Toshiba Personal Computer

TECRA M3

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-507

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Toshiba Personal Computer TECRA M3 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA M3.

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 M3 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
```

Table of Contents

Chapter 1   Hardware Overview

Chapter 2   Troubleshooting Procedures

Chapter 3   Tests and Diagnostics

Chapter 4   Replacement Procedures

Appendices

Chapter 1

Hardware Overview

Chapter 1   Contents

Figures

Tables

1.1 Features

The Toshiba TECRA M3 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.

❑ Microprocessor

The TECRA M3 computer is equipped with an Intel Dothan Processor. The Intel Dothan Processor incorporates a math co-processor, a 64KB L1 cache memory and a 2MB L2 cache memory.
The PC comes in with one of the following speeds:

- 1.6BGHz/1.73GHz/1.86GHz/2.0AGHz/2.13GHz (0.748 to 1.356V)

These processors operate at 533MHz bus clock.

❑ Chipset

The TECRA M3 is equipped with Intel Alviso-PM, Intel ICH6-M and TI PCI7411.

❑ Graphics Processing Unit

The computer has a NVIDIA MEP43L Graphics Processing Unit (GPU). The internal VRAM is 64MB or 128MB.

❑ Memory

The computer comes with two PC3300/PC4300 compatible DDR2 SO-DIMM slots. Two memory modules of 256GB, 512MB or 1GB(1,024MB) can be installed.

❑ HDD

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

- 40/60/80/100 GB

❑ USB FDD

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

❑ Slim Select Bay

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

❑ Optical Drive

A CD-ROM drive, DVD-ROM drive, CD-RW/DVD-ROM drive, DVD±R/±RW drive or DVD super Multi drive can be installed in the Slim Select 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 64/128MB 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)/86(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 or three batteries: a rechargeable Lithium-Ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory).

Second battery can be mounted in the slim select bay as an option.

❑ Universal Serial Bus (USB2.0)

Two 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.

❑ Parallel port

The parallel port enables connection of parallel printer or other parallel devices. (ECP compatible)

❑ 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

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.

❑ Docking interface port

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

- RJ-45 LAN jack, RJ-11 Modem jack

- External monitor port

- PS/2 mouse and PS/2 keyboard ports

- Parallel port

- Serial port

- DC IN socket

- Audio line-in, line out jack

- Two USB ports

- IEEE 1394 port

- TV-out (S-Video)

- DVI port

❑ Infrared port

The infrared port is compatible with Fast InfraRed (FIR) standards enabling cableless 4 Mbps, 1.152 Mbps, 115.2 kbps, 57.6 kbps, 38.4 kbps, 19.2 kbps or 9.6 kbps data transfer with Infrared Data Association (IrDA) 1.1 compatible external devices.

❑ Sound system

The sound system is equipped with the following features:

- AC Link (in ICH6-M) and Analog Deveices AD1981B

- AMP: Matsushita AN12491 and MAX4410

- 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 Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100 BASE-TX) or Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T). It also supports Wakeup on LAN (WOL), Magic Packet and LED.

❑ Wireless LAN

The computer is equipped with a mini-PCI Type III wireless LAN board that supports 802.11 a/g or 802.11b/g in the Mini PCI card slot. This function can be switched on and off by a switch on the computer.

❑ Bluetooth

The computer is equipped with Bluetooth (V1.2) communications standard enable wireless connection between electronic devices such as computers and printers. It supports kill SW.

❑ Presentation button

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

❑ Toshiba Console button

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

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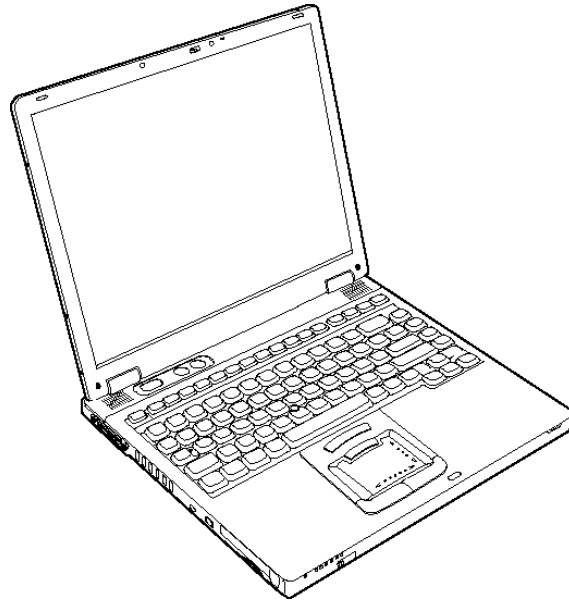
Figure 1-1   Front of the computer

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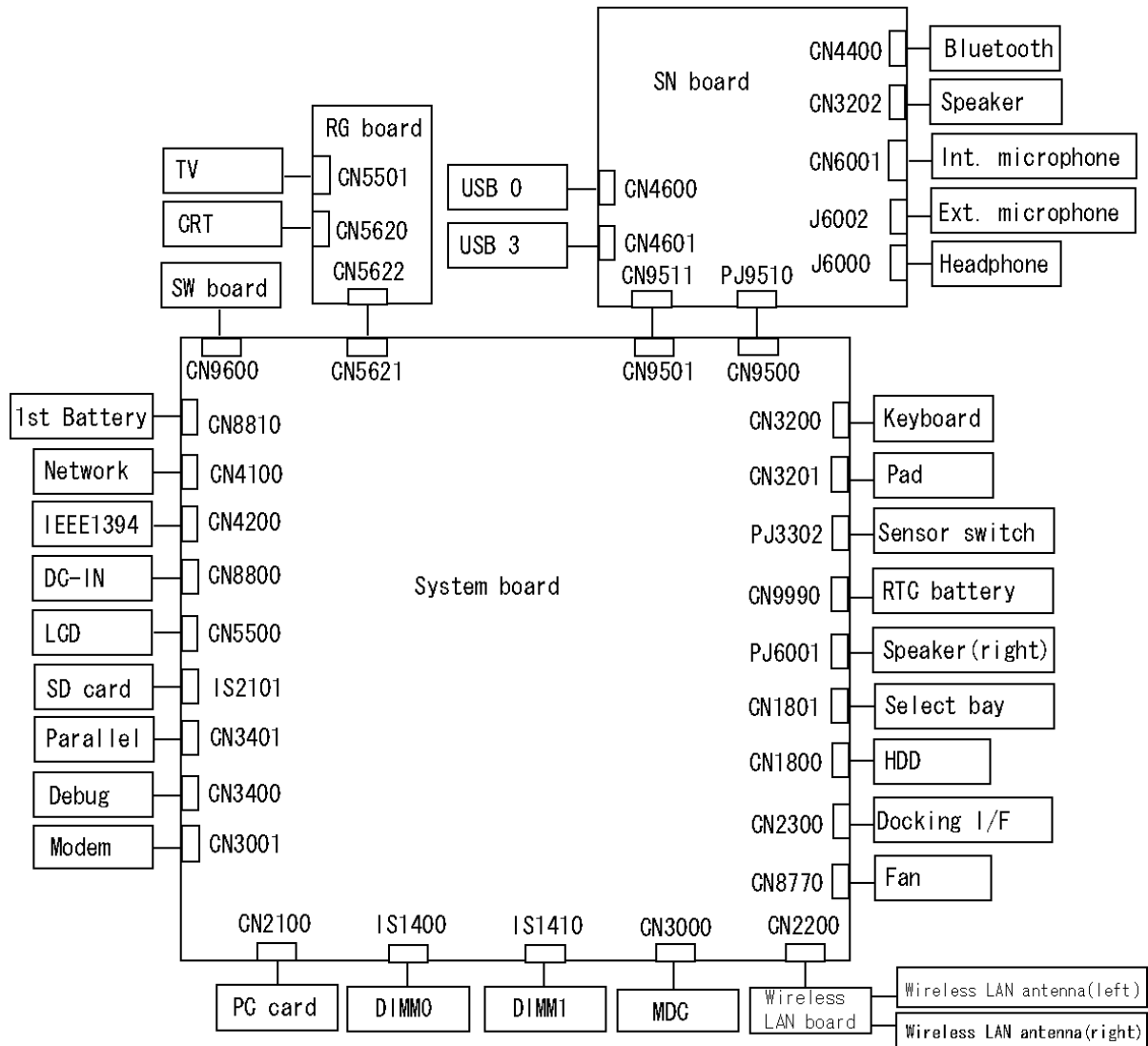
Figure 1-2   System unit configuration

1.2   System Unit Block Diagram

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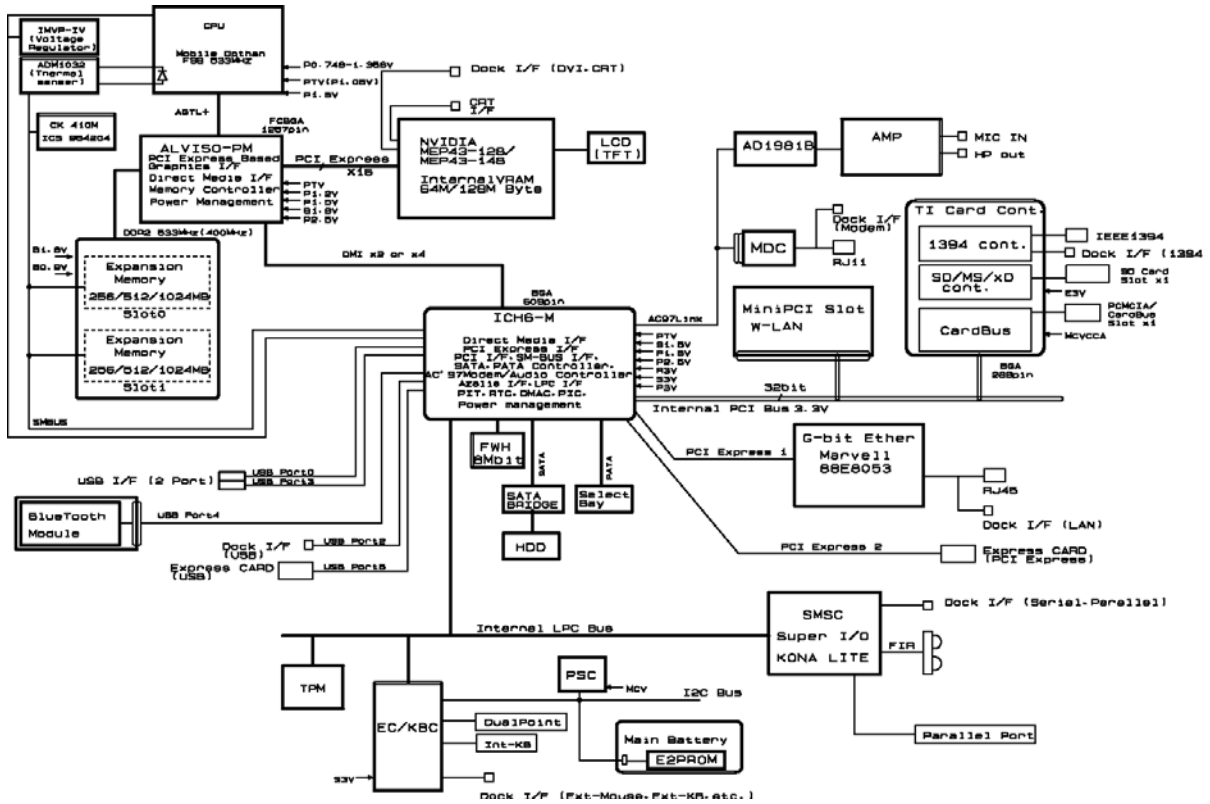
Figure 1-3   System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel Dothan Processor: 1.6BGHz/1.73GHz/1.86GHz/2.0AGHz/2.13GHz

  – Processor core speed: 1.6GHz/1.73GHz/1.86GHz/2.0GHz/2.13GHz

  – Processor bus speed: 533MHz

  – Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache

  – Integrated L2 cache memory of 2MB

  – Integrated NDP

  – 478-pin Micro FC-PGA package

❑ Memory

Two memory slots are provided. Expansion up to 2GB (2,048MB) is available.

Memory

- DDR2-SDRAM

- DDR400 or DDR533 memory

- 1.8 volt operation

- FBGA

Memory Module

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

- PC3300 or PC4300

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

  – 256 MB: 256Mb×8

  – 512 MB: 512Mb×8

  – 1GB: 512Mb×16

❑ Intel GMCH (North Bridge)

- One Intel Alviso-PM is used.

- Features:

    – Supports Dothan Processor System Bus

    – System Memory Interface

    – Memory Control: supports DDR333, DDR2-400/DDR2-533 2Gbmax.

    – Graphics I/F: x16 PCI Express Based Graphics I/F

    – DMI(Direct Media Interface)

    – 1,257-ball, 40.0×37.5×2.6mm, FC-BGA package

❑ Intel ICH6-M (South Bridge)

- One Intel UICH6MA is used.

- Features:

    – DMI(Direct Media Interface)

    – PCI Express I/F (4 ports)

    – PCI Bus I/F Rev2.3 （7 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

    – USB 1.1/2.0 Controller 8 ports (EHCI: Enhanced Host Controller)

    – 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

    – 609-ball, 31×31mm, micro BGA Package

❑ Firmware Hub (FWH)

   • One STMicro M50FW080N is used.

❑ Card controller (TI PCI7411ZHK)

   – 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

❑ VGA Controller

   One NVIDIA MEP43L chip is used. The video controller incorporates graphics accelerator and video accelerator.

   – Built-in VRAM 64MB/128MB

   – PCI Express Interface

   – LCD Interface LVDS 2ch

   – Supports TV Encoder, S-Video

❑ Sound Controller

   • One AC'97Codec AD1981B chip and AC-Link controller embedded in ICH6-M

   • SW sound

❑ EC/KBC (Embedded Controller/Keyboard Controller)

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

  This controller controls the following functions:

  - Power supply sequence
  - Thermal conditions
  - LEDs
  - Beep
  - Device ON/OFF
  - Fan speed
  - Universal I/O port
  - Docker Docking Sequence
  - Battery capacity check
  - Forced reset
  - Flash rewriting
  - EC interface
  - I2C communication
  - EC access
  - Slim Select Bay Control

- KBC

  This controller has the following functions:

  - Scan controller to check status of keyboard matrix
  - Interface controller between the keyboard scan controller and the system
  - Control of switching and simultaneous operation of the accupoint and internal keyboard

❑ PSC (Power Supply Controller)

- One TMP87PM48UG chip is used.

- This controller controls the power sources.

❑ Clock Generator

- One ICS 954204BGFT is used.

- This device generates the system clock.

❑ Modem Controller

- One Askey made MDC is used.

- This controller has the following functions:

   – One RJ11 port
   – Digital line protection support
   – Ring wake up support
   – Analog audio support
   – AC97 interface
   – The following communication codes are supported

      Data:

      V.90 (56K bps) data communication control

      V.92 (56K bps) data communication control

      V.34 (33.6K to 2400bps) data communication control

      V.44, V.42, V.42bis and MNP class 5 data compression

      V.32 turbo, V.32 bis and fallbacks

      Fax:

      V.34 (33.6K to 2400 bps)

      V.17 (14.4K, 12K, 7200 bps)

      V.29 (9600, 7200 bps)

      V.27 ter (4800, 2400 bps)

      V.21 ch2 (300 bps)

❑ Internal LAN Controller

- One internal chip (Marvell made 88E8053 or 88E8036) is used.

- This controller has the following functions:
    - 10/100M-Ethernet (88E8036)
    - Gigabit-Ethernet chip (88E8053)
    - WOL support
    - Magic Packet support
    - LED support

❑ Wireless LAN

- One Mini PCI card for wireless LAN with Type III card bus controller.

❑ 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 PCI7411 is used.

❑ Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.

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

❑ Other major chips

      • Clock Generator: One 954204BGFTCG 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.
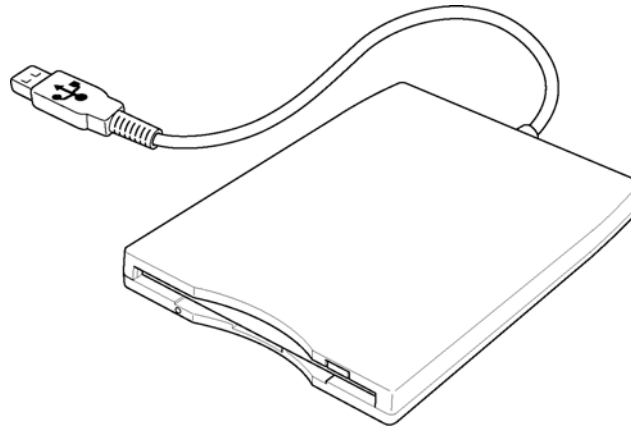
Figure 1-4   3.5-inch FDD (USB External)

Table 1-1   3.5-inch FDD specifications

Items		TEAC G8AC0000B310	
		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.
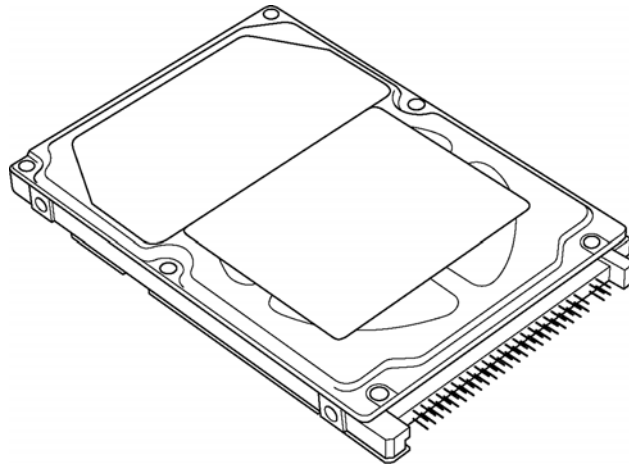
Figure 1-5   2.5-inch HDD

Table 1-2 2.5-inch HDD specifications (1/7)

Items		Specifications		
		TOSHIBA HDD 2190BZKO*	HITACHI GST G8BC0001E411	TOSHIBA HDD 2190BZE02
Outline dimensions	Width (mm)	69.85	69.85±0.25	69.85
	Height (mm)	9.5	9.5±0.2	9.5
	Depth (mm)	100	100.2±0.25	100
	Weight (g)	95 max.	95 max	95
Storage size (formatted)		40GB	40GB	40GB
Speed (RPM)		4,200	4,200	4,200
Data transfer speed (Mbits/s)		175.0-341.7	372	175.0-341.7
Interface transfer rate (MB/s)		100 max (Ultra DMA mode)		
Track density (Ktpi)		88.1	96.0	88.1
Average random seek time (read) (ms)			12	12
Motor startup time (ms)		4typ	3	4

Table 1-2   2.5-inch HDD specifications (2/7)

Items		Specifications		
		TOSHIBA HDD2193VZKO*	HITACHI GST G8BC0001N410	TOSHIBA HDD2193VZE02
Outline dimensions	Width (mm)	69.85	69.85±0.25	69.85
	Height (mm)	9.5	9.5±0.2	9.5
	Depth (mm)	100	100.2±0.25	100
	Weight (g)	97 max.	102 max.	97 max.
Storage size (formatted)		40GB	40GB	40GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mbits/s)		233-446	493	233-446
Interface transfer rate (MB/s)		100 max (Ultra DMA mode) 16.6 (PIO mode		
Track density (Ktpi)		88.8	113.2	88.8
Average random seek time (read) (ms)		12	12	12
Motor startup time (ms)		4 typ.	3.5	4 typ.

Table 1-2   2.5-inch HDD specifications (3/7)

Items		Specifications		
		TOSHIBA HDD2189BZKO*	TOSHIBA HDD2189BZE02	HITACHI GST G8BC0001N611
Outline dimensions	Width (mm)	69.85	69.85	69.85±0.25
	Height (mm)	9.5	9.5	9.5±0.2
	Depth (mm)	100	100	100.2±0.25
	Weight (g)	95	95	102
Storage size (formatted)		60GB	60GB	60GB
Speed (RPM)		4,200	4,200	4,200
Data transfer speed (Mbits/s)		175.0-341.7	175.0-341.7	175.0-341.7
Interface transfer rate (MB/s)		100(Ultra DMA mode)		
Track density (Ktpi)		88.1	88.1	96.6

Average seek time (ms)
  Read
  Write
		12	12	12
				14

Motor startup time (ms)		4	4	3.5

Table 1-2   2.5-inch HDD specifications (4/7)

Items		Specifications		
		TOSHIBA HDD2194VZKO*	TOSHIBA HDD2194VZE02	HITACHI GST G8BC0001N610
Outline dimensions	Width (mm)	69.85	69.85	69.85±0.25
	Height (mm)	9.5	9.5	9.5±0.2
	Depth (mm)	100±0.25	100	100.2±0.25
	Weight (g)	102 max.	95	102 max.
Storage size (formatted)		60GB	60GB	60GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mbits/s)		258-394	202.9-373.3	493
Interface transfer rate (MB/s)		100 max (Ultra DMA mode) 16.6 (PIO mode)		
Track density (Ktpi)		88.8	88.8	113.2
Average seek time (ms) Read Write		12	12 12	12 14
Motor startup time (ms)		4 typ.	4	3.5

Table 1-2   2.5-inch HDD specifications (5/7)

Items		Specifications	
		HITACHI GST G8BC00015610	HITACHI GST G8BC0001N810
Outline Dimensions	Width (mm)	69.85	69.85±0.25
	Height (mm)	9.5	9.5±0.2
	Depth (mm)	100.2	100.2±0.25
	Weight (g)	115 max.	102 max.
Storage size (formatted)		60GB	80GB
Speed (RPM)		7,200	5,400
Data transfer speed (Mb/s)		507 max.	493
Interface transfer rate (MB/s)		100 (MAX Ultra DMA mode)	
Track density (Ktpi)		88.2	113.2
Average seek time (ms) Read Write		10 11	12 14
Motor startup time (ms)		4	3.5

Table 1-2   2.5-inch HDD specifications (6/7)

Items		Specifications		
		TOSHIBA HDD2191VZKO*	**TOSHIBA HDD2191VZE02**	**HITACHI GST G8BC0001NA10**
Outline Dimensions	Width (mm)	69.85	69.85	69.85
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100.2	100.2
	Weight (g)	95	102 max.	102 max.
Storage size (formatted)		80GB	80GB	100GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mb/s)		154.3-298.0	154.3-298.0	493
Interface transfer rate (MB/s)		100 (MAX Ultra DMA mode)		
Track density (Ktpi)		78.9	78.9	113.2

Average seek time (ms)
  Read
  Write
		12
		12
			12
			12
				12
				14

Motor startup time (ms)		4	4	3.5

Table 1-2   2.5-inch HDD specifications (7/7)

Items		Specifications	
		TOSHIBA HDD2A02BZK01	**TOSHIBA HDD2A02BZE01**
Outline Dimensions	Width (mm)	69.85	69.85
	Height (mm)	9.5	9.5
	Depth (mm)	100	100.2
	Weight (g)	99 max.	99 max.
Storage size (formatted)		100GB	100GB
Speed (RPM)		4,200	4,200
Data transfer speed (Mb/s)		170.0-373.0	170.0-373.0
Interface transfer rate (MB/s)		100 (Ultra DMA mode)	
Track density (Ktpi)		110-120	110-120

Access time (ms)
  Track to track
  Average seek
		2
		12
			2
			12

Motor startup time (ms)		4 typ.	4 typ.

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 G8CC00005410
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)

Access time (ms)
     Average Random Access
     Average Full Stroke Access
	110 (except in Audio play mode)
	240 (except in Audio play mode)

Rotation speed (rpm) (typ.)	5,136
Data Buffer Capacity (Kbytes)	128
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 (1/3)

Item	TSST G8CC0000R410	
	DVD-ROM mode	**CD-ROM mode**
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)	
Access time (ms) Average Random Access	110 (Typ.)	85 (Typ.)
Rotation speed (rpm)	4,594 max.	5,136 max
Data Buffer Capacity (Kbytes)	256	
Supported Format	DVD-ROM, DVD-R (Read) CD-DA, CD+(E)G, CD-MIDI, CD-TEXT CD-ROM, CD-ROM XA, CD-I CD-I Bridge (Photo-CD, Video-CD) Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW) CD-R (Read), CD-RW (Read)	

Item	HITACHI G8CC00015410	
	DVD-ROM mode	**CD-ROM mode**
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)	

Access time (ms)
   Average Random
   Access
	110 (Typ.)	85 (Typ.)

Rotation speed (rpm)	4,594 Max	5,136Max
Data Buffer Capacity (Kbytes)	256	
Supported Format	DVD-ROM, DVD-R (Read) CD-DA, CD+(E)G, CD-MIDI, CD-TEXT CD-ROM, CD-ROM XA, CD-I CD-I Bridge (Photo-CD, Video-CD) Multi-session CD (Photo-CD, CD-EXTRA, CD-R, CD-RW) CD-R (Read), CD-RW (Read)	

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

Item	TSST SD-C2712	
	DVD-ROM mode	**CD-ROM mode**
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)	
Access time (ms) 　Average Random Access	110	110
Rotation speed (rpm)	4,670Max	5,100Max
Data Buffer Capacity (Kbytes)	256	
Supported Format	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (Ver.1.0, Ver.2.1), DVD-RW (Ver. 1.0, Ver. 1.1), DVD+R, DVD+RW, DVD-RAM Ver. 2.1 CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multi-session CD (Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio), CD-R, CD-RW	

1.7   CD-RW/DVD-ROM Drive

The CD-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-RW/DVD-ROM drive specifications (1/2)

Item		Specifications
		MATSUSHITA G8CC001X411
ATAPI Burst (Mbytes/s)		16.6 (PIO mode) 16.6 (DMA mode) 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
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-RW/DVD-ROM drive specifications (2/2)

Item		Specifications
		TEAC G8CC0001Y411
ATAPI Burst (Mbytes/s)		33.3 max
Average access time (msec)	CD-ROM	90
	DVD-ROM	110
Data Buffer Capacity		-
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, CD-ROM (Mode1, Mode2), CD-ROM XA Mode2 (Form 1, Form2) Photo CD (Single/Multi-border) Enhanced CD, CD-TEXT, DVD-ROM DVD-R (General Authoring, Single/Multi-border) DVD-RW (Single/Multi-border) DVD-Video DVD-RAM (4.7GB, 2.6GB) DVD+R/RW ((Single/Multi-session, Packer)

1.8   DVD±R/±RW Drive

This full size DVD±R/±RW drive module lets you record data to rewritable CD/DVDs as well as run either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD without using an adaptor. It is a high-performance drive. It reads CD-ROM and CD-R/RW at maximum 24-speed, DVD at maximum 8-speed, DVD-R/-RW and DVD+R/+RW at maximum 8-speed. It writes CD-R/-RW at maximum 24-speed, DVD-R/+R at maximum 8-speed and DVD-RW/+RW at 4-speed.

The specifications for the DVD ±R/±RW drive are described in table 1-6.

Table 1-6   DVD±R/±RW drive specifications

Item	Pioneer G8CC00020410
ATAPI Interface	SFF-8090 Ver5, ATA5, MMC3
IDE Data Transfer Mode	PIO Mode4, Multi Word DAM Mode2, Ultra DMA Mode2
Average access time (ms) DVD-ROM CD-ROM	 150 130
Data buffer (MB)	2

Supported format (Read)	CD: KODAK Photo CD (single and multiple
	          session)
	         CD Extra (CD Plus), Mixed CD
	         CD-ROM/XA, CD text
	         CD-R, CD-RW
	
	DVD : DVD-ROM, DVD-R (Ver.2.0)
	         DVD-RW(Ver.1.1, Ver.1.2), DVD+R,
	         DVD+RW

1.9   DVD±R/±RW/-RAM (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 16-speed, CD-RW at maximum 8-speed, DVD-R at maximum 4-speed, DVD-RW at maximum 2-speed, DVD+R at maximum 2.4-speed, DVD +RW at maximum 2.4-speed, and DVD-RAM at maximum 2-speed.

The specifications are listed in Table 1-7.

Table 1-7   DVD Super Multi drive specifications(1/2)

Item	MATSUSHITA G8CC0001S410
ATAPI Burst (MB/sec)	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 (MB)	2

Supported format (Read)	CD: CD-DA, CD-ROM, CD-R, CD-RW
	        CD-ROM XA, Photo CD, Video CD
	        CD-Extra (CD+), CD-Text
	DVD : DVD-VIDEO, DVD-ROM
	        DVD-R (3.9GB, 4.7GB)
	        DVD-RW (Ver.1.1)
	        DVD-RAM (2.6GB, 4.7GB, 9.4GB)
	        DVD+R, DVD+RW

Table 1-7 DVD Super Multi drive specifications (2/2)

Item	MATUSHITA G8CC00021410
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
	 150

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) DVD-Video, DVD+R, DVD-RW, DVD-RAM(2.6GB/4.7GB)

1.10 Keyboard

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

Figure 1-7 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-7   Keyboard

1.11 TFT Color Display

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

1.11.1 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 MEP43L can control both internal and external XGA- or SXGA+- support displays simultaneously.

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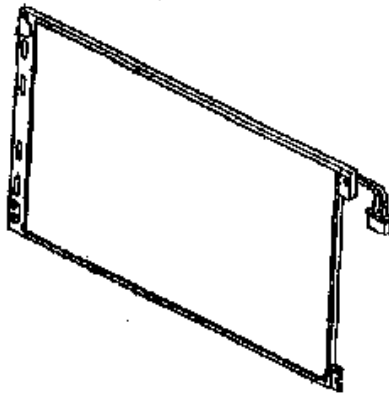
Figure 1-8   LCD module

Table 1-8   LCD module specifications (1/4)

Item	Specifications
	14.1-inch XGA TFT (G33C0001P110)
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 1-8   LCD module specifications (2/4)

Item	Specifications
	14.1-inch XGA TFT (G33C0001M110)
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 1-8   LCD module specifications (3/4)

Item	Specifications
	14.1-inch XGA+ TFT (G33C00025110)
Number of Dots	1,024 (W) x 768 (H)
Dot spacing (mm)	0.279 (H) x 0.279 (V)
Display range (mm)	228 (H) x 299 (V)

Table 1-8   LCD module specifications (4/4)

Item	Specifications
	14.1-inch SXGA+ TFT (G33C00022110)
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)

1.11.2   FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.
Table 1-9 lists the FL inverter board specifications.

Table 1-9   FL inverter board specifications

Item		Specifications	
		G71C00011121	**G71C00011110**
Input	Voltage (V)	DC 5	
	Power (W)	7	
Output	Voltage (V)	750	
	Current (mA)	6.00	
	Power (mA)	5W/7VA	

1.12 Power Supply

The power supply supplies many different voltages to the system board and performs the following functions:

1. Checks power input to determine:

    - Whether the AC adaptor is connected to the computer.
    - Whether the battery pack is installed and supplying power.

2. Checks power supply's internal controls:

    - Battery pack charging: start, stop and voltage supplied to the battery pack
    - Power supply system: Power supplied from a DC power source (AC adaptor)
    - Faulty power supply: Executes forced shutdown if needed
    - Logic: Power supply to various circuits
    - Charging current to PWM control IC for battery pack charging

3. Controls the following aspects of the logic system;

    - Power supply to gate arrays
    - Power on/off

4. Indicates the following:

    - DC IN (sets LED to orange or green)
    - Battery icon (sets LED to orange or green)
    - Faulty power supply by low battery

5. Interface for the following:

    - BIOS via EC/KBC
    - Function mode of power supply

6. Detects the following:

    - Input voltage to logic system
    - Input voltage, overvoltage and input/output to battery pack
    - Battery pack's internal temperature
    - Input voltage to DC power supply (output from AC adaptor)

The power supply output rating is specified in Table 1-10.

Table 1-10   Power supply output rating

Name	Voltage (V)	Use
PPV	0.748-1.308	CPU
PTV	1.05	CPU, MCH, ICH6-M
1R5-P1V	1.5	CPU, MCH, ICH6-M, Express Card
1R8-B1V	1.8	MCH, DDR2-SDRAM
2R5-P2V	2.5	MCH, CH6-M
MR0R9-B0V	0.9	MCH, DDR2-SDRAM
0R9-P0V	0.9	DDR2-SDRAM
1R5-S1V	1.5	ICH4-M
P3V	3.3	Clock Generator, Thermal Sensor, SDRAM(SPD), ICH6-M, SATA Bridge, PC CARD Cont., Mini-PCI, TPM, Express Card, FWH, AD1981B, Super I/O, EC/KBC FIR, GPU, LCD
E3V	3.3	PC CARD Cont., PC Card Power, Mini-PCI, Express Card, MDC, RS232C
LAN-E3V	3.3	LAN Power
LAN2R5-E2V	2.5	LAN Power
BT-P3V	3.3	Bluetooth
S3V	3.3	ICH6-M, EC/KBC, PSC
P5V	5	CRT, ICH6-M, FL inverter, LEDs, HDD, KB, PAD, Parallel, Bluetooth Power
SB-P3V	3.3	Select Bay
ICH-S5V	5	ICH6-M
ICH-S3V	3.3	ICH6-M
ICH1R5-S1V	1.5	ICH6-M
SND-P5V	5	AN12940AA(Amp)
A4R7-P4V	4.7	AD1981B, Amp, Head Phone, Ring Phone
E5V	5	PC Card Power, USB Power
M5V	5	ICH6-M, MAX6501, LED
MCV	5	PSC
R3V	2.0-3.5	ICH6-M(RTC)

1.13 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 1-11.

Table 1-11   Battery specifications

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	10.8 V	8,800 mAh
			4,700 mAh
2nd battery	Lithium-Ion	10.8 V	3,600 mAh
RTC battery	NiMH	2.4 V	16 mAh

1.13.1   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.

1.13.2 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 1-12 lists the charging time required for charges.

Table 1-12   Time required for charges

Battery type	Power on (hours)	Power off (hours)
High capacity battery (8,800 mAh)	About 9.0 to 21.5	About 4.5
Battery (4,700 mAh)	About 5.5 to 13.0	About 3.0
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.

1.13.3   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 1-13 lists the charging time and data preservation period of the RTC battery.

Table 1-13   RTC battery charging/data preservation time

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

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	

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.

Figure 2-1 Troubleshooting flowchart (1/2)

①

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

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	Adaptor (AC Adaptor, DS)	AC Adaptor is not connected. Error code begins with : 0x10 Error code ends with : 0x1F
2*h	1st battery	The 1st Battery is not connected. Error code begins with : 0x20 Error code ends with : 0x2F
3*h	2nd Battery	The 2nd Battery is not connected. Error code begins with : 0x30 Error code ends with : 0x3F
4*h	S3V output (P60)	Operating Power ON Error code begins with : 0x40 Error code ends with : 0xEF
5*h	1R5-C1V output (P61)	
6*h	A-C3V output (P62)	
7*h	PPV output (P63:CH0)	
8*h	E5V output (P64:CH0)	
9*h	PTV output (P65:CH0)	
A*h	1R8-B1V output (P66:CH0)	
B*h	PTV output (P63:CH1)	
C*h	E3V output (P64:CH1)	
D*h	PTV output (P65:CH1)	
E*h	1R8-B1V output (P66:CH1)	
F*h		

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

❑ DC IN

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	Common Dock 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	Current sensing IC is not normal.

❑ 1st Battery

Error code	Meaning
20h	Overvoltage is detected. (Not supported)
21h	1st battery charge current is over 7.00A.
22h	1st battery discharge current over 0.5A when there is no load.
23h	1st battery charge current is over 3.9A when AC adapter is not connected.
24h	Current sensing IC is not normal.
25h	1st battery charge current is over 0.3A.

❑ 2nd Battery

Error code	Meaning
30h	Overvoltage is detected. (Not supported)
31h	Secondary battery charge current is over 7.00A.
32h	Secondary battery discharge current is over 0.5A when there is no load.
33h	Secondary battery charge current is over 3.1A when AC adapter is not connected.
34h	Current sensing IC is not normal.
35h	Secondary battery charge current is over 0.3A.

❑ S3V output (P60)

Error code	Meaning
40h	S3V voltage is 2.81V or less when the computer is powered on/off.
45h	S3V voltage is 2.81V or less when the computer is booting up. (CV support)

❑ 1R5-C1V output (P61)

Error code	Meaning
50h	1R5-C1V voltage is over 1. 80V when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
54h	1R5-C1V voltage is abnormal when the computer shuts down. (CV support)
55h	1R5-C1V voltage is 1.275V or less when the computer is booting up. (CV support)

❑ A-C3V output (P62)

Error code	Meaning
60h	A-C3V voltage is over 3.96V when the computer is powered on/off.
61h	A-C3V voltage is 2.81V or less when the computer is powered on.
62h	A-C3V voltage is 2.81V or less when the computer is booting up.
63h	A-C3V voltage is 2.81V or less when the computer is booting up.
64h	A-C3V voltage is abnormal when the computer shuts down. (CV support)
65h	A-C3V voltage is 2.81V or less when the computer is booting up. (CV support)

❑ PPV output (P63:CH0)

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

❑ E5V output (P64:CH0)

Error code	Meaning
80h	E5V voltage is over 6.00V when the computer is powered on/off.
81h	E5V voltage is 4.50V or less when the computer is powered on.
82h	E5V voltage is 4.50V or less when the computer is booting up.
83h	E5V voltage is 4.50V or more when the computer is powered off.
84h	E5V voltage is 4.50V or less when the computer is suspended.

❑ PTV output (P65: CH0)

Error code	Meaning
90h	PTV voltage is over 1.26V when the computer is powered on/off.
91h	PTV voltage is 0.89V or less when the computer is powered on.
92h	PTV voltage is 0.89V or less when the computer is booting up.
93h	PTV voltage is 0.89V or more when the computer is powered off.
94h	PTV voltage is 0.89V or less when the computer is suspended.

❑ 1R8-B1V output (P66:CH0)

Error code	Meaning
A0h	1R8-B1V voltage is over 2.40V when the computer is powered on/off.
A1h	1R8-B1V voltage is 1.53V or less when the computer is powered on.
A2h	1R8-B1V voltage is 1.53V or less when the computer is booting up.
A3h	1R8-B1V voltage is 1.53V or less when the computer is suspended.
A4h	1R8-B1V voltage is 1.53V or less when the computer is booting up. (CV support)

❑ PGV output (P63:CH1)

Error code	Meaning
B0h	PGV voltage is over 1.62V when the computer is powered on/off.
B1h	PGV voltage is 0.68V or less when the computer is powered on.
B2h	PGV voltage is 0.68V or less when the computer is booting up.
B3h	PGV voltage is 0.68V or more when the computer is powered off.

❑ E3V output (P64:CH1)

Error code	Meaning
C0h	E3V voltage is over 3.96V when the computer is powered on/off.
C1h	E3V voltage is 2.81V or less when the computer is powered on.
C2h	E3V voltage is 2.81V or less when the computer is booting up.
C3h	E3V voltage is 2.81V or more when the computer is powered off.
C4h	E3V voltage is 2.81V or less when the computer is suspended.

❑ PTV output (P65:CH1)

Error code	Meaning
D0h	PTV voltage is over 1.26V when the computer is powered on/off.
D1h	PTV voltage is 0.89V or less when the computer is powered on.
D2h	PTV voltage is 0.89V or less when the computer is booting up.
D3h	PTV voltage is 0.89V or more when the computer is powered off.
D4h	PTV voltage is 0.89V or less when the computer is suspended.

❑ 1R8-B1V output (P66:CH1)

Error code	Meaning
E0h	1R8-B1V voltage is over 2.40V when the computer is powered on/off.
E1h	1R8-B1V voltage is 1.53V or less when the computer is powered on.
E2h	1R8-B1V voltage is 1.53V or less when the computer is booting up.
E3h	1R8-B1V voltage is 1. 53 V or more when the computer is powered off.
E4h	1R8-B1V voltage is 1.53V or less when the computer is suspended.

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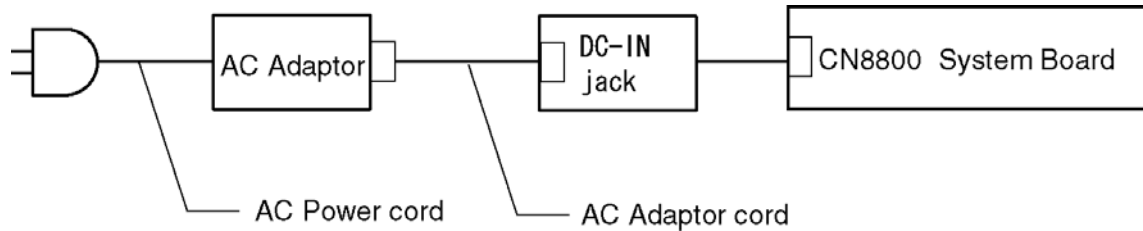
Any of the connectors may be disconnected. Perform Check 1.

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 06 (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:   Debug Port Check

        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) or (20) 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)   IDE #0 ERROR
    (21)   IDE #1 ERROR
    (22)   TIMER INTERRUPT ERROR
    (23)   RTC UPDATE ERROR

Procedure 2   Debug Port Check

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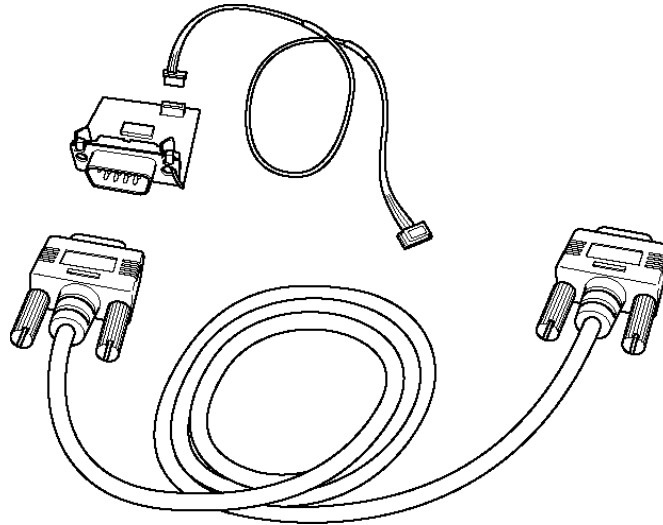
Figure 2-2 A set of tool for debug port test

The test procedures are follows:

1. Connect the debug test cable to the connector CN3400 of the system board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross cable to the test board.
3. Connect the RS-232C cross cable to the PC that displays the test results.
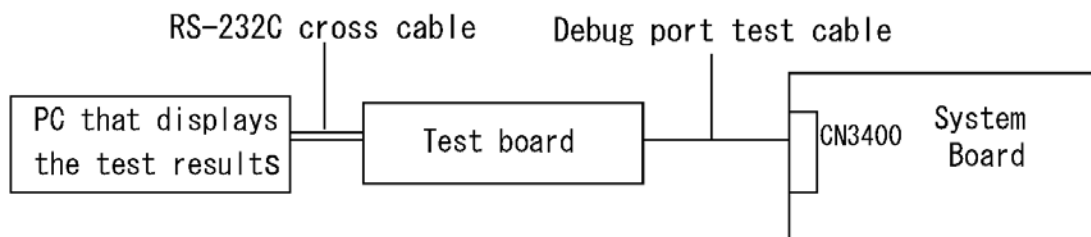
4. Boot the computer in MS-DOS mode.
5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into USB FDD and input "FD starting drive:>dport".)
6. When the D port status is FFFFh (normal status), go to Procedure 3.
7. When the D port status falls into any status in Table 2-5, go to Procedure 4.

Table 2-5 Debug port LED boot mode status (1/7)

LED Status	Item	Contents/Message
	Start	Clearance of software reset bit
		Permission of A20 line
		Initialization for special register and Intel chip set
	PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite flag initialization	
	Checksum check (FEF00000h-FEFF7FFFh)	Transition to protected mode
		Boot block checksum (HLT when checksum error occurred.)
		Checksum check except boot block
B1h	EC/KBC rewrite check	Transition to BIOS rewriting when required
B2h	Start initializing the SC	(HLT when Initialization for SC error occurred) B3H
		(HLT when processing the SC can not be continued by the HW failure) B4H
	Executing initialization of KBC sequence	transmission of KB enable command
		Key check at Boot Block
B5h	Enabling CPU cache	
B6h	BIOS signature check	
	BIOS rewrite request check	Checksum error except boot block (When key rewriting is requested, go to BIOS rewrite process)
B7h	Transition of the process to System BIOS IRT side	
	Rewriting BIOS	H/W initialization
		Setting of base for Power Management I/O Space
		Permission of BIOS writing
		Serial interrupt control
		Releasing BIOS rewrite protection
		Enabling SM Bus I/O space
		Enabling SM Bus access
		Opening work I/O for SDRAM initialization
		Setting FDC port
		Initialization of PIT channel 1 (Setting refresh interval to 30ms)
		Initialization of PIT, DMAC, PIC
		Prohibition of cache

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

LED Status	Item	Contents/Message
(B7h)		Memory type check
		Initialization of cache Bus L2 configuration
		Permission of cache
		Prohibition of L2 cache
		Memory clear
B9h	Setting of TASK_1ms_TSC	
	FAN control	
	Sound controller initialization (for beep)	Enabling system speaker setting
	Controlling LED instead of display massage	Reading security status
		Reading policy (When reading error above is occurred, beep sounds every one second for thirty seconds)
	Key input (Key input is skipped when the BIOS is damaged)	Sound beep
	Reading CHGBIOS.EXE	FDC reset
		Setting of parameter for 2HD (1.44MB), transmission rate
		Reading first sector
		When using 2HD (1.44MB), go to Search of entry for CHGBIOSA.EXE
	Setting of parameter for 2DD (720KB), transmission rate	Search of CHGBIOSA.EXE from route directory
		Calculation of directory start head, sector
		Reading contents of route directory by one sector
		Search of entry for "CHGBIOSA.EXE" from the sector read
		Reading of EXE header of "CHGBIOSA.EXE" key input when an error occurred
		Execute "CHGBIOSA.EXE"/"CHGFIRMA.EXE"
00h	CHECK_SYSTEM	
	Prohibition of cache	
	Initialization of special register and Intel chipset	
	PIT CH1 initialization	(Setting refresh interval to 30μs)

Table 2-5 Debug port LED boot mode status (3/7)

LED Status	Item	Contents/Message
01h	Check of DRAM type and size	(Reading DRAM size at Warm Boot) (DRAM check at Cold Boot))
11h	Check of DRAM size	(HLT when the DRAM type is 0.)
	SM-RAM stack area test	(HLT when the stack area can not be used.)
02h	Permission of Cache (L1 cache only)	
	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	(Boot status, the remaining bit is 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	SM-RAM checksum check (Resume error 0F4H)
		Check of memory configuration change
		RAM area checksum check in system BIOS (Resume error 0FAH)
		PnP RAM checksum check (Resume error 0F8H)
		PIT test and initialization (HLT when refresh signal is not changed.)
		Initialization of PIT CH0 (Setting of timer interrupt interval to 55ms)
		Initialization of PIT CH2 (Setting of sound generator frequency to 664Hz)
		Transition to RESUME-MAIN
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Initialization of memory map
	Boot mode process (in no resume)	Check hibernation from S4 OS
		Check hibernation status code
		ROM/RAM copy of system BIOS (HLT when copied BIOS checksum error.)

Table 2-5 Debug port LED boot mode status (4/7)

LED Status	Item	Contents/Message
04h	BIOS signature check (at Cold Boot)	
05h	SMRAM initialization	
	Check of Wake Up factor	
	Rewriting of SMRAM base and storing CPU state map for BIOS (Enabling SMI only by ASMI)	

06h	Initialization of a device which needs initialization before initialization of PCI bus	PIT test (at the Cold Boot) and initialization
		
		  Setting of test pattern for PIT#0 of CH0
		
		  Check whether the test pattern set can be read.
		
		  Initialization of PIT CH0 (Setting of timer interrupt interval to 55ms)
		
		  Initialization of PIT CH2 (Setting of sound generator frequency to 664Hz)
		
		  Test of PIT CH1 (Check whether a refresh signal is working properly when refresh interval is set to 30ms. HLT when the time is out.)
		
		  Test of PIT CH2 (Check whether the speaker gate is working properly.)

		Measuring of CPU clock
		Enabling SMI except for auto-off function
		Check of parameter block A
		Control of input voltage over rating
		Control of battery discharge current
		Control of AC adapter over current rating
		Division process of measuring IRT time
		Setting for clock generator

		CPU initialization
		
		  Setting of CPU core frequency
		
		  Setting of Gsv high and low frequency
		
		  Check of Geyserville support
		
		  Setting of CPU clock to high

07h	Storing memory configuration in buffer	
	Reading EC version	
	Update of flash ROM type	
	Evaluation of destination (home/overseas) by DMI data	

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

LED Status	Item	Contents/Message
(07h)	Setting default when a CMOS default (Bad Battery, Bad Checksum (ROM, CMOS)) check	
	Initialization of ACPI table (for executing an option ROM)	
	Initialization of a device that needs initialization before PCI bus initialization	AC'97 control
		Initialization of temperature control information
		Initialization of HC sequence start, Recognition of device
		VGA display off and reset control
		KBC initialization
		Sound initialization
		Acquisition of multi box status
		Start of HC initialization sequence and device recognition
		Control of interval LAN enable/disable
	PIC initialization	
	PIC test	
	Password initialization	
08h	PCI Bus initialization	
	Initialization of LAN information	
	Check of Wakeup factor	
09h	Running a task waiting for the end of INIT PCI	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup item	Setting of power on enable
		Clearance of Wake Up condition
		Controling CPU speed
		Controling panel open/close
	Initialization of PC card slot	
0Ah	Running a task waiting for the end of PnP resource	
	Serial interrupt control	
	Initialization of H/W related to PnP	

Table 2-5 Debug port LED boot mode status (6/7)

LED Status	Item	Contents/Message
(0Ah)	PCI automatic configuration	Creating a work area for auto configuration
		Configuration
		Storing the results of VGA configuration
0Bh	Initialization of H/W that is necessary after PCI configuration	
	Enabling power off	
0Ch	Check memory of first 64KB	
0Dh	Vector initialization	
0Eh	NDP initialization	
0Fh	System initialization	Storing CMOS error status in IRT_ERR_STS_BUF
		Start of TIMER initialization
		Initialization of EC and Reading battery information
		Update of system BIOS (model name, EDID of the LCD)
		Setting of DRAM window from memory size
		SMI Permission of Dock Port Multi box
11h	Display initialization	
12h	Display initialization	(VGA chip, Waiting for the end of initialization, initialization of VGA BIOS)
13h	LOGO display	
14h	System memory check	(Conventional memory check) (Boot)
15h	Extension memory check	(Check of exceptional cases in protected mode) (Boot)
16h	Extension memory check	(Occurrence of exceptional case)
17h	System memory initialization	(Conventional memory initialization) (Reboot)
18h	DMA page check	(Boot)
19h	DMAC check	(Boot)
1Ah	DMAC initialization	(Boot)
1Bh	Printer check	
1Ch	SIO check	
1Dh	Boot password	(Password check)
		(Waiting for the end of INIT_KBC division process)
1Eh	Extension I/O ROM check	(Option I/O ROM check)

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

LED Status	Item	Contents/Message
1Fh	Pre boot setup	Storing the value of 40:00h (for SIO save/restore)
		Font address setting for resume password
		Setting of parameter for character repeat on a USB keyboard
		Getting keys pressed during the IRT
		Storing T_SHADO_RAM_SIZE
		Reflecting expansion memory size to CMOS
		Update of system resources information just before booting
		Updating a table for DMI
		Rewriting memory map data for INT15h E820h
		Rewriting Wake UP factor of DMI and SM-BIOS structure table
		Copying an ACPI table to the top of an expansion memory
		Waiting for the end of writing PSC version on BIOS
		Waiting for the end of clock generator setting and check (Stop at LED=20H when an error occurred)
		Waiting for the end of serial port initialization
		Canceling NMI Mask
		Examining the checksum of TIT
		Clearance of IRT running flag for runtime
		Updating checksum for runtime
		Branching to hibernation
		Bluetooth initialization
		Check upgrade of CPU, HDD, etc.
		Check whether a target maintenance card is set
		Disabling a PC card not used
		Setting of Wake UP status data for ACPI
		HW initialization prior to boot, Waiting for the end of HW initialization
		SID of SC initialization
		Cutting power consumption of built-in LAN
21h	IRT post end	
FFh		

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 CN4600 (USB port 0) or CN4601 (USB port 3) on the SN board and the SN cable is firmly connected to CN9501 on the system board and CN9511 on the SN board.
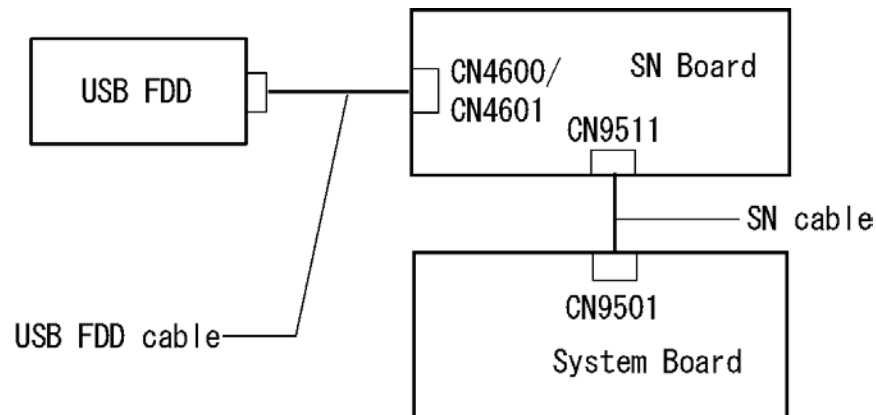
      If any of the connections are loose, reconnect firmly and repeat Procedure 2.
      If any of the connections is damaged, or there is still an error, go to Check 2.

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 SN board or SN 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 CN1800 on the system board.
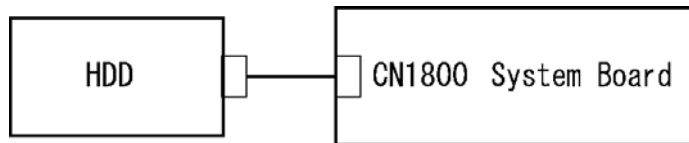
```
┌──────────────┐   ┌┐   ┌─────────────────────────┐
│              │   ││   │┌┐                        │
│     HDD      │───┤├───┤││ CN1800  System Board   │
│              │   ││   │└┘                        │
└──────────────┘   └┘   └─────────────────────────┘
```

    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 and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector and Replacement Check

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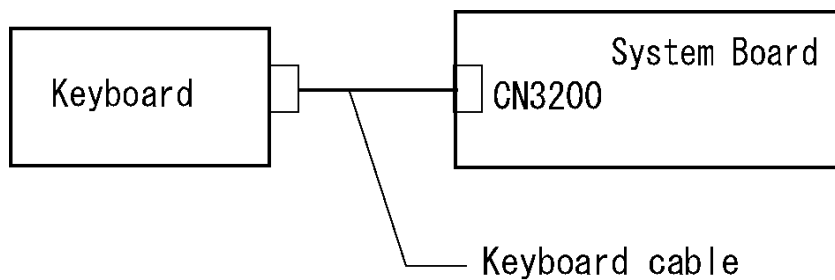
If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

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 7.

Check 3   Make sure the touch pad cable is firmly connected to CN3201 on the system board.
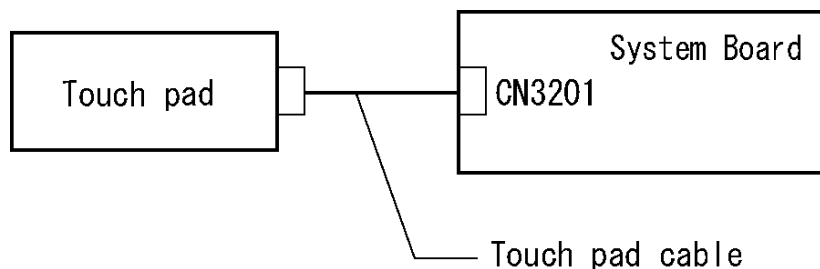
If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 4.

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 7.

Check 5   Make sure the sensor/switch cable is firmly connected to the connector CN9600 on the system board and to connector PJ9610 on the sensor/switch board.
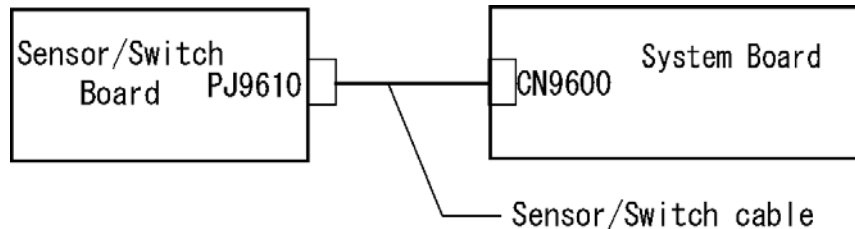
```
 Sensor/Switch                            System Board
      Board    PJ9610 ┌┐            ┌CN9600
                      └┘            └
                                   /
                          ┌────── Sensor/Switch cable
```

If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 6.

Check 6   The sensor/switch board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If there is still an error, go to Check 7.

Check 7   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*.
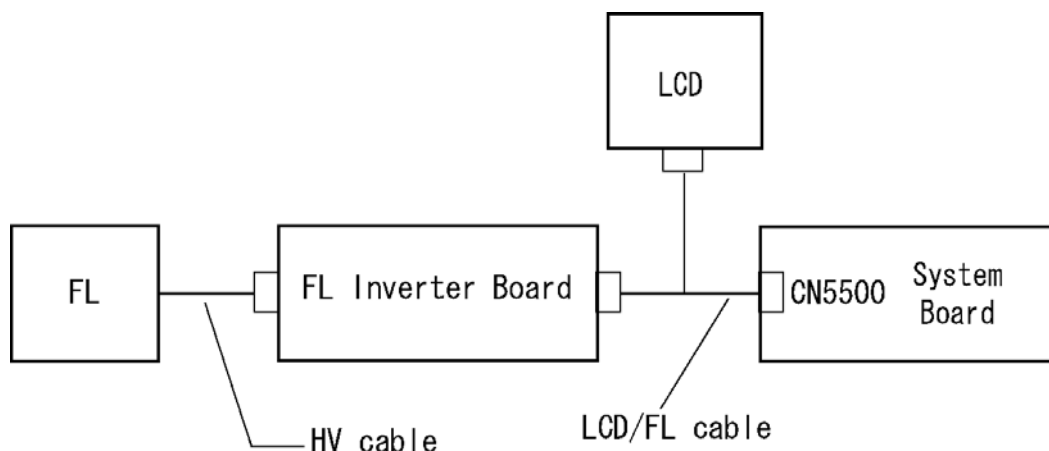
If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 4.

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-RW/DVD-ROM, DVD±R/±RW or 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-RW/DVD-ROM, DVD±R/±RW or 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.
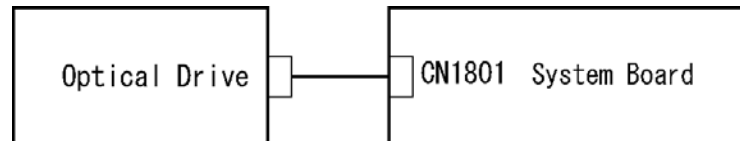
         If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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 CN3000 on the system board, and the MDC cable is connected to CN3001 on the system board and the connector of the MDC.
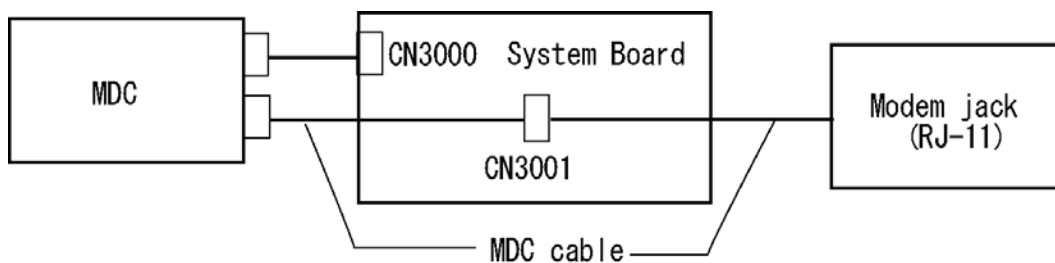
    If a connector is disconnected, connect it firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

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.

