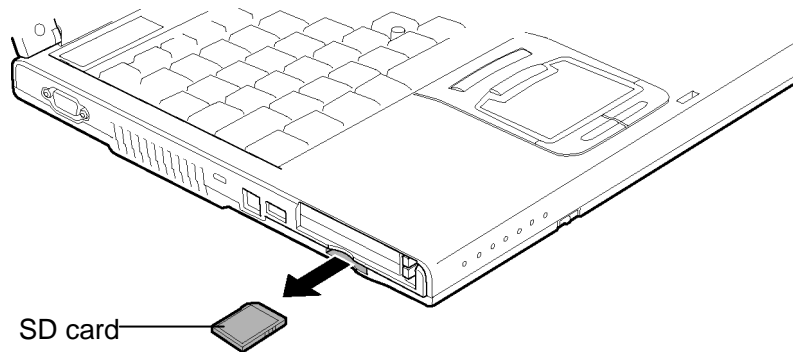
SD card

Figure 4-4   Removing the SD card

Installing the SD card

To install the SD card, follow the steps below and refer to Figure 4-4.

1. Insert the **SD card** in the SD card slot.

2. Push it carefully to ensure a firm connection.

4.5 HDD

CAUTION: *When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.*
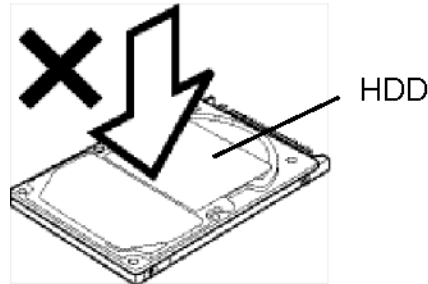
Removing the HDD

To remove the HDD, follow the steps below and refer to Figure 4-5 to 4-7.

1. Turn the computer upside down.

2. Loosen the **screw** (with an e-ring) and remove the **HDD cover** while releasing latches.
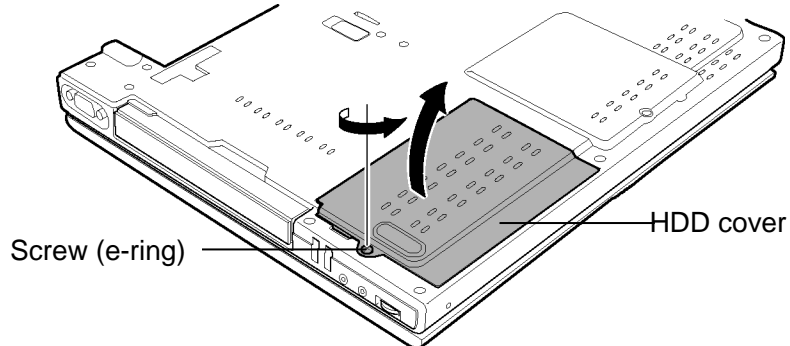
Figure 4-5   Removing the HDD cover

3. Pull the **tab** of the **HDD assembly** to remove it from the connector of the HDD cable. Be careful not to damage the connector.
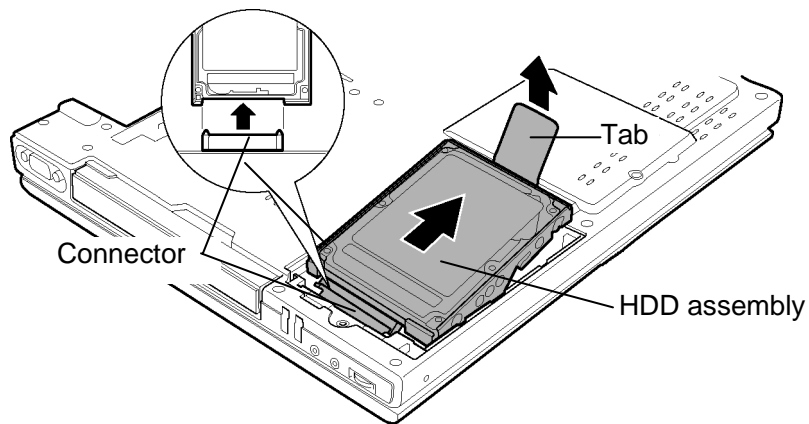
Figure 4-6   Removing the HDD assembly

NOTE: *The following steps describe how to disassemble the HDD assembly, however, do not disassemble if the HDD is working properly.*

---

4. Place the HDD assembly on a flat surface, and remove the following **screws**.

   - M3×4S   FLAT HEAD screw   ×4

5. Separate the **HDD** and **HDD Holder**.

> *CAUTION:* *Do not apply pressure to the top or bottom of the HDD.*
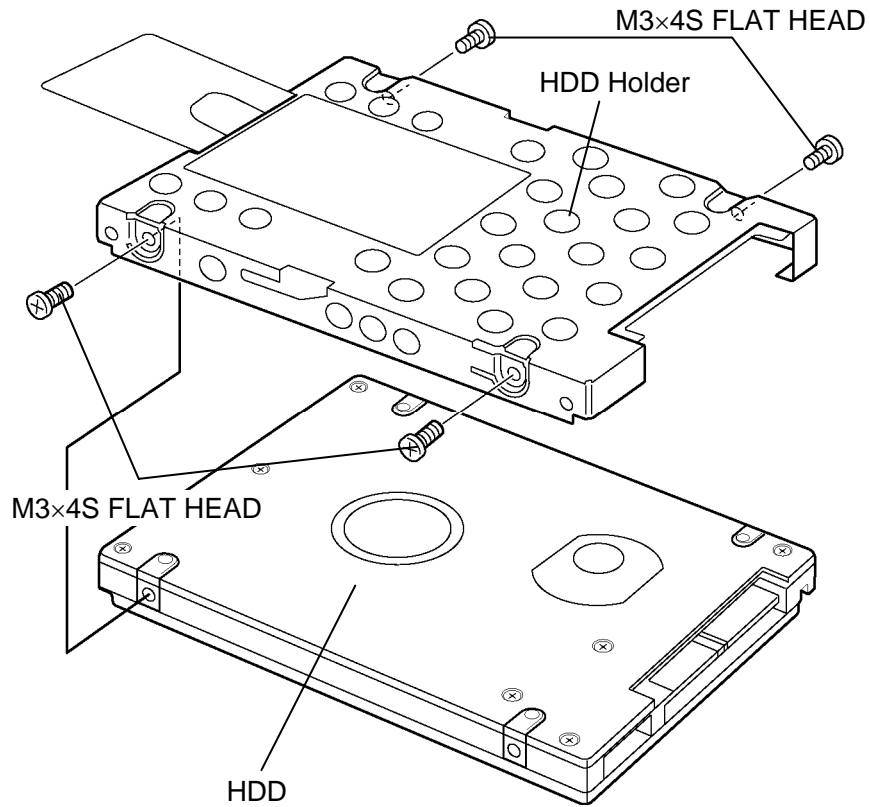
Figure 4-7   Separating the HDD and HDD holder

Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-5 to 4-7.

CAUTION: *Do not hold the HDD by its top and bottom flat surfaces. It may damage the HDD.*

1. Seat the **HDD** in the **HDD Holder** and secure them with the following **screws**.

    - M3×4S   FLAT HEAD screw   ×4

CAUTION: *Do not apply pressure to the center of the HDD pack. It may damage the HDD pack. Hold the HDD pack by its corners.*

2. Set the connector of the **HDD cable** upward and connect firmly the **HDD assembly** to the connector. Lay the **HDD assembly** down in the slot.

3. Set the **HDD cover** and secure it with the **screw** (with an e-ring).

4.6 Slim select bay module

Removing the Slim select bay module

To remove the slim select bay module, follow the steps below and refer to Figure 4-8 and 4-9.

CAUTION: The slim select bay module can become hot with use. Be careful when removing the module.

1. Remove the following **screw** securing the latch to unlatch the slim select bay and drive the removed **screw** into the **screw hole**.

   - M2.5×4B FLAT HEAD screw   ×1

2. While sliding the **latch** in the direction of the arrow in the figure below, remove the **slim select bay module** (from connector on the system board).
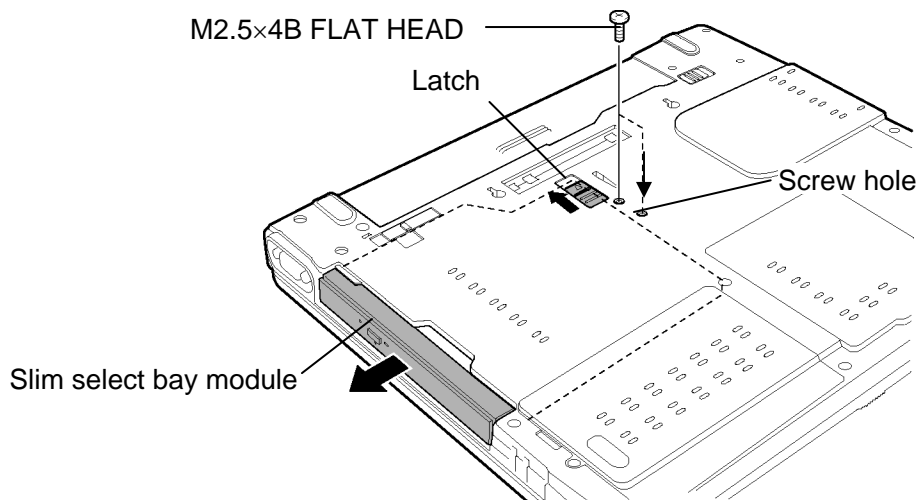
Figure 4-8 Removing the slim select bay module

3. Remove the following **screws** securing the connector and plastic brace.

   - M2×8S   BIND screw   ×2

4. Remove the **connector** and **plastic brace** from the slim select bay module.

5. Remove the following **screws** securing the plastic frame.

   - M2×3S   S-THIN HEAD screw   ×5
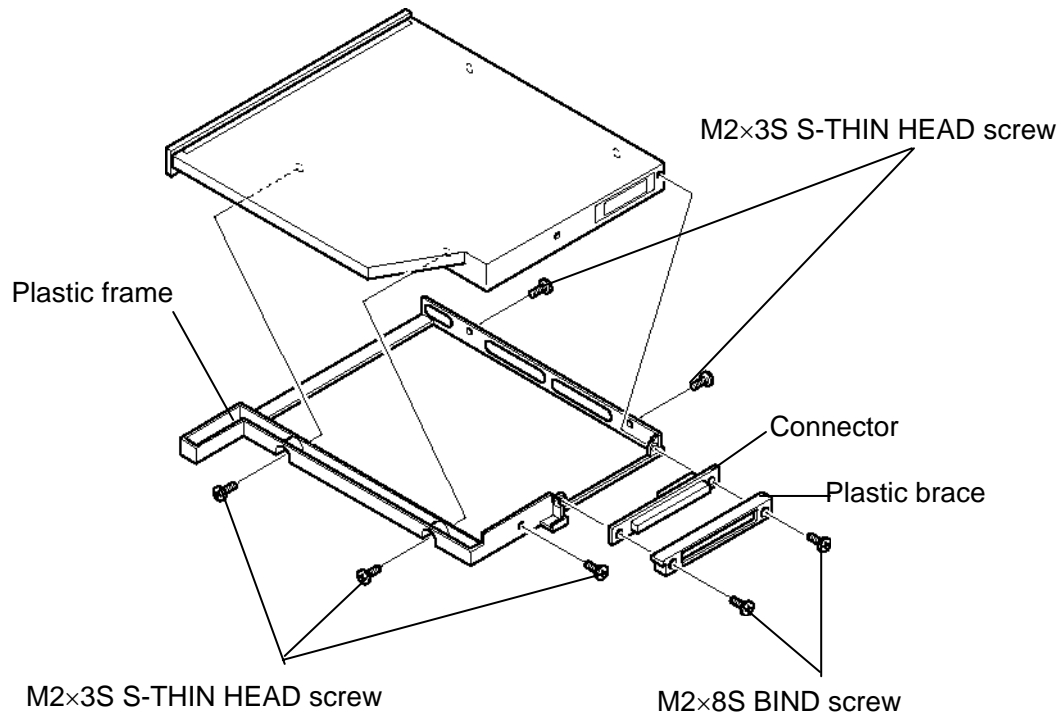
Figure 4-9   Disassembling the slim select bay module (for example DVD-ROM drive)

Installing the Slim select bay module

To install the slim select bay module, follow the steps below and refer to Figure 4-8 and 4-9.

1. Set the **plastic frame** on the side of the slim select bay module, and secure it with the following **screws**.

   - M2×3S   S-THIN HEAD screw   ×5

2. Set the **connector** and **plastic brace** and secure them with the following **screws**.

   - M2×8S   BIND screw   ×2

3. Insert the **slim select bay module** firmly into the computer to connect it to the connector on the system board.

4. Secure the latch with the **screw** removed from the screw hole. (The slim select bay is latched.)

   - M2.5×4B   FLAT HEAD screw   ×1

4.7　Memory module

Removing the Memory module

To remove the memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-10 to 4-11.

1. Loosen the **screw** (with an e-ring) and remove the **memory cover** while releasing latches.
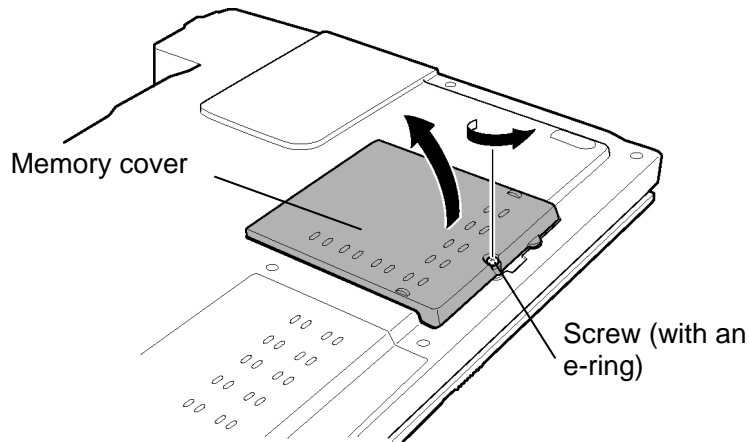
Figure 4-10　Removing the memory slot cover

2. Press two **latches** outward and remove the **memory module**.
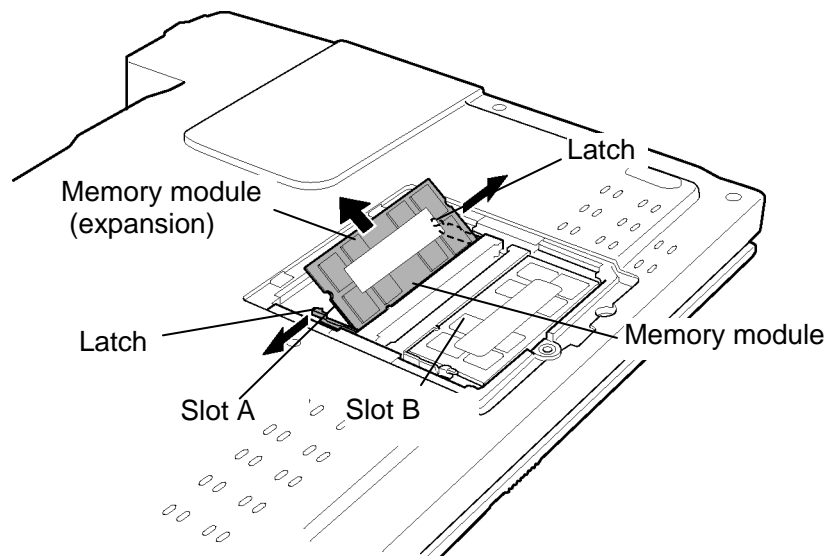
Figure 4-11　Removing the memory module

Installing the Memory module

To install the memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-10 to 4-11.

> *CAUTION:* *When installing only one memory module, be sure to insert it into the slot A.*
> *Otherwise, the computer or the memory may not work properly..*
>
> *Do not touch the connectors on the memory module or on the computer.*
> *Dust and stains on the connectors may cause memory access problems.*

    1. Insert the **memory module** into the connector slantwise and press it to connect firmly.

> *CAUTION:* *The power must be turned off when you insert a memory module. Inserting a*
> *memory module with the power on might damage the module or the*
> *computer itself.*
>
> *Never press hard or bend the memory module.*

    2. Seat the **memory cover** and secure it with the **screw** (with an e-ring).

    3. When the power of computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.

    4. If the memory is not detected, check that it is connected correctly.

4.8   Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-12 to 4-15.

1. Turn over the computer and open the display.

2. Insert your fingers into the slits on both sides and lift up the **keyboard holder** to **remove.**
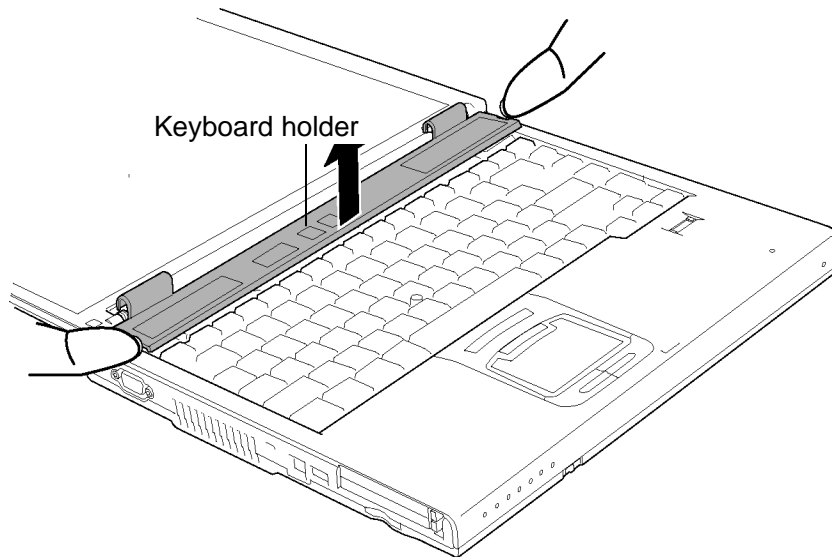
Figure 4-12   Removing keyboard holder

3. Remove the following **screws** securing the keyboard.
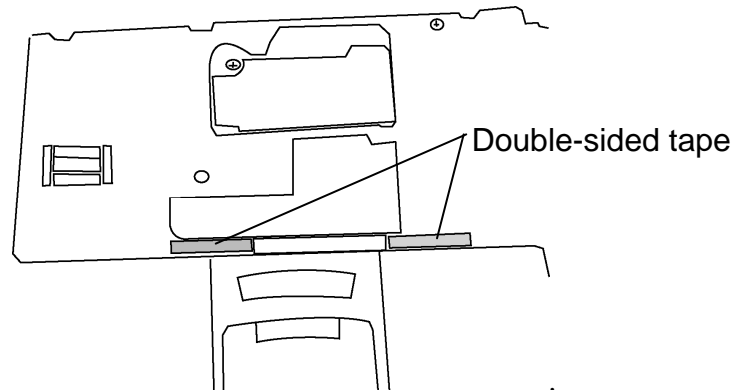
   • M2.5×2.8B   FLAT HEAD screw   ×2
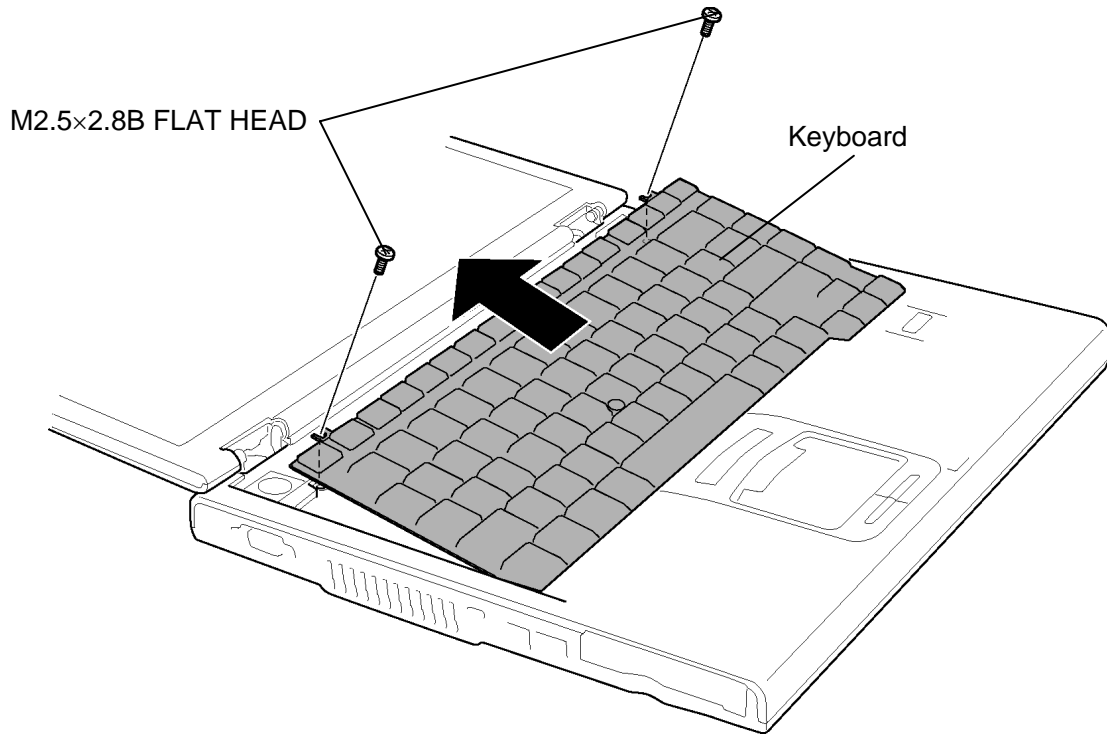
Figure 4-13   Removing the keyboard holder and screws

4. Lift the upper side of the **keyboard** fixed with double-sided tape.

5.   Lift the **keyboard** upward a little and turn it face down on the palm rest.

NOTE: The bottom of the key board is stuck on the middle frame with double-sided tapes
        at following two points.

Double-sided tape

6.   Remove the following **screws** and **keyboard support plate**.

- M2.5×16B   FLAT HEAD screw   ×1

- M2.5×4B   FLAT HEAD screw   ×1

M2.5×4B FLAT HEAD

M2.5×16B FLAT HEAD

Keyboard support plate
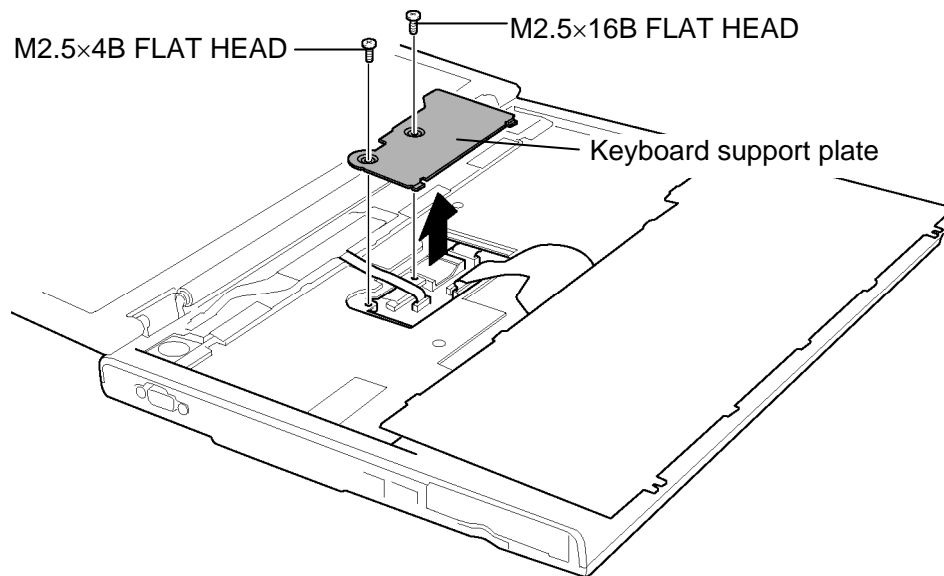
Figure 4-14   Removing the keyboard support plate

7. Disconnect the **keyboard flexible cable** from the connector **CN3200** on the system board and remove the **keyboard**.
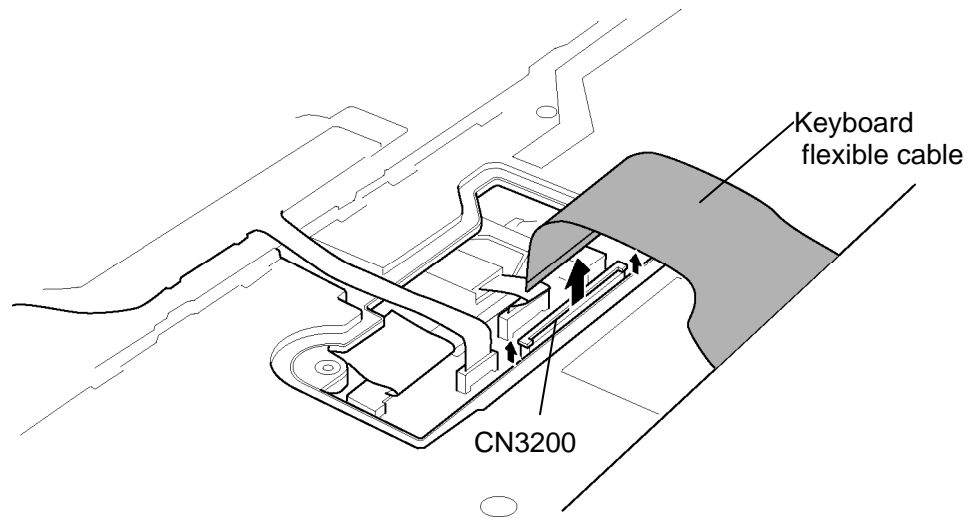
Figure 4-15   Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figure 4-12 to 4-15.

1. Place the keyboard face down on the top cover.

2. Connect the **keyboard flexible cable** to the connector **CN3200** on the system board.

3. Insert the guides of the keyboard support plate first, then place the **keyboard support plate** on the keyboard cable.

4. Secure the keyboard support plate with the following **screws**.

    *   M2.5×16B   FLAT HEAD screw   ×1

    *   M2.5×4B   FLAT HEAD screw   ×1

5. Turn the **keyboard** face up and set it in place.

---

*NOTE: Press lightly around both sides of Space key of the keyboard to stick the keyboard
          to the middle frame.*

---
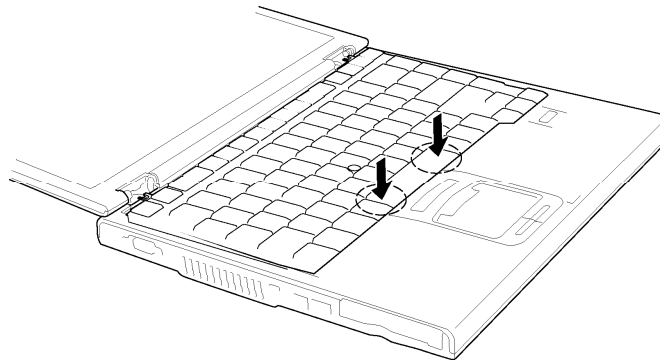
6. Make sure that there is no gap between the keyboard and the edge of the top cover.

