Toshiba Personal Computer

TECRA M2V

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-476

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Toshiba Personal Computer TECRA M2V Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA M2V.

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 M2V system unit and each FRU.

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

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

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

Appendices   The appendices describe the following:

- ❑ Handling the LCD module
- ❑ Board layout
- ❑ Pin assignments
- ❑ Keyboard scan/character codes
- ❑ Key layout
- ❑ Wiring diagrams
- ❑ BIOS rewrite procedures
- ❑ EC/KBC rewrite procedures
- ❑ Reliability

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

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

```
Format complete
System transferred
```

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Hardware Overview

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1.1 Features

The Toshiba TECRA M2V 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 and benefits: The product configuration is BTO/CTO-compatible so that a system can be designed to suit a specific purpose.

❑ Microprocessor (BTO)

The TECRA M2V computer is equipped with an Intel$^®$ Pentium$^®$ M Processor. The Intel$^®$ Pentium$^®$ M Processor incorporates a math co-processor, a 64KB L1 cache memory and a 1MB L2 cache memory.
The processor runs with one of the following speeds:

 Intel$^®$ Pentium$^®$ M Processor

  • Intel$^®$ Pentium$^®$ M Processor 1.4GHz / 1.5GHz / 1.6GHz / 1.7GHz (1.484V)

These processors operate at 400MHz bus clock.

❑ Chipset

The TECRA M2V is equipped with Intel MontaraGM+, Intel ICH4-M and YEBISU3S.

❑ Video Controller

The computer has a MontaraGM+ VGA controller. The internal VRAM is 32MB (64MB is also supported.), DDR250MHz.

❑ Memory (BTO)

Two memory slots are provided to accommodate 2.5V drive PC2100/PC2700 DDR-SDRAM memory units with a total capacity of 2GB (2,048MB) maximum.

The following four memory modules are available.

  • 128 MB (16M×16bit×4, 2.5V, SDRAM)
  • 256 MB (16M×16bit×8, 2.5V, SDRAM)
  • 512 MB (32M×8bit×16, 2.5V, SDRAM)
  • 1,024MB (64M×8bit×16, 2.5V, SDRAM)

❑ HDD (BTO)

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

  • 30/40/60/80GB

❑ USB FDD (BTO)

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

❑ Slim Select Bay (BTO)

A DVD-ROM drive, CD-RW/DVD-ROM drive, DVD±R/±RW drive, DVD Multi drive, DVD Super Multi drive, 2nd HDD or 2nd Battery can be installed in the Slim Select Bay.

❑ DVD-ROM Drive (BTO)

A 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.

❑ CD-RW/DVD Drive (BTO)

A full-size, CD-RW/DVD drive that contains an AT Attachment Packet Interface (ATAPI) controller. This drive writes CD-R at maximum 24-speed and CD-RW at maximum 24-speed. It reads DVDs at maximum 8-speed and CDs at maximum 24-speed.

❑ DVD±R/±RW Drive (BTO)

This full size DVD±RW/±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) DVD/CDs without using an adaptor. It is a high-performance drive that reads DVDs at maximum 8-speed, CDs at maximum 24-speed and writes DVD-R/RW at maximum 2-speed, DVD+R/+RW at maximum 2.4 -speed, CD-R/-RW at maximum 10-speed.

❑ DVD Multi Drive (BTO)

This drive is a combination of DVD-ROM and CD-R/-RW 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, CDs at maximum 24-speed and writes CD-R at maximum 16-speed, CD-RW at maximum 8-speed, DVD-RW at maximum single speed, DVD-R/-RAM at maximum 2-speed.

❑ DVD Super Multi Drive (BTO)

This drive is a combination of DVD-ROM and DVD±R/±RW 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.

❑ Display (BTO)

The display comes in the following type:

- 14.1" XGA-TFT color display, resolution 1,024×768, 16M colors

A video controller and a 32/64MB VRAM enables an external monitor to display 16M colors at a resolution of 1,024×768 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 Touch pad Device

The Touch pad and control buttons enable control of the on-screen pointer and scrolling of windows.

❑ 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.

❑ 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 slot

The PC card slot (PCMCIA) accommodates two Type II cards or one Type III card. The slot supports 16-bit PC cards and Card Bus PC cards. CardBus supports 32-bit PC cards.

❑ 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

- Four USB ports

- IEEE 1394 port (This port is not supported by the computer.)

- DVI port (This port is not supported by the computer.)

❑ 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 ICH4-M) and Analog Devices AD1981B

- AMP: Matsushita AN12490 and NSC LM4911

- Stereo speakers

- Volume control knob

- Stereo headphone jack

- External microphone jack

❑ Internal modem

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

The internal modem provides capability for data and fax communication and supports V.90/92. For data reception it operates at 56,000bps and for data transmission it operates at 33,600bps. For fax transmission it operates at 14,400bps. It is also equipped with Speakerphone and TAM (Telephony Answering Machine) function. The speed of data transfer and fax depends on analog telephone line conditions. It has a RJ11 modem jack for connecting to a telephone line. Both of V.90 and V.92 are supported in USA, Canada and Australia. In other regions, only V.90 is available.

❑ Internal LAN

The computer is equipped with LAN circuits that support Ethernet LAN (10 megabits per second, 10BASE-T) and Fast Ethernet LAN (100 megabits per second). It also supports Wakeup on LAN (WOL), Magic Packet and LED.

❑ Mini PCI card slot (BTO)

The computer is equipped with Wireless LAN board compatible with the Standard of IEEE 802.11b, IEEE 802.11b/g, or IEEE 802.11a/b/g in the Mini PCI card slot.

❑ 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.
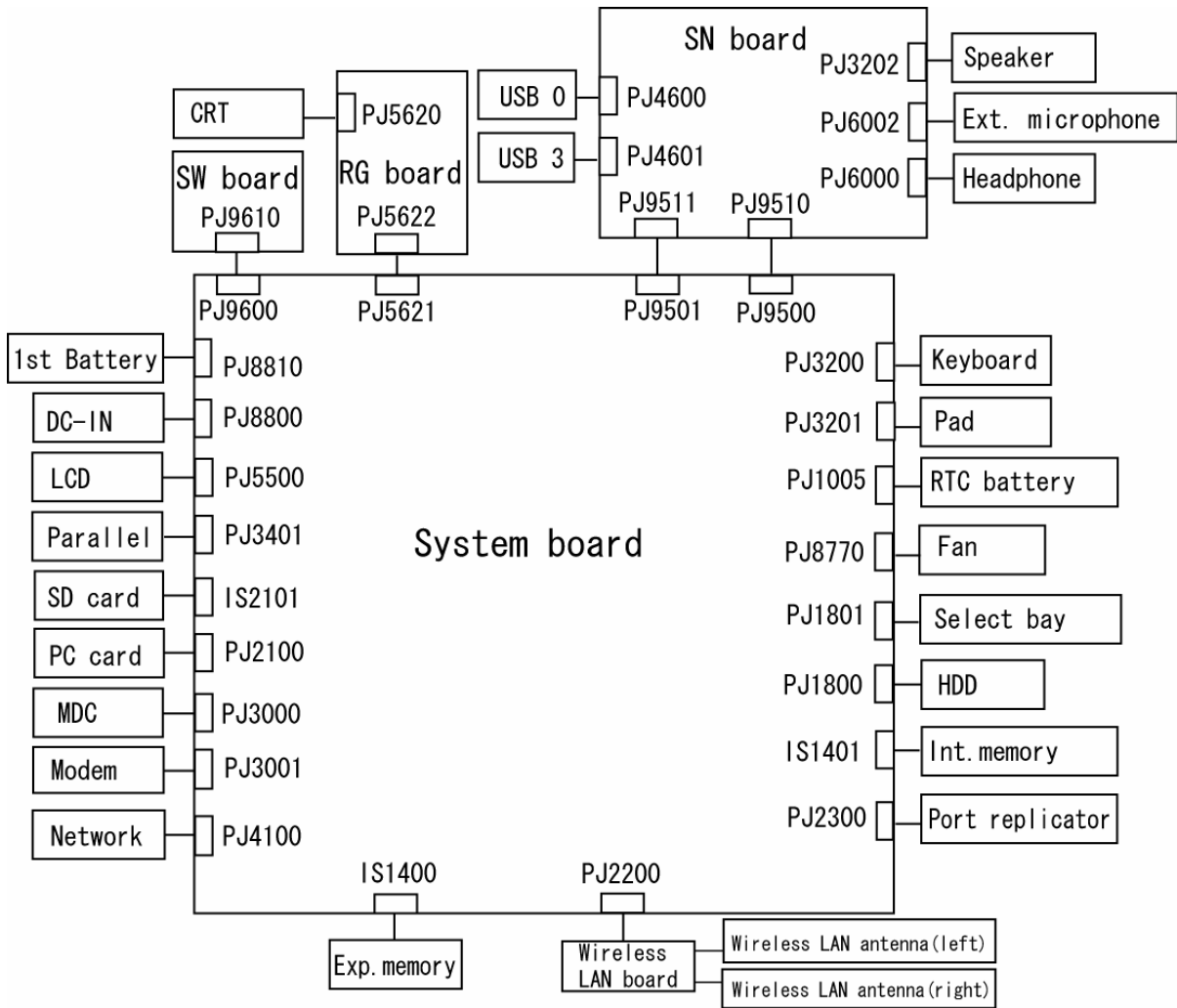
Figure 1-2 System unit configuration

1.2   System Unit Block Diagram

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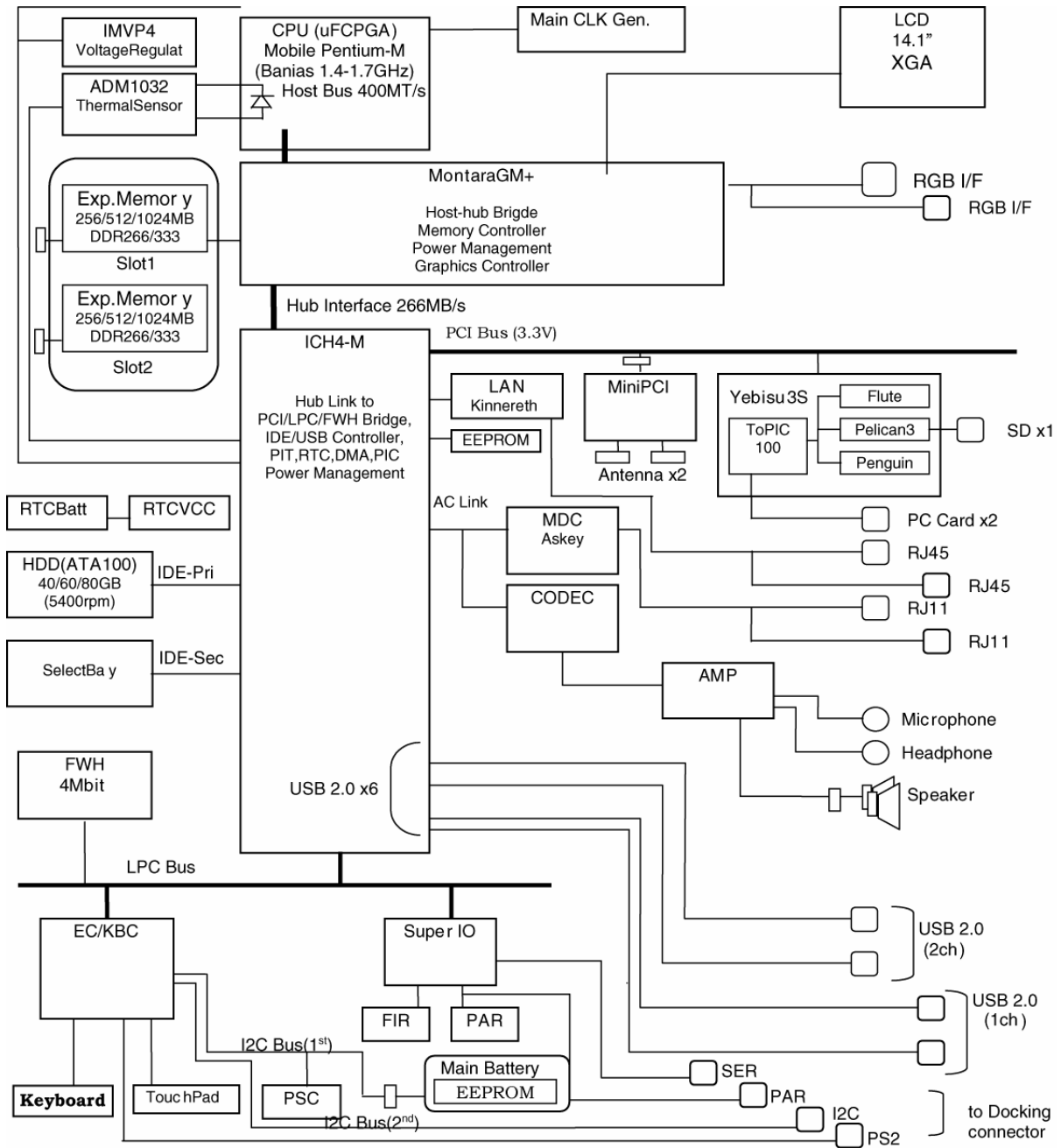
Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel® Pentium® M Processor 1.40GHz/1.50GHz/1.60GHz/1.70GHz
  - Processor core speed:1.40GHz/1.50GHz/1.60GHz/1.70GHz
  - Processor bus speed: 400MHz
  - Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache, 4-way set associative
  - Integrated L2 cache memory: 1MB ECC protected cache data array, 8-way set associative
  - Integrated NDP

❑ Memory

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

- DDR-SDRAM (Double Data Rate - Synchronous DRAM)
- 128MB/256MB/512MB/1GB selectable
  - 128 MB   (16M×16bit×4)
  - 256 MB   (16M×16bit×8)
  - 512 MB   (32M×8bit×16)
  - 1GB   (64M×8bit×16)
- 200 pin, SO Dual In-line Memory Modules (SO-DIMM)
- 2.5 volt operation
- Supports DDR266 (128MB, 256MB, 512MB and 1GB) and DDR333 (256MB, 512MB and 1GB)
- Supports PC2100 and PC2700

❑ Intel MontaraGM+ (North Bridge)

- One Intel 855GM (GMCH-M) is used.
- Features:
  - Intel® Pentium® M Processor System bus support
  - DRAM control (supports DDR266/DDR333)
  - Built-in graphic control
  - RGB, DVO interface
  - AGP master slave interface (complies with AGP V2.0)
  - Supports Intel Speed step Technology
  - 732-ball (37.5x37.5mm) micro FCBGA package

❑ Intel ICH4-M (South Bridge)

- One Intel FW82801DBM is used.
- This gate array has the following features:
  − Hub Link Interface
  − PCI Rev2.2 Interface (6 PCI REQ/GNT Pairs)
  − BusMaster IDE Controller (Ultra ATA 100/66/33)
  − USB 1.1/2.0 Controller 6 Ports (EHCI: Enhanced Host Controller)
  − I/O APIC (ACPI 1.0b)
  − SMBus2.0 Controller
  − FWH Interface (BIOS)
  − LPC Interface (EC/KBC, Super I/O)
  − IRQ Controller
  − Serial Interrupt Controller
  − Power Management Controller
  − Deeper Sleep (C4) Support
  − Suspend/Resume Control
  − AC'97 2.2 Interface
  − Internal RTC
  − Internal LAN Controller (WfM2.0)
  − Complies with ACPI 1.0
  − 421-ball 31×31mm BGA Package

❑ PC Card Controller Gate Array

- One YEBISU3S gate array is used.
- This gate array has the following functions and components.
  − PCI interface (PCI Rev. 2.2)
  − CardBus/PC Card controller (Yenta2 Ver. 2.2)
  − SD memory card controller (SDHC Ver. 1.2)
  − SD IO card controller (Ver. 1.0)
  − SmartMedia controller (SMHC Ver.01/SMIL1.0) (not used in this computer)
  − SIO (UART) controller (MS Debug Port Specification Ver. 1.0)
  − Docking station interface (Q-SW control, reset control)
  − External device interface

❑ Firmware Hub (FWH)

- One Intel 820 chipset (82802ABB) is used.
- This gate array has the following features:
  - Firmware hub hardware interface mode
  - Two configurable interfaces
  - Program/erase controller
  - Program and erase suspend
  - 4Mbits of flash memory for platform code/data nonvolatile storage
  - Address/Address-Multiplexed (A/A Mux) interface/mode
  - Case temperature operating range
  - Vcc: 3V to 3.6V
  - Vpp: 12V for fast programming
- 4Mbits of flash memory are used as shown below:
  - 64KB are used for VGA-BIOS.
  - 288KB are used for system BIOS.
  - 8KB are used for plug and play data area.
  - 8KB are used for password security.
  - 16KB are used for boot strap.
  - 32KB are used for ACPI P code.
  - 48KB are used for LOGO.
  - 128KB are reserved for LAN BIOS.
  - 432KB are reserved.

❑ VGA controller (in the MontaraGM+)

  - UMA (16MB) can be extended to 64MB by a Display Driver
  - AGP bus R2.0 x4
  - LCD I/F LVDS 2ch

❑ Sound Controller

- One AC'97Codec AD1981B chip and AC-Link controller embedded in ICH4-M
- SW sound

❏ EC/KBC (Embedded Controller/Keyboard Controller)

- One Mitsubishi M306K9FCLRP microcomputer 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 TMP87PM48U chip is used.
- This controller controls the power sources.

❏ Clock Generator

- One ICS950812CGT is used.
- This device generates the system clock.

❑ Modem Controller

  - One built-in modem card with Agere SCORPIO+CSP1037B 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 MAC incorporated with ICH4-M and PHY (Kinnereth-R 82562EZ) are used for the internal chip, and are connected with RJ11/RJ45 combo connector.
  - This controller has the following functions:
    – 10/100M-Ethernet ([MAC] ICH4M+[PHY]82562EZ)
    – WOL support
    – Magic Packet support
    – LED support

❑ Wireless LAN

  - One Mini PCI card for wireless LAN with Type IIIA card bus controller. Ardon (Intel) or AR5121 (Askey) Mini PCI I/F controller is used.