```
┌────────────────────┐         ┌──────────────────────────┐
│                    │         │ ┌┐                        │
│  LAN jack          │─────────│ ││CN4100  System Board     │
│  (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:
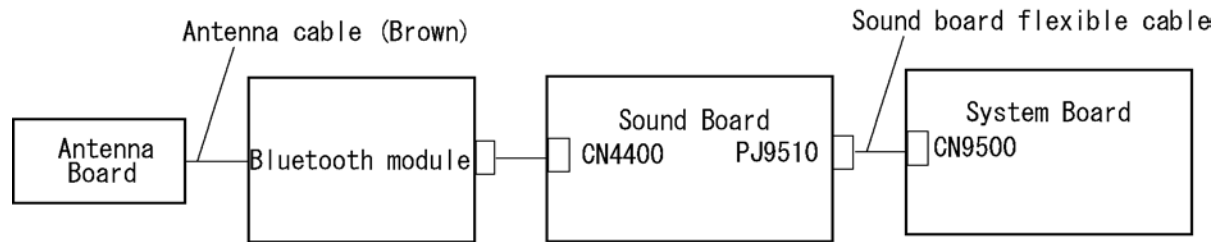
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

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

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

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

        If the Bluetooth antenna cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function is still not functioning properly, perform Check 3.

Check 3   Make sure the sound board flexible cable is firmly connected to PJ9510 on the sound board and CN9500 on the system board.

        If the sound board flexible cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function 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 sound board may be defective or damaged. Replace the sound board 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 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 4.

Check 4   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.

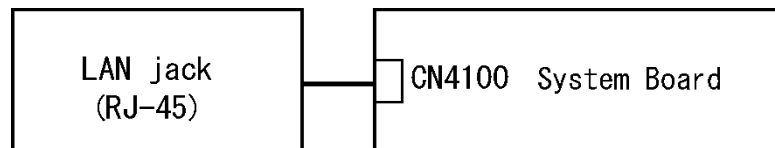Check 1   Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN.

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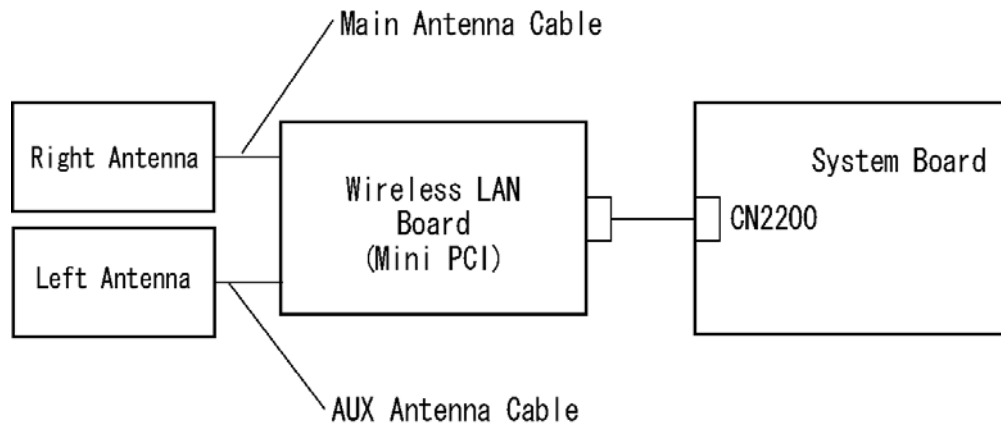
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the wireless LAN board is firmly connected to CN2200 on the system board.

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

Check 2   Make sure the wireless LAN antenna cables (black and white) are firmly connected to the wireless LAN board.

            If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN function 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:
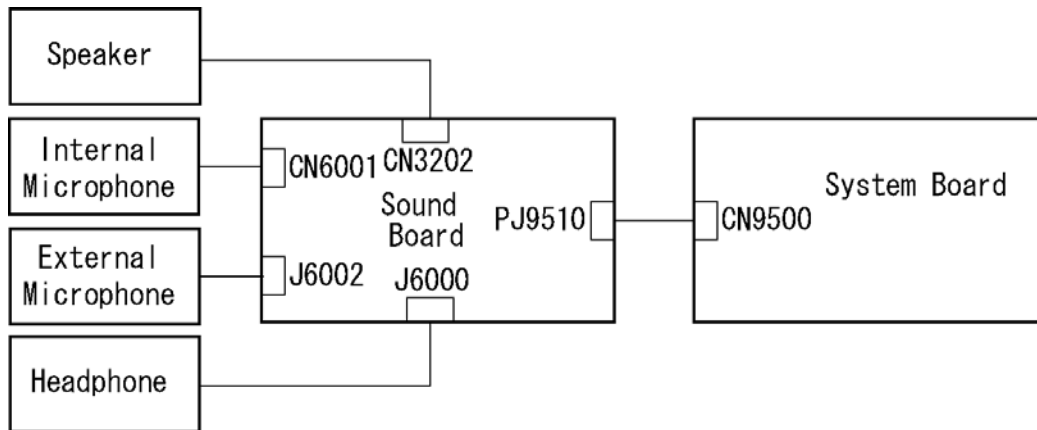
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

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 CN3202 on the sound 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 J6000 on the sound 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 CN6001 on the sound board. When using the external microphone, make sure the external microphone cable is firmly connected to J6002 on the Sound board. If the microphones are still not functioning properly, go to Check 4.

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

            If the sound board flexible cable is disconnected, connect it firmly and perform Procedure 1. 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 sound 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               │
 │             │         │                      │
 └─────────────┘         └──────────────────────┘
```
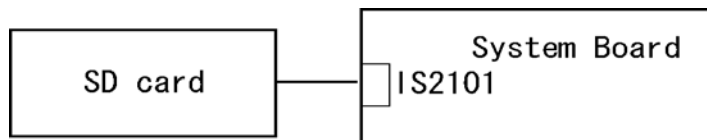
Check 1   The SD card and the System Board may be disconnected. Make sure the SD card is firmly inserted to IS2101 on the System Board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

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.

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
- ❑ Region write
- ❑ 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.

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

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

Enter a choice: 1
```

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

Note: *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, select `1- Repair Main (T&D)` 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        [It is not supported]
 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    : XXXXXX STATUS     : XXX

SUB-TEST MENU :

01 - ROM checksum
02 - Fan ON/OFF
03 - Geyserville
04 - Quick charge
05 - DMI read
99 - Exit to DIAGNOSTIC TEST MENU


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

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

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

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

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

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

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

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

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

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

```
ERROR STATUS NAME    [[ HALT OPERATION ]]

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

These three selections have the following functions respectively:

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

Selecting **NO** keeps the test running even if an error is found. When an error occurred, the error status is displayed and one error is added to the error counter.

Table 3-1 in section 3.5 describes the function of each test on the subtest. 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                    *
*      2 ............................. Region write                             *
*      8 ............................. System configuration display             *
*      9 ............................. E2PROM test (MAC/GUID/DMI)                *
*******************************************************************
... Press test number [1,2,8,9] ?
```

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, select `2-Repair initial config set` 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 02   Region write

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

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

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

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

Subtest 03   DMI information save

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, select `3-Repair heatrun` 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 02 03	Ripple pattern Function Wraparound
7	ASYNC	01 02 03	FIR/SIR Point to point (send) FIR/SIR Point to point (receive) Wraparound (board)
8	HARD DISK	01 02 03 04 05 06 07 08 09	Sequential read Address uniqueness Random address/data Cross talk & peak shift Partial Read Write specified address Read specified address Sequential write W-R-C specified address
9	REAL TIMER	01 02 03	Real time Backup memory Real time carry
10	NDP	01	NDP
11	EXPANSION	01 03	PCMCIA wraparound [Not supported] RGB monitor ID
12	CD-ROM /DVD-ROM	01 02 03 04	Sequential read Read specified address Random address/data 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 sub-test 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 $\rightarrow$ OK
> Number of misses $\geq$ Number of hits $\rightarrow$ 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.
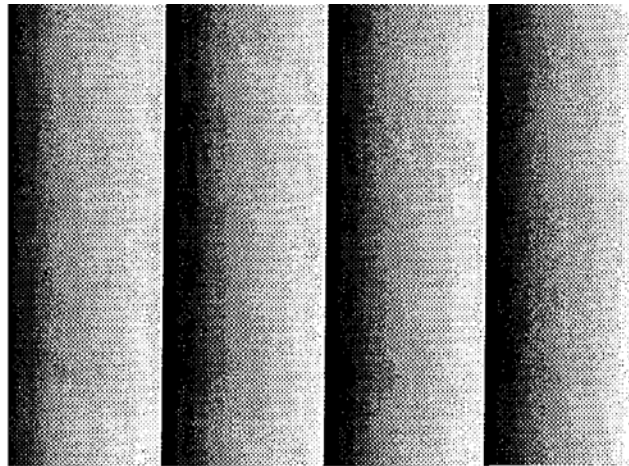
To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

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.
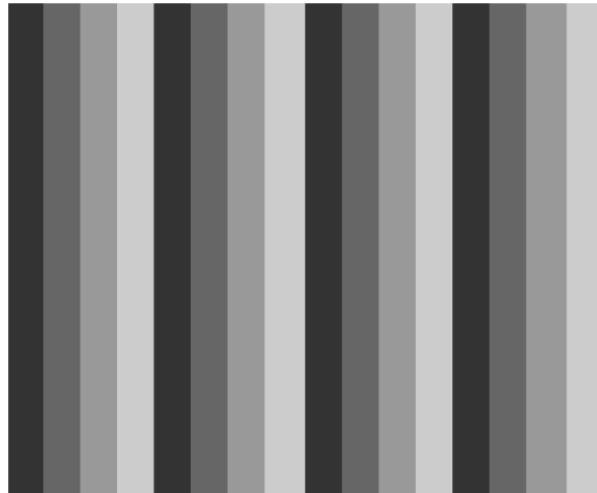
(Display example: Mode 12)

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.

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

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

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

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 wrap around

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                      *
*    9 ...........   Common Test                              *
*                                                             *
***************************************************************
.... Press test number[1-9] ?
```

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
```
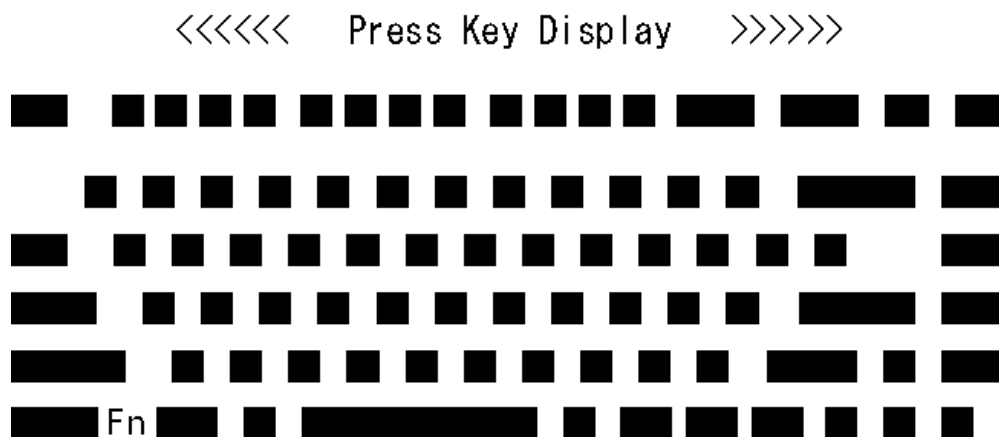
Subtest 02   Touch Pad

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 moving of the Internet button.

Press the Console button after the following message appears.

```
Press [ Console ] button
```

This subtest checks moving of the Presentation button.

Press the Mail button after the following message appears.

```
Press [ Presentation ] button
```

If the test ends successfully, the display returns to the KEYBOARD 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                                  *
*   1 ............   Port 1                                  *
*   9 ............   EXIT                                    *
*                                                            *
**************************************************************
.... 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 Common Dock 3 installed.

Press **Enter** while pushing the eject button of the Common Dock 3 after the following message appears.

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

Press **Enter** without pushing the eject button of the Common Dock 3 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 Common Dock 3 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

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.

When it passes the test, following message appears.

```
Device Lock TEST OK… Press any key to continue…..
```

When it passes the test, following message appears.

```
Device Lock TEST NG…Press any key to continue…
```

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

```
PC Card Not Inserted… Press any key to continue…
```

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

3.21 Head Cleaning

3.21.1 Function Description

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

3.21.2 Operations

1. Selecting 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           Write data   Error status name
  │     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 ] = XXXXXXXX

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

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration.

```
[HDD ID Read (VX.XX)] [Drive #1]
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. SVP parameter version [Panel/Manufacture code/Product code]
8. Micro code revision [Processor number]
9. Total Memory Size [Conventional memory]
10. Battery code
11. HWSC
12. FSB [Voltage]
13. The number of printer ports
14. The number of ASYNC ports
15. Math co-processors
16. Floppy Disk Drive [Track/Head/Sector]
17. Hard Disk Drive [Sector/Drive size/Manufacture code]
18. Optical Disk Drive [Maker/Drive type/Manufacture code/Product code]
19. T&D total version
20. Date/Time

3.25.2 Operations

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

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

*  - Processor Type     = XXXXXX-XXXXXMHz      Code = XX    L2 Cache = XXXXXKB
*  - Chip set           = XXXXXX                 VRAM = 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
*  - SVP Par. Version   = VX.XX    (Panel=XXXXXXXXX, Manu=XXXX, Prod=XXXX)
*  - 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) [XXXXXXXXXXXXXXXXX]
*  - ODD                = XXXX XXXXXXXX XXXXXXXXX [XXXXXXXXXXXX]
*  - T&D Total Version  = VX.XX

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

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

3.26 Wireless LAN Test Program (Intel-made Calexico2 a/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/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 Wireless LAN Test Program (Intel-made Calexico2 b/g)

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

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

The following menu appears in the display.

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

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

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

Subtest 01   SKU check of module

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

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

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

        Press any key to return to the test menu.

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

- Bad connection of wireless LAN card

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

- Defective wireless LAN card

Check the connection and execute the subtest again.

Subtest 02   MAC Address Check

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

```
********************MAC CHECK*****************************
        MAC = XXXXXXXXXXXX

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

Press any key to return to the test menu.

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

```
********************MAC CHECK*****************************
        ERROR: MAC all 0
        MAC = XXXXXXXXXXXX

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

Press any key to return to the test menu.

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

- Bad of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Check the connection and execute the subtest again.

Subtest 03   Antenna check & communication test of 11b mode

Caution:	*To execute subtest 03-05, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a responder machine. Access points are also required. (Access point for 802.11b and 802.11g)*
	Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)
	Release the write-protection of floppy disk for the test.
	Turn on the responder machine before selecting subtest 03-05.

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

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

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

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

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

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

Press any key to return to the test menu.

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

- Bad connection of wireless LAN card

- Bad connection of wireless LAN antenna cable (Main/Aux)

- Bad environment for wireless LAN communication (Interference/ obstruction)

- Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

Subtest 04   Communication test of 11g mode

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

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

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

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

Press any key to return to the test menu.

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

- Bad connection of wireless LAN card

- Bad connection of wireless LAN antenna cable (Main)

- Bad environment for wireless LAN communication (Interference/ obstruction)

- Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

Subtest 05   All the tests of Calexico 11b/g Card

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

3.28 Wireless LAN Test Program (Askey-made Atheros)

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

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

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

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

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

Setting the responder machine

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

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

2. The program for responder machine starts automatically.

3. The program for responder machine is set.

Setting the tester (DUT) machine

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

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

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

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

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

---

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

```
*******************************************************
*     Atheros MB4x(MB44ag/43g) Maintenance T&D Menu   *
*                                                     *
*     1 : SKU check of Module                         *
*                                                     *
*     2 : MAC Address Check                           *
*                                                     *
*     3 : Communication test of 11a mode(MB44ag)      *
*                                                     *
*     4 : Communication test of 11b mode(MB44ag/MB43g)*
*                                                     *
*     5 : Communication test of 11g mode(MB44ag/MB43g)*
*                                                     *
*     6 : All the tests of MB43g Module               *
*        (SKU & MAC Check, 11b/g communication test)  *
*                                                     *
*     7 : All the tests of MB44ag Module              *
*        (SKU & MAC Check, 11a/b/g communication test)*
*                                                     *
*******************************************************
SELECT TEST No. (1-7) :
```

Subtest 01   SKU check of module

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

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

Press any key to return to the test menu.

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

- Bad connection of wireless LAN card

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

- Defective wireless LAN card

Check the connection and execute the subtest again.

Subtest 02   MAC Address Check

This subtest reads out the MAC address of the card installed and confirms if it is valid. When the MAC address is valid one, following message will appear in the display.

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

Press any key to 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

Check the connection and execute the subtest again.

Subtest 03   Communication test of 11a mode (MB44ag)

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

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

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

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

Press any key to return to the test menu.

When a defective is found, open the log file (log.txt) and check the result.

Moreover, following typical cause is considered.

- Bad connection of wireless LAN card

- Bad connection of wireless LAN antenna cable (Main/Aux)

- Environment for wireless LAN communication (Interference/ obstruction)

- Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

Subtest 04   Communication test of 11b mode (MB44ag/MB43g)

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

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

Subtest 05   Communication test of 11g mode (MB44ag/MB43g)

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

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

Subtest 06   All the tests of MB43g Module

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

Subtest 07   All the tests of MB44ag Module

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

3.29 LAN/Modem/Bluetooth/IEEE1394 Test Program

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

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

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

          1.   LAN

          2.   Modem

          3.   Bluetooth

          4.   IEEE1394

Enter a choice:
```

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

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

3.29.1   LAN test

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

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

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

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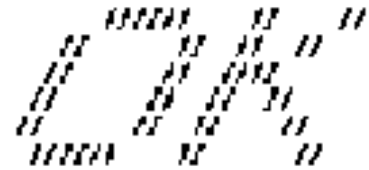
Note: *The menu displayed by your computer may be slightly different from the one shown above.*

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

Subtest 02   (GbE)

Note: *Gigabit Ethernet (GbE) test is not supported for this model.*

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

The following message will appear.

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

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

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

3.29.2   Modem test

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

3.29.3   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  O M M M M P    P L        E        T    E       D    D
  C        O   O  O M   M M PPPPPP  L       EEEEE    T    EEEEEEE D    D
  C        O   O  O M     M P      L        E        T    E       D   D
   C    C  O   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    EEEEEEE
 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    EEEEEEE



                       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.

3.29.4 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   IEEE1394 GUID Display

This program checks the GUID of IEEE1394.

3.30 Sound Test program

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

Insert the test program disk for Sound test in the floppy disk drive and turn on the power. The following message will appear:

```
###############################################################
######    WSS, Sound blaster pro Diagnostics program    ######
###############################################################
*                                                             *
*     1 ............    Sound (Standard)                      *
*                                                             *
*     2 ...........     Sound (Legacy)                        *
*                                                             *
*     3 ...........     CD Sound (Standard)                   *
*                                                             *
*     4 ...........     CD Sound (Legacy)                     *
*                                                             *
*           ---It outputs at the speaker and lineout---       *
*                                                             *
***************************************************************
.... Press test number[1-4] ?
```

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

3.30.1 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.

3.30.2 Sound (Legacy) test

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

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

3.30.3 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 3.29.3.1 Test media (Toshiba-made test media). For details on use of audio CD on the market, refer to 3.29.3.2 Audio CD.

3.30.3.1 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.

3.30.3.2 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.*

3.30.4 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.*

3.31 SETUP

3.31.1 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

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
    (c) Network Boot Protocol

7. Display

    (a) Power On Display
    (b) LCD Display Stretch
    (c) TV Type

8. Others

    (a) CPU Cache
    (b) Level 2 Cache
    (c) Dynamic CPU Frequency Mode
    (d) Execute-Disable Bit Capability
    (e) Auto Power On
    (f) Language During Bootup

9. Configuration

    (a) Device Config.

10. I/O Ports

     (a) Serial
     (b) Parallel

11. Drives I/O

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

12. PCI Bus

     (a) PCI Bus

13. Security Controller

     (a) TPM
     (b) Clear TPM Owner

14. Peripheral

     (a) Internal Pointing Device
     (b) Ext keyboard "Fn"
     (c) Parallel Port Mode
     (d) Hard Disk Mode

15. Legacy Emulation

     (a) USB KB/Mouse Legacy Emulation
     (b) USB-FDD Legacy Emulation

16. PCI LAN

     (a) Built-in LAN

3.31.2 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 ─────┐     │ NetWork Boot Protocol =PXE       │
     │ Date(MM-DD-YY)   = XX-XX-XXXX │ └──────────────────────────────────┘
     │ Time(HH:MM:SS)   = XX:XX:XX  │
     └─────────────────────────┘      ┌─── DISPLAY ───────────────────────┐
                                      │ Power On Display    = Auto-Selected│
     ┌─── BATTERY ──────────────┐    │ LCD Display Stretch = Enabled      │
     │ Battery Save Mode = Full Power│ │ TV Type             = NTSC (US)    │
     └─────────────────────────┘      └──────────────────────────────────┘

     ┌─── PASSWORD ─────────────┐     ┌─── Others ────────────────────────┐
     │ Not Registered           │     │ CPU Cache           = Enabled     │
     └─────────────────────────┘      │ Level 2 Cache       = Enabled     │
                                      │                                  │
     ┌─── HDD PASSWORD ─────────┐     │ Dynamic CPU Frequency Mode        │
     │ HDD            = Built-in HDD │ │           = Dynamically Switchable│
     │ HDD Password mode = User Only│ │ Execute-Disable Bit Capability    │
     │ User Password  = Not registered│ │            = Available           │
     │ Master Password = Not registered│ │ Auto Power On       = Disabled  │
     └─────────────────────────┘      │ Language During Bootup = English  │
                                      └──────────────────────────────────┘
```

↑↓←→: 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 ────────┐     ┌─── PERIPHERAL ────────────────────┐
     │ Device Config.   = Setup by OS│ │ Internal Pointing Device = Enabled│
     └─────────────────────────┘      │ Ext Keyboard "Fn"     = Disabled  │
                                      │ Parallel Port Mode    = ECP       │
     ┌─── I/O PORTS ────────────┐     │ Hard Disk Mode = Enhanced IDE (Normal)│
     │ Serial        = COM1(3F8H/IRQ4)│ └──────────────────────────────────┘
     │ Parallel      = Not Used     │
     └─────────────────────────┘      ┌─── LEGACY EMULATION ──────────────┐
                                      │ USB KB/Mouse Legacy Emulation     │
     ┌─── DRIVES I/O ───────────┐     │                       = Enabled   │
     │ Built-in HDD             │     │ USB-FDD Legacy Emulation          │
     │       = Primary IDE(1F0H/IRQ14)│ │                     = Enabled    │
     │ Select Bay               │     └──────────────────────────────────┘
     │       = Secondary IDE(170H/IRQ15)│
     └─────────────────────────┘      ┌─── PCI LAN ───────────────────────┐
                                      │ Built-in LAN       = Enabled      │
     ┌─── PCI BUS ──────────────┐     └──────────────────────────────────┘
     │ PCI BUS         = IRQ10, IRQ11│
     └─────────────────────────┘

     ┌─── SECURITY CONTROLLER ──┐
     │ TPM            = Enabled │
     │ Clear TPM Owner          │
     └─────────────────────────┘
```

↑↓←→: 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 Network Boot Protocol is not displayed in Gigabit LAN models.*

   2. The item of Language During Boot up is only for TCL model.

   3. 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.

    (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.

<u>CPU Sleep Mode</u>

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

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

<u>LCD Brightness</u>

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility.

Semi-Bright   Less than full brightness for saving power.

<u>Cooling Method</u>

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 fan first, then if necessary lowers CPU processing speed.

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

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 (Default)

Second HDD→Built-in HDD

(c) Network Boot Protocol

Use this option to set the starting method via a network.

PXE   Sets to PXE protocol. (Default)

RPL   Sets to PRL protocol.

7. 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

8. 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) CPU Cache

Use this option to enable or disable the CPU cache.

Enabled   Enables the CPU cache. (Default)

Disabled   Disables the CPU cache.

When enabled is selected, a sub window similar to the one below is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

```
┌──── OPTION ──────────────────────┐
│ Write policy     =  Write-back    │
└───────────────────────────────────┘
```

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

(b) Level 2 Cache

Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option is not displayed.

Enabled   Enables the level 2 cache. (Default)

Disabled   Disables the level 2 cache.

(c) 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.

(d) 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.

(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) 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.

9. 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

10. 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**.

11. 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) Selected 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.

12. 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

13. Security controller

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.

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.

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.

(d) Hard Disk Mode

Use this item to select the hard disk mode.

> **Enhanced IDE**   Select this mode when using an operating system that
> **(Normal)**   supports Enhanced IDE. (Default)
>
> **Standard IDE**   Select this mode when using an operating system that does not support Enhanced IDE.

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

---

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.

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 4.4 SD card	4.23 LCD unit/FL inverter
4.5 HDD 4.6 Slim select bay module	4.26 Fluorescent Lamp
4.7 Keyboard	
4.8 Memory module 4.9 Cover/Touch pad	
4.10 Modem Daughter Card 4.11 Wireless LAN board 4.12 Bluetooth module	
4.13 Display assembly	
4.14 Sound board 4.15 RTC battery/HDD con holder 4.16 LAN jack 4.17 RGB harness holder/RGB board/Modem jack 4.18 Fan 4.19 Cooling fin/CPU	4.21 Speaker 4.22 Power switch board
	4.24 Microphone/Wireless LAN antenna /Bluetooth antenna
4.20 System board/DC-IN jack	4.25 Hinge

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 keyboard, you need to remove units, in the hatched boxes above the boxes in which the Keyboard is.

4.2 Battery Pack	
4.3 PC card 4.4 SD card	4.23 LCD unit/FL inverter
4.5 HDD 4.6 Slim select bay module	4.26 Fluorescent Lamp
4.7 Keyboard	
4.8 Memory module 4.9 Cover/Touch pad	
4.10 Modem Daughter Card 4.11 Wireless LAN board 4.12 Bluetooth module	
4.13 Display assembly	
4.14 Sound board 4.15 RTC battery/HDD con holder 4.16 LAN jack 4.17 RGB harness holder/RGB board/Modem jack 4.18 Fan 4.19 Cooling fin/CPU	4.21 Speaker 4.22 Power switch board
	4.24 Microphone/Wireless LAN antenna /Bluetooth antenna
4.20 System board/DC-IN jack	4.25 Hinge

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 stick 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 FLAT HEAD screw   S
- ❑ TAPPING screw   T
- ❑ Other screws   U
  (Unique screws, STUD, etc.)

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 cable 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**.

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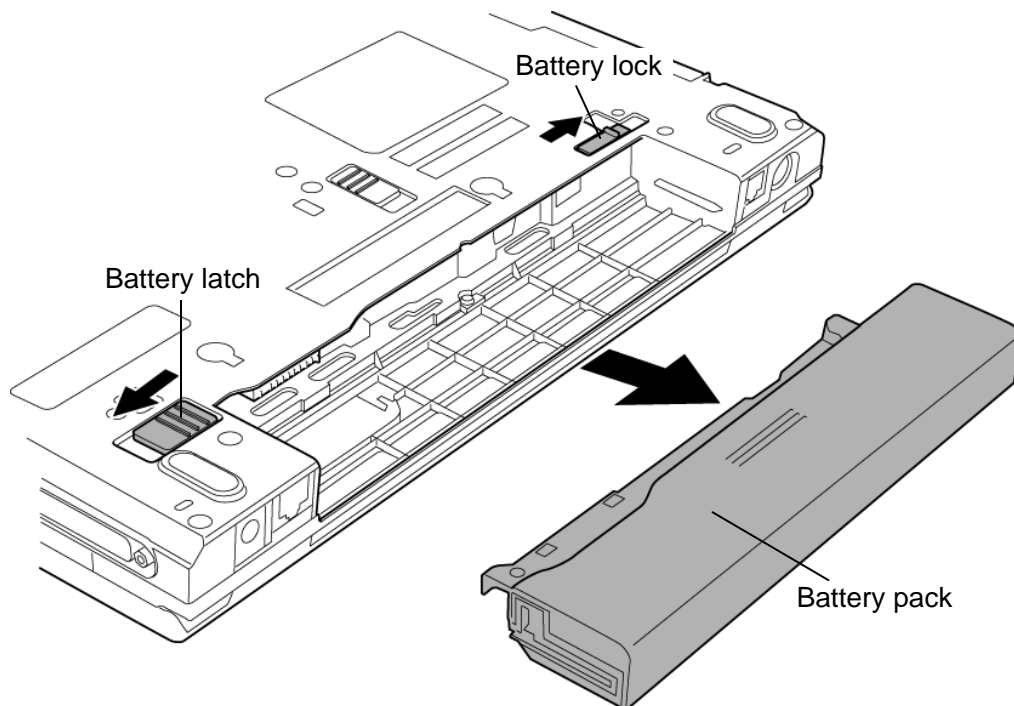
Figure 4-1   Removing the battery pack

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 as 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   PC card / Express card

Removing the PC card / Express card

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

> **CAUTION:** *Before you remove the PC card / Express card, refer to the card'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 PC card / Express card you want to remove to extend the button.

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

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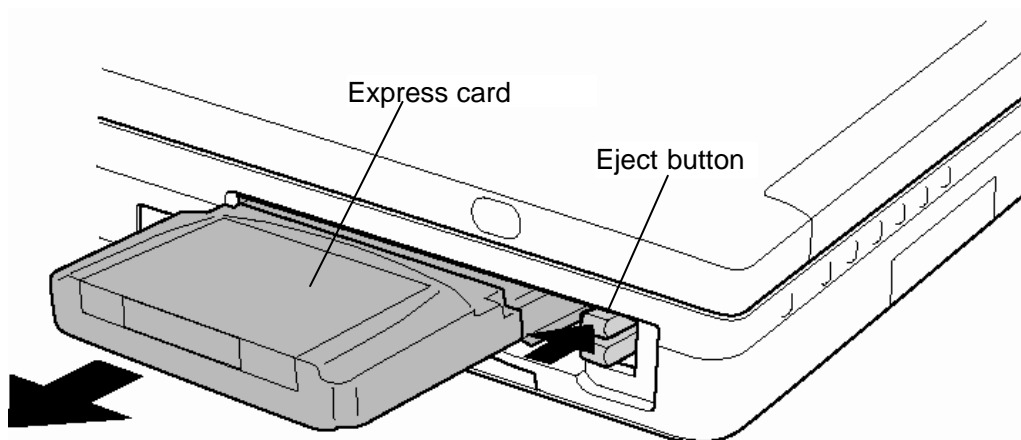
Figure 4-2   Removing the PC card / Express card

Installing the PC card / Express card

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

> **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**.

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 4-3.

> *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 (indicated as "1" in the figure below) and release it to pop the card out slightly.

2. Grasp the **SD card** and pull it out (indicated as "2" in the figure below).
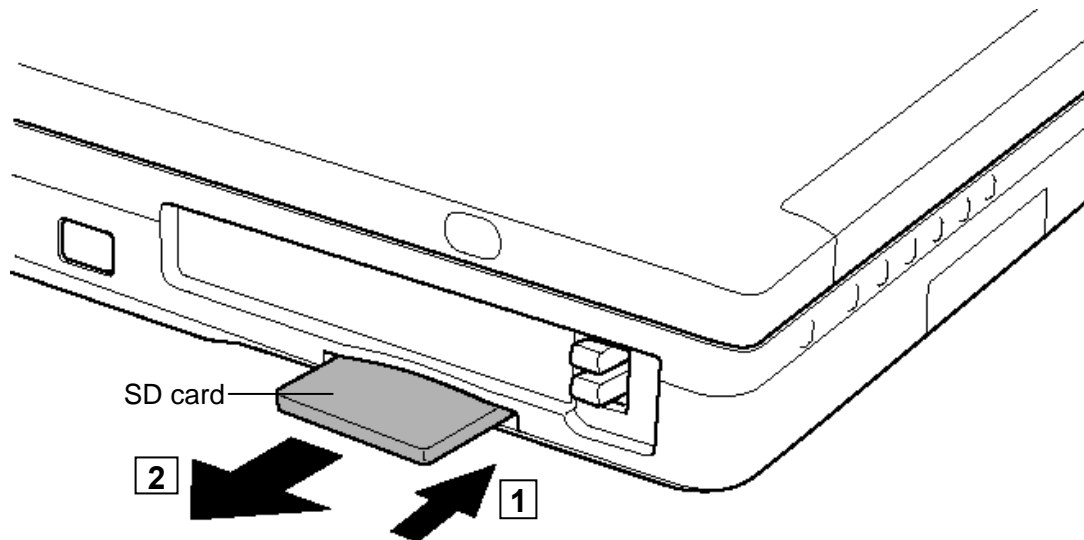
Figure 4-3   Removing the SD card

Installing the SD card

To install the SD card, follow the steps below and refer to Figure 4-3.

1. Insert the **SD card**.
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.*

HDD
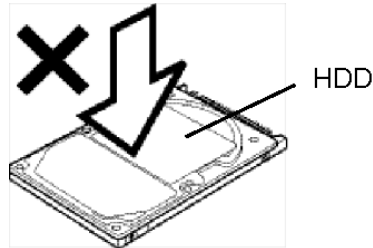
Removing the HDD

To remove the HDD, follow the steps below and refer to Figure 4-4 to 4-6.

1. Turn the computer upside down.

2. Remove the following **screw** securing the HDD cover. Remove the **HDD cover** by lifting it up.

   - M2.5×4B FLAT HEAD screw   ×1

M2.5×4B FLAT HEAD
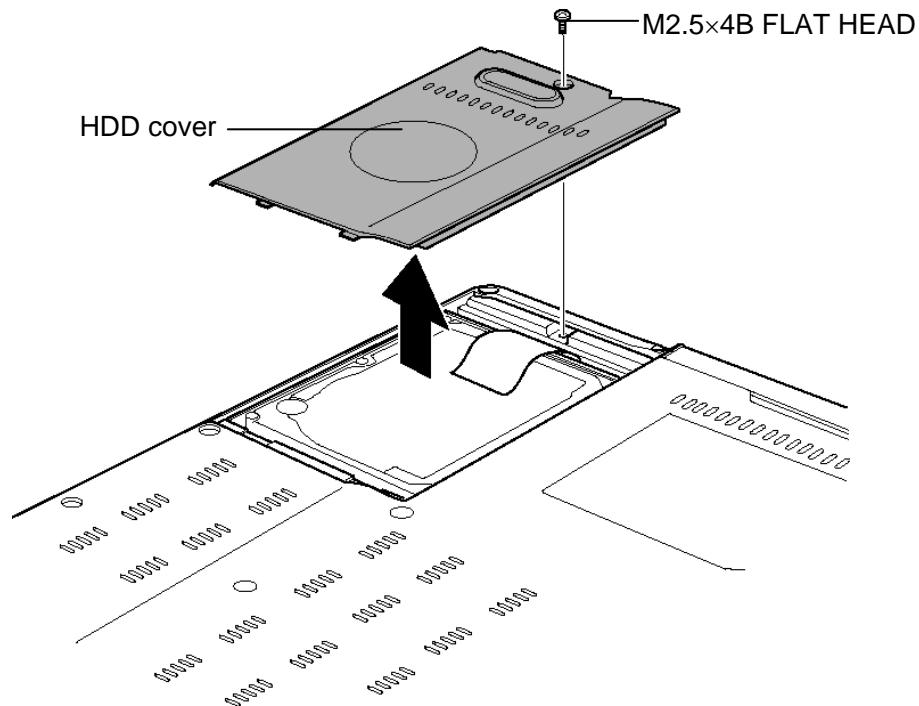
HDD cover

Figure 4-4   Removing the HDD cover

3. Pull the **tab** of the **HDD pack** to remove it from the system board. Be careful not to damage the connector.
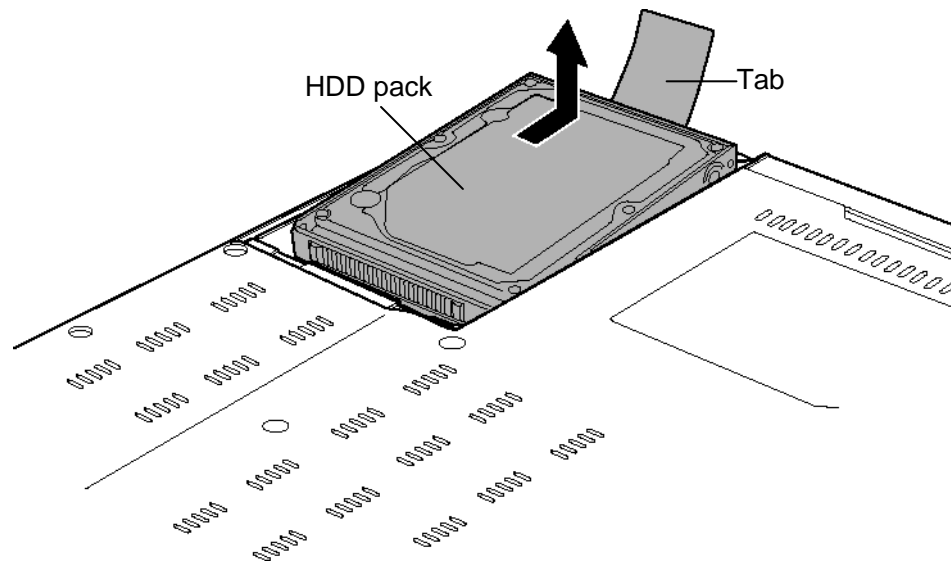
Figure 4-5   Removing the HDD pack

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

---

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

    *   M3×4Z   FLAT HEAD screw   ×4

5. Separate the **HDD** from the **HDD bracket**.

6. Separate the **Guide mold** from the **HDD**.

CAUTION: *Do not apply pressure to the top or bottom of the HDD.*

M3×4Z FLAT HEAD

HDD

HDD bracket

M3×4Z FLAT HEAD

HDD
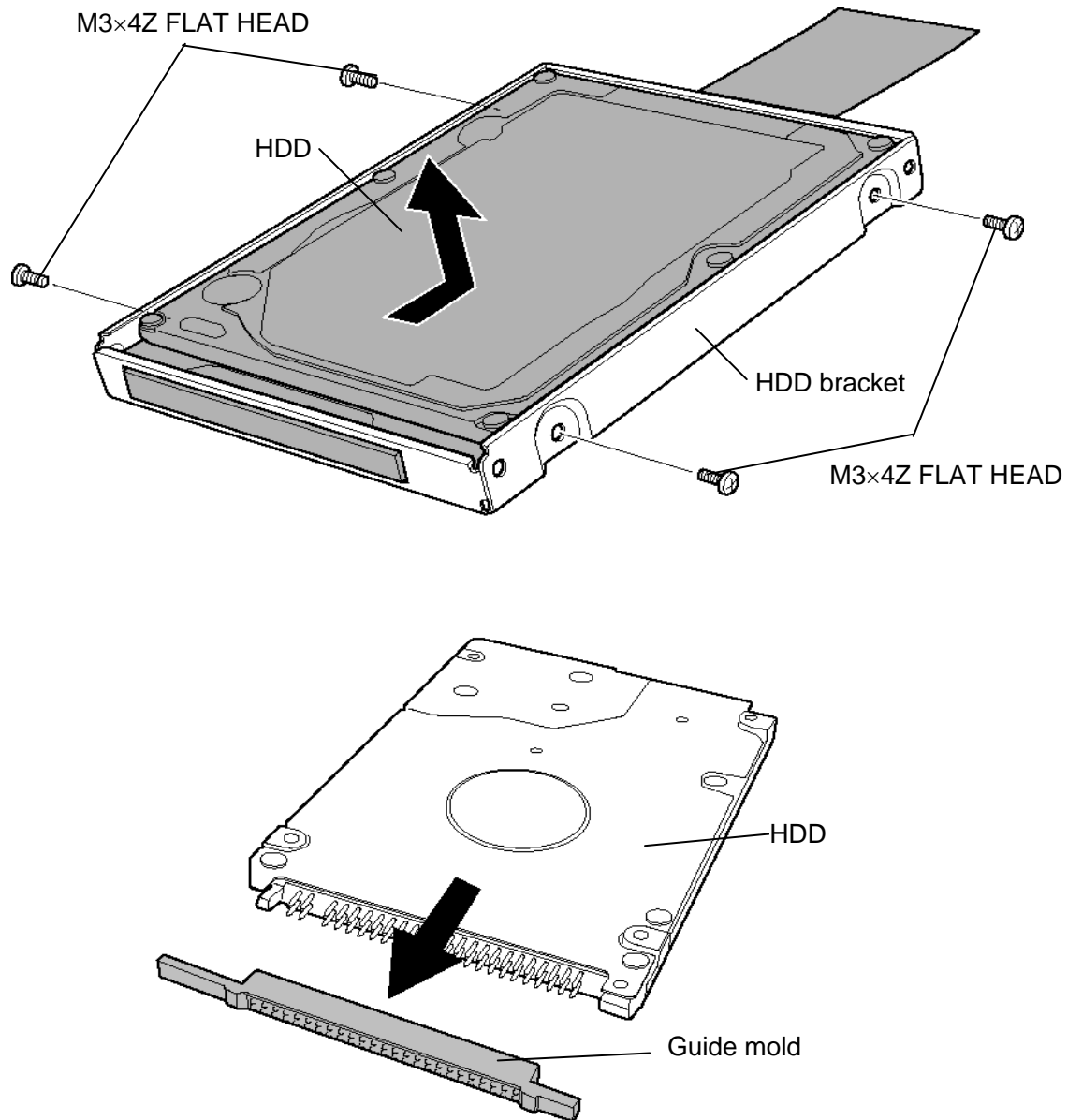
Guide mold

Figure 4-6   Separating the HDD and Guide mold

Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-4 to 4-6.