7. Secure the **keyboard** with the following **screws**.

    *   M2.5×2.8B   FLAT HEAD screw   ×2

8. Install the **keyboard holder** and press to secure the latches.

4.9 SW membrane

Removing the SW membrane

To remove the SW membrane, follow the steps below and refer to Figure 4-16.

1. Disconnect the **SW membrane cable** from the connector **CN3250** on the system board.

2. Push the **latch A** in the direction in the following figure and lift up the flexible cable portion of **SW membrane** from the slot.

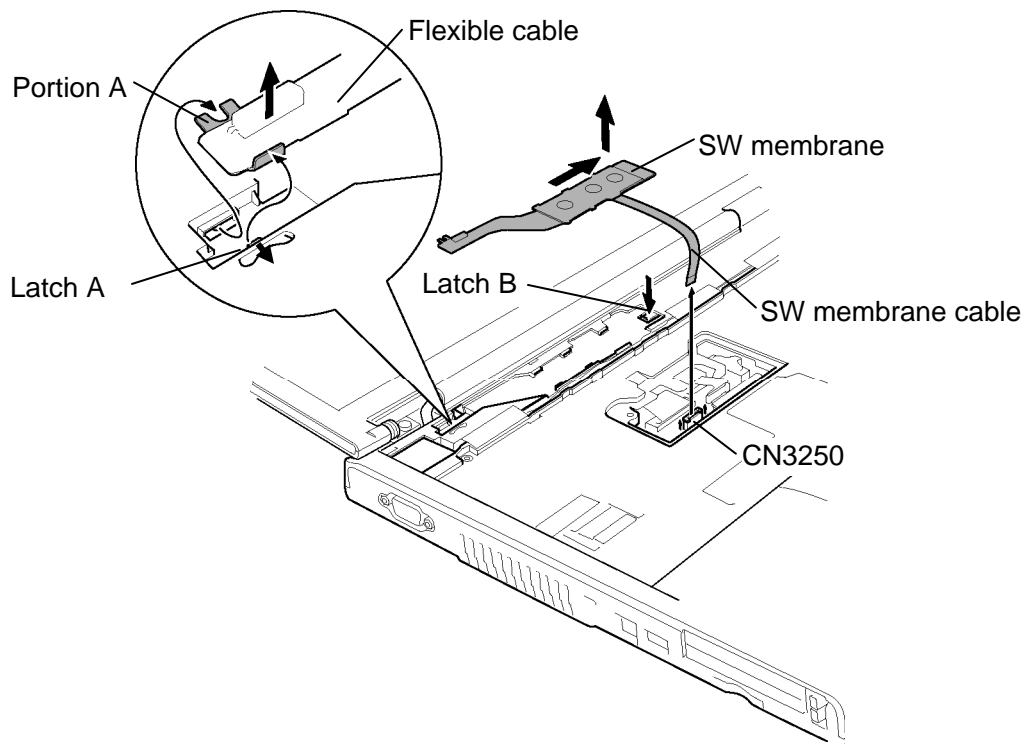3. Push down the **latch B** and slide the **SW membrane** in the direction in the figure.

4. Remove the **SW membrane**.

Figure 4-16   Removing the SW membrane

Installing the SW membrane

To install the SW membrane, follow the steps below and refer to Figure 4-16.

1. Place the **SW membrane** in the slot.

2. Inserting the **portion A** of the flexible cable portion under the guide and push down the metal portion to engage the latch.

3. Push the **latch B** and slide the **SW membrane** left.

4. Connect the **SW membrane cable** from the connector **CN3250** on the system board.

4.10 Display assembly

Removing the Display assembly

To remove the display assembly, follow the steps below and refer to Figure 4-17 to 4-20.

1. Turn the computer face down and remove the following **screws** on the bottom.

   - M2.5×4B   FLAT HEAD screw   ×1 ("4B" in the figure below)
   - M2.5×6B   FLAT HEAD screw   ×6 ("6" in the figure below)
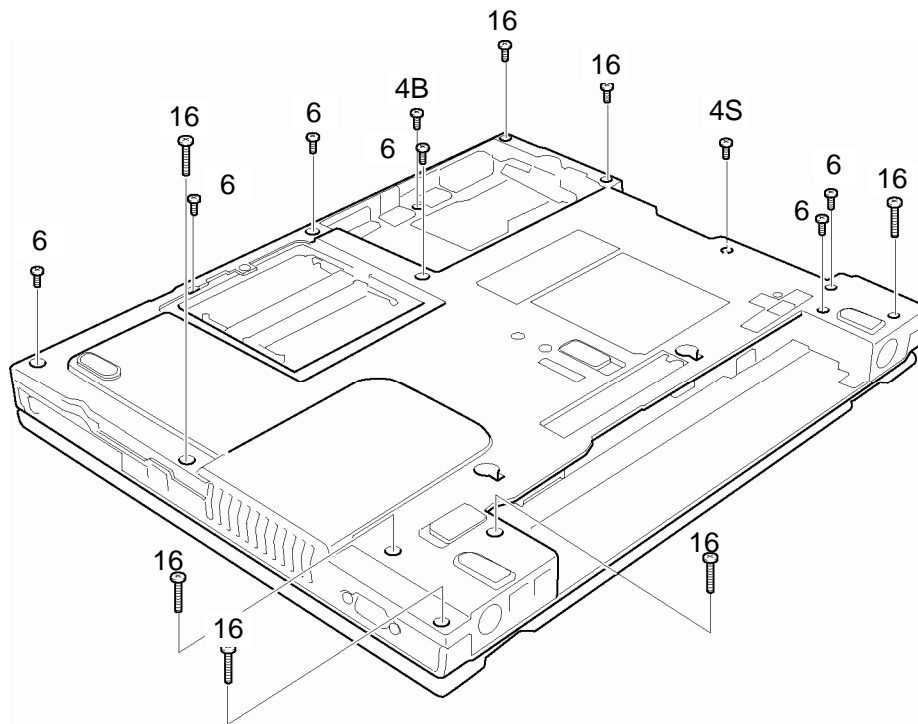   - M2.5×16B   FLAT HEAD screw   ×7 ("16" in the figure below)
   - M2×4S   S-THIN HEAD screw   ×1 ("4S" in the figure below)

Figure 4-17   Removing the display assembly (1)

2. Peel off the **black insulator** from the HDD slot and disconnect the **Speaker cable** from the connector **CN6170** on the sound board.
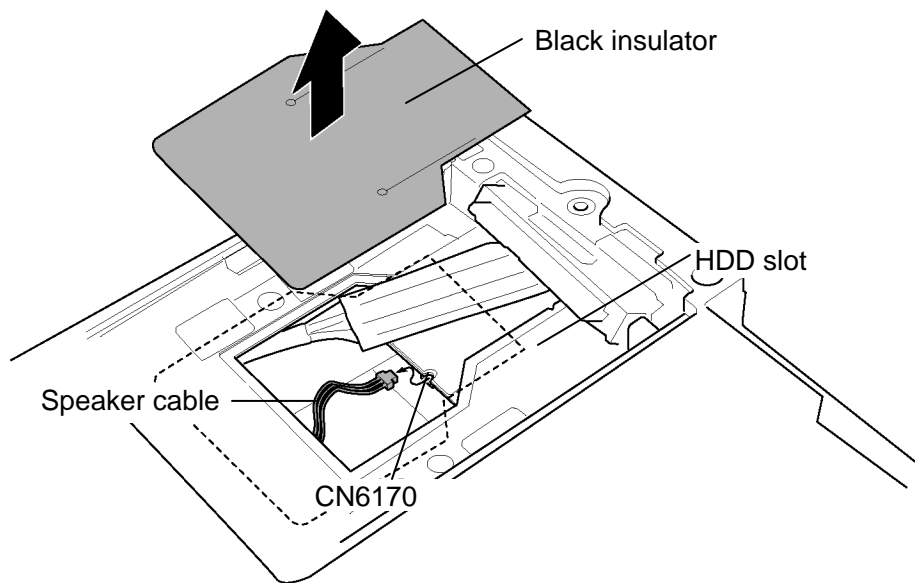

Figure 4-18   Removing the display assembly (2)

3. Turn the computer face up and open the display.

4. Disconnect the **LCD cable** from the connector **CN5000** on the system board.

5. Disconnect the **Bluetooth cable** from the connector **CN4400** on the system board.

6. Disconnect the **finger print sensor cable** from the connector **CN9700** on the system board.

7. Disconnect the **touch pad cable** from the connector **CN3201** on the system board.

8. Peel off the **insulator** and remove the following **screws**.

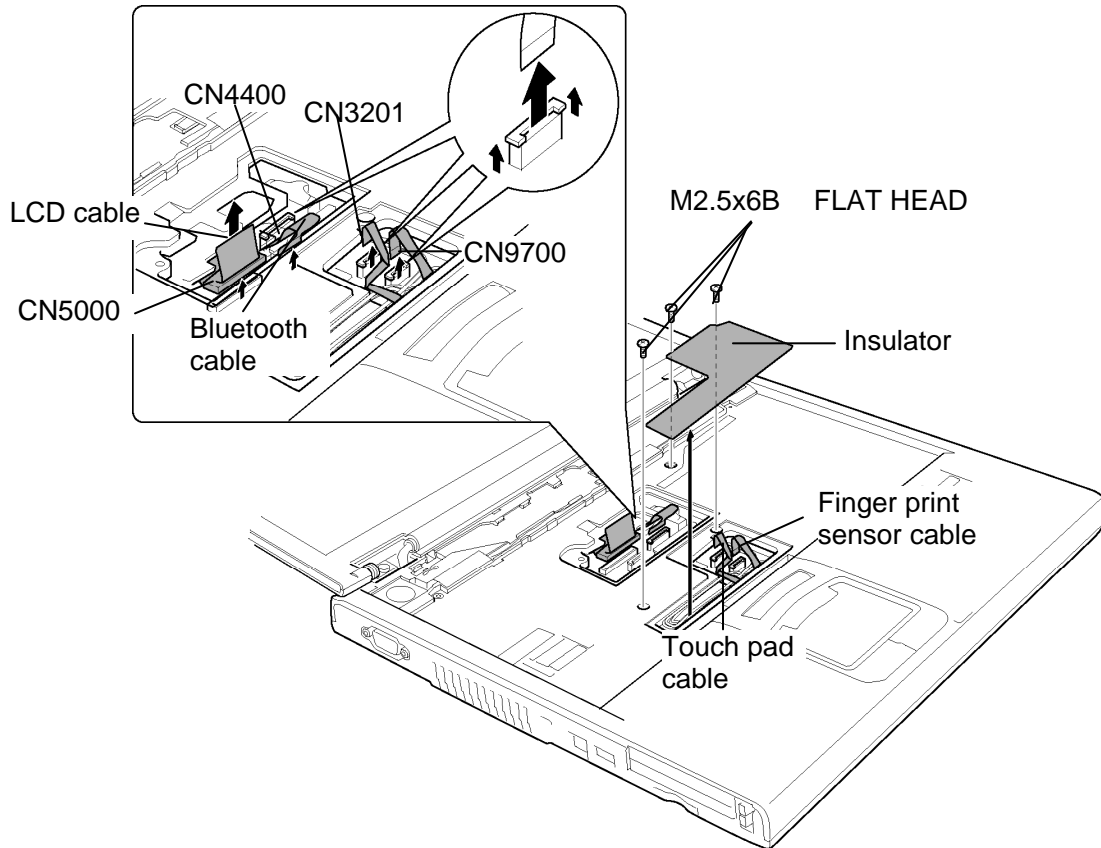- M2.5×6B   FLAT HEAD screw   ×3

Figure 4-19   Removing the display assembly (3)

9. Remove the **display assembly** from the **base assembly** while releasing the latches and place the display assembly next to the base assembly.

CAUTION: *As the wireless LAN antenna cables are still connected to the wireless LAN card on the base assembly, be careful not to break the antenna cables.*
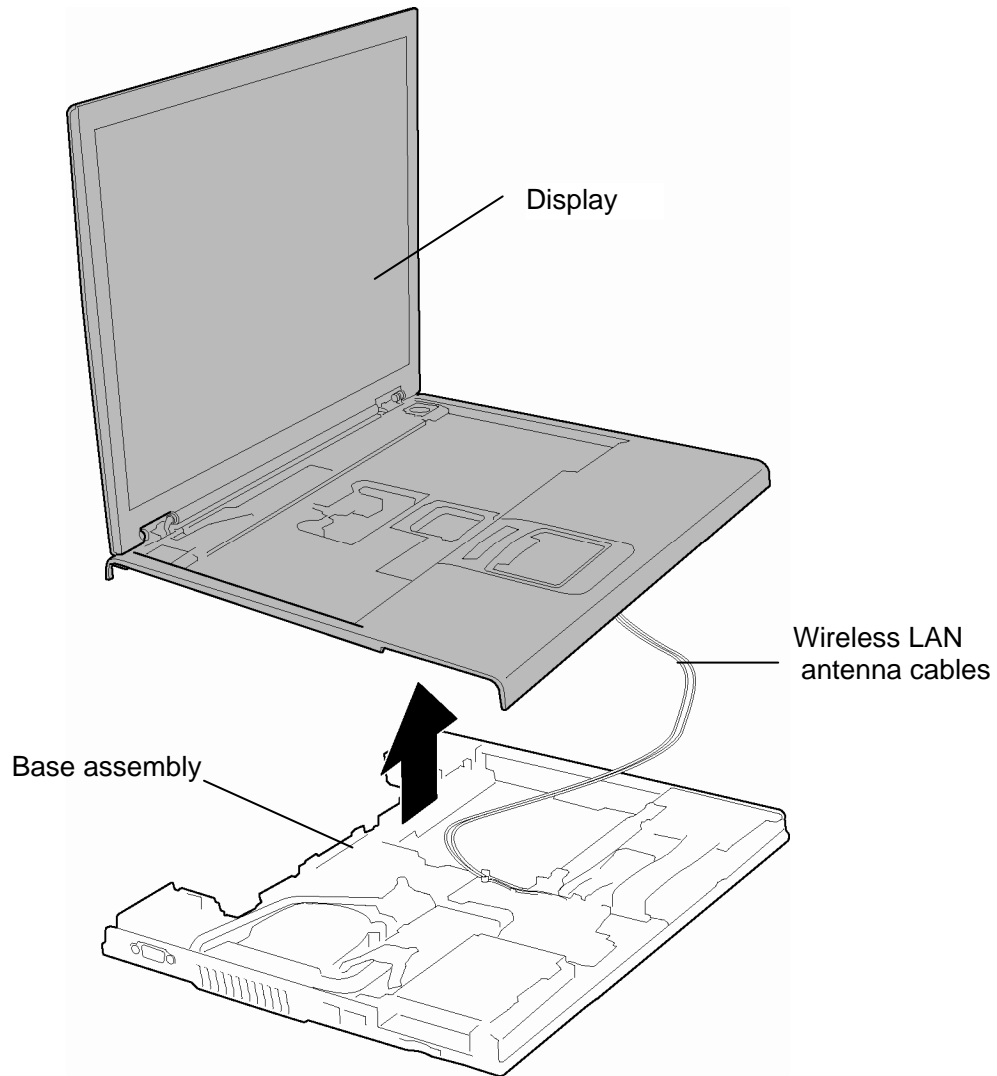

Display

Wireless LAN
 antenna cables

Base assembly

Figure 4-20   Removing the display assembly (4)

Installing the Display assembly

To install the display assembly, follow the steps below and refer to Figure 4-17 to 4-20.

1. Place the **display assembly** on the **base assembly** and secure the latches.

2. Connect the **LCD cable** to the connector **CN5000** on the system board.

3. Connect the **Bluetooth cable** to the connector **CN4400** on the system board.

4. Connect the **finger print sensor cable** to the connector **CN9700** on the system board.

5. Connect the **touch pad cable** to the connector **CN3201** on the system board.

6. Secure the display assembly with the following **screws** and stick the insulator in place.

   - M2.5×6B   FLAT HEAD screw   ×3

7. Turn the PC face down and connect the **Speaker cable** to the connector **CN6170** on the sound board in the HDD slot.

8. Stick the **black insulator** on the slot.

9. Close the display and turn the computer face down. Secure the display assembly with the following **screws**.

   - M2.5×4B   FLAT HEAD screw   ×1 ("4B" in the figure below)
   - M2.5×6B   FLAT HEAD screw   ×6 ("6" in the figure below)
   - M2.5×16B   FLAT HEAD screw   ×7 ("16" in the figure below)
   - M2×4S   S-THIN HEAD screw   ×1 ("4S" in the figure below)

4.11 MDC (Modem Daughter Card)

Removing the MDC

To remove the MDC, follow the steps below and refer to Figure 4-21.

1. Remove the following **screws** securing the MDC.

   - M2×4S   BIND screw   ×2

CAUTION: *When removing the MDC, lift it up right above. Otherwise, the MDC or connector may be damaged.*

---

2. Lift up the **MDC** to disconnect it from the connector **CN3010** on the system board.

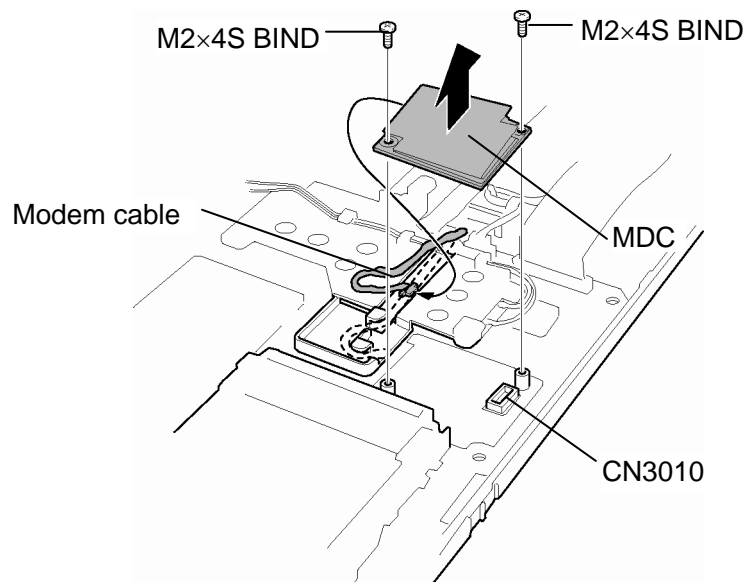3. Disconnect the **modem cable** from the connector on the MDC.

Figure 4-21   Removing the MDC (Modem Daughter Card)

Installing the MDC

To install the MDC, follow the steps below and refer to Figure 4-21.

1. Connect the **modem cable** to the connector on the MDC.

2. Set the **MDC** and press it carefully to connect it to the connector **CN3010** on the system board. Be careful not to damage the MDC and connector.

3. Secure the MDC with the following **screws**.

   - M2×4S   BIND screw   ×2

4.12 Wireless LAN card

Removing the Wireless LAN card

To remove the wireless LAN card, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-22 to 4-23.

NOTE: *The wireless LAN card is an option.*

CAUTION: *Do not try to remove the wireless LAN card with the computer turned on. The computer or the wireless LAN card can be damaged. Do not touch the connectors on the wireless LAN card module on the computer. Debris on the connectors may cause wireless LAN card access problems.*

---

1. Remove the following **screw** and **wireless LAN antenna cable holder**.

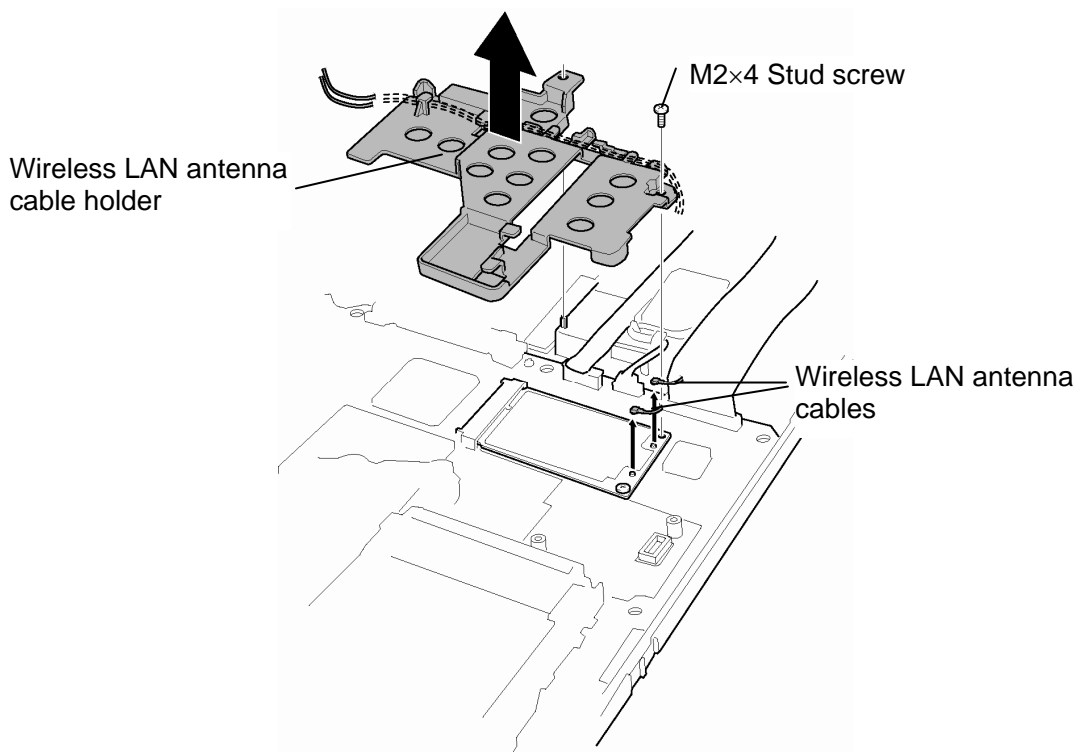   - M2×4   Stud screw   ×1

Figure 4-22 Removing the wireless LAN antenna cable holder

2. Disconnect the **wireless LAN antenna cables** (black and white) from the wireless LAN card using an antenna coaxial cable disconnector.

3. Remove the following **screw** securing the wireless LAN card.

   - M2×4S   BIND screw   ×1

4. Disconnect the **wireless LAN card** from the connector **CN 2600** on the system board. Be careful not to damage the connector.
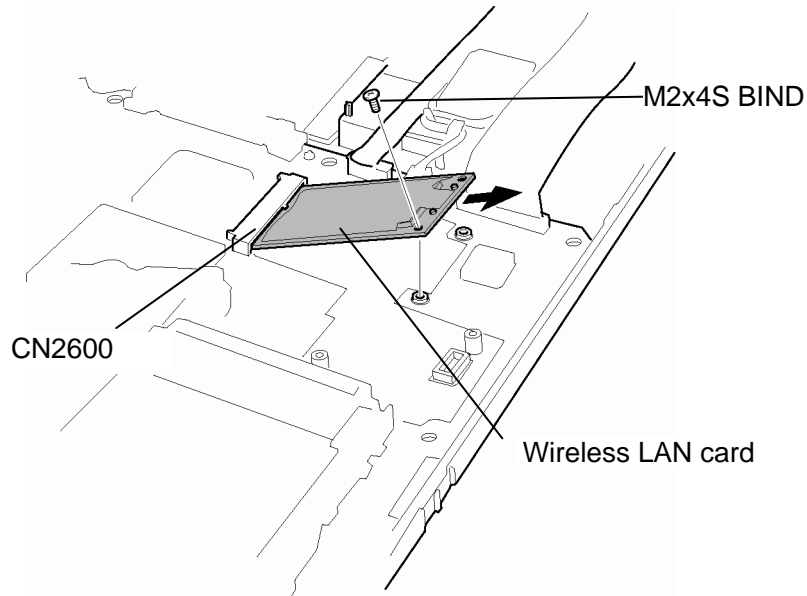

Figure 4-23   Removing the wireless LAN card

Installing the Wireless LAN card

To install the wireless LAN card, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figure 4-22 to 4-23.

CAUTION: *Be sure to switch the computer off before installing the wireless LAN card.*
             Otherwise, the computer or the wireless LAN card may be damaged.

---

1. Insert slantingly the **wireless LAN card** into the connector **CN 2600** on the system board.

2. Gently push the wireless LAN card down and secure the wireless LAN card with the following **screw**.

   - M2×4S   BIND screw   ×1

3. Connect the **wireless LAN antenna cables** (black and white) to the connectors on the wireless LAN card.

4. Seat the **wireless LAN antenna cable holder** and secure it with the following **screw**.

   - M2×4   Stud screw   ×1

CAUTION: *There are two MAC address barcode labels in the package containing the new wireless LAN board. Apply one label on the wireless LAN board and one on the box the computer was in. Before you apply the new labels, remove the old ones from the wireless LAN board and the box. The computer may have MAC address barcode labels for both wired and wireless LANs. Be sure to replace the correct label.*

4.13 Internal microphone

Removing the Internal microphone

To remove the internal microphone, follow the steps below and refer to Figure 4-24.

1. Peel off the **glass tape** and disconnect the microphone cable from the connector **CN6050** on the sound board.

2. Remove the **internal microphone** with a microphone holder from the slot.

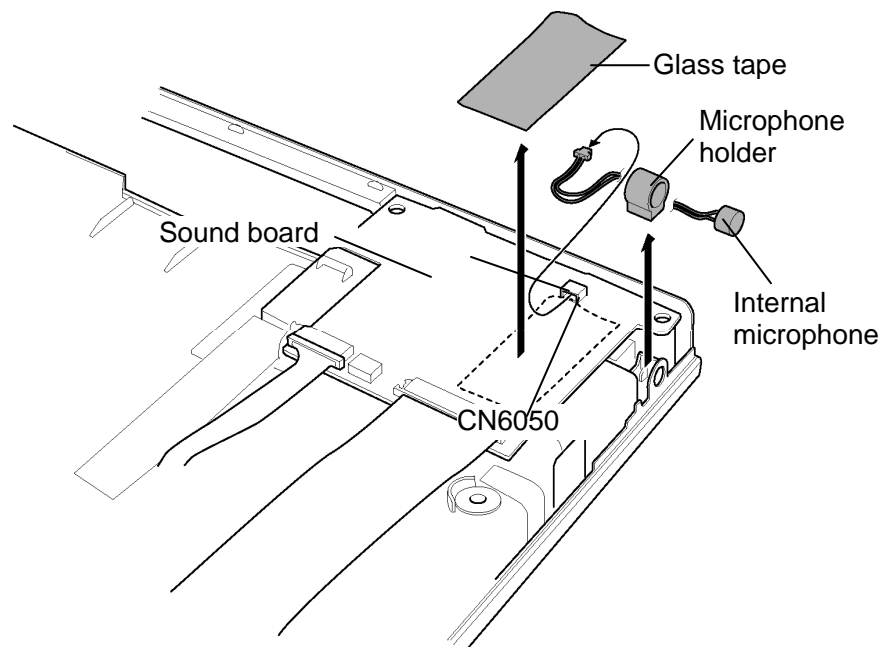3. Separate the internal microphone and the **microphone holder**.

Figure 4-24   Removing the internal microphone

Installing the Internal microphone

To install the internal microphone, follow the steps below and refer to Figure 4-24.

1. Set the **internal microphone** into the **microphone holder**.

2. Install the internal microphone with a microphone holder to the slot.

3. Connect the microphone cable to the connector **CN6050** on the sound board and stick the **glass tape** in place.

4.14 Sound board

Removing the Sound board

To remove the sound board, follow the steps below and refer to Figure 4-25 to 4-26.