❑ Super I/O

  - One SMSC Kona-Lite chip is used.
  - This gate array has the following features:
    – Infrared Communications Controller
    – Parallel Port Controller

❑ Sensor

- Thermal Sensor: One ADM1032AR chip is used.
- LCD Sensor: One NRS-701-1015T 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.
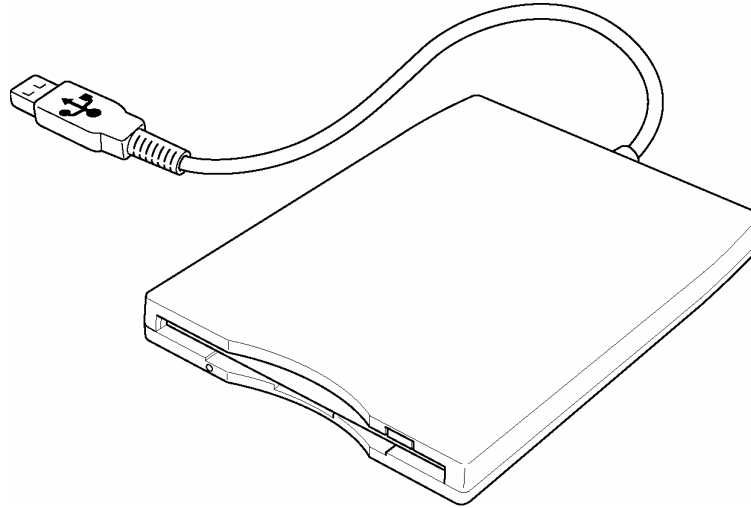
Figure 1-4 3.5-inch FDD (USB External)

Table 1-1 3.5-inch FDD specifications

Items		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 30GB, 40GB, 60GB and 80GB HDD.
The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.
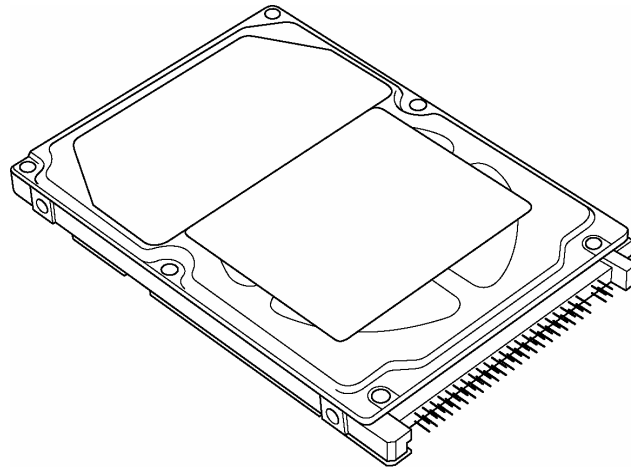
Figure 1-5   2.5-inch HDD

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

Items		Specifications		
		TOSHIBA HDD 2181B	**HITACHI GST G8BC0000Z310**	**HITACHI GST G8BC00017310**
Outline dimensions	Width (mm)	69.85	69.85	69.85
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100.2	100
	Weight (g)	99 max.	95 max.	91
Storage size (formatted)		30GB	30GB	30GB
Speed (RPM)		4,200	4,200	4,200
Data transfer speed (Mbits/s)		154.3 – 298.0	-	183.2-347.2
Interface transfer rate (Mbytes/s)		100 max.(Ultra DMA mode)		
Track density (Ktpi)		78.9	63	80
Average seek time (ms) Read Write		12	12 typ. 14 typ.	13 typ. -
Motor startup time (ms)		4 typ	5	5 typ. (Power on)

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

Items		Specifications		
		TOSHIBA HDD 2190B	**HITACHI GST G8BC0000Z410**	**HITACHI GST G8BC00013410**
Outline dimensions	Width (mm)	69.85	69.85	70
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100.2	100
	Weight (g)	95 max.	95 max.	95 max.
Storage size (formatted)		40GB	40GB	40GB
Speed (RPM)		4,200	4,200	5,400
Data transfer speed (Mbits/s)		175.0-341.7	-	263.2-401.6
Interface transfer rate (Mbytes/s)		100 (MAX Ultra DMA mode)		
Track density (Ktpi)		88.1	63	85
Average seek time (ms) Read Write		12	12 typ. 14 typ	13 typ. -
Motor startup time (ms)		4typ	5	5 (Power on)

Items		Specifications		
		TOSHIBA HDD 2193B	**HITACHI GST G8BC00014410**	**FUJITSU G8BC00019410**
Outline dimensions	Width (mm)	69.85	69.85	70
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100.2	100
	Weight (g)	95 max.	95 max.	99 max.
Storage size (formatted)		40GB	40GB	40GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mbits/s)		154.3-298.0	450	443.2
Interface transfer rate (Mbytes/s)		100 max (Ultra DMA mode)		
Track density (Ktpi)		78.9	96.0	-
Average random seek time (read) (ms)		12		
Motor startup time (ms)		4	3.5	4

Table 1-2   2.5-inch HDD specifications (3/4)

Items		Specifications		
		TOSHIBA HDD2183	HITACHI GST G8BC00017610	HITACHI GST G8BC0000Z610
Outline dimensions	Width (mm)	69.85	69.85	69.85
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100	100.2
	Weight (g)	99 max.	95	99 max.
Storage size (formatted)		60GB	60GB	60GB
Speed (RPM)		4,200	4,200	4,200
Data transfer speed (Mbits/s)		154.3-298.0	160-297	-
Interface transfer rate (Mbytes/s)		100(Ultra DMA mode)		
Track density (Ktpi)		78.9	80	63
Average seek time (ms) Read Write		12	13 typ. -	12 typ. 14 typ.
Motor startup time (ms)		4 typ.	5 typ.(Power on)	5

Items		Specifications		
		TOSHIBA HDD2194B	HITACHI GST G8BC00014610	HITACHI GST G8BC00013610
Outline dimensions	Width (mm)	69.85±0.25	69.85	70
	Height (mm)	9.5±0.25	9.5	9.5
	Depth (mm)	100±0.25	100.2	100
	Weight (g)	95 max.	102 max.	95 max.
Storage size (formatted)		60GB	60GB	60GB
Speed (RPM)		5,400	5,400	5,400
Data transfer speed (Mbits/s)		258-394	450	263.2-401.6
Interface transfer rate (Mbytes/s)		100 max (Ultra DMA mode)		
Track density (Ktpi)		88.8	96	85
Average seek time (ms) Read Write		12	12 14	13 typ. -
Motor startup time (ms)		4 typ.	3.5	5 (Power on)

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

Items		Specifications		
		FUJITSU G8BC00019610	**HITACHI GST G8BC00015610**	**HITACHI GST G8BC00014810**
Outline Dimensions	Width (mm)	70	69.85	69.85
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100.2	100.2
	Weight (g)	99 max.	115 max.	102 max.
Storage size (formatted)		60GB	60GB	80GB
Speed (RPM)		5,400	7,200	5,400
Data transfer speed (Mbits/s)		443.2 max.	507 max.	450 max.
Interface transfer rate (Mbytes/s)		100 (MAX Ultra DMA mode)		
Track density (Ktpi)		-	88.2	96
Average seek time (ms) Read Write		12 typ. -	10 11	12 typ. 14 typ.
Motor startup time (ms)		4 typ.	4	3.5

1.5   DVD-ROM Drive

A 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.

The DVD-ROM drive is shown in figure 1-6. Specifications for the DVD-ROM drive are described in table 1-3.
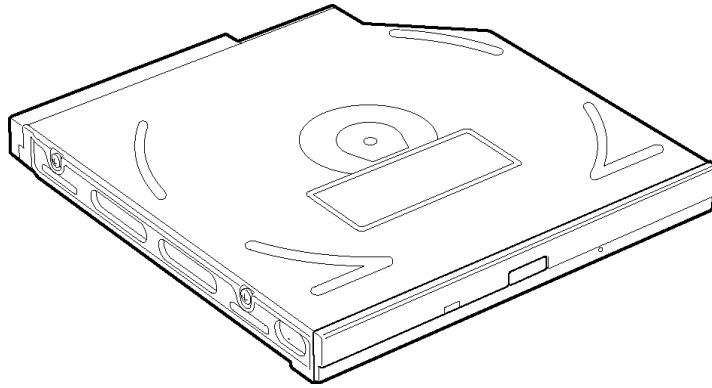
Figure 1-6   DVD-ROM drive

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

Item	TOSHIBA G8CC00015410	
	DVD-ROM mode	**CD-ROM mode**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2)	
Access time (ms) (Typ.)	90 (Single Layer) 130 (Dual Layer)	85
Rotation speed (rpm)	4,710 (Single Layer) 5,180 (Dual Layer)	5,670 max.
Data Buffer Capacity (Kbytes)	256	
Supported Format	DVD: DVD-ROM, DVD-R (read, 3.95 Gbytes/side and 4.7 Gbytes/side), DVD-RW (read, 4.7 Gbytes/side), DVD-RAM (read, 2.6 Gbytes/side and 4.7 Gbytes/side), CD: CD-ROM Mode-1 data disc CD-ROM Mode-2 data disc, CD-ROM XA CD-I Digital Video, Photo-CD Multisession, CD-Audio disc, Mixed mode CD-ROM disc (data and audio), CD-EXTRA, CD-TEXT, CD-R (read), CD-RW (read)	

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

Item	HITACHI 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)	

1.6   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 writes CD-R/RW at maximum 24-speed and reads DVDs at maximum 8-speed, CDs at maximum 24-speed.

The CD-RW/DVD-ROM drive is shown in figure 1-7. Specifications are listed in Table 1-4.
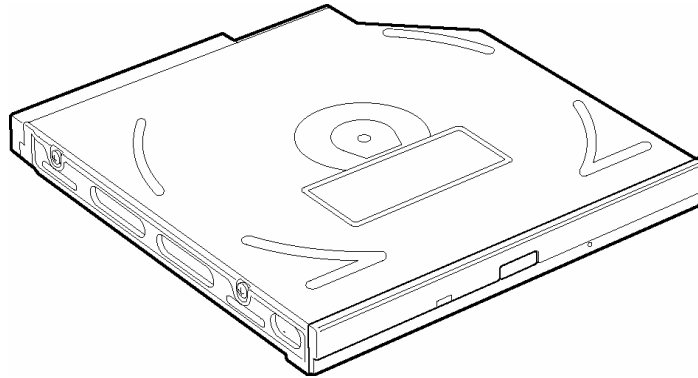
Figure 1-7   CD-RW/DVD-ROM drive

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

Item		Specifications
		TEAC G8CC0001D410
ATAPI Burst (Mbytes/s)		16.7 (Mode 0 to 2, Mode 0 to 4) 33.3 (Ultra DMA)
Average access time (msec)	CD-ROM	90
	DVD-ROM	110
Data Buffer Capacity		2MB
Supported Formats		CD: CD-DA, CD-ROM Mode 1, CD-ROM XA Mode 2 (Form 1, Form 2), Multi-session Photo CD, CD-I, Video CD, Enhanced CD, CD-TEXT DVD: DVD-ROM, DVD-Video, DVD-R (General, Authoring), DVD-RW, DVD-RAM (4.7GB, 2.6GB) Multi Boarder (DVD-R/DVD-RW)

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

Item		Specifications
		Panasonic G8CC0001C410
ATAPI Burst (Mbytes/s)		16.6 (PIO Mode 4, Multi-word DMA Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec)	CD-ROM	130 typ.
	DVD-ROM	180 typ.
Data Buffer Capacity		2MB
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, CD-R, CD-RW Photo CD, Video CD, CD-Extra (CD+), CD-TEXT DVD: DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW, DVD-RAM (4.7GB)

Item		Specifications
		HITACHI G8CC0001K410
ATAPI Burst (Mbytes/s)		16.6 (PIO Mode 4, DMA MW Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec)	CD-ROM	120 typ.
	DVD-ROM	110 typ.
Data Buffer Capacity		2MB
Supported Formats		CD: CD-ROM, CD-ROM XA, CD-I FMV, Video CD, CD-EXTRA, Photo-CD (Single and multi session), CD-DA, CD-R, CD-RW DVD: DVD-ROM

1.7 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 that reads DVDs at maximum 8-speed, CDs at maximum 24-speed and writes DVD-R/RW at maximum 2-speed, DVD+R/+RW at maximum 2.4 -speed, CD-R/-RW at maximum 10-speed

The DVD±R/±RW drive is shown in Figure 1-8. Specifications for the DVD ±R/±RW drive are described in table 1-5.
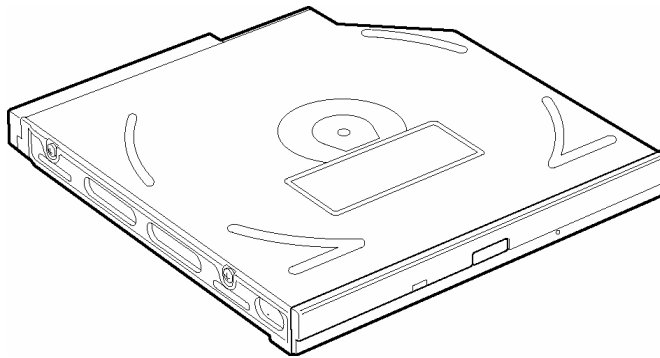
Figure 1-8 DVD±R/±RW drive

Table 1-5 DVD±R/±RW drive specifications

Item	Pioneer G8CC0001L410
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	 150 130
Data buffer (MB)	2

Supported format (Read)	CD: Photo CD (single and multiple session)
	       CD-ROM mode1
	       CD-ROM XA mode2 (form1, form2)
	       Video CD, CD-DA, CD-Extra
	       Mixed-CD, CD-Text,
	       CD-R, CD-RW,
	DVD : DVD-ROM (DVD-5, DVD-9,DVD-10,
	       DVD-18)
	       DVD-R (Ver.1.0, Ver.2.0)
	       DVD-RW(Ver.1.0, Ver.1.1), DVD+R,
	       DVD+RW

1.8 DVD Multi (DVD-R/-RW/-RAM) Drive

The DVD Multi drive is capable of driving either 12cm (4.72-inch) or 8cm (3.15-inch) DVD and CD without using an adaptor. This drive reads DVDs at maximum 8-speed, CDs at maximum 24-speed and writes CD-R at maximum 16-speed, CD-RW at maximum 8-speed, DVD-RW at maximum single speed, DVD-R/-RAM at maximum 2-speed.

The DVD Multi drive is shown in figure 1-9. Specifications are listed in Table 1-6.
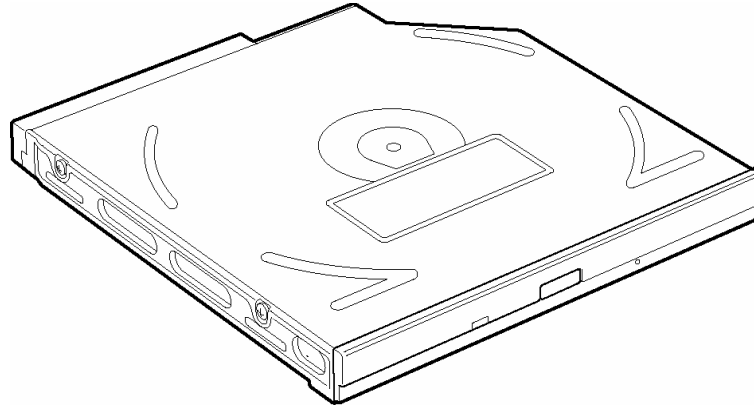
Figure 1-9   DVD Multi drive

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

Item	Panasonic G8CC00019410		
	DVD-ROM mode	**CD-ROM mode**	**CD-R/CD-RW (Write)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.6 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms)	180	150	-
Data Buffer Capacity (MB)	2		

Supported Format	CD:CD-DA, CD-ROM, CD-R/W, CD-R,
	     CD-ROM XA, CD-I Ready,
	     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)
			CD-R, CD-RW

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

Item	TEAC G8CC00013410		
	DVD-ROM mode	**CD-ROM mode**	**CD-R/CD-RW (Write)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms)	130	110	-
Data Buffer Capacity (Mbytes)	2		
Supported Format	CD: CD-DA, CD-ROM Mode1, Mode2, CD-R/W, CD-R, CD-ROM XA Mode2 (Form1,Form2), Photo CD (Single/multi-session), CD-TEXT, Enhanced CD DVD: DVD-VIDEO, DVD-ROM, DVD-R (General, Authoring), DVD-RAM		CD-R, CD-RW

1.9   DVD Super Multi (DVD±R/±RW/-RAM) Drive

This drive is a combination of DVD-ROM and DVD±R/±RW 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 DVD Super Multi drive is shown in figure 1-10. Specifications are listed in Table 1-7.
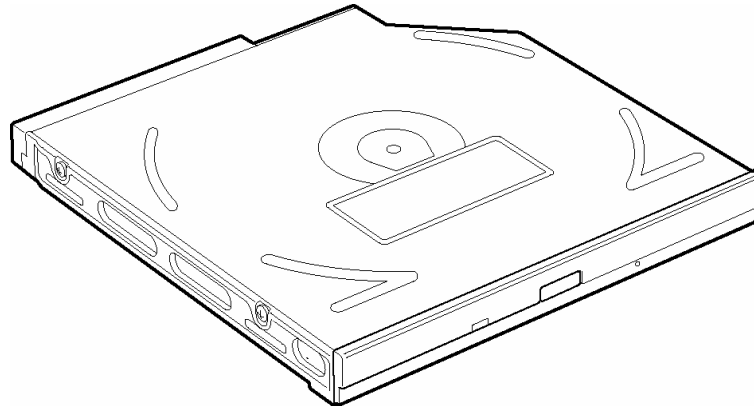
Figure 1-10   DVD Super Multi drive

Table 1-7   DVD Super Multi drive specifications

Item	Pioneer 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

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 1-11 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-11   Keyboard

1.11 TFT Color Display

The TFT color display consists of 14.1-inch XGA 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 resolution. The MontaraGM+ can control both internal and external XGA support displays simultaneously.

Figure 1-12 shows a view of the LCD module and Table 1-8 lists the specifications.
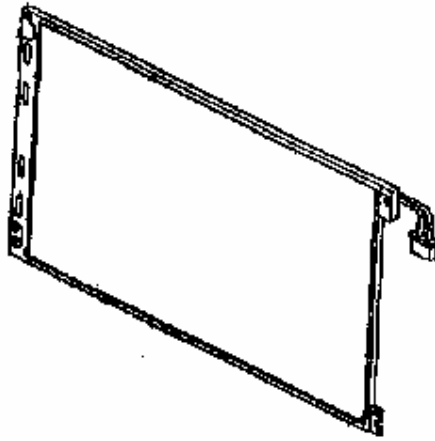
Figure 1-12   LCD module

Table 1-8   LCD module specifications

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)

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)

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	0.748-1.484	CPU
PTV	1.05	CPU, GMCH, ICH4-M
1R8-P1V	1.8	CPU
1R35-P1V	1.35	GMCH
1R25-P1V	1.25	DDR-SDRAM (Termination)
MR1R25-B1V	1.25	DDR-SDRAM, GMCH
1R5-P1V	1.5	GMCH (DVO), ICH4-M
1R5-S1V	1.5	ICH4-M
2R5-B2V	2.5	GMCH, DDR-SDRAM
P3V	3.3	Clock Generator, Thermal Sensor. GMCH, SDRAM(SPD), LCD, ICH4-M, FWH, Mini-PCI, AD1981B, Super I/O, FIR
E3V	3.3	YEBISU3S, PC Card Power, Mini-PCI, MDC, RS232C
LAN-E3V	3.3	ICH4-M, KINNERETH
LAN1R5-E1V	1.5	ICH4-M
S3V	3.3	ICH4-M, EC/KBC
P5V	5	ICH4-M, KB, LEDs, FL inverter, HDD, PAD, Parallel, RGB (DDC)
SND-P5V	5	AN12940AA
A4R7-P4V	4.7	AD1981B, AN12940AA, Line IN
E5V	5	USB Power, PC Card Power
M5V	5	ICH4-M, temperature reset IC, LED
MCV	5	PSC
R3V	2.0-3.5	ICH4-M
SB-P5V	5	Select Bay
SD-P3V	3.3	SD Card
IF-P5V	5	Docker

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	12 cell	Lithium-Ion	10.8 V	8,800 mAh
	6 cell			4,400 mAh
RTC battery		Lithium-Ion	3.0 V	17 mAh
Secondary battery		Lithium-Ion	10.8 V	3,600 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 using quick charge.

Quick Battery Charge

When the AC adaptor is attached, there are two types of quick charge: quick charge 1 when the system is powered off and quick charge 2 when the system is powered on. Table 1-12 lists the charging time required for quick charges.

Table 1-12   Time required for quick charges

Status		Charging time
Quick charge 1 (Power off)	12 cell	About 4.5 hours
	6 cell	About 2.5 hours
Quick charge 2 (Power on)	12 cell	About 10.5 to 21.5 hours
	6 cell	About 5.0 to 11.0 hours

NOTE: The time required for quick charge 2 is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

If any of the following occurs, the battery quick 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 quick charge. A full charge is detected under any of the following conditions:

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

2. The charging time exceeds the fixed limit.

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. System Board	6. Optical Drive	11. SD Card Slot
2. Floppy Disk Drive	7. Modem	
3. Hard Disk Drive	8. LAN	
4. Keyboard/Touch pad	9. Wireless LAN	
5. Display	10. Sound components	

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:

1. Diagnostics Disk

2. Philips screwdriver with type 0 bit and 1 bit

3. Toshiba MS-DOS system disk(s)
    (You must install the following onto the disk: SYS.COM, FORMAT.COM, FDISK.COM and FDISK.EXE)

4. 2DD or 2HD formatted work disk for floppy disk drive testing

5. Cleaning kit for floppy disk drive troubleshooting

6. PC card wraparound card

7. Multimeter

8. External USB FDD

9. External RGB monitor

10. Headphone

11. Microphone

12. Speaker

13. USB test module and USB cable

14. Printer wraparound connector

15. TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)

16. DVD-ROM TSD-1 (TOSHIBA EMI DVD Test Media)

17. Music CD

18. CD-RW Media (blank)

19. RJ11 connector checker

20. Advanced Port Replicator III

21. RS-232C cable

22. LAN wraparound connector

23. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting

2.2   Troubleshooting Flowchart

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

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

❑ Verify with the customer that Microsoft Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.