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

---

1. Attach the **Guide mold** to **the HDD**

2. Seat the **HDD** in the **HDD bracket** and secure them with the following **screws**.

   - M3×4Z   FLAT HEAD screw   ×4

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

---

3. Insert the **HDD pack** into the slot. Press to ensure a firm connection.

4. Seat the **HDD cover** and secure it with the following **screw**.

   - M2.5×4B FLAT HEAD screw   ×1

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 4-7 and 4-8.

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 and drive the removed **screw** into the **screw hole**. (The slim select bay is unlocked.)

   - M2.5×4B　FLAT HEAD screw　　×1

2. While sliding the **latch** toward the arrow direction in the figure, slide the slim select bay module outward to disconnect it from the system board.
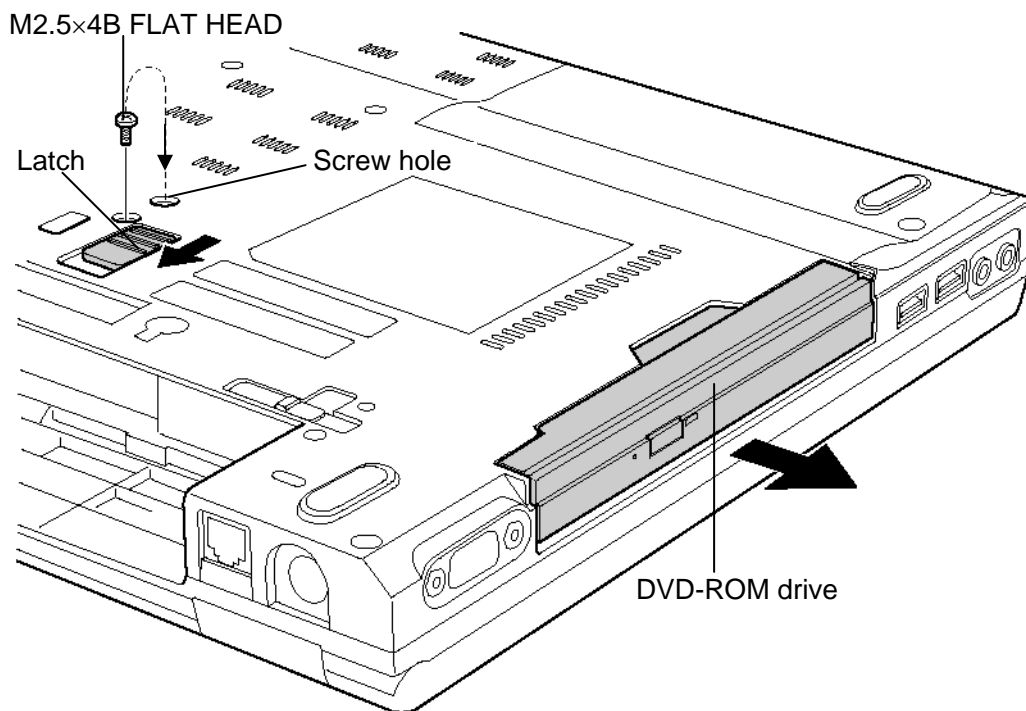
Figure 4-7　Removing the slim select bay module (for example DVD-ROM drive)

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-FLAT HEAD screw   ×5
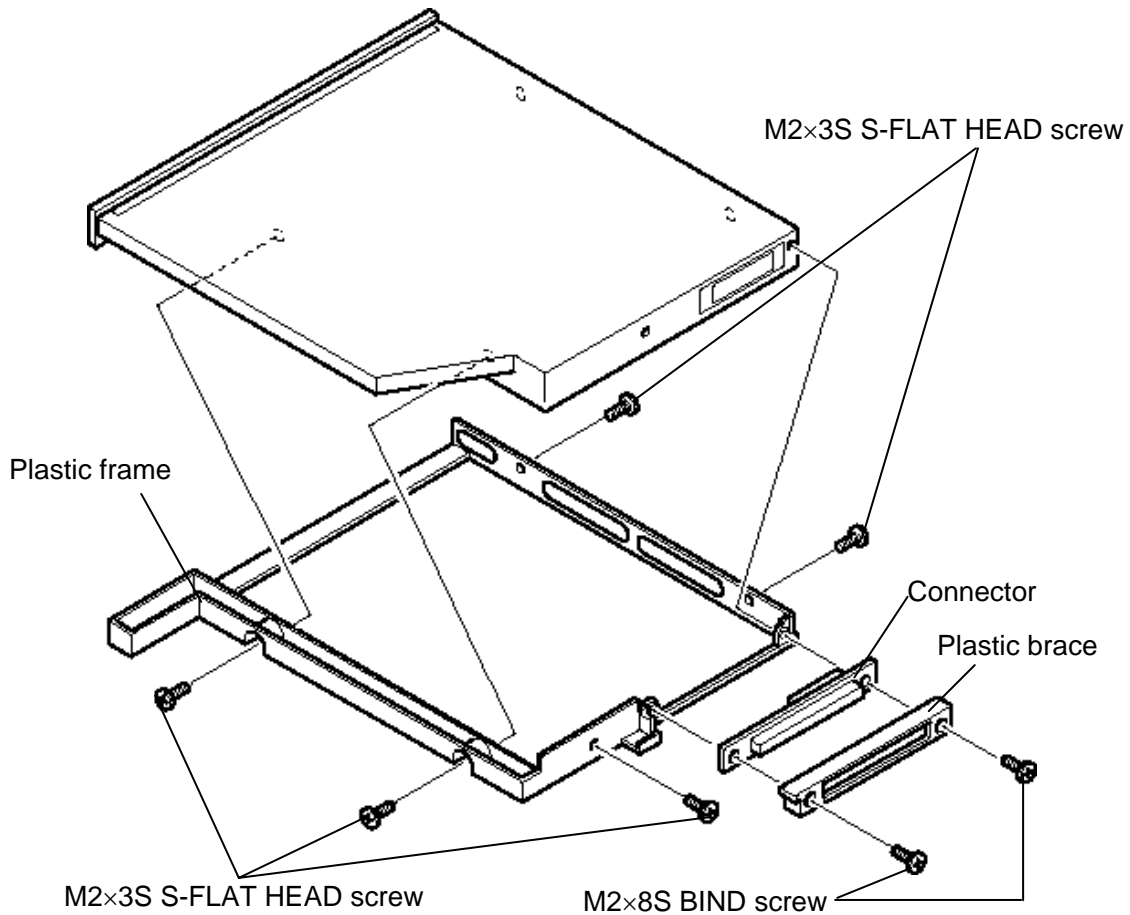
Figure 4-8 Disassembling the slim select bay module (for example DVD-ROM drive)

Installing the Slim select bay module

To install the slim select bay module, follow the steps below and refer to Figure 4-7 and 4-8.

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

    • M2×3S　　S-FLAT HEAD screw　　×5

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

    • M2×8S　　BIND screw　　　　　　×2

3. Insert the **slim select bay module** 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 locked.)

    • M2.5×4B FLAT HEAD screw　　×1

4.7 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-9 to 4-13.

1. Remove the following **screw** securing the keyboard holder.

   - M2.5×3S   S-FLAT HEAD screw   ×1

   M2.5×3S S-FLAT HEAD
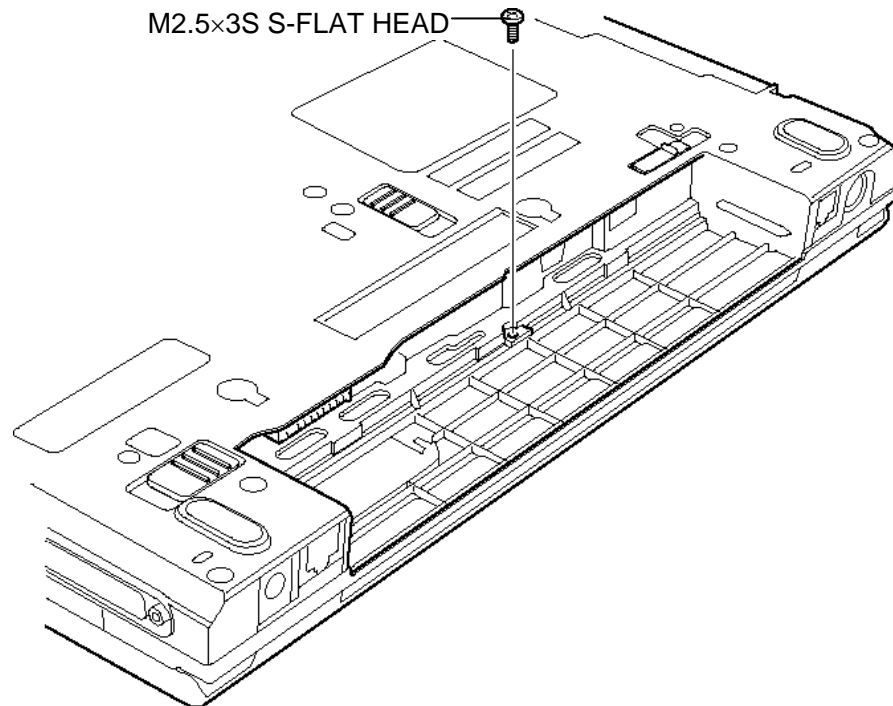
Figure 4-9   Removing the screw

2. Turn the computer face up and open the display panel.

3. Insert your fingers into the latches between the keyboard holder and the computer, and lift up the **keyboard holder** to unlatch and remove it.

4. Remove the following **screws** securing the keyboard.

    • M2.5×2.8B   FLAT HEAD screw ×2
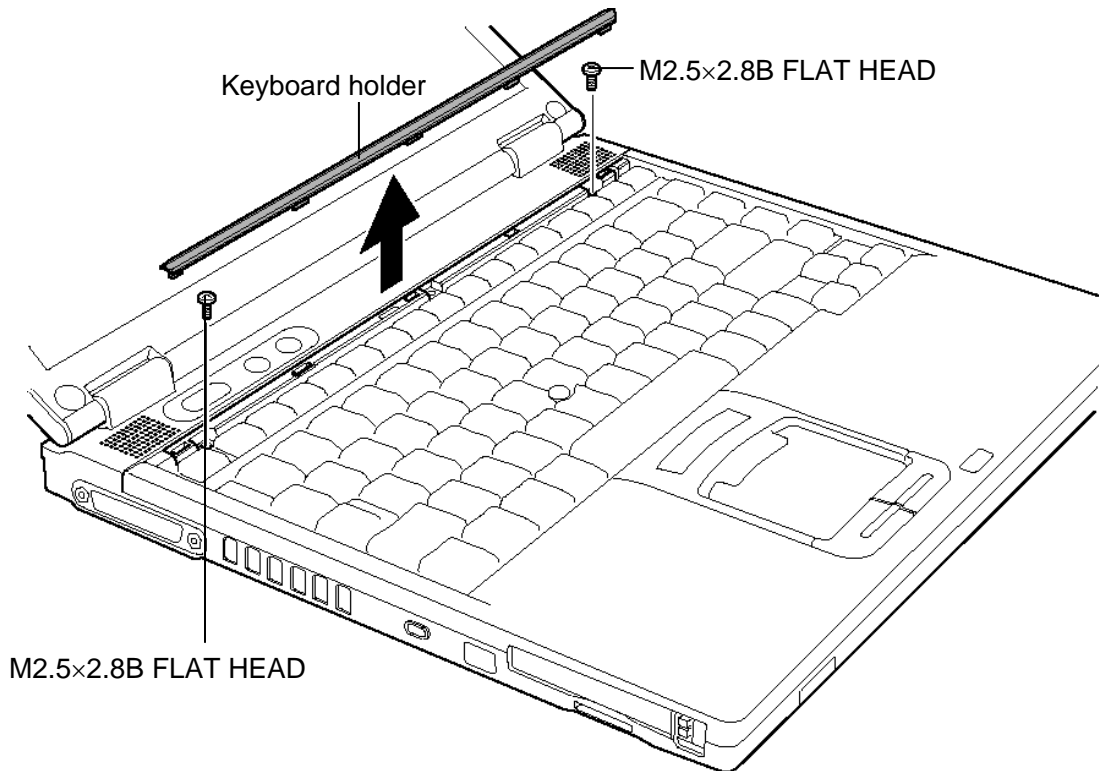
Figure 4-10   Removing the keyboard holder and screws

5. Lift the upper side of the **keyboard** and turn it face down on the cover.
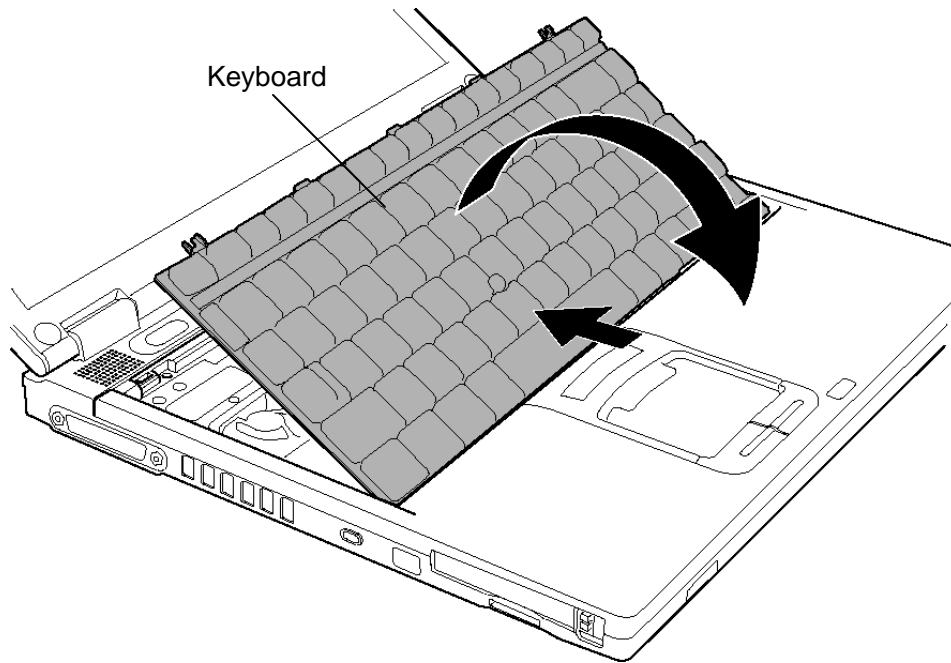
Keyboard

Figure 4-11   Turning the keyboard

6. Loosen the **screw** (with e-ring) securing the keyboard support plate and remove the **keyboard support plate**.
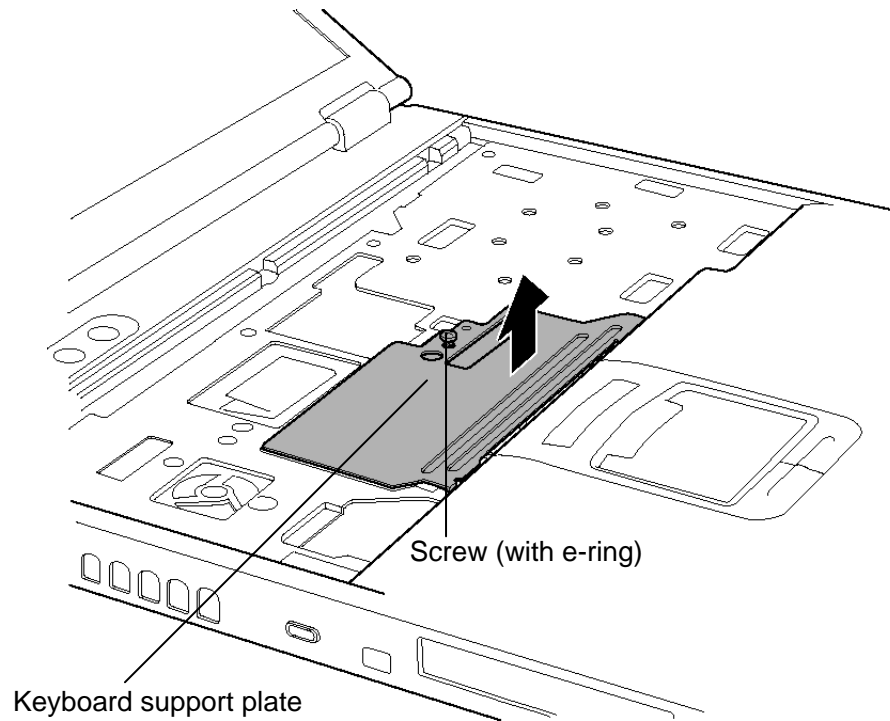
Figure 4-12   Removing the keyboard support plate

7. Disconnect the **keyboard cable** from the connector **CN3200** on the system board and remove the **keyboard**.

Keyboard

Keyboard cable
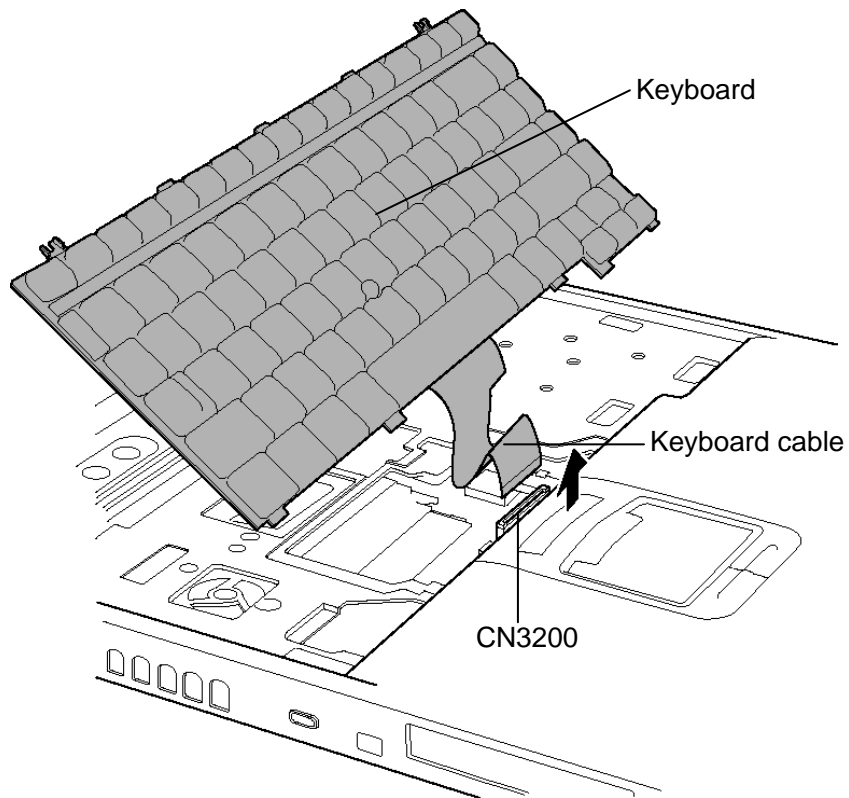
CN3200

Figure 4-13 Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figure 4-9 to 4-13.

1. Place the keyboard face down on the cover.

2. Connect the **keyboard 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. Secure the keyboard support plate with the **screw** (with e-ring).

4. Turn the **keyboard** face up and set it. Make sure that there is no gap between the keyboard and the edge of the cover.

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

   - M2.5×2.8B   FLAT HEAD screw   ×2

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

7. Close the display and turn the computer face down.

8. Secure the **keyboard** with the following **screw**.

   - M2.5×3S   S-FLAT HEAD screw   ×1

4.8   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 4-14.

1. Press the two **latches** outward and remove the **memory module**.
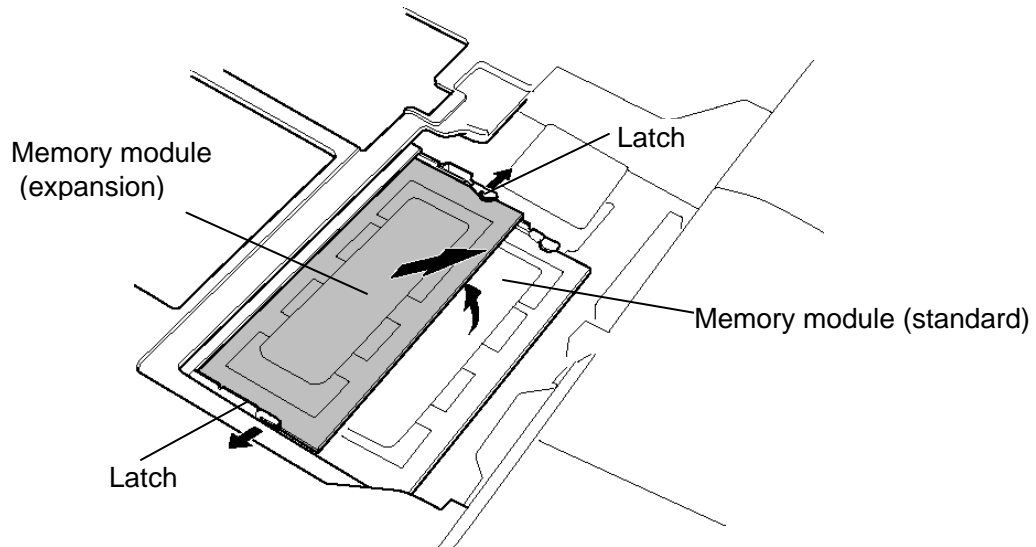
Figure 4-14   Removing the memory module

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 4-14.

> *CAUTION:*   *Do not install a memory module only in the upper slot for expansion. Use the lower slot A prior to the upper slot. Otherwise, the computer or the memory may be damaged.*
>
>   *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 (terminal side first) 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. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.

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

4.9   Cover / Touch pad

Removing the Cover / Touch pad

To remove the cover/touch pad, follow the steps below and refer to Figure 4-15 to 4-20.

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

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

                                                 or

    - M2×4   Stick screw   ×1 ("4" in the figure below)
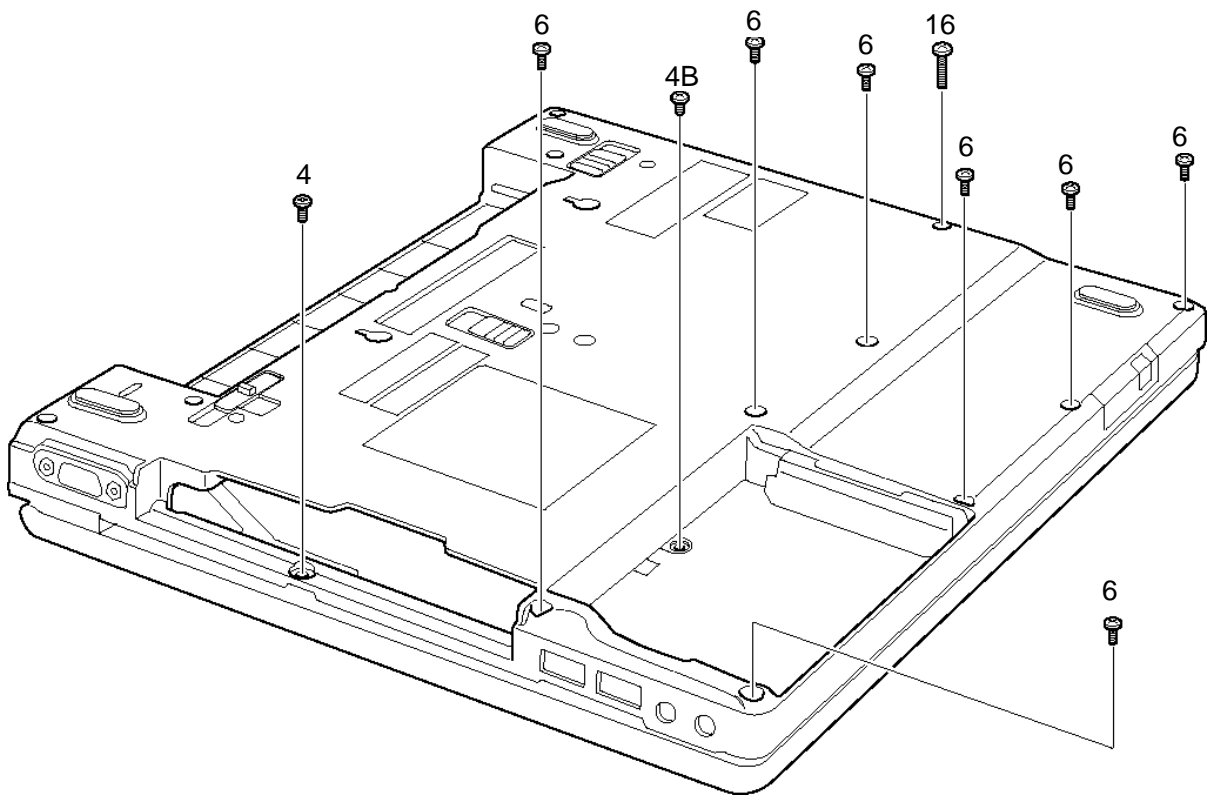
Figure 4-15   Removing the cover (1)

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

3. Remove the following **screws**.

   - M2.5×4B   FLAT HEAD screw   ×1
   - M2.5×12B   FLAT HEAD screw   ×2
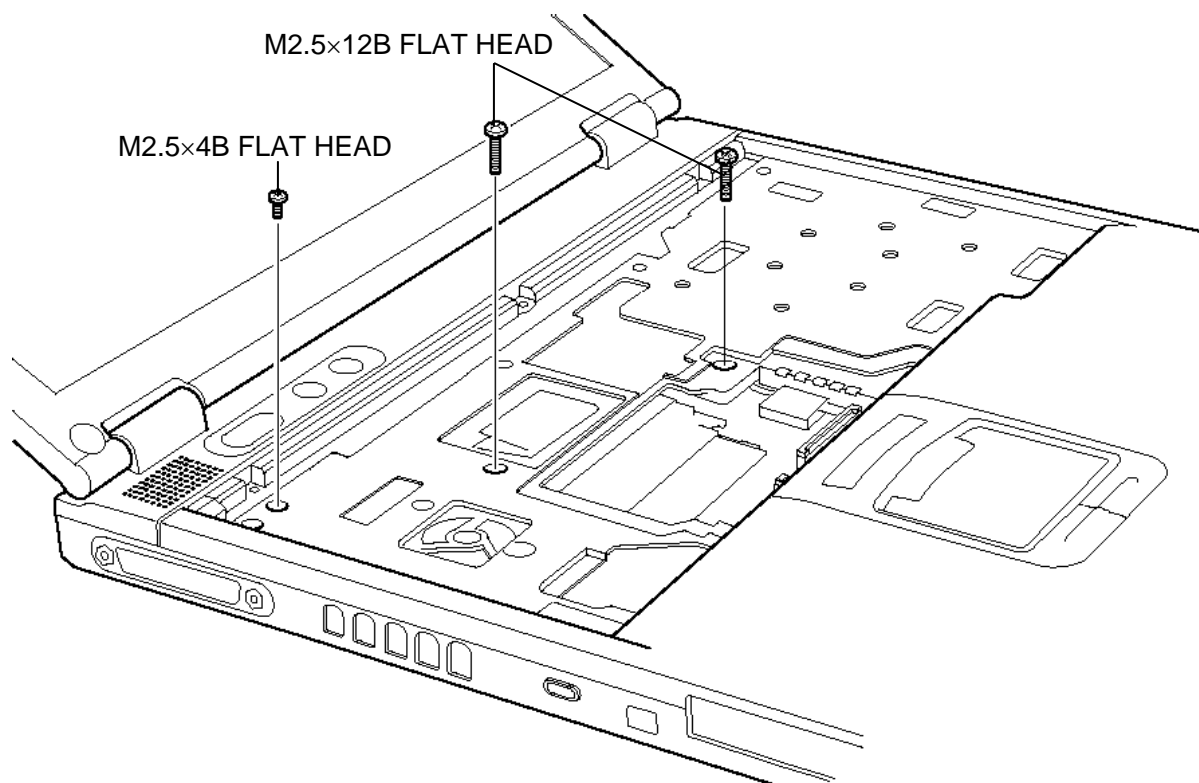
Figure 4-16   Removing the cover (2)

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

Touch pad cable

CN3201
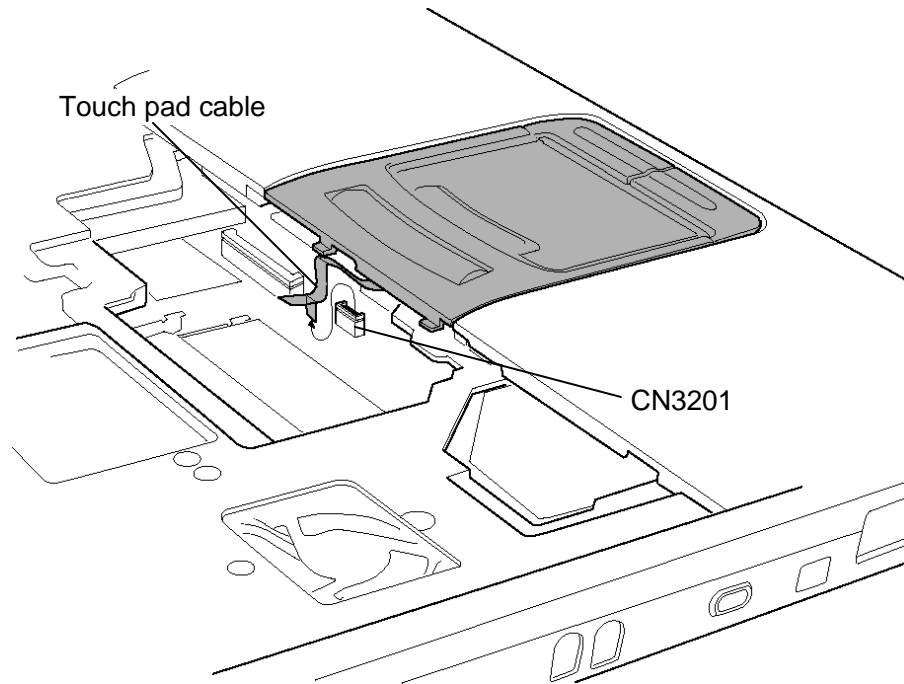
Figure 4-17   Removing the cover (3)

5. Remove the **cover** by lifting it up toward the front of the computer.
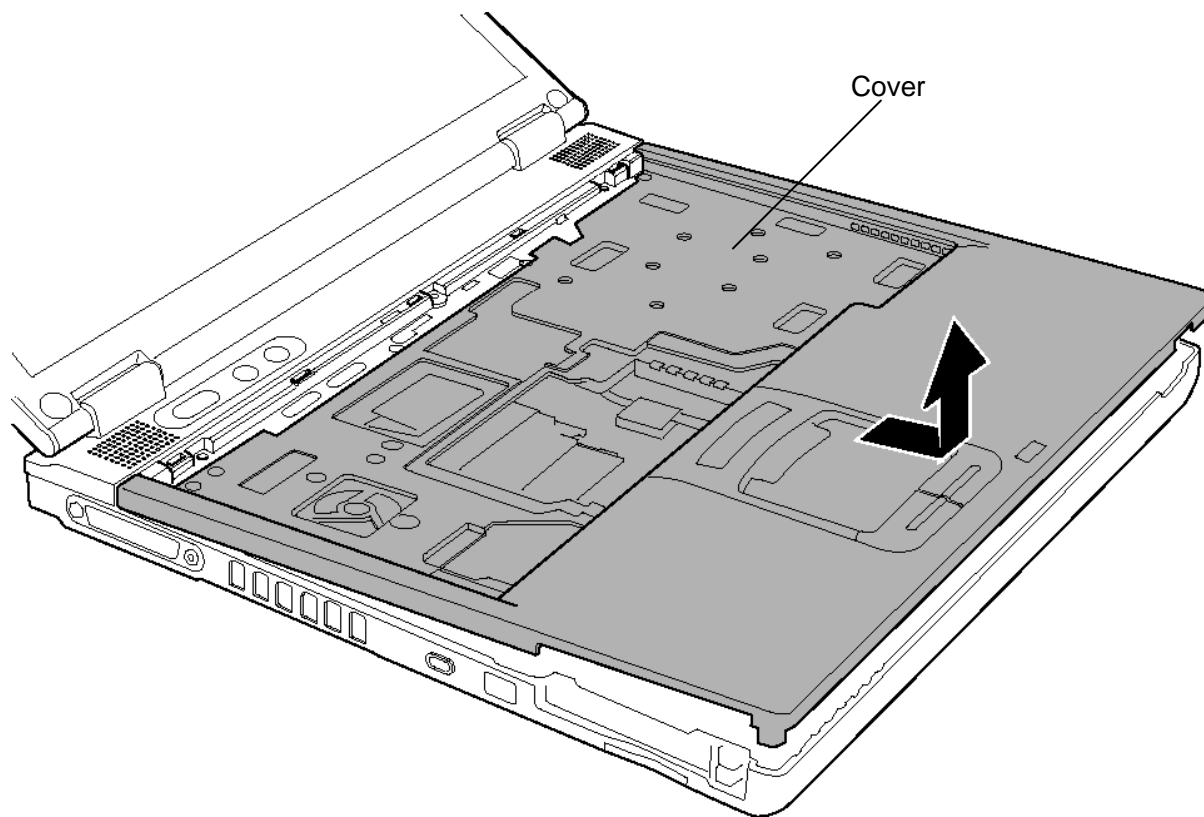
Figure 4-18   Removing the cover (4)

6. Remove the following **screws** securing the touch pad and touch pad switch to the cover. (Remove one screw after peeling the insulator.)

- M2.5×4B FLAT HEAD screw   ×2
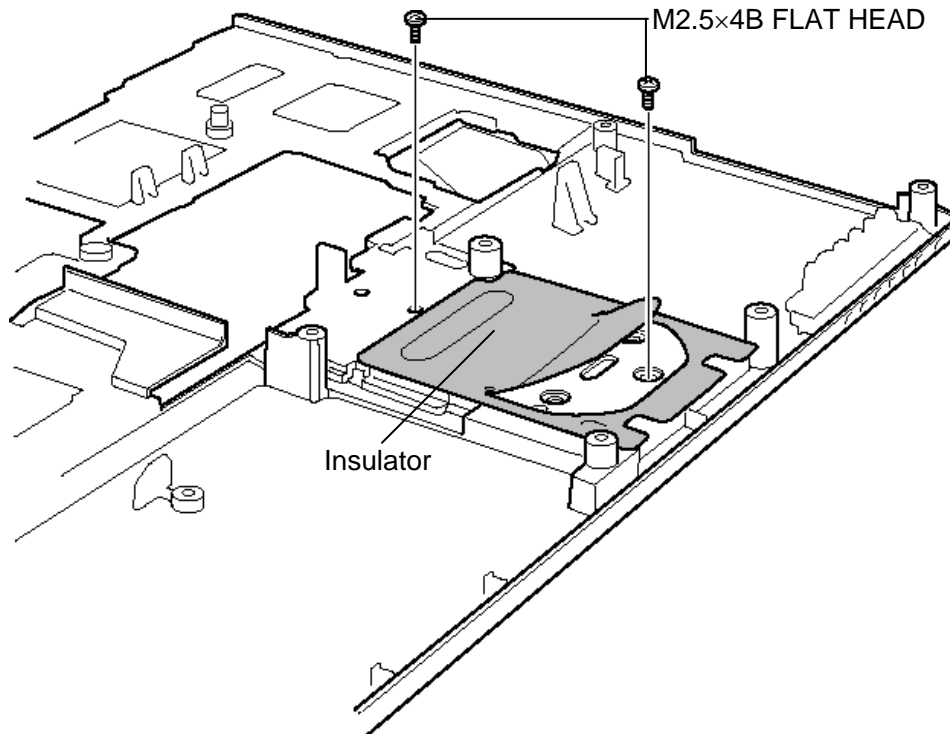
Figure 4-19   Removing the screws

7. Remove the **touch pad** and **touch pad switch** from the cover while unhooking the latches.
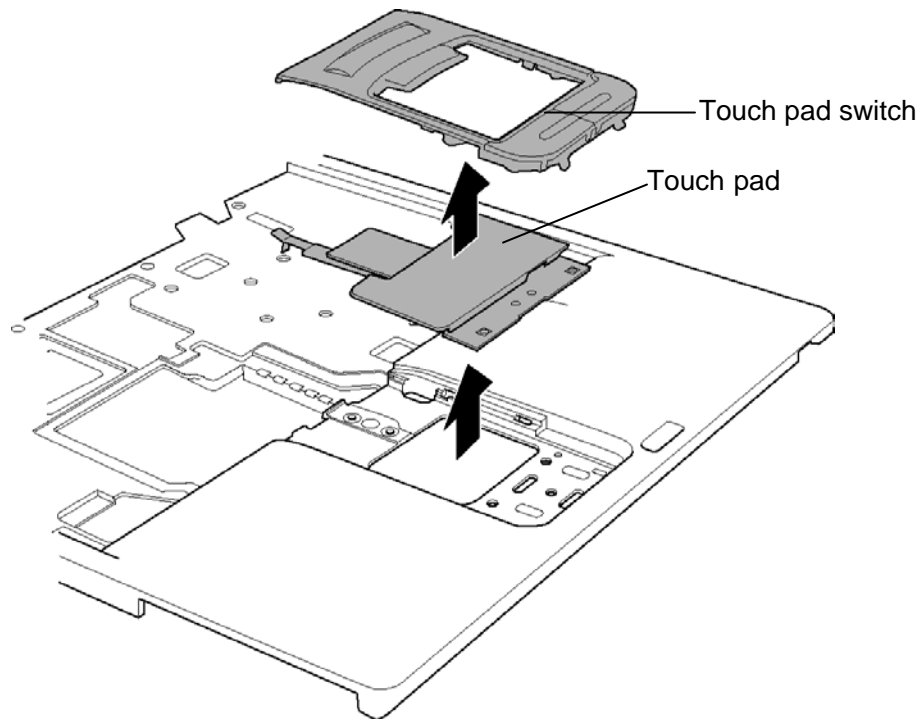
Figure 4-20   Removing the touch pad and touch pad switch

8. Disconnect the **touch pad cable** from the connector on the touch pad.

Installing the Cover / Touch Pad

To install the cover/touch pad, follow the steps below and refer to Figure 4-15 to 4-20.

1. Connect the **touch pad cable** to the connector on the touch pad.

2. Install the **touch pad** and **touch pad switch** on the cover while hooking the latches.

3. Turn the cover face down and secure the touch pad and touch pad switch to the cover with the following **screws**.

   - M2.5×4B   FLAT HEAD screw   ×2

4. Place the **cover** on the display assembly and secure the latches by pressing it. Secure the cover with the following **screw**.

   - M2.5×4B   FLAT HEAD screw   ×1
   - M2.5×12B   FLAT HEAD screw   ×2

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

6. Close the display panel and turn the computer face down. Secure the cover with the following **screws** to the display assembly.

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

     or
   - M2×4   Stick screw   ×1 ("4" in the figure below)

4.10 Modem Daughter Card (MDC)

Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to Figure 4-21.

1. Remove the following **screws** securing the modem daughter card.

   - M2×4Z   BIND screw   ×2

2. Lift up the **modem daughter card** to disconnect it from the connector **CN3000** on the system board.

3. Disconnect the **MDC cable** from the connector on the modem daughter card.
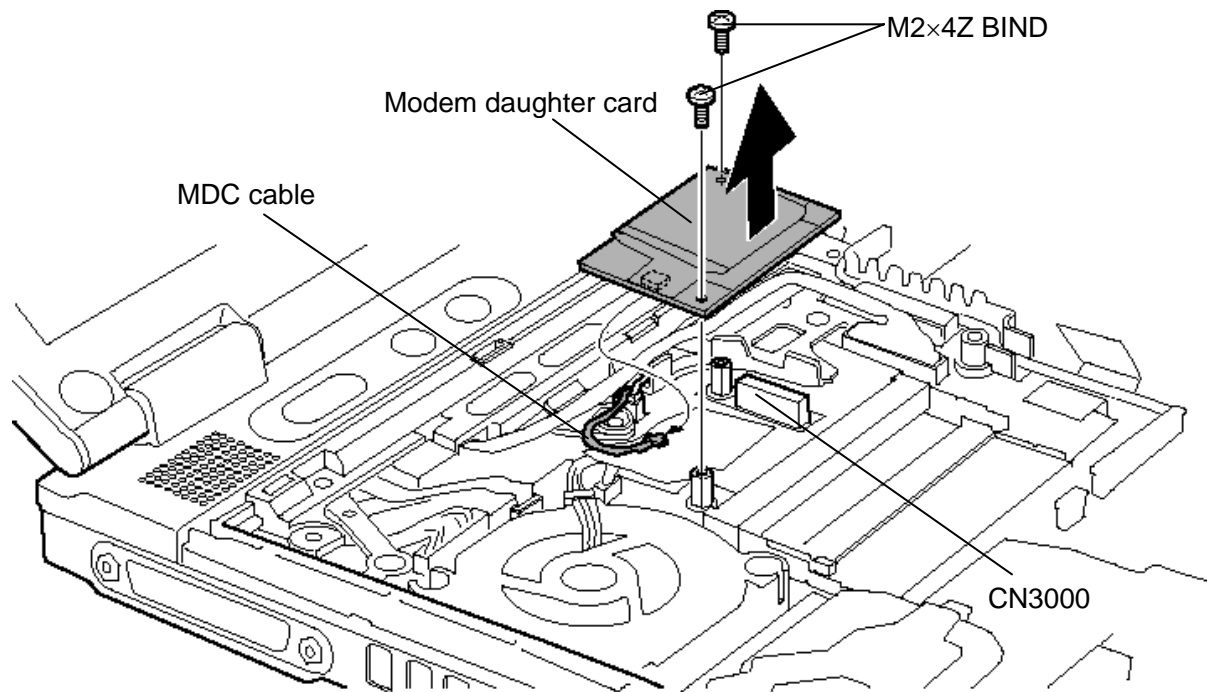
Figure 4-21   Removing the Modem Daughter Card (MDC)

Installing the Modem Daughter Card

To install the modem daughter card, follow the steps below and refer to Figure 4-21.

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

2. Seat the **modem daughter card** and press carefully on the card to connect it to the connector **CN3000** on the system board. Be careful not to damage the card and connector.

3. Secure the modem daughter card with the following **screws**.

    - M2×4Z   BIND screw   ×2

4.11 Wireless LAN board

Removing the Wireless LAN board

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

NOTE: The wireless LAN board is an option in some models. This computer supports three types of wireless LAN board (802.11a/g, 802.11b/g or 802.11a/b/g).

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

---

1. Peel off two **glass tapes** and disconnect the **wireless LAN antenna cables** (black and white) from the wireless LAN board using an antenna coaxial cable disconnector.
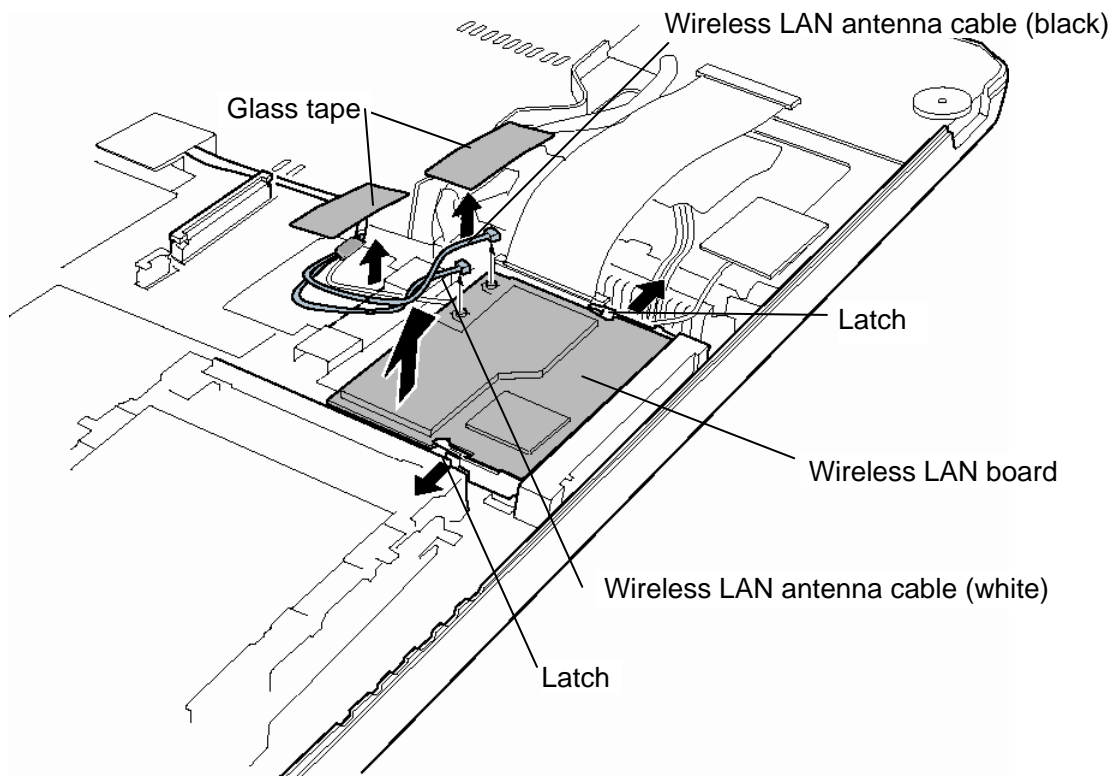
Figure 4-22   Removing the wireless LAN board

2. Press the **latches** outward to release the wireless LAN board.

3. Disconnect the **wireless LAN board** from the connector on the system board. Be careful not to damage the connector.

Installing the Wireless LAN board

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

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

---

1. Insert the **wireless LAN board** into the connector on the system board.

2. Gently push the wireless LAN board down until the latches on both sides are engaged.

3. Connect the **wireless LAN antenna cables** (black and white) to the connectors on the wireless LAN board and stick the **glass tapes**.

CAUTION: *Stick the glass tape to the edges of the insulator shown below.*

Wireless LAN cable

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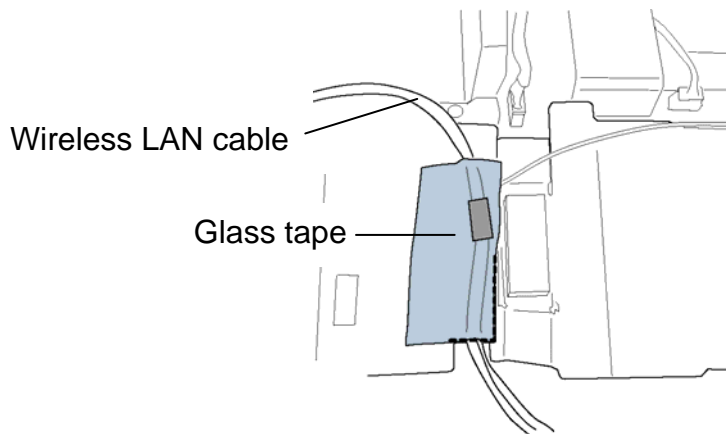
CAUTION: *There are two MAC address barcode labels in the package containing the new wireless LAN board. Apply one label on the wireless LAN board and one on the box the computer was in. Before you apply the new labels, remove the old ones from the wireless LAN board and the box. The computer may have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

4.12 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-23.