1. Disconnect the **sound board cable** from the connector **CN9510** on the sound board and the connector **CN9500** on the system board.

2. Disconnect the **USB cable** from the connector **PJ9511** on the sound board and the connector **CN9501** on the system board.

3. Remove the **sound board** from the base assembly.

Figure 4-25   Removing the sound board
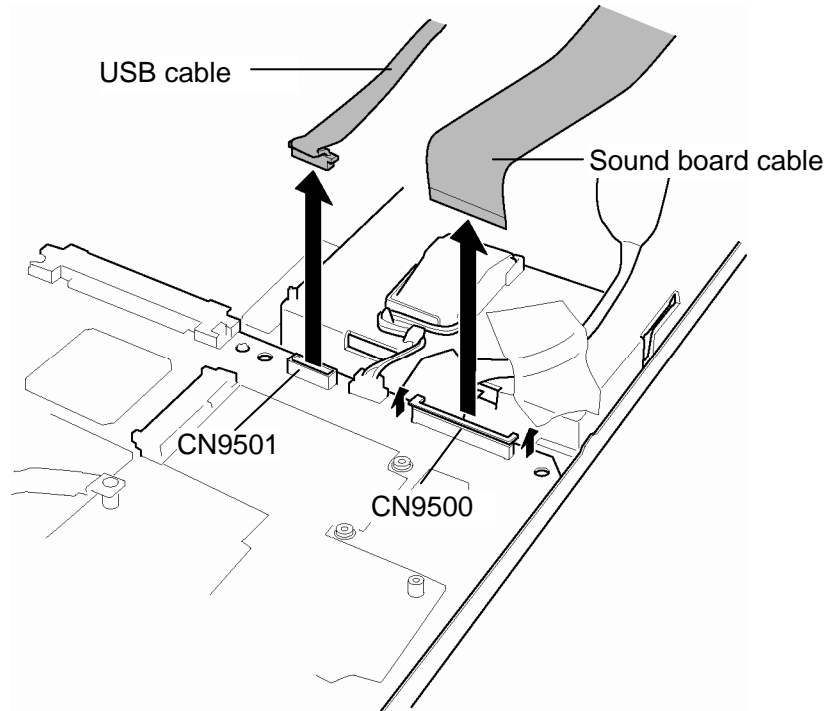
Figure 4-26 Removing the cables

Installing the Sound board

To install the sound board, follow the steps below and refer to Figure 4-25 to 4-26.

1. Install the **sound board** from the right side on the base assembly.

2. Connect the **USB cable** to the connector **PJ9511** on the sound board and the connector **CN9501** on the system board.
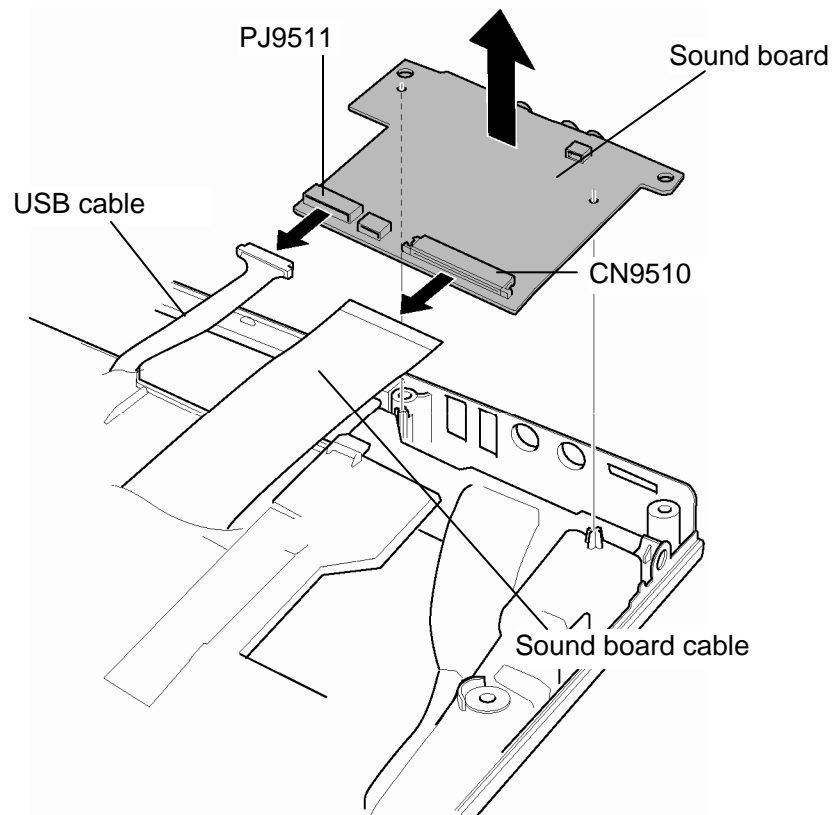
3. Connect the **sound board cable** from the connector **CN9510** on the sound board and the connector **CN9500** on the system board.

4.15 RTC battery

WARNING: *When replacing the RTC battery, be sure to use a genuine battery authorized by Toshiba. Installing the wrong battery could cause a battery explosion or other damage.*

If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.

Check for any of the following signs of damage:

1) Electrolyte leakage

- *Corrosion (greenish color) on the battery connector or cable*
- *Corrosion on the computer's battery connector*
- *White powder on any part of the battery*
- *White powder in the battery tray*
- *Clear liquid on the battery*
- *Clear liquid in the battery tray*
- *Clear liquid on any board near the battery*

2) Damage to the connection cable

3) Damage to the connector housing

If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to Figure 4-27.

1. Disconnect the **RTC battery cable** from the connector **CN9390** on the system board.

2. Open the insulator and remove the **RTC battery**.
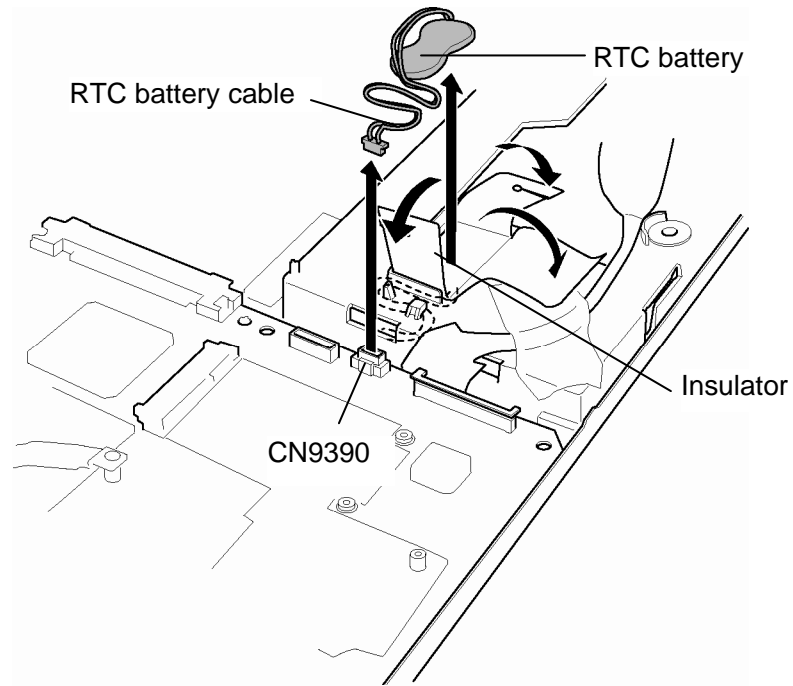
Figure 4-27   Removing the RTC battery

Installing the RTC battery

To install the RTC battery, follow the steps below and refer to Figure 4-27.

1. Set the **RTC battery** in place and wrap it with the **insulator**.

2. Connect the **RTC battery cable** to the connector **CN9390** on the system board.

4.16 Video board

Removing the Video board

To remove the video board, follow the steps below and refer to Figure 4-28 to 4-29.

1. Remove the **video cable holder** while releasing latches. (one latch from the back)

2. Disconnect the **video cable** from the connector **CN9600** on the system board.
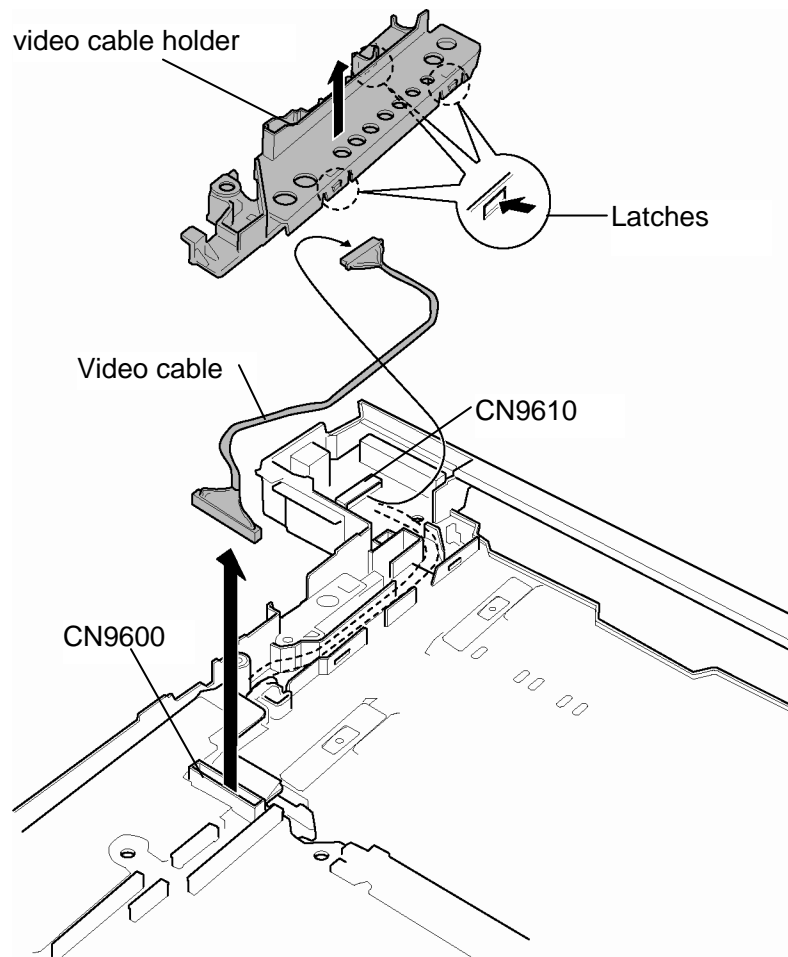
Figure 4-28 Removing the video cable holder

3. Disconnect the **video cable** from the connector **CN9610** on the video board.

4. Remove the **video board** from the slot of the base assembly.
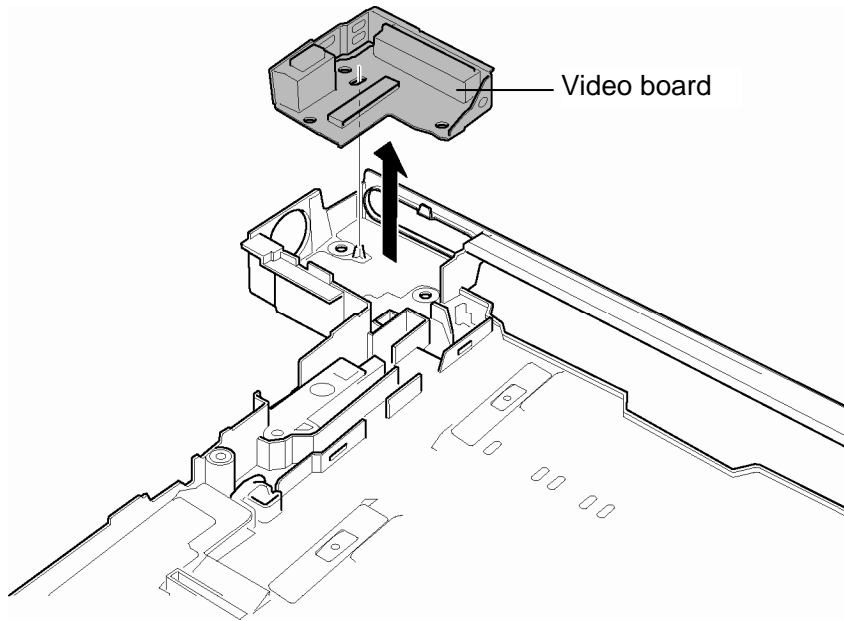
Figure 4-29 Removing the video board

Installing the Video board

To install the video board, follow the steps below and refer to Figure 4-28 to 4-29.

1. Connect the **video cable** to the connector **CN9610** on the video board.

2. Install the **video board** in the slot of the base assembly.

3. Connect the **video cable** to the connector **CN9600** on the system board.

4. Install the **video cable holder** while hooking the latches.

4.17 GPU heat sink

Removing the GPU heat sink

To remove the GPU heat sink, follow the steps below and refer to Figure 4-30.

1. Remove the following **screws** and **GPU holder**.

    •   M2×4S   BIND screw   ×2

2. Remove the **GPU heat sink**.
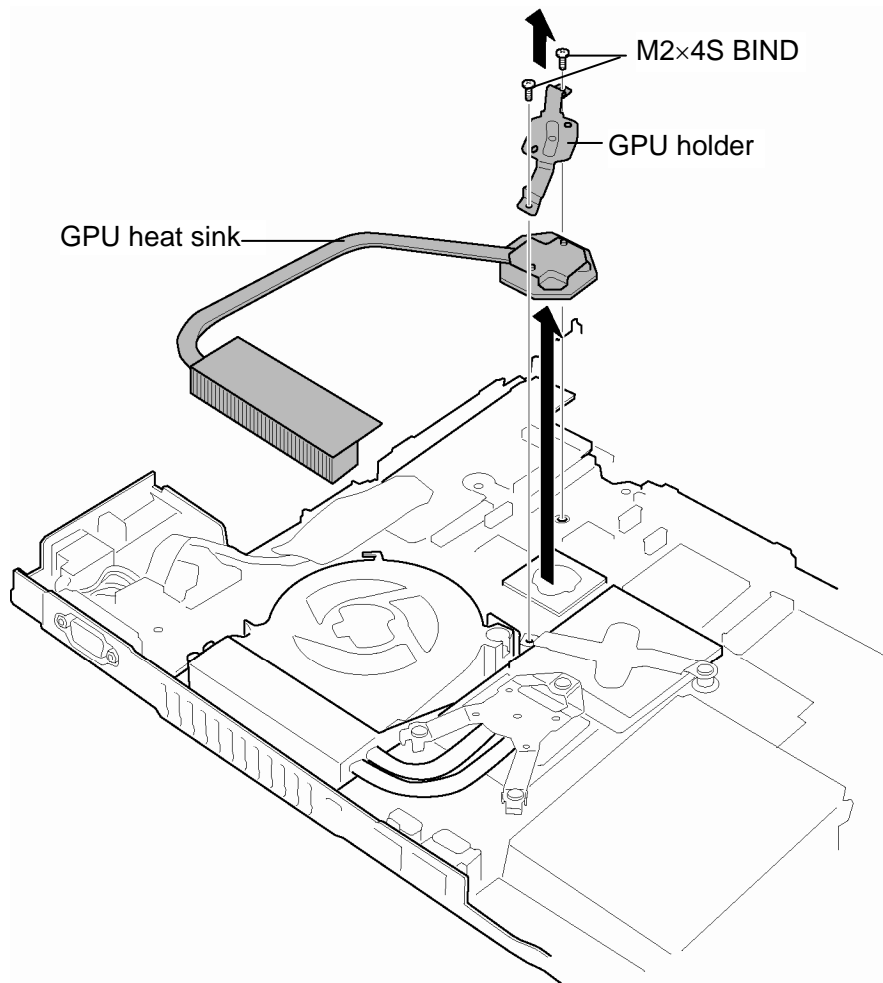
Figure 4-30 Removing the GPU heat sink

Installing the GPU heat sink

To install the GPU heat sink, follow the steps below and refer to Figure 4-30.

1. Install the **GPU heat sink** in place.

2. Set the **GPU holder** on the GPU heat sink and secure it with the following **screws**.

    - M2×4S   BIND screw   ×2

4.18 CPU heat sink/CPU

Removing the CPU heat sink/CPU

To remove the CPU heat sink/CPU, follow the steps below and refer to Figure 4-31 to 4-32.

CAUTION: 1) *The CPU can become very hot during operation. Be sure to let it cool before starting repair work.*
          2) *When you remove the CPU, wipe the grease off of the bottom of the heat sink and top of the CPU. Apply new grease when installing.*

---

1. Remove the following **screws** securing the **CPU holder**, in the reverse order of the number marked on the holder.

   - M2×4S   BIND screw   ×3

CAUTION: *Remove the screws in the order of mark "3", "2" and "1" on the CPU holder.*

---

2. Remove the **CPU holder**.
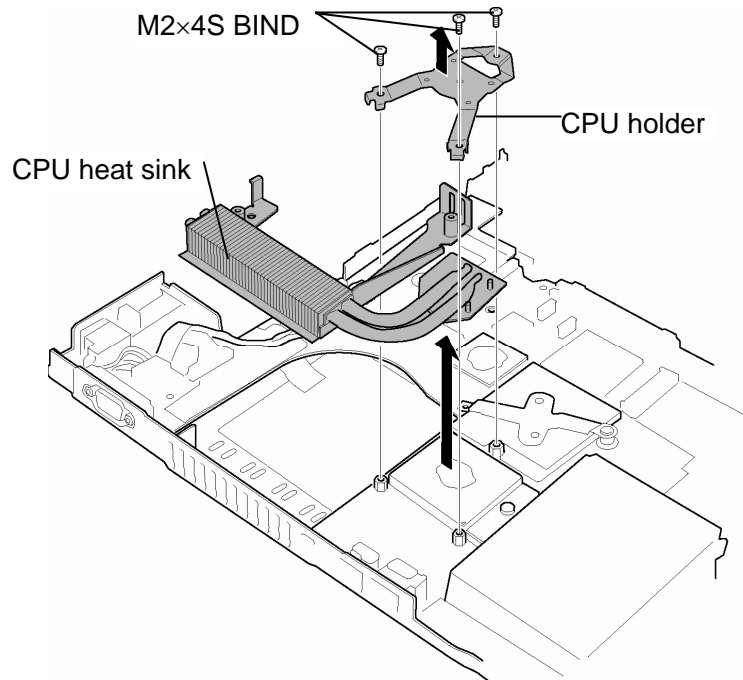
Figure4-31 Removing the CPU holder

---

3. Remove the **CPU heat sink**.

CAUTION: *When removing the heat sink, be careful not to damage the CPU under the fin.*

4. Unlock the **CPU** by turning the **cam** counterclockwise on the CPU socket by 90 degrees with a flat-blade screwdriver.
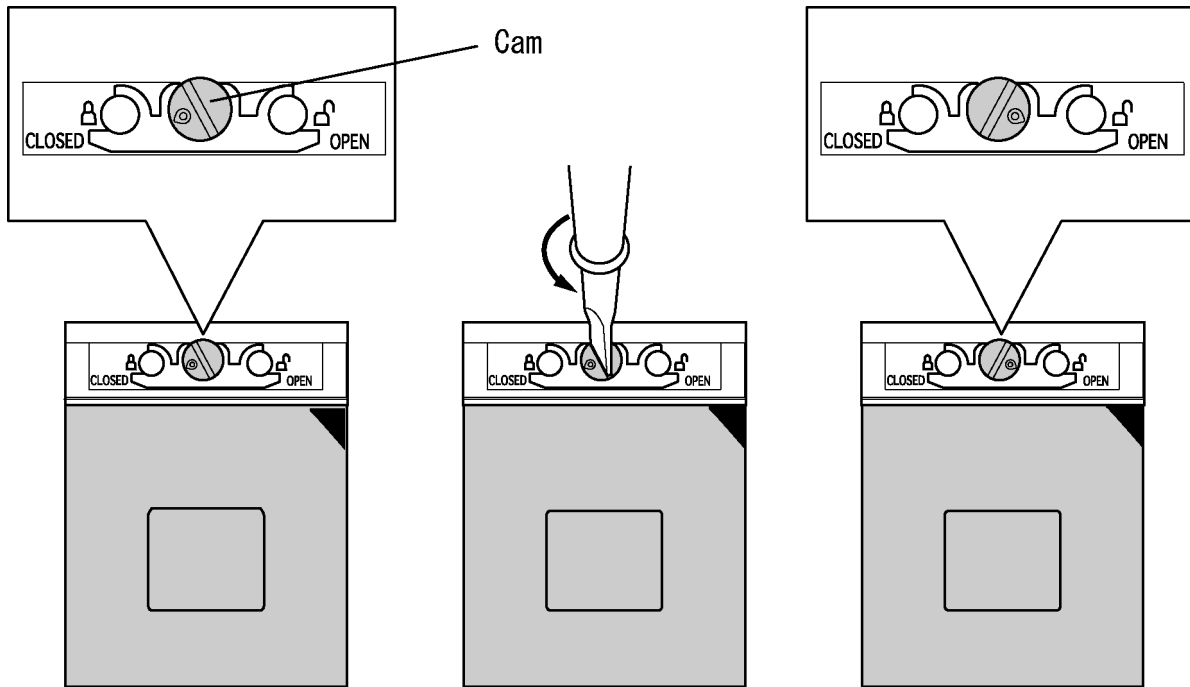
Figure 4-32 Unlocking the CPU

5. Remove the **CPU**.

CAUTION: *When removing the CPU, lift it up right above. Otherwise, pins of CPU may be damaged.*

Installing the CPU heat sink/CPU

To install the CPU heat sink/CPU, follow the steps below and refer to Figure 4-31 to 4-34.

1. Make sure the **cam** is in the open position.

2. Seat the **CPU** in the CPU socket. Make sure the direction and position of CPU is correct to avoid damaging pins on the CPU.

CAUTION: *Place the CPU in such direction as shown below. (Pay attention to the position of the triangle mark on the CPU.)*

---

3. Fix the **CPU** by turning the **cam** on the CPU socket by 90 degrees clockwise with a flat-blade screwdriver (in the order shown in the figure below).
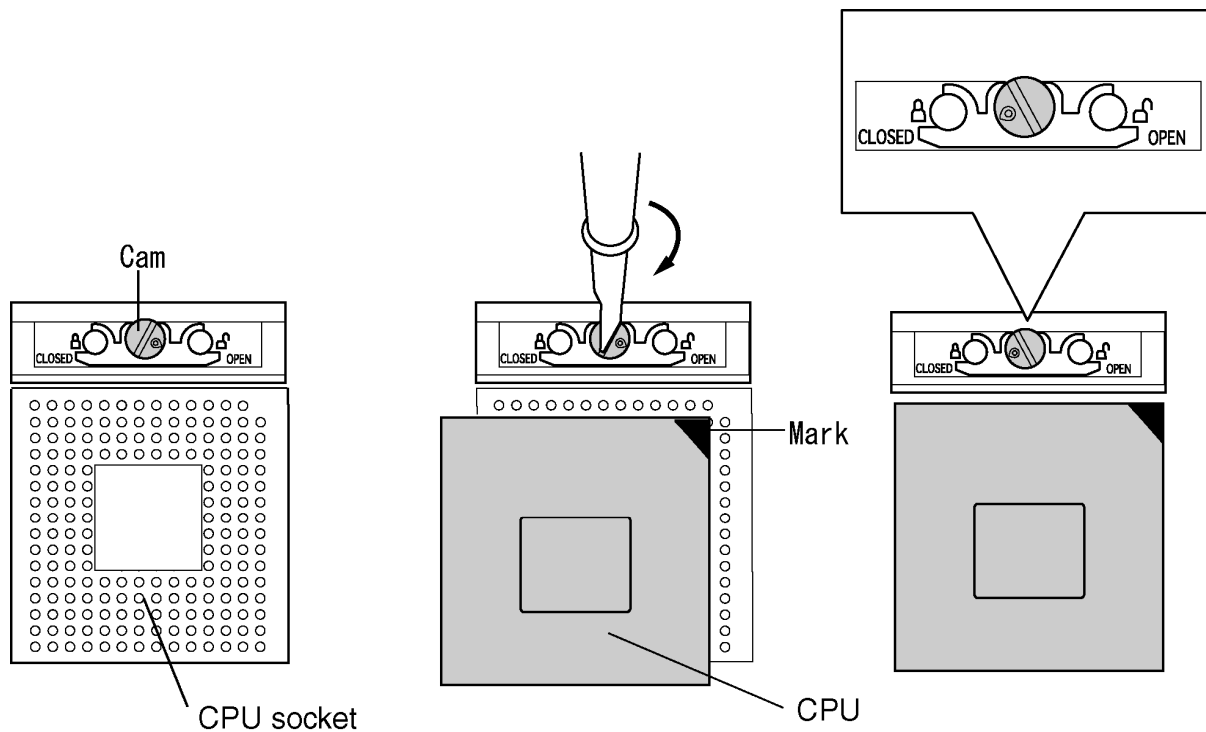
Figure 4-33   Installing the CPU

4. Apply new **grease** on the CPU using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip. When silicon grease is already applied to the CPU, wipe them off with a close in advance.

> *CAUTION:* *When installing the CPU, apply new grease on the top of the CPU chip. When installing the fin, make sure the bottom of the fin covers the top of the CPU.*
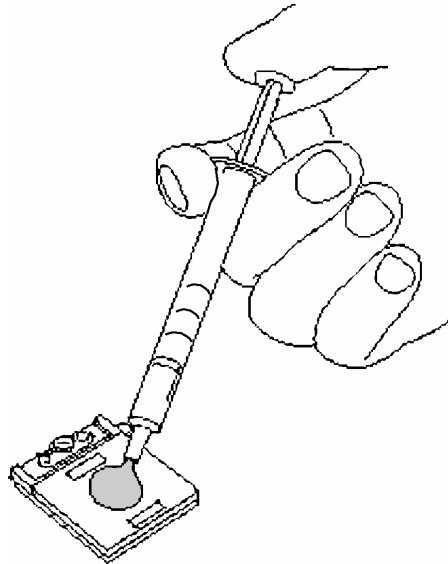
Figure 4-34   Applying new grease

5. Install the **CPU heat sink**.

6. Place the **CPU holder** and secure it with the following **screws** in the order of the number marked on the holder.

   - M2×4S   BIND screw   ×3

> *CAUTION:* *Tighten the screws in the order of mark "1", "2" and "3" on the CPU holder.*

4.19 Fan

Removing the Fan

To remove the fan, follow the steps below and refer to Figure 4-35.