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

❑ Make sure the External USB floppy disk drive is empty.
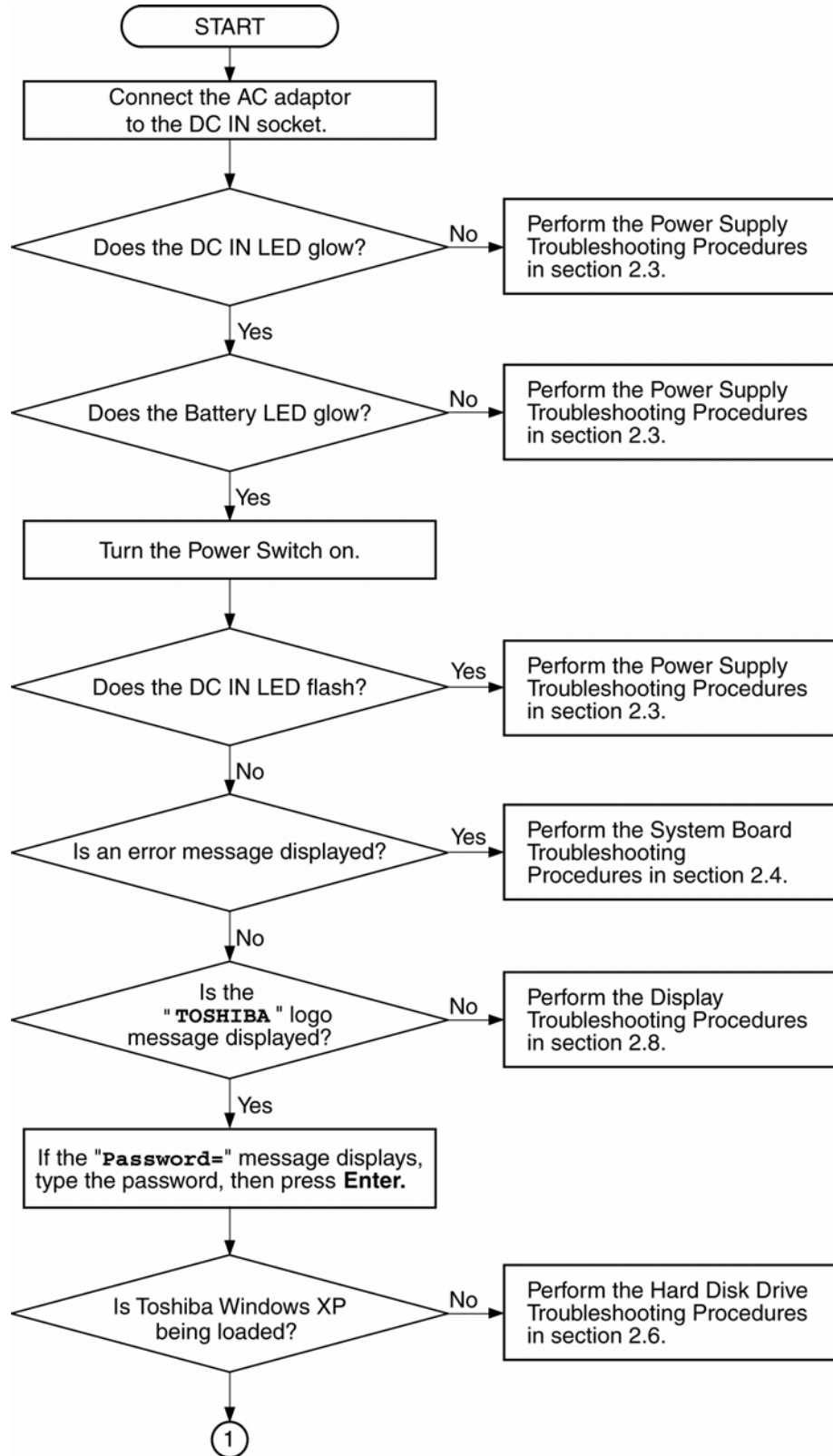
Figure 2-1 Troubleshooting flowchart (1/2)
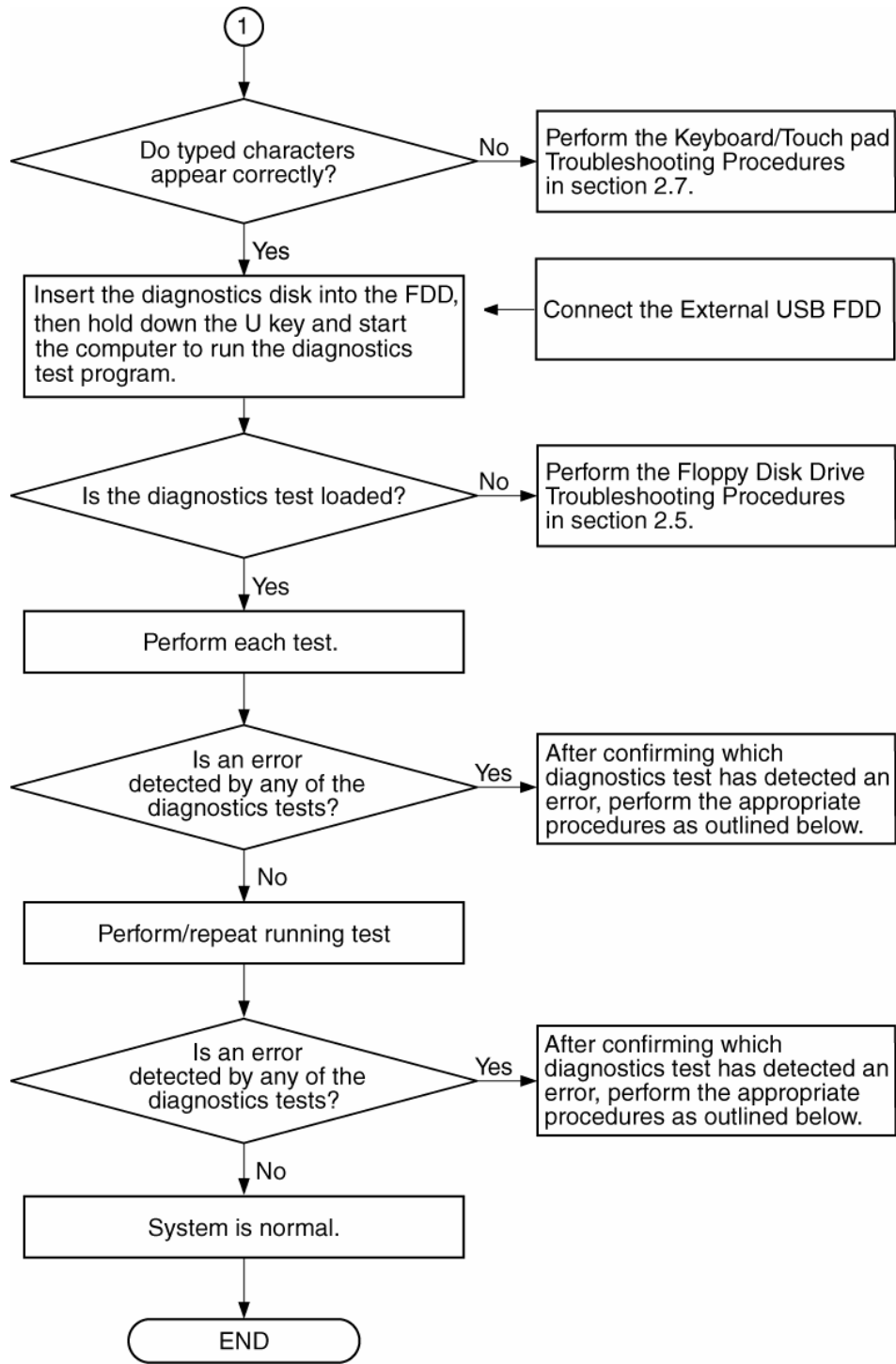
Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Running Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error, 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 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 Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.12.

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

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	The 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	Operating Power ON
5*h	1R5-C1V output	Error code begins with : 0x40
6*h	1R8-C1V output	Error code ends with : 0xEF
7*h	PPV output	
8*h	1R35-P1V output	
9*h	E5V output	
A*h	E3V output	
B*h	PTV output	
C*h	1R35-P1V output	
D*h	1R25-P1V output	
E*h	2R5-B2V output	
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	Main battery charge current is over 7.00A.
22h	Main battery discharge current over 0.5A when there is no load.
23h	Main battery charge current is over 3.9A when AC adapter is not connected.
24h	Current sensing IC is not normal.
25h	Main 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

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

❑ 1R5-C1V output

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)

❑ 1R8-C1V output

Error code	Meaning
60h	1R8-C1V voltage is over 2.16V when the computer is powered on/off.
61h	1R8-C1V voltage is 1.53V or less when the computer is powered on.
62h	1R8-C1V voltage is 1.53V or less when the computer is booting up.
63h	1R8-C1V voltage is 1.53V or less when the computer is suspended.
64h	1R8-C1V voltage is abnormal when the computer shuts down. (CV support)
65h	1R8-C1V voltage is 1.53V or less when the computer is booting up. (CV support)

❑ PPV output

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.

❑ 1R35-P1V output

Error code	Meaning
80h	1R35-P1V voltage is over 1.62V when the computer is powered on/off.
81h	1R35-P1V voltage is 1.147V or less when the computer is powered on.
82h	1R35-P1V voltage is 1.147V or less when the computer is booting up.
83h	1R35-P1V voltage is 1.147V or more when the computer is powered off.
84h	1R35-P1V voltage is 1.147V or less when the computer is suspended.

❑ E5V output

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

❑ E3V output

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

❑ PTV output

Error code	Meaning
B0h	PTV voltage is over 1.26V when the computer is powered on/off.
B1h	PTV voltage is 0.89V or less when the computer is powered on.
B2h	PTV voltage is 0.89V or less when the computer is booting up.
B3h	PTV voltage is 0.89V or more when the computer is powered off.

❑ 1R35-P1V output

Error code	Meaning
C0h	1R35-P1V voltage is over 1.62V when the computer is powered on/off.
C1h	1R35-P1V voltage is 1.147V or less when the computer is powered on.
C2h	1R35-P1V voltage is 1.147V or less when the computer is booting up.
C3h	1R35-P1V voltage is 1.147V or more when the computer is powered off.
C4h	1R35-P1V voltage is 1.147V or less when the computer is suspended.

❑ 1R25-P1V output

Error code	Meaning
D0h	1R25-P1V voltage is over 1.50V when the computer is powered on/off.
D1h	1R25-P1V voltage is 1.063V or less when the computer is powered on.
D2h	1R25-P1V voltage is 1.063V or less when the computer is booting up.
D3h	1R25-P1V voltage is 1.063V or more when the computer is powered off.
D4h	1R25-P1V voltage is 1.063V or less when the computer is suspended.

❑ 2R5-B2V output

Error code	Meaning
E0h	2R5-B2V voltage is over 3.00V when the computer is powered on/off.
E1h	2R5-B2V voltage is 2.125V or less when the computer is powered on.
E2h	2R5-B2V voltage is 2.125V or less when the computer is booting up.
E3h	2R5-B2V voltage is 2.125V or more when the computer is powered off.
E4h	2R5-B2V voltage is 2.125V or less 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:
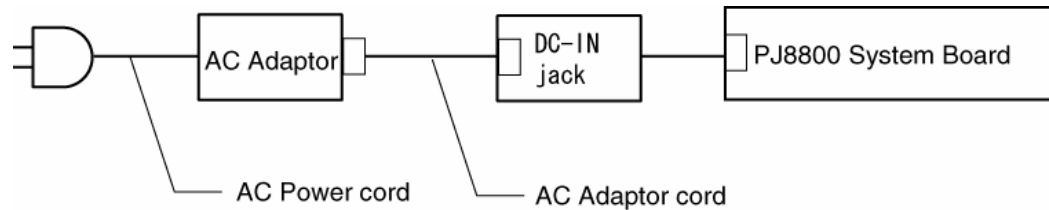
Any of the connectors may be disconnected. Perform Check 1.

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 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:   Printer Port LED Check on Boot Mode

Procedure 3:   Diagnostic Test Program Execution Check

Procedure 4:   Replacement Check

Procedure 1   Message Check

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

❑ If an error message is shown on the display, perform Check 1.

❑ If there is no error message, go to Procedure 2.

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

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

If you press **F1** as the message instructs, returns all system settings to their default values. Then the system reboots.

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

```
(a)    *** Bad HDD type ***
       Check system.  Then press [F1] key ......

(b)    *** Bad RTC battery ***
       Check system.  Then press [F1] key ......

(c)    *** Bad configuration ***
       Check system.  Then press [F1] key ......

(d)    *** Bad memory size ***
       Check system.  Then press [F1] key ......

(e)    *** Bad time function ***
       Check system.  Then press [F1] key ......

(f)    *** Bad check sum (CMOS) ***
       Check system.  Then press [F1] key ......

(g)    *** Bad check sum (ROM) ***
       Check system.  Then press [F1] key ......
```

Check 2   The IRT checks the system board. When the IRT detects an error, the system
stops or an error message appears.

If one of the following error messages (1) through (17), (24) or (25) 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.

If the error message (22) or (23) appears, go to the FDD Troubleshooting
Procedures in Section 2.5.

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

Procedure 2   Printer Port LED Check on Boot Mode

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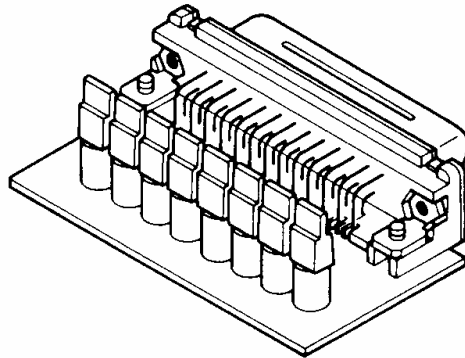
Figure 2-2 Printer port LED

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

1. Plug the printer port LED into the parallel port.

2. Read the LED status from left to right as you are facing the back of the computer.

3. Convert the status from binary to hexadecimal notation.

4. If the final LED status is FFh (normal status), go to Procedure 3.

5. If the final LED status matches any of the test status values in Table 2-5, go to Procedure 4.

> *NOTE: If an error is detected by the IRT test, the printer port LED displays an error code. For example, when the printer port LED displays B0 and halts, it indicates an error has been detected during the Flash ROM check.*

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

LED Status	Test item	Message
	Start	Clearance of software reset bit
		Permission of A20 line
		Initialization for special register and Intel chip set
B0h	Flash ROM check	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	System BIOS rewrite transition to IRT	
	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 Printer port LED boot mode status (2/7)

LED Status	Test item	Message
(B7h)	Memory type check	
	Initialization of cache Bus L2 configuration	
	Permission of cache	
	Prohibition of L2 cache	
	Memory clear	
B9h	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 30ms)

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

LED Status	Test item	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	Cache configuration (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
		Setting of resume error request
	Boot mode process (Not 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 Printer port LED boot mode status (4/7)

LED Status	Test item	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 Printer port LED boot mode status (5/7)

LED Status	Test item	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
		Control of interval LAN enable/disable
		Check whether self test is necessary or not (at Cold Boot) (Check of space key and printer wraparound connector)
	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 Printer port LED boot mode status (6/7)

LED Status	Test item	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	Interrupt 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 initialize	
12h	Display initialization	(VGA chip, Waiting for the end of initialization, initialization of VGA BIOS)
13h	Display logo	(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 Printer port LED boot mode status (7/7)

LED Status	Test item	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. Printer test
7. ASYNC test
8. Hard Disk test
9. Real Timer test
10. NDP test
11. Expansion test
12. CD-ROM/DVD-ROM test
13. Sound/Modem/LAN test
14. Wireless LAN 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 FDD Troubleshooting

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

> Procedure 1: FDD Head Cleaning Check
>
> Procedure 2: Diagnostic Test Program Execution Check
>
> Procedure 3: Connector Check and Replacement Check

Procedure 1   FDD Head Cleaning Check

FDD head cleaning 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 FDD heads using the cleaning kit. If the 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 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 3.5-inch FDD is connected to the System Board.

Check 1   When using the USB port, make sure the USB FDD cable is firmly connected to PJ4600 (USB port 0) or PJ4601 (USB port 3) on the SN board and the SN cable is firmly connected to PJ9501 on the system board and PJ9511 on the SN board.
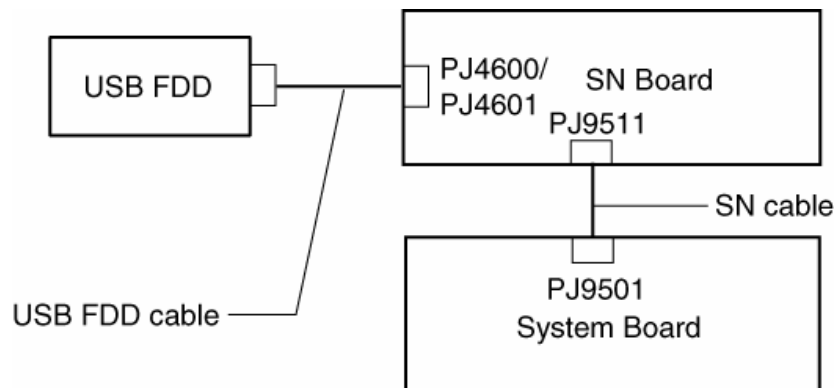
        If any of the connections are loose, reconnect firmly and repeat Procedure 2.
        If any of the connections is damaged, or there is still an error, go to Check 2.

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 Troubleshooting 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 PJ1800 on the system board.
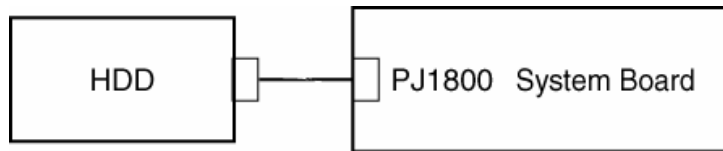
If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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*. If the problem still exists, perform Check 4.

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 malfunctions, start with Check 1.

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

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

Check 1   Make sure the keyboard cable is securely connected to PJ3200 on the system board.
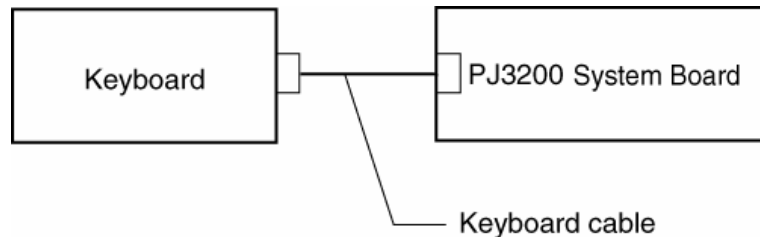
If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

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 PJ3201 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 cable of the sensor/switch board is firmly connected to PJ9600 on
the system board, and the sensor/switch board cable is connected to PJ9610 on the
sensor/switch board.
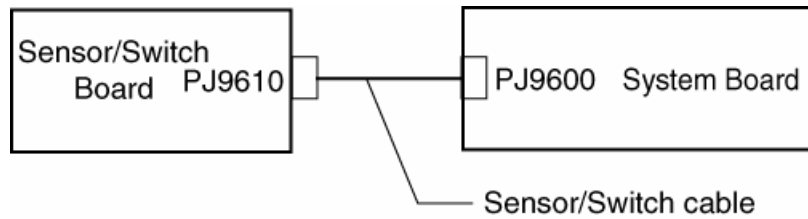
If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still
an error, go to Check 6.

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:   Diagnostic Test Program Execution Check

        Procedure 2:   Connector and Cable Check

        Procedure 3:   Replacement Check

Procedure 1   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 2   Connector and Cable Check

The LCD module is connected to the system board by an LCD/FL cable. The FL inverter board is also connected to the system board by an LCD/FL cable. 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*.

If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 3.

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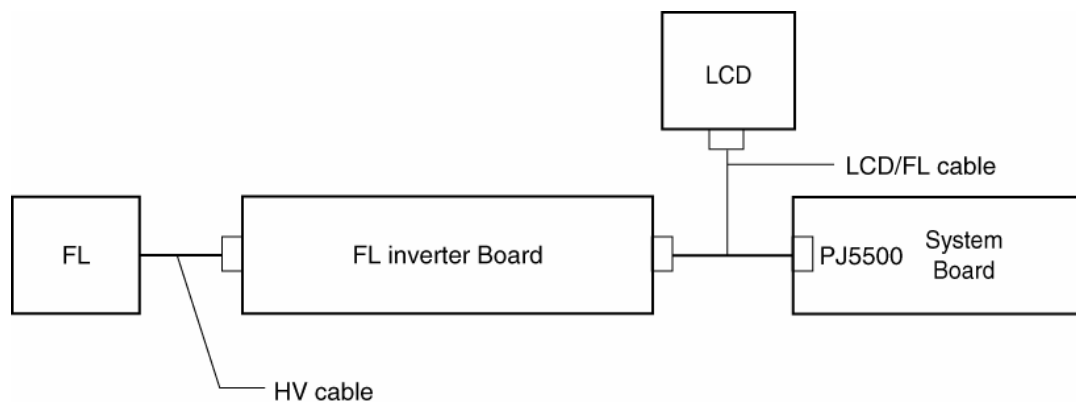
Check 2   Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 3.

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 (DVD-ROM, CD-RW/DVD-ROM, DVD±R/±RW, DVD Multi drive 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 (DVD-ROM, CD-RW/DVD-ROM, DVD±R/±RW, DVD Multi 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:
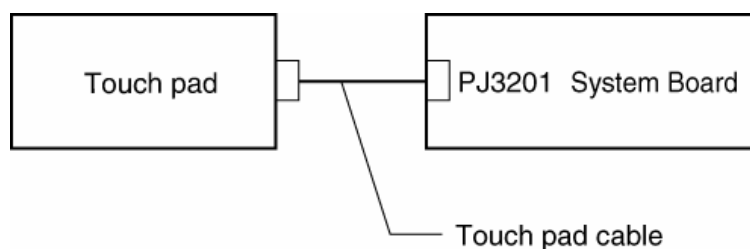
Check 1　　Make sure the drive to test is firmly connected to PJ1801 on the system board.
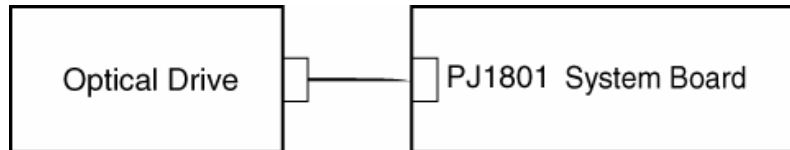
　　　　　　If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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 Sound/Modem/LAN 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 modem daughter card (MDC). 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 PJ3000 on the system board, and the modem/jack cable is connected to PJ3001 on the system board and the connector of the MDC.
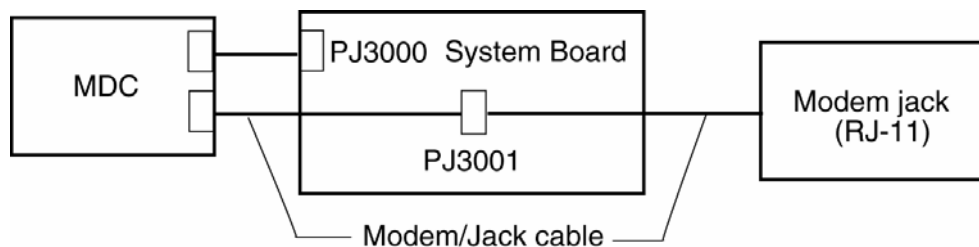
If a connector is disconnected, connect it firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

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 modem/jack 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 Procedure 1.