> *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.*

1. Remove the following **screw** to remove the **Bluetooth module**.

   - M2×3S   S-FLAT HEAD screw   ×1

2. Disconnect the **Bluetooth cable** (brown) from the Bluetooth module using an antenna coaxial cable disconnector.

3. Disconnect the flexible cable from the Bluetooth module.
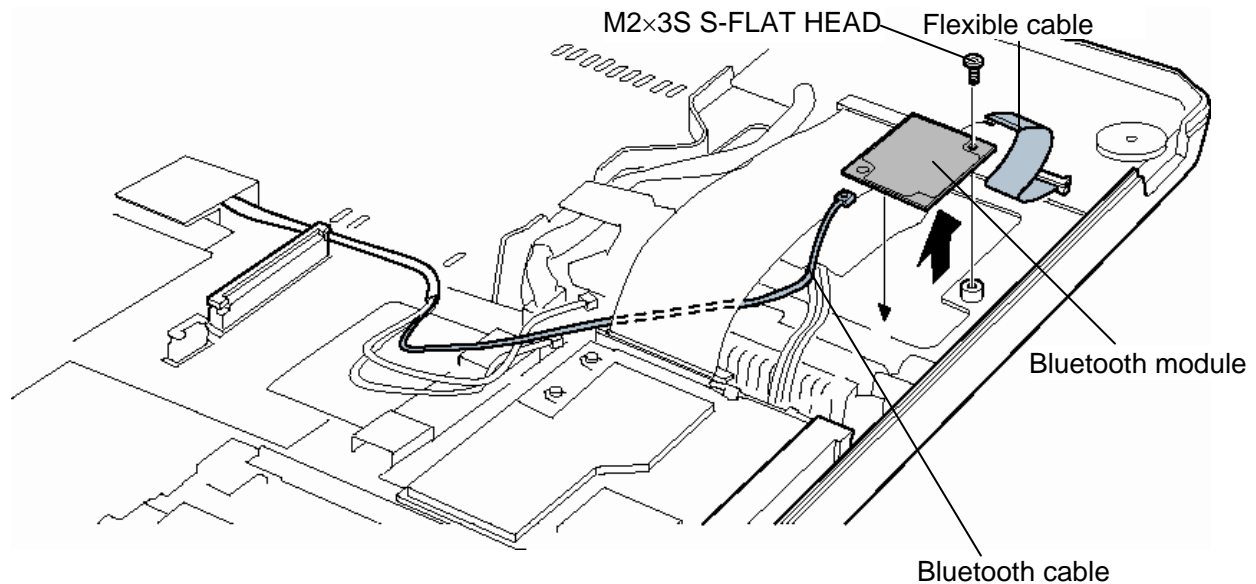
Figure4-23 Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below and refer to Figure 4-23.

1. Connect the flexible cable to the Bluetooth module.

2. Connect the **Bluetooth cable** (brown) to the Bluetooth module.

3. Secure the **Bluetooth module** with the following **screw**.

   - M2×3S   S-FLAT HEAD screw   ×1

4.13 Display assembly

Removing the Display assembly

To remove the display assembly, follow the steps below and refer to Figure 4-24 to 4-27.

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

    - M2.5×16B   FLAT HEAD screw   ×2
    - M2.5×6B   FLAT HEAD screw   ×2
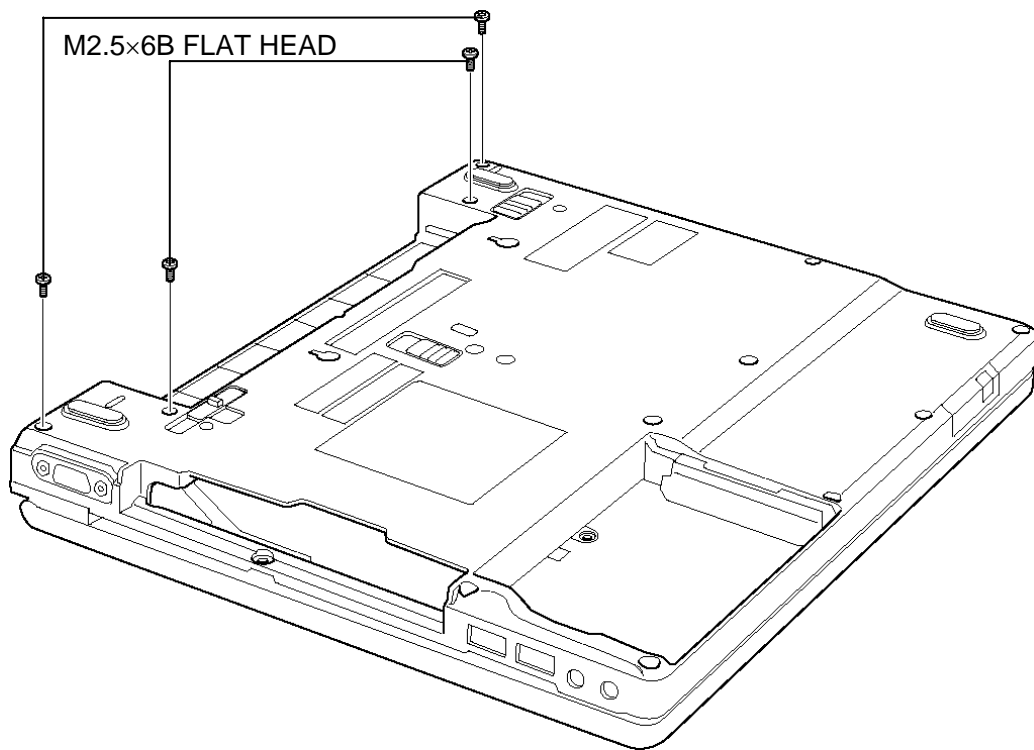
Figure 4-24 Removing the display assembly (1)

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

3. Remove the following **screw** and the **LCD cable holder**.

    *   M2.5×6B   FLAT HEAD screw   ×1

4. Disconnect the **LCD cable** from the connector CN5500 on the system board.

5. Disconnect the **power switch cable** from the connector CN9600 on the system board.

6. Disconnect the **RGB cable** from the connector CN5621 on the system board.

7. Turn up the **insulator** and disconnect the **speaker cable** from the connector CN3202 on the sound board.

8. Disconnect the **microphone cable** from the connector CN6001 on the sound board.

9. Disconnect the **modem cable** from the connector CN3001 on the system board.

10. Peel the **insulator** securing the wireless LAN cable.
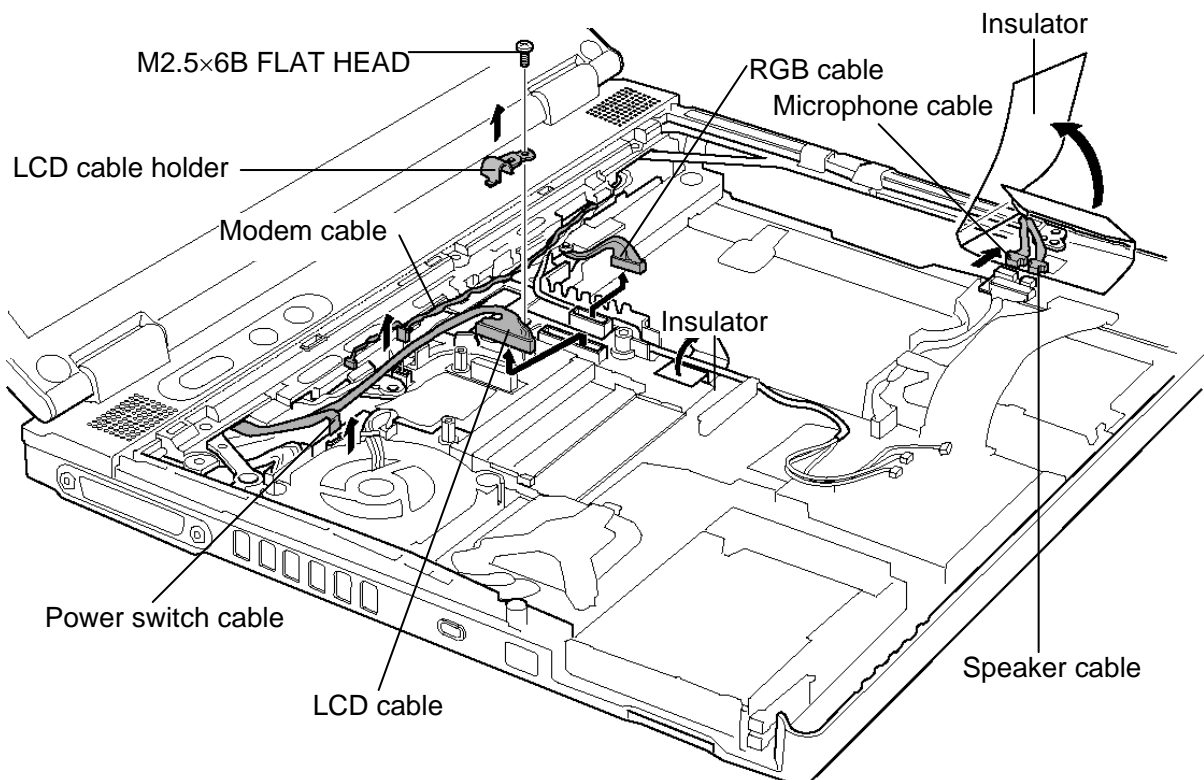
Figure 4-25 Removing the display assembly (2)

11. Remove the following **screws** securing the display assembly.

- M2.5×6B   FLAT HEAD screw   ×4
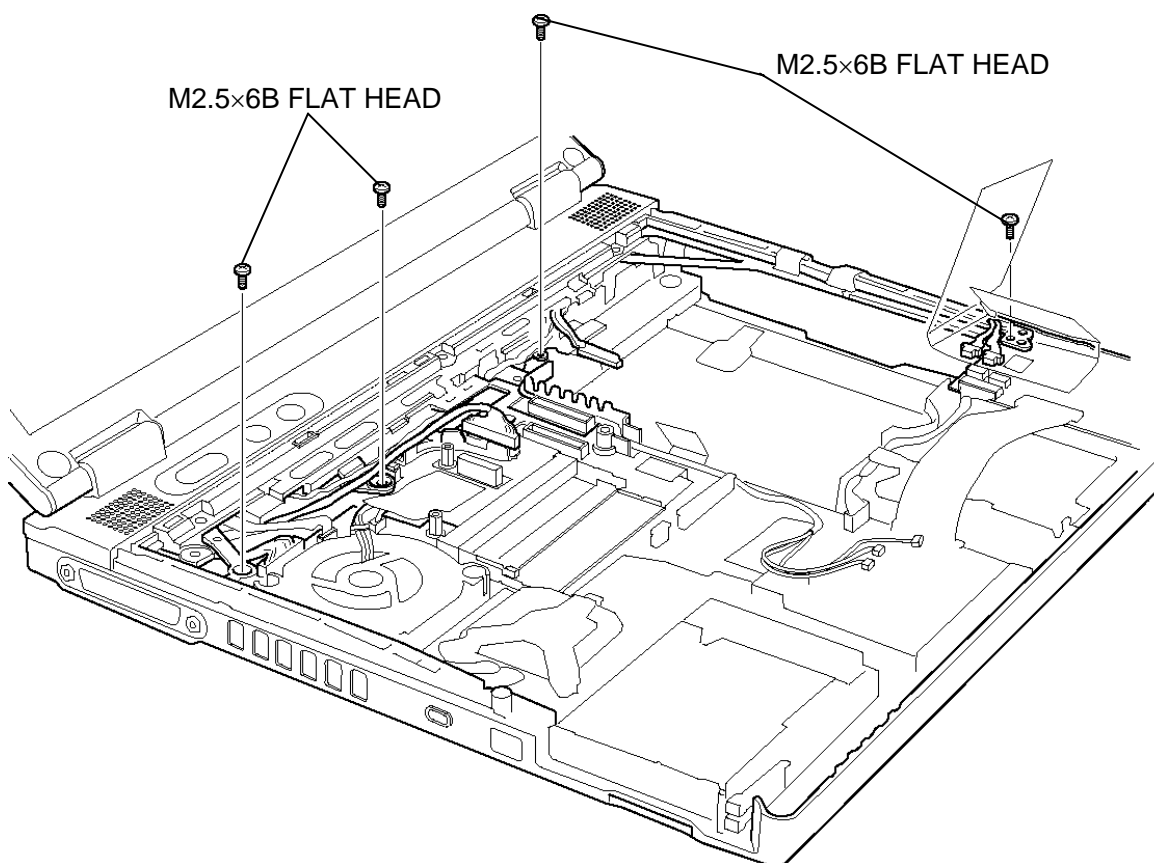
Figure 4-26 Removing the display assembly (3)

12. Remove the **display assembly** from the base assembly.
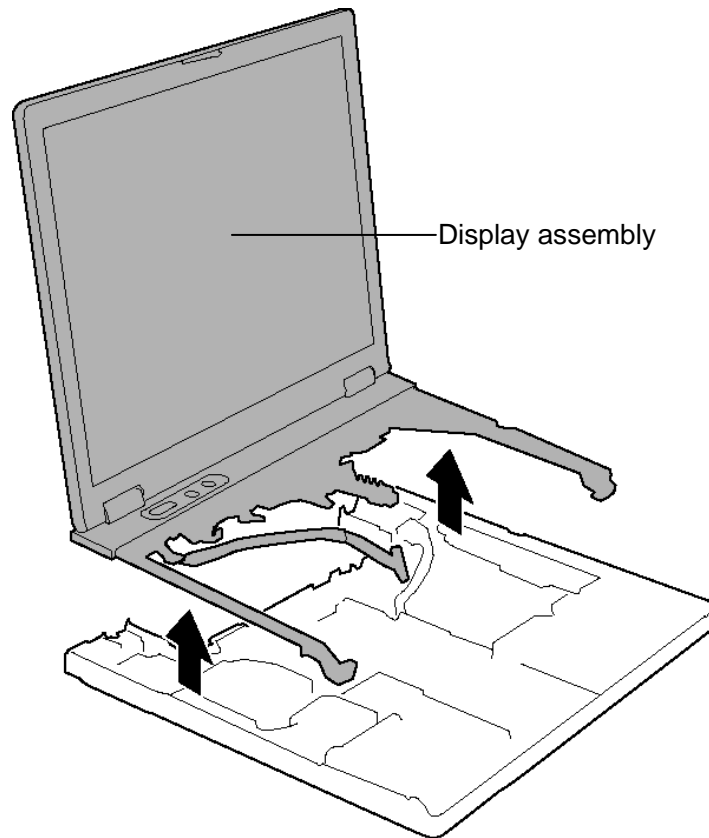
Display assembly

Figure 4-27   Removing the display assembly (4)

NOTE: When removing the display assembly, be careful not to damage any cables.

Installing the Display assembly

To install the display assembly, follow the steps below and refer to Figure 4-24 and 4-27.

1. Install the **display assembly** on the base assembly.

NOTE: *When installing the display assembly, be careful not to pinch or damage any cables.*

---

2. Press along the edges of the display assembly to secure the latches.

3. Connect the **microphone cable** to the connector CN6001 on the sound board.

4. Connect the **speaker cable** to the connector CN3202 on the sound board and stick the **insulator**.

5. Connect the **RGB cable** to the connector CN5621 on the system board.

6. Connect the **power switch cable** to the connector CN9600 on the system board.

7. Connect the **LCD cable** to the connector CN5500 on the system board.

8. Connect the **modem cable** to the connector CN3001 on the system board.

9. Stick the **insulator** to secure the wireless LAN cable.

10. Install the **LCD cable holder** and secure it with the following **screw**.

    - M2.5×6B   FLAT HEAD screw   ×1

11. Secure the display assembly with the following **screws**.

    - M2.5×6B   FLAT HEAD screw   ×4

12. Turn the computer face down and secure the display assembly with the following **screws**.

    - M2.5×16B   FLAT HEAD screw   ×2
    - M2.5×6B   FLAT HEAD screw   ×2

4.14 Sound board

Removing the Sound board

To remove the sound board, follow the steps below and refer to Figure 4-28.

1. Disconnect the **sound board flexible cable** from the connector **PJ9510** on the sound board and the connector **CN9500** on the system board.

2. Peel off the **glass tape** on the sound board cable.

3. Remove the following **screws** fixing the HDD con holder.

   - M2.5×4B   FLAT HEAD screw   ×1

4. Disconnect the **sound board cable** from the connector **CN9511** on the sound board and the connector **CN9501** on the system board.

5. Remove the **sound board cable** while lifting up the **HDD con holder**

6. Remove the **sound board**.
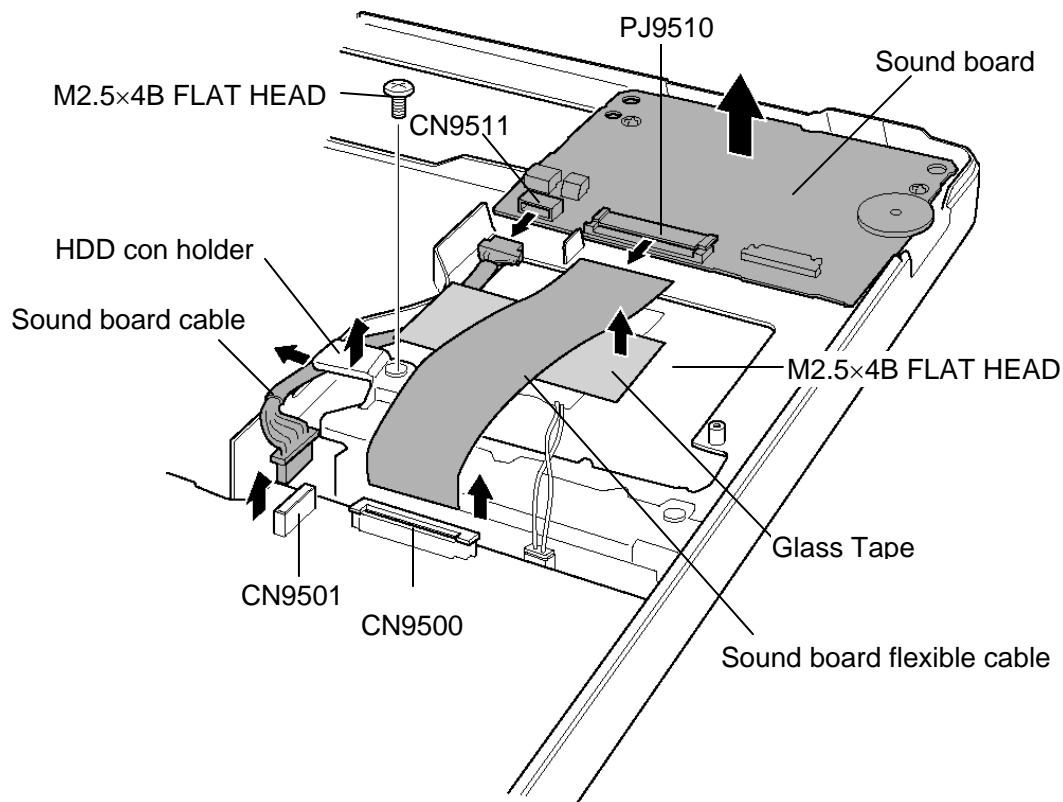
Figure 4-28　Removing the sound board

Installing the Sound board

To install the sound board, follow the steps below and refer to Figure 4-28.

1. Install the **sound board** from the right side.

2. Connect the **sound board cable** to the connector **CN9511** on the sound board and the connector **CN9501** on the system board.

3. Set the **sound board cable** while lifting up **the HDD con holder**.

4. Fix the **HDD con holder** with the following screws.

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

5. Stick the **glass tape** on the sound board cable.

6. Connect the **soundboard flexible cable** to the connector **PJ9510** on the sound board and the connector **CN9500** on the system board.

4.15 RTC battery / HDD con holder

> *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 / HDD con holder

To remove the RTC battery / HDD con holder, follow the steps below and refer to Figure 4-29 and 4-30.

1. Disconnect the **RTC battery cable** from the connector **CN9990** on the system board and remove the **RTC battery** from the slot.
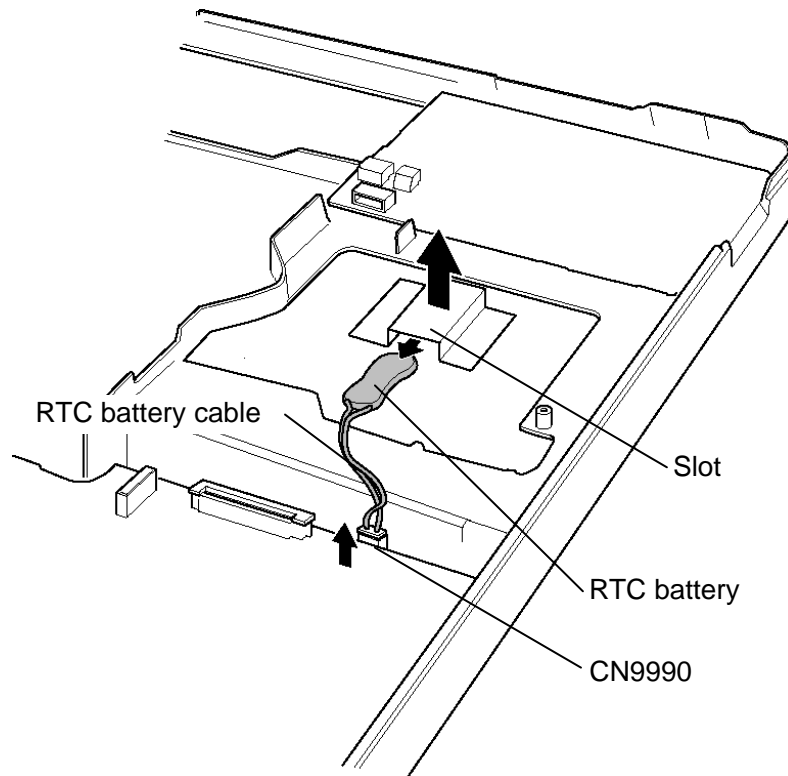
Figure 4-29   Removing the RTC battery
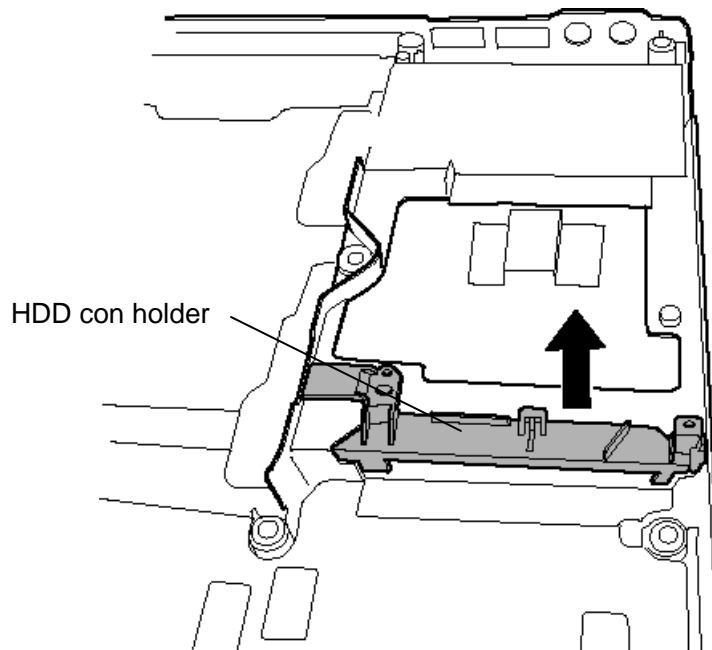
2. Remove the **HDD con holder**.

HDD con holder

Figure 4-30 Removing the HDD con holder

Installing the RTC battery / HDD con holder

To install the RTC battery/HDD con holder, follow the steps below and refer to Figure 4-29 and 4-30.

1. Install the **HDD con holder** in position.

2. Install the **RTC battery** into the slot.

3. Connect the **RTC battery cable** to the connector **CN9990** on the system board.

4.16 LAN jack

Removing the LAN jack

To remove the LAN jack, follow the steps below and refer to Figure 4-31.

1. Peel off the **glass tape** on the LAN jack cable.

2. Disconnect the **LAN jack cable** from the connector **CN4100** on the system board.

3. Remove the **LAN jack** from the slot.
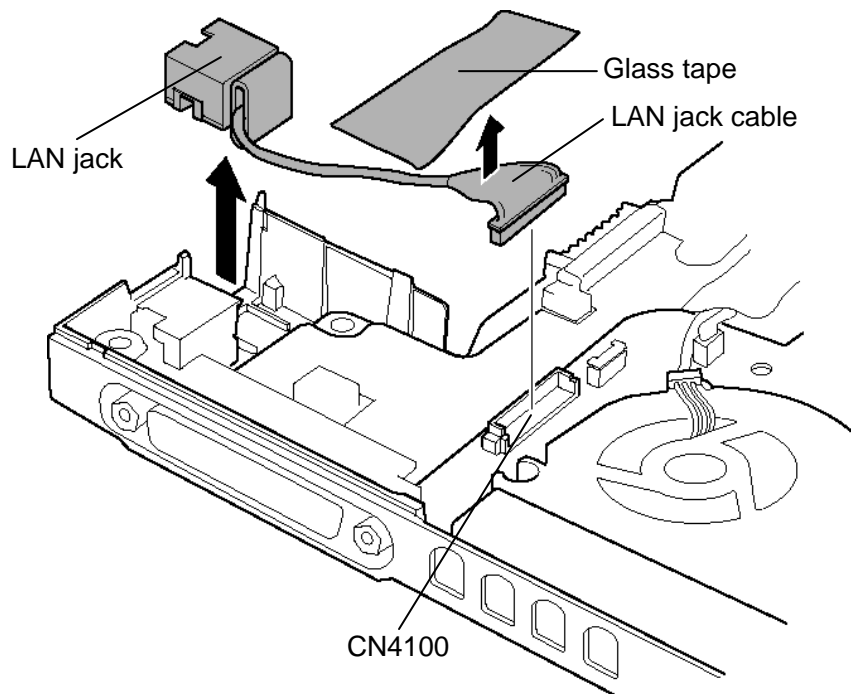
Figure 4-31   Removing the LAN jack

Installing the LAN jack

To install the LAN jack, follow the steps below and refer to Figure 4-31.

1. Install the **LAN jack** to the slot.

2. Connect the **LAN jack cable** to the connector **CN4100** on the system board.

3. Stick the **glass tape** on the LAN jack cable.

4.17 RGB harness holder / RGB board / Modem jack

Removing the RGB harness holder / RGB board / Modem jack

To remove the RGB harness holder / RGB board / modem jack, follow the steps below and refer to Figure 4-32 to 4-34.

1. Remove the following **screw** securing the RGB harness holder.

   - M2.5×4B   FLAT HEAD screw   ×1

2. Take out the **RGB harness holder** while unhooking the front latches.
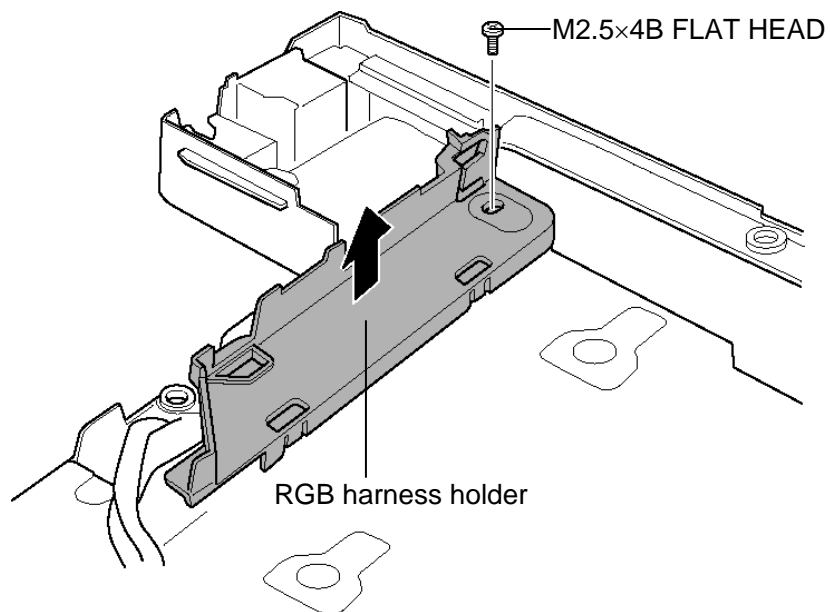
Figure 4-32 Removing the RGB harness holder

3. Peel off the **glass tape**.

4. Take out the **modem jack** from the slot.
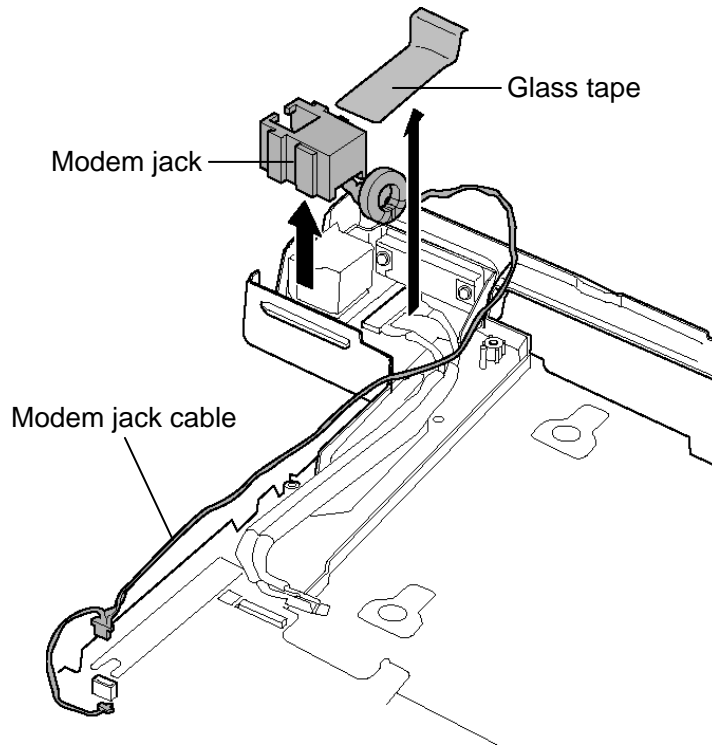
Figure 4-33 Removing the modem jack

5. Remove the following **screw**.

   - M2.5×2.8B   FLAT HEAD screw   ×1

6. Remove the **RGB board** and disconnect the **RGB harness** from the connector **CN5622** on the RGB board.
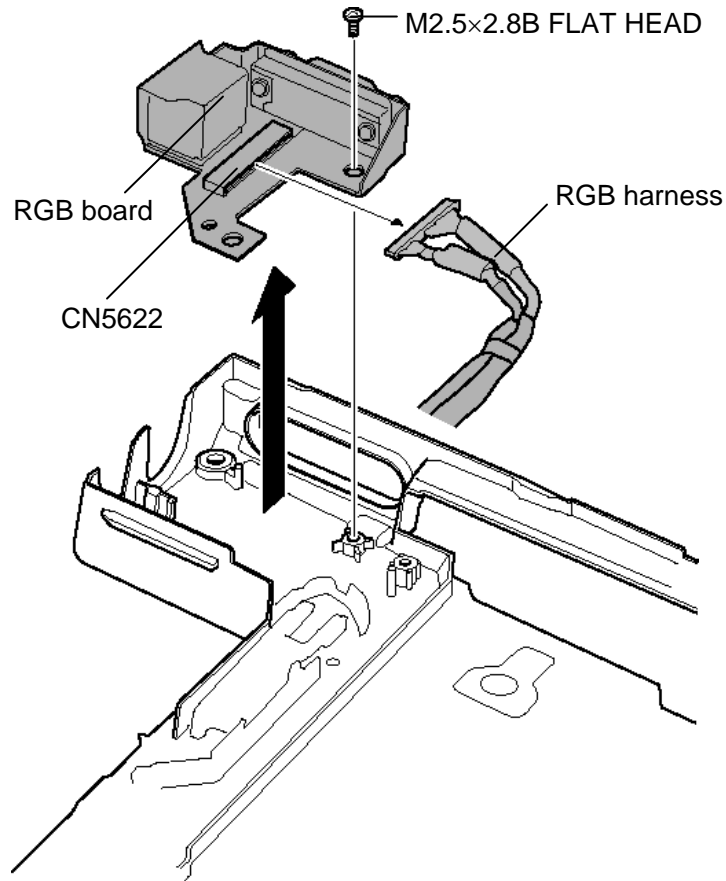

Figure 4-34 Removing the RGB board

Installing the RGB harness holder / RGB board / Modem jack

To install the RGB harness holder / RGB board / modem jack, follow the steps below and refer to Figure 4-32 to 4-34.

1. Connect the **RGB harness** to the connector **CN5622** on the RGB board.

2. Install the **RGB board** while inserting the RGB connector to the slot.

3. Secure the RGB board with the following **screw**.

    - M2.5×2.8B   FLAT HEAD screw   ×1

4. Install the **modem jack** to the slot.

5. Stick the **glass tape**.

6. Install the **RGB harness holder** while hooking the front latches.

7. Secure the RGB harness holder with the following **screw**.

    - M2.5×4B   FLAT HEAD screw   ×1

CAUTION: *Route correctly the modem jack cable and RGB harness in the slot as shown below.*
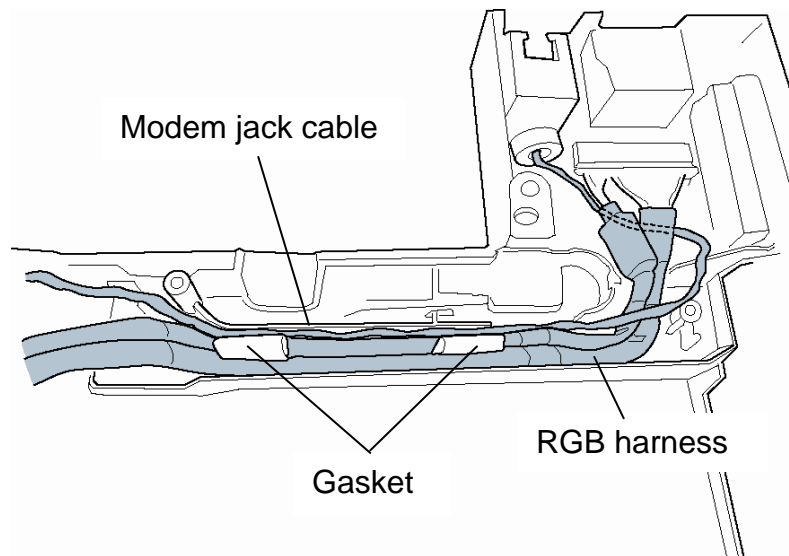
4.18 Fan

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 **CN8770** on the system board.
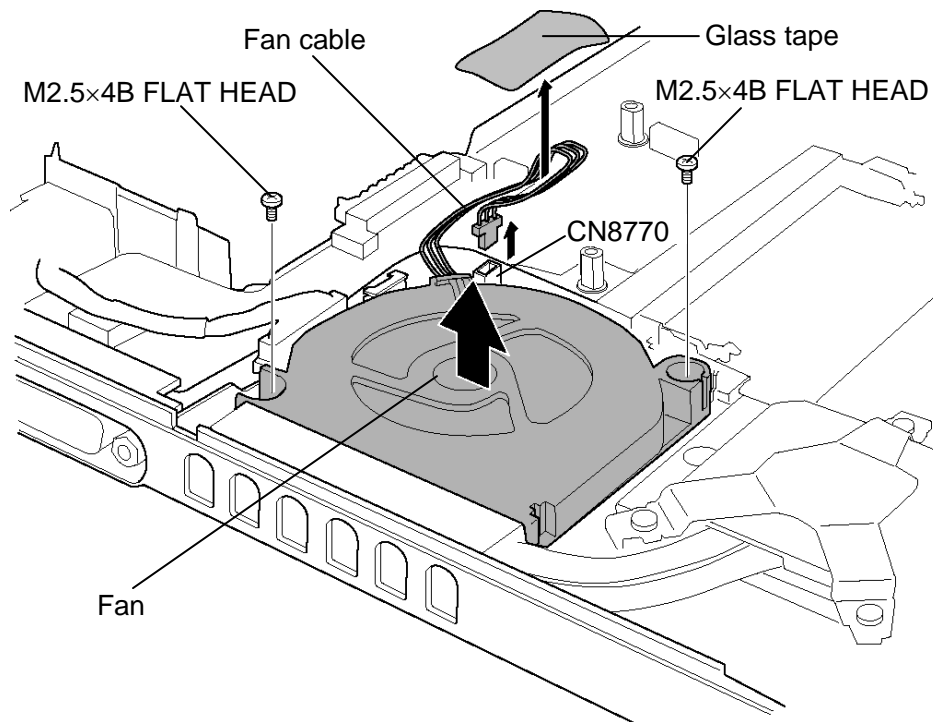
3. Remove the **fan**.

Figure4-35   Removing the fan

Installing the Fan

To install the fan, follow the steps below and refer to Figure 4-35.

1. Place the **fan**.

2. Connect the **fan cable** to the connector **CN8770** 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

4.19 Cooling fin / CPU

Removing the Cooling fin / CPU

To remove the Cooling fin / CPU, follow the steps below and refer to Figure 4-36 to 4-38.

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 fin*
                      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.

    •   M2×4Z   BIND screw   ×3

CAUTION: *Remove the screws in the order of mark "3", "2" and "1" on the CPU*
                  holder.

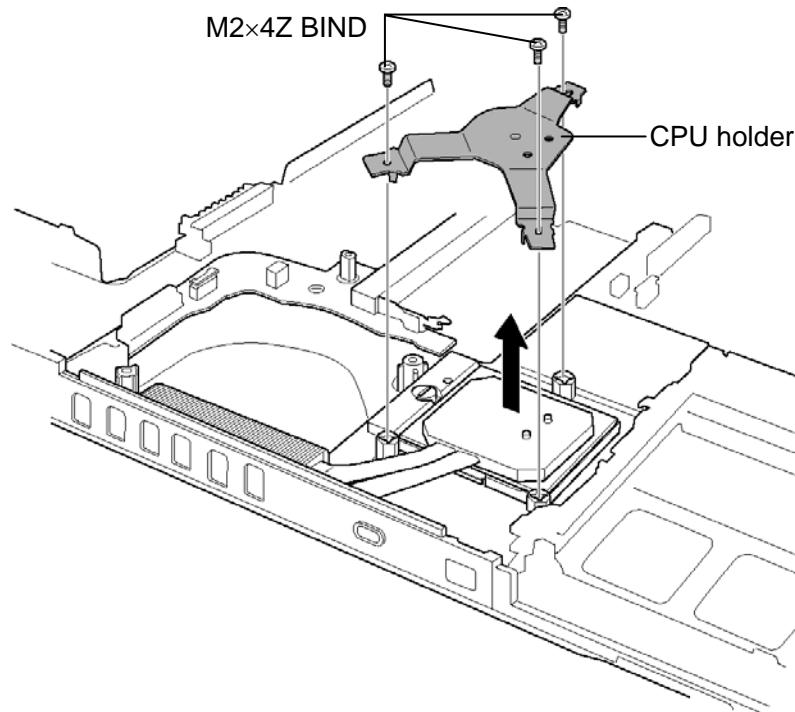2. Remove the **CPU holder**.

Figure4-36 Removing the CPU holder

---

3. Remove the **cooling fin**.

> **CAUTION:** *Silicon grease is applied between the fin and the CPU. When removing the fin, be careful not to damage the CPU under the fin.*
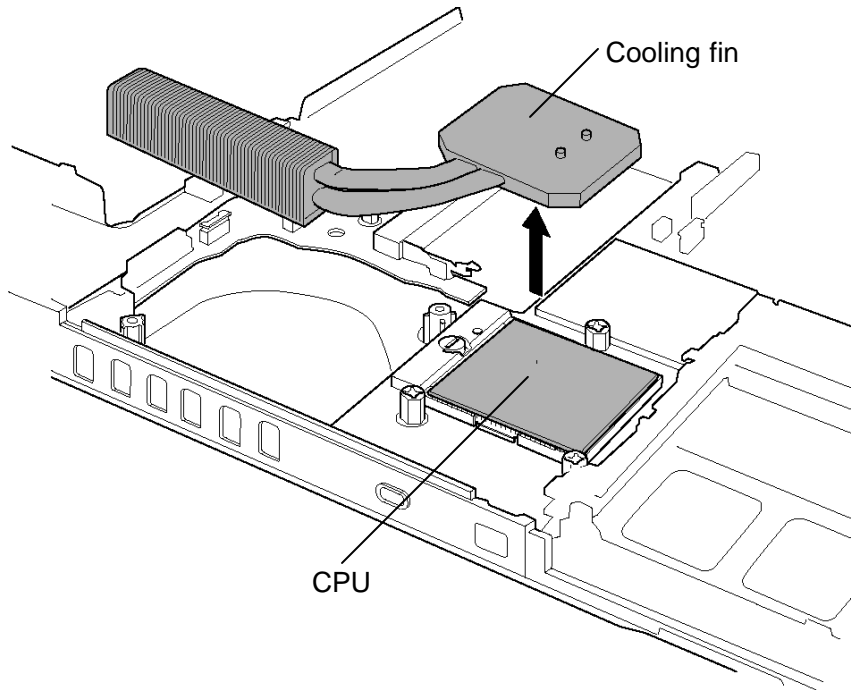

Figure4-37 Removing the cooling fin

4. Unlock the **CPU** by turning the **cam** on the CPU socket 180 degrees to the counterclockwise with a flat-blade screwdriver (in the order shown in the figure below).
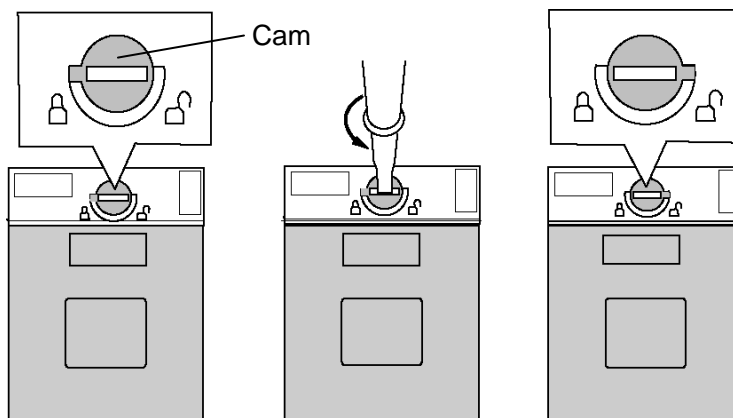

Figure 4-38   Unlocking the CPU

5. Remove the **CPU**.

Installing the Cooling fin / CPU

To install the Cooling fin / CPU, follow the steps below and refer to Figure 36 to 4-40.

1. Make sure the cam is in the open position.

2. Seat the **CPU** in the CPU socket. Make sure the alignment is exact 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 180 degrees to the clockwise with a flat-blade screwdriver (in the order shown in the figure below).
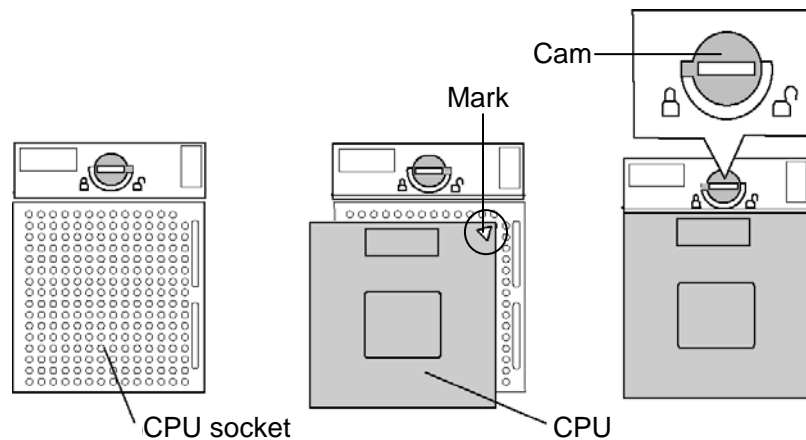

Figure 4-39   Installing the CPU

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.*
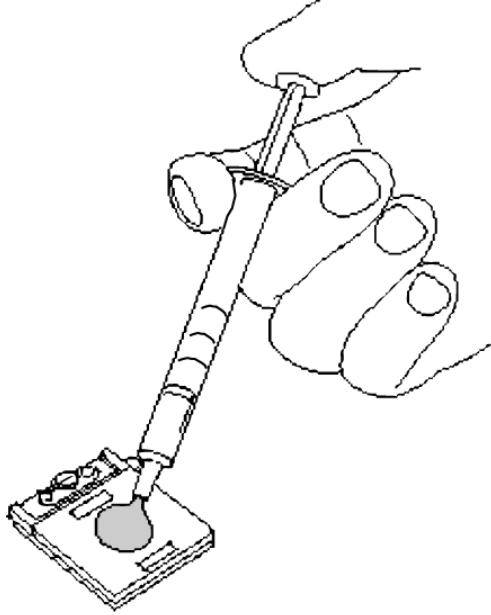

Figure 4-40   Applying new grease

5. Install the **cooling fin**.

6. Place the **CPU holder** and secure it with the following **screws** in the order of the number marked on the holder.

   - M2×4Z   BIND screw   ×3

> *CAUTION:*   *Tighten the screws in the order of mark "1", "2" and "3" on the CPU holder.*

4.20 System board / DC-IN jack

Removing the System board / DC-IN jack

To remove the system board / DC-IN jack, follow the steps below and refer to Figure 4-41.

1. Remove the following **screw** securing the system board.

   - M2.5×4B   FLAT HEAD screw   ×1

2. Lift up the **system board** and **DC-IN jack**.

3. Disconnect the **DC-IN jack cable** from the connector **CN8800** on the system board.
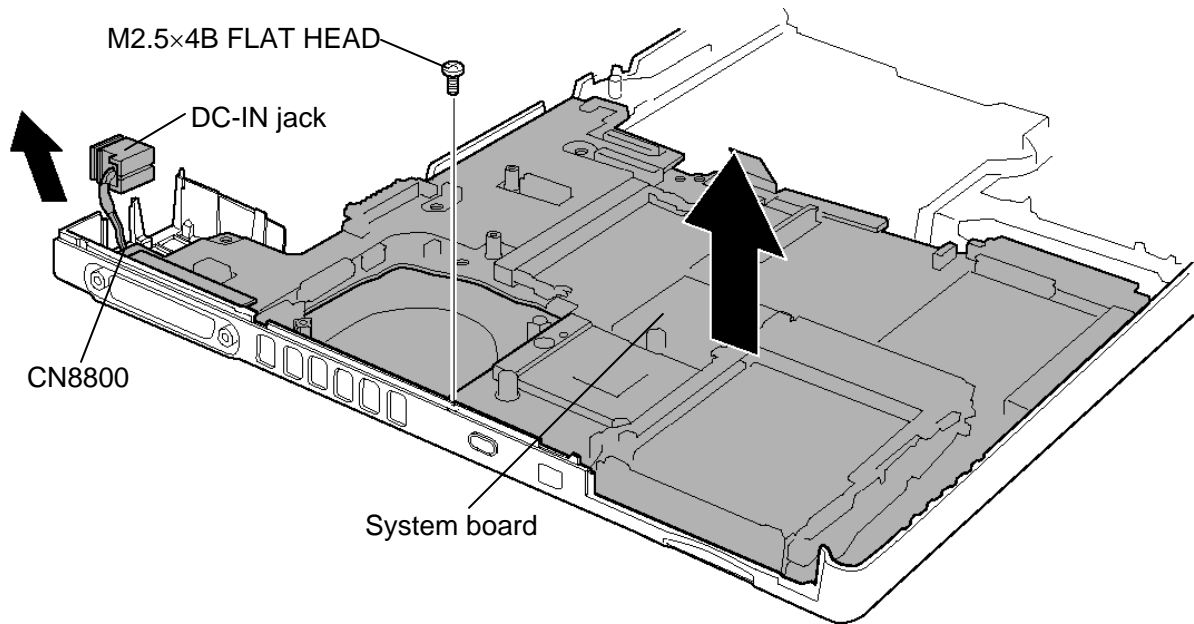
Figure 4-41 Removing the system board/DC-IN jack

Installing the System board / DC-IN jack

To install the system board / DC-IN jack, follow the steps below and refer to Figure 4-41.

1. Connect the **DC-IN jack cable** to the connector **CN8800** on the system board.

2. Install the **system board** from the left side and secure it with the following **screw**.

   - M2.5×4B   FLAT HEAD screw   ×1

3. Install the **DC-IN jack** into the slot.

4.21 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-42.