1. Remove the following **screws** securing the fan.

   - M2.5×4B   FLAT HEAD screw   ×2

2. Peel off the **glass tape** and disconnect the **fan cable** from the connector **CN8771** on the system board.

3. Remove the **fan** from the slot.
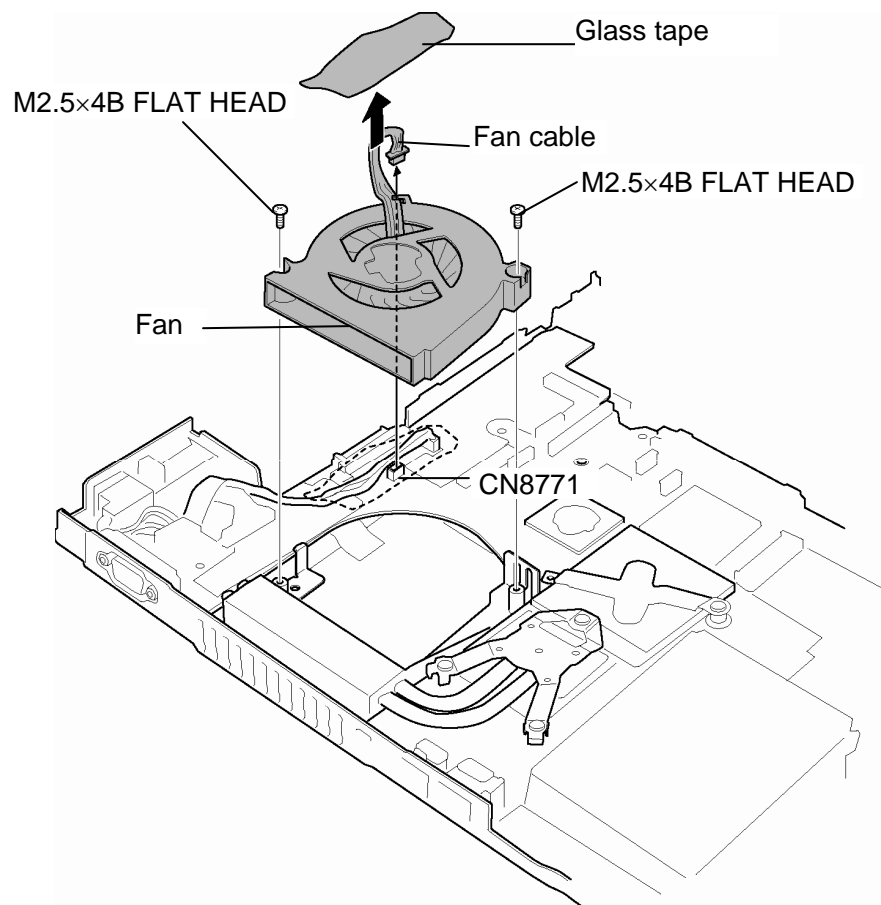
Figure4-35   Removing the fan

Installing the Fan

To install the fan, follow the steps below and refer to Figure 4-35.

1. Install the **fan** to the slot.

2. Connect the **fan cable** to the connector **CN8771** on the system board.

3. Secure the fan cable with the **glass tape**.

4. Secure the fan with the following **screws**.

   - M2.5×4B   FLAT HEAD screw   ×2

4.20 System board/HDD cable/DC-IN jack

Removing the System board/HDD cable/DC-IN jack

To remove the system board/HDD cable/DC-IN jack, follow the steps below and refer to Figure 4-36 to 4-39.

1. Remove the **HDD cable holder A** from the slot of the base assembly.

2. Remove **HDD cable** from the **HDD cable holder B**.

3. Peel off the **glass tape**.
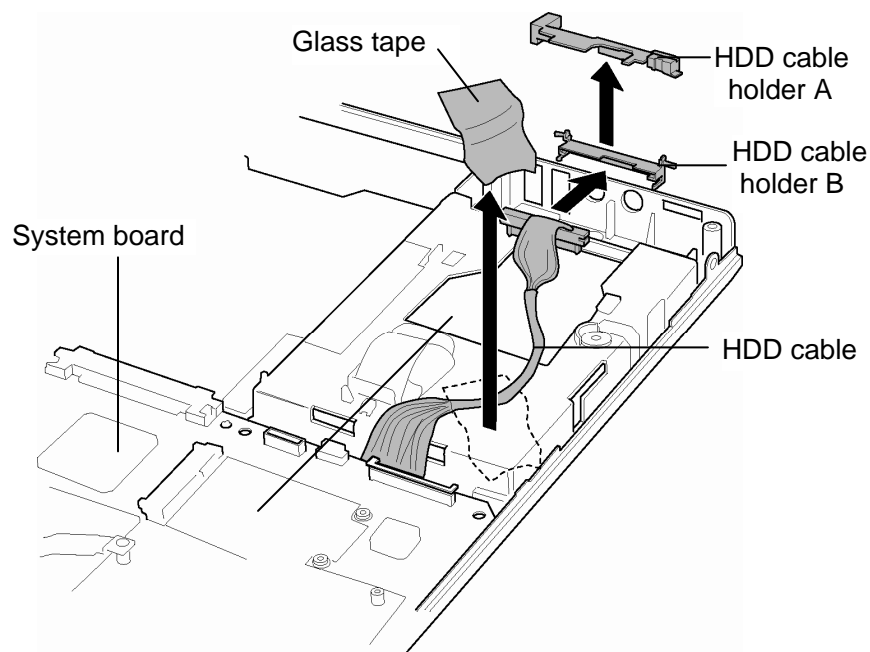
Figure 4-36 Removing the system board/HDD cable/DC-IN jack (1)

4. Disconnect the **LAN cable** and **modem cable** from the connectors **CN4100** and **CN3011** on the system board.
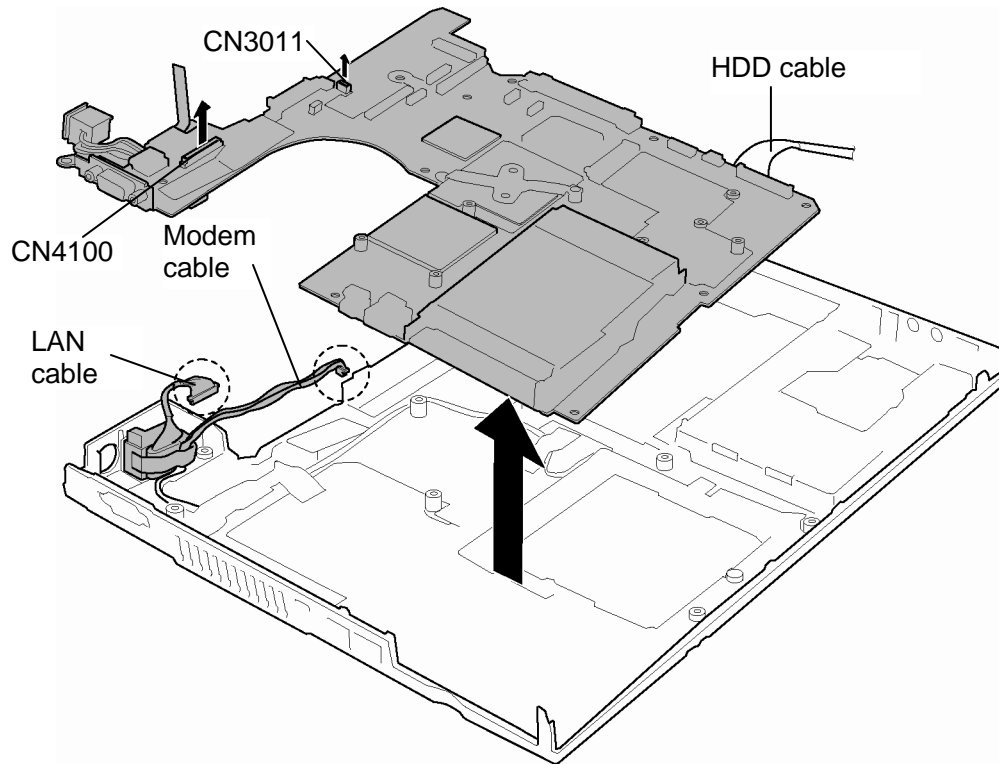
Figure 4-37 Removing the system board/HDD cable/DC-IN jack (2)

5. Lift up the **system board** (with **DC-IN jack** and **HDD cable**).

6. Peel off the **Insulator** and disconnect the **HDD cable** from the connector **CN1850** on the back of the system board.
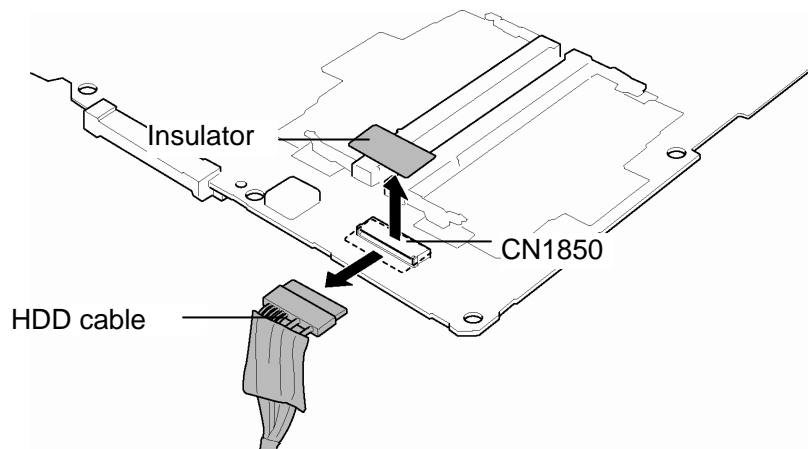
Figure 4-38 Removing the system board/HDD cable/DC-IN jack (3)

7. Disconnect the **DC-IN jack cable** from the connector **CN8800** on the system board and remove the DC-IN jack from the slot.
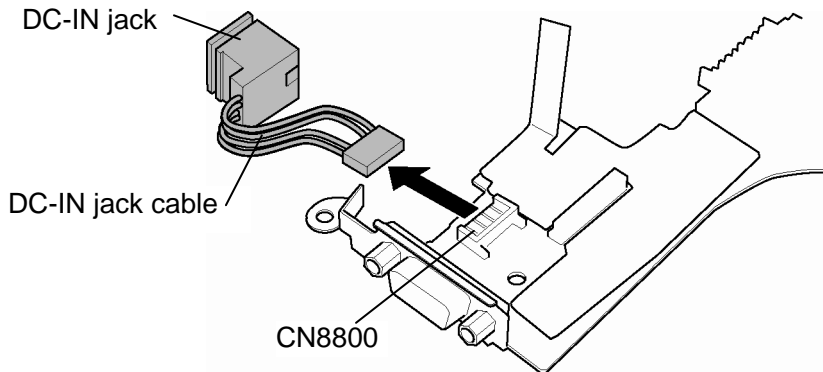
Figure 4-39 Removing the system board/HDD cable/DC-IN jack (4)

Installing the System board/HDD cable/DC-IN jack

To install the system board/HDD cable/DC-IN jack, follow the steps below and refer to Figure 4-36 to 4-39.

1. Connect the **DC-IN jack cable** to the connector **CN8800** on the system board.

2. Connect the **HDD cable** to the connector **CN1850** on the back of the system board and stick the **insulator** on the connector.

3. Install the **system board** to the base assembly.

4. Install the **DC-IN jack** to slot of the base assembly.

5. Connect the **LAN cable** and **modem cable** to the connectors **CN4100** and **CN3011** on the system board.

6. Place the **HDD cable** and stick the **glass tape** in place.

7. Set the **HDD cable** to the **HDD cable holder B**.

8. Install the **HDD cable holder B** (with the HDD cable) on the slot of the base assembly.

9. Install the **HDD cable holder A** on the slot of the base assembly.

4.21 LAN/Modem jack

Removing the LAN/Modem jack

To remove the LAN/Modem jack, follow the steps below and refer to Figure 4-40.

1. Peel the **insulators** and **acetate tapes**.

2. Take out the **modem cable** and remove the **LAN/Modem jack** from the slot.
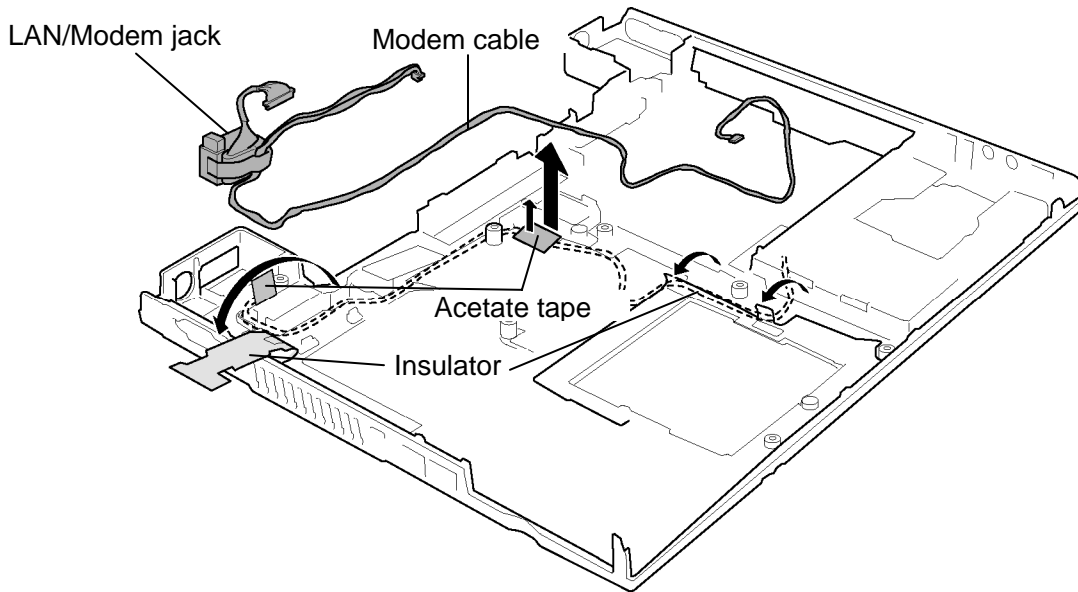
Figure 4-40 Removing the LAN/Modem jack

Installing the LAN/Modem jack

To install the LAN/Modem jack, follow the steps below and refer to Figure 4-40.

1. Arrange the Modem cable along the guides.

2. Install the **LAN/Modem jack** in the slot of the base assembly.

3. Stick the **insulators** and **acetate tapes**.

4.22 PC card slot

Removing the PC card slot

To remove the PC card slot, follow the steps below and refer to Figure 4-41.

1. Turn up the insulator on the back.

2. Remove the following **screws** and **PC card slot**.

   - M2×3S   S-THIN HEAD screw   ×2
   - M2×8S   S-THIN HEAD screw   ×2
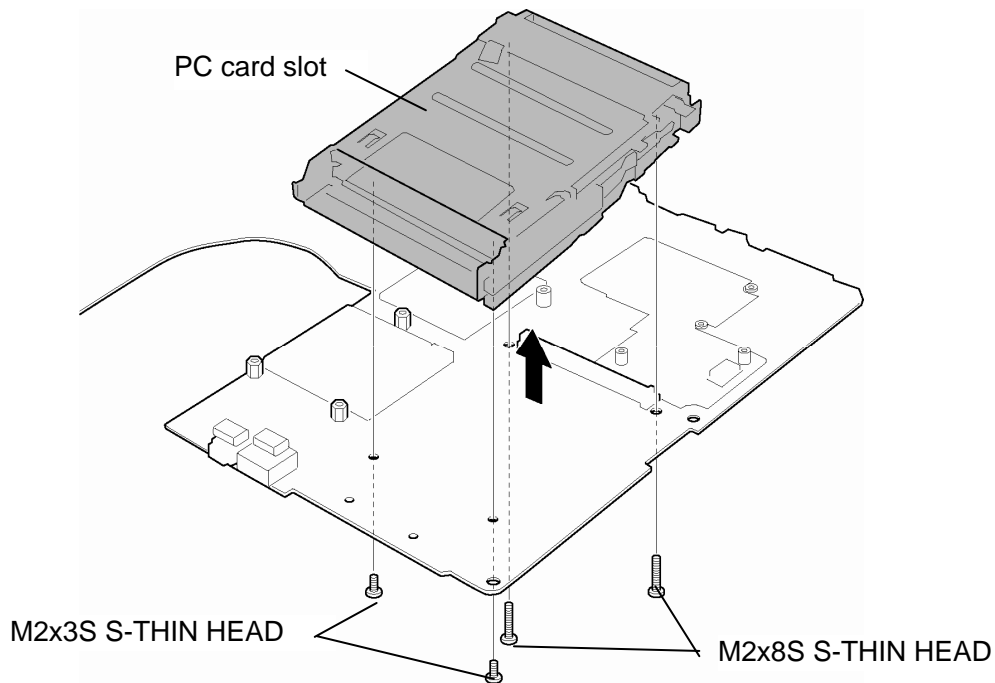
Figure 4-41 Removing the PC card slot

Installing the PC card slot

To install the PC card slot, follow the steps below and refer to Figure 4-41.

1. Turn up the insulator on the back. .

2. Install the **PC card slot** and secure it with the following **screws**.

   - M2×3S   S-THIN HEAD screw   ×2
   - M2×8S   S-THIN HEAD screw   ×2

4.23 Battery lock/Battery latch/ODD latch

Removing the Battery lock/Battery latch/ODD latch

To remove the battery lock/battery latch/ODD latch, follow the steps below and refer to Figure 4-42.

1. Remove the **battery lock cap** from the bottom of the computer while unlatching.

2. Remove the **battery lock** from the base assembly.
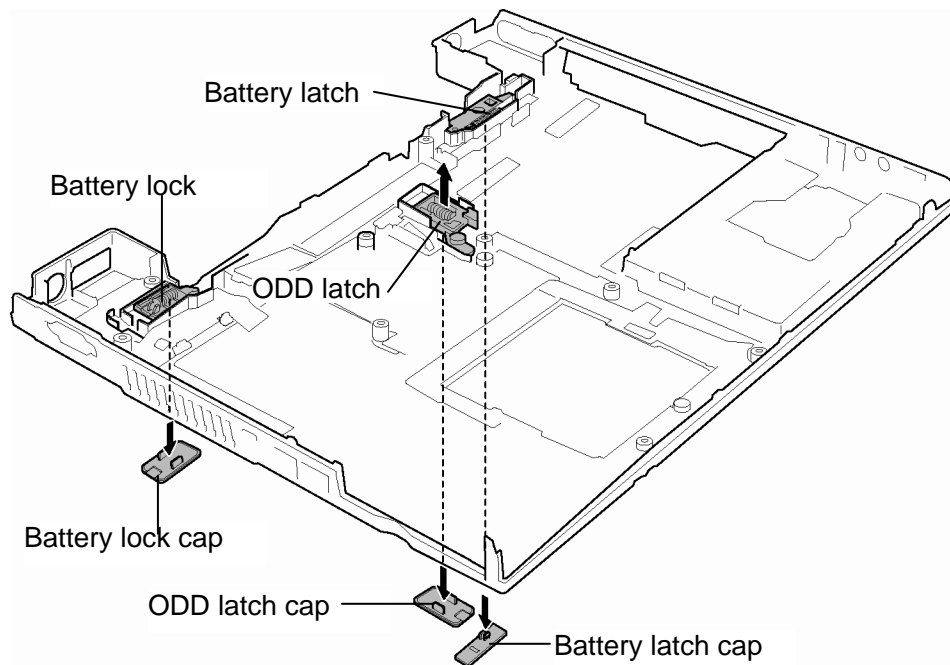
Figure 4-42 Removing the battery lock

3. Remove the **battery latch cap** from the bottom of the computer while unlatching.

4. Remove the **battery latch** from the base assembly.

5. Remove the **ODD latch cap** from the bottom of the computer while unlatching.

6. Remove the **ODD latch** from the base assembly..

> *CAUTION: When removing the battery lock, battery latch and ODD latch, do not miss the springs.*

Installing the Battery lock/Battery latch/ODD latch

To install the battery lock/battery latch/ODD latch, follow the steps below and refer to Figure 4-42.

1. Set the **spring** to the **ODD latch** and install them to the base assembly.

2. Push the **ODD latch cap** into the **ODD latch** from the bottom of the computer.

3. Set the **spring** to the **battery latch** and install them to the base assembly.

4. Push the **battery latch cap** into **battery latch** from the bottom of the computer.

5. Set the spring to the **battery lock** and install them to the base assembly.

6. Push the **battery lock cap** into **battery lock** from the bottom of the computer.

4.24 LCD unit/FL inverter

Removing the LCD unit/FL inverter

To remove the LCD unit/FL inverter, follow the steps below and refer to Figure 4-43 to 4-46.

1. Remove the **keyboard holder**. (Refer to Figure 4-12 on page 4-22.)

2. Remove the **mask seals** (2 points), **mask rubbers** (2 points) and following **screws** securing the LCD mask.

   - M2.5×6B   FLAT HEAD screw   ×2
   - M2×4B   S- THIN HEAD screw   ×2
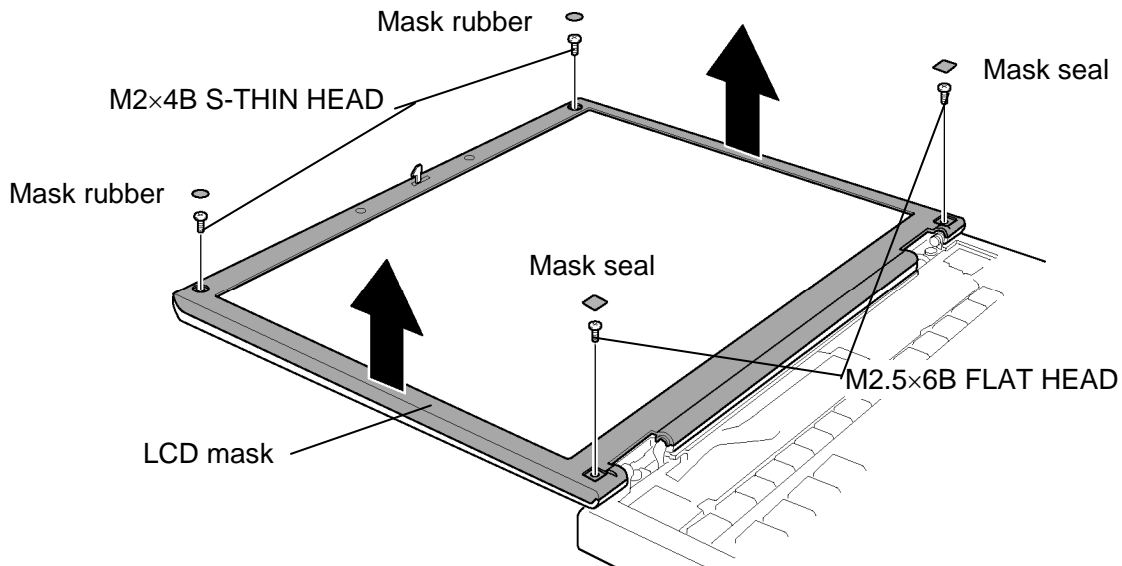
Figure 4-43   Removing the mask seal, mask lubber and screw

3. Remove the **LCD mask** (stuck with a double-sided tape) while releasing the latches.

4. Peel the insulator on the connector of HV cable and disconnect the **FL cable** and **HV cable** from the FL inverter.

5. Remove the **FL inverter** while peeling off the double-sided tape.
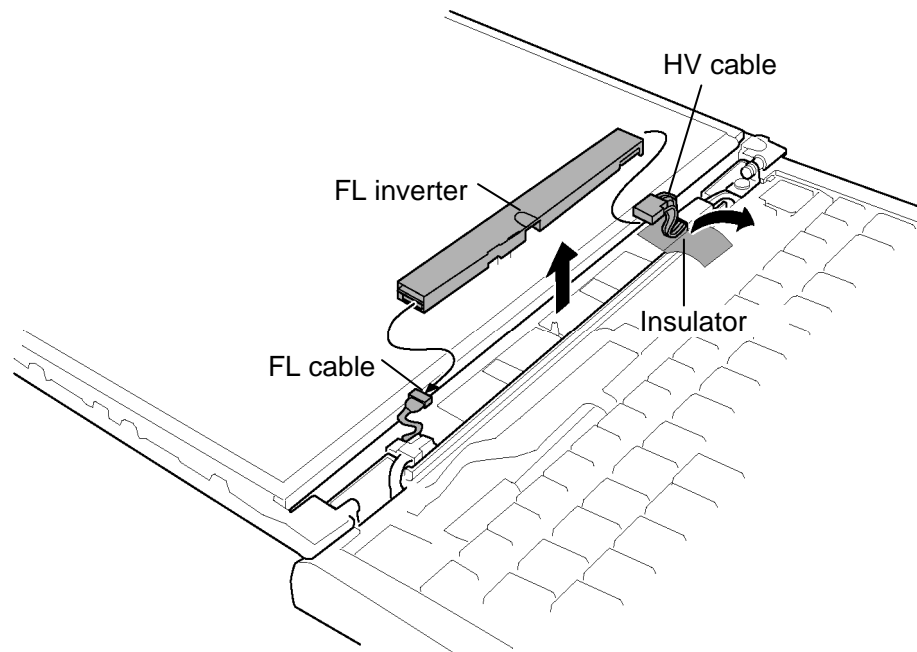
Figure 4-44   Removing the FL inverter

6. Carefully lift up the top of the **LCD unit** to access the LCD cable.

NOTE: *When lifting up the top of the LCD unit, hold the corners of the LCD unit. The*
top edge of LCD unit is sensitive area.