Procedure 1:   Connector Check and Replacement Check

Procedure 1   Connector Check and Replacement Check

The RJ45 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 PJ4100 on the system board.
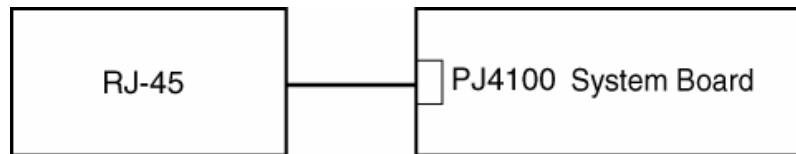
> If the connector is disconnected, connect it firmly and repeat Procedure 1. If the LAN port is still not functioning properly, perform Check 2.

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 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:   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 the Wireless LAN test program to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN. Perform the test following the instructions described in Section 3.16-17, *Wireless LAN Test Program*.

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

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

Procedure 2   Connection Check

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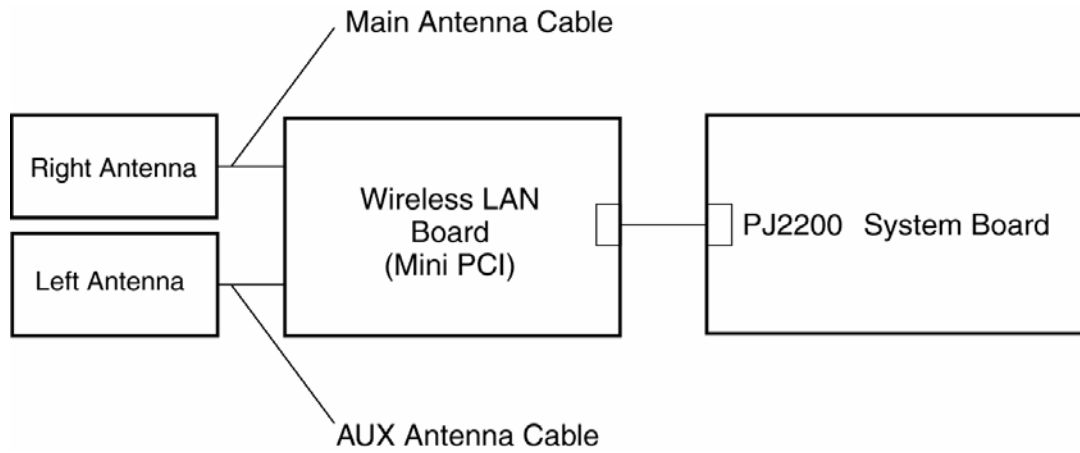
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the wireless LAN board is firmly connected to PJ2200 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.

2.13 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:   Connector Check
>
> Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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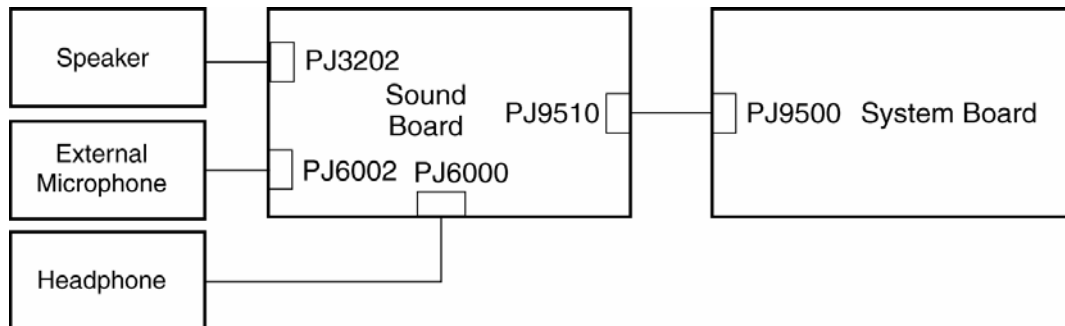
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

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 PJ3202 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 PJ6000 on the sound board. If the sound function still does not work properly, go to Check 4.

Check 3   If the external microphones do not work properly, the external microphone cable may be disconnected. Make sure the external microphone cable is firmly connected to PJ6002 on the system 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 PJ9500 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.

2.14 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
>
> Procedure 2: Connector/Replacement Check

Procedure 1 Check on Windows

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/Replacement Check

The SD card is connected to IS2101 on the system board.
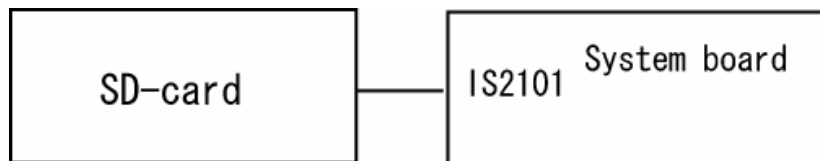
Check 1   The SD card and the system board may be disconnected. Make sure the SD card is firmly inserted to IS2101 on the system board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

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*.

Chapter 3
Tests and Diagnostics

Chapter 3   Contents

Tables

3.1   The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. The Diagnostic Test Program is stored on the Diagnostic Disk

---

NOTE: *To start the diagnostics, follow these steps:*

    1. Check all cables for loose connections.
    2. Exit any application you may be using and close Windows.

The Diagnostic Test program consists of the following two functions:

- ❑ Repair Main (T&D)
- ❑ Repair initial config set

The Repair Main (T&D) consists of the following eight functions:

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

The DIAGNOSTIC TEST MENU contains the following twelve 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 as follows:

- ❑ Wireless LAN (Atheros) Test
- ❑ Wireless LAN (Calexico) Test
- ❑ Sound/Modem/LAN Test
- ❑ Thermal Radiation Control Test

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

- ❑ The Diagnostics Disk (all tests)
- ❑ A formatted working disk for the floppy disk drive test
- ❑ An external USB FDD
- ❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- ❑ A PC card wraparound connector (Expansion test) (Rev.B or higher)
- ❑ A printer wraparound connector for the printer wraparound test (Printer test)
- ❑ A CD test media (TOSHIBA CD-ROM TEST DISK ZA1217P01/P000204190) (CD-ROM/DVD-ROM test)
- ❑ A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1) (CD-ROM/DVD-ROM test)
- ❑ A CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)
- ❑ A Music CD (CD-ROM/DVD-ROM test)
- ❑ An External RGB monitor (Display test)
- ❑ A Serial port wraparound connector (ASYNC test)
- ❑ A RS-232C cable (ASYNC test)
- ❑ A Headphone (Sound test)
- ❑ A microphone
- ❑ A modular cable and RJ11 connector checker
- ❑ A modular cable and RJ11 connector checker (LED)
- ❑ USB test module and USB cable
- ❑ LAN wraparound connector
- ❑ An access point and a cross cable (Wireless LAN (Calexico) test)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.21 through 3.26 for detailed information on the remaining Service Program Module functions.

3.2   Executing the Diagnostic Test

Toshiba MS-DOS is required to run the Diagnostic Test Program. To start the Diagnostic Test Program, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive and turn on the computer while pressing **U** key.
    (The Diagnostics Disk contains the MS-DOS boot files.)

    The following menu will appear:

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

    Enter a choice = 1
    ```

    To execute Repair Main (T&D), select "1.Repair Main (T&D)" with ↑ or ↓ key and press **Enter** key.

    To execute Repair initial config set, select "2.Repair initial config set" with ↑ or ↓ key and press **Enter** key.

    The followings are described on the Repair Main (T&D). The Repair initial config set is described in section 3-27.

When "1.Repair Main (T&D)" is selected and **Enter** key is pressed, the following menu will appear.

```
TOSHIBA Personal Computer  xxxxxxx DIAGNOSTICS
Version X.XX (C) Copyright TOSHIBA Corp. XXXX

DIAGNOSTICS MENU :

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




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

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

---

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

```
TOSHIBA Personal Computer XXXX DIAGNOSTICS
Version X.XX (c) Copyright TOSHIBA Corp. XXXX

DIAGNOSTIC TEST MENU :

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




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

Refer to sections 3.4 through 3.15 for detailed descriptions of each Diagnostic Tests 1 through 13. Function 88 sets the floppy disk drive and hard disk drive error retry count. Function 99 exits the submenus of the Diagnostic Test and returns to the Diagnostic Menu.

3. Select the option you want to execute and press **Enter**. When "1-SYSTEM TEST" is selected, the following message will appear:

```
SYSTEM TEST      XXXXXXX
                              XXXX 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     TATUS      : XXX

SUB-TEST MENU :

01 - ROM checksum
02 - Dock/UnDock
03 -
04 - Fan ON/OFF
05 - Gerserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 - CPU Thirmistor
10 -
11 - System LED
99 - Exit to DIAGNOSTIC TEST MENU


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

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

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

```
TEST LOOP : YES/NO
```

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

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

5. The following message will appear:

    ```
    ERROR STOP : YES/NO
    ```

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

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

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

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

    These three selections have the following functions respectively:

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

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

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

    Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-2 in section 3.19 describes the error codes and error status for each error.

3.3 Subtest Names

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

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Dock/UnDock
		04	Fan ON/OFF
		05	Gerserville
		06	Quick charge
		07	DMI read
		08	DMI write
		09	CPU Thirmistor
		11	System LED
2	MEMORY	01	Conventional memory
		02	Protected mode
		04	Cache memory
		05	L2 Cache memory
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		04	Touch Pad/IPS
		05	USB test
		07	InTouch/Presentation key
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
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wrap around

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
7	ASYNC	01	Wrap around (board)
		02	Point to point (send)
		03	Point to point (receive)
		04	Interrupt test
		06	FIR/SIR Point to point (send)
		07	FIR/SIR Point to point (receive)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		06	Write specified address
		07	Read specified address
		09	Sequential write
		10	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP
11	EXPANSION	01	PCMCIA wrap around
		03	RGB monitor ID
13	CD-ROM/DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	Playback music
		05	CD-RW 1point W/R/C
-	Wireless LAN (Atheros)	1	Test PC [Initiator]
		0	[Responder]
-	SOUND/ MODEM/LAN	1	Microphoned recording & play
		2	Sin wave
		3	LAN
		4	Modem

3.4   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 on the System Board.

Subtest 02   Dock/UnDock

When this subtest displays message shown below, slide the corresponding switch and press **Enter**.

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

Subtest 04   Fan ON/OFF

This subtest checks CPU fan operation using the on/off command. The following message will appear when this subtest is executed. Make sure the fan does not rotate and press **Enter**.

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

The following message will appear. Make sure the fan rotates at low speed and press **Enter**.

```
*** Test Fan Revolution Low speed start
```

The following message will appear. Make sure the fan rotates at high speed and press **Enter**.

```
*** Test Fan Revolution High speed start
```

Subtest 05   Gerserville

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

Subtest 06   Quick charge

This subtest checks the status for the quick charge.

Subtest 07   DMI read

Reads the factory setting for the serial and DMI numbers.

```
Model Name          :  XXXXXX
Version Number      :  XXXXXX-XXXXX
Serial Number       :  XXXXXXXXXX
Model Number        :  XXXXXX-XXXXX
PCN/BND Number      :  XXXXXXXXXXXXXXXXXX
UUID Number         :  XXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

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

Subtest 08   DMI write

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. TECRA M2V)

2. "Enter Version Number ?"

   Input the computer's version number and press **Enter**. (e.g. PTM2VU-AAAA1)

3. "Enter Serial Number ?"

   Input the computer's serial number and press **Enter**. (e.g. Y3017904JU)

4. "Enter Model Number ?"

   Input the computer's sales model number and press **Enter**. (e.g. PTM2VU -AAAA1)

5. "Enter Bundle Number ?"

   Input the computer's PCN/Bundle number and press **Enter**. (e.g. PCN1391CCZ01/S3A1320D990)

6. "Write data OK (Y/N) ?"

   When **Y** is press, the DMI information is written to the Flash-ROM.

7. "Create DMIINFO TXT (Y/N) ?" is displayed.

   Press **Y**, then the DMI information (text data) is written to the Floppy disk, etc.

Subtest 09   CPU Thirmistor

This subtest measures the CPU temperature to see if the cooling functions of the computer are effectively working.

When the subtest starts, the following message appears on the display:

```
CPU TEMP =  XX deg C   Throttling level = XXXXh
```

The number of the CPU TEMP indicates the CPU temperature at the moment in decimal notation. For example, if the number is 57, the CPU temperature is 57 degrees.

The number of "Throttling level" indicates how much the CPU has slowed. This number takes one of the following three values:

     0000h : The CPU is running full speed.
     4000h : The CPU has slowed to 75% of its maximum speed.
     8000h : The CPU has slowed to 50% of its maximum speed.

The subtest displays the message five times at intervals of one minute; therefore, it takes five minutes to complete the test. The computer passes the test if the CPU temperature is less than 70 degrees at the end of the test. If the temperature is 70 degrees or more, the computer fails the test, and an error message appears on the display.

Subtest 11   System LED

This subtest checks the condition of the LED.

```
Check [PS-LED]=Orange & [Batt.LED] Green !
Check [PS-LED]=Green & [Batt.LED] normal
Check [Pow-LED]=Green
Check [Pow-LED]= Orange
```

3.5 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 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 (FFh, AAh, 55h, 00h) and address data (FFFFh, FFFEh,….., 0000h) to the area of 1MB to maximum MB and reads the new data and compares the result with the original data.

Subtest 04   Cache memory

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

                  Number of misses < Number of hits $\rightarrow$ OK
                  Number of misses $\geq$ Number of hits $\rightarrow$ Fail

Subtest 05   L2 Cache memory

              To test the L2 cache memory, a test similar to that for the cache memory is performed.

Subtest 06   Stress

              The conventional memory is provided with a write/read buffer (size 1b30 h) and creates write data in the write buffer. Subsequent to 1 MB, the data is written in the write buffer and is read into the read buffer, followed by a data comparison up to the maximum memory size.

3.6 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 display

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

> When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key that was pressed. Holding a key down enables the auto-repeat function, which causes the key's display character to blink.
>
> To exit this subtest, press **Del + Enter**.


```
            <<<<<<   Press Key Display   >>>>>>
```

```
            IF TEST OK, Press [Del] [Enter] key
```

Subtest 02   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, 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
```

Subtest 04   Touch Pad/IPS

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

A) Touch Pad/IPS stick pressure sensing direction and parameter.
B) Touch Pad/IPS switch function check.

This test reports the pointing stick motion response from the IPS and IPS switch. When the stick is pressed towards the upper left, the <DIRECTION> display changes according to the following illustration. If an IPS switch is pressed, the <LAT> displays appear on the right side one by one. The parameters appear on the center of the display. To exit this subtest, press the four IPS switches at the same time.

```
*****  I P S (4 - B u t t o n) T E S T   (V x . x x)  ******
   < D I R E C T I O N >      < P A R A M E T E R >  < L A T >
                             S T A T U S : 0 0 0 0
                             X - R A T E : 0 0 0 0
                             Y - R A T E : 0 0 0 0
                             Z - R A T E : 0 0 0 0

                                  < BUTTONS >


                             <              >

                             <              >

<<  P r e s s   B t 1 + B t 2 + U P + D W (L a t)  T h e n   e x i t >>
```

```
*****  I P S (4 - B u t t o n) T E S T   (V x . x x)  ******
   < D I R E C T I O N >      < P A R A M E T E R >  < L A T >
                             S T A T U S : 0 0 1 8   B t n U P
                             X - R A T E : 0 0 F F   B t n D W
                             Y - R A T E : 0 0 0 1   B t n - 1
                             Z - R A T E : 0 0 0 0   B t n - 2
                                  < BUTTONS >
                             [B t U P]        [B t D W]
                             <   Button1-ON   >
                             <   Button1-ON   >
                                  < B t 2 - O N >
                                  < B t 2 - O N >
<<  P r e s s   B t 1 + B t 2 + U P + D W (L a t)  T h e n   e x i t >>
```

Subtest 05   USB Test

This Subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to test and press **Enter**.

```
Test port number select (1:Port0, 2:Port1, 3:Port2) ?
```

If the test ends successfully, OK is displayed. If nothing is displayed, there may be a problem with the USB port. Check the wraparound connection and repeat the test.

Subtest 07   InTouch/Presentation key

When this subtest displays messages shown below in order, press the corresponding button.

NOTE: *This subtest tests the functions of Console button and Presentation button. Press the Console button when the message "Press [InTouch] key" is displayed.*

This subtest must be completed within 10 seconds.

```
Press [ InTouch ] key
Press [ Presentation ] key
```

3.7   Display Test

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

Subtest 01   VRAM read/write for VGA

This subtest writes constant data AAh and 55h and address data to video RAM 8MB. This data is then read from the video RAM and compared to the original data.

Subtest 02   Gradation for VGA

This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen when this subtest is executed.
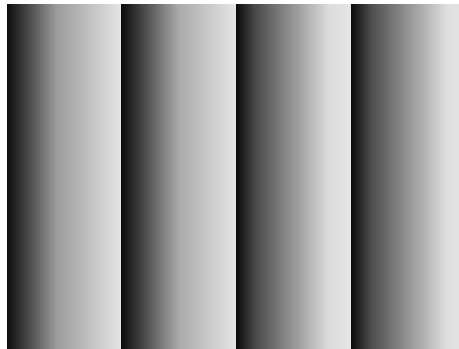
To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03   Gradation for LCD

This subtest displays several horizontal bands of multiple color, followed by red, green and blue bars. Each bar displays black on the top and the brightest color at the bottom.

Next, this subtest displays full screen of eight colors: 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 each mode. Execute the test, then press **Enter** to change the mode.

The display below appears on the screen when this subtest is executed. Pressing **Enter** changes the size of the displayed image.

[Mode 12]

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

[Mode 13]

Pressing **Enter** changes the size of the displayed image.
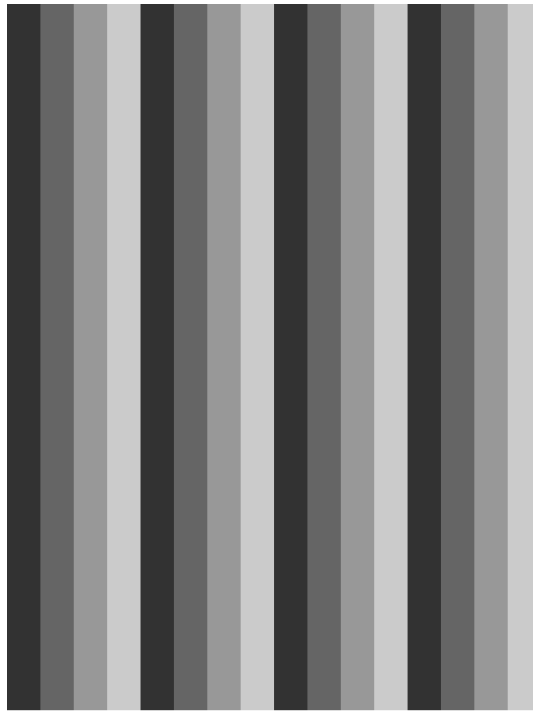
[Mode 3]

Pressing **Enter** changes the size of the displayed image in the following order:

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

[Mode 111 640*480 64K]

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

Subtest 05   All dot on/off for LCD

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

Subtest 06   "H" Pattern Display

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

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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 an error.*

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

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

The display switches automatically every three seconds and returns to the DISPLAY TEST menu.

3.8   Floppy Disk Test

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

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter**.

1. The following messages will appear. Specify the start track of the floppy disk drive to be tested.

```
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.

```
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
```

3. 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.    ?
```

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            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
```

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.

The start track is specified at the start of the FDD test. Refer to 1. in this section.

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 place pointed by track, head, and address.

Subtest 05   Read specified address

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

3.9   Printer Test

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

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

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

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

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

Subtest 01   Ripple pattern

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

```
 !"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`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   Wrap around

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

This subtest checks the output and bi-directional modes of the data control
and status lines through the parallel port wraparound connector.

3.10   Async Test

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

Subtests require the following data format:

> Method: Asynchronous
> Speed: 9600BPS (subtests 01 to 04)
>   38400BPS (subtests 06, 07)
> Data: 8 bits and one parity bit (EVEN)
> Data pattern: 20h to 7Eh

The following message will appear at the bottom of the screen when the subtest 01, 02 or 03 are selected.

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

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

Subtest 01   Wrap around (board)

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

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

Subtest 02   Point to point (send)

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

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

Subtest 03   Point to point (receive)

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

Subtest 04   Interrupt test

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

Subtest 06   FIR/SIR Point to point (send)

NOTE: *To execute subtests 06 and 07, 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 07   FIR/SIR Point to point (receive)

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

3.11   Hard Disk Test

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

NOTE: *The contents of the hard disk will be erased when the subtest 02, 03, 04, 06,09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk. If the customer has not or cannot perform the back up, create back-up disks as described below.*

Check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the pre-installed software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.

Refer to the operating system instructions.

After selecting the hard disk test from the DIAGNOSTIC TEST MENU, answer each of the questions with an appropriate response to execute the test.

1. Select the hard disk drive number to be tested.

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

2. This message is used to select the error dump operation when a data compare error is detected. Select **yes** or **no**.

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

3. This message is used to select whether or not the HDD status is displayed on the screen. The HDD status is described in section 3.23. Select yes or no.

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

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

```
HARD DISK TEST      XXXXXXX

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

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

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in table 3-5 of the section 3.22.