1. Remove the following **screws** and the **speaker holders** and **speakers** (right and left).

    - M2.5×6B   FLAT HEAD screw   ×2
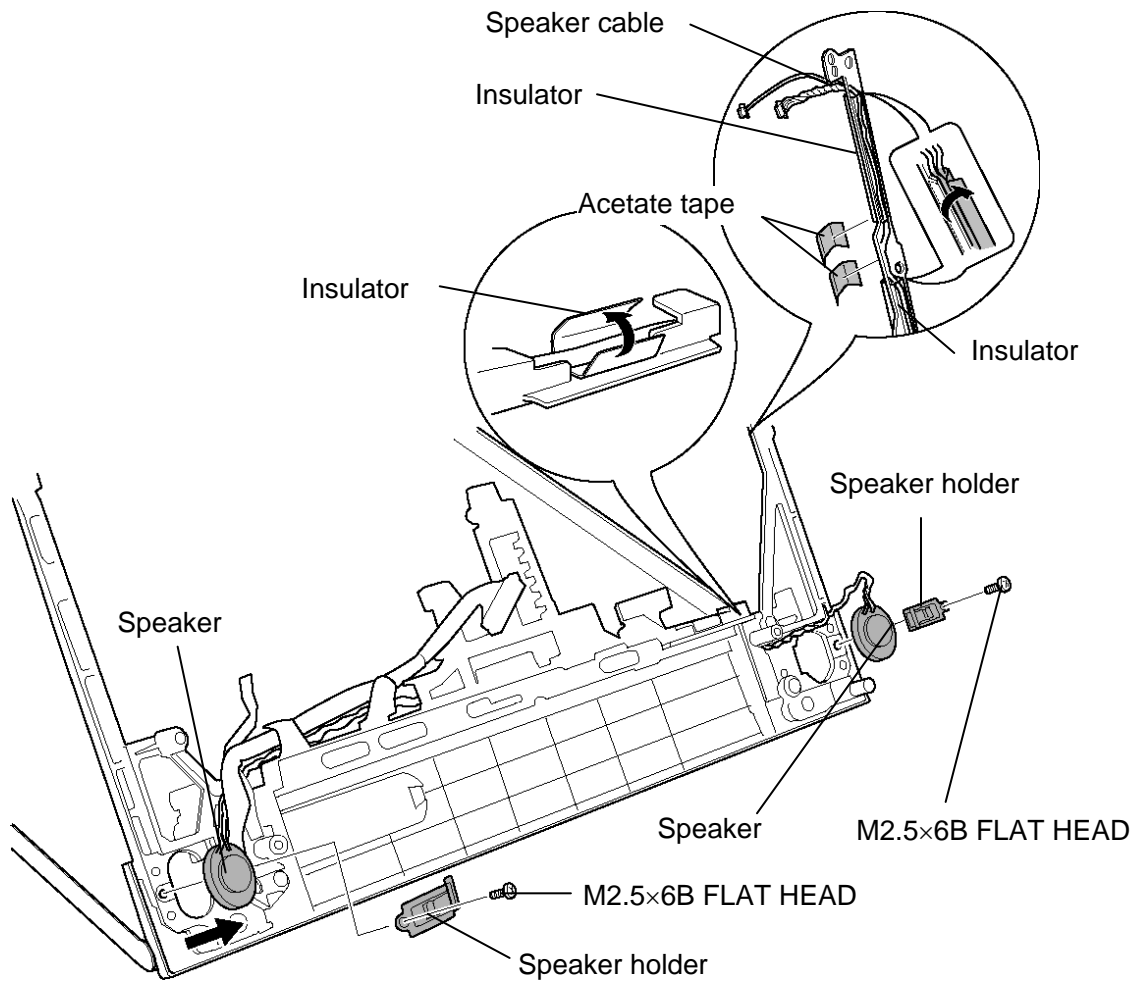
Figure 4-42 Removing the speakers

2. Peel off the two **acetate tapes** and **three insulators** securing the **speaker cable**.

3. Remove the **speaker cable** from the slot.

Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-42 and 4-43.

1. Install the **speakers** (right and left) to the slot.

2. Install the **speaker holders** (right and left) while inserting its tip to the slot and secure it with the following **screws**.

   • M2.5×6B   FLAT HEAD screw   ×2

3. Install the **speaker cable** to the slot while passing through the guide.
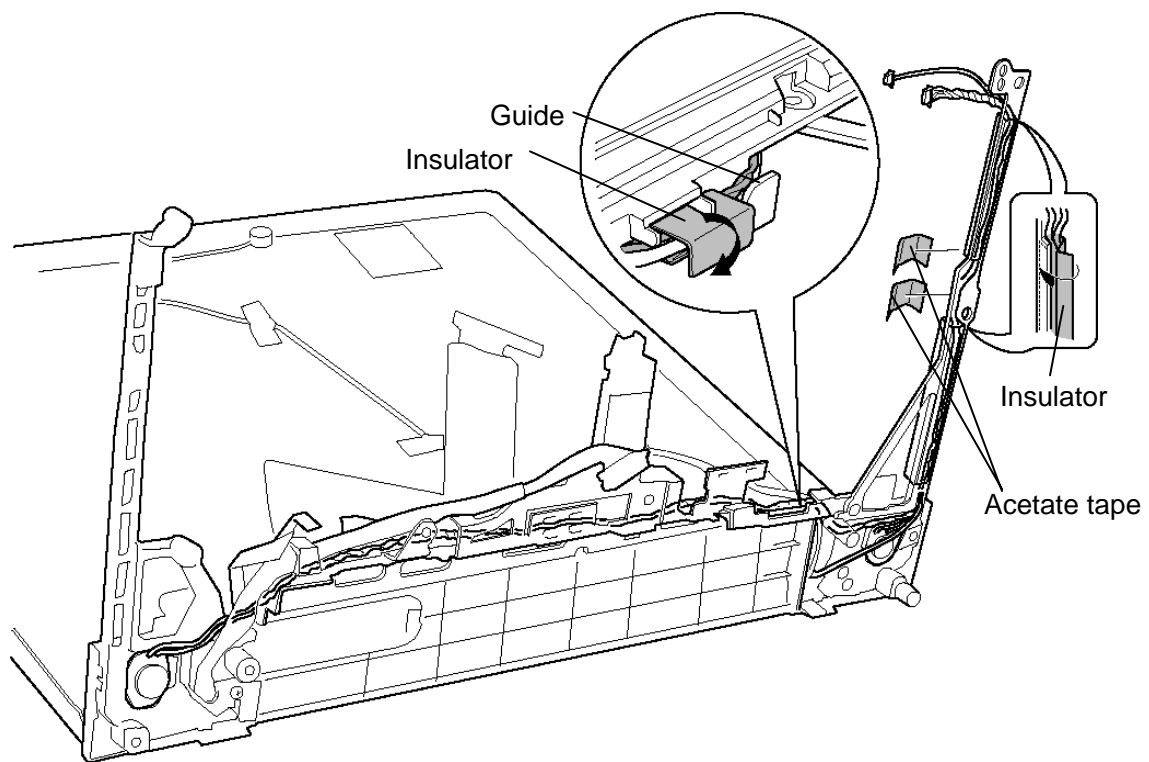
Figure 4-43 Installing the speaker cable

4. Stick three **insulators** to secure the speaker cable.

5. Stick two **acetate tapes** to secure the insulators and speaker cable.

4.22 Power switch board

Removing the Power switch board

To remove the power switch board, follow the steps below and refer to Figure 4-44 and 4-45.

1. Remove the **power button holder** while pushing three **latches** from the back.
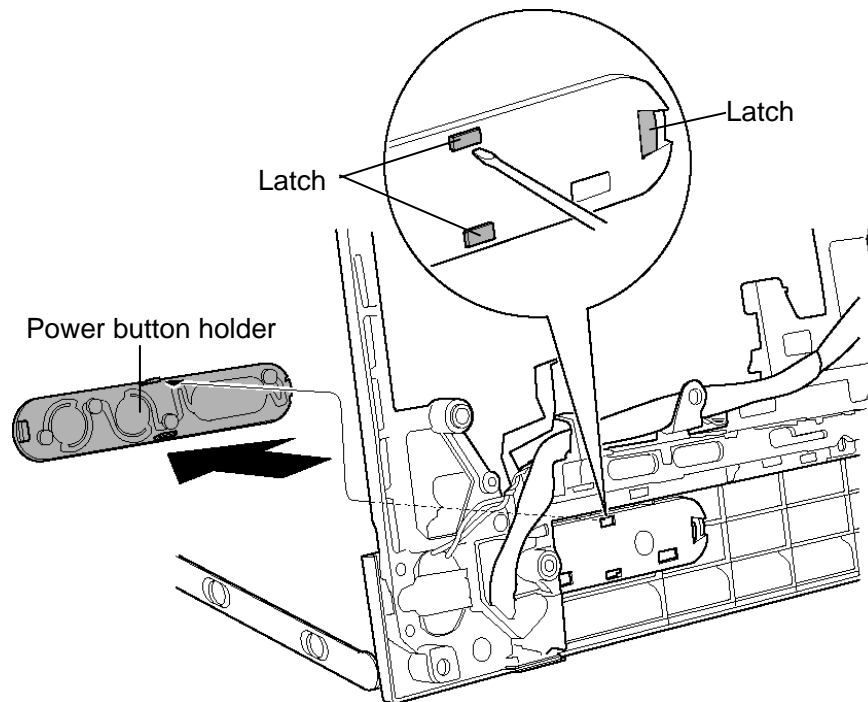
Figure 4-44 Removing the power button holder

2. Remove the **power switch board** from the hole.

3. Disconnect the **power switch cable** from the connector **PJ9610** on the power switch board.
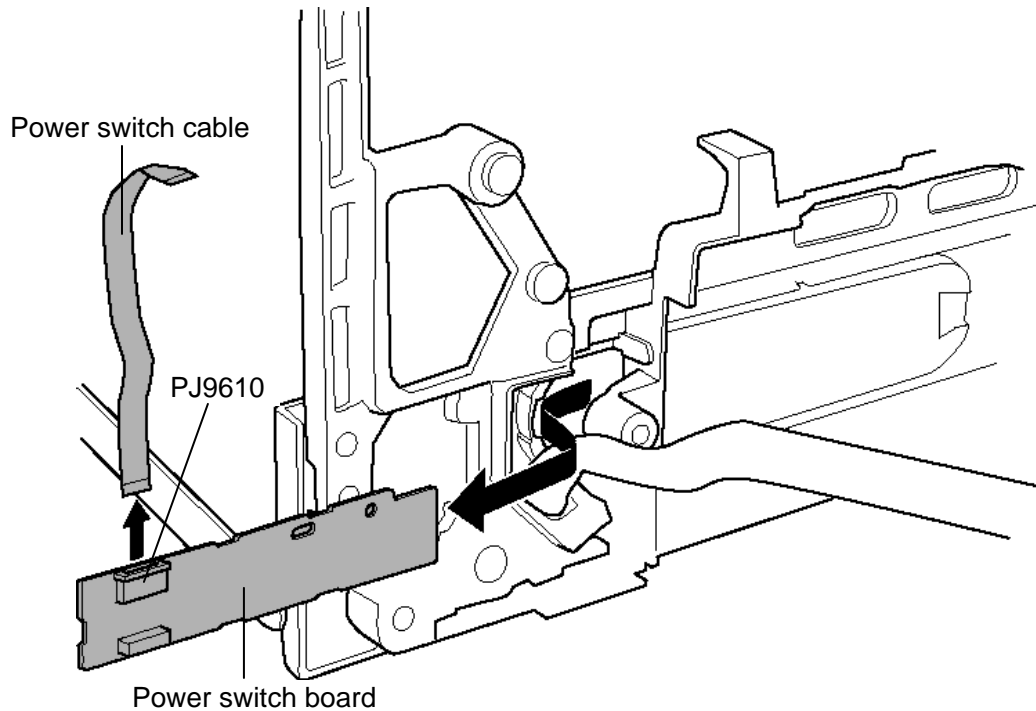
Figure 4-45 Removing the power switch board

Installing the Power switch board

To install the power switch board, follow the steps below and refer to the Figure 4-44 and 4-45.

1. Connect the **power switch cable** to the connector **PJ9610** on the power switch board.

2. Install the **power switch board** in place while passing through the hole.

3. Install the **power button holder** while hooking the three **latches**.

4.23 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 4-46 to 4-51.

1. Remove the two **mask seals** and the following **screws** securing the LCD mask.

   - M2.5×6B   FLAT HEAD screw   ×2
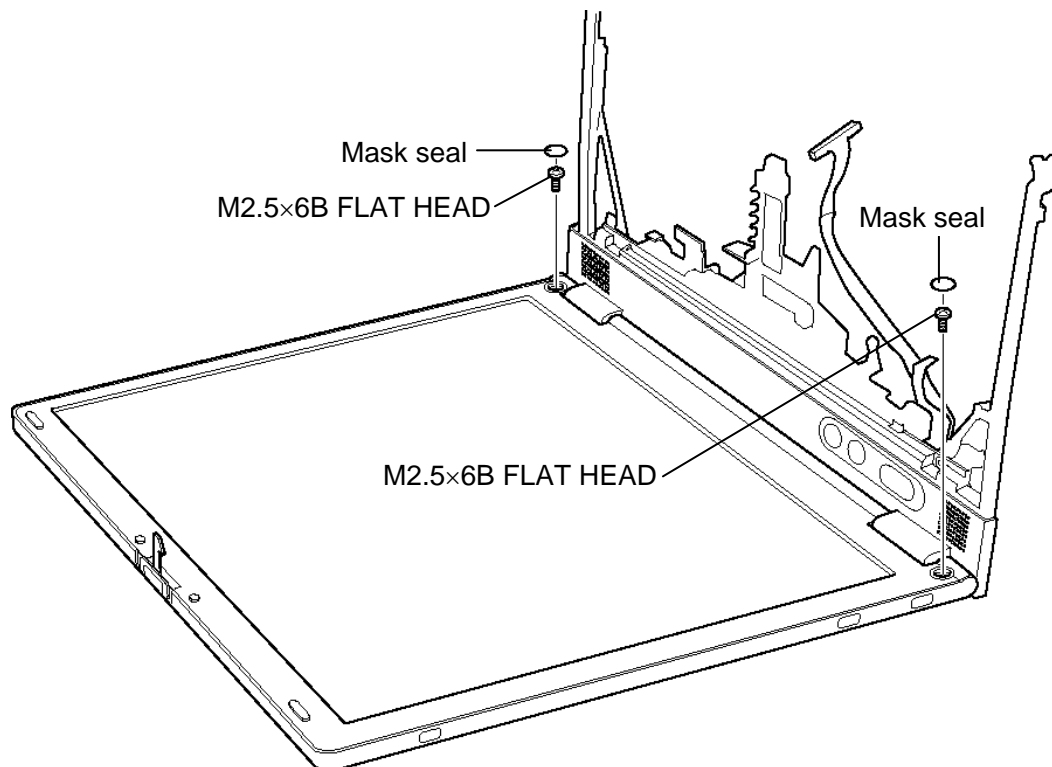
Figure 4-46   Removing the mask seals and screws

2. Remove the **LCD mask** while releasing the latches.
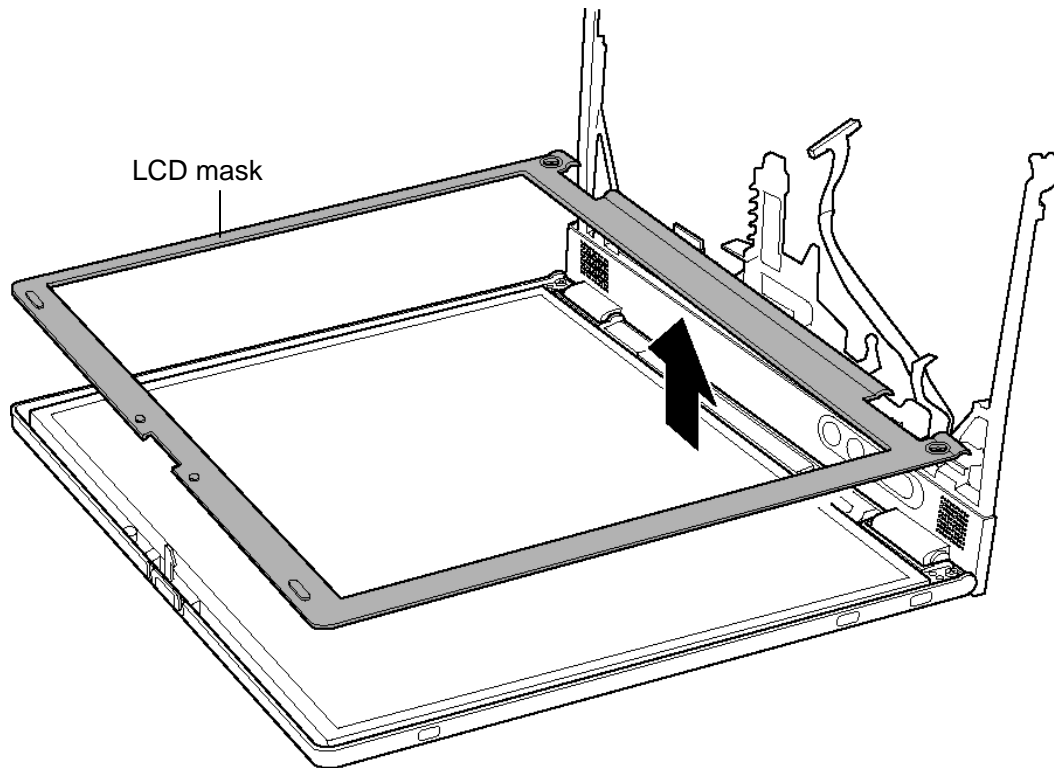
Figure 4-47   Removing the LCD mask

3. Remove the following **screw** securing the FL inverter.

    •   M2×4Z   S-FLAT HEAD screw   ×1

4. Peel the **insulator**.

5. Disconnect the **FL cable** under the insulator and the **HV cable** from the FL inverter.

6. Remove the **FL inverter**.
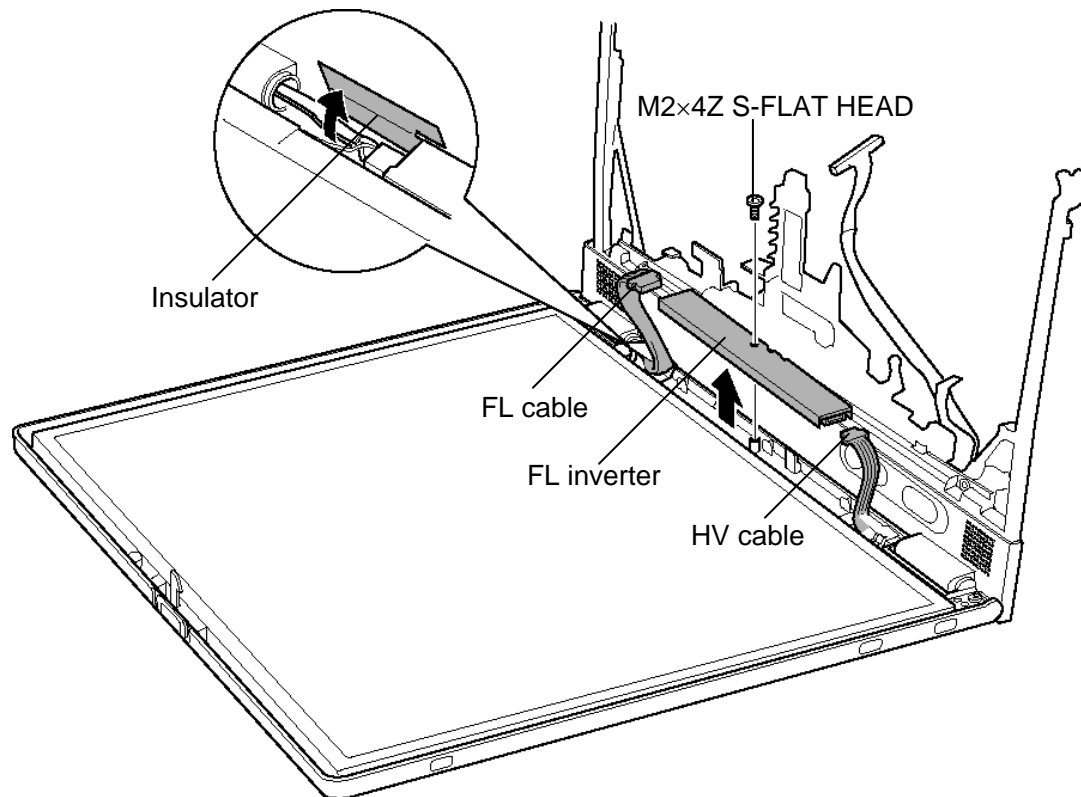
Figure 4-48   Removing the FL inverter

7. Remove the four **mask seals** on both the sides of the LCD unit and the following **screws** securing the LCD unit.

- M2×4Z   S-FLAT HEAD screw   ×4
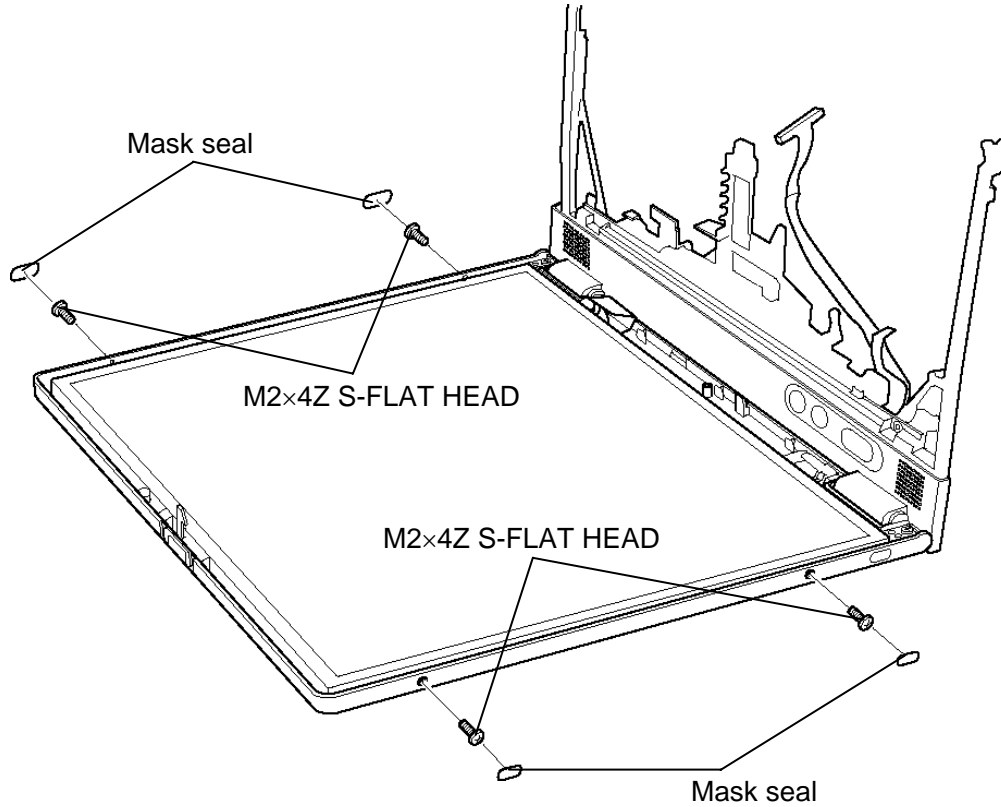
Figure 4-49   Removing the LCD unit (1)

8. 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.*

9. Remove the **copper tape** securing the LCD cable.

10. Disconnect the **LCD cable** and remove the **LCD unit**.

CAUTION: *When removing the LCD cable, be careful not to damage the connector.*
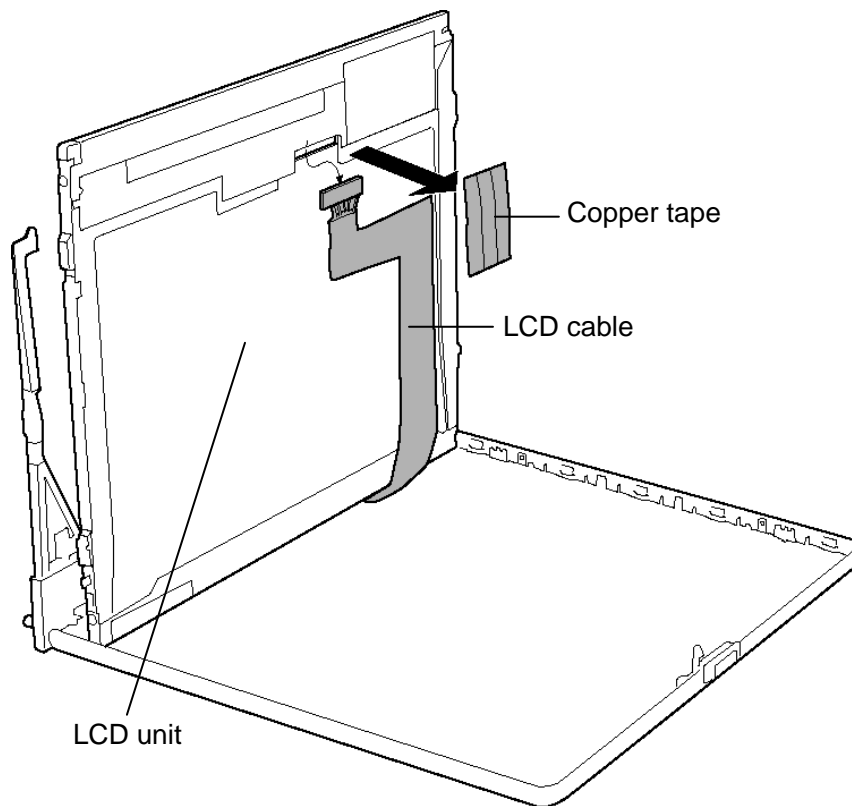
Figure 4-50   Removing the LCD unit (2)

11. Remove the following **screws** and detach the two **LCD supports** from the **LCD unit**.

- M2×3C   S-FLAT HEAD screw   ×4
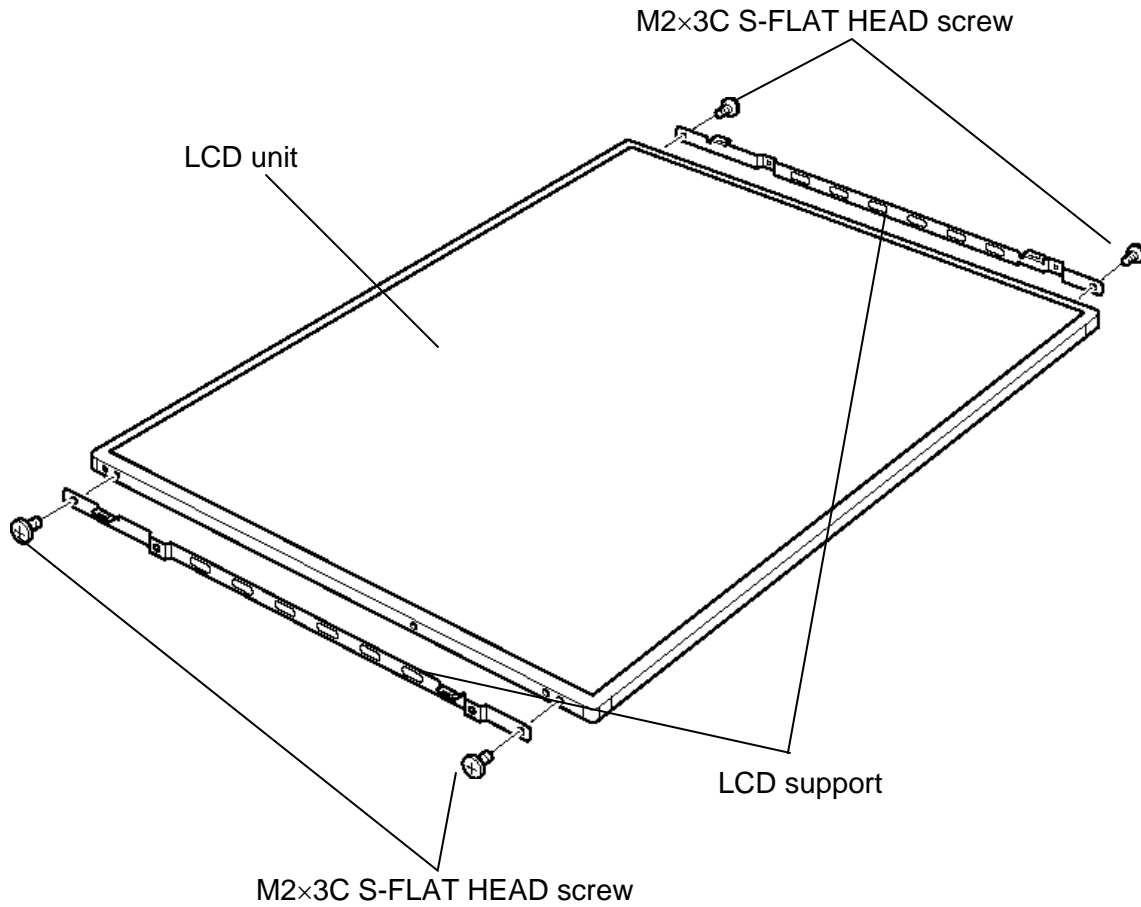
Figure 4-51   Detaching the LCD supports

12. Peel off the **aluminum cover** from the LCD unit.(only for the Samsung-made 14.1-inch XGA LCD unit)

CAUTION: *Peel off the aluminum cover from the LCD unit. (only for Samsung-made 14.1-inch XGA LCD unit).*

Aluminum cover
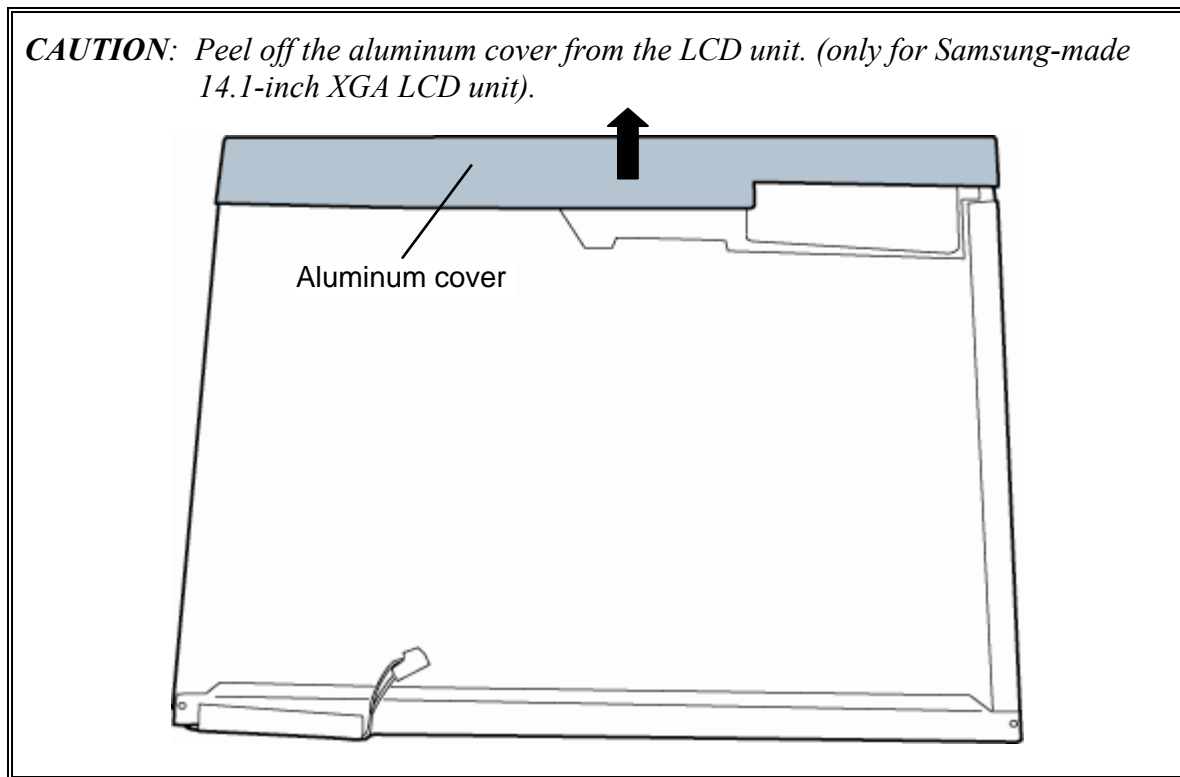
NOTE: 1) *Be careful not to apply pressure to the ICs along the edge of LCD unit. The ICs are easily damaged.*

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 4-46 to 4-51.

1. Stick the **aluminum cover** on the LCD unit (only for the Samsung-made14.1-inch XGA LCD unit).

CAUTION: When installing the LCD, be careful of the points in the following picture.

Back of the right side of LCD

Align the edge of the aluminum cover with the corner of LCD unit.

Bend the aluminum cover at these lines.

Right side of LCD

Bend the aluminum cover to the side.

Left side of LCD

Top of the LCD.

Bend the aluminum cover to the top of LCD.

When sticking the aluminum cover,
do not cover the bar code.
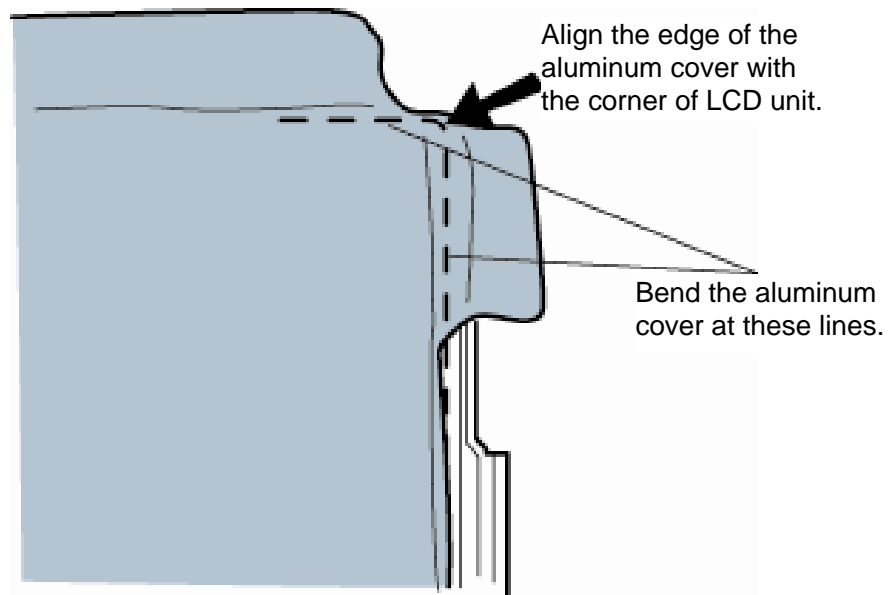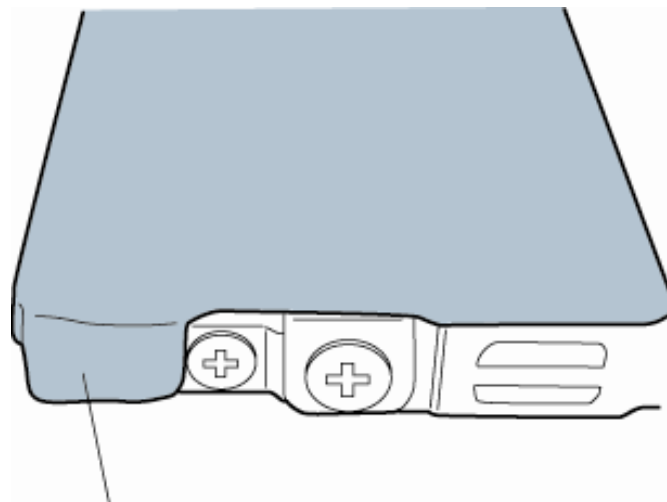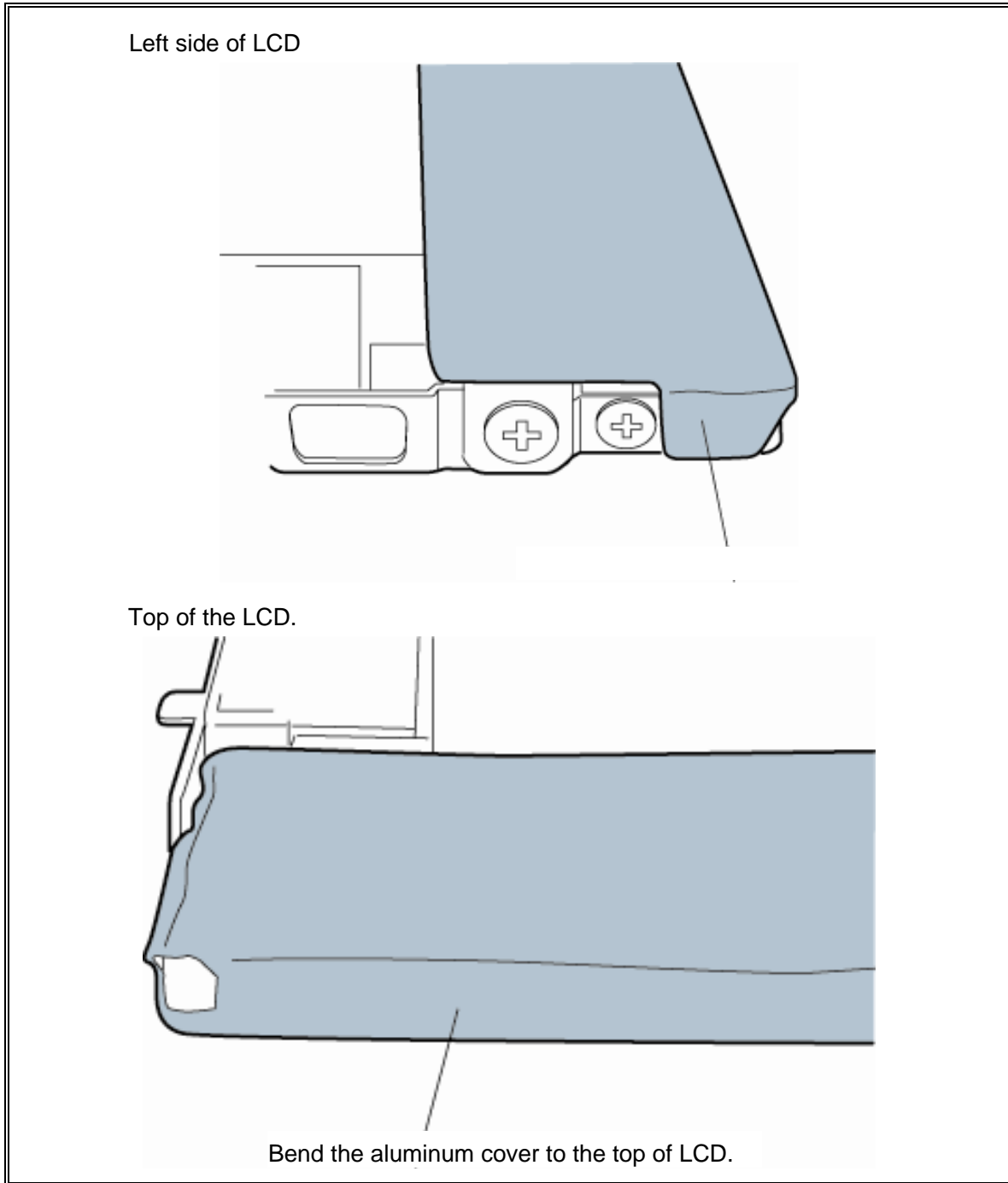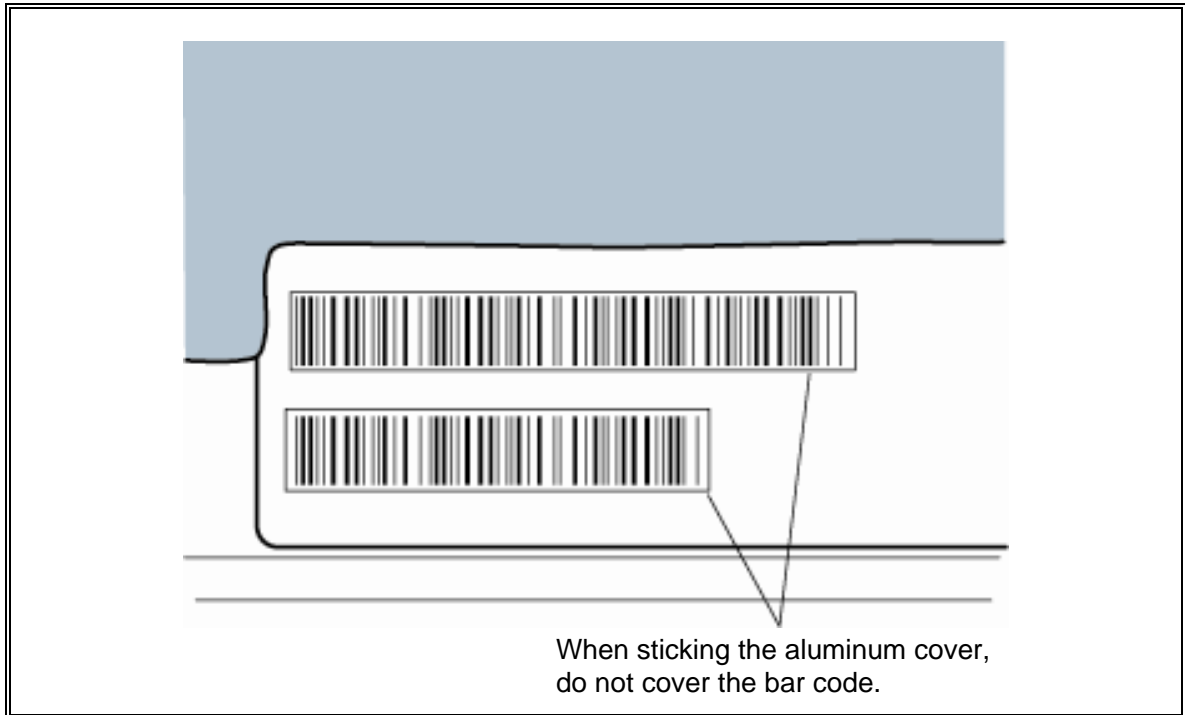
2. Secure the two **LCD supports** to the LCD unit with the following **screws**.

    * M2×3C   S-FLAT HEAD screw   ×4

3. Lean the **LCD unit** against the lower side of the display cover.

4. Connect the **LCD cable** to the connector on the back of the LCD unit. Stick the **copper tape** on the LCD cable.

CAUTION:

When sticking the copper tape, do not cover the aluminum cover.

Align the bottom edge of copper tape with the edge of LCD harness.

---
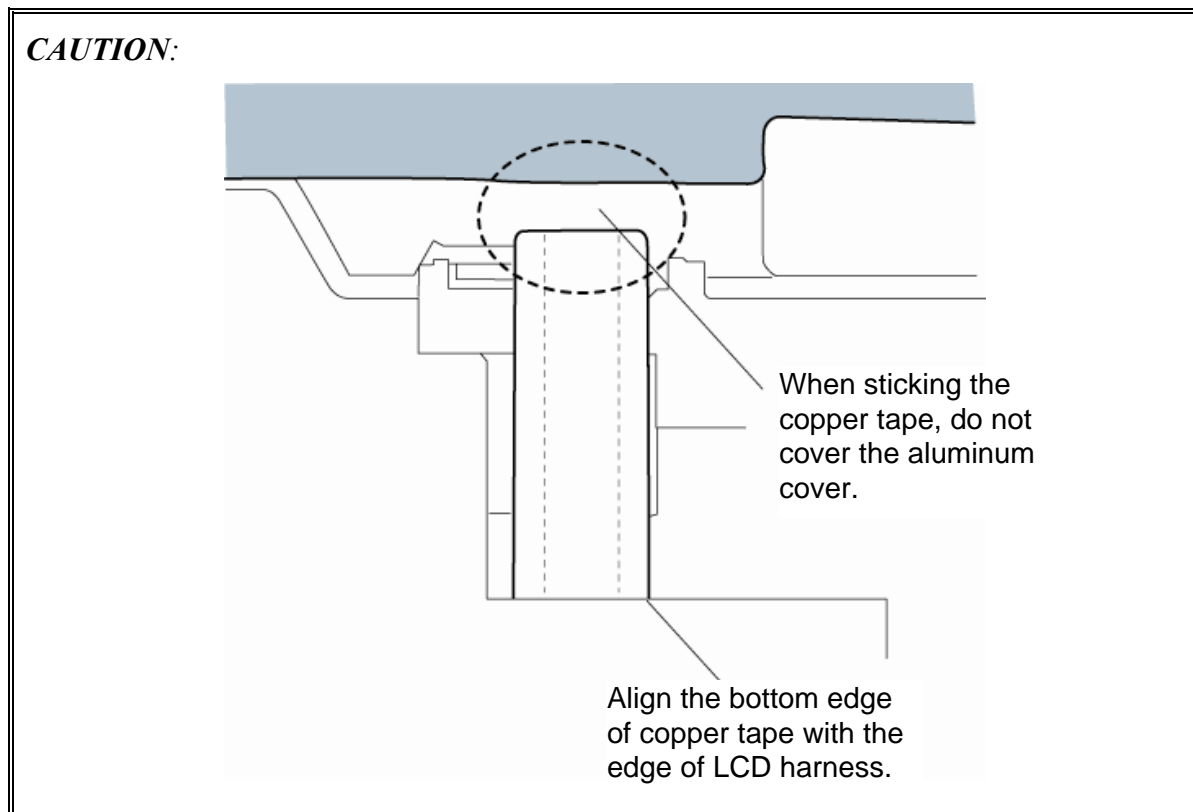
5. Seat the **LCD unit** and secure it with the following **screws**.

    - M2×4Z   S-FLAT HEAD screw   ×4

6. Stick the four **mask seals** on the sides of the LCD unit.

7. Connect the **FL cable** and the **HV cable** to the FL inverter.

8. Seat the **FL inverter** and stick the **insulator** on the FL inverter of the FL cable side.

9. Secure the FL inverter with the following **screw**.

    - M2×4Z   S-FLAT HEAD screw   ×1

10. Install the **LCD mask** while hooking the latches.

11. Secure the LCD mask with the following **screws**.

    - M2.5×6B   FLAT HEAD screw   ×2

12. Stick the two **mask seals**.

4.24 Microphone / Wireless LAN antenna / Bluetooth antenna

Removing the Microphone / Wireless LAN antenna / Bluetooth antenna

To remove the microphone / wireless LAN antenna / Bluetooth antenna, follow the steps below and refer to Figure 4-52 and 4-53.

1. Remove the **hinge cap** (right).

2. Peel off the **aluminum tape** and five **acetate tapes**.

3. Take out the **microphone** from the slot while passing the cable from the hole.
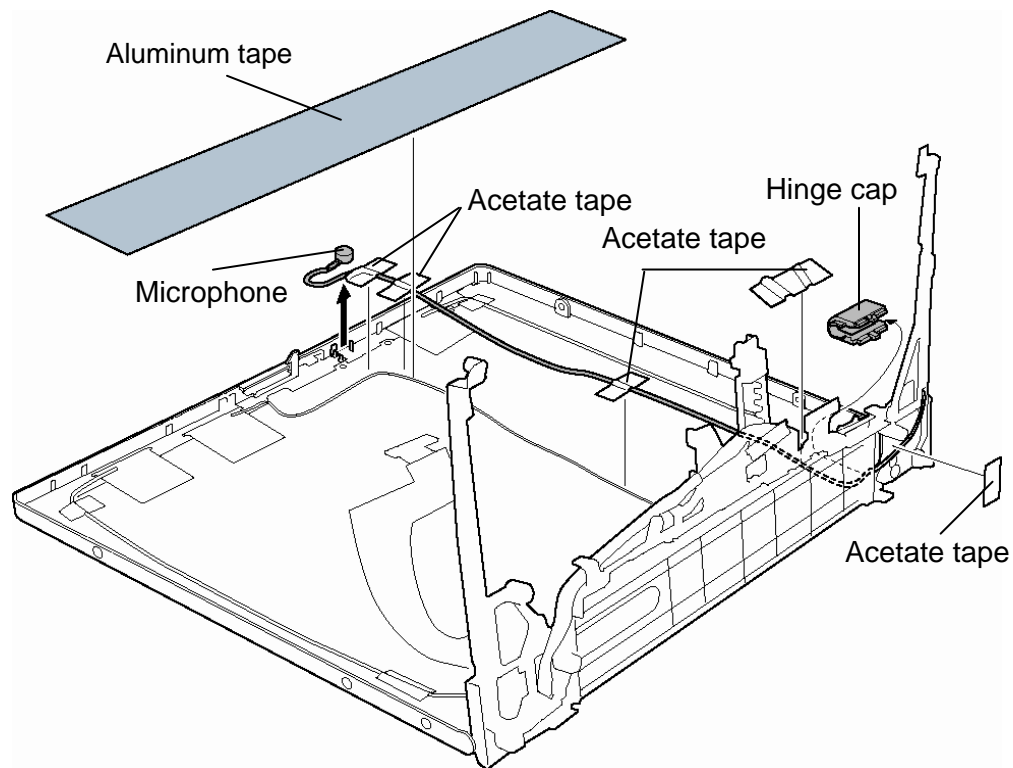
Figure 4-52   Removing the microphone

4. Remove the ten **acetate tapes** securing the wireless LAN antenna cables and Bluetooth antenna cable (for wireless LAN/Bluetooth models only).