7. Remove the **glass tape** securing the LCD cable.

8. Disconnect the **LCD cable** and remove the **LCD unit**.

CAUTION: When removing the LCD cable, be careful not to damage the connector.
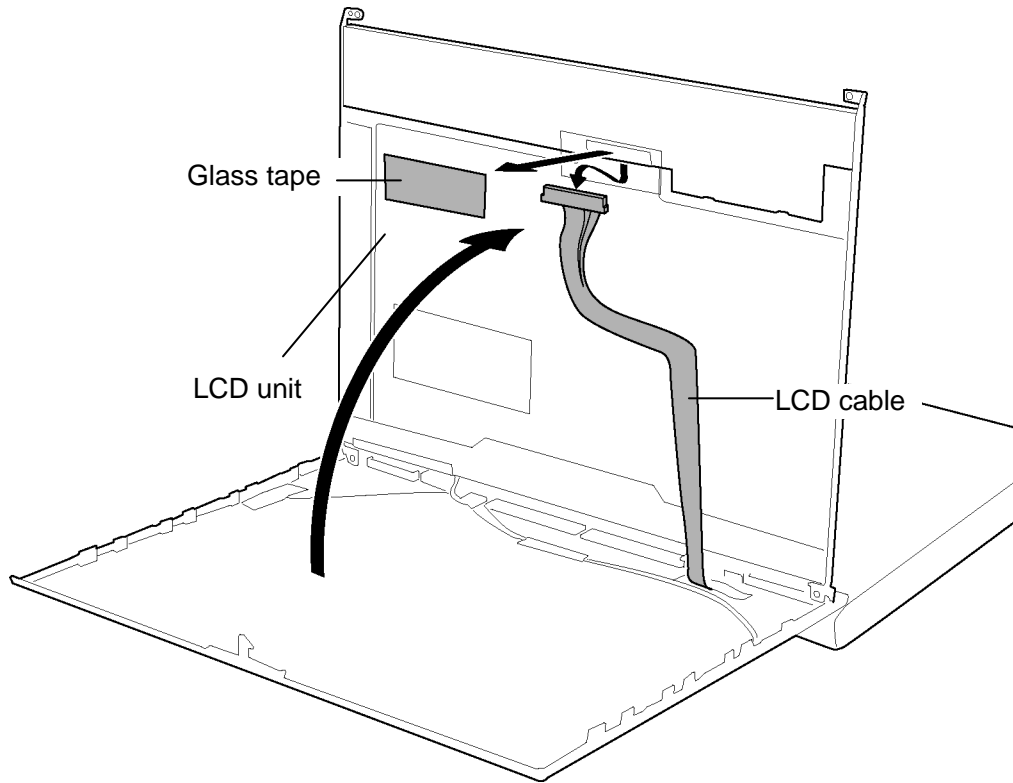
Figure 4-45   Removing the LCD unit

9. Remove the following **screws** and two **LCD supports** from the LCD.

- M2×3S   S-THIN HEAD screw   ×4
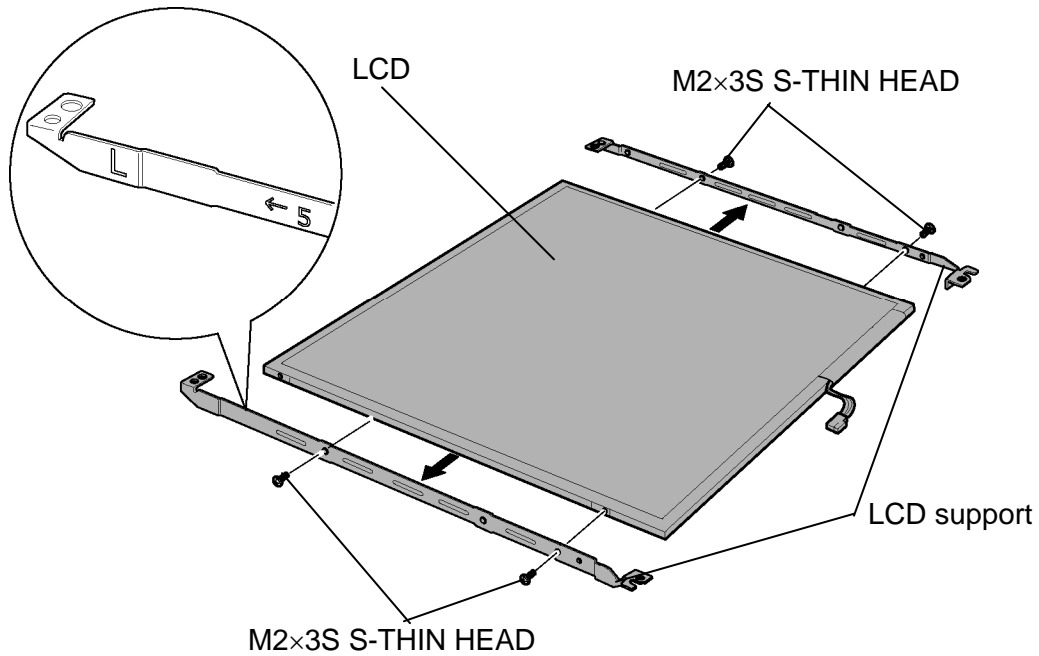
Figure 4-46   Removing the LCD support

NOTE: *1) Be careful not to apply pressure to the ICs along the edge of LCD unit. The ICs are easily damaged.*

        2) For environmental reasons, do not throw away a malfunctioning LCD unit (or FL). Please follow local ordinances or regulations for its disposal.

Installing the LCD unit / FL inverter

To install the LCD unit / FL inverter, follow the steps below and refer to Figure 4-43 to 4-46.

1. Set two **LCD supports** to the LCD and secure them with the following **screws**.

   - M2×3S   S-THIN HEAD screw   ×4

CAUTION: When installing the LCD support, do not mistake the left for the right and vice versa. "L" for the left, "R" for the right and "UP" for the up of the bracket are marked on the bracket.

2. Stand the LCD unit on the display cover and connect the **LCD cable** to the connector on the back of the LCD unit. Stick the **glass tape** on the LCD connector.

3. Install the **LCD unit** to the display cover.

4. Connect the **FL cable** and the **HV cable** to the FL inverter.

5. Install the **FL inverter** in place while sticking to the double-sided tape.

6. Stick the **insulator** on the connector of HV cable.

7. Install the **LCD mask** (with double-sided tape) while hooking the latches.

8. Secure the LCD mask with the following **screws**.

   - M2.5×6B   FLAT HEAD screw   ×2
   - M2×4B   S-THIN HEAD screw   ×2

9. Stick the **mask seals** (2 points) and **mask rubbers** (2 points).

4.25 Touch pad

Removing the Touch pad

To removing the touch pad, follow the steps below and refer to Figure 4-47.

1. Remove the following **screws** securing the touch pad assembly from the back.

    *   M2.5×4B   FLAT HEAD screw   ×2

2. Remove the **touch pad cover** while releasing the latches.

3. Remove the **touch pad assembly** from the slot.
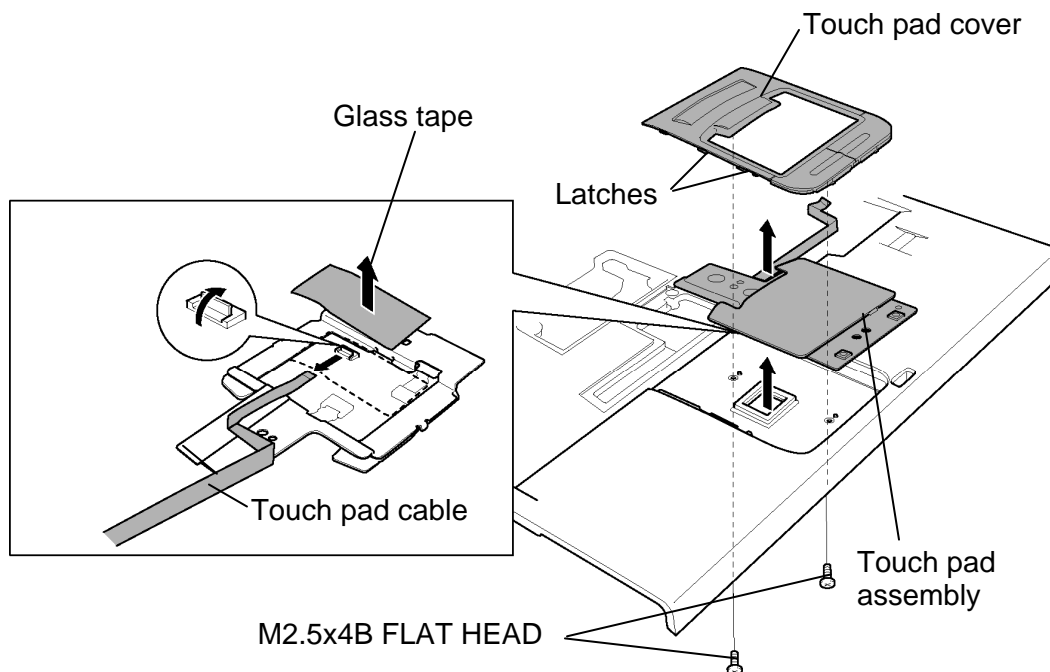
Figure 4-47   Removing the touch pad assembly

4. Turn the touch pad face down and peel off the **glass tape** on the connector of touch pad cable.

5. Disconnect the **touch pad cable** from the connector on the touch pad.

Installing the Touch pad

To install the touch pad, follow the steps below and refer to Figure 4-47.

1. Connect the **touch pad cable** to the connector on the touch pad and stick the **glass tape**.

2. Install the **touch pad assembly** to the slot.

3. Install **touch pad cover** while engaging the latches.

4. Secure the touch pad assembly with the following **screws**.

   - M2.5×4B   FLAT HEAD screw   ×2

4.26 Finger print sensor board

Removing the Finger print sensor board

To remove the finger print sensor board, follow the steps below and refer to Figure 4-48.

1. Remove the **speaker cable** from the guides.

2. Peel off the **glass tape** on the finger print sensor cable**.**

3. Lift up the tip of **bracket** while releasing the latch and remove it.

4. Lift up the tip of **finger print sensor board** while releasing the latch and slide it to remove.

5. Disconnect the **finger print sensor cable** from the connector on the finger print sensor board.
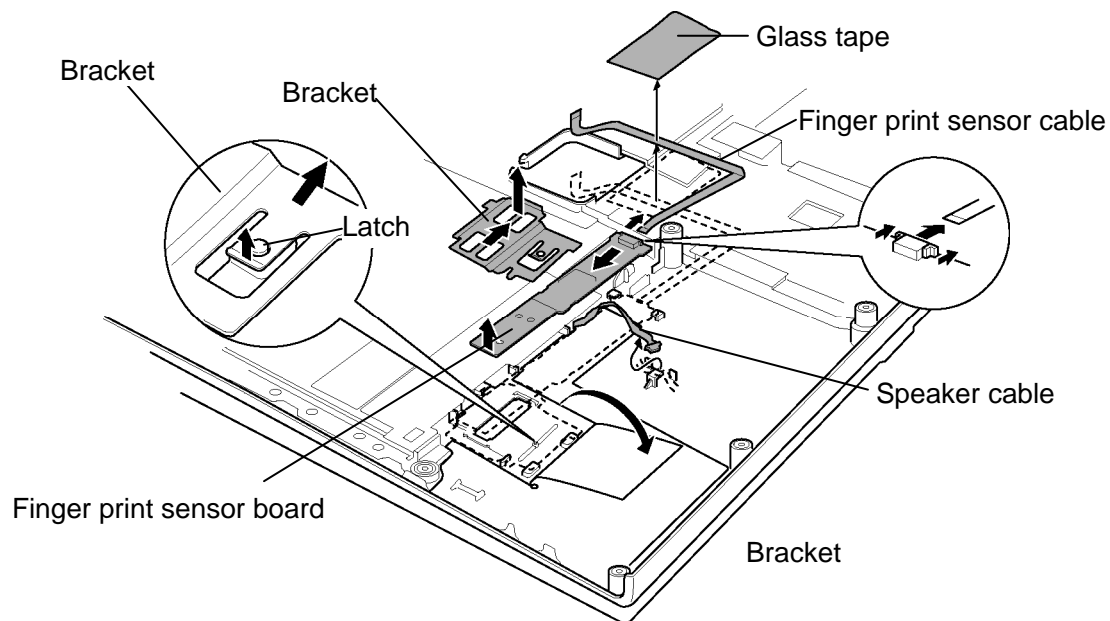
Figure 4-48   Removing the finger print sensor board

Installing the Finger print sensor board

To install the finger print sensor board, follow the steps below and refer to Figure 4-48.

1. Connect the **finger print sensor cable** to the connector on the finger print sensor board.

2. Place the **finger print sensor board** in place while inserting the connecter side into the guide.

3. Place the **bracket** while sliding it into the guide.

4. Stick the **glass tape** on the finger print sensor cable**.**

5. Pass the **speaker cable** through the guides.

4.27 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-49.

CAUTION: *Do not try to remove the Bluetooth module with the computer turned on.*
You can damage the computer or Bluetooth module. Do not touch the
connectors on the Bluetooth module on the computer. Debris on the
connectors may cause Bluetooth access problems.

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1. Disconnect the **Bluetooth antenna cable** from the Bluetooth module using an antenna coaxial cable disconnector.

2. Remove the **Bluetooth module** from the slot.

3. Disconnect the **Bluetooth cable** from the connector on the Bluetooth module.
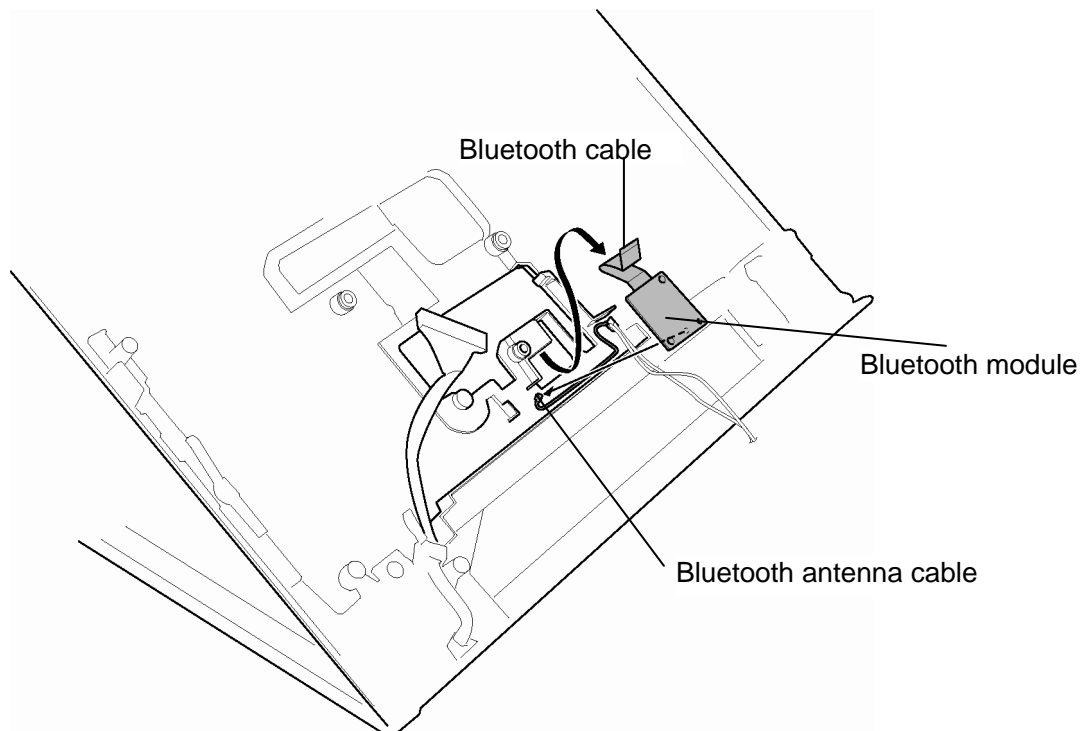
Figure4-49   Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below and refer to Figure 4-49.

1. Connect the **Bluetooth cable** to the connector on the Bluetooth module.

2. Install the **Bluetooth module** to the slot.

3. Connect the **Bluetooth antenna cable** to the Bluetooth module.

4.28 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to Figure 4-50-a to 4-53.

1. Remove the **LCD cable holder A** while releasing the latch.
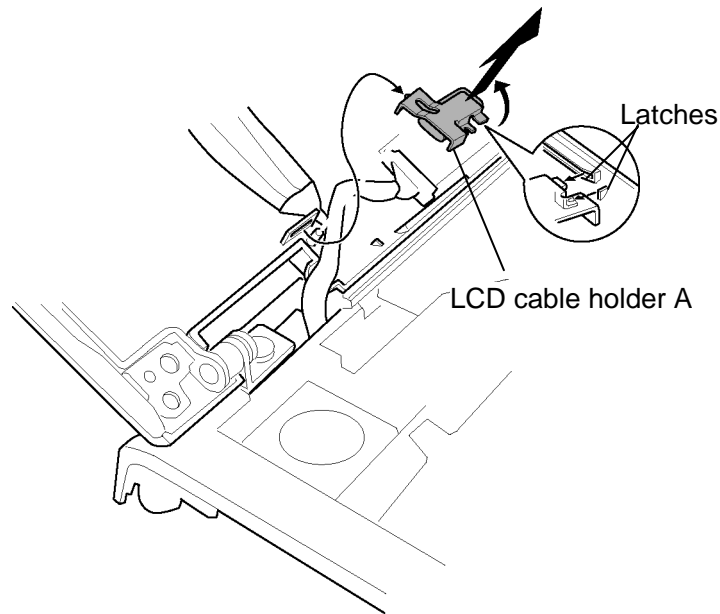
Figure 4-50-a Removing the LCD cable holder

2. Remove the following **screws**.

   - M2.5x3B   S-THIN HEAD screw   ×2

   - M2.5x4B   FLAT HEAD screw   × 2

3. Remove the **hinge** from the top cover.
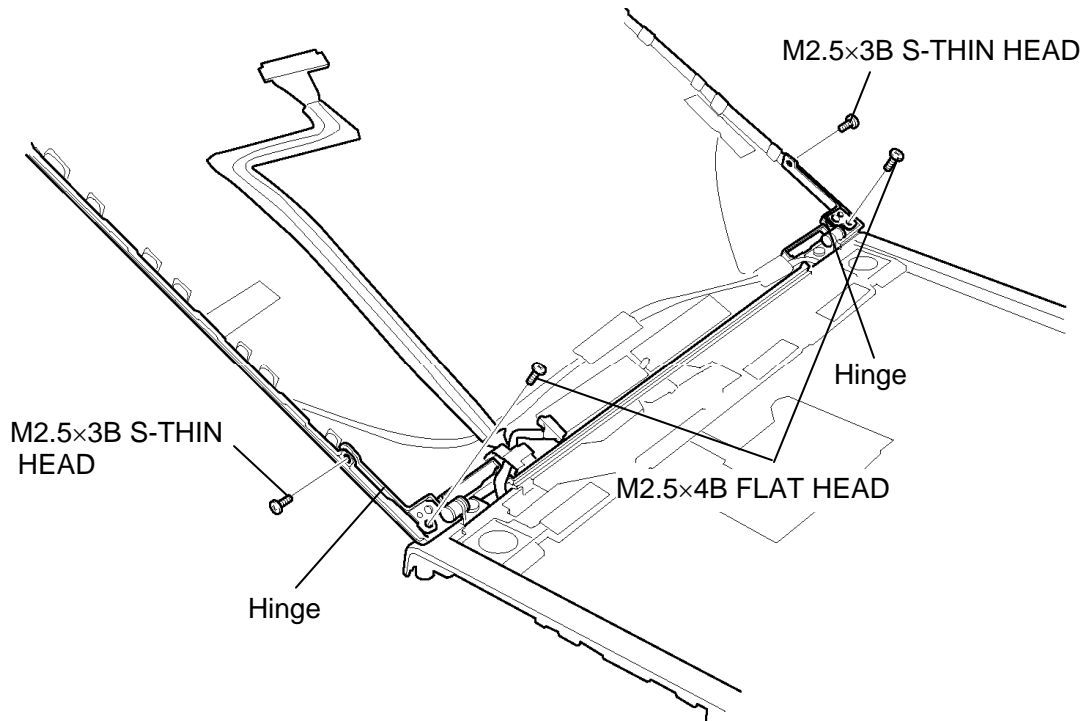
Figure 4-50-b   Removing the hinge from top cover

4. Peel of the **insulator** on the middle frame.

5. Remove the **wireless LAN and Bluetooth cables** from the **guides** of the hinge on the back.

6. Pull out the **wireless LAN** and **Bluetooth cables** from the hole.
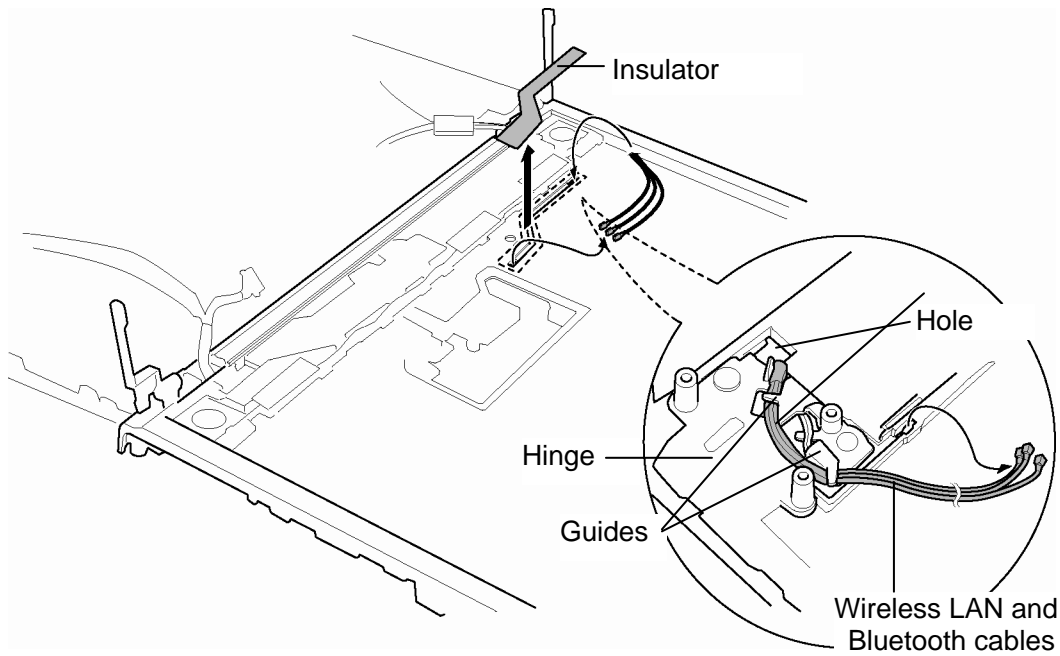
Figure 4-51   Removing the LCD cable

7. Remove the **LCD cable holder B** while releasing the latch.

8. Remove the following **screw** and **earth plate**.

   - M2×4B   S-THIN HEAD screw   ×1

9. Remove the following **screw** securing the hinge (left).

   - M2.5×4S   Tapping screw   ×1

10. Remove the **hinge** (left) while sliding and turning it.

11. Pull out the **LCD cable** from the hole.
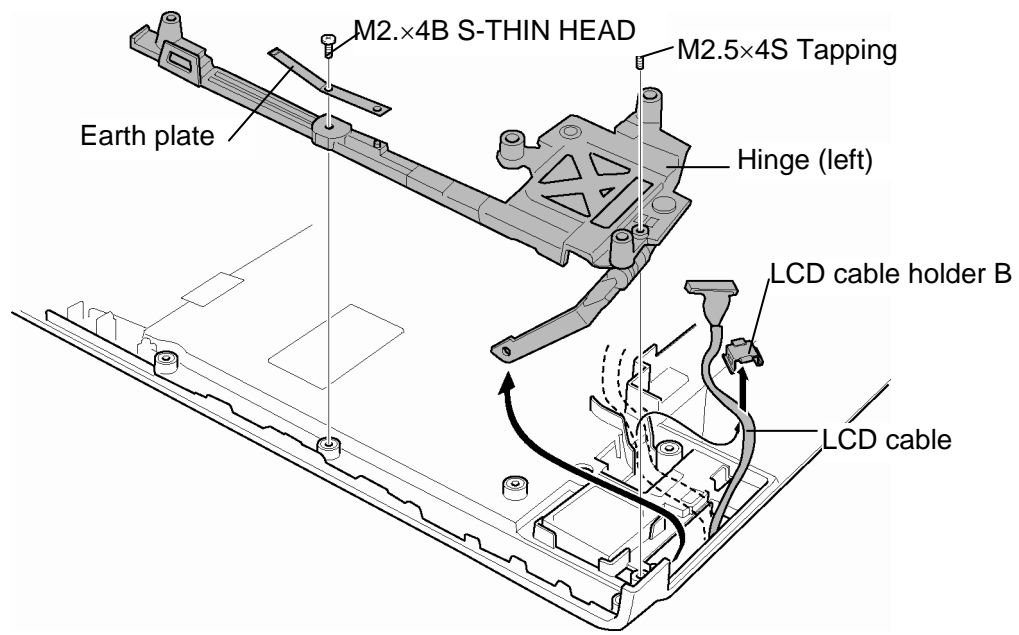
Figure 4-52 Removing the hinge

12. Peel off the **insulator** and remove the following **screw** securing the hinge (right).

   • M2.5×4S   Tapping screw   ×1
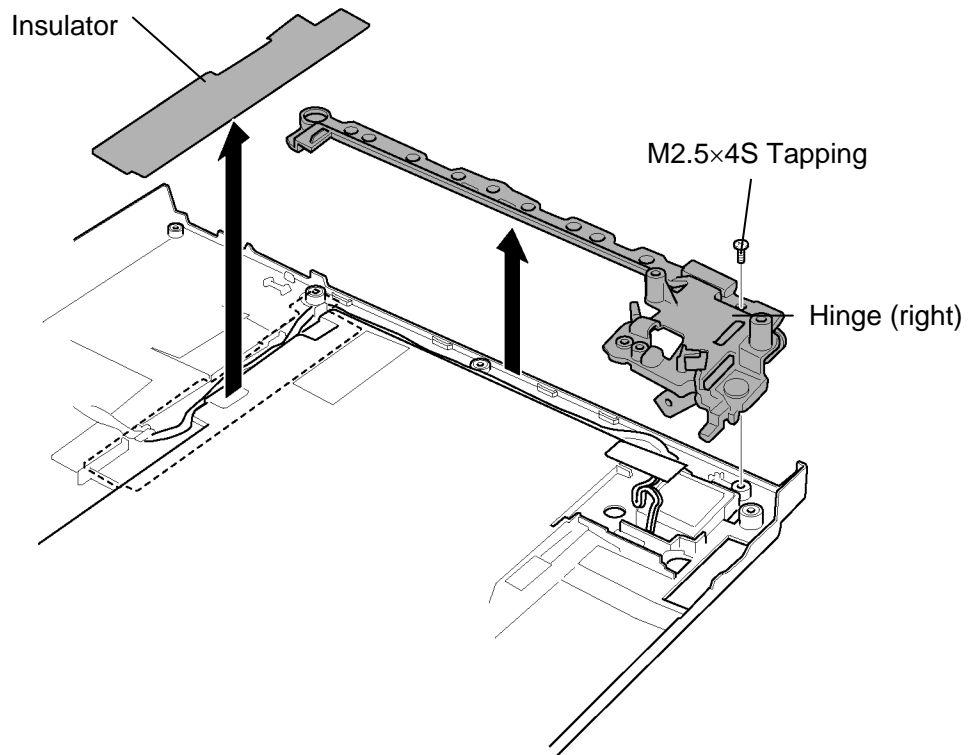
Figure 4-53 Removing the hinge

Installing the Hinge

To install the hinge, follow the steps below and refer to Figure 4-50-a to 4-53.

1. Install the **hinge** (right) and secure it with the following **screw**.

   • M2.5×4S   Tapping screw   ×1

2. Stick the **insulator** in place.

3. Pass the **LCD cable** through the hole and seat it in place.

4. Install the **hinge** (left) and secure it with the following **screw**.

    - M2.5×4S   Tapping screw   ×1

5. Install the **earth plate** and secure it with the following **screw**.

    - M2×4B   S-THIN HEAD screw   ×1

6. Install the **LCD cable holder B** while engaging the latches.

7. Pass the **wireless LAN** and **Bluetooth cables** along the **guides** on the hinge.

8. Pass the wireless LAN and Bluetooth cables through the hole.

9. Stick the **insulator**.

10. Set the **hinge** on the top cover and secure with following **screws**.

    - M2.5x3B   S-THIN HEAD screw   ×2

    - M2.5x4B   FLAT HEAD screw   ×2

11. Install **LCD cable holder A** while setting the latch.

4.29 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-54.