Subtest 01   Sequential read

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

Subtest 02   Address uniqueness

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

- Forward sequential
- Reverse sequential
- Random

Subtest 03   Random address/data

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

Subtest 04   Cross talk & peak shift

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

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

Subtest 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 that has been written to a specified cylinder and head
on the HDD.

Subtest 09   Sequential write

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

Subtest 10   W-R-C specified address

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

3.12 Real Timer Test

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

Subtest 01   Real time

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

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

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

PRESS [ENTER] KEY TO EXIT TEST
```

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

```
Enter new time :
```

3. If the current time is not correct, input the correct time in 24-hour format and press **Enter**. The time is updated.

Subtest 02   Backup memory

This Subtest performs the following backup memory check:

Writes 1-bit of "on" data to address 01h through 80h

Writes 1-bit of "off" data to address 0Eh through 80h

Writes the data pattern AAh and 55h to the RTC 114-byte memory (address 0Eh to 7Fh)

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

Subtest 03   Real time carry

CAUTION*: When you execute this Subtest, 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

PRESS [Enter] KEY TO EXIT TEST
```

Press **Enter** to exit.

3.13 NDP Test

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

Subtest 01   NDP

This test checks the following functions of the coprocessor:

❑ Control word

❑ Status word

❑ Bus

❑ Addition

❑ Multiplication

3.14 Expansion Test

To execute the Expansion Test, select **11** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The expansion test contains two subtests.

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

Subtest 01   PCMCIA wrap around

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

❑   Address line

❑   REG#, CE#1, CE#2 line

❑   Data line

❑   Speaker line

❑   Wait line

❑   BSY#, BVD1 line

This subtest is executed in the following order:

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

Subtest 03   RGB monitor ID

For this test, the computer must be in CRT mode. Connect the CRT (an RGB monitor) with the external monitor port.

3.15 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM Test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The CD-ROM/DVD-ROM test contains five subtests that test the computer's CD-ROM/DVD-ROM functions.

> *NOTE:*   *Make sure the CD-ROM driver (CDRNEW.COM) is installed and insert the test menu media CD (TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)). For the DVD-DOM test, insert the Toshiba-EMI DVD-ROM TEST DISK TSD-1.*

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   Playback music

> *NOTE*: *You cannot use the Toshiba-EMI DVD-ROM TEST DISK TSD-1 for Subtest 04. For this test, use an ordinary music CD.*

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

Subtest 05   CD-RW 1 point W/R/C

             This subtest performs the CD-RW drive test.

> *NOTE*: *For the CD-RW drive test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)*

3.16 Wireless LAN Test (Atheros)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

> *NOTE:* *Use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform this test.*
>
> *It is recommended to conduct this test in the environment where any other wireless networks such as Bluetooth is not used nearby.*

In this test, the following items are tested:

    (1) SKU (destination code) check
    (2) Mac Address check
    (3) Communication test (for 11a mode)
    (4) Communication test (for 11g mode)
    (5) Communication test (for 11b mode)

This program conducts the above test items 2) to 5) continuously and displays results for each item during the test. However, only the destination code and the last result for the other test items shall be checked. (The message "OK" or "NG" is displayed.)

> *NOTE:* *Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)*

Setting the responder machine

> *NOTE: Release the write-protection of the floppy disk for the test.*

Insert the first floppy disk containing the test program into the floppy disk drive of the responder machine and turn on the power. When the test starts, the following message will appear.

```
*****************************************
*   Please inserts Media#2 in FDD. !      *
*   After replacing FD, "S" + "Enter" *
*****************************************
```

Replace the first floppy disk with the second one. Then press **S** and **Enter**. The menu for selecting the test mode will appear.

```
#####################################################################
#########   Askey/Atheros Wireless LAN Module Maintenance T&D   #######
#####################################################################
*                                                                   *
*             1 ..... DUT mode                                      *
*                                                                   *
*             2 ..... REF mode (Responder)                          *
*                                                                   *
**********************************************************************

....Press test number [1,2] ?
```

Press **2** and **Enter** of the responder machine.

The responder machine is ready for the test.

Setting the tester machine

> *NOTE: Release the write-protection of the floppy disk for the test.*

Insert the first floppy disk containing the test program into the floppy disk drive of the tester machine and turn on the power. When the test starts, the following message will appear.

```
*****************************************
*   Please inserts Media#2 in FDD. !      *
*   After replacing FD, "S" + "Enter"     *
*****************************************
```

Replace the first floppy disk with the second one. Then press **S** and **Enter**. The menu for selecting the test mode will appear.

```
######################################################################
########   Askey/Atheros Wireless LAN Module Maintenance T&D   ######
######################################################################
*                                                                    *
*               1 ..... DUT mode                                     *
*                                                                    *
*               2 ..... REF mode (Responder)                         *
*                                                                    *
**********************************************************************

....Press test number [1,2] ?
```

Press **1** and **Enter** of the tester machine. The test program starts and shows the destination code of the installed wireless LAN card.

Check the "SKU" (destination code). When the code is correct (a proper card is installed), press any key to continue the test. If the code is not correct (an improper card is installed), end the test by pressing **Ctrl + C**.

Example) Message for G86C0000S210 (11a/g: MoW)
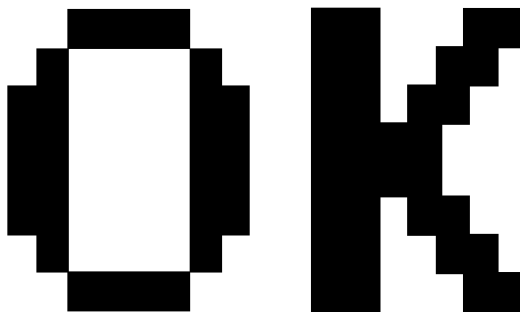
```
**********************************************
*                                            *
*       Module  : Askey/Atheros 802.11a/g    *
*                                            *
*       SKU     : MoW                        *
*                                            *
*       G code  : G86C0000S210               *
*                                            *
**********************************************
```

When the test is continued, "Mac Address check" and "Communication test (confirmation of antenna connection)" are automatically conducted in order.

For the 11a/g card, the antenna connection confirmation test and the sending/receiving data test are conducted in 11a mode, and the sending /receiving data test is successively conducted in 11g mode and 11b mode. For the 11g card, the antenna connection confirmation test and the sending/receiving data test are conducted in 11g mode, and the sending/receiving data test is conducted in 11b mode.

When the tester machine has passed the test, the message "OK" will appear in the tester machine.

OK

Press **Enter** to return to the command prompt.

When the tester machine has not passed the test, it conducts automatically the test again. When the tester machine still cannot pass the test, the message "NG" will appear in the tester machine. Pressing **Enter** on the screen shows the message of the cause of error.

Example) Error in 11g mode test

```
**************************************************
*                                                *
*      11g Throughput test : NG !!               *
*                                                *
**************************************************
```

Press **Enter** to return to the command prompt.

To finish the test, turn off the tester machine and responder machine, and set the Wireless Communication Switch to "off" position.

3.17 Wireless LAN Test (Calexico)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program. To execute the LAN Test, use the Diagnostics disk (No.2). Finish the tests of the Diagnostics disk (No.1) 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 (No.2) into the Floppy Disk Drive. Turn on the power while pressing **U.**

The following menu appears in the display.

```
******Intel Calexico2 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.
                Confirm if there is no difference between the SKU information appeared on the display and the information of the label on the back of the wireless LAN Card.

                Press any key and return to the test menu.

Subtest 02   MAC Address Check

                This subtest displays the MAC address.

                Press any key and return to the test menu.

Subtest 03   11b mode of Calexico 11b/g Card

This subtest checks if the wireless LAN antennas of Calexico 11b/g Card are connected and if the communication is operated properly.

CAUTION: *To execute subtest 03-05, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform those tests. Access points are also required. (Access point for 11b and 11g)*

Make sure that the wireless communication switch is moved to ON side before executing wireless LAN 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 11b and 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.

Setting the target machine

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

Following message appears in the display.

Exchange the floppy disk of test program for that of responder.
After exchanging the floppy disk, input **S** and press **Enter**.

```
**************************************************************
*                                                            *
*            Please exchange for Responder media             *
*                                                            *
**************************************************************
Please input the "S" key and push the "Enter" key :
```

OK appears in the display when a problem is not found. Press any key and return to the test menu.

NG appears in the display when a problem is found.
Press any key, then the following message appears in the display.

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

Press any key and return to the test menu.

Subtest 04   communication test of 11g mode

This subtest checks if the communication is operated properly in Calexico11g mode.

OK appears in the display when a problem is not found. Press any key and return to the test menu.

NG appears in the display when a problem is found.
Press any key, then the following message appears in the display.

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

Press any key and return to the test menu.

Subtest 07   All the tests of Calexico 11b/g Card

This subtest checks SKU information, MAC address, connecting of the antennas and communication of Calexico 11b/g Card. The test stops at when an error occurs if a problem is found. To return to the test menu, follow the each subtest the test stops.

3.18 Sound/Modem/LAN Test

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

CAUTION: The system is capable of producing high volume sound. When you use a headphone, be careful to set the volume low and adjust it as necessary. Using a headphone at full volume might damage your ears.

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

(a) Insert the test program disk in the floppy disk drive and turn on the computer. (The Diagnostics Disk contains the MS-DOS boot files.)

The following menu will appear:

```
########################################################################
####      XXXXXXXXXX    DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)     ####
########################################################################
*                                                                      *
*            1        ( Microphoned Recording & play )                 *
*            2        ( Sin wave  )                                     *
*            3        ( LAN(100M) )                                     *
*            4        ( MODEM     )                                     *
*                                                                      *
************************************************************************

....Press test number [1-4]  ?
```

(b) To execute the TEST, select the option number you want to execute and press **Enter**.

Subtest 01   Microphoned recording & play

This subtest checks the function of the CODEC A/D D/A converter. Both the microphone and headphone terminal can be checked at the same time.

Before executing this subtest, connect an external microphone to the computer. If necessary, connect a headphone to the computer to check whether the headphone jack of the computer is working properly.

When the subtest is selected, the following message appears.

```
....Press test number[1-4] ? pause
```

Press any key, and the following two messages appear.

```
Press any key to continue...
....Press test number[1-4] ? call micrec
```

The sound is recorded for five seconds automatically from the microphone. After the recording is completed, the computer immediately plays back the sound recorded. When the playing is finished, a message similar to the one below appears.

```
Completing   SoundMAX/ICH microphone capture test
End time      XXX XXX XX XX*XX:XX XXXX
System Status 0x0

Performing SoundMAX/ICH play buffer to line out
Start Time:     XXX XXX XX XX:XX:XX XXXX

Play to destination is LINEOUT
Volume requested is X.XXX dB
Play from buffer name is BUFFER0
Requested play time is 5.000 seconds.
Actual play time will be 5.000 seconds.

Completing SoundMAX/ICH play buffer to line out
End Time XXX XXX XX :XX:XX XXXX
System Status 0x0

Test completed at XXX XXX XX :XX:XX XXXX
System completion code was 0x0
```

Then, the screen returns to the main menu and the following message will appears.

```
....Press test number[1-4] ?
```

To execute a subtest continuously, select the test number and press **Enter**. To exit the Sound/Modem/LAN test, remove the test program disk from the USB FDD and turn the computer off.

Subtest 02   Sin wave

This subtest is executed by the load format of COM file (ADSIN.COM). The program expands sin wave data table to data in 16-64KB, and creates play data (It sounds like continuous beep). By using wave measuring devices such as an oscilloscope, this program can read sine wave without expanding.

When the subtest is executed, the following message appears.

```
....Press test number[1-4] ? pause
Press any key to continue...
```

Press any key, and the following message appears. Then sin wave is expanded to 16-64KB data and is played.

```
....Press test number[1-4] ? call sin
```

When the beep sound finished, the screen returns to the main menu and the following massage appears.

```
....Press test number [1-4] ?
```

To execute a subtest continuously, select the test number and press **Enter**. To exit the Sound/Modem test, remove the test program disk from the USB FDD and turn the computer off.

Subtest 03   LAN (100M)

This subtest checks the operation of mini-PCI I/F by the loopback in the chip. Select **3** to execute and press **Enter**. The following message will appear:

```
XXXX+XXXXXXX LAN test Rev.XX
                        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 >
```
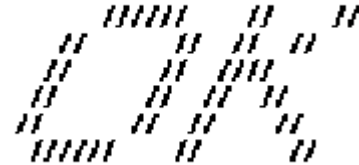
NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

Check that the message "OK" appears.

Subtest 04   Modem

(a) Select **4** to execute and press **Enter**. The following message will appear:

```
ICHX MDC Test Program with Modem Sound ( PCB Interface )
Version X.X

* Scorpio Modem Initialize            :OK
* Digital Loopback Test               :OK
* Modem Sound Test                    :( Operator's Check!! )
```

(b) After a few seconds, the following message will appear:

```
...Press Key ( Y = OK , N =NG )
```

If you hear the modem sound from the speakers, press **Y**. Otherwise, press **N**.

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

(c) After you press Y or N, the RJ11 Connection Check (LED) (Operator's Check LED) test will execute, 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**.

Press **Enter** to return to Main Menu.

3.19 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	ROM Checksum Error
	03	ROM Serial ID Write Error
	04	ROM Not Supported PS-System
	05	ROM Sensing Error (AC-adapter)
	06	ROM Sensing Error (1st Battery)
	07	ROM Sensing Error (2nd Battery)
	08	ROM Thormistor Error (1)
	09	ROM Thormistor Error (2)
	10	ROM Thormistor Error (3)
Memory	01	RAM Parity Error
	02	RAM Protected Mode Not Changed
	DD	RAM Cache Memory Error
Keyboard	FE	USB Get Descr.Error (First)
	FD	USB Set Address Error
	F0	HUB Get Descr.Error (Top 8B)
	F1	HUB Get Descr.Error (Whole)
	F2	HUB Set Configuration Error
	F3	HUB Get Descr.Error (Descr.)
	F4	HUB Set Feature Error (P ON)
	F5	HUB Get Status Error
	F6	HUB Set Feature Error (Reset)
	F7	HUB Clear Feature Error
	F8	HUB Clear Feature1 Error
	F9	HUB Set Feature Error (Enab.)
	FA	HUB Clear Feature2 Error
	EF	USB Over Current Error
	ED	USB Get Descr.Error (Second)
Display	EE	VRAM Size Not Support
FDD	01	FDD Bad Command Error
	02	FDD Address Mark Not Found
	03	FDD Write Protected
	04	FDD Record Not Found
	06	FDD Media Removed
	08	FDD DMA Overrun Error
	09	FDD DMA Boundary Error
	10	FDD CRC Error
	20	FDD FDC Error
	40	FDD Seek Error
	60	FDD Not Drive Error
	80	FDD Time Out Error
	EE	FDD Write Buffer Error

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

Device name	Error code	Error status name
Printer	01 08 10 20 40 80	PRT Time Out PRT Fault PRT Select Line PRT Out Of Paper PRT Power Off PRT Busy Line
ASYNC	01 02 04 05 06 08 10 20 40 80 88	RS232C [DTR On] Time Out RS232C [CTS On] Time Out RS232C [RX-READY] Time Out SIR Time Out Error FIR Time Out Error RS232C [TX Full] Time Out RS232C Parity Error RS232C Framing Error RS232C Overrun Error RS232C Line Status Error RS232C Modem Status Error
HDD	01 02 04 05 07 08 09 0A 0B 10 11 12 20 40 80 AA BB CC E0 EE DA	HDD Bad Command Error HDD Address Mark Not Found HDD Record Not Found HDD HDC Not Reset Error HDD Drive Not Initialized HDD Overrun Error (DRQ ON) HDD DMA Boundary Error HDD Bad Sector HDD Bad Track Error HDD ECC Error HDD ECC Recover Enable HDD DMA CRC Error HDD HDC Error HDD Seek Error HDD Time Out Error HDD Drive Not Ready HDD Undefined Error HDD Write Fault HDD Status Error HDD Access Time Out Error No HDD
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 Multiply Error

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

Device name	Error code	Error status name
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/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 Additional Sense Boundary Error Corrected Data Error Drive Not Ready Seek Error Time Out Reset Error Address Error

3.20 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	BBK1 (Bad block mark)	"0" … Not used "1" … A bad block mark is detected.
6	UNC (Uncorrectable)	"0" … There is no uncorrectable data error. "1" … Uncorrectable data error has been detected.
5	⎯⎯	Not used
4	IDN (Identification)	"0" … Not used "1" … There was 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

3.21 Head Cleaning

3.21.1 Function Description

This function cleans the heads in the USB 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 following message appears, the FDD head cleaning has begun.

   ```
   cleaning start
   ```

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

3.22.2 Operations

Selecting **5** and pressing **Enter** in the DIAGNOSTIC MENU, logs error information into RAM
or onto a floppy disk. The error information is displayed in the following format:

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

 001 EXP01 0000 XXX 00000000 00 00 0000  FDD-WRITE PROTECTED
 001 EXP03 0000 XXX 00000000 00 00 0000  FDD-TIME OUT ERROR
  │   │   │   │      │         │  │   │                │
  │   │   │   │      Address   │  │   │                │
  │   │   │   Error status     │  HDC 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]]`

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

    1 scrolls the display to the next page.
    2 scrolls the display to the previous page.
    3 returns to the Diagnostic Menu.
    4 erases all error log information in RAM.
    5 outputs the error log information to a printer.
    6 reads the log information from a floppy disk.
    7 writes the log information to a floppy disk.

2. 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 and 06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01)
7. Printer test (subtest 03) if selected

3.23.2 Operations

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

1. Remove the diagnostics disk from the floppy disk drive and insert the work disk.

2. Select **6** from the Diagnostic Menu and press **Enter,** the following message displays:

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

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

3. Select **Y** or **N** and press **Enter**. The following message will appear:

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

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

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

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

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

3.24   Floppy Disk Drive Utilities

3.24.1   Function Description

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

1. FORMAT

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

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

(a) 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

This program reads the hard disk ID and displays the hard disk ID, serial number and other 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.

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

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

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

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

    (e) To copy another disk, type **1** and the message from step (a) displays 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

Selecting HDD ID READ displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)]           [Drive #X]
ID code (h)               =  XXXX
No. of Cylinders       =  XXXXXXXX
Removable Cylinders       =  XXXXXXXX
No. of Heads              =  XXXXXXXX
Unformat Bytes/Track      =  XXXXXXXX
Unformat Bytes/Sector     =  XXXXXXXX
Sectors/Track             =  XXXXXXXX
Gap Length                =  XXXXXXXX
Sync. Bytes               =  XXXXXXXX
Reserved (h)              =  XXXX
Serial No.                =  YYY...
Controller Type (h)       =  XXXX
Sector Buffers            =  XXXXXXXX
ECC Bytes                 =  XXXXXXXX
Firmware Rev.             =  YYYYYY..
Model No.                 =  YYYY...
Reserved (h)              =  XXXX
Double Word Capability    =  XXXXXXXX

Press [Enter] key
```

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

3.25 System Configuration

3.25.1 Function Description

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

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM Version (1st ID, 2nd ID)
5. Boot ROM Version
6. KBC Version
7. PS Microprocessor Version
8. Total Memory Size
9. Battery Code
10. Sound System
11. The number of Printer ports
12. The number of ASYNC ports
13. The number of Math Co-Processors
14. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. The number of floppy disk drives
18. The number of hard disk drives
19. Date/Time

3.25.2 Operations

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

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

* - Processor Type        = XXXX
**- VGA Controller        = XXXX
* - MS-DOS Version        = VX.XX
* - BIOS ROM Version      = VX.XX 1st ID = XXH, 2nd ID = XXH
* - BOOT ROM Version      = VX.XX
* - KBC Version           = VX.XX
* - PS Micom Version      = VX.XX   ( EC Version = VX.XX )
* - Total Memory Size     = XXXXXMB ( Conventional Memory = XXXXXKB )
* - Battery Code          = XXXXXXXXXXXX
**- Sound System          = XXXXXX
* - X Printer Adapter          LPT1=XXXX  LPT2=XXXX  LPT3=XXXX
* - X ASYNC Adapter            COM1=XXXX  COM2=XXXX  COM3=XXXX
* -
* - X Math Co-Processor
* - X PCMCIA Slot
* -    Modem              = XXX
* -    LAN                = XXX
* - X Floppy Disk Drive(s)   Track =XX, Head =XX, Sector =XX
* - X Hard Disk Drive(s)     #1 Sectors   =XXXXX (XX GB)
                             #2 Sectors =XXXXX (XX GB)
* -