5. Peel off the **wireless LAN antennas** and **Bluetooth antenna** from the display cover.

6. Remove these **antennas** from the guides and pull them from the hole of the display cover.
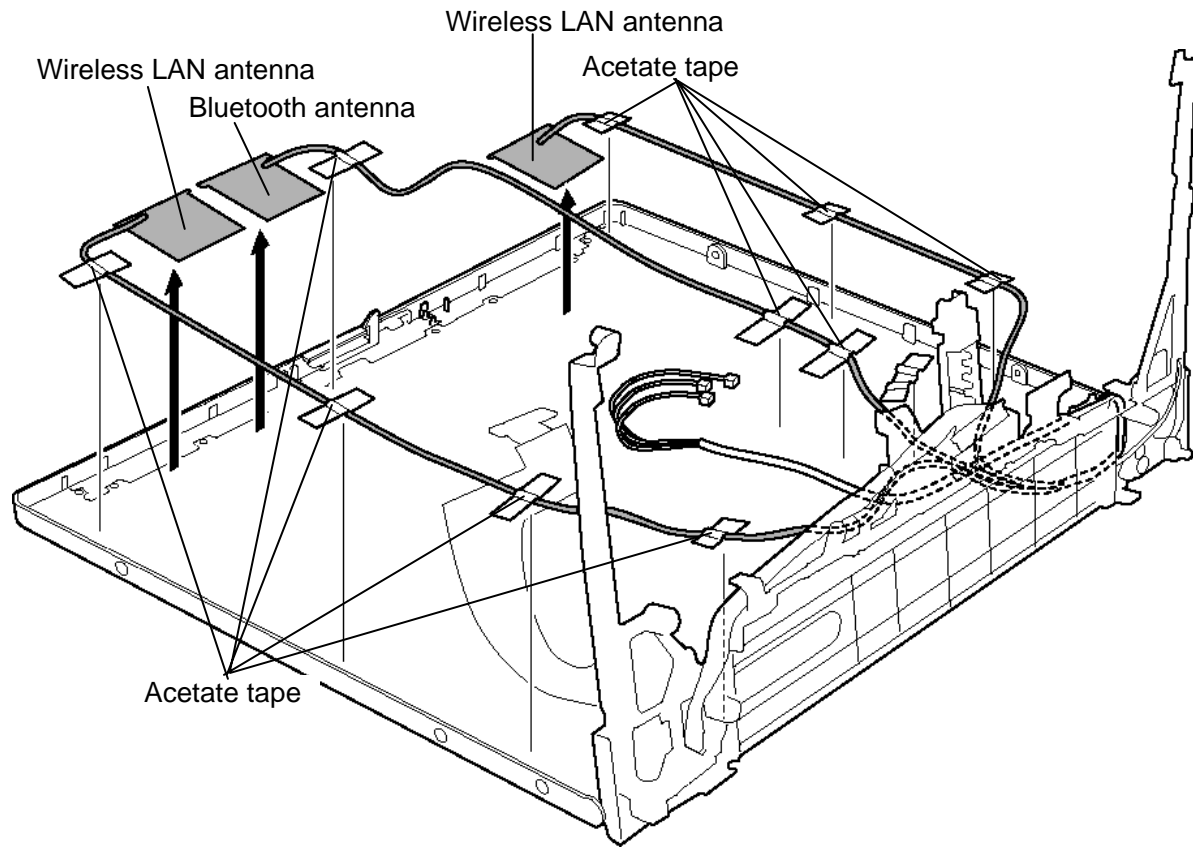
Figure 4-53   Removing the wireless LAN/Bluetooth antenna

Installing the Microphone / Wireless LAN antenna / Bluetooth antenna

To install the microphone / wireless LAN antenna / Bluetooth antenna, follow the steps below and refer to Figure 4-52 and 4-53.

1. Set the **microphone** into the slot while passing through the cable in place.

2. Stick the five **acetate tapes**.

3. Stick the **wireless LAN antennas** and **Bluetooth antenna**.

4. Pass the **wireless LAN antenna cables** and **Bluetooth antenna cable** through the hole and set them in place.

5. Secure the **wireless LAN antenna cables** and **Bluetooth antenna cable** with the ten **acetate tapes**.

6. Stick the **aluminum tape**.

7. Install the **hinge cap** (right).

4.25 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to Figure 4-54 to 4-57.

1. Remove the following **screw** and the **LCD cable holder**.

   • M2.5×4B FLAT HEAD screw   ×1
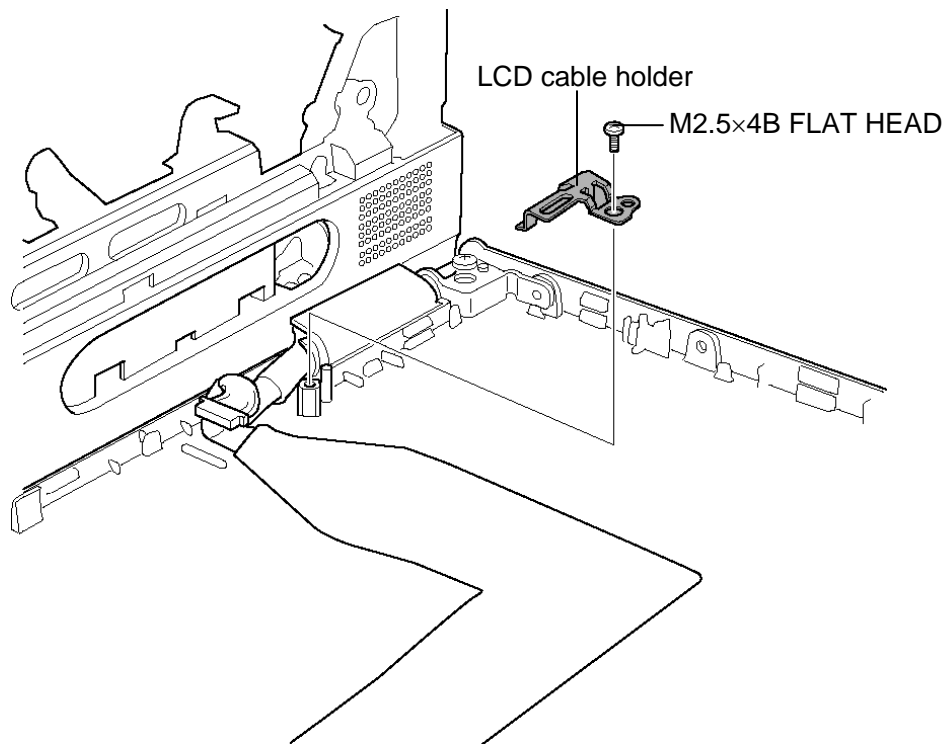
Figure 4-54   Removing the LCD cable holder

2. Remove the **hinge cap** (at the LCD cable side).
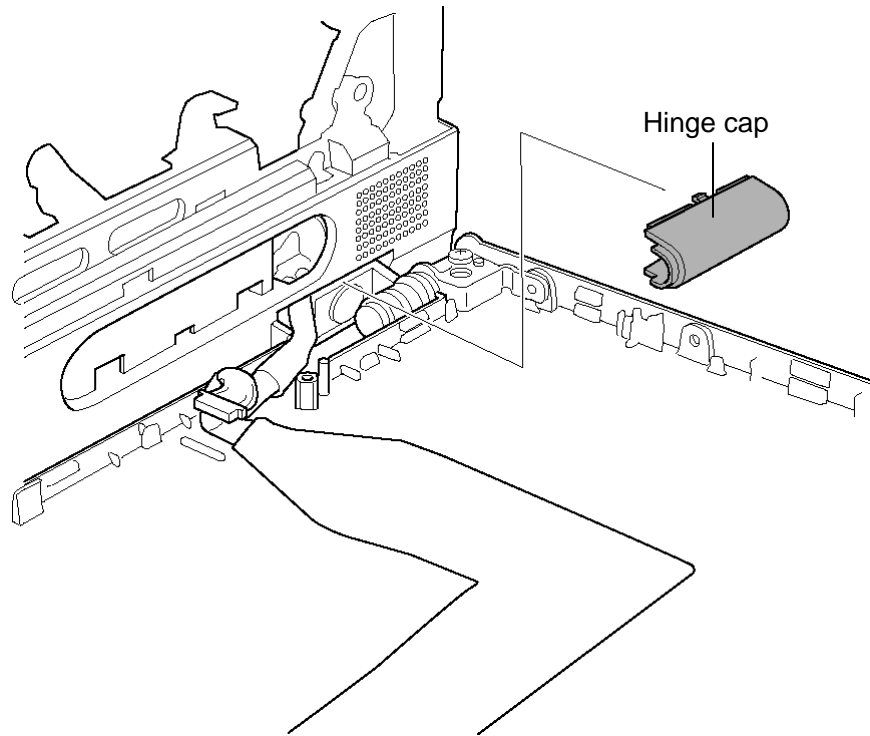
Figure 4-55   Removing the hinge cap

3. Remove the two **mask seals** and the following **screws** of the LCD cover.

  * M2.5×2.8B   FLAT HEAD screw   ×2

4. Remove the following **screws** securing the hinges on the LCD cover.

  * M2.5×5B   FLAT HEAD screw   ×2

M2.5×5B FLAT HEAD

Mask seal

M2.5×5B FLAT HEAD

Hinge

M2.5×2.8B FLAT HEAD

Hinge

Mask seal

M2.5×2.8B FLAT HEAD
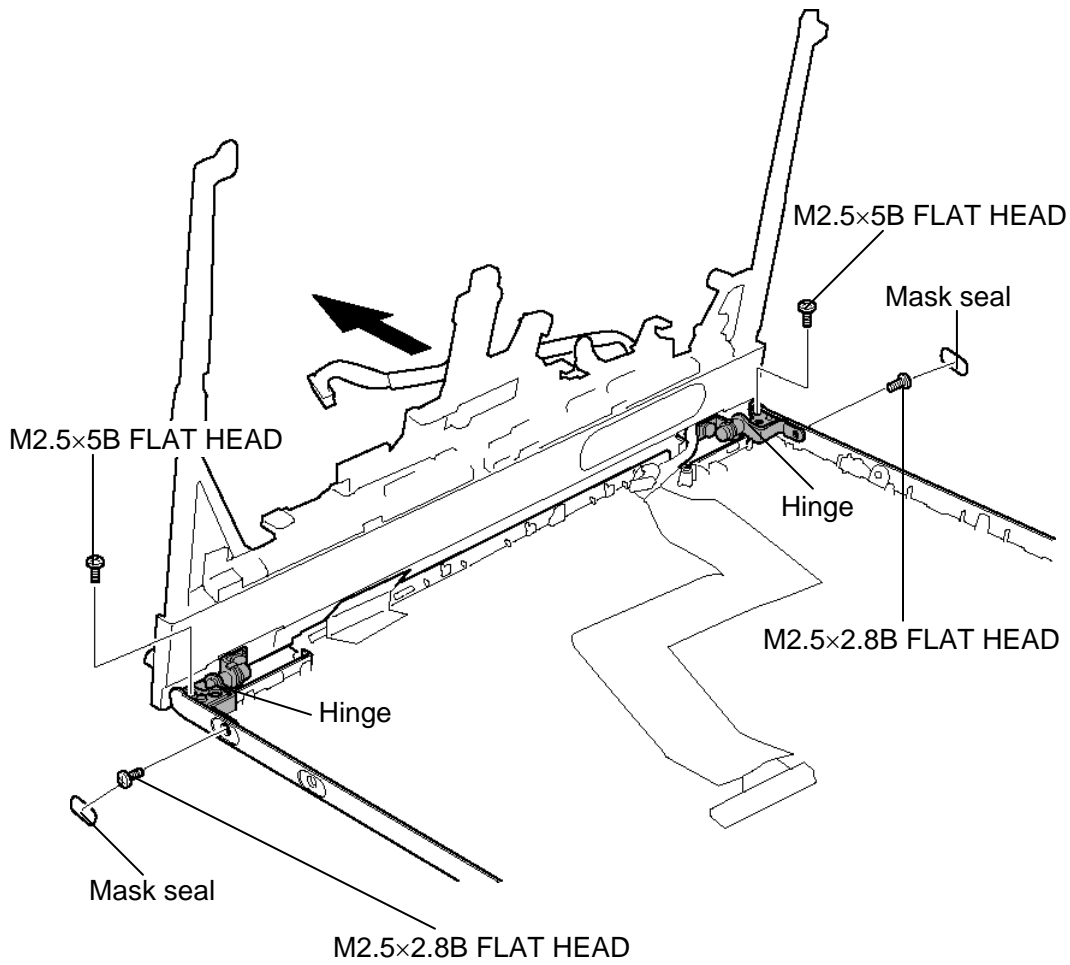
Figure 4-56 Removing the hinge (1)

5. Remove the following **screws** securing the hinges at the back and remove the **hinges** while turning them.

   - M2.5×6   Tapping screw   ×2
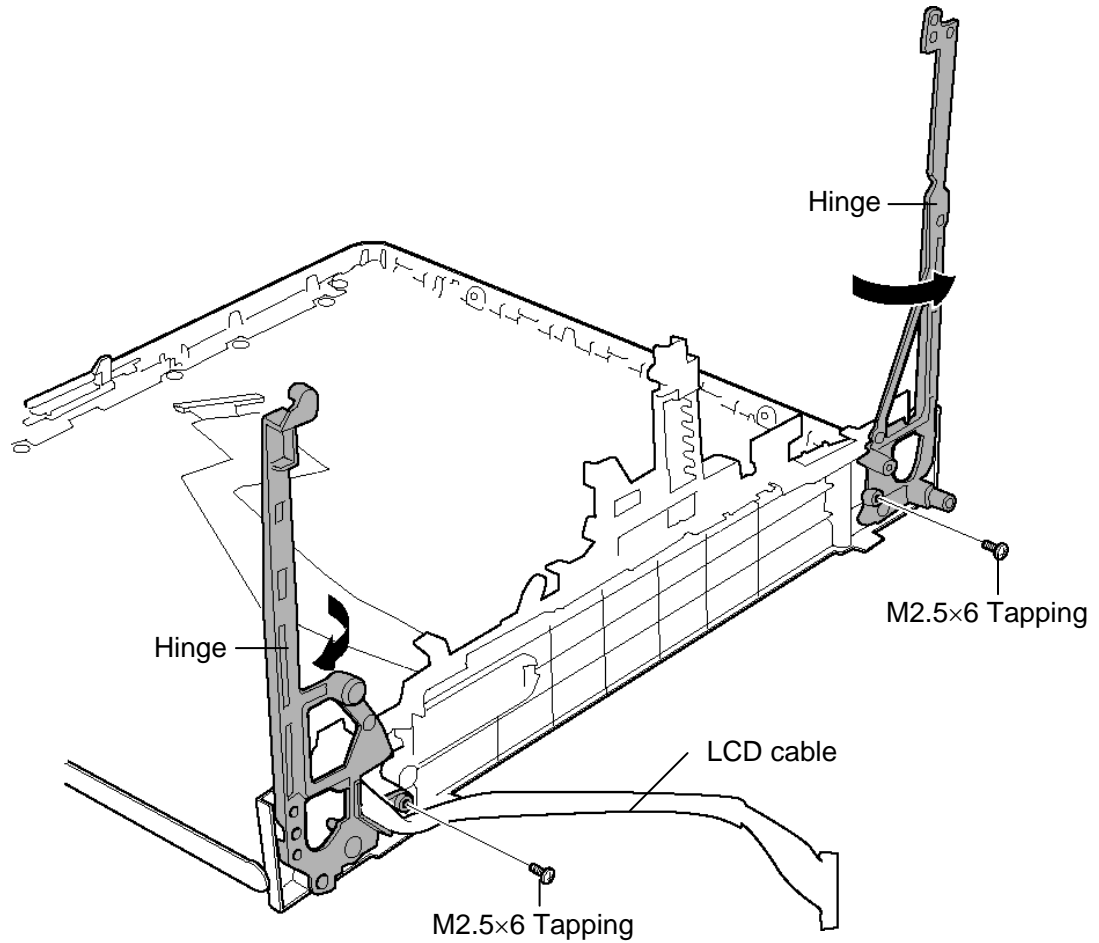
Figure 4-57 Removing the hinge (2)

6. Pull out the **LCD cable** from the hole.

Installing the Hinge

To install the hinge, follow the steps below and refer to Figure 4-54 to 4-57.

1. Pass the **LCD cable** through the hole.

2. Set the both sides **hinges** and secure them with the following **screws** (on the back).

   - M2.5×6   Tapping screw   ×2

3. Secure both the **hinges** with the following screws.

   - M2.5×5B   FLAT HEAD screw   ×2

4. Secure the following **screws** and stick the **mask seals**.

   - M2.5×2.8B   FLAT HEAD screw   ×2

5. Install the **hinge cap**.

6. Set the **LCD cable holder** and secure it with the following **screw**.

   - M2.5×4B   FLAT HEAD screw   ×1

4.26 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)	G33C0001P110	Samsung	4.26.1
	G33C00025110	TMD	4.26.2
14.1-inch (SXGA+)	G33C00022110	Samsung	4.26.3

> *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.*

4.26.1 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 4-58 to 4-68.

1. Remove the PCB cover and COF cover.

CAUTION: *Handle with care not to damage the COF of S/D and G/D ICs.*
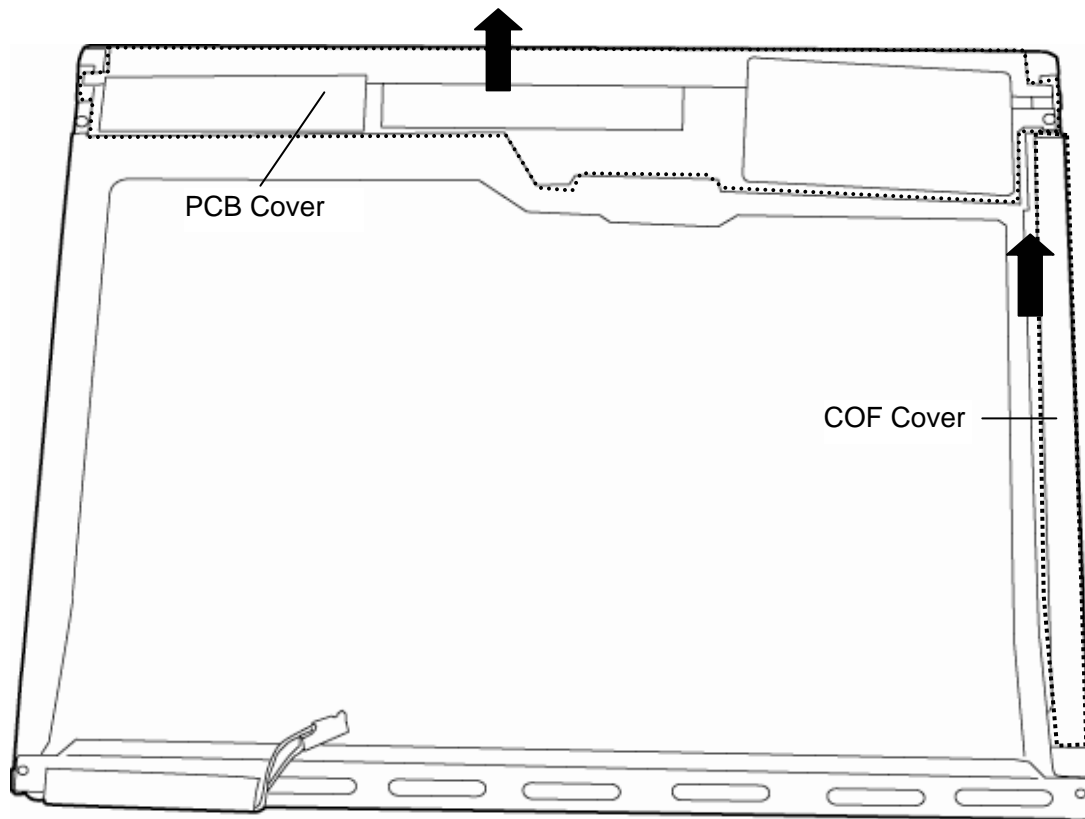
Figure 4-58 Replacing Samsung fluorescent lamp (XGA) (1)

2. Remove the lamp-wire tape and aluminum tape.

Lamp-wire tape
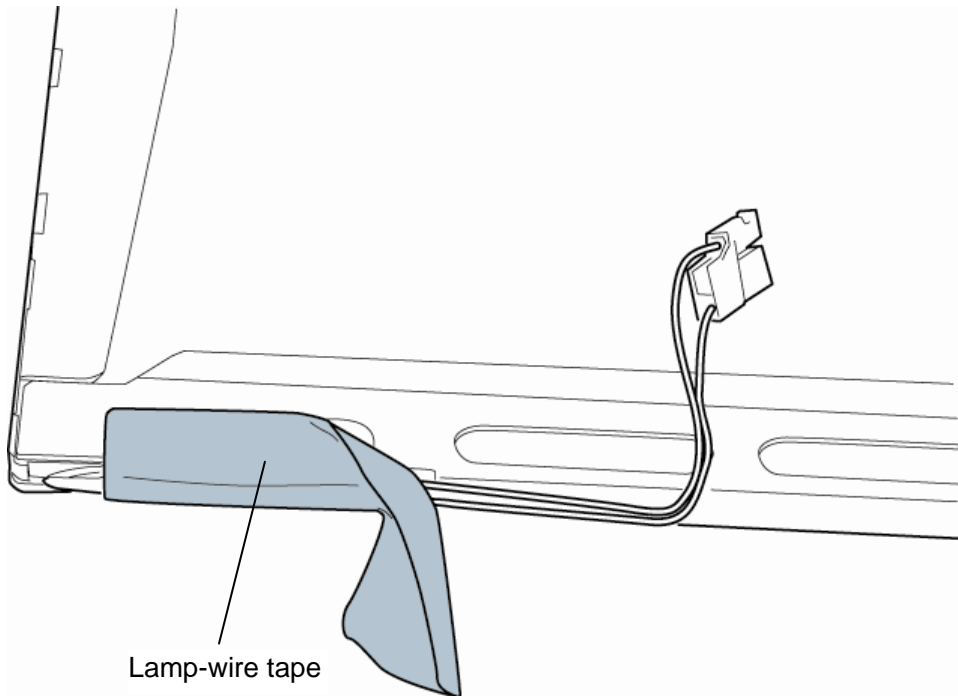
Figure 4-59 Replacing Samsung fluorescent lamp (XGA) (2)

Aluminum tape
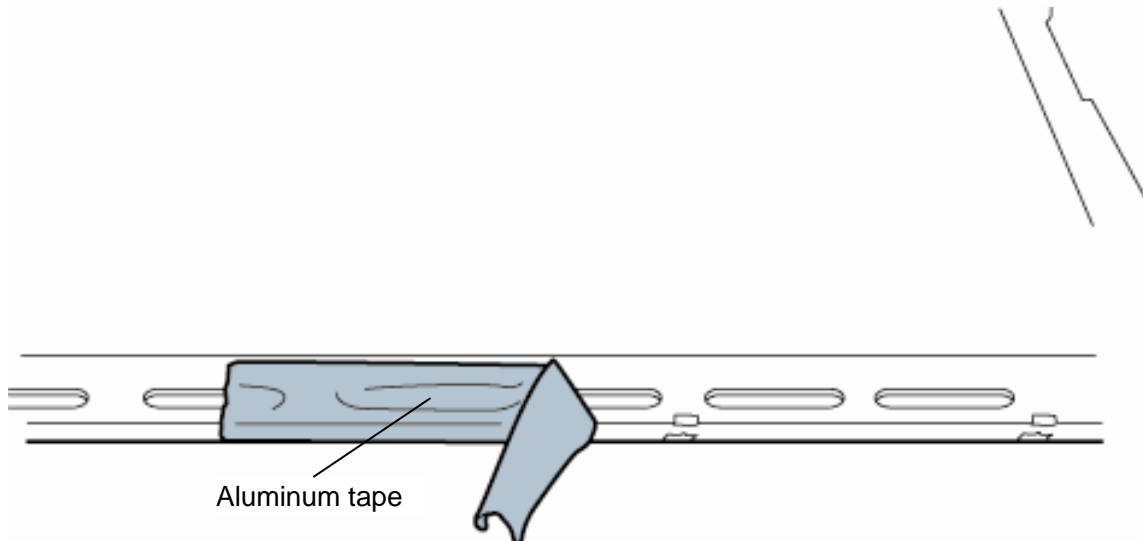
Figure 4-60 Replacing Samsung fluorescent lamp (XGA) (3)

3. Remove the two screws from the PCB.
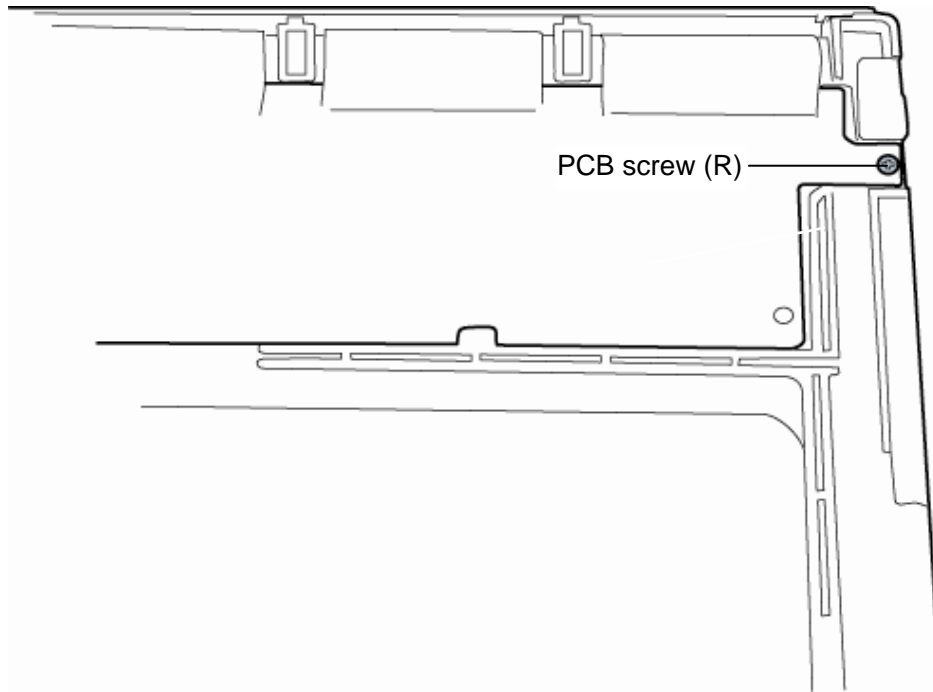
Figure 4-61 Replacing Samsung fluorescent lamp (XGA) (4)
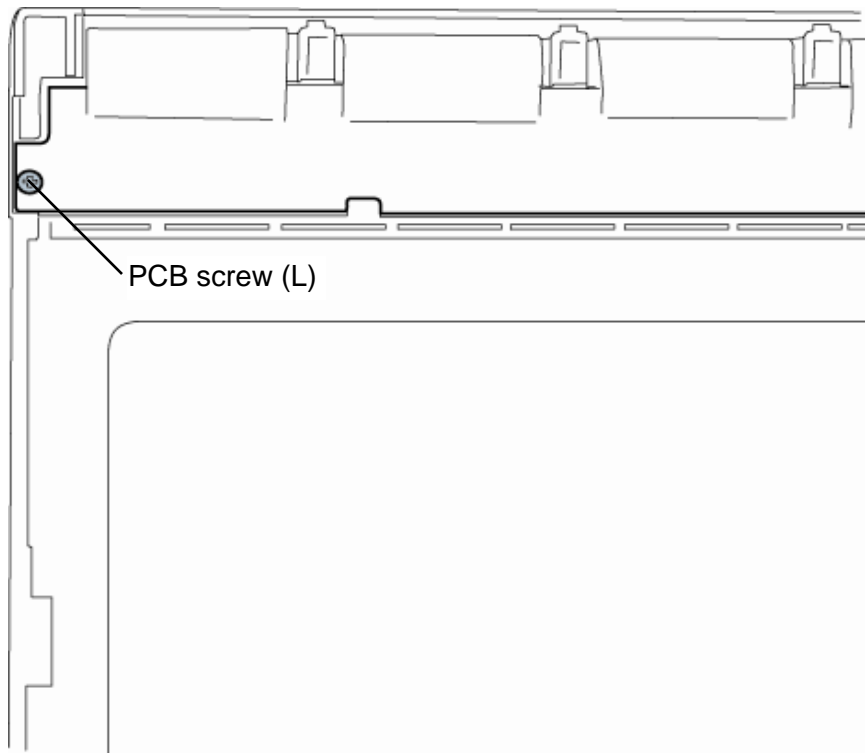
Figure 4-62 Replacing Samsung fluorescent lamp (XGA) (5)

4. Remove the four screws from the top chassis.
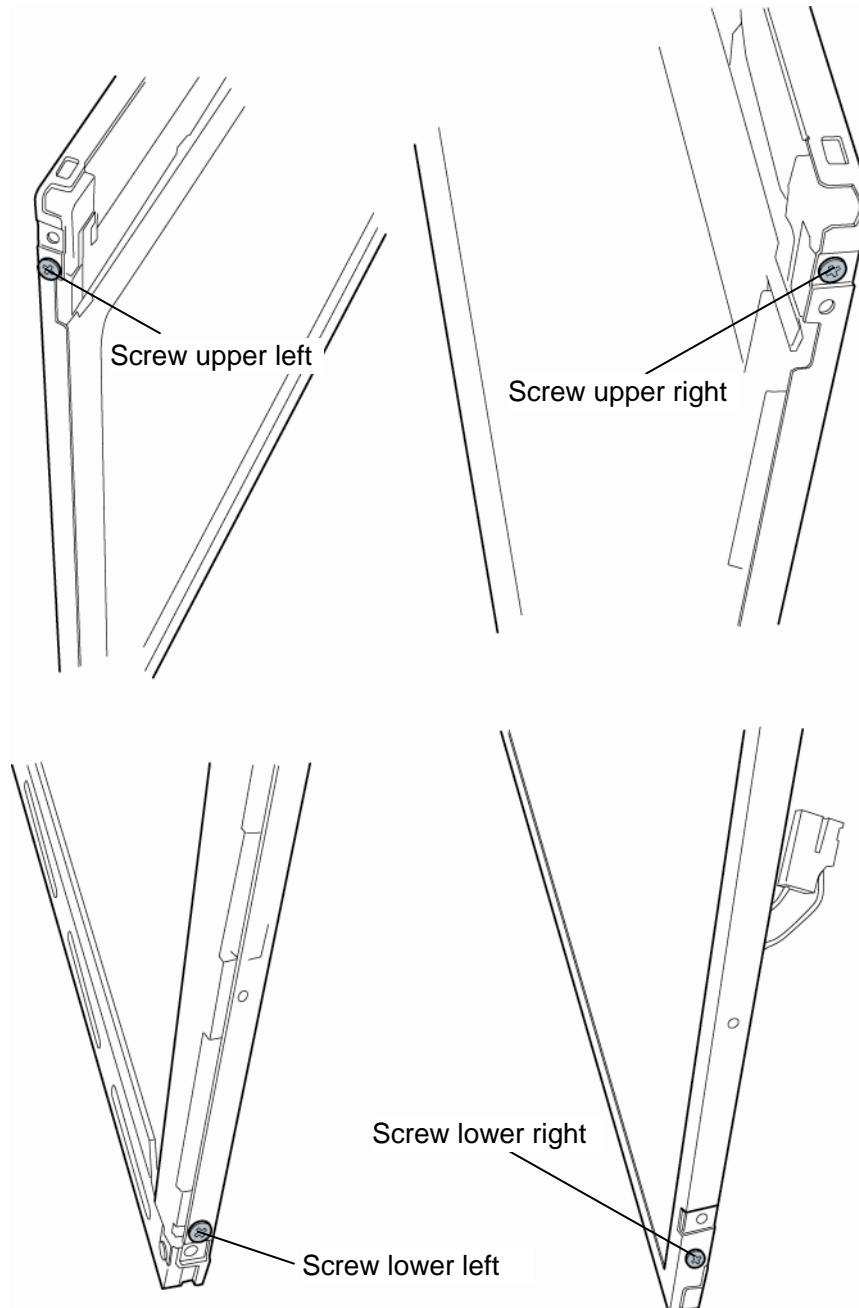
Figure 4-63 Replacing Samsung fluorescent lamp (XGA) (6)

5. Separate the panel assembly from the backlight assembly.

CAUTION*: Handle with care not to damage the COF of S/D and G/D ICs.*
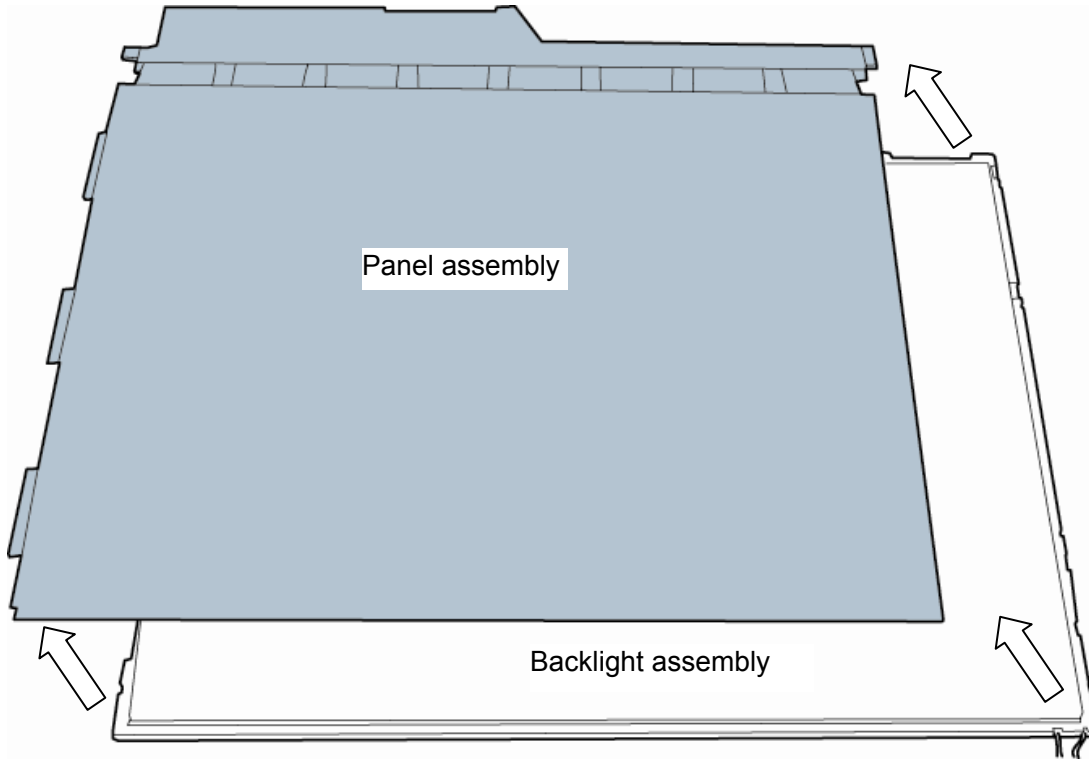
Figure 4-64 Replacing Samsung fluorescent lamp (XGA) (7)

6. Remove the two clips.

7. Remove the backlight assembly.

Backlight assembly

Clip

Clip
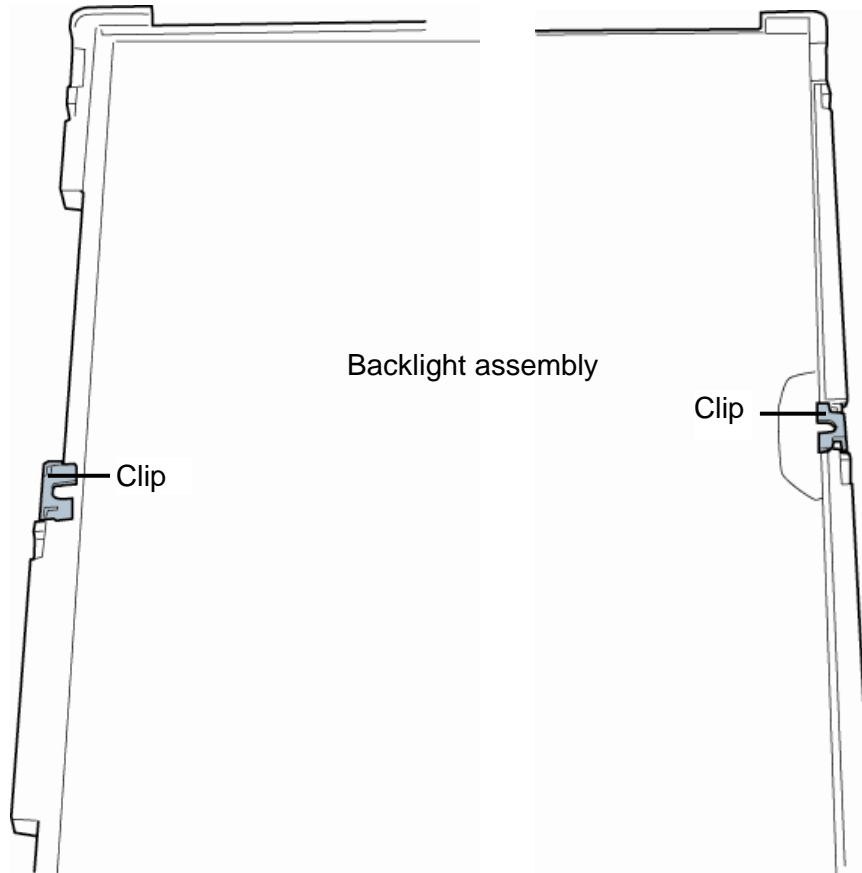
Figure 4-65 Replacing Samsung fluorescent lamp (XGA) (8)

8. Remove the two screws fixing the back cover of the fluorescent lamp.
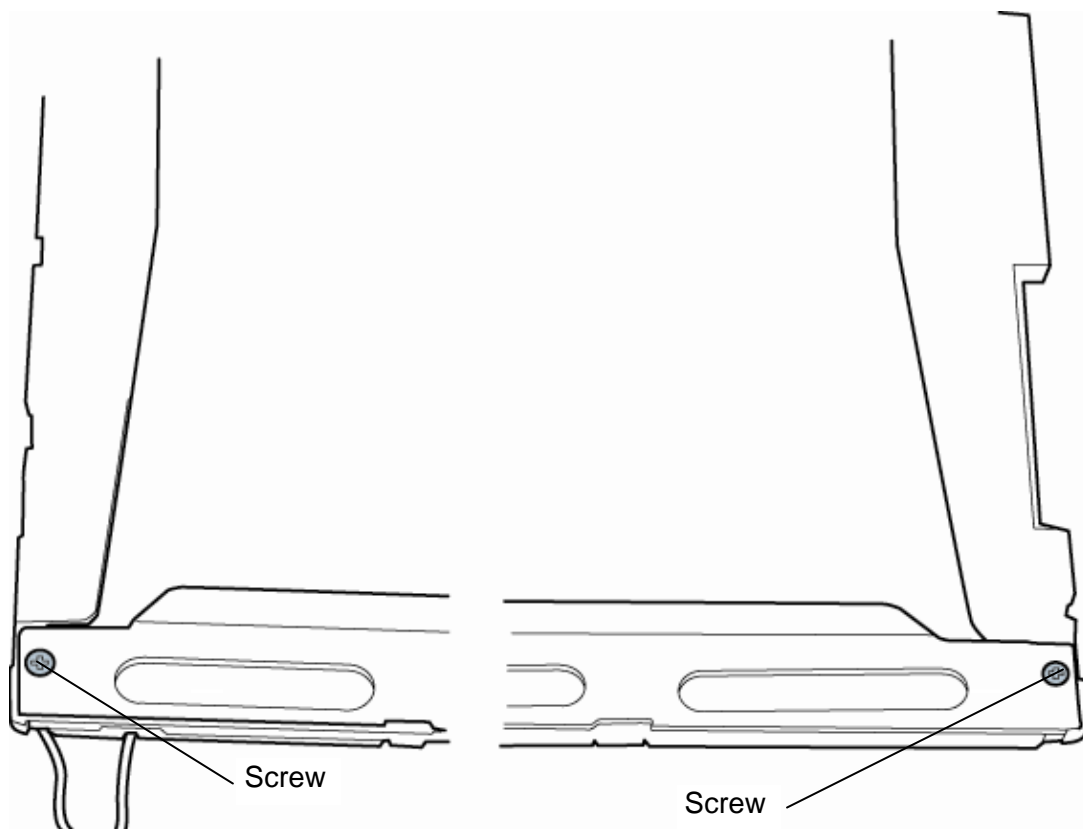
Figure 4-66 Replacing Samsung fluorescent lamp (XGA) (9)

9. Remove the grounding wire of the fluorescent lamp from the frame.
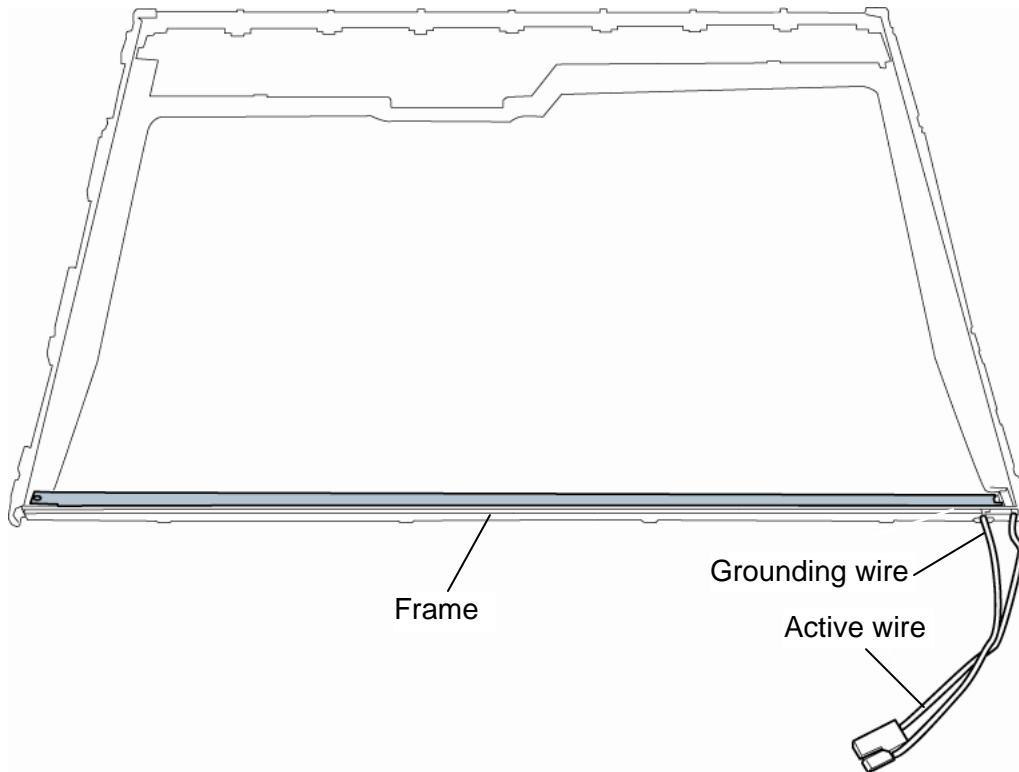
Figure 4-67 Replacing Samsung fluorescent lamp (XGA) (10)

10. Remove the fluorescent lamp from the frame.
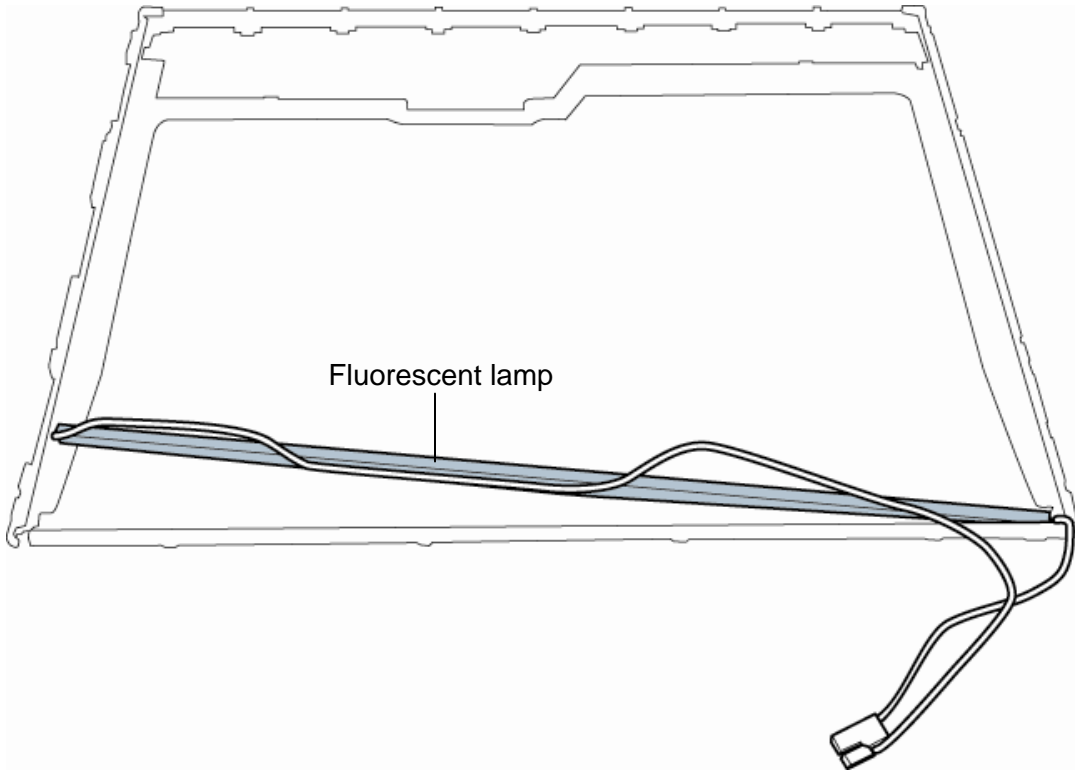
Fluorescent lamp

Figure 4-68 Replacing Samsung fluorescent lamp (XGA) (11)

Assembling the 14.1-inch XGA Samsung Fluorescent Lamp

To assemble the 14.1-inch XGA Samsung fluorescent lamp, follow the steps below and refer to Figure 4-58 to 4-68.

1. Set the fluorescent lamp on the flame in place.

2. Connect the grounding wire of the fluorescent lamp to the frame.

3. Fix the back cover of the fluorescent lamp with the two screws.

4. Install the backlight assembly.

5. Install the two clips.

6. Install the panel assembly to the backlight assembly.

7. Secure the top chassis with the four screws.

8. Secure the PCB with the two screws.

9. Stick the lamp-wire tape and aluminum tape.

10. Stick the PCB cover and COF cover.

4.26.2 Replacing the 14.1-inch XGA TMD 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 TMD Fluorescent Lamp

To disassemble the 14.1-inch XGA TMD fluorescent lamp, follow the steps below and refer to Figure 4-69 to 4-79.

Peeling off the tapes and insulation sheets

1. Place the LCD module face down on a flat table that has no alien substance on it. Make sure there is no dust on the desk to avoid scratching the surface of the LCD module. Place a protection sheet (such as soft cloth) on the surface.