1. Take out the **speaker cable** and right **speaker** from the slot. (The speaker cable is stuck to the base at one point with a **double-sided tape**)

2. Peel off three insulators and remove the left **speaker** from the slot.
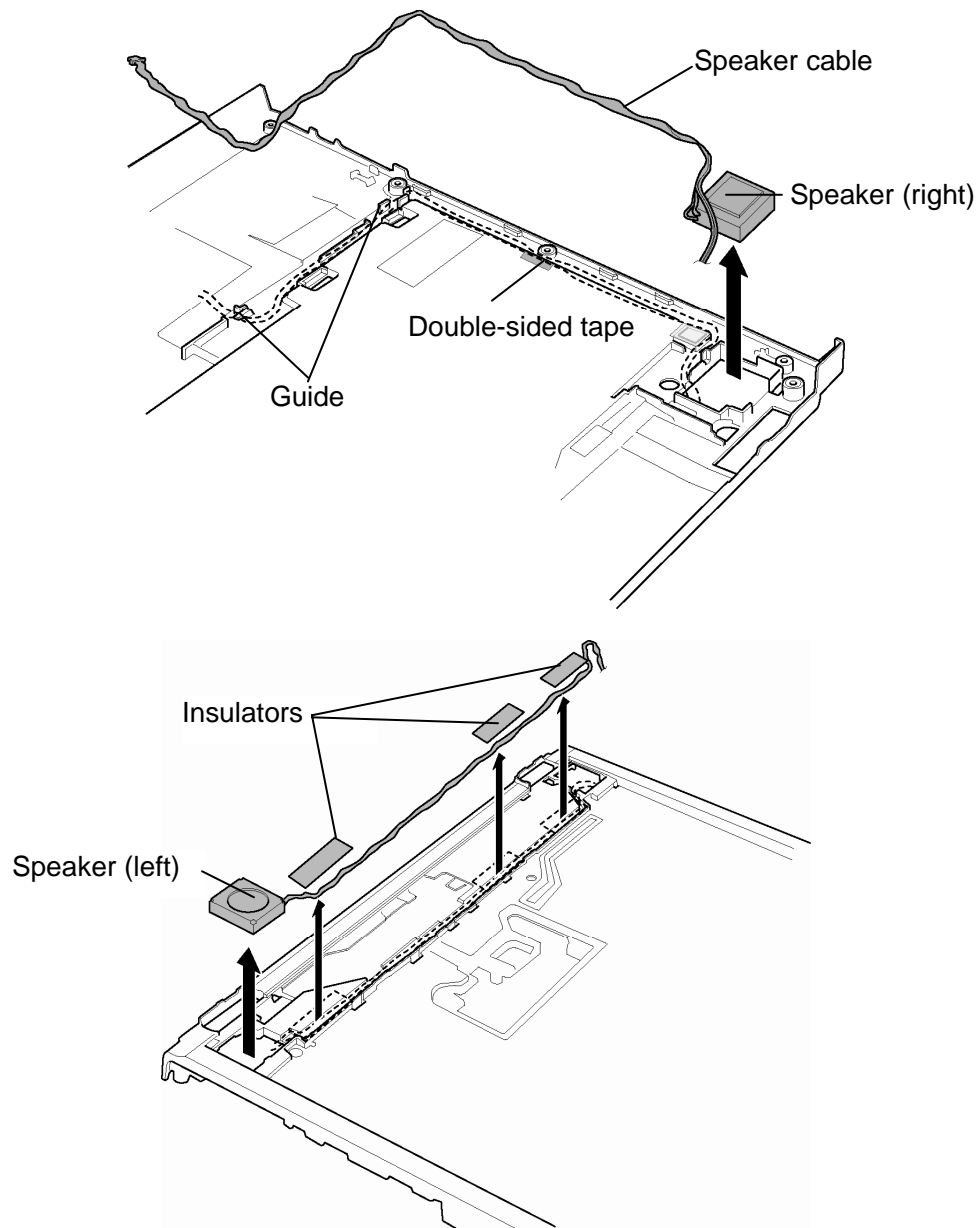
Figure 4-54 Removing the speakers

Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-54.

1. Install the left **speaker** into the slots and pass the **speaker cables** along the **guides**.

2. Install the right **speaker** and pass the **speaker cable** in place.

3. Stick three **insulators**.

4.30 Wireless LAN antenna/Bluetooth antenna

Removing the Wireless LAN antenna/Bluetooth antenna

To remove the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-55.

1. Remove the nine **acetate tapes** securing the wireless LAN antenna cables and Bluetooth antenna cable.

2. Remove the **wireless LAN antennas** and **Bluetooth antenna** from the slot of the display assembly.
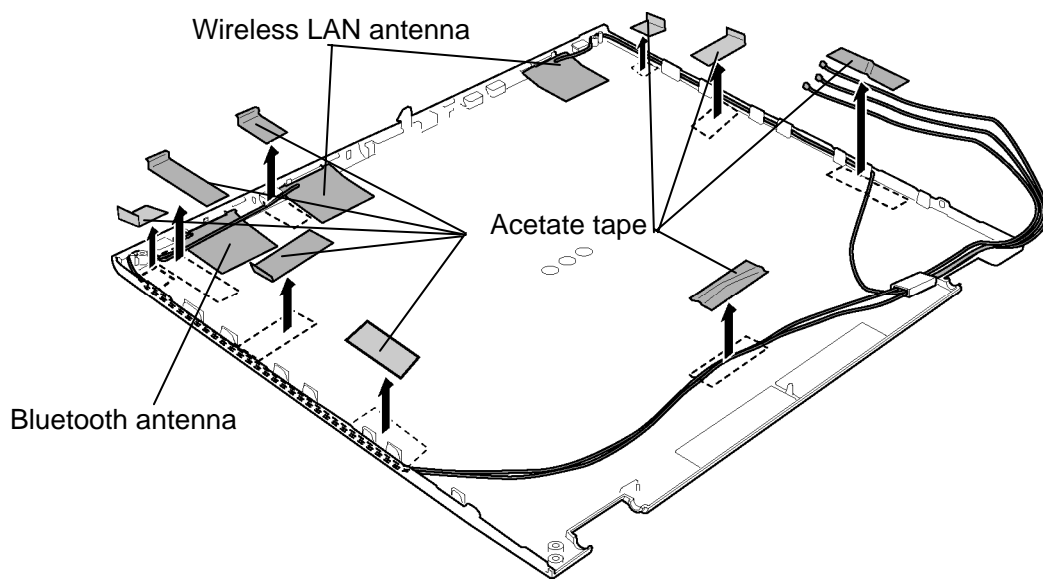
Figure 4-55   Removing the wireless LAN/Bluetooth antenna

Installing the Wireless LAN antenna/Bluetooth antenna

To install the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-55.

1. Install the **wireless LAN antennas** and **Bluetooth antenna** on the display assembly in place.

2. Stick nine **acetate tapes** to secure the wireless LAN antenna cables and Bluetooth antenna cable.

4.31 LCD cover latch

Removing the LCD cover latch

To remove the LCD cover latch, follow the steps below and refer to Figure 4-56.

1. Remove the **LCD cover cap** while pushing **three latches** from the LCD cover latch side.

2. Remove the **LCD cover latch**. Be careful not lose the **spring**.
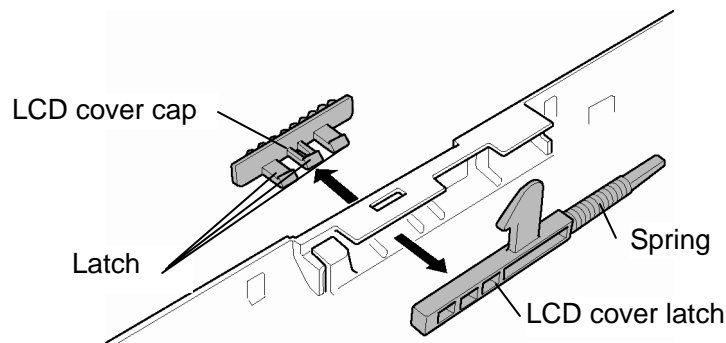
Figure 4-56   Removing the LCD cover latch

Installing the LCD cover latch

To install the LCD cover latch, follow the steps below and refer to Figure 4-56.

1. Install the **LCD cover latch** in place of the top cover. Be careful not lose the **spring**.

2. Set the **LCD cover cap** and push it until the latches are engaged.

4.32 Fluorescent Lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part No.	Supplier	Section
14.1-inch (XGA)	G33C00039110	Samsung	4.32.1
14.1-inch (SXGA+)	G33C00022B10	Samsung	4.32.2
	G33C00022210	Samsung	

NOTE: - When working with a LCD module, always use a flat, grounded table.

  - Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.

  - Use an anti-static or protective sheet.

  - When replacing the FL unit, cover with a finger protector or similar to prevent soiling or scratching the LCD panel.

  - Be careful when handling the lamp. Excessive force may break the lamp.

  - Be careful not to soil or deform the lamp reflector.

  - Make sure that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.

4.32.1 Replacing the 14.1-inch XGA Samsung Fluorescent Lamp

CAUTION: When replacing the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign substance into the module.

Disassembling the 14.1-inch XGA Samsung Fluorescent Lamp

To disassemble the 14.1-inch XGA Samsung fluorescent lamp, follow the steps below and refer to Figure 4-57 to 4-60.

1. Remove the PCB cover COF cover .

CAUTION: Handle with care not to damage the COF of S/D ICs.
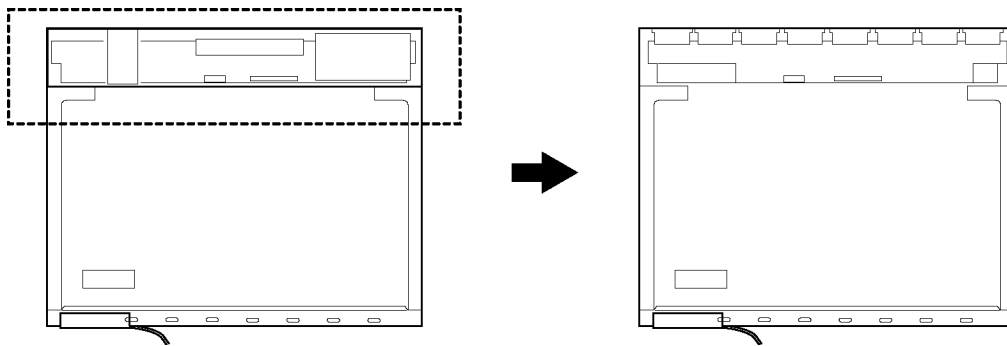
Figure 4-57 Replacing Samsung fluorescent lamp (XGA) (1)

2. Remove the white tape and Al (aluminum) tape.

White Tape

White tape

Al tape
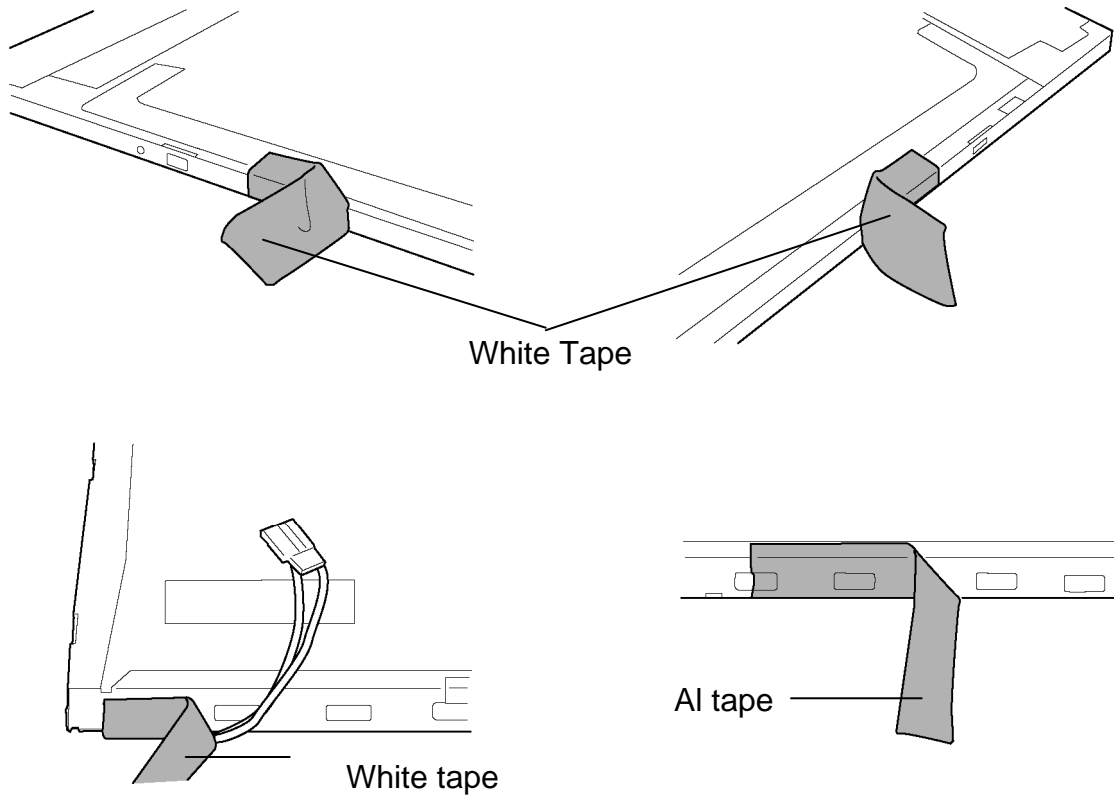
Figure 4-58 Replacing Samsung fluorescent lamp (XGA) (2)

3. Separate top chassis and the mold frame.
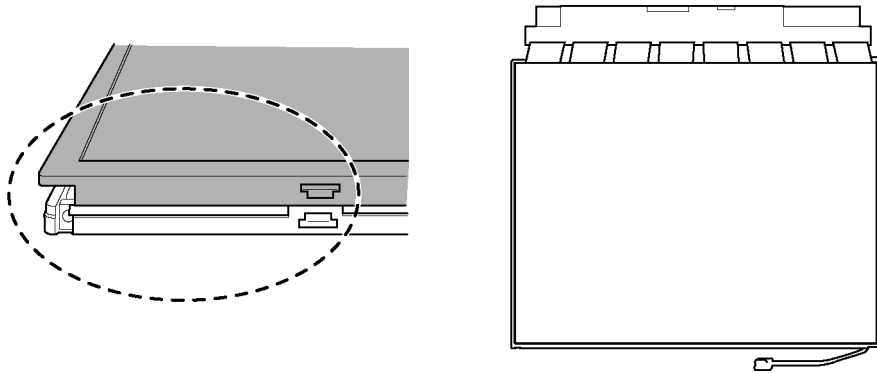
Figure 4-59 Replacing Samsung fluorescent lamp (XGA) (3)

4. Separate the panel assembly and the backlight assembly.

CAUTION: *Handle with care not to damage the COF of S/D ICs.*
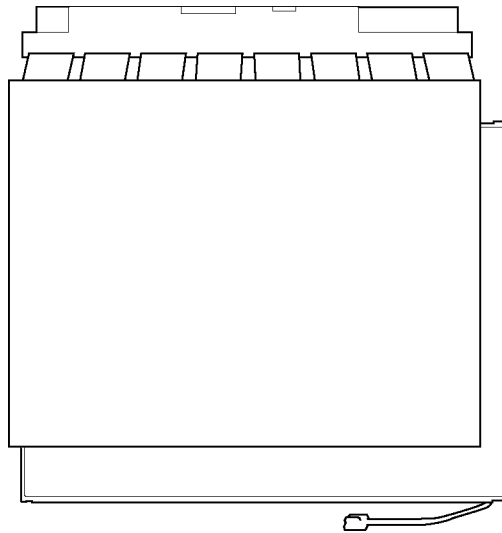
Figure 4-60 Replacing Samsung fluorescent lamp (XGA) (4)

Assembling the 14.1-inch XGA Samsung Fluorescent Lamp

To assemble the 14.1-inch XGA Samsung fluorescent lamp, follow the opposite steps for disassemble.

4.32.2 Replacing the 14.1-inch SXGA+ Samsung Fluorescent Lamp

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CAUTION: *When replacing the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign substance into the module.*

To replace the 14.1-inch SXGA+ Samsung fluorescent lamp, follow the steps below and refer to figures 4-61 to 4-64.

1. Remove the PCB cover and CFO cover.

CAUTION: *Handle with care not to damage TAB.*
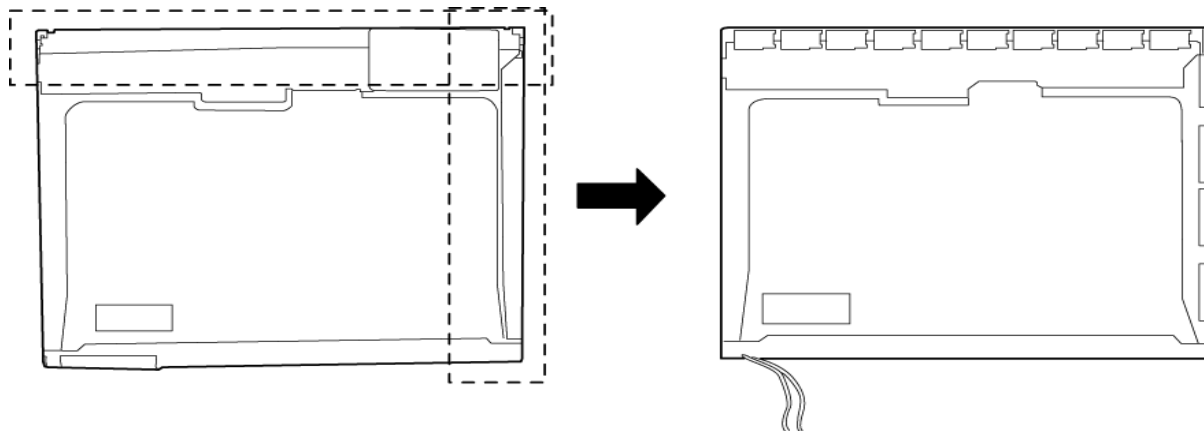
Figure 4-61 Replacing Samsung fluorescent lamp (SXGA+) (1)

2. Remove the lamp-wire tape and Al tape.
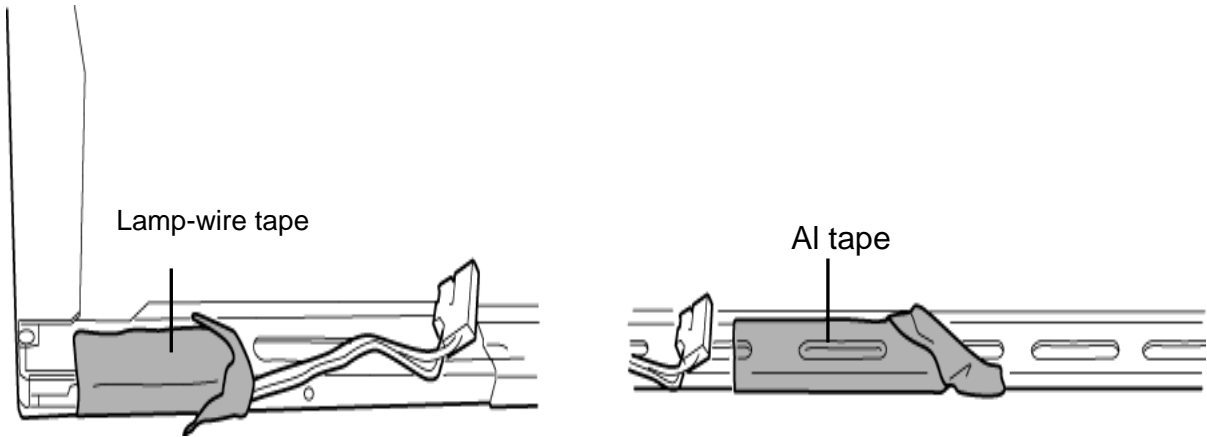
Figure 4-62 Replacing Samsung fluorescent lamp (SXGA+) (2)

3. Remove the two screws from the PCB.
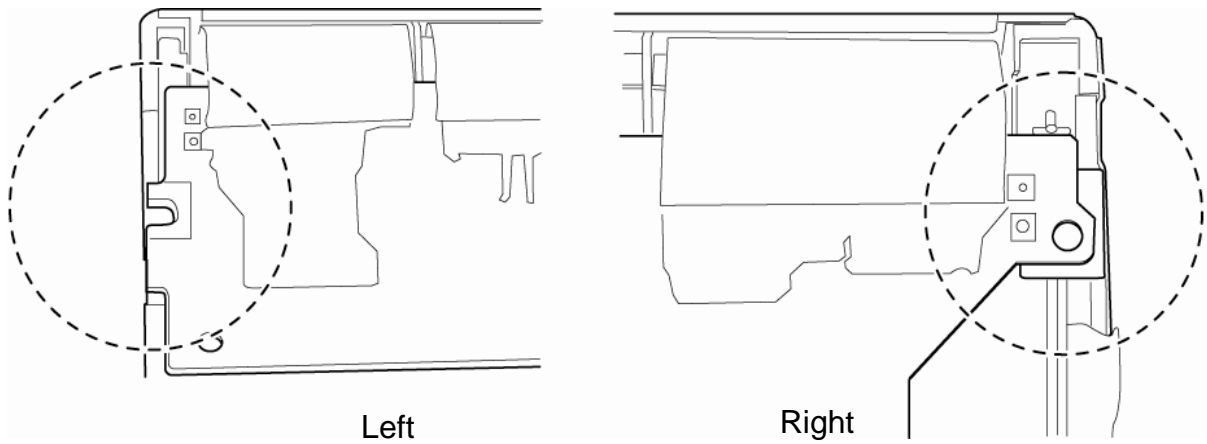
Figure 4-63 Replacing Samsung fluorescent lamp (SXGA+) (3)

4. Separate the panel assembly from the BLU.

CAUTION: Handle with care not to damage the TAB
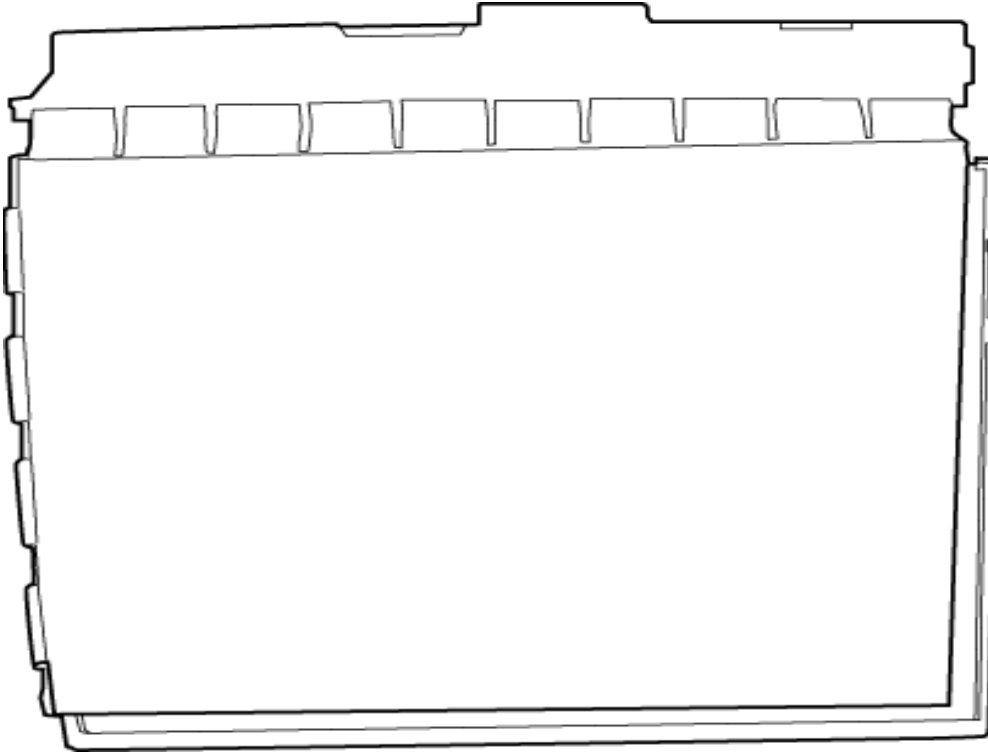
Figure 4-64 Replacing Samsung fluorescent lamp (SXGA+) (4)

Assembling the 14.1-inch SXGA+ Samsung Fluorescent lamp

The assembly procedure of the 14.1-inch SXGA+ Samsung fluorescent lamp is the reverse of the above disassembly procedure.

Appendices

Appendix   Contents

Figures

Tables

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.
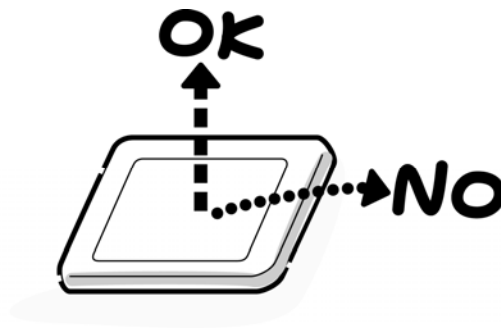
2. For the LCD module, be careful to align the four holes at the right side and left side of the LCD module with the corresponding holes in the LCD cover before securing the module with four screws.