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

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

3.26 SETUP

3.26.1 Function Description

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

1. Memory

    (a) Total

2. 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

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority

7. Display

    (a) Power On Display

8. Others

    (a) CPU Cache
    (b) Level 2 Cache
    (c) Dynamic CPU Frequency Mode
    (d) Auto Power On

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. PC Card

    (a) Controller Mode

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

17. SD

    (a) SD Controller

3.26.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the SETUP screen. The SETUP screen is divided into two pages.

```
                    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→PC Card │
        ┌──── SYSTEM DATE/TIME ───┐          └───────────────────────────┘
        │ Date(MM-DD-YY)   = XX-XX-XXXX │
        │ Time(HH:MM:SS)   = XX:XX:XX   │     ┌────────── DISPLAY ──────────┐
        └────────────────────────┘          │ Power On Display    = Auto-Selected │
                                             └─────────────────────────────┘
        ┌────── BATTERY ─────────┐
        │ Battery Save Mode = Full Power │   ┌─────────── Others ──────────┐
        └────────────────────────┘          │ CPU Cache              = Enabled │
                                             │ Level 2 Cache          = Enabled │
        ┌────── PASSWORD ────────┐          │ Dynamic CPU Frequency Mode       │
        │ Not Registered         │           │            = Dynamically Switchable │
        └────────────────────────┘          │ Auto Power On          = Disabled │
                                             └─────────────────────────────┘
        ┌──── HDD PASSWORD ──────┐
        │ HDD            = Built-in HDD │
        │ HDD Password mode = User Only │
        │ User Password    = Not Registered │
        └────────────────────────┘

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


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

    ┌──── CONFIGURATION ─────┐              ┌───────── PC CARD ──────────┐
    │ Device Config.   = Setup by OS │      │ Controller Mode = Auto-Selected │
    └────────────────────────┘              └────────────────────────────┘

    ┌───── I/O PORTS ────────┐              ┌───────── PERIPHERAL ──────────┐
    │ Serial         = COM1(3F8H/IRQ4) │    │ Internal Pointing Device   = Enabled │
    │ Parallel       = LPT1(378H/IRQ7/CH3) │ │ Ext Keyboard "Fn"   = Disabled │
    └────────────────────────┘              │ Parallel Port Mode  = ECP      │
                                             │ Hard Disk Mode      = Enhanced IDE(Normal) │
    ┌───── DRIVERS I/O ──────┐              └───────────────────────────────┘
    │ Built-in HDD           │
    │        = Primary IDE(1F0H/IRQ14) │    ┌────── LEGACY EMULATION ───────┐
    │ Select Bay             │               │ USB KB/Mouse Legacy Emulation │
    │        = Secondary IDE(170H/IRQ15) │   │                    = Enabled  │
    └────────────────────────┘              │ USB-FDD Legacy Emulation  = Enabled │
                                             └───────────────────────────────┘
    ┌───── PCI BUS ──────────┐              ┌────────── PCI LAN ─────────┐
    │ PCI BUS         = IRQ10, IRQ11 │      │ Built-in LAN    = Enabled  │
    └────────────────────────┘              └────────────────────────────┘
                                             ┌──────────── SD ────────────┐
                                             │ SD Controller    = Enabled │
                                             └────────────────────────────┘

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

> *NOTE:* *USB FDD Legacy Emulation under LEGACY EMULATION appears only when floppy Disk I/O is set to "Disabled".*

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press **PgDn** and **PgUp** to move between the two pages. Press ↑ and ↓ to move between items in a column.

2. Press either the **space bar** to change the value.

Accepting Changes and Exiting the SETUP Window

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

   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 toward User.*

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.

CPU Sleep Mode

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

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

Display Auto Off

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

Disabled   Disables display automatic power off.

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

HDD Auto Off

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

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

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility.

Semi-Bright   Less than full brightness for saving power.

Cooling Method

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.

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 a DVD-ROM, CD-RW/DVD, DVD±R/±RW, DVD Multi or DVD Super Multi drive.*

   (b) HDD Priority

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

   Built-in HDD→Second HDD→PC Card (Default)

   Second HDD→Built-in HDD→PC Card

   Built-in HDD→PC Card→Second HDD

   Second HDD→PC Card→Built-in HDD

   PC Card→Built-in HDD→Second HDD

   PC Card→Second HDD→Built-in HDD

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.*

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 subwindow 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) 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 adaptor and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.*

---

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 subwindow similar to the one below appears to let you set the DMA. The options for this setting are Channel 1and Channel 3 (Default).

```
                  ┌──────── OPTIONS ────────┐
                  │ DMA        = Channel 3 (Default) │
                  └──────────────────────────────────┘
```

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

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) Select Bay

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

(c) PC Card

When an ATA card is installed in IN13h, the sub window below is displayed.

```
       ┌───────────── DRIVES I/O ─────────────┐
       │ Built-in HDD       = Primary IDE (1F0H/IRQ14) │
       │ ATA Card           = Others (190H/IRQ)         │
       └────────────────────────────────────────────────┘
```

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. PC Card

This option sets the PC Card Controller mode. This option can be changed when "Device Config." is set to "All Devices".

Auto-Selected   Use this setting for all PC Cards when OS supports Plug&Play. (Default)

PCIC Compatible Use this setting for PCIC compatible PC card.

CardBus/16-bit   Use this setting when CardBus does not work properly in "Auto-Selected", or PC card supports 16-bit.

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.

17. SD

This option enables/disables the SD Controller functions.

    (a) SD Controller

        Enabled   Enables SD Controller functions. (Default)

        Disabled   Disables SD Controller functions.

3.27 Repair Initial Config Set

The following message will appear:

```
####################################################################
#########    H/W initial information setting tool VerX.XX    #####
####################################################################
*                                                                  *
*   1                   Initial configuration                      *
*   2                   Region write                               *
*   8                   System configuration display               *
*   9                   E2PROM test (MAC/GUIDE/DMI)                 *
*                                                                  *
********************************************************************
.... Press test number[1,2,8,9] ?
```

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

Subtest 01   Initial configuration

This subtest executes the following items and displays the result.
- Setting CPU settable
- Setting Micro code
- Setting EHSS
- Inputting DMI information and writing it (Flash-ROM text)
  (Writes the text adding time stamp to DMI information being written)
- Setting HWSC
- Setting UUID

When any abnormal is detected, it waits for any key input. (If the problem is solved, execute it again)

To make all the setting effective, turns off the power.

Subtest 02   Region write

This subtest sets the DVD region code. (Executing or not is selectable.)
This subtest judges the destination based on the DMI information of the computer and sets the appropriate region code to the DVD drive. If the region code has been already written, this subtest is finished without setting.

Subtest 08   System configuration display

This subtest displays System configuration.

Subtest 09   E2PROM test (MAC/GUIDE/DMI)

Make sure that the MAC address, IEEE1394 GUIDE and DMI information are written. (This test does not need tools.)
For models without H/W, this test fails. Go to next with any key pressed.

3.28 Thermal Radiation Control Test

This thermal radiation control test checks the temperature of the CPU and GPU. To execute this test, use the diagnostics disk (thermal radiation control) and follow the procedures below.

1. Turn on the computer and start the Windows.

2. Insert the diagnostic disk for the thermal radiation control test to the USB FDD.

3. Open the [EXPLORE] window and double-click the [THERMAL.bat] file in the diagnostic disk.

4. The input field appears on the screen. Then, input the temperature around the computer and click [OK] button. The thermal radiation control test starts.

5. The test result is displayed 15 minutes later. When the test ends normally, the following message appears in the display.

        [Status:pass]

    When an error is found, the following message appears in the display.

        [Status:CPU:FAIL GPU:FAIL]

    When the error message appears in the display, there is a possibility of breakage of CPU, GPU or FAN.

    Close the test menu to end the thermal radiation control test.

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 Expansion memory 4.7 Slim select bay module	4.26 Fluorescent Lamp
4.8 Keyboard	
4.9 Modem Daughter Card 4.10 RTC battery	
4.11 Cover/Touch pad	
4.12 Memory module 4.13 Wireless LAN board	
4.14 Display assembly	
4.15 Sound board 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 Wireless LAN antenna
4.20 System board/DC-IN jack	4.25 Hinge

How to See the Chart

Two examples of referring to the chart are shown below.

•**Removing the Display assembly**
4.2 Battery Pack to 4.13 Wireless LAN board must be removed.

•**Removing the Speaker**
4.2 Battery Pack to 4.14 Display assembly must be removed.

4.23 LCD unit /FL inverter
4.26 Fluorescent Lamp

4.14 Display assembly	
4.15 Sound board 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 Wireless LAN 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 three 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   0.17 N·m   (1.7 kgf·cm)

- M2.5   0.30 N·m   (3.0 kgf·cm)

- M3   0.57 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**. Lift up 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.
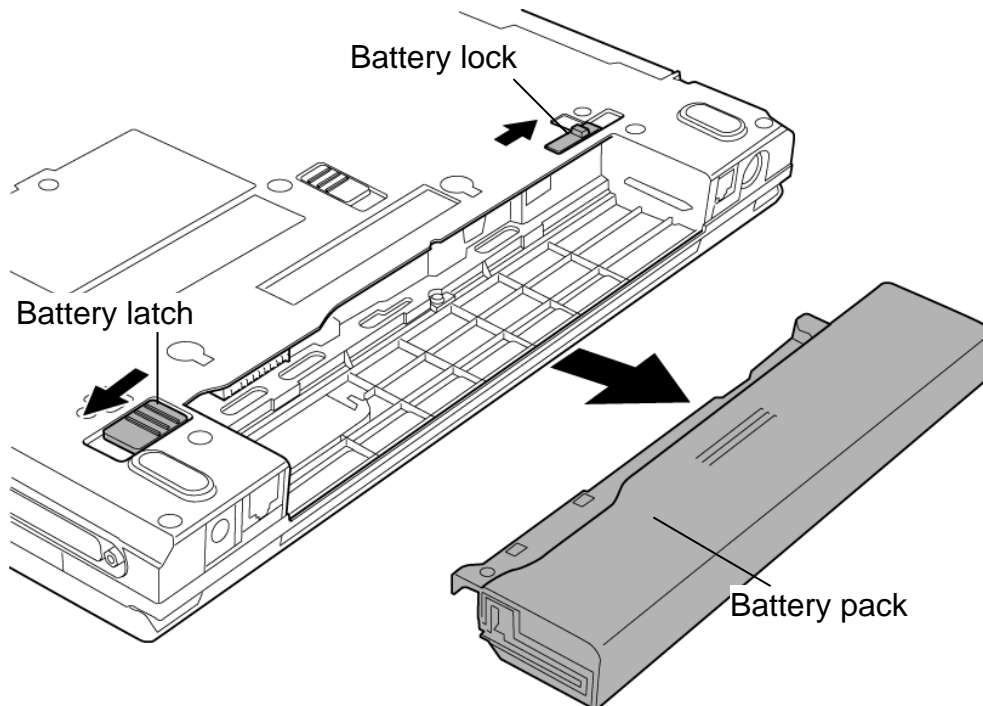
Figure 4-1   Removing the battery pack

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. Install **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

Removing the PC card

To remove the PC card follow the steps below and refer to figure 4-2.

> *CAUTION:* *Before you remove a PC 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 you want to remove to extend the button.

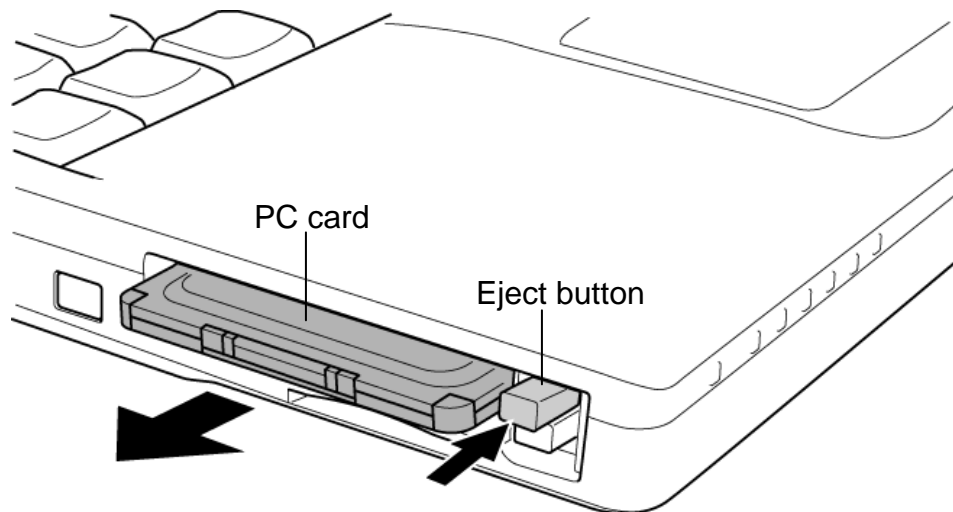3. Press the extended eject button to pop the PC card out slightly.

4. Grasp the **PC card** and pull it out.

Figure 4-2   Removing the PC card

Installing the PC card

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

1. Insert the **PC 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. Turn the computer face up.

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

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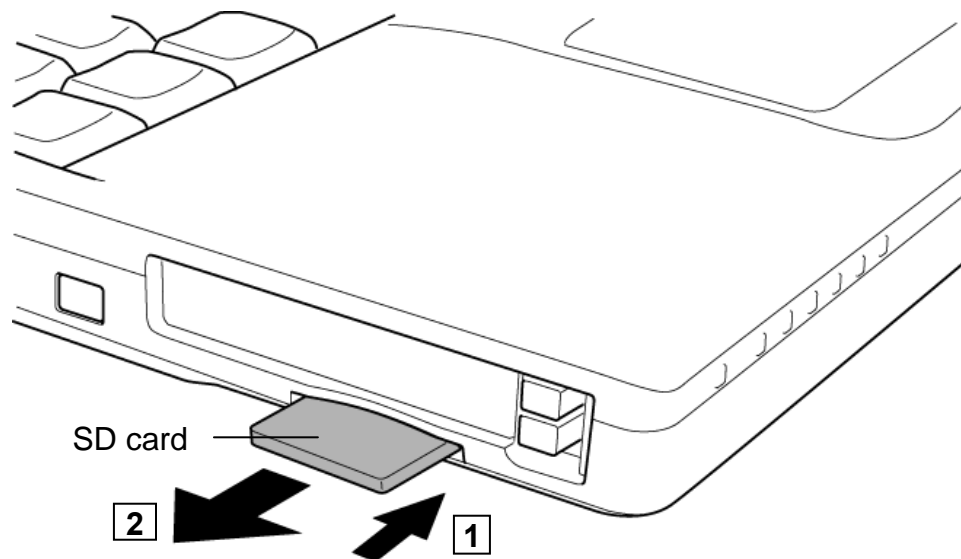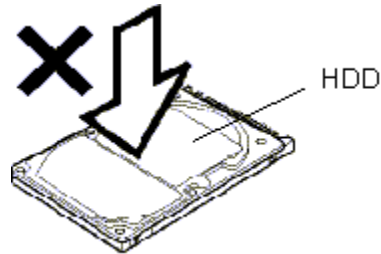
Figure 4-3   Removing the SD card

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.

Removing the HDD

To remove the HDD, follow the steps below and refer to figures 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.
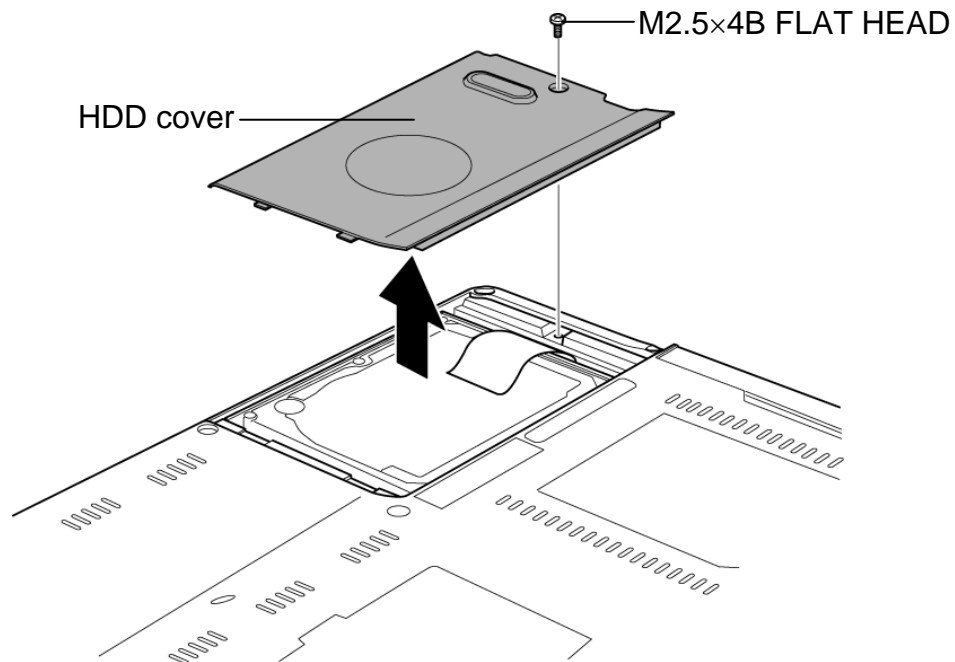
      • M2.5×4B FLAT HEAD screw   ×1

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.
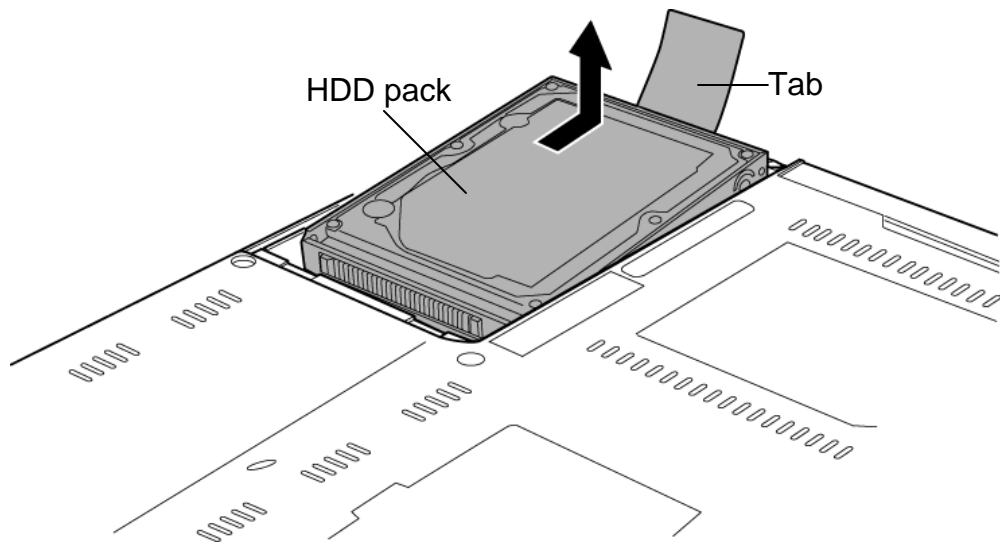
HDD pack   Tab

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**.

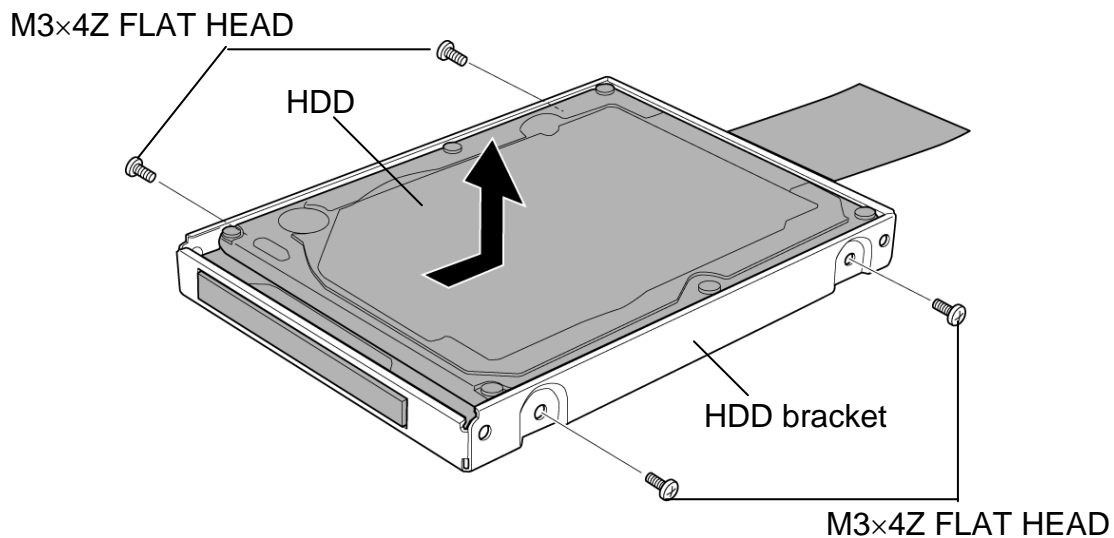*CAUTION:*   *Do not apply pressure to the top or bottom of the HDD.*

M3×4Z FLAT HEAD

HDD

HDD bracket

M3×4Z FLAT HEAD

Figure 4-6   Separating the HDD

Installing the HDD

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

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

1. Seat the **HDD** in the **HDD 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.*

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

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

   - M2.5×4B FLAT HEAD screw   ×1

4.6 Expansion memory

Removing the expansion Memory Module