2. In the order (1), (2) shown in Figure 4-69, remove the tapes for fixing the FL cable and lump clip.

CAUTION: *(1) Be careful not to damage the TAB.*

(2) Leave the insulation sheet on the bezel to allow the reuse of the sheet.
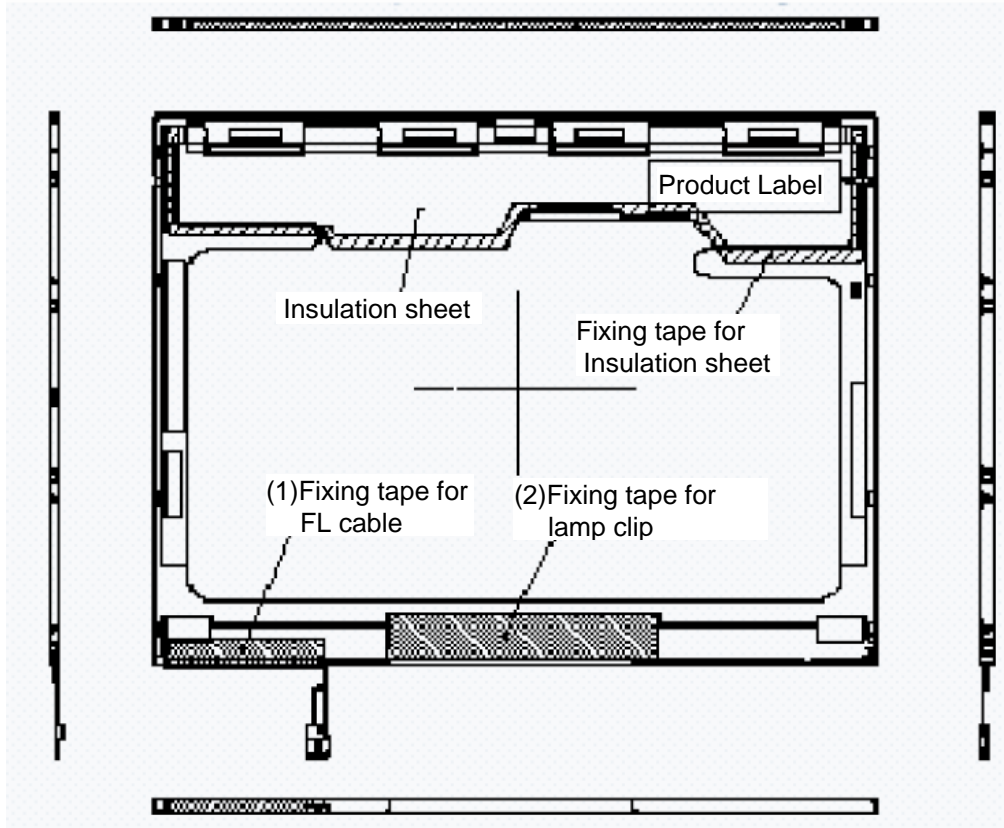
Figure 4-69 Replacing TMD fluorescent lamp (XGA) (1)

Removing the screws

1. Remove the lamp clip (Reuse it).

2. Spread out the insulation sheet without detaching it from the side of the bezel, as shown in Figure 4-70.

3. In the order (1) and (2) shown in Figure 4-70, remove the screws from the left- and right-hand sides of the module.

CAUTION: *(1) To unfasten the screws, use an insert bit of point size 0 for Philips screwdrivers.*

(2) Leave the insulation sheet on the bezel to allow the reuse of the sheet.
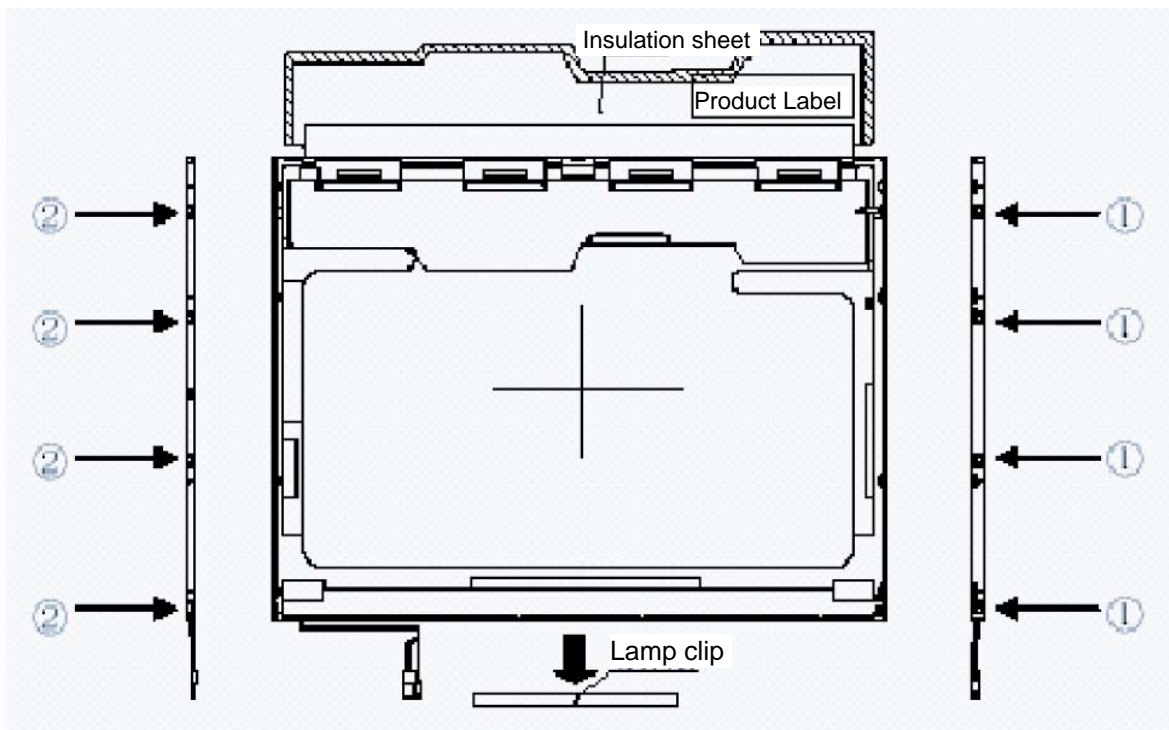
Figure 4-70 Replacing TMD fluorescent lamp (XGA) (2)

Removing the bezel

1. Turn the LCD module face up with the insulation sheets on it.

2. Release the latches of the bezel and frame. (three points on upper side)

CAUTION: Do not damage the TAB when releasing the latches on the upper area.
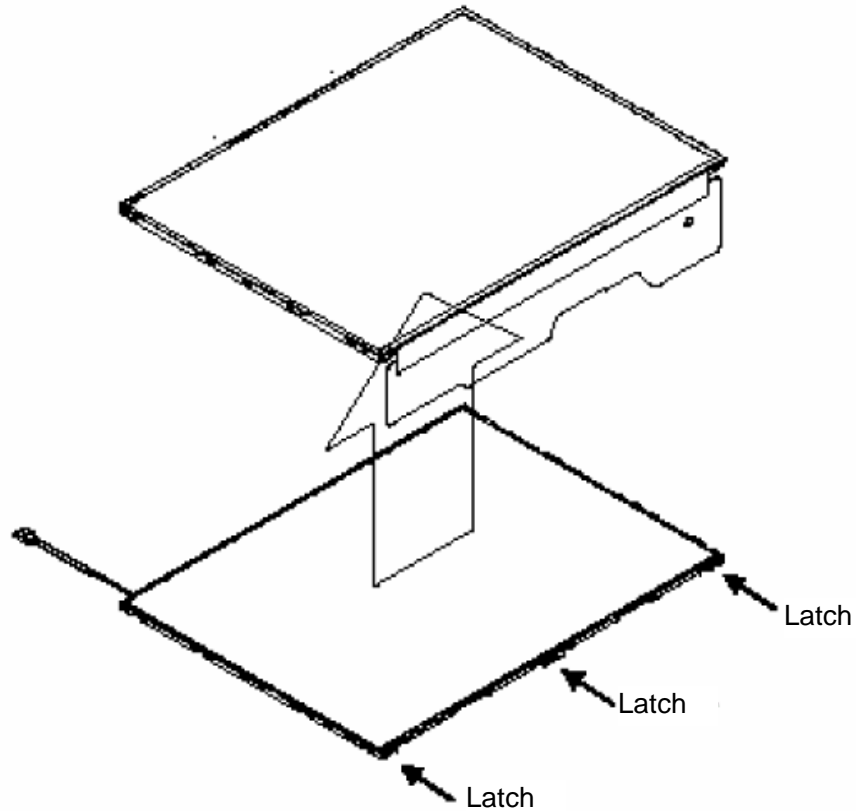
Figure 4-71 Replacing TMD fluorescent lamp (XGA) (3)

Opening the PCB

1. Spread out the PCB horizontally, as shown in Figure 4-72.

CAUTION: *Be careful not to damage the TAB.*
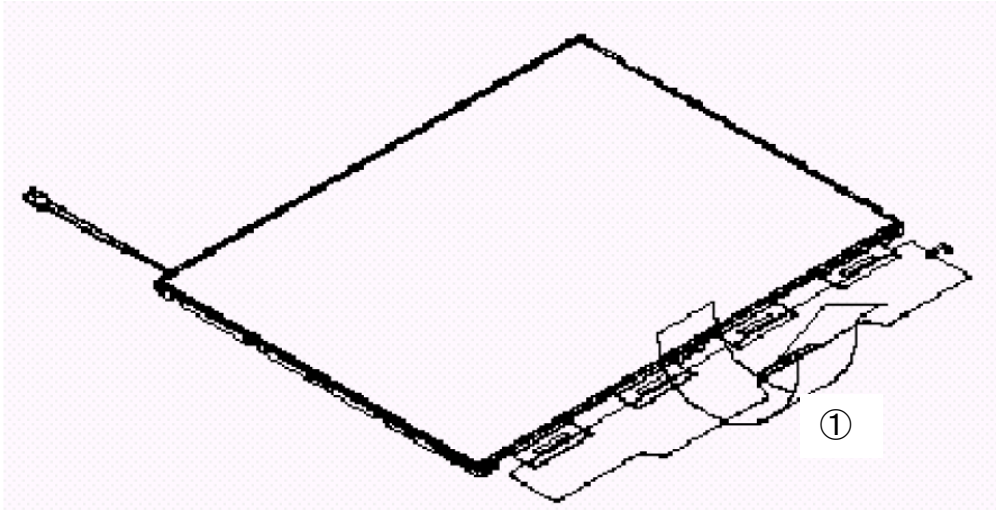
Figure 4-72 Replacing TMD fluorescent lamp (XGA) (4)

Removing the PCB-assembly cell

1. Remove the PCB- assembly cell from the backlight unit, as shown in Figure 4-73.

2. Completely remove the double-sided tape remaining on the reverse side of the cell.

CAUTION: *(1) Remove the tape slowly not to break the cell. The cell and frame are glued by double-sided adhesive tape (as shown in Figure 4-73).*

                   (2) Be careful not to remove the light shielding tapes from the upper, left and right sides of the cell.

Double-sided tape
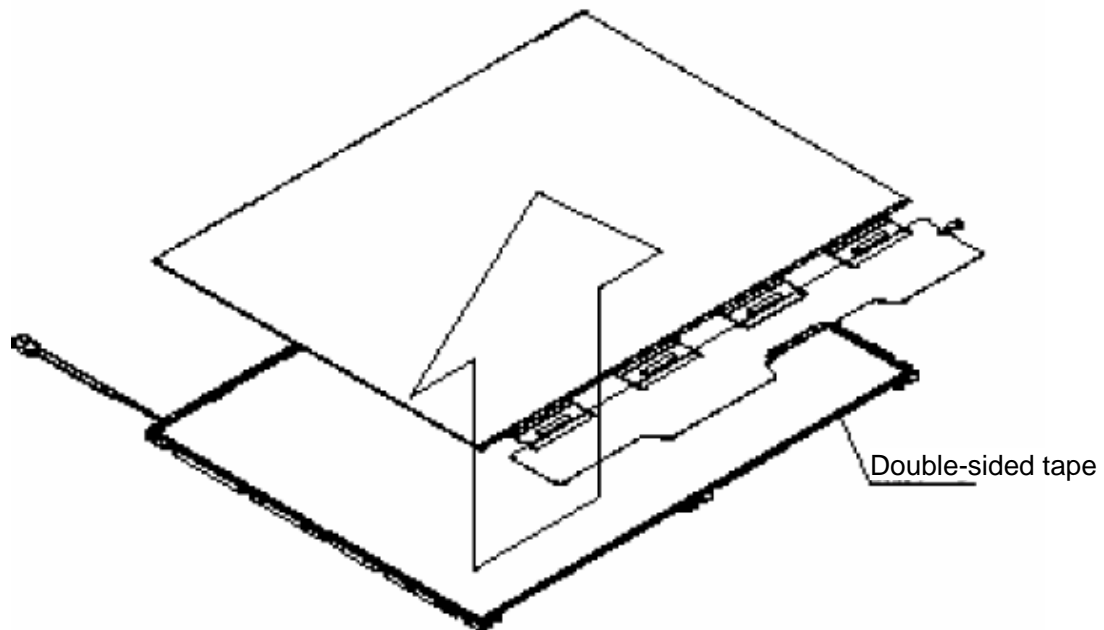
Figure 4-73 Replacing TMD fluorescent lamp (XGA) (5)

Assembling Fluorescent lamp

Checking the backlight

1. Check the following items according to Figure 4-74.
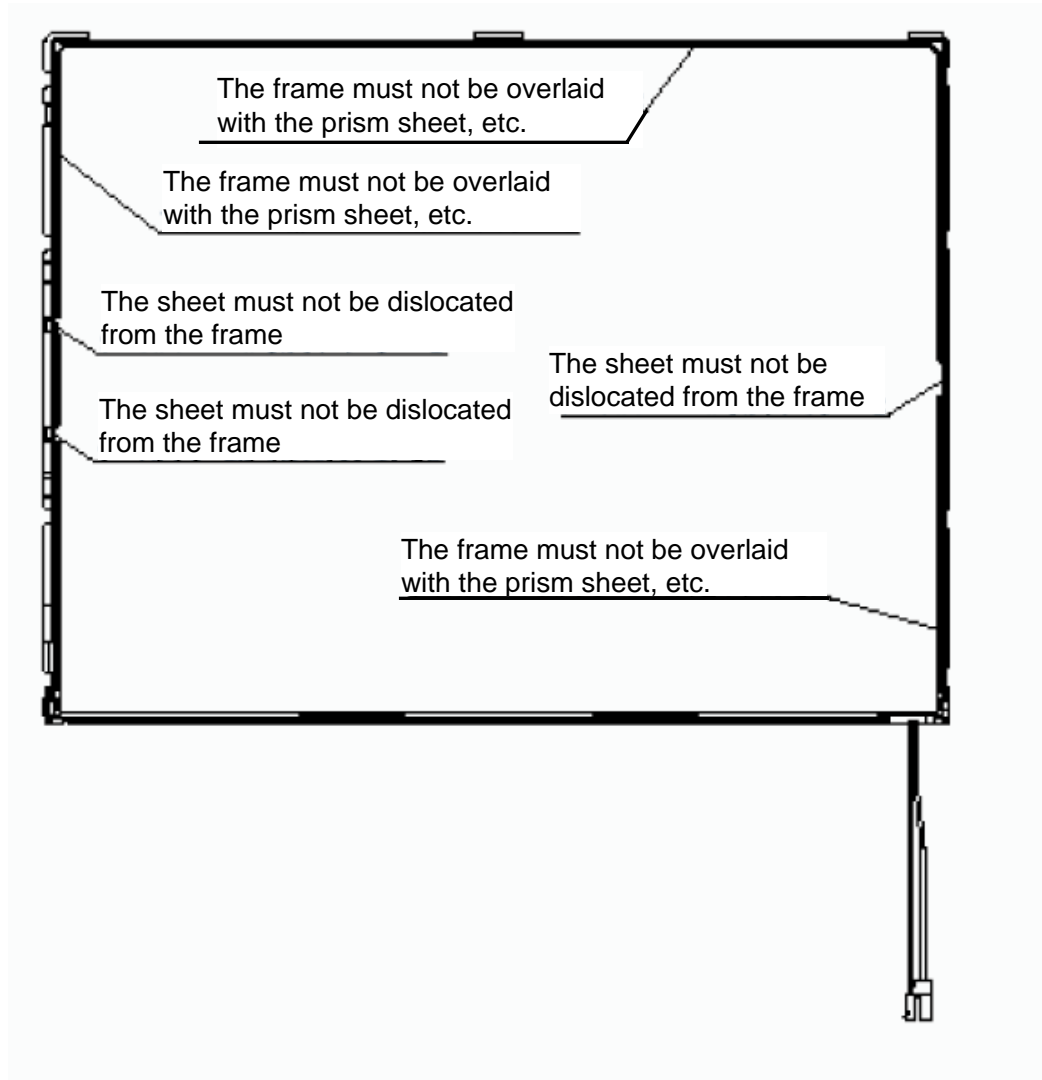
Figure 4-74 Replacing TMD fluorescent lamp (XGA) (6)

Assembling PCB-assembly cell

1. Remove the release paper of the double-sided tape at the upper of the backlight unit. (See Figure 4-75)

2. Turn the backlight on.

3. Check that the backlight is free of dust, foreign objects, or damage. Perform this check also for the reverse side of the cell. Then install the PCB-assembly cell in the backlight unit.

CAUTION: *(1) Align the top left corner of the cell with the corresponding corner of the backlight unit, as indicated in Figure 4-75.*

   (2) Be careful not to damage the TAB.
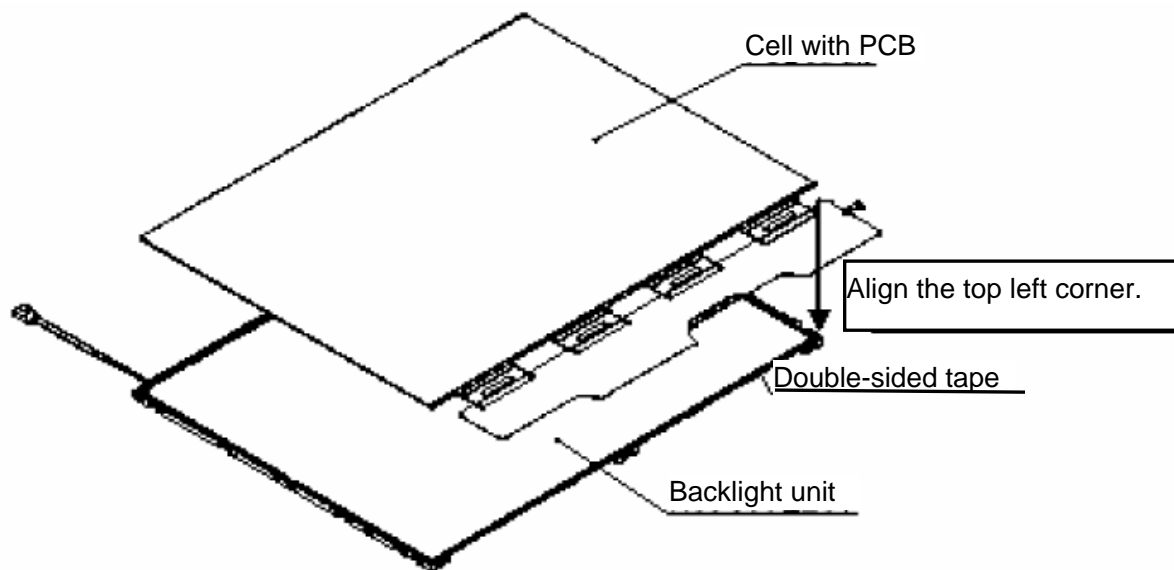
Figure 4-75 Replacing TMD fluorescent lamp (XGA) (7)

Folding down and temporary fixing of the TAB/PCB

1. Fold down the TAB (PCB) toward the reverse side of the backlight unit, as shown in Figure 4-76.

CAUTION: *Be careful not to damage the TAB.*
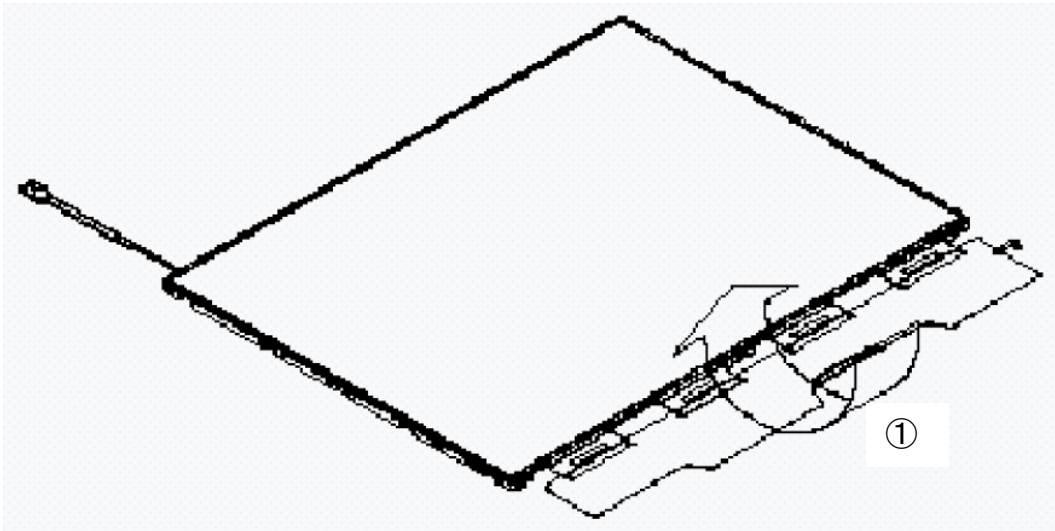
Figure 4-76 Replacing TMD fluorescent lamp (XGA) (8)

Setting the bezel

1. Start installing the bezel in the upward direction until it stops at the top left corner.

CAUTION: (1) *The GND-CU and lamp reflector on the left-hand side must not go beyond the edges of the bezel.*

   (2) *Be careful not to damage the cables and TAB.*

   (3) *The bezel latches must be engaged (there are three latches).*

The fold of lamp reflector must not go beyond the bezel's edge.

First, fit the bezel's edge close to the lamp. Use care not to damage the FL cable.

The fold of GND-CU must not go beyond the bezel's

Next, fit the bezel's edge close to the TAB. Engage the three latches.
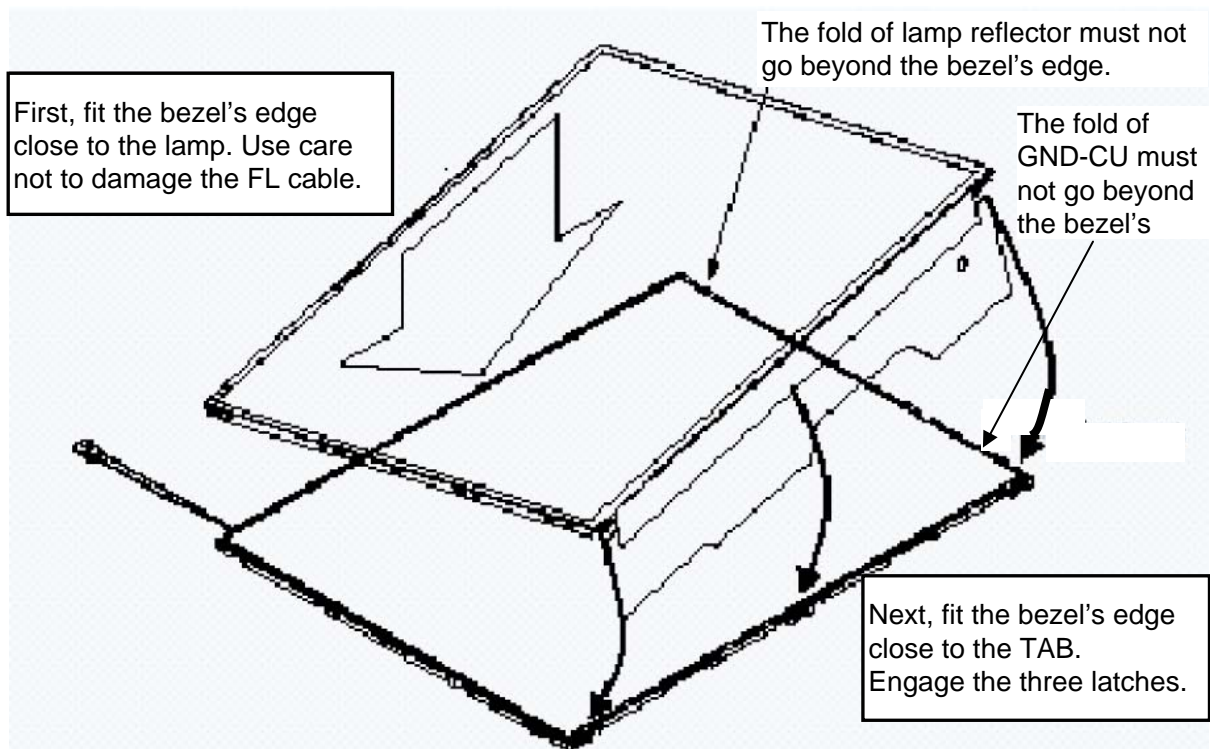
Figure 4-77 Replacing TMD fluorescent lamp (XGA) (9)

Fasten screws of the PCB and bezel

1. Fasten four screws on the left.

2. Fasten four screws on the right.

CAUTION: *(1) Fasten the screws in the orders shown in Figure 4-78. No loose fastening is allowed.*
               (2) The tightening torque must not exceed 0.147 N ⋅m (1.5kgf ⋅cm) for all the eight screws.
               (3) For the Philips screwdrivers, use an insert bit of point size 0.
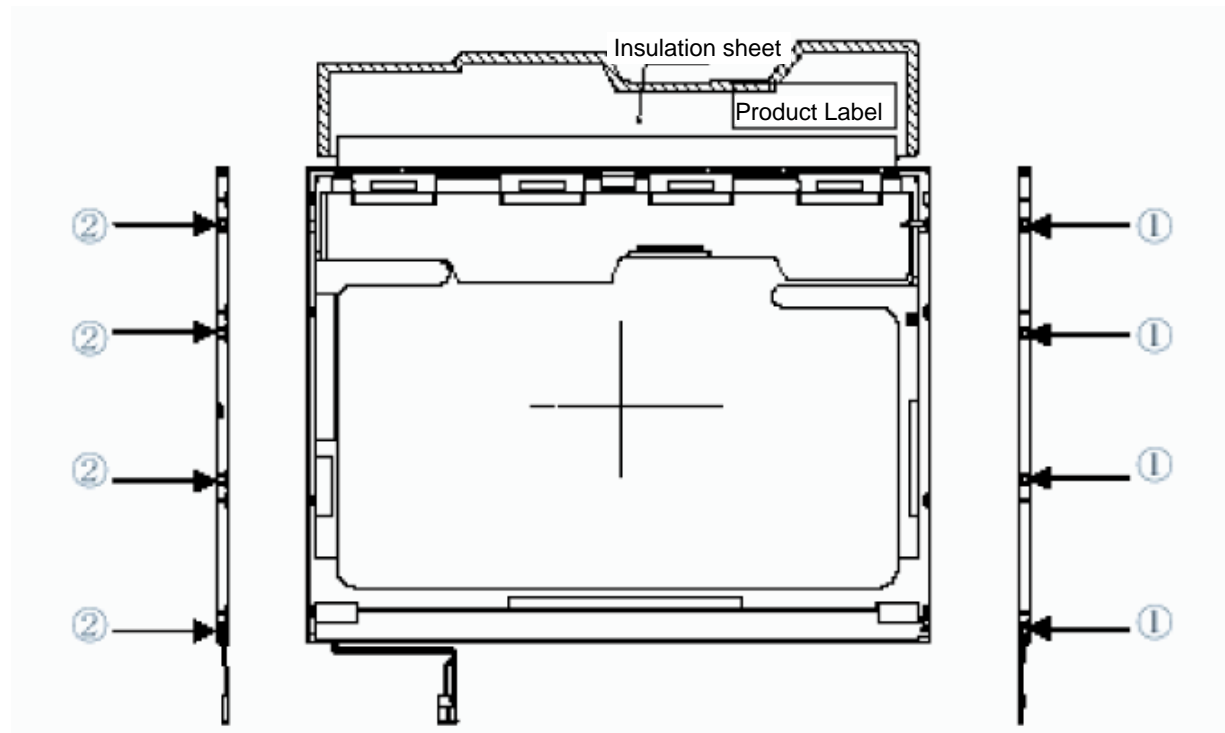
Figure 4-78 Replacing TMD fluorescent lamp (XGA) (10)

Attaching the tapes and insulation sheet

1. Attach the PCB insulation sheet (one point).

2. Install the lamp clip.

3. Attach the tape for fixing the lamp clip (one point).

4. Attach the tape for fixing the FL cable (one point).

> **CAUTION:** *When attaching tape and insulation sheet, be careful not to damage the TAB and lamp cable connections.*

The tape must not be overlaid with the
Fixing tape for FL

Lamp clip
Install the clip into the level
difference of the bezel

Stick the tape, making the line as a guide

Stick the tape, making the
dent of the frame as a guide
Fixing tape for lamp
Fixing tape for FL
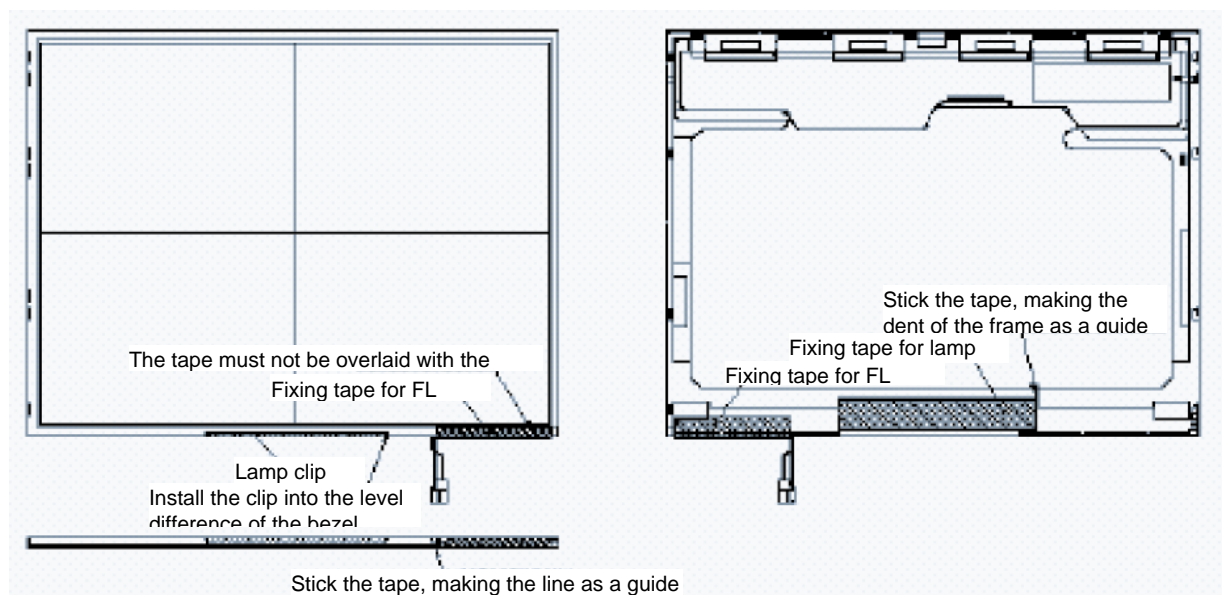
Figure 4-79 Replacing TMD fluorescent lamp (XGA) (11)

4.26.3 Replacing the 14.1-inch SXGA+ 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.

To replace the 14.1-inch SXGA+ Samsung fluorescent lamp, follow the steps below and refer to figures4-80 to 4-85.

1. Remove the PCB cover and CFO cover.

CAUTION: Handle with care not to damage COF of S/D and G/D ICs.
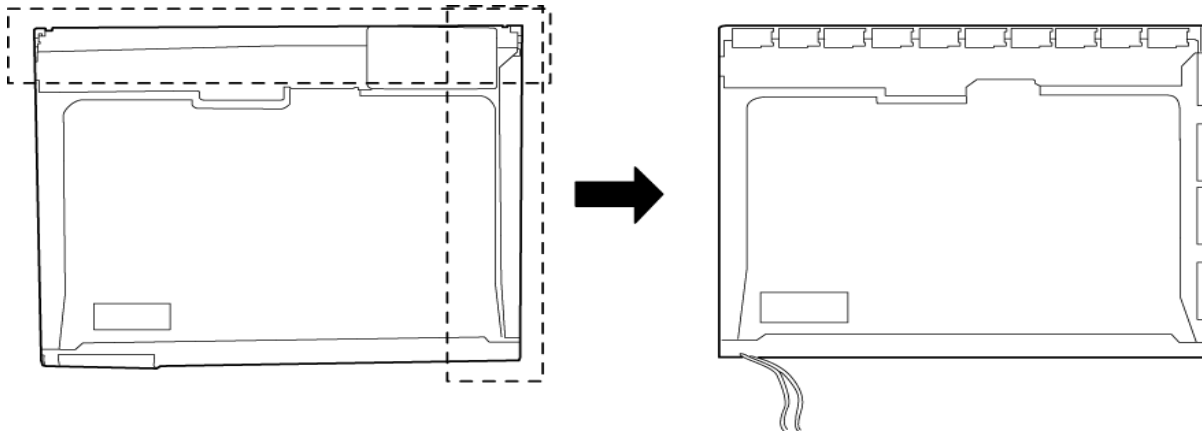
Figure 4-80 Replacing Samsung fluorescent lamp (SXGA+) (1)

2. Remove the lamp-wire tape and Al tape.

Lamp-wire tape

Al tape
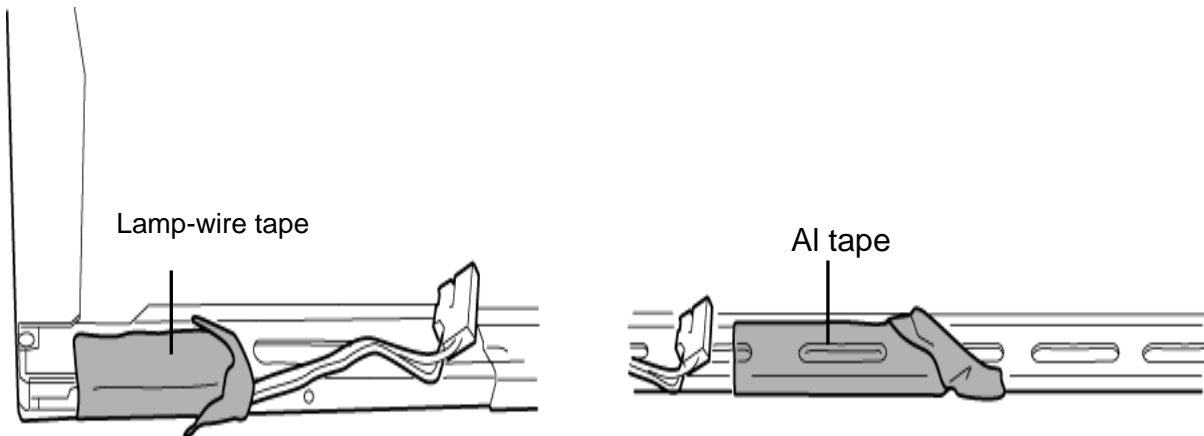
Figure 4-81 Replacing Samsung fluorescent lamp (SXGA+) (2)

3. Remove the two screws from the PCB.

Left

Right
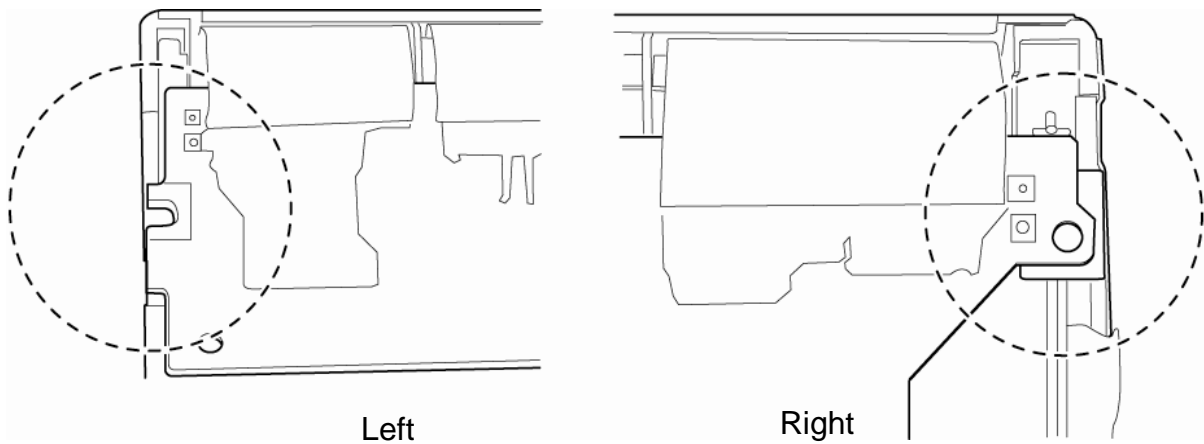
Figure 4-82 Replacing Samsung fluorescent lamp (SXGA+) (3)

4. Remove the five screws from the top chassis.

Upper left

Upper right

Bottom left
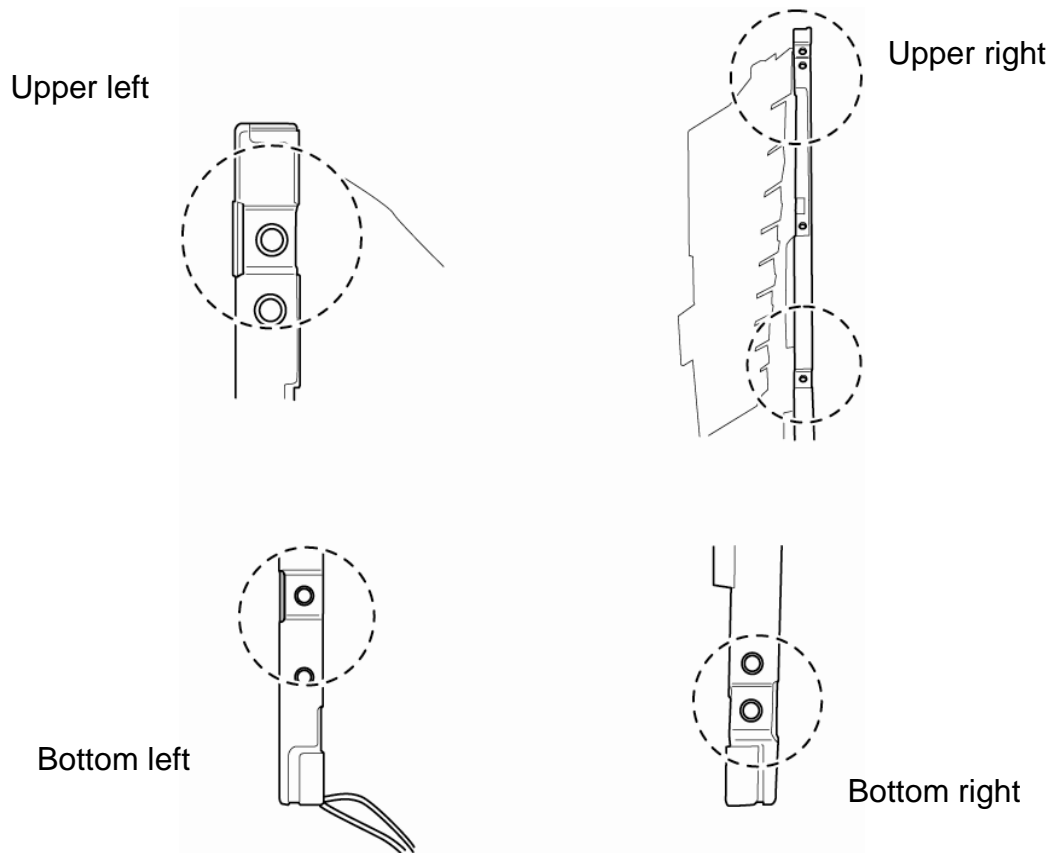
Bottom right

Figure 4-83 Replacing Samsung fluorescent lamp (SXGA+) (4)

5. Separate the top chassis from the mold frame.

NOTE: *The order : Bottom hook → Side hook [Left & Right]*
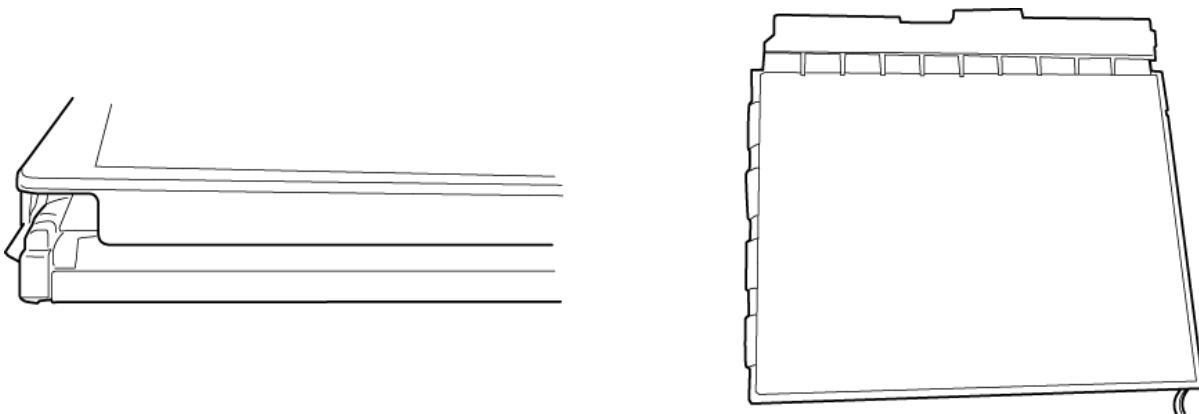
Figure 4-84 Replacing Samsung fluorescent lamp (SXGA+) (5)

6. Separate the panel assembly from the BLU.

CAUTION*: Handle with care not to damage COF of S/D and G/D ICs.*
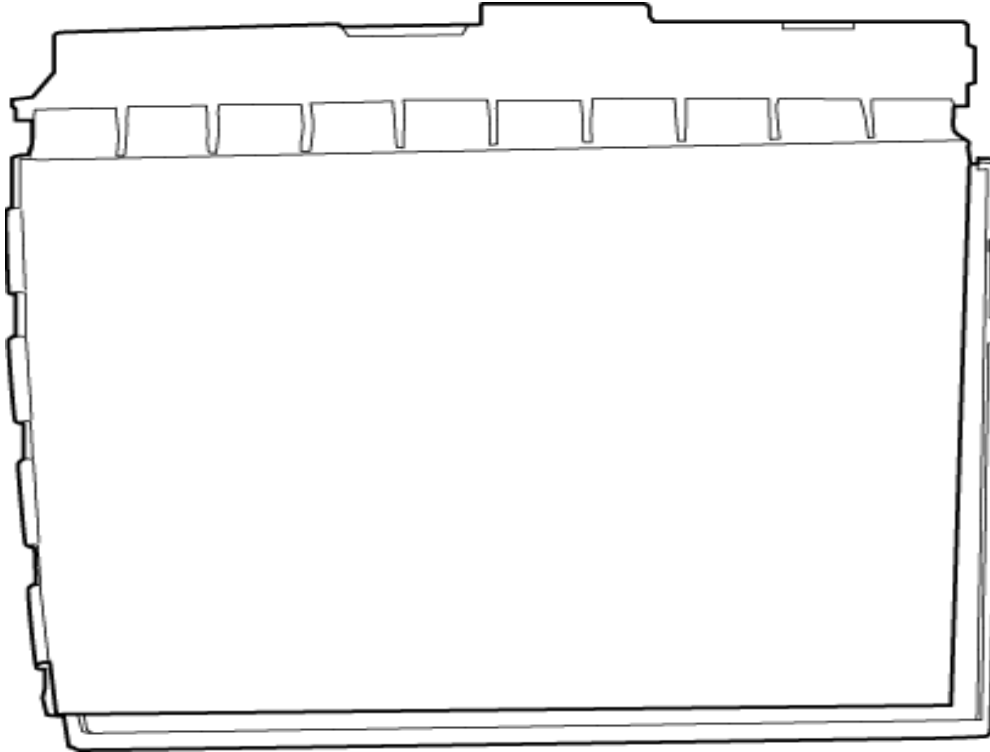
Figure 4-85 Replacing Samsung fluorescent lamp (SXGA+) (6)

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.
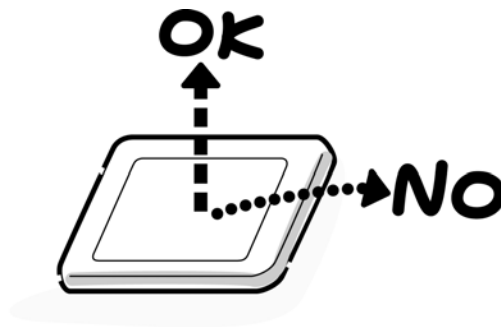
2. For the LCD module, be careful to align the four holes at the right side and left side of the LCD module with the corresponding holes in the LCD cover before securing the module with four screws.