    Do not force the module into place, because stress can affect its performance. Also, the panel's polarized surface is easily scarred, so be carefully 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.
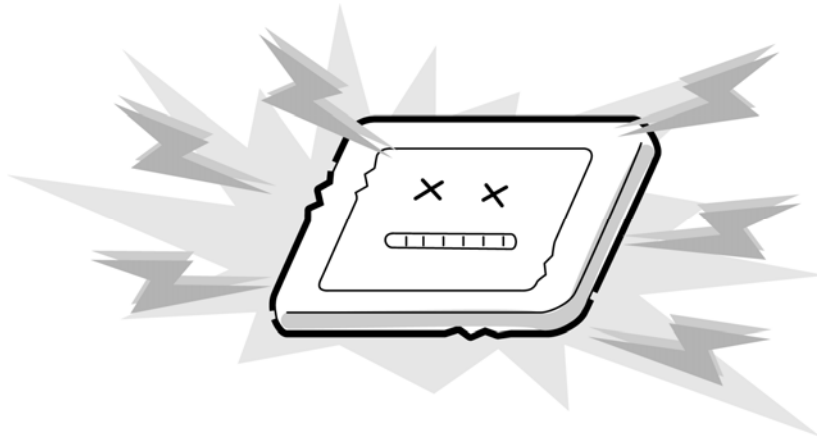
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

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.
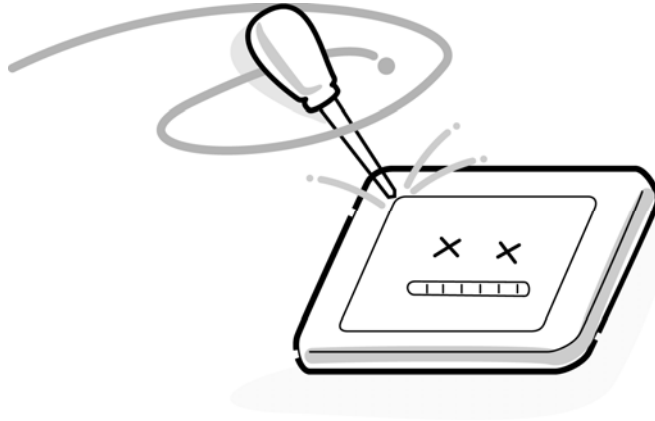
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
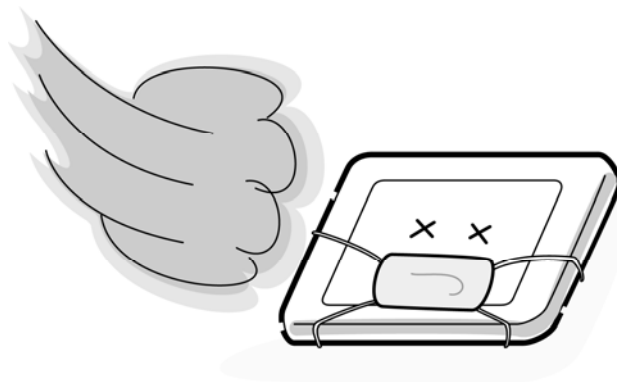
Appendix B   Board Layout

B.1   System Board (FDBGS*) Front View
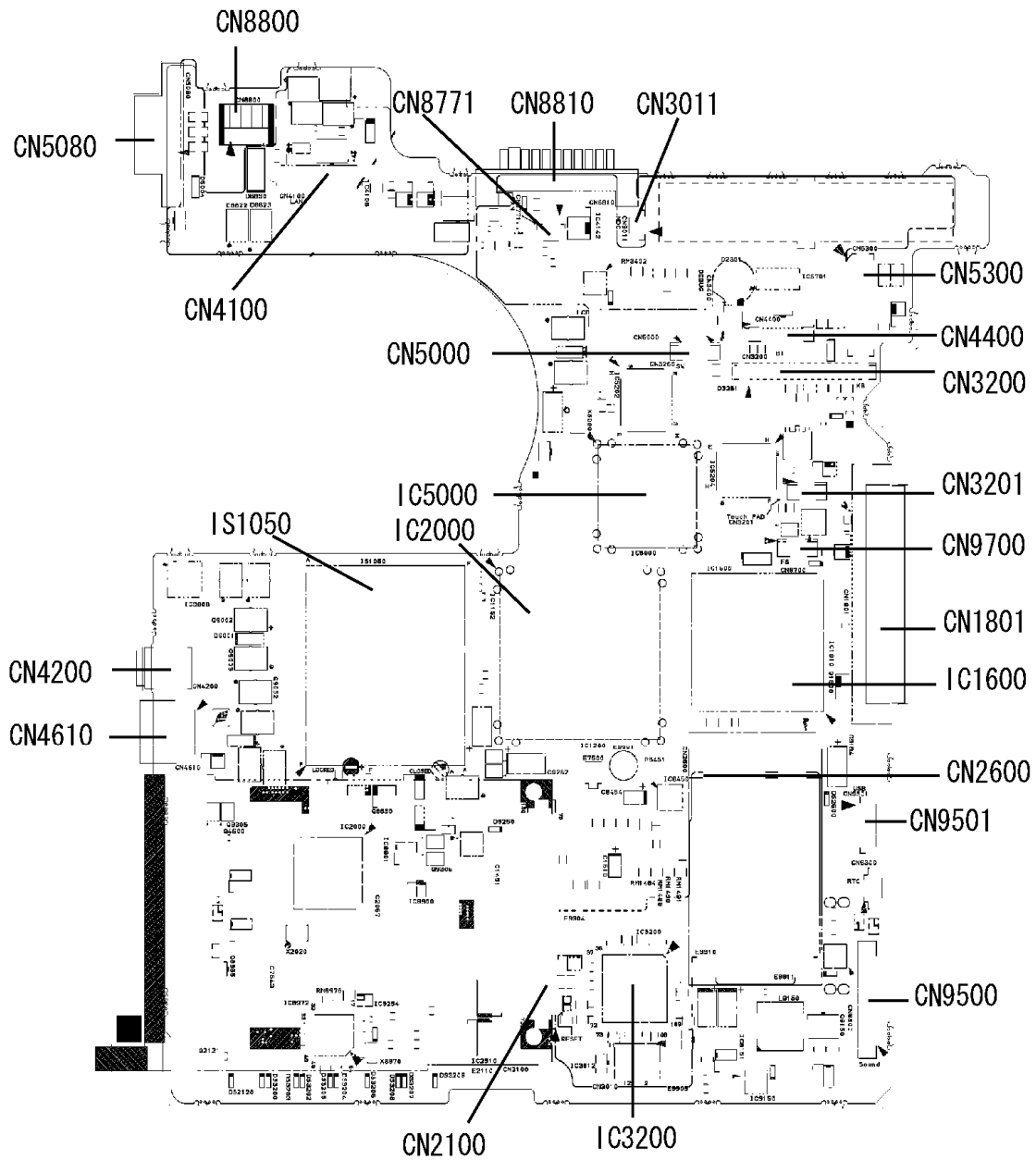
*Figure B-1 System board (FDBGS *) layout (front)*

Table B-1   System board (FDBGS) ICs and connectors (front)*

Number	Name
CN4100	Network interface connector
CN8810	Main Battery connector
CN8800	DC-IN connector
CN3011	Modem relay connector
CN5080	RGB connector
CN2600	PCI Express card connector
CN8771	Fan connector
CN5000	LCD interface connector
CN4200	IEEE1394 connector
CN4610	USB port 0 connector
CN2100	PC card interface connector
CN1801	Select bay connector
CN9500	GN board I/F connector
CN9501	USB harness connector
CN9700	GF board I/F connector
CN3201	Touch pad connector
CN3200	Keyboard connector
CN4400	Bluetooth connector
CN5300	DVI TV connector
IS1050	CPU socket
IC2000	Card controller
IC1600	ICH7-M
IC3200	EC/KBC
IC5000	GPU

B.2   System Board (FDBGS *) Back View
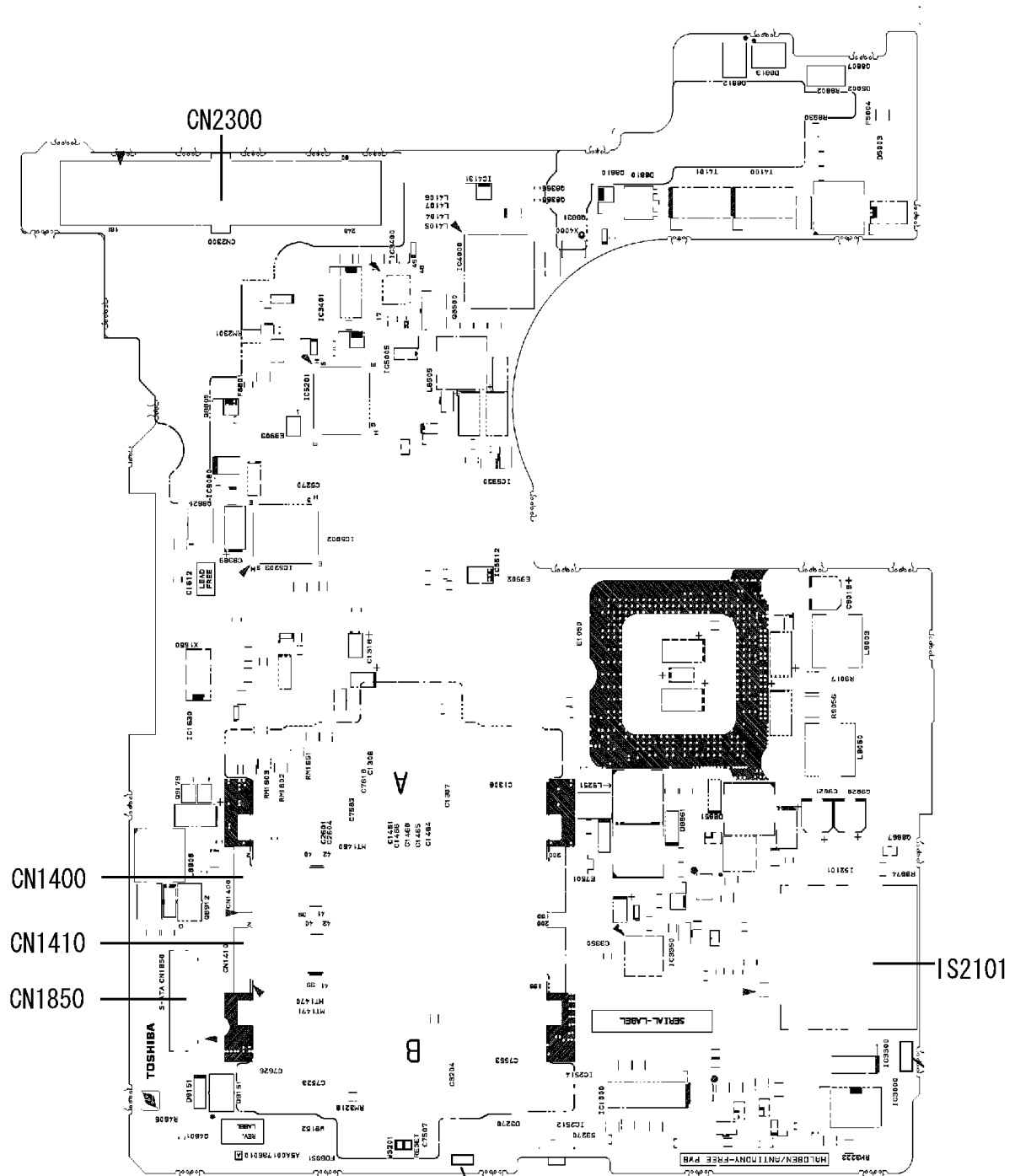
Figure B-2 System board (FDBGS) layout (back)*

Table B-2 System board (FDBGS*) connectors (back)

Number	Name
CN2300	Docking interface connector
CN1850	HDD connector
IS2101	SD card slot
CN1400	DIMM0 slot
CN1410	DIMM1 slot

B.3   GN Board (FDBGN*) Front and Back View
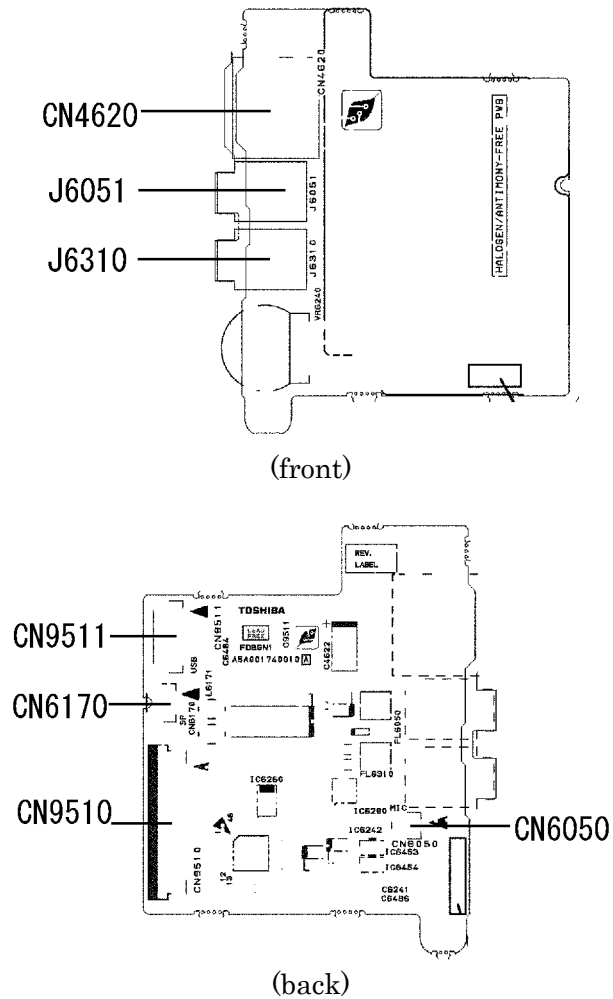
(front)

(back)

Figure B-3   GN Board (FDBGN) layout (front/back)*

Table B-3   GN Board (FDBGN) connectors (front/back)*

Number	Name
J6310	Headphone connector
J6051	External microphone connector
CN4620	USB connector
CN6170	Speaker connector
CN9511	USB harness connector
CN6050	Internal microphone connector
CN9510	System board I/F connector

B.4   GR Board (FDBGR*) Front and Back View
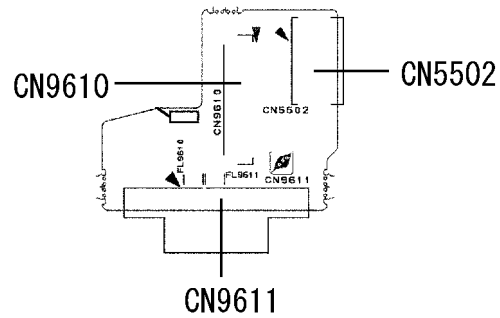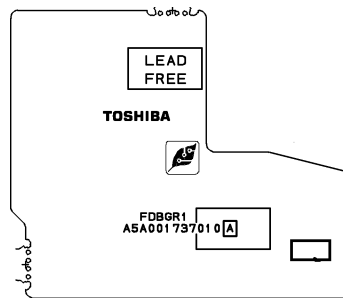
(front)

(back)

Figure B-4 GR Board (FDBGR) layout (front/back)*

Table B-4 GR Board (FDBGR) connector (front)*

Number	Name
CN9610	System board interface connector
CN9611	Serial connector
CN5502	S-Video connector

B.5   GF Board (FDBGF*) Front and Back View
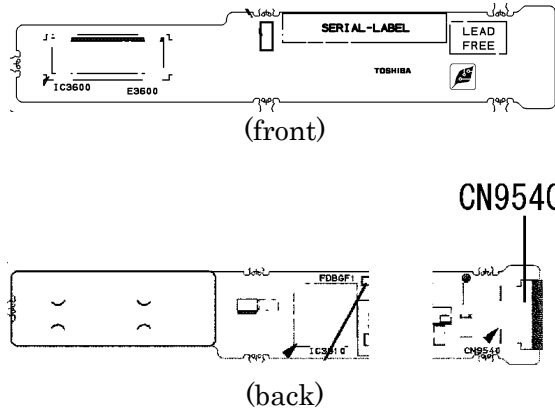
(front)

(back)

Figure B-5 GF Board (FDBGF) layout (front/back)*

Table B-5 GF Board (FDBGF) connectors (back)*

Number	Name
CN9540	System board interface connector

Appendix C   Pin Assignments

System board

C.1   CN1400 SO-DIMM0 connector (200-pin)

Table C-1 SO-DIMM0 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR0R9-B0V	I	2	GND	-
3	GND	-	4	ADQ05-B1P	I/O
5	ADQ07-B1P	I/O	6	ADQ04-B1P	I/O
7	ADQ06-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ01-B1P	I/O
15	GND	-	16	ADQ00-B1P	I/O
17	ADQ03-B1P	I/O	18	GND	-
19	ADQ02-B1P	I/O	20	ADQ12-B1P	I/O
21	GND	-	22	ADQ13-B1P	I/O
23	ADQ11-B1P	I/O	24	GND	-
25	ADQ08-B1P	I/O	26	ADM0-B1P	I
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK3-B1P	I
31	ADQS1-B1P	I/O	32	MCK3-B1N	I
33	GND	-	34	GND	-
35	ADQ09-B1P	I/O	36	ADQ15-B1P	I/O
37	ADQ14-B1P	I/O	38	ADQ10-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ16-B1P	I/O	44	ADQ21-B1P	I/O
45	ADQ18-B1P	I/O	46	ADQ17-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	N.C.	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ22-B1P	I/O	58	ADQ20-B1P	I/O
59	GND	-	60	GND	-
61	ADQ30-B1P	I/O	62	ADQ24-B1P	I/O

Table C-1 SO-DIMM0 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	ADQ28-B1P	I/O	64	ADQ25-B1P	I/O
65	GND	-	66	GND	-
67	ADM3-B1P	I	68	ADQS3-B1N	I/O
69	N.C.	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ26-B1P	I/O	74	ADQ29-B1P	I/O
75	ADQ27-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	I	80	MCKE3-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	ABS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	AMA12-B1P	I	90	AMA11-B1P	I
91	AMA09-B1P	I	92	AMA07-B1P	I
93	AMA08-B1P	I	94	AMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	AMA05-B1P	I	98	AMA04-B1P	I
99	AMA03-B1P	I	100	AMA02-B1P	I
101	AMA01-B1P	I	102	AMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	AMA10-B1P	I	106	ABS1-B1P	I
107	ABS0-B1P	I	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS2-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	ACAS-B1N	I	114	MODT2-B1P	I
115	MCS3-B1N	I	116	AMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT3-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	ADQ32-B1P	I/O	124	ADQ36-B1P	I/O
125	ADQ33-B1P	I/O	126	ADQ37-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	I
131	ADQS4-B1P	I/O	132	GND	-

Table C-1 SO-DIMM0 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
133	GND	-	134	ADQ38-B1P	I/O
135	ADQ34-B1P	I/O	136	BDQ39-B1P	I/O
137	ADQ35-B1P	I/O	138	GND	-
139	GND	-	140	ADQ44-B1P	I/O
141	ADQ40-B1P	I/O	142	ADQ45-B1P	I/O
143	ADQ41-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	AMD5-B1P	I	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ43-B1P	I/O	152	ADQ46-B1P	I/O
153	ADQ42-B1P	I/O	154	ADQ47-B1P	I/O
155	GND	-	156	GND	-
157	ADQ48-B1P	I/O	158	ADQ52-B1N	I/O
159	ADQ54-B1P	I/O	160	ADQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK4-B1P	I
165	GND	-	166	MCK4-B1N	I
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	ADM6-B1P	I
171	GND	-	172	GND	-
173	ADQ51-B1P	I/O	174	ADQ50-B1P	I/O
175	ADQ55-B1P	I/O	176	ADQ49-B1P	I/O
177	GND	-	178	GND	-
179	ADQ57-B1P	I/O	180	ADQ56-B1P	I/O
181	ADQ60-B1P	I/O	182	ADQ61-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	I	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ58-B1P	I/O	190	GND	-
191	ADQ59-B1P	I/O	192	ADQ62-B1P	I/O
193	GND	-	194	ADQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	P3V	I

C.2   CN1410 SO-DIMM1 connector (200-pin)

Table C-2 SO-DIMM1 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR0R9-B0V	I	2	GND	-
3	GND	-	4	BDQ05-B1P	I/O
5	BDQ07-B1P	I/O	6	BDQ04-B1P	I/O
7	BDQ06-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ01-B1P	I/O
15	GND	-	16	BDQ00-B1P	I/O
17	BDQ03-B1P	I/O	18	GND	-
19	BDQ02-B1P	I/O	20	BDQ12-B1P	I/O
21	GND	-	22	BDQ13-B1P	I/O
23	BDQ11-B1P	I/O	24	GND	-
25	BDQ08-B1P	I/O	26	BDM0-B1P	I
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	I
31	BDQS1-B1P	I/O	32	MCK3-B1N	I
33	GND	-	34	GND	-
35	BDQ09-B1P	I/O	36	BDQ15-B1P	I/O
37	BDQ14-B1P	I/O	38	BDQ10-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ16-B1P	I/O	44	BDQ21-B1P	I/O
45	BDQ18-B1P	I/O	46	BDQ17-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	N.C.	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I
53	GND	-	54	GND	-
55	BDQ23-B1P	I/O	56	BDQ19-B1P	I/O
57	BDQ22-B1P	I/O	58	BDQ20-B1P	I/O
59	GND	-	60	GND	-
61	BDQ30-B1P	I/O	62	BDQ24-B1P	I/O

Table C-2 SO-DIMM1 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	BDQ28-B1P	I/O	64	BDQ25-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	BDQS3-B1N	I/O
69	N.C.	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ26-B1P	I/O	74	BDQ29-B1P	I/O
75	BDQ27-B1P	I/O	76	BDQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	I	80	MCKE3-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	BBS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	BMA12-B1P	I	90	BMA11-B1P	I
91	BMA09-B1P	I	92	BMA07-B1P	I
93	BMA08-B1P	I	94	BMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	BMA05-B1P	I	98	BMA04-B1P	I
99	BMA03-B1P	I	100	BMA02-B1P	I
101	BMA01-B1P	I	102	BMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	BMA10-B1P	I	106	BBS1-B1P	I
107	BBS0-B1P	I	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	BCAS-B1N	I	114	MODT2-B1P	I
115	MCS3-B1N	I	116	BMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT3-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	BDQ32-B1P	I/O	124	BDQ36-B1P	I/O
125	BDQ33-B1P	I/O	126	BDQ37-B1P	I/O
127	GND	-	128	GND	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	I
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ38-B1P	I/O

Table C-2 SO-DIMM1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
135	BDQ34-B1P	I/O	136	BDQ39-B1P	I/O
137	BDQ35-B1P	I/O	138	GND	-
139	GND	-	140	BDQ44-B1P	I/O
141	BDQ40-B1P	I/O	142	BDQ45-B1P	I/O
143	BDQ41-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BMD5-B1P	I	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ43-B1P	I/O	152	BDQ46-B1P	I/O
153	BDQ42-B1P	I/O	154	BDQ47-B1P	I/O
155	GND	-	156	GND	-
157	BDQ48-B1P	I/O	158	BDQ52-B1N	I/O
159	BDQ54-B1P	I/O	160	BDQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK4-B1P	I
165	GND	-	166	MCK4-B1N	I
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	BDQ51-B1P	I/O	174	BDQ50-B1P	I/O
175	BDQ55-B1P	I/O	176	BDQ49-B1P	I/O
177	GND	-	178	GND	-
179	BDQ57-B1P	I/O	180	BDQ56-B1P	I/O
181	BDQ60-B1P	I/O	182	BDQ61-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	I	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ58-B1P	I/O	190	GND	-
191	BDQ59-B1P	I/O	192	BDQ62-B1P	I/O
193	GND	-	194	BDQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	P3V	I

C.3   CN1801 Select bay interface connector (72-pin)

Table C-3 Select bay interface connector (72-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	NC	-	4	GND	-
5	NC	-	6	GND	-
7	GND	-	8	CDCHG2-S5P	I
9	BTMP2-SXP	I/O	10	PSCL-S5P	I
11	BT2VD	-	12	PSDA-S5P	I
13	DBT20V-S5N	I	14	GND	-
15	MBSTS0-S3N	I	16	MBSTS1-S3N	I
17	MBSTS2-S3N	I	18	GND	-
19	CDRLED-P5N	O	20	PDCS3-P3N	O
21	PDCS1-P3N	O	22	PDA2-P3P	O
23	PDA0-P3P	O	24	SB-P5V	-
25	SB-P5V	-	26	SB-P5V	-
27	PDA1-P3P		28	NC	-
29	IDEIRQ-P3P		30	GND	-
31	PDDACK-P3N	O	32	GND	-
33	PIORDY-P3P	I	34	GND	-
35	PDIOR-P3N	O	36	GND	-
37	PDIOW-P3N	O	38	GND	-
39	PDDREQ-P3P	I	40	GND	-
41	GND	-	42	PDD15-P3P	I/O
43	PDD00-P3P	I/O	44	PDD14-P3P	I/O
45	PDD01-P3P	I/O	46	SB-P5V	-
47	SB-P5V	-	48	PDD13-P3P	I/O
49	PDD02-P3P	I/O	50	PDD12-P3P	I/O
51	PDD03-P3P	I/O	52	PDD11-P3P	I/O
53	PDD04-P3P	I/O	54	GND	-
55	GND	-	56	PDD10-P3P	I/O
57	PDD05-P3P	I/O	58	PDD09-P3P	I/O
59	PDD06-P3P	I/O	60	PDD08-P3P	I/O
61	PDD07-P3P	I/O	62	GND	-
63	GND	-	64	PLTRS3+RSTIDB	O
65	NC	-	66	GND	-
67	NC	-	68	NC	-
69	GND	-	70	GND	-
71	PVBAT2		72	GND	-

C.4   CN1850 SATA interface connector (11-pin)

Table C-4 SATA interface connector (11-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZSATT0-P1P	I	2	ZSATT0-P1N	I
3	GND	-	4	ZSATR0-P1N	I
5	ZSATR0-P1P	I	6	GND	-
7	P3V	-	8	GND	-
9	P5V	-	10	GND	-
11	GND	-			
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.5　CN2100　PC card interface connector (150-pin)

Table C-5 PC card interface connector (150-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	GND	-	10	NC	-
11	NC	-	12	NC	-
13	NC	-	14	NC	-
15	NC	-	16	NC	-
17	GND	-	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	ZETCRD-P3P	O	24	ZETCRD-P3N	O
25	GND	-	26	GND	-
27	ZERCRD-P3P	I	28	ZERCRD-P3N	I
29	GND	-	30	GND	-
31	GND	-	32	GND	-
33	GND	-	34	XPECRD-P3P	O
35	XPECRD-P3N	O	36	GND	-
37	GND	-	38	GND	-
39	GND	-	40	GND	-
41	GND	-	42	CPPE-E3N	I
43	GND	-	44	CRDCRQ-E3N	I
45	CRD-P3V	-	46	CRD-P3V	-
47	CRD-P3V	-	48	CRD-P3V	-
49	CRD-P3V	-	50	CRDRST-E3N	O
51	GND	-	52	CRD-E3V	-
53	CRD-E3V	-	54	CRD-E3V	-
55	PEWAKE-E3N	O	56	CRD1R5-P1V	-
57	CRD1R5-P1V	-	58	CRD1R5-P1V	-
59	GND	-	60	CRD-E3V	-
61	CRD-E3V	-	62	GND	-
63	NC	-	64	GND	-
65	NC	-	66	GND	-
67	GND	-	68	NC	-
69	GND	-	70	CPUSB-E3N	I

Table C-5 PC card ard interface connector (150-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
71	GND	-	72	ZUSBEX-E3P	I/O
73	ZUSBEX-E3N	I/O	74	GND	-
75	GND	-	76	GND	-
77	GND	-	78	ACCD2-P3N	I
79	ACCLKR-PYN	I/O	80	ACAD31-PYP	I/O
81	ACD02-PYP	I/O	82	ACAD30-PYP	I/O
83	ACAD29-PYP	I/O	84	GND	-
85	ACAD28-PYP	I/O	86	ACAD27-PYP	I/O
87	ACSTSC-PYP	I	88	ACAD26-PYP	I/O
89	ACAUDI-PYP	I	90	ACAD25-PYP	I/O
91	ACCBE3-PYN	I/O	92	GND	-
93	ACAD24-PYP	I/O	94	ACREQ-PYN	I
95	ACAD23-PYP	I/O	96	ACSERR-PYN	I/O
97	ACAD22-PYP	I/O	98	ACRST-PYN	I/O
99	ACAD21-PYP	I/O	100	GND	-
101	ACVS2-P3P	I/O	102	ACAD20-PYP	I/O
103	ACAD19-PYP	I/O	104	ACAD18-PYP	I/O
105	ACAD17-PYP	I/O	106	ACCBE2-PYN	I/O
107	ACFRAM-PYN	I/O	108	GND	-
109	ACIRDY-PYN	I/O	110	ACTRDY-PYN	I/O
111	ACCLK-PYP	I/O	112	MCVPPA-PYV	-
113	MCVCCA-PYV	-	114	MCVCCA-PYV	-
115	ACINT-PYN	I	116	ACDEVS-PYN	I/O
117	ACGNT-PYN	O	118	GND	-
119	ACSTOP-PYN	I/O	120	ACPERR-PYN	I/O
121	ACLOCK-PYN	I/O	122	ACPAR-PYP	I/O
123	ACA18-PYP	I/O	124	ACCBE1-PYN	I/O
125	ACAD16-PYP	I/O	126	GND	-
127	ACAD14-PYP	I/O	128	ACAD15-PYP	I/O
129	ACAD12-PYP	I/O	130	ACAD13-PYP	I/O
131	ACAD11-PYP	I/O	132	ACVS1-PYP	I/O
133	ACAD09-PYP	I/O	134	GND	-
135	ACAD10-PYP	I/O	136	ACCBE0-PYN	I/O
137	ACAD08-PYP	I/O	138	ACAD07-PYP	I/O
139	ACD14-PYP	I/O	140	ACAD05-PYP	I/O
141	ACAD06-PYP	I/O	142	GND	-
143	ACAD03-PYP	I/O	144	ACAD04-PYP	I/O