   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.
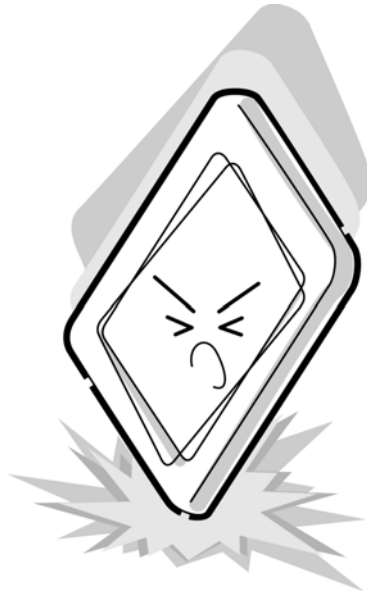
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
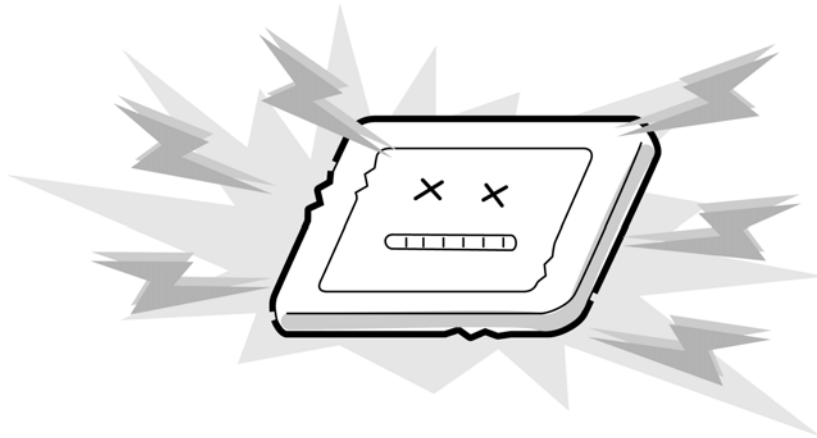
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

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.
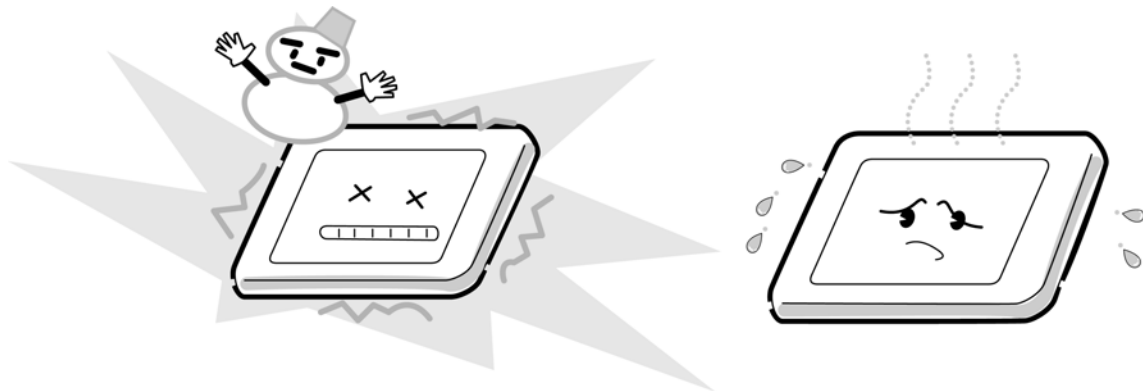
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
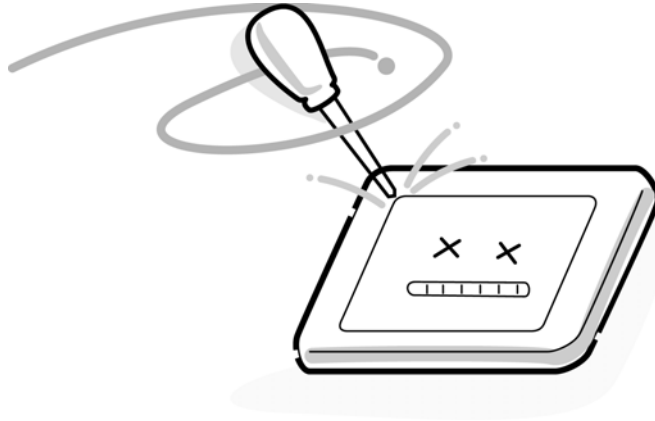
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
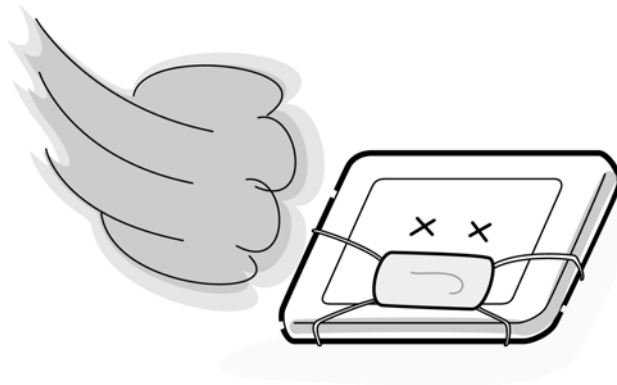
Appendix B   Board Layout

B.1   System Board (FAS2S*) Front View
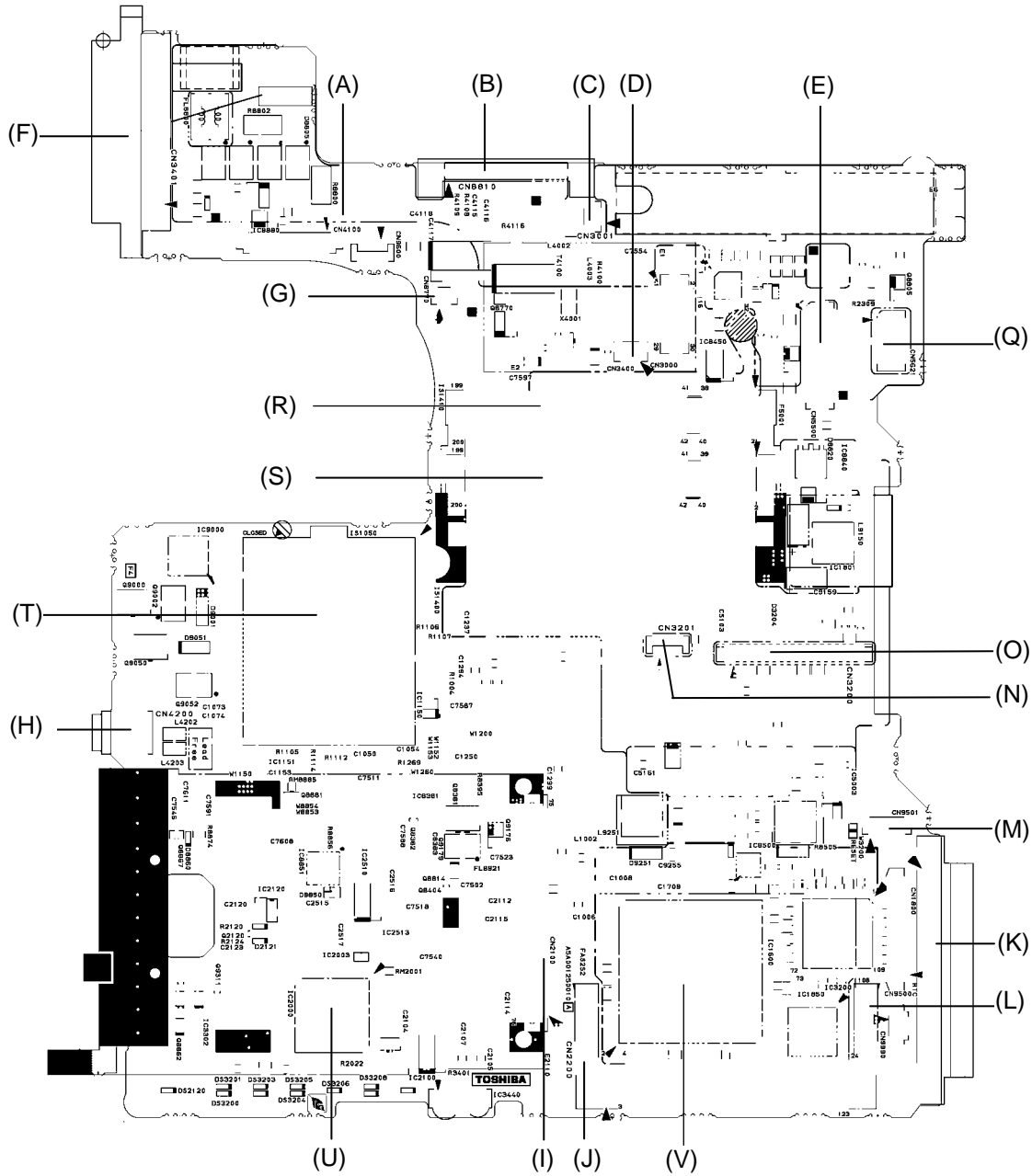
Figure B-1 System board (FAS2S) layout (front)*

Table B-1 System board (FAS2S*) ICs and connectors (front)

Mark	Number	Name
(A)	CN4100	Network interface connector
(B)	CN8810	Main Battery connector
(C)	CN3001	Modem connector
(D)	CN3000	MDC connector
(E)	CN5500	LCD interface connector
(F)	CN3401	Parallel port connector
(G)	CN8770	Fan connector
(H)	CN4200	IEEE1394 connector
(I)	CN2100	PC card interface connector
(J)	CN2200	Mini PCI interface connector
(K)	CN1800	HDD connector
(L)	CN9500	SN board interface connector
(M)	CN9501	USB harness connector
(N)	CN3201	Touch pad connector
(O)	CN3200	Keyboard connector
(P)	CN2000	Not used
(Q)	CN5621	RG board interface connector
(R)	IS1400	SO DIMM0
(S)	IS1410	SO DIMM1
(T)	IS1050	CPU socket
(U)	IC2000	Card controller
(V)	IC1600	ICH6-M

B.2   System Board (FAS2S*) Back View
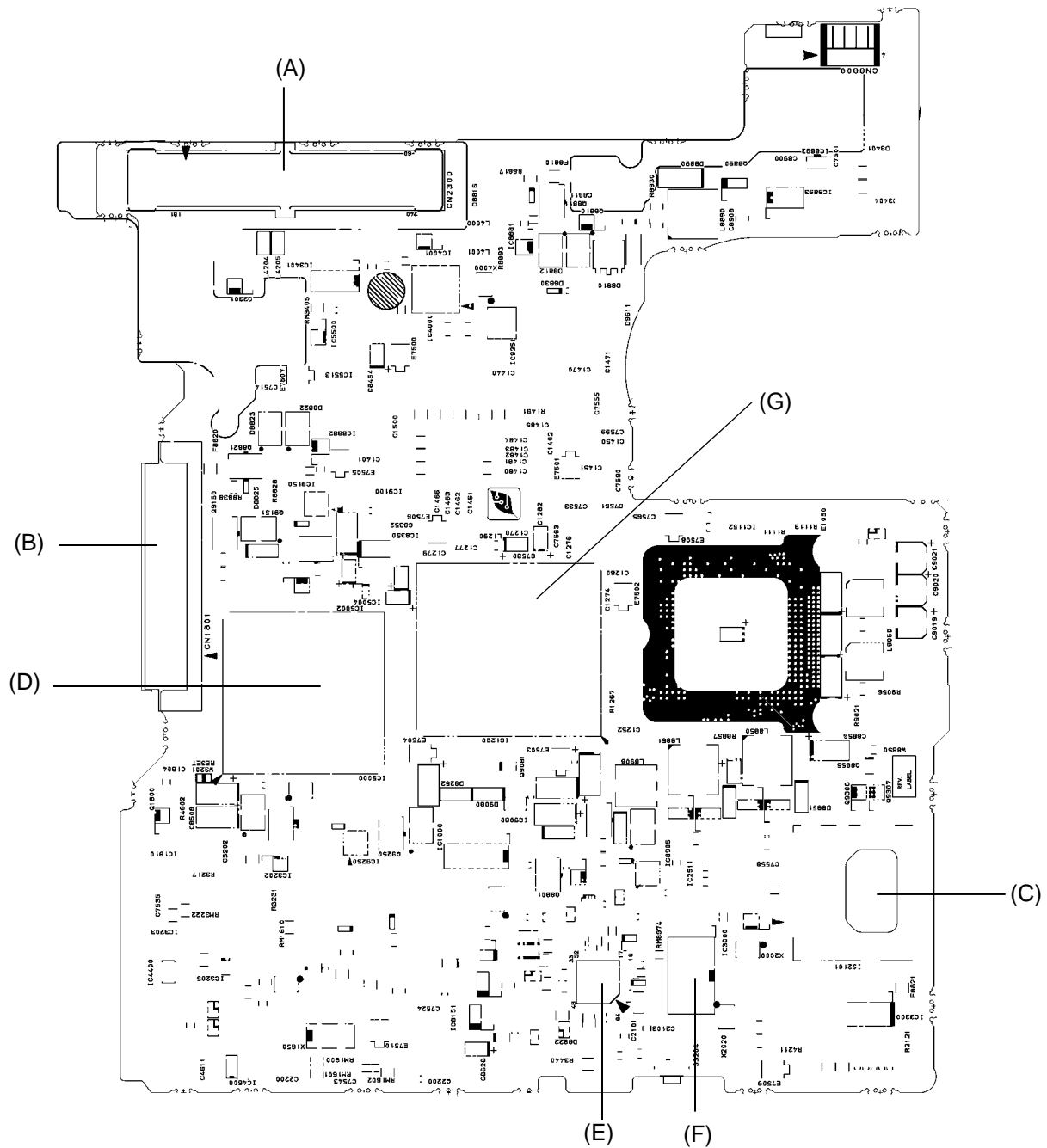
Figure B-2 System board (FAS2S) layout (back)*

Table B-2 System board (FAS2S*) ICs and connectors (back)

Mark	Number	Name
(A)	CN2300	Docking interface connector
(B)	CN1801	Select-bay interface connector
(C)	IS2101	SD card interface connector
(D)	IC5000	MAP34 AGP
(E)	IC8972	PSC
(F)	IC3000	HWH
(G)	IC1200	ALVISO GMCH

B.3   Sound Board (FAS2A*) Front and Back View
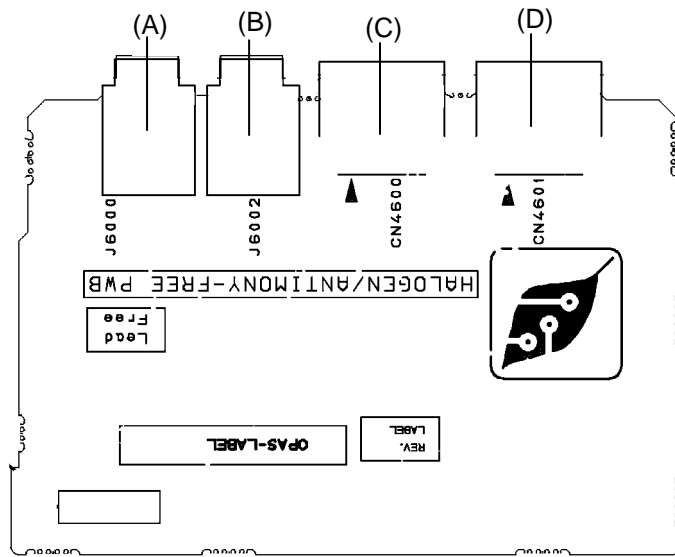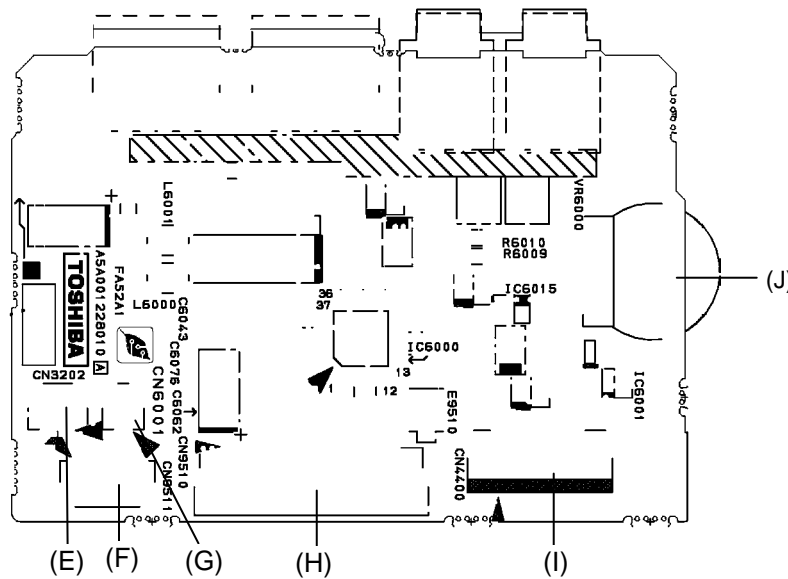
(front)

(back)

Figure B-3 Sound board (FAS2A) layout (front/back)*

Table B-3 Sound board (FAS2A*) ICs and connectors (front/back)

Mark	Number	Name
(A)	J6000	Headphone connector
(B)	J6002	External microphone connector
(C)	CN4600	USB port 0 connector
(D)	CN4601	USB port 3 connector
(E)	CN3202	Speaker connector
(F)	CN9511	USB harness connector
(G)	CN6001	Internal microphone connector
(H)	CN9510	System board I/F connector
(I)	CN4400	Bluetooth I/F connector
(J)	VR6000	Volume

B.4   Switch Board (FGTSW*) Front and Back View
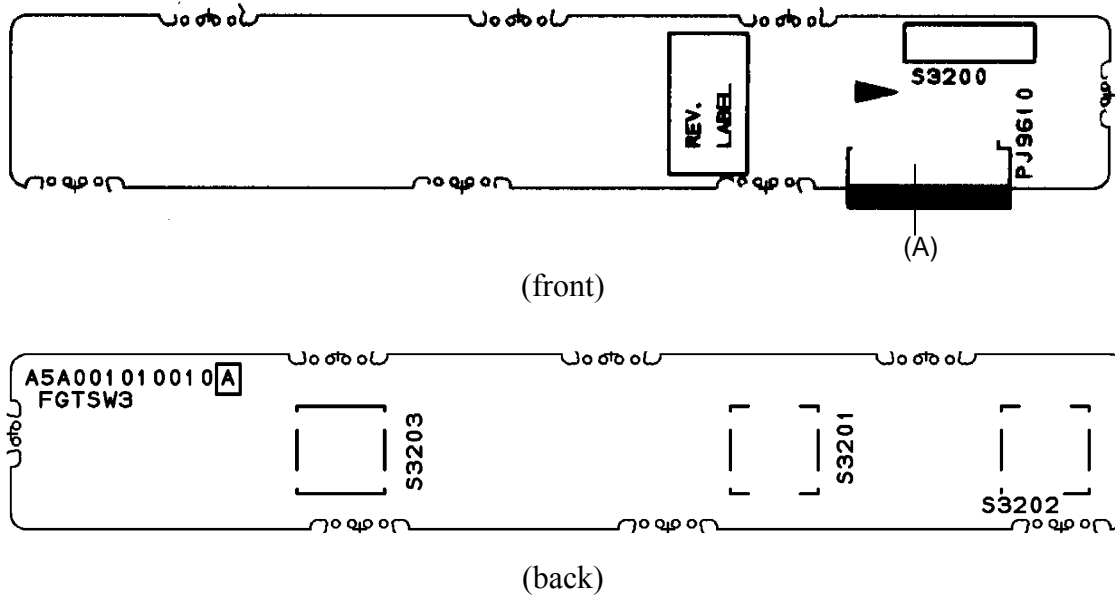
(front)

(back)

Figure B-4 Switch board (FGTSW) layout (front/back)*

Table B-4 Switch board (FGTSW) connector (front)*

Mark	Number	Name
(A)	PJ9610	System board interface connector

B.5   RGB Board (FAS2G*) Front and Back View
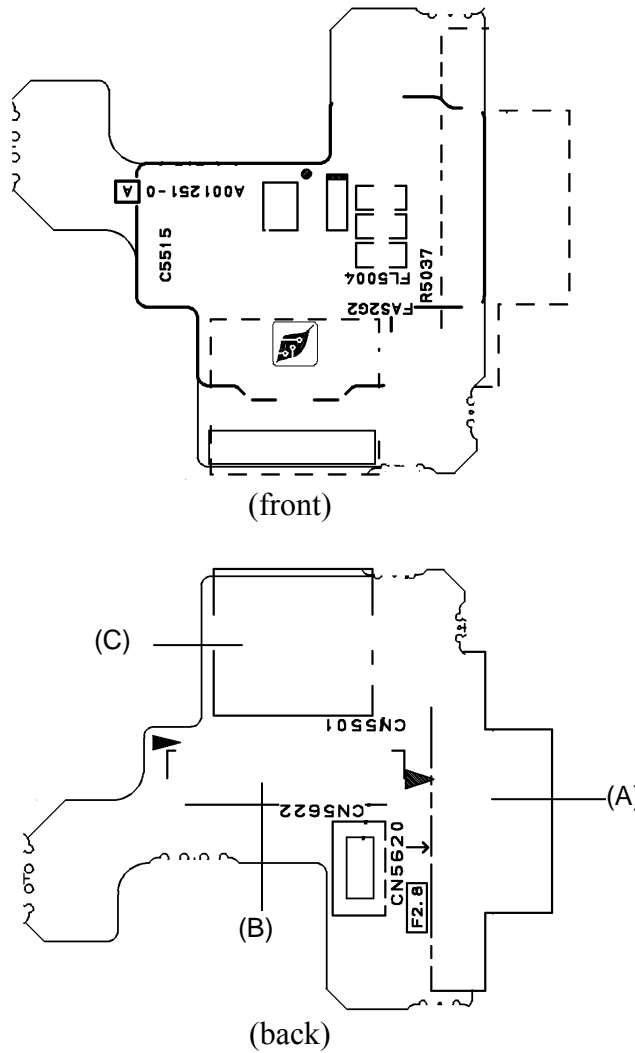
(front)

(back)

Figure B-5 RGB board (FAS2G) layout (front/back)*

Table B-5 RGB board (FAS2G) connectors (back)*

Mark	Number	Name
(A)	CN5622	System board interface connector
(B)	CN5620	CRT connector
(C)	CN5501	TV connector

Appendix C   Pin Assignments

System board

C.1   IS1400 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	-	2	GND	-
3	GND	-	4	BDQ01-B1P	I/O
5	BDQ05-B1P	I/O	6	BDQ00-B1P	I/O
7	BDQ04-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I/O
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ07-B1P	I/O
15	GND	-	16	BDQ03-B1P	I/O
17	BDQ02-B1P	I/O	18	GND	-
19	BDQ06-B1P	I/O	20	BDQ08-B1P	I/O
21	GND	-	22	BDQ09-B1P	I/O
23	BDQ13-B1P	I/O	24	GND	-
25	BDQ12-B1P	I/O	26	BDM1-B1P	I/O
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	O
31	BDQS1-B1P	I/O	32	MCK3-B1N	O
33	2R5-B2V	-	34	GND	-
35	BDQ10-B1P	I/O	36	BDQ15-B1P	I/O
37	BDQ11-B1P	I/O	38	BDQ14-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ20-B1P	I/O	44	BDQ17-B1P	I/O
45	BDQ16-B1P	-	46	BDQ21-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	NC	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I/O
53	GND	-	54	GND	-
55	BDQ23-B1P	I/O	56	BDQ19-B1P	I/O
57	BDQ22-B1P	I/O	58	BDQ18-B1P	I/O
59	GND	-	60	GND	-
61	BDQ28-B1P	I/O	62	BDQ24-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	BDQ30-B1P	I/O	64	BDQ25-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I/O	68	BDQS3-B1N	I/O
69	NC	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ27-B1P	I/O	74	BDQ29-B1P	I/O
75	BDQ25-B1P	I/O	76	BDQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	O	80	MCKE3-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	BBS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	BMA12-B1P	O	90	BMA11-B1P	O
91	BMA09-B1P	O	92	BMA07-B1P	O
93	BMA08-B1P	O	94	BMA05-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	BMA05-B1P	O	98	BMA04-B1P	O
99	BMA03-B1P	O	100	BMA02-B1P	O
101	BMA01-B1P	O	102	BMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	BMA10-B1P	O	106	BBS1-B1P	O
107	BBS0-B1P	O	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	2R5-B2V	-	114	MODT2-B1P	O
115	MCS3-B1N	O	116	BMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT3-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	BDQ36-B1P	I/O	124	BDQ32-B1P	I/O
125	BDQ37-B1P	I/O	126	BDQ33-B1P	I/O
127	GND	-	128	GND	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	O
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ39-B1P	I/O
135	BDQ35-B1P	I/O	136	BDQ38-B1P	I/O
137	BDQ34-B1P	I/O	138	GND	-

Table C-1 SO-DIMM0 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	GND	-	140	BDQ45-B1P	I/O
141	BDQ41-B1P	I/O	142	BDQ44-B1P	I/O
143	BDQ40-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BDM5-B1P	O	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ47-B1P	I/O	152	BDQ42-B1P	I/O
153	BDQ46-B1P	I/O	154	BDQ43-B1P	I/O
155	GND	-	156	GND	-
157	BDQ48-B1P	I/O	158	BDQ53-B1P	I/O
159	BDQ54-B1P	I/O	160	BDQ52-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK4-B1P	O
165	GND	-	166	MCK4-B1N	O
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6	O
171	GND	-	172	GND	-
173	BDQ55-B1P	I/O	174	BDQ51-B1P	I/O
175	BDQ50-B1P	I/O	176	BDQ49-B1P	I/O
177	GND	-	178	GND	-
179	BDQ60-B1P	I/O	180	BDQ61-B1P	I/O
181	BDQ57-B1P	I/O	182	BDQ56-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	O	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ52-B1P	I/O	190	GND	-
191	BDQ63-B1P	I/O	192	BDQ59-B1P	I/O
193	GND	-	194	BDQ58-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	-	200	P3V	-

C.2   IS1410 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	-	2	GND	-
3	GND	-	4	ADQ01-B1P	I/O
5	ADQ05-B1P	I/O	6	ADQ00-B1P	I/O
7	ADQ04-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I/O
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ07-B1P	I/O
15	GND	-	16	ADQ03-B1P	I/O
17	ADQ02-B1P	I/O	18	GND	-
19	ADQ06-B1P	I/O	20	ADQ08-B1P	I/O
21	GND	-	22	ADQ09-B1P	I/O
23	ADQ13-B1P	I/O	24	GND	-
25	ADQ12-B1P	I/O	26	ADM1-B1P	I/O
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK3-B1P	O
31	ADQS1-B1P	I/O	32	MCK3-B1N	O
33	2R5-B2V	-	34	GND	-
35	ADQ10-B1P	I/O	36	ADQ15-B1P	I/O
37	ADQ11-B1P	I/O	38	ADQ14-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ20-B1P	I/O	44	ADQ17-B1P	I/O
45	ADQ16-B1P	-	46	ADQ21-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	NC	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I/O
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ22-B1P	I/O	58	ADQ18-B1P	I/O
59	GND	-	60	GND	-
61	ADQ28-B1P	I/O	62	ADQ24-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	ADQ30-B1P	I/O	64	ADQ25-B1P	I/O
65	GND	-	66	GND	-
67	ADM3-B1P	I/O	68	ADQS3-B1N	I/O
69	NC	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ27-B1P	I/O	74	ADQ29-B1P	I/O
75	ADQ25-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	O	80	MCKE3-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	ABS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	AMA12-B1P	O	90	AMA11-B1P	O
91	AMA09-B1P	O	92	AMA07-B1P	O
93	AMA08-B1P	O	94	AMA05-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	AMA05-B1P	O	98	AMA04-B1P	O
99	AMA03-B1P	O	100	AMA02-B1P	O
101	AMA01-B1P	O	102	AMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	AMA10-B1P	O	106	ABS1-B1P	O
107	ABS0-B1P	O	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS2-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	2R5-B2V	-	114	MODT2-B1P	O
115	MCS3-B1N	O	116	AMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT3-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	ADQ36-B1P	I/O	124	ADQ32-B1P	I/O
125	ADQ37-B1P	I/O	126	ADQ33-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	O
131	ADQS4-B1P	I/O	132	GND	-
133	GND	-	134	ADQ39-B1P	I/O
135	ADQ35-B1P	I/O	136	ADQ38-B1P	I/O
137	ADQ34-B1P	I/O	138	GND	-

Table C-2 SO-DIMM1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	GND	-	140	ADQ45-B1P	I/O
141	ADQ41-B1P	I/O	142	ADQ44-B1P	I/O
143	ADQ40-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	ADM5-B1P	O	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ47-B1P	I/O	152	ADQ42-B1P	I/O
153	ADQ46-B1P	I/O	154	ADQ43-B1P	I/O
155	GND	-	156	GND	-
157	ADQ48-B1P	I/O	158	ADQ53-B1P	I/O
159	ADQ54-B1P	I/O	160	ADQ52-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK4-B1P	O
165	GND	-	166	MCK4-B1N	O
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	ADM6	O
171	GND	-	172	GND	-
173	ADQ55-B1P	I/O	174	ADQ51-B1P	I/O
175	ADQ50-B1P	I/O	176	ADQ49-B1P	I/O
177	GND	-	178	GND	-
179	ADQ60-B1P	I/O	180	ADQ61-B1P	I/O
181	ADQ57-B1P	I/O	182	ADQ56-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	O	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ52-B1P	I/O	190	GND	-
191	ADQ63-B1P	I/O	192	ADQ59-B1P	I/O
193	GND	-	194	ADQ58-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	-	200	P3V	-

C.3   CN1800 HDD interface connector (44-pin)

Table C-3 HDD interface connector (44-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	I	2	RSTIDA-P3N	O
3	SOD08-P3P	I/O	4	SOD07-P3P	I/O
5	SOD09-P3P	I/O	6	SOD06-P3P	I/O
7	SOD10-P3P	I/O	8	SOD05-P3P	I/O
9	SOD11-P3P	I/O	10	SOD04-P3P	I/O
11	SOD12-P3P	I/O	12	SOD03-P3P	I/O
13	SOD13-P3P	I/O	14	SOD02-P3P	I/O
15	SOD14-P3P	I/O	16	SOD01-P3P	I/O
17	SOD15-P3P	I/O	18	SOD00-P3P	I/O
19	N.C	-	20	GND	-
21	GND	I	22	SODREQ-P3P	I
23	GND	I	24	SODIOW-P3N	O
25	GND	I	26	SODIOR-P3N	O
27	GND	I	28	SOIORY-P3P	I
29	GND	I	30	SODACK-P3N	O
31	N.C	I	32	SOIRQ-P3P	I
33	N.C	I	34	SODA1-P3P	O
35	SODA2-P3P	O	36	SODA0-P3P	O
37	SODCS3-P3N	O	38	SODCS1-P3N	O
39	GND	I	40	NC	-
41	P5V	-	42	P5V	-
43	N.C	-	44	GND	-

C.4   CN1801 Select bay interface connector (72-pin)

Table C-4 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	NC	-
5	GND	-	6	NC	-
7	PLTRS1-S3N	O	8	GND	-
9	GND	-	10	PDD07-P3P	I/O
11	PDD08-P3P	I/O	12	SDD06-P3P	I/O
13	PDD09-P3P	I/O	14	SDD05-P3P	I/O
15	PDD10-P3P	I/O	16	GND	-
17	GND	-	18	PDD04-P3P	I/O
19	PDD11-P3P	I/O	20	PDD03-P3P	I/O
21	PDD12-P3P	I/O	22	PDD02-P3P	I/O
23	PDD13-P3P	I/O	24	SB-P5V	-
25	SB-P5V	-	26	PDD01-P3P	I/O
27	PDD14-P3P	I/O	28	PDD00-P3P	I/O
29	PDD15-P3P	I/O	30	GND	-
31	GND	-	32	PDDREQ-P3P	O
33	GND	-	34	PDIOW-P3N	O
35	GND	-	36	PDIOR-P3N	O
37	GND	-	38	PIORDY-P3P	O
39	NC	-	40	PDDACK-P3N	O
41	GND	-	42	IDEREQ-P3P	O
43	NC	-	44	PDA1-P3P	I
45	SB-P5V	-	46	SB-P5V	-
47	SB-P5V	-	48	PDA0-P3P	I
49	PDA2-P3P	I	50	PDCS1-P3N	O
51	PDCS3-P3N	O	52	CDRLED-P5N	O
53	GND	-	54	MBSTS2-S3N	O
55	MBSTS1-S3N	O	56	MBSTS0-S3N	O
57	GND	-	58	DBT20V-S5N	O
59	PSDA-S5P	O	60	BT2VD	-
61	PSCL-S5P	O	62	BTMP2-SXP	I
63	CDCHG2-S5P	I	64	GND	-
65	GND	-	66	NC	-
67	GND	-	68	NC	-
69	GND	-	70	GND	-
71	GND	-	72	PVBAT2	I

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	PETCRD-P3P	O	24	PETCRD-P3N	O
25	GND	-	26	GND	-
27	PERCRD-P3P	I	28	PERCRD-P3N	I
29	GND	-	30	GND	-
31	GND	-	32	GND	-
33	GND	-	34	XPRCRD-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-S3N	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	USBP6-S3P	I/O
73	USBP6-S3N	I/O	74	GND	-
75	GND	-	76	GND	-
77	GND	-	78	ACCD2-E3N	I
79	ACCLKR-EYN	I/O	80	ACAD31-EYP	I/O
81	ACD02-EYP	I/O	82	ACAD30-EYP	I/O
83	ACAD29-EYP	I/O	84	GND	-
85	ACAD28-EYP	I/O	86	ACAD27-EYP	I/O
87	ACSTSC-EYP	I	88	ACAD26-EYP	I/O
89	ACAUDI-EYP	I	90	ACAD25-EYP	I/O
91	ACCBE3-EYN	I/O	92	GND	-
93	ACAD24-EYP	I/O	94	ACREQ-EYN	I
95	ACAD23-EYP	I/O	96	ACSERR-EYN	I/O
97	ACAD22-EYP	I/O	98	ACRST-EYN	I/O
99	ACAD21-EYP	I/O	100	GND	-
101	ACVS2-E3P	I/O	102	ACAD20-EYP	I/O
103	ACAD19-EYP	I/O	104	ACAD18-EYP	I/O
105	ACAD17-EYP	I/O	106	ACCBE2-EYN	I/O
107	ACFRAM-EYN	I/O	108	GND	-
109	ACIRDY-EYN	I/O	110	ACTRDY-EYN	I/O
111	ACCLK-EYP	I/O	112	MCVPPB-EYV	-
113	MCVCCB-EYV	-	114	MCVCCB-EYV	-
115	ACINT-EYN	I	116	ACDEVS-EYN	I/O
117	ACGNT-EYN	O	118	GND	-
119	ACSTOP-EYN	I/O	120	ACPERR-EYN	I/O
121	ACLOCK-EYN	I/O	122	ACPAR-EYP	I/O
123	ACA18-EYP	I/O	124	ACCBE1-EYN	I/O
125	ACAD16-EYP	I/O	126	GND	-
127	ACAD14-EYP	I/O	128	ACAD15-EYP	I/O
129	ACAD12-EYP	I/O	130	ACAD13-EYP	I/O
131	ACAD11-EYP	I/O	132	ACVS1-E3P	I/O
133	ACAD09-EYP	I/O	134	GND	-
135	ACAD10-EYP	I/O	136	ACCBE0-EYN	I/O
137	ACAD08-EYP	I/O	138	ACAD07-EYP	I/O
139	ACD14-EYP	I/O	140	ACAD05-EYP	I/O
141	ACAD06-EYP	I/O	142	GND	-
143	ACAD03-EYP	I/O	144	ACAD04-EYP	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-EYP	I/O	146	ACAD02-EYP	I/O
147	ACAD00-EYP	I/O	148	ACCD1-E3N	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-E3P	I	6	GND	-
7	SDAT0-E3P	I/O	8	SDAT1-E3P	I/O
9	SDAT2-E3P	I/O	10	SDCD-E3N	I
11	GND	-	12	SDWP-E3P	I

C.7   CN2200 Mini PCI interface connector (124-pin)

Table C-7 Mini PCI interface connector (124-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	WLON-S3N	O	14	NC	-
15	GND	-	16	NC	-
17	PIRQA-P3N	I	18	P5V	-
19	P3V	-	20	PIRQD-P3N	I
21	NC	-	22	NC	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	I	26	PCIRST-S3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	O	30	PGNT2-P3N	I
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	I/O

Table C-7 Mini PCI interface connector (124-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
35	AD29-P3P	I/O	36	NC	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	-
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	NC	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD26-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O
69	GND	-	70	P3V	-
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I/O	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	I/O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	NC	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	NC	-
99	AD01-P3P	I/O	100	NC	-
101	GND	-	102	GND	-
103	NC	-	104	GND	-
105	NC	-	106	NC	-
107	NC	-	108	NC	-

Table C-7 Mini PCI interface connector (124-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
109	NC	-	110	NC	-
111	NC	-	112	NC	-
113	GND	-	114	GND	-
115	NC	-	116	NC	-
117	GND	-	118	NC	-
119	GND	-	120	GND	-
121	NC	-	122	NC	-
123	NC	-	124	B3V	-

C.8   CN2300 Docking interface connector (240-pin)

Table C-8 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	-
69	DILSON-E3P	O	70	NC	-

Table C-8   Docking interface connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
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
143	TXD-PYN	O	144	RING-PYP	I

Table C-8   Docking interface connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
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	-
217	GND	-	218	NC	-

Table C-8   Docking interface connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
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.9   CN3000 MDC interface connector (30-pin)

Table C-9 MDC interface connector (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	GND	-
3	GND	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	GND	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	NC	-	14	NC	-
15	GND	-	16	E3V	-
17	E3V	-	18	NC	-
19	GND	-	20	GND	-
21	NC	-	22	M97SY2-B3P	O
23	M97OT2-P3P	O	24	NC	-
25	M97RS2-S3N	O	26	M97IN2-B3P	I
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O

C.10   CN3001 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 NC	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

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 CN4100 LAN interface connector (14-pin)

Table C-14 LAN interface connector (14-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MDI2-EXP	-	2	MDI2-EXN	-
3	MDI3-EXP	-	4	MDI3-EXN	-
5	MDIO-EXP	-	6	MDIO-EXN	-
7	MDI1-EXP	-	8	MDI1-EXN	-
9	NC	-	10	NC	-
11	LINK-E3N	O	12	ACT-E3N	O
13	(LAN-E3V)	-	14	(LAN-E3V)	-

C.15 CN4200 IEEE 1394 interface connector (4-pin)

Table C-15 IEEE 1394 interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TPB0-P3N	I/O	2	TPB0-P3P	I/O
3	TPA0-P3N	I/O	4	TPA0-P3P	I/O

C.16 CN5500 LCD interface connector (40-pin)

Table C-16 LCD interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNL-P3V	-	2	GND	-
3	PNL-P3V	-	4	TXDT6-P3N	O
5	BRT2DA-S3P	O	6	TXDT6-P3P	O
7	PNL2-P3P	I	8	TXDT4-P3N	O
9	PNL1-P3P	I	10	TXDT4-P3P	O
11	PNL0-P3P	I	12	TXCK1-P3N	O
13	GND	-	14	TXCK1-P3P	O
15	GND	-	16	TXDT5-P3N	O
17	GND	-	18	TXDT5-P3P	O
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	TXDT1-P3N	O
25	GND	-	26	TXDT1-P3P	O
27	GND	-	28	TXDT2-P3N	O
29	GND	-	30	TXDT2-P3P	O
31	BRT0-P5P	O	32	TXDT0-P3N	O
33	BRT1-P5P	O	34	TXDT0-P3P	O
35	FL-P5V	-	36	TXCK0-P3N	O
37	GND	-	38	TXCK0-P3P	O
39	FL-P5V	-	40	GND	-

C.17 CN8800 DC-IN connector (4-pin)

Table C-17   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.18 CN8810 1st Battery connector (10-pin)

Table C-18   1st Battery connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(PVBL1)	-	2	BTMP1	I
3	(DCHG)	-	4	M5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT10V-S5N	I
9	GND	-	10	GND	-

C.19 CN9990 RTC Battery connector (3-pin)

Table C-19   RTC Battery connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZS-PWCHKF	-	2	NC	-
3	GND	-			

C.20 CN8770 FAN interface connector (3-pin)

Table C-20   FAN interface connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(P5V)	-	2	GND	-
3	FANG-P3P	O			

C.21   CN9500 SN board interface connector (40-pin)

Table C-21 SN board interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BT-P3V	-	2	USBP4-S3N	I/O
3	USBP4-S3P	I/O	4	BTRST-S3N	O
5	BTMDL-P3N	I	6	GND	-
7	VOLBYP-P3N	O	8	WCHCLK-P3P	I
9	WCHDAT-P3P	I	10	PCBEEP-E3P	O
11	M97RS1-S3N	I	12	M970T1-P3P	I
13	M97SY1-P3P	I	14	M97IN1-P3P	I
15	GND	-	16	X97BCK-P3P	I
17	GND	-	18	DOUTR-PXN	I
19	DOUTR-PXP	I	20	DOUTL-PXN	I
21	DOUTL-PXP	I	22	DINR-PXN	O
23	DINR-PXP	O	24	DINL-PXN	O
25	DINL-PXP	O	26	P3V	-
27	X14SND-P3P	O	28	GND	-
29	SPKON-P3N	O	30	SNDMUT-S3N	O
31	AMPSD-S3N	O	32	SND-GND	-
33	SND-GND	-	34	SND-GND	-
35	SND-GND	-	36	ATBEEP-E3P	O
37	SND-P5V	-	38	SND-P5V	-
39	SND-P5V	-	40	SND-P5V	-

C.22   CN9501 USB harness connector (8-pin)

Table C-22 USB harness connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USBP3-S3P	I/O
3	USBP3-S3N	I/O	4	USB0PS-E5V	O
5	USB0PS-E5V	O	6	USBP0-S3P	I/O
7	USBP0-S3N	I/O	8	GND	-

C.23   CN5621 RG board interface connector (20-pin)

Table C-23 RG board interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RED-PXP	O	2	GND	-
3	GREEN-PXP	O	4	GND	-
5	BLUE-PXP	O	6	GND	-
7	GND	-	8	GND	-
9	SVSYNC-P3P	O	10	SHSYNC-P3P	O
11	GND	-	12	GND	-
13	CRTSCL-P5P	O	14	CRTSDA-P5P	O
15	GND	-	16	PVON-S5P	I
17	TVCHRO-PXP	O	18	GND	-
19	TVLUMA-PXP	O	20	GND	-

C.24   CN9600 SW board interface connector (8-pin)

Table C-24 SW board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PWRSW-S3N	I	2	GND	-
3	GPBTNA-S3N	I	4	GPBTNB-S3N	I
5	PNLOFF-S3N	I	6	NC	-
7	GND	-	8	GND	-

SN Board

C.25 PJ9510 System board interface connector (40-pin)

Table C-25   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-E3P	I	6	SND-GND	-
7	SND-GND	-	8	SND-GND	-
9	SND-GND	-	10	AMPSD-S3N	I
11	SNDMUT-S3N	I	12	SPKON-P3N	I
13	GND	-	14	X14SND-P3P	I
15	P3V	-	16	DINL-PXP	I
17	DINL-PXN	I	18	DINR-PXP	I
19	DINR-PXN	I	20	DOUTL-PXP	O
21	DOUTL-PXN	O	22	DOUTR-PXP	O
23	DOUTR-PXN	O	24	GND	-
25	X97BCK-P3P	O	26	GND	-
27	M97IN1-P3P	O	28	M97SY1-P3P	O
29	M97OT1-P3P	O	30	M97RS1-S3N	O
31	PCBEEP-E3P	I	32	WCHDAT-P3P	O
33	WCHCLK-P3P	O	34	VOLBYP-P3N	I
35	GND	-	36	BTMDL-P3N	O
37	BTRST-S3N	I	38	USBP4-S3P	I/O
39	USBP4-S3N	I/O	40	BT-P3V	-

C.26   CN4400   Bluetooth interface connector (20-pin)

Table C-26   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	USBP4-S3P	I/O
17	USBP4-S3N	I/O	18	NC	-
19	NC	-	20	BT-P3V	-

C.27   CN4600 USB0 interface connector (4-pin)

Table C-27   USB0 interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	I	2	USBP0-S3N	I/O
3	USB0-S3P	I/O	4	GND	-

C.28   CN4601 USB3 interface connector (4-pin)

Table C-28 USB3 interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	I	2	USBP3-S3N	I/O
3	USBP1-S3P	I/O	4	GND	-

C.29   CN6001 Internal microphone connector (2-pin)

Table C-29 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.30   J6002 External microphone connector (6-pin)

Table C-30 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.31   CN3202 Speaker connector (4-pin)

Table C-31 Speaker (Right) connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTL-PXP	O	2	SPOTL-PXN	O
3	SPOTR-PXP	-	4	SPOTR-PXN	O

C.32　J6000　Headphone connector (6-pin)

Table C-32 Headphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	A-GND	-
5	(SPKEN-P5P)	I	6	NC	-

C.33　CN9511　USB harness connector (8-pin)

Table C-33 USB harness connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USBP3-S3P	I/O
3	USBP3-S3N	I/O	4	USB0PS-E5V	I
5	USB0PS-E5V	I	6	USBP0-S3P	I/O
7	USBP0-S3N	I/O	8	GND	-

RG Board

C.34 CN5622 System board interface connector (20-pin)

Table C-34 System board interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TV-GND	-	2	TVLUMA-PXP	I
3	VGA-GND	-	4	TVCHRO-PXP	I
5	GND	-	6	PVON-S5P	O
7	E5V	-	8	E5V	-
9	CRTSCL-P5P	I	10	CRTSDA-P5P	I
11	GND	-	12	SVSYNC-P3P	I
13	SHSYNC-P3P	I	14	VGA-GND	-
15	BLUE-PXP	I	16	VGA-GND	-
17	GREEN-PXP	I	18	VGA-GND	-
19	RED-PXP	I	20	GND	-

C.35 CN5620 CRT interface connector (15-pin)

Table C-35   CRT interface 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-P5P	O	14	SVSYNC-P5P	O
15	CRTSCL-P5P	I/O			

C.36 CN5501 TV connector (4-pin)

Table C-36   TV connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
3	GND	-	6	TVLUMA-PXP	O
5	GND	-	8	TVCHRO-PXP	O

SW Board

C.37   PJ9610 System board interface connector (8-pin)

Table C-37 System board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PWRSW-S3N	O	2	KBSC16-S3N	I
3	KBRT00-S3N	O	4	KBRT03-S3N	O
5	PNLOFF-S3N	O	6	NC	-
7	GND	-	8	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	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\ |	2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*2
38	K	25	A5	42	F0	42	*2
39	L	26	A6	4B	F0	4B	*2
40	; :	27	A7	4C	F0	4C	*2
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*2
53	, <	33	B3	41	F0	41	*2
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break			Note
58	Ctrl		1D		9D		14	F0		14	*3
60	Alt (L)		38		B8		11	F0		11	*3
61	Space		39		B9		29	F0		29	
62	ALT (R)	E0	38	E0	B8	E0	11	E0	F0	11	
75	Ins	E0	52	E0	D2	E0	70	E0	F0	70	*1
76	Del	E0	53	E0	D3	E0	71	E0	F0	71	*1
79	←	E0	4B	E0	CB	E0	6B	E0	F0	6B	*1
80	Home	E0	47	E0	C7	E0	6C	E0	F0	6C	*1
81	End	E0	4F	E0	CF	E0	69	E0	F0	69	*1
83	↑	E0	48	E0	C8	E0	75	E0	F0	75	*1
84	↓	E0	50	E0	D0	E0	72	E0	F0	72	*1
85	PgUp	E0	49	E0	C9	E0	7D	E0	F0	7D	*1
86	PgDn	E0	51	E0	D1	E0	7A	E0	F0	7A	*1
89	→	E0	4D	E0	CD	E0	74	E0	F0	74	*1
110	Esc		01		81		76	F0		76	
112	F1		3B		BB		05	F0		05	
113	F2		3C		BC		06	F0		06	
114	F3		3D		BD		04	F0		04	
115	F4		3E		BE		0C	F0		0C	
116	F5		3F		BF		03	F0		03	
117	F6		40		C0		0B	F0		0B	
118	F7		41		C1		83	F0		83	
119	F8		42		C2		0A	F0		0A	
120	F9		43		C3		01	F0		01	
121	F10		44		C4		09	F0		09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2					Note
		Make		Break		Make		Break			
122	F11	57		D7		78		F0		78	*3
123	F12	58		D8		07		F0		07	*3
124	PrintSc	*6		*6		*6		*6			*6
126	Pause	*7		*7		*7		*7			*7
202	Fn	—		—		—		—			*4
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F	
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F	

Notes:

1. *   Scan codes differ by mode.
2. *   Scan codes differ by overlay function.
3. *   Combination with the **Fn** key makes different codes.
4. *   **Fn** key does not generate a code by itself.
5. *   This key corresponds to key No. 42 in a 102-key model.
6. *   Refer to Table D-6, No. 124 key scan code.
7. *   Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2	
		Make	**Break**	**Make**	**Break**
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1								Code set 2									
		Make				Break				Make				Break					
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

Table D-4 Scan codes with Fn key

Cap No.	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

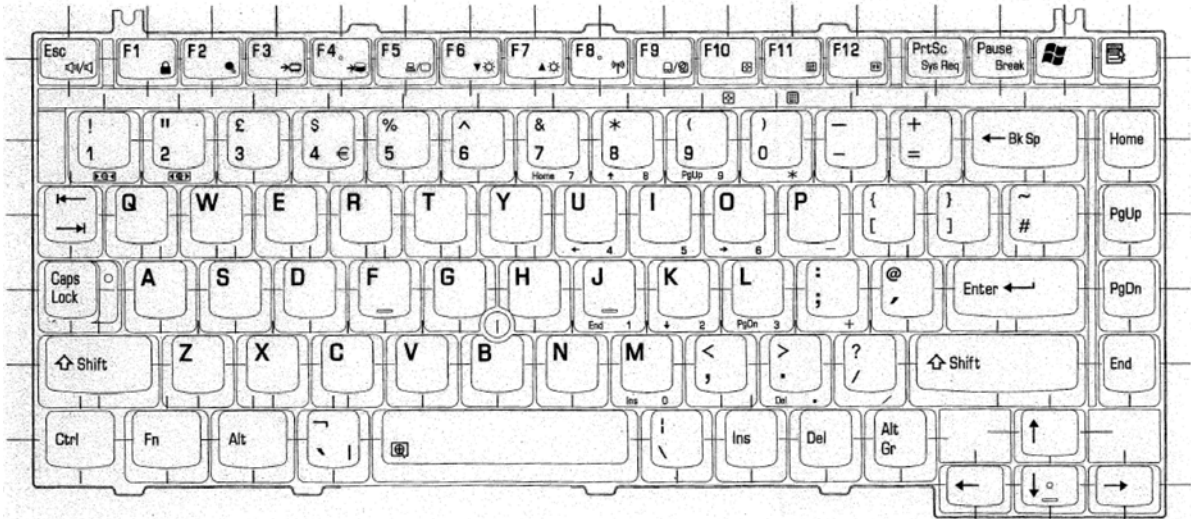## E.1   United Kingdom (UK) Keyboard

Figure E-1 UK keyboard
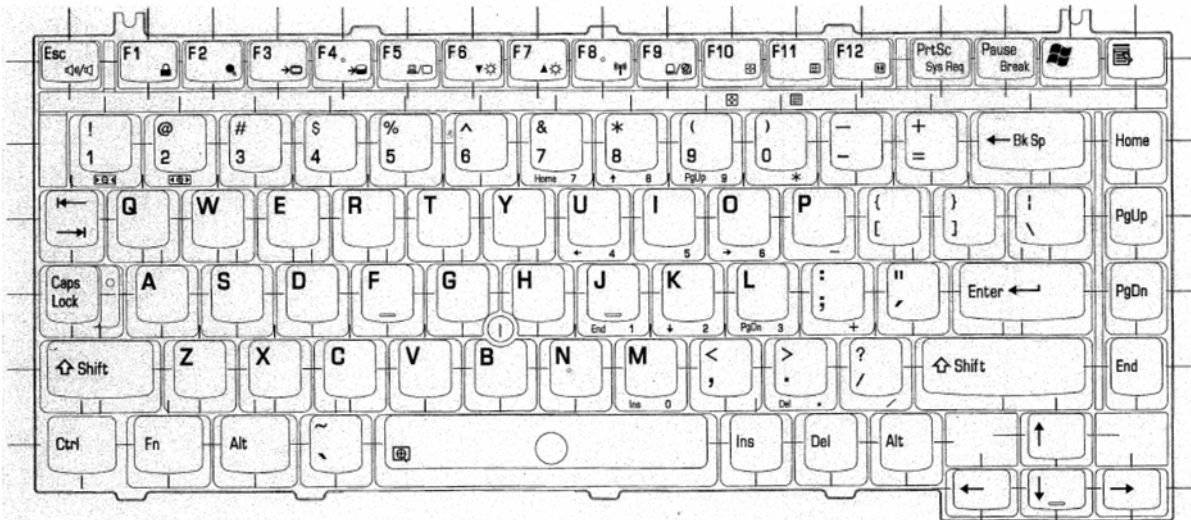
E.2   United States (US) Keyboard

Figure E-2 US keyboard

Appendix F   Wiring diagrams
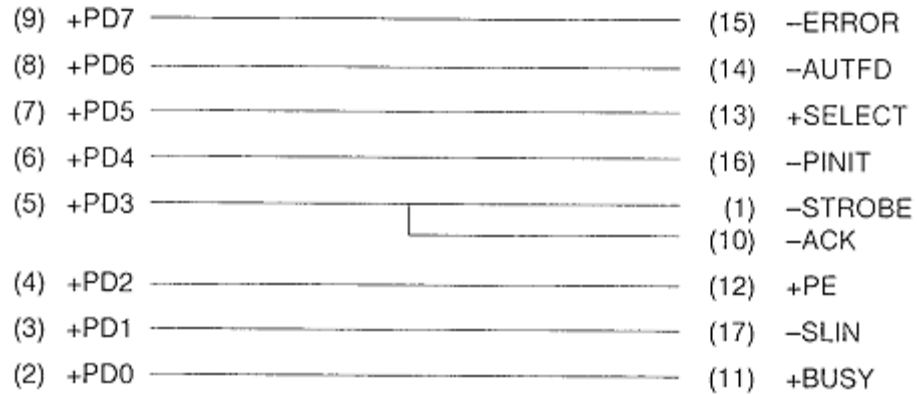
F.1   Parallel Port Wraparound Connector

```
(9)  +PD7  ──────────────────  (15)  −ERROR
(8)  +PD6  ──────────────────  (14)  −AUTFD
(7)  +PD5  ──────────────────  (13)  +SELECT
(6)  +PD4  ──────────────────  (16)  −PINIT
(5)  +PD3  ──────────────┐      (1)  −STROBE
                         └─────  (10)  −ACK
(4)  +PD2  ──────────────────  (12)  +PE
(3)  +PD1  ──────────────────  (17)  −SLIN
(2)  +PD0  ──────────────────  (11)  +BUSY
```

Figure F-1 Parallel port wraparound connector

F.2   LAN Loopback Connector

```
(1) BIBAP (TX+)  ──────────────  (3) BIDBP (RX+)

(2) BIDAN (TX-)  ──────────────  (6) BIDBN (RX-)
```
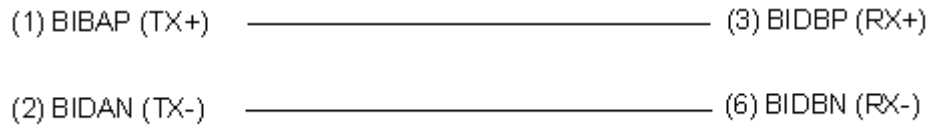
Figure F-2 LAN loopback connector

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 No. 01 key.

   For example

    (US Keyboard)

    (UK Keyboard)
   (Keep holding down the key until a message appears on the screen.)
   The BIOS rewriting starts.

6. When the process is completed, eject the BIOS/EC/KBC rewriting disk and the system is automatically reset.

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:

❑ BIOS/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 message appears on the screen.) The BIOS/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	5,021