Table C-5 PC card interface connector (150-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
145	ACAD01-PYP	I/O	146	ACAD02-PYP	I/O
147	ACAD00-PYP	I/O	148	ACCD1-P3N	I
149	GND	-	150	GND	-

C.6   IS2101 SD card interface connector (12-pin)

Table C-6 SD card interface 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-P3V	-
5	SDCLK-P3P	I/O	6	GND	-
7	SDAT0-P3P	I/O	8	SDAT1-P3P	I/O
9	SDAT2-P3P	I/O	10	SDCD-P3N	I
11	GND	-	12	SDWP-P3P	I

C.7   CN2300 Docking interface connector (240-pin)

Table C-7 Docking interface connector (240-pin) (1/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	DSKDC	-	A2	GND	-
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	IF-P5V	-
5	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	(PHYRST-E3N)	O
9	DPCONF-S5P	I	10	GND	-
11	GND	-	12	NVASCL-P5P	I/O
13	DRED-PXP	O	14	DGREEN-PXP	O
15	DBLUE-PXP	O	16	DVSYNC-P5P	O
17	NVBSCL-P5P	I/O	18	NC	-
19	GND	-	20	NC	-
21	NC	-	22	DVITX2-P3P	O
23	DVITX2-P3N	O	24	DVITX1-P3P	O
25	DVITX1-P3N	O	26	DVITX0-P3P	O
27	DVITX0-P3N	O	28	GND	-
29	GND	-	30	DVITXC-P3P	O
31	DVITXC-P3N	O	32	DVIDET-S3N	O
33	NC	-	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	NC	-
41	GND	-	42	NC	-
43	NC	-	44	NC	-
45	GND	-	46	NC	-
47	NC	-	48	NC	-
49	GND	-	50	NC	-
51	NC	-	52	NC	-
53	Not Mount	-	54	Not Mount	-
55	BIDDP-EXP	O	56	BIDDN-EXN	O
57	Not Mount	-	58	Not Mount	-
59	MDMRNG-B3P	I/O	60	MDMTIP-B3P	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	EXMSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	GND	-

Table C-7   Docking interface connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	DILSON-E3P	O	70	NC	-
71	GND	-	72	NVDSDA-P5P	I/O
73	GND	-	74	GND	-
75	GND	-	76	DHSYNC-P5P	O
77	NVBSDA-P5P	I/O	78	NC	-
79	GND	-	80	NC	-
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	NC	-	86	NC	-
87	NC	-	88	GND	-
89	GND	-	90	NC	-
91	NC	-	92	NC	-
93	NC	-	94	NC	-
95	NC	-	96	NC	-
97	GND	-	98	NC	-
99	NC	-	100	NC	-
101	GND	-	102	NC	-
103	NC	-	104	NC	-
105	GND	-	106	NC	-
107	NC	-	108	NC	-
109	GND	-	110	NC	-
111	NC	-	112	NC	-
113	Not Mount	-	114	Not Mount	-
115	BIDCN-EXN	-	116	Not Mount	-
117	BIDCP-EXP	-	118	Not Mount	-
119	Not Mount	-	120	Not Mount	-
121	DCOUT	-	122	DCOUT	-
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	(M5V)	-	126	DTPA-P3P	I/O
127	GND	-	128	DTPB-P3P	I/O
129	NC	-	130	NC	-
131	GND	-	132	NC	-
133	NC	-	134	SNDMUT-S3N	O
135	NC	-	136	DOUTL-PXP	I/O
137	DINL-PXP	I/O	138	DINR-PXN	I/O
139	GND	-	140	PWRSW-S3N	O
141	DCD-PYP	I	142	DSR-PYP	I

Table C-7   Docking interface connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
143	TXD-PYN	O	144	RING-PYP	I
145	PE-P5P	I	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	O
155	NC	-	156	NC	-
157	GND	-	158	NC	-
159	NC	-	160	NC	-
161	GND	-	162	NC	-
163	NC	-	164	NC	-
165	GND	-	166	NC	-
167	NC	-	168	NC	-
169	GND	-	170	NC	-
171	NC	-	172	NC	-
173	GND	-	174	Not Mount	-
175	LAN-E3V	-	176	Not Mount	-
177	Not Mount	-	178	NC	-
179	BIDAP-EXP	I	180	BIDAN-EXN	I
181	DCOUT	-	182	DCOUT	-
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	NC	-	186	DTPA-P3N	I/O
187	GND	-	188	DTPB-P3N	I/O
189	USBP2-S3P	I/O	190	USBP2-S3N	I/O
191	GND	-	192	NC	-
193	NC	-	194	DOUTR-PXP	I
195	DOUTR-PXN	I	196	DOUTL-PXN	I
197	DINL-PXN	O	198	DINR-PXP	O
199	GND	-	200	RXD-PYN	I
201	RTS-EYP	O	202	CTS-PYP	I
203	DTR-EYP	O	204	SELCT-P5P	I
205	BUSY-P5P	I	206	ACK-P5N	I
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	O	212	PINIT-P5N	O
213	ERROR-P5N	I	214	AUTFD-P5N	O
215	NC	-	216	NC	-

Table C-7   Docking interface connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
217	GND	-	218	NC	-
219	NC	-	220	NC	-
221	GND	-	222	NC	-
223	NC	-	224	NC	-
225	GND	-	226	NC	-
227	NC	-	228	NC	-
229	GND	-	230	NC	-
231	NC	-	232	NC	-
233	GND	-	234	ACT-E3N	I
235	LINK-E3N	I	236	DOCDT2-S3N	I
237	Not mounted	-	238	Not mounted	-
239	BIDBP-EXP	O	240	BIDBN-EXN	O

C.8   CN2600 Mini PCI Express interface connector (52-pin)

Table C-8 Mini PCI Express interface connector (52-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	O	2	P3V	-
3	WCHDAT-P3P	O	4	GND	-
5	WCHCLK-P3P	O	6	1R5-P1V	-
7	MPEXRQ-P3N	I	8	NC	-
9	GND	-	10	NC	-
11	XPEMPE-P3N	O	12	NC	-
13	XPEMPE-P3P	O	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	(WLON-S3N)	O
21	GND	-	22	PLTRS3-E3N	-
23	ZPERWL-P1N	I	24	E3V	-
25	ZPERWL-P1P	I	26	GND	-
27	GND	-	28	1R5-P1V	-
29	GND	-	30	SMBCL0-P3P	O
31	ZPETWL-P1N	O	32	SMBDA0-P3P	O
33	ZPETWL-P1P	O	34	GND	-
35	GND	-	36	NC	-
37	NC	-	38	NC	-

Table C-8 Mini PCI Express interface connector (52-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	1R5-P1V	-
49	NC	-	50	GND	-
51	NC	-	52	P3V	-
1T	GND	-	2T	GND	-

C.9   CN3010 MDC interface connector (12-pin)

Table C-9 MDC interface connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	ACZOT1-P3P	I/O	4	NC	-
5	GND	-	6	E3V	-
7	ACZSY1-P3P	O	8	GND	-
9	ACZIN2-E3P	I/O	10	GND	-
11	ACZRS1-E3N	O	12	XAZBC1-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.10   CN3011 Modem connector (4-pin)

Table C-10 Modem connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MDMRNG-E3P	I/O	2	MDMRNG-E3P	I/O
3	MDMTIP-E3P	I/O	4	MDMTIP-E3P	I/O

C.11   CN3200 Keyboard interface connector (34-pin)

Table C-11 Keyboard interface connector (34-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	SPY-PXP	O
3	SP-GND	-	4	SPX-PXP	O
5	SP-P5V	-	6	P5V	-
7	KBSC15-S3N	O	8	KBSC14-S3N	O
9	KBRT07-S3N	I	10	KBRT06-S3N	I
11	KBSC13-S3N	O	12	KBSC12-S3N	O
13	KBRT05-S3N	I	14	KBRT04-S3N	I
15	KBSC11-S3N	O	16	KBSC10-S3N	O
17	KBRT03-S3N	I	18	KBRT02-S3N	I
19	KBRT01-S3N	I	20	KBSC09-S3N	O
21	KBSC08-S3N	O	22	KBSC07-S3N	O
23	KBRT00-S3N	I	24	KBSC06-S3N	O
25	KBSC05-S3N	O	26	KBSC04-S3N	O
27	KBSC03-S3N	O	28	KBSC02-S3N	O
29	KBSC01-S3N	O	30	KBSC00-S3N	O
31	P5V	-	32	CAPLED-P5N	O
33	ARWLED-P5N	O	34	NUMLED-P5N	O
1T	SP-GND	-	2T	SP-GND	-

C.12   CN3201 PAD interface connector (8-pin)

Table C-12   PAD interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SP-P5V	-	2	SPX-PXP	O
3	SPY-PXP	O	4	SP-GND	-
5	GND	-	6	IPDCLK-P5P	I/O
7	IPDDAT-P5P	I/O	8	P5V	-

C.13   CN3401 Parallel interface connector (25-pin)

Table C-13 Parallel interface connector (25-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	STROB-P5N	O	2	PDB00-P5P	I/O
3	PDB01-P5P	I/O	4	PDB02-P5P	I/O
5	PDB03-P5P	I/O	6	PDB04-P5P	I/O
7	PDB05-P5P	I/O	8	PDB06-P5P	I/O
9	PDB07-P5P	I/O	10	ACK-P5N	I
11	BUSY-P5P	I	12	PE-P5P	I
13	SELCT-P5P	I	14	AUTFD-P5N	O
15	ERROR-P5N	I	16	PINIT-P5N	O
17	SLIN-P5N	O	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	GND	-			

C.14   CN3250 Switch interface connector (13-pin)

Table C-14 Switch interface connector (13-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF-S3N	I	2	NC	-
3	NC	-	4	GND	-
5	NC	-	6	NC	-
7	PWRSW-S3N	I	8	NC	-
9	NC	-	10	GPBTNA-S3N	I
11	NC	-	12	NC	
13	GPBTNB-S3N	I			
1T	GND	-	2T	GND	-

C.15   CN4100 LAN interface connector (14-pin)

Table C-15 LAN interface connector (14-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZMDI2P-EYP	I/O	2	ZMDI2N-EYN	I/O
3	ZMDI3P-EYP	I/O	4	ZMDI3N-EXN	I/O
5	ZMDIOP-EYP	I/O	6	ZMDION-EYN	I/O
7	ZMDI1P-EYP	I/O	8	ZMDI1N-EYN	I/O
9	NC	-	10	NC	-
11	LINK-E3N	O	12	ACT-E3N	O
13	(LAN-E3V)	-	14	(LAN-E3V)	-
1T	GND	-	2T	GND	-

C.16   CN4200 IEEE 1394 interface connector (4-pin)

Table C-16 IEEE 1394 interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZTPB0-P3N	I/O	2	ZTPB0-P3P	I/O
3	ZTPA0-P3N	I/O	4	ZTPA0-P3P	I/O

C.17   CN4400 Bluetooth interface connector (20-pin)

Table C-17 Bluetooth interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	BTMDL-P3N	I	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	BTRST-S3N	O
9	NC	-	10	NC	-
11	GND	-	12	NC	-
13	(GND)	-	14	WCHCLK-P3P	O
15	NC	-	16	ZUSBBT-E3P	I/O
17	ZUSBBT-E3N	I/O	18	NC	-
19	NC	-	20	BT-P3V	-
1T	GND	-	2T	GND	-

C.18　CN4610　USB connector (4-pin)

Table C-18 USB connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	O	2	(ZUSBP0-E3N)	I/O
3	(USBPEN-E3N)+ ZUSBP0-E3P)	I/O	4	GND	-
1T	GND	-	2T	GND	-

C.19　CN5000　LCD interface connector (40-pin)

Table C-19 LCD interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BRT2DA-S3P	O	2	BRT10-P5P	O
3	(FL-P5V)	O	4	FL-P5V	-
5	FL-P5V	-	6	FL-P5V	-
7	NC	-	8	GND	-
9	GND	-	10	GND	-
11	NC	-	12	PNL-P3V	-
13	PNL-P3V	-	14	PNL1-P3P	I
15	PNL0-P3P	I	16	GND	-
17	ZTX2-PYP	O	18	ZTX2-PYN	O
19	GND	-	20	ZTX1-PYP	O
21	ZTX1-PYN	O	22	GND	-
23	ZTX0-PYP	O	24	ZTX0-PYN	O
25	GND	-	26	XLCK0-PYP	O
27	XLCK0-PYN	O	28	GND	-
29	ZTX6-PYP	O	30	ZTX6-PYN	O
31	GND	-	32	ZTX5-PYP	O
33	ZTX5-PYN	O	34	GND	-
35	ZTX4-PYP	O	36	ZTX4-PYN	O
37	GND	-	38	XLCK1-PYN	O
39	XLCK1-PYN	O	40	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.20   CN5080 RGB connector (15-pin)

Table C-20 RGB connector (15-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RED-PXP	O	2	GREEN-PXP	O
3	BLUE-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	-	10	GND	-
11	NC	-	12	CRTSDA-P5P	I/O
13	SHSYNC-P3P	O	14	SVSYNC-P3P	O
15	CRTSCL-P5P	I/O			
1T	GND	-	2T	GND	-

C.21   CN5300 DVI/TV interface connector (40-pin)

Table C-21 DVI/TV interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	XDMCK0-PYN	O	4	TVY-PXP	
5	XDMCK0-PYP	O	6	TVC-PXP	
7	GND	-	8	GND	-
9	ZDMTX0-PYN	O	10	GND	-
11	ZDMTX0-PYP	O	12	GND	-
13	GND	-	14	DCD-PYP	I
15	ZDMTX1-PYN	O	16	DSR-PYP	I
17	ZDMTX1-PYP	O	18	RXD-PYN	I
19	GND	-	20	RTS-PYN	I
21	ZDMTX2-PYN	O	22	GND	-
23	ZDMTX2-PYP	O	24	TXD-PYN	O
25	GND	-	26	CTS-PYP	I
27	DVISCL-P5P	O	28	DTR-PYP	I
29	DVISDA-P5P	O	30	RING-PYP	I
31	GND	-	32	GND	-
33	(DVIDET-S3N)	I	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38		
39	GND	-	40	NC	-

C.22   CN8800 DC-IN connector (4-pin)

Table C-22 DC-IN connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ADPDC	-	2	ADPDC	-
3	GND	-	4	GND	-

C.23   CN8810 1st Battery connector (10-pin)

Table C-23 1st Battery connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(PVBL1)	-	2	BTMP1	I
3	(DCHG)	I	4	M5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT1OV-S5N	I
9	GND	-	10	GND	-

C.24   CN9390 RTC Battery connector (3-pin)

Table C-24 RTC Battery connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(R3V)	-	2	NC	-
3	GND	-			

C.25   CN8771 FAN interface connector (4-pin)

Table C-25   FAN interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	FANGO-P3P	I
3	GND	-	4	FPWMO-S3P	O

C.26   CN9500 GN board interface connector (40-pin)

Table C-26 GN board interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	ROTENB-P3P	I
5	ROTENA-P3P	I	6	P5V	-
7	VOLBYP-P3P	I/O	8	GND	-
9	ACZIN0-P3P	I	10	ACZRS0-P3P	O
11	ACZOT0-P3P	O	12	GND	-
13	ACZSY0-P3P	O	14	GND	-
15	XAZBC0-P3P	I/O	16	GND	-
17	ZDINR-PXN	I	18	ZDINR-PXP	I
19	ZDINL-PXN	I	20	ZDINL-PXP	I
21	GND	-	22	ZDOUTR-PXN	O
23	ZDOUTR-PXP	O	24	ZDOUTL-PXN	O
25	ZDOUTL-PXP	O	26	GND	-
27	SPKON-P3N	I/O	28	SNDMUT-S3N	O
29	AMPSD-S3N	O	30	P3V	-
31	PCBEEP-P3P	O	32	SND-GND	-
33	SND-GND	-	34	SND-GND	-
35	SND-GND	-	36	ATBEEP-P3P	O
37	SND-P5V	-	38	SND-P5V	-
39	SND-P5V	-	40	SND-P5V	-

C.27   CN9501 GN board interface connector (10-pin)

Table C-27 GN board interface connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	ZUSBP6-E3P	I/O	4	ZUSBP6-E3N	I/O
5	USB1PS-E5V	-	6	USB1PS-E5V	-
7	ZUSBP4-E3P	I/O	8	ZUSBP4-E3N	I/O
9	GND	-	10	GND	-

C.28   CN9700 GF board interface connector (8-pin)

Table C-28 GF board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ZUSBFS-E3P	I/O
3	ZUSBFS-E3N	I/O	4	GND	-
5	FGSPON-S3N	O	6	E3V	-
7	NC	-	8	NC	-
1T	GND	-	2T	GND	-

GN Board

C.29 PJ9510 System board interface connector (40-pin)

Table C-29 System board interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SND-P5V	-	2	SND-P5V	-
3	SND-P5V	-	4	SND-P5V	-
5	ATBEEP-P3P	I	6	SND-GND	-
7	SND-GND	-	8	SND-GND	-
9	SND-GND	-	10	PCBEEP-P3P	I
11	P3V	-	12	AMPSD-S3N	i
13	SNDMUT-S3N	I	14	SPKON-P3N	I/O
15	GND	-	16	ZDOUTL-PXP	I
17	ZDOUTL-PXN	I	18	ZDOUTR-PXP	I
19	ZDOUTR-PXN	I	20	GND	-
21	ZDINL-PXP	O	22	ZDINL-PXN	O
23	ZDINR-PXP	O	24	ZDINR-PXN	O
25	GND	-	26	XAZBC0-P3P	I/O
27	GND	-	28	ACZSY0-P3P	I
29	GND	-	30	ACZOT0-P3P	i
31	ACZRS0-P3P	I	32	ACZIN0-P3P	O
33	GND	-	34	VOLBYP-P3P	I/O
35	NC	-	36	NC	
37	NC	-	38	NC	-
39	NC	-	40	NC	-

C.30 CN9511 System board interface connector (10-pin)

Table C-30 System board interface connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	ZUSBP6-E3P	I/O	4	ZUSBP6-E3N	I/O
5	USB1PS-E5V	-	6	USB1PS-E5V	-
7	ZUSBP4-E3P	I/O	8	ZUSBP4-E3N	I/O
9	GND	-	10	GND	-

C.31   CN4620 USB interface connector (8-pin)

Table C-31   USB interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	USB1PS-E5V	-	A2	ZUSBP6-E3N	I/O
A3	ZUSBP6-E3P	I/O	A4	GND	-
B1	USB1PS-E5V	I	B2	ZUSBP4-E3N	I/O
B3	ZUSBP4-E3P	I/O	B4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.32   CN6050 Internal microphone connector (2-pin)

Table C-32 Internal microphone connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(MICIN-PXP)	I	2	A-GND	-

C.33   J6051 External microphone connector (6-pin)

Table C-33 External Microphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	(MICIN-PXP)	I
3	(VREF1-P2V)	-	4	NC	-
5	NC	-	6	(MICIN-PXP)	I

C.34   CN6170 Speaker connector (4-pin)

Table C-34 Speaker (Right) connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTR-PXN	O	2	SPOTR-PXP	O
3	SPOTL-PXP	-	4	SPOTL-PXN	O

C.35   J6310 Headphone connector (6-pin)

Table C-35 Headphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEADL-PXP	I
3	HEADR-PXP	I	4	(POWER)	-
5	A-GND	-	6	NC	-

GF Board

C.36   CN9540 System board interface connector (8-pin)

Table C-36 System board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	E3V	-	4	FGSPON-S3N	I
5	GND	-	6	ZUSBFS-E3N	I/O
7	ZUSBFS-E3P	I/O	8	GND	
1T	GND	-	2T	GND	-

GR Board

C.37   CN9610 System board interface connector (20-pin)

Table C-37 System board interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TV-GND	-	2	TVY-PXP	O
3	TVC-PXP	O	4	TV-GND	-
5	GND	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	GND	-
11	DCD-PYP	I	12	DSR-PYP	I
13	RXD-PYN	I	14	RTS-PYP	O
15	GND	-	16	TXD-PYN	O
17	CTS-PYP	I	18	DTR-PYP	O
19	RING-PYP	I	20	GND	-
1T	GND	-	2T	GND	-

C.38   CN9611 Serial connector (9-pin)

Table C-38 Serial connector (9-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD-PYP	I	2	RXD-PYN	I
3	TXD-PYN	O	4	DTR-PYP	O
5	GND	-	6	DSR-PYP	I
7	RTS-PYP	O	8	CTS-PYP	I
9	RING-PYP	I			
1T	GND	-	2T	GND	-

C.39   CN5502 S-Video connector (4-pin)

Table C-39 S-Video connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TV-GND	-	2	TV-GND	-
3	TVY-PXP	O	4	TVC-PXP	O
1T	GND	-	2T	GND	-
2T	GND	-	4T	GND	-

Appendix D   Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 $	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*1
09	8 *	09	89	3E	F0	3E	*1
10	9 (	0A	8A	46	F0	46	*1
11	0)	0B	8B	45	F0	45	*1
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	*1
24	I	17	97	43	F0	43	*1
25	O	13	98	44	F0	44	*1
26	P	19	99	4D	F0	4D	*1
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	*2
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	*1
38	K	25	A5	42	F0	42	*1
39	L	26	A6	4B	F0	4B	*1
40	; :	27	A7	4C	F0	4C	*1
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	*1
53	, <	33	B3	41	F0	41	*1
54	. >	34	B4	49	F0	49	*1
55	/ ?	35	B5	4A	F0	4A	*1
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	*4
76	Del	E0	53	E0	D3	E0	71	E0	F0	71	*4
79	←	E0	4B	E0	CB	E0	6B	E0	F0	6B	*4
80	Home	E0	47	E0	C7	E0	6C	E0	F0	6C	*4
81	End	E0	4F	E0	CF	E0	69	E0	F0	69	*4
83	↑	E0	48	E0	C8	E0	75	E0	F0	75	*4
84	↓	E0	50	E0	D0	E0	72	E0	F0	72	*4
85	PgUp	E0	49	E0	C9	E0	7D	E0	F0	7D	*4
86	PgDn	E0	51	E0	D1	E0	7A	E0	F0	7A	*4
89	→	E0	4D	E0	CD	E0	74	E0	F0	74	*4
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	Refer to table 2-25					
126	Pause	Refer to table 2-25					
202	Fn						*5
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 overlay function.
2. * This key corresponds to key No. 42 in the 102 key mode.
3. * Combination with the **Fn** key makes different codes.
4. * Scan codes differ by mode.
5. * The Fn key does not generate a code by itself..

Table D-2 Scan codes with left Shift key

| Cap | Key | Code set 1 | | Code set 2 | |
No.	top	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 the case of Key no. 55 Overlay mode only.

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.	Key top	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**	
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

E.1   United Kingdom (UK) Keyboard

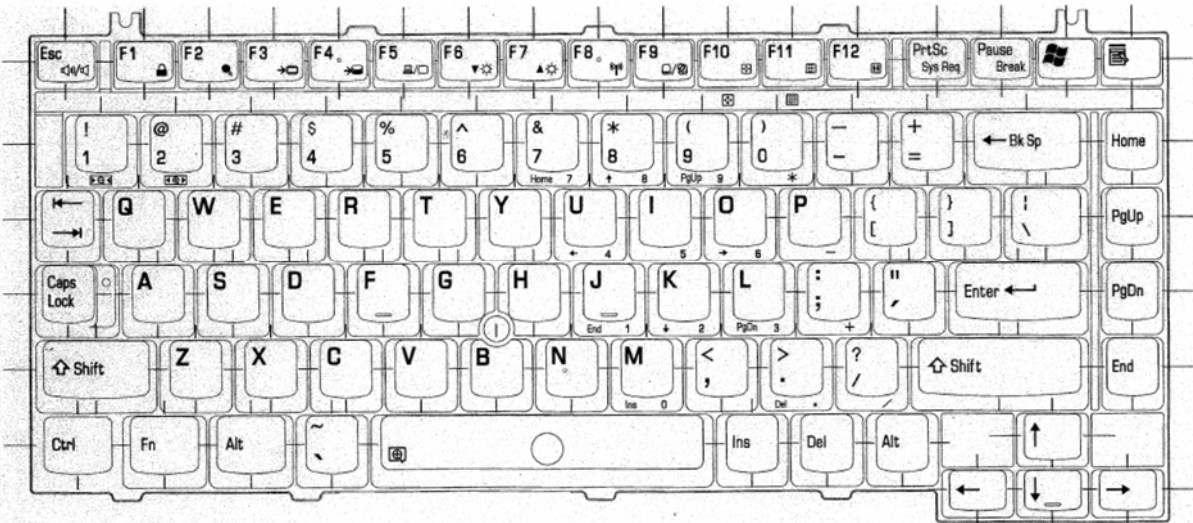
Figure E-1 UK keyboard

E.2   United States (US) Keyboard

Figure E-2 US keyboard

Appendix F   Wiring diagrams

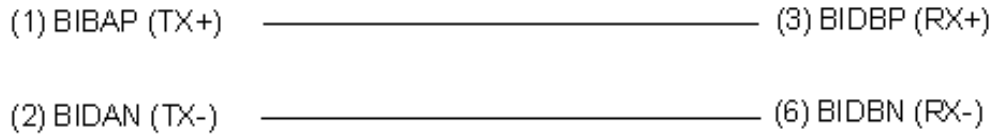## F.1   Serial Port Wraparound Connector

(1) BIBAP (TX+) ———————————————————— (3) BIDBP (RX+)

(2) BIDAN (TX-) ———————————————————— (6) BIDBN (RX-)

Figure F-1 Serial port wraparound connector

F.2   LAN Loopback Connector

(1) BIBAP (TX+) ———————————————————— (3) BIDBP (RX+)

(2) BIDAN (TX-) ———————————————————— (6) BIDBN (RX-)
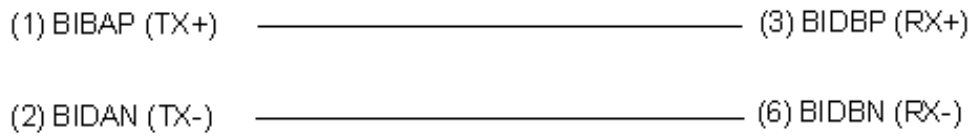
Figure F-2 LAN loopback connector

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/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

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 an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.

5. Turn on the power while holding down the tilde character key until a beep sounds.

   For example

    (US Keyboard)

    (UK Keyboard)

6. The BIOS rewriting starts
7. When the process is completed, it beeps and the system automatically reboots.

NOTE: *1.*   *Connect the AC adapter 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 erased.   In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.*

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/KBC only when instructed by a diagnostic disk release notice.*
>
>   *2.* *Connect the AC adaptor 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 contents of the EC/KBC have been erased. In this case, insert the BIOS/EC/KBC rewriting disk and the EC/KBC will be rewritten.*
>
>   *5.* *Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending 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 an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.

5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a beep sounds.) 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

	Time (hours)
MTBF	5,337