To remove the expansion memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to figures 4-7 and 4-8.

1. Loosen the **screw** (with e-ring) fixing the memory slot cover and remove the **memory slot cover**.
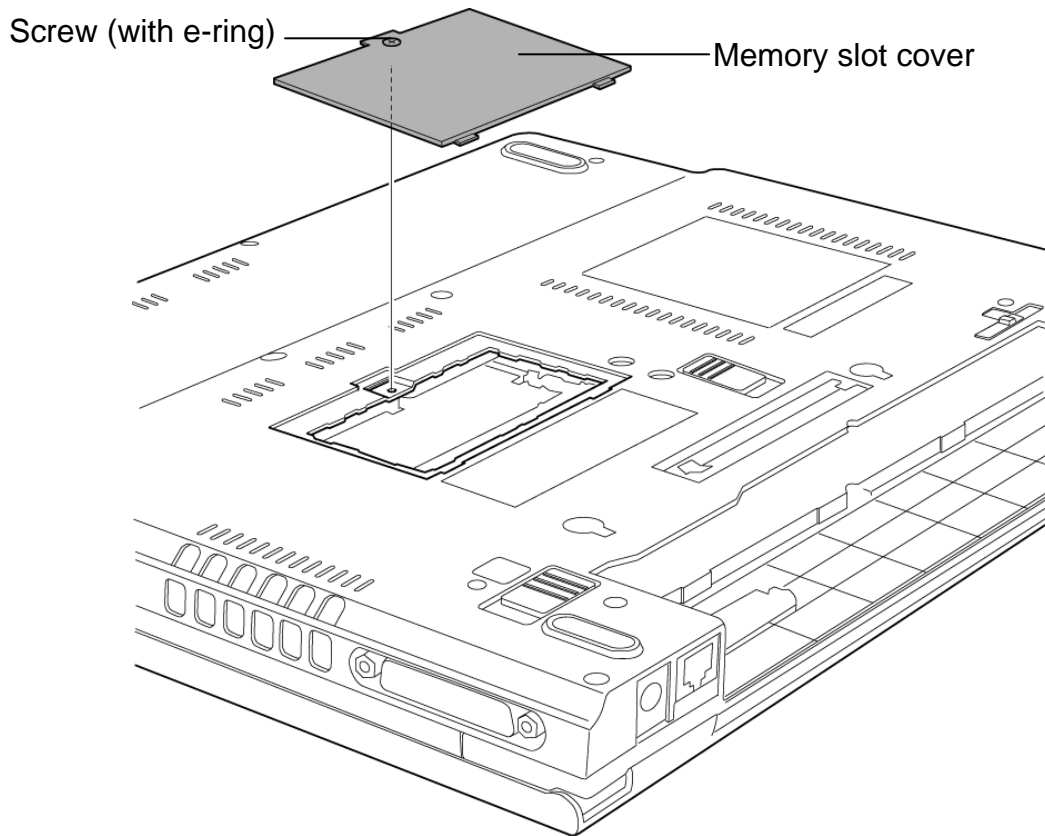

Figure 4-7   Removing the memory slot cover

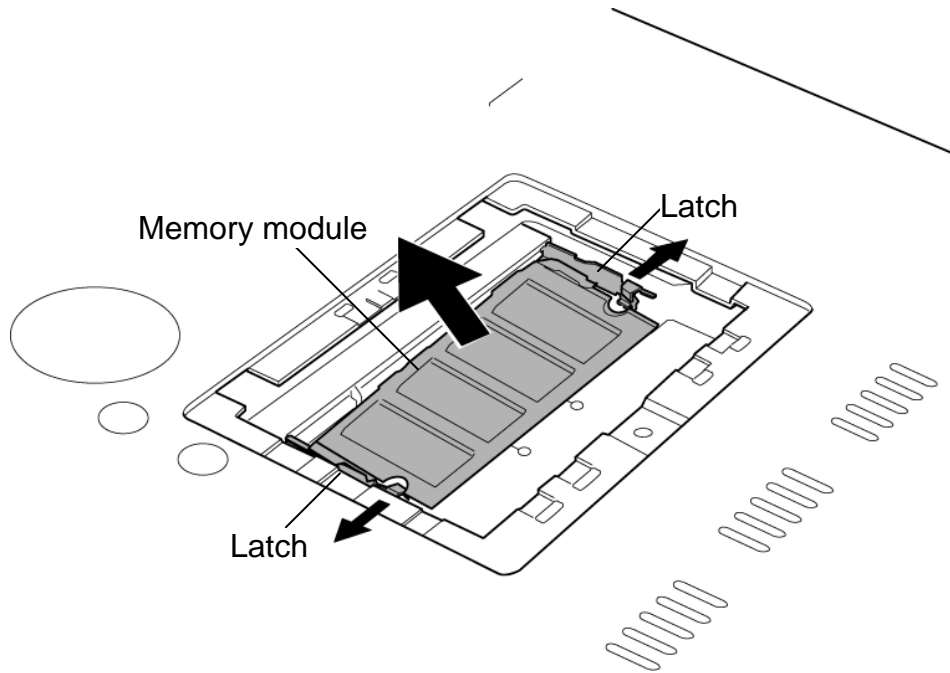2. Press the two **latches** outward and remove the **memory module**.

Figure 4-8   Removing the expansion memory module

Installing the expansion Memory module

To install the expansion memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figures 4-7 and 4-8.

CAUTION: *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 the memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

              Never press hard or bend the memory module.

---

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

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

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

4.7 Slim select bay module

Removing the Slim select bay module

To remove the slim select bay module, follow the steps below and refer to figures 4-9 and 4-10.

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.
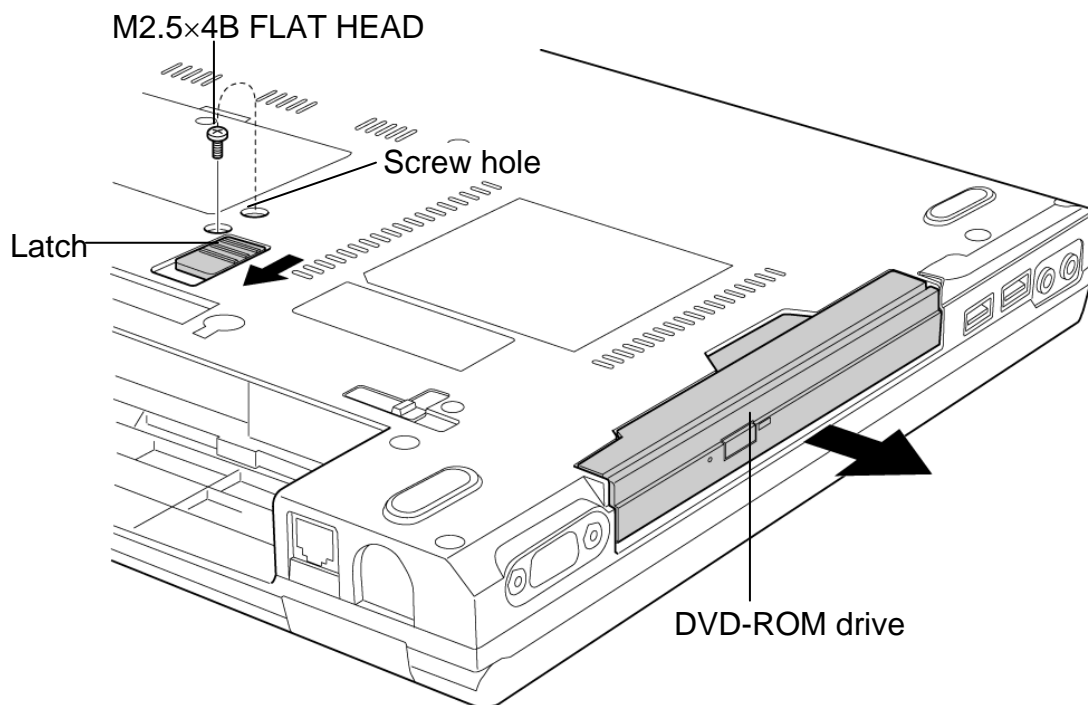
Figure 4-9   Removing the slim select bay module (for example DVD-ROM drive)

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.

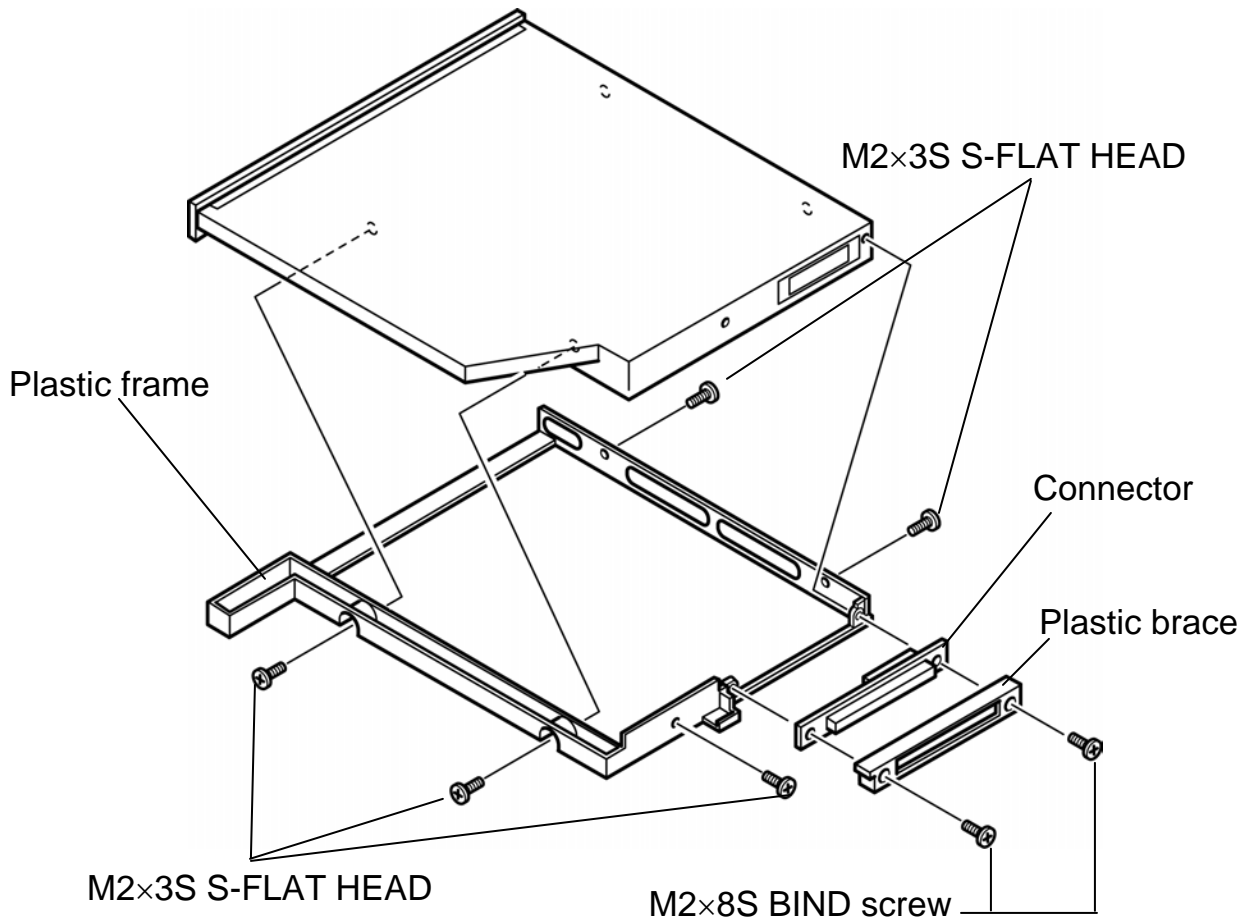   - M2×3S   S-FLAT HEAD screw   ×5

Figure 4-10   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 figures 4-9 and 4-10.

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. Remove the following **screw** from the screw hole. Then secure the latch with the **removed screw**. (The slim select bay is locked.)

    *   M2.5×4B FLAT HEAD screw   ×1

4.8 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to figures 4-11 to 4-15.

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

    • M2.5×3S   S-FLAT HEAD screw   ×1
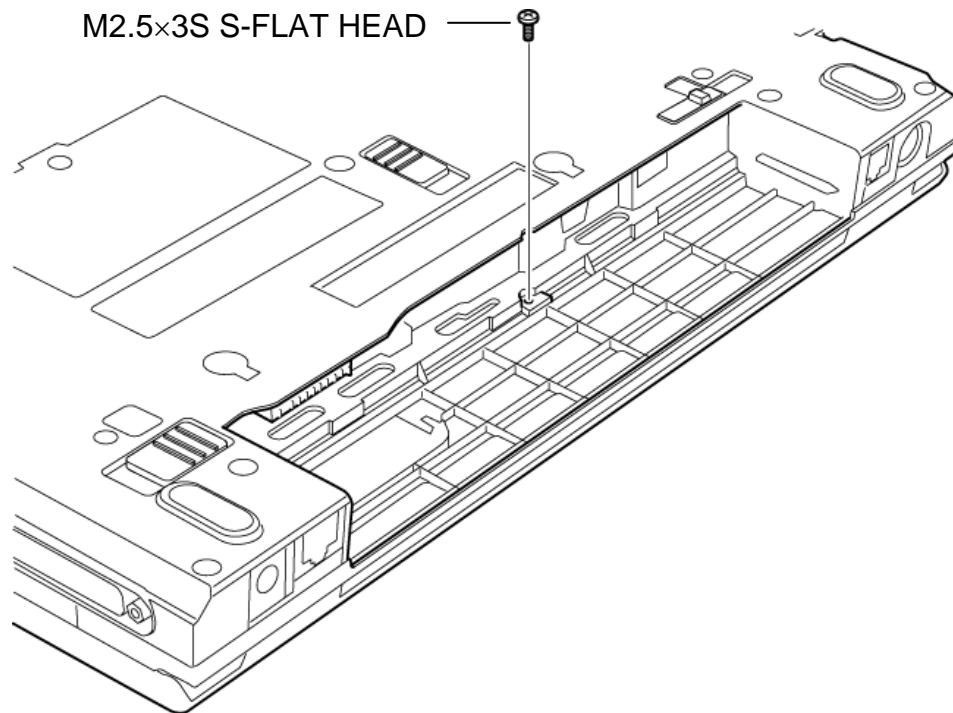
Figure 4-11   Removing the screw

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

Keyboard holder

M2.5×2.8B FLAT HEAD

M2.5×2.8B FLAT HEAD
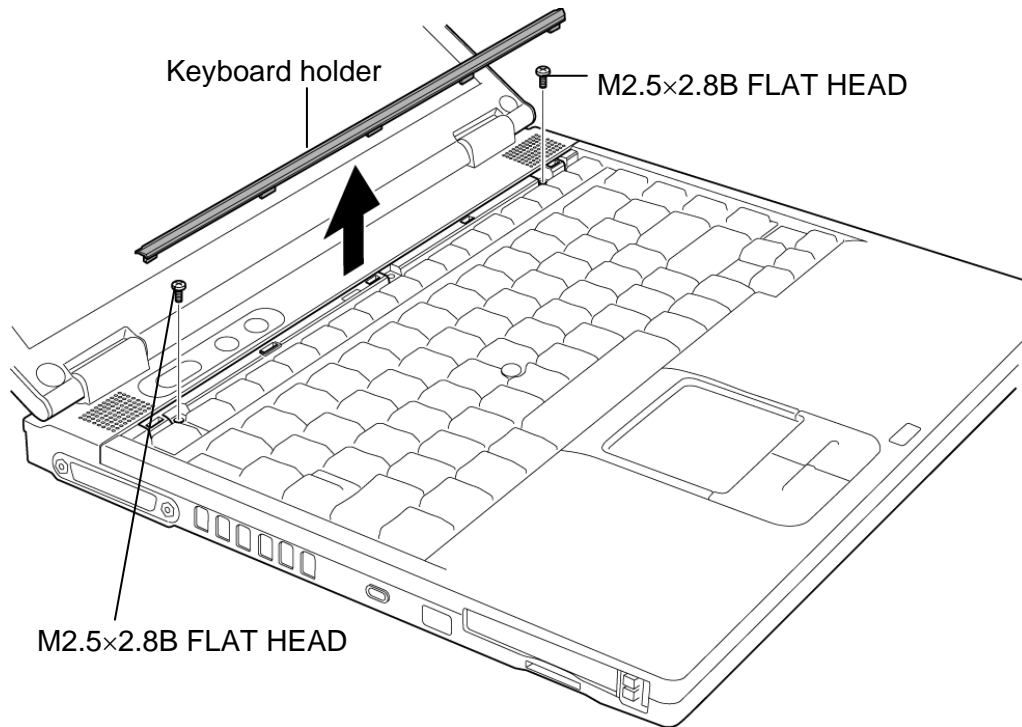
Figure 4-12   Removing the keyboard holder and screws

5. Lift the upper side of the **keyboard** and turn it face down on the cover.
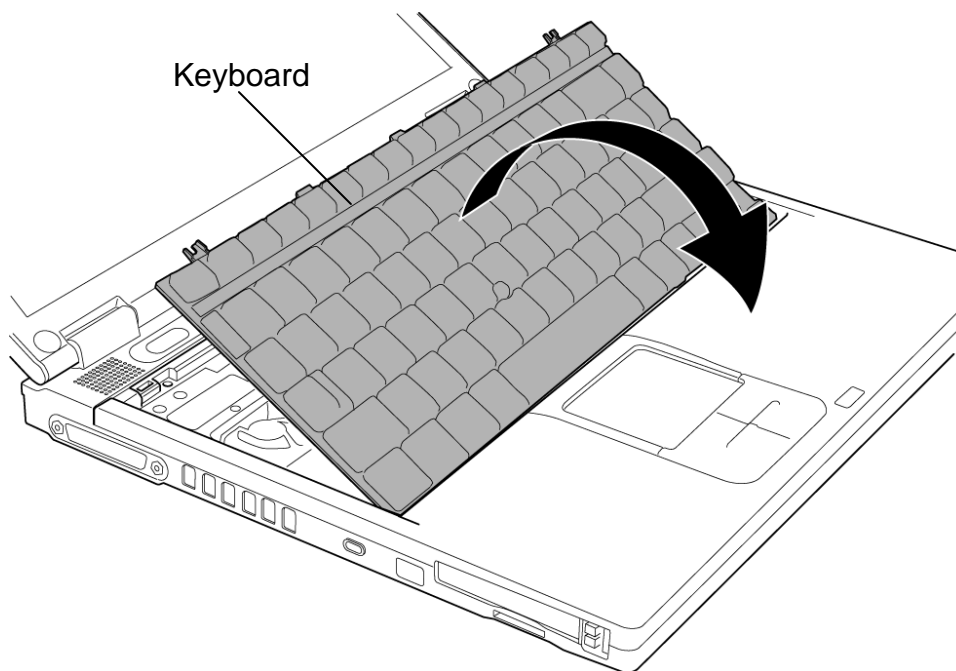
Figure 4-13   Turning the keyboard

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

Keyboard support plate

Screw (with e-ring)
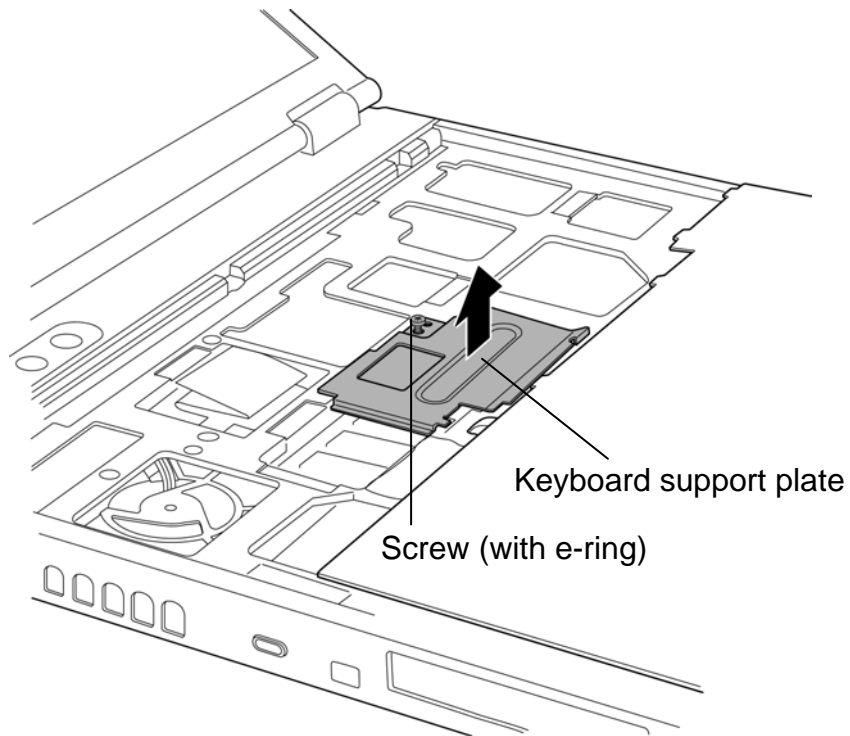
Figure 4-14   Removing the keyboard support plate

7. Disconnect the **keyboard cable** from the connector **PJ3200** on the system board and remove the **keyboard**.
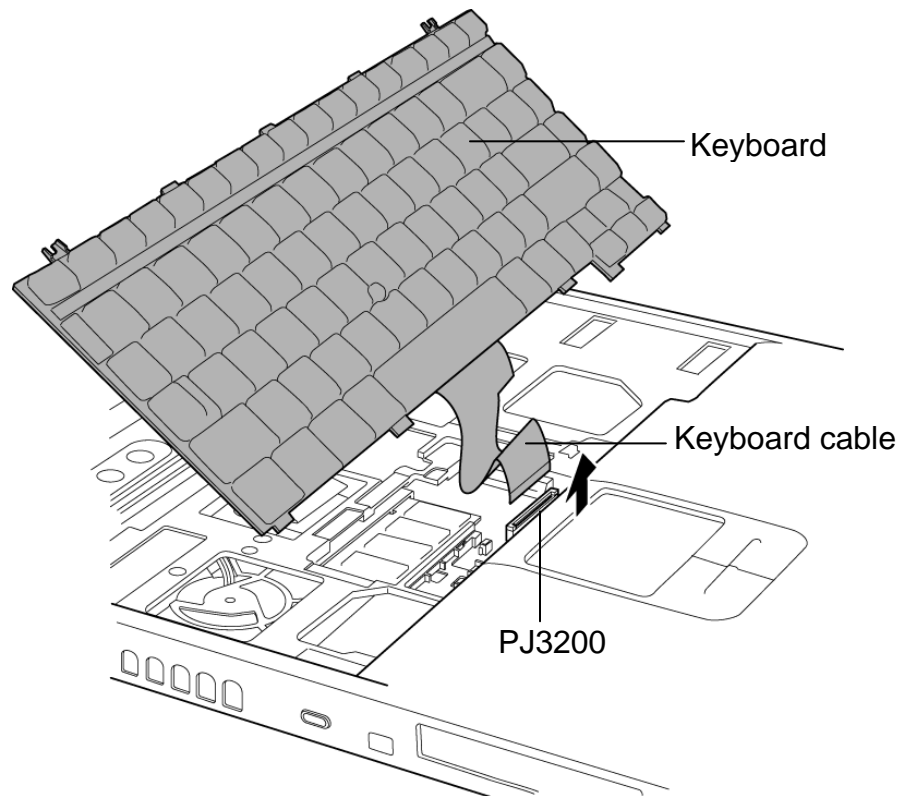
Figure 4-15 Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to figures 4-11 to 4-15.

1. Place the keyboard face down on the cover.

2. Connect the **keyboard cable** to the connector **PJ3200** 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 **screws**.

   - M2.5×3S   S-FLAT HEAD screw   ×1

4.9 Modem Daughter Card (MDC)

Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to figure 4-16.

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 **PJ3000** on the system board.

3. Disconnect the **modem cable** from the connector on the modem daughter card.
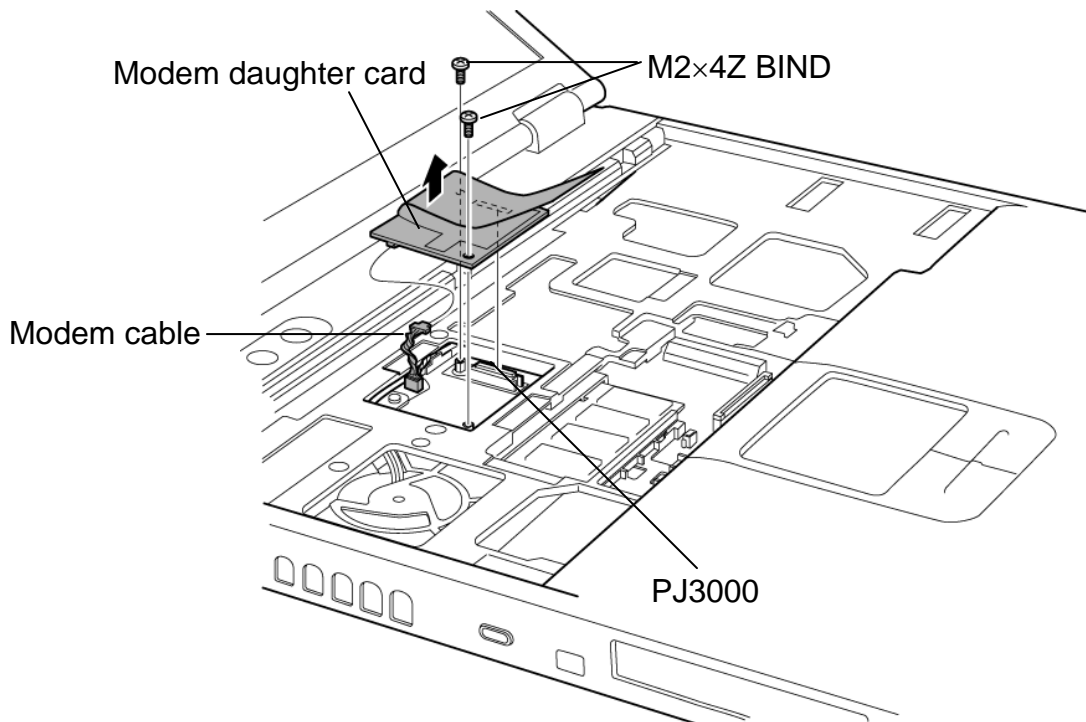
Figure 4-16   Removing the Modem Daughter Card (MDC)

Installing the Modem Daughter Card

To install the modem daughter card, follow the steps below and refer to figure 4-16.

1. Connect the **modem 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 **PJ3000** on the system board. Be careful not to damage the card or connector.

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

   • M2×4Z   BIND screw   ×2

4.10 RTC battery

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

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

Check for any of the following signs of damage:

1) Electrolyte leakage

*   •   Corrosion (greenish color) on the battery connector or cable*
*   •   Corrosion on the computer's battery connector*
*   •   White powder on any part of the battery*
*   •   White powder in the battery tray*
*   •   Clear liquid on the battery*
*   •   Clear liquid in the battery tray*
*   •   Clear liquid on any board near the battery*

2) Damage to the connection cable

3) Damage to the connector housing

If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to figure 4-17.

1. Peel off the **glass tape**.

2. Disconnect the **RTC battery cable** from the connector **PJ1005** on the system board and remove the **RTC battery** from the slot.
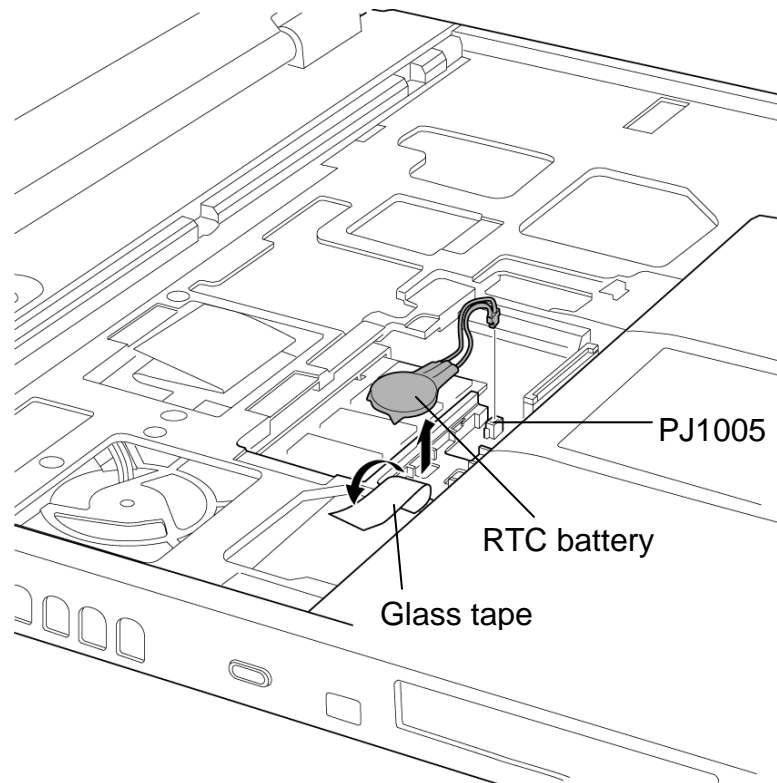
Figure 4-17   Removing the RTC battery

Installing the RTC battery

To install the RTC battery, follow the steps below and refer to figure 4-17.

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

2. Connect the **RTC battery cable** to the connector **PJ1005** on the system board.

3. Stick the **glass tape** to secure the RTC battery.

4.11 Cover/Touch pad

Removing the Cover/Touch pad

To remove the cover/touch pad, follow the steps below and refer to figures 4-18 to 4-23.

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)
   - M2×4   Stick screw   ×1 ("4" in the figure below)
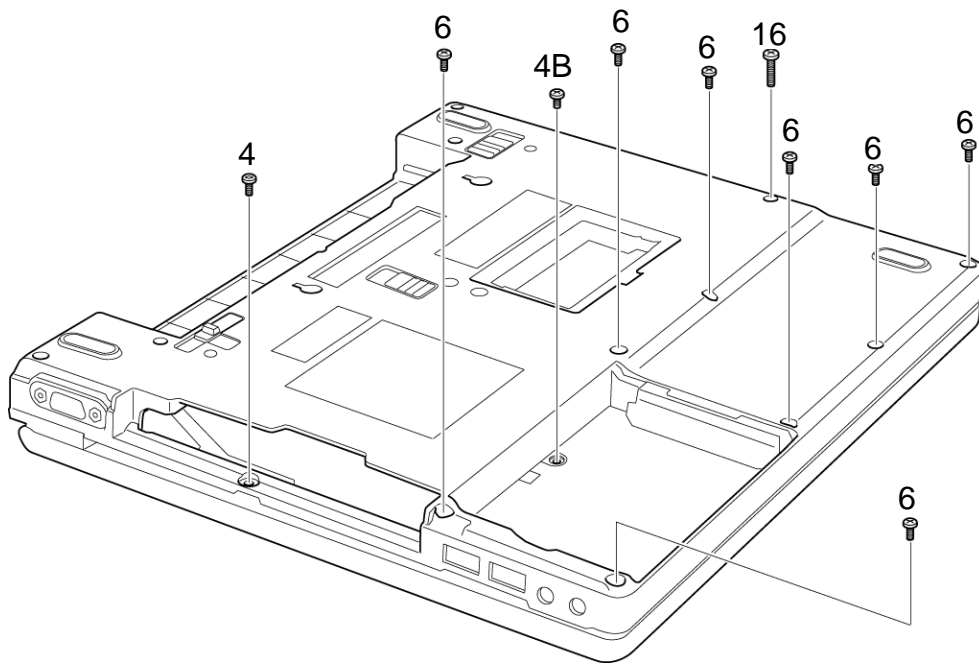
Figure 4-18   Removing the cover (1)

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

M2.5×12B FLAT HEAD

M2.5×12B FLAT HEAD

M2.5×4B FLAT HEAD
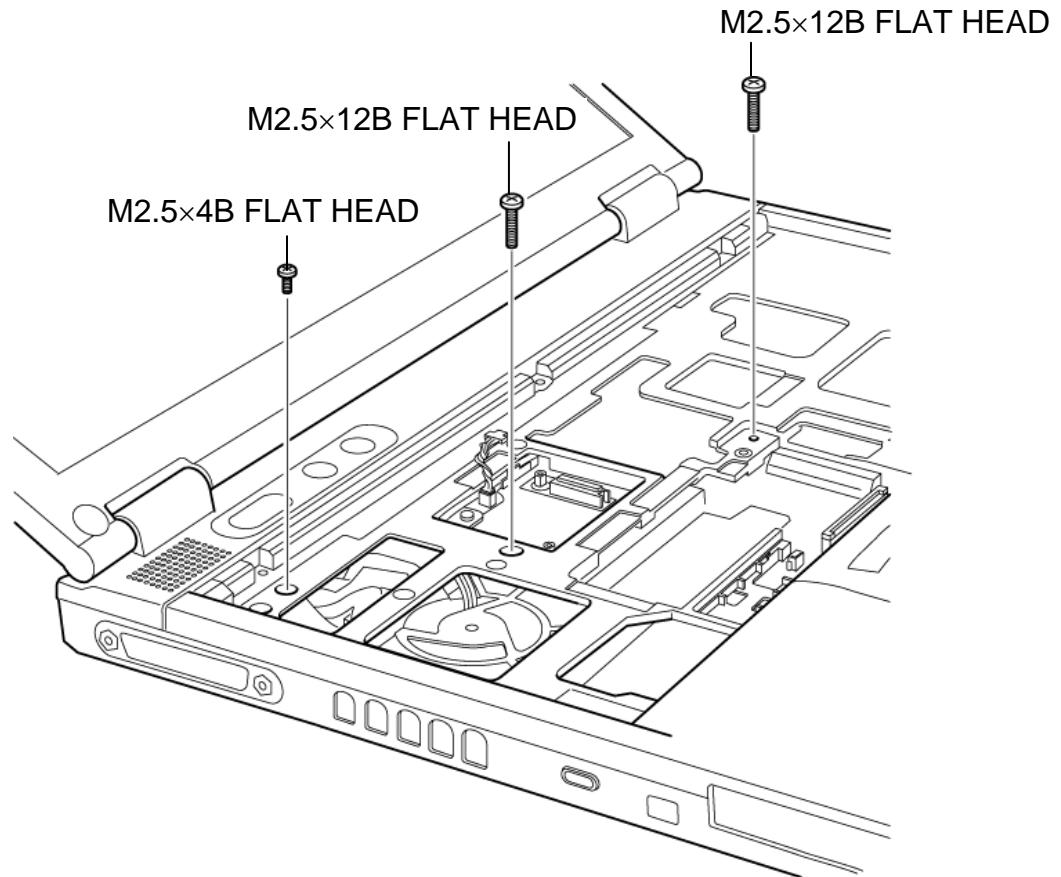
Figure 4-19   Removing the cover (2)

4. Disconnect the **touch pad cable** from the connector **PJ3201** on the system board.
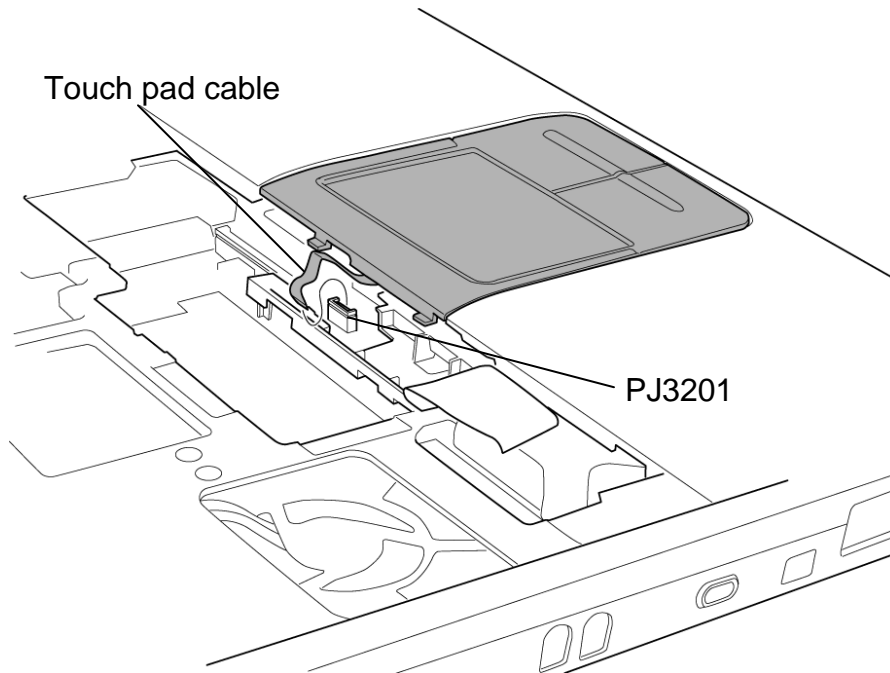
Figure 4-20   Removing the cover (3)

5. Remove the **cover** by lifting it up toward the front of the computer.
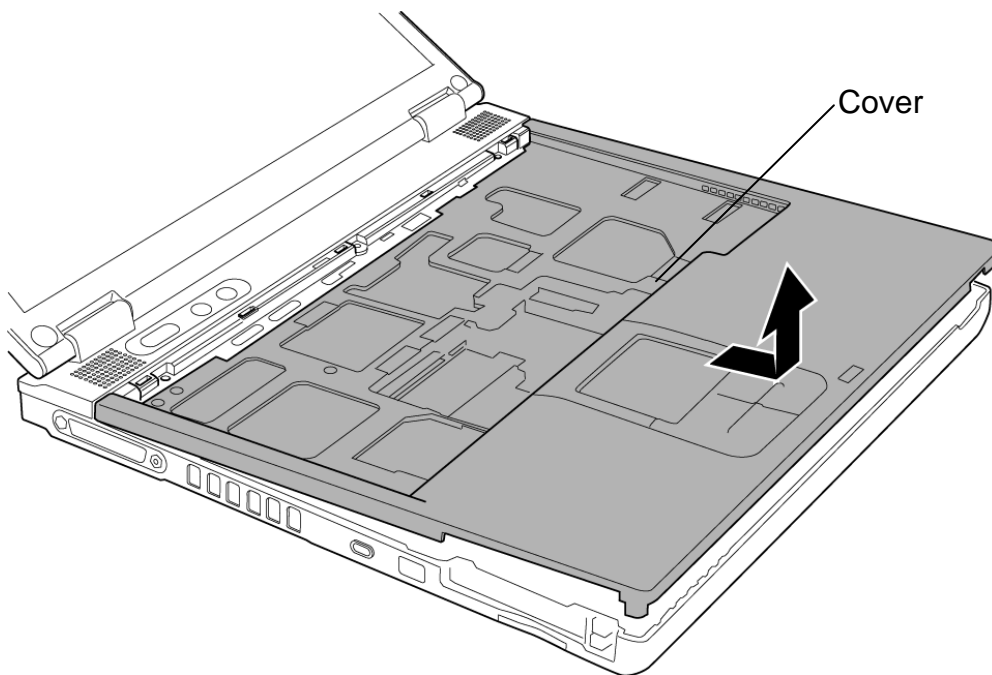
Figure 4-21   Removing the cover (4)

6. Turn the removed cover face down and remove the following **screws** securing the touch pad and touch pad switch to the cover. (Remove two screws after peeling the insulator.)

- M2.5×4B FLAT HEAD screw   ×3
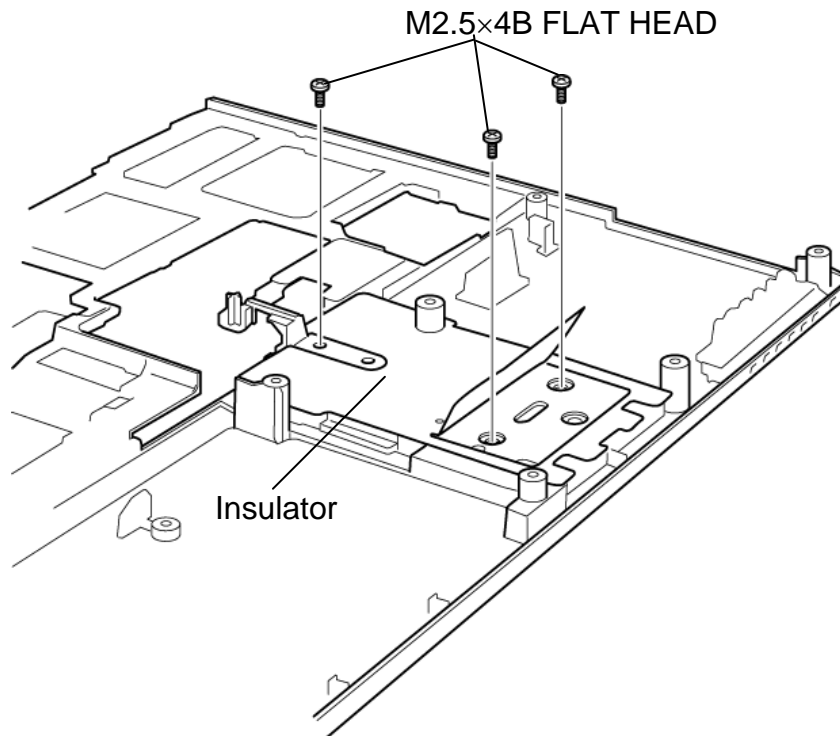
Figure 4-22   Removing the screws

7. Remove the **touch pad** and **touch pad switch** from the cover while unhooking the latches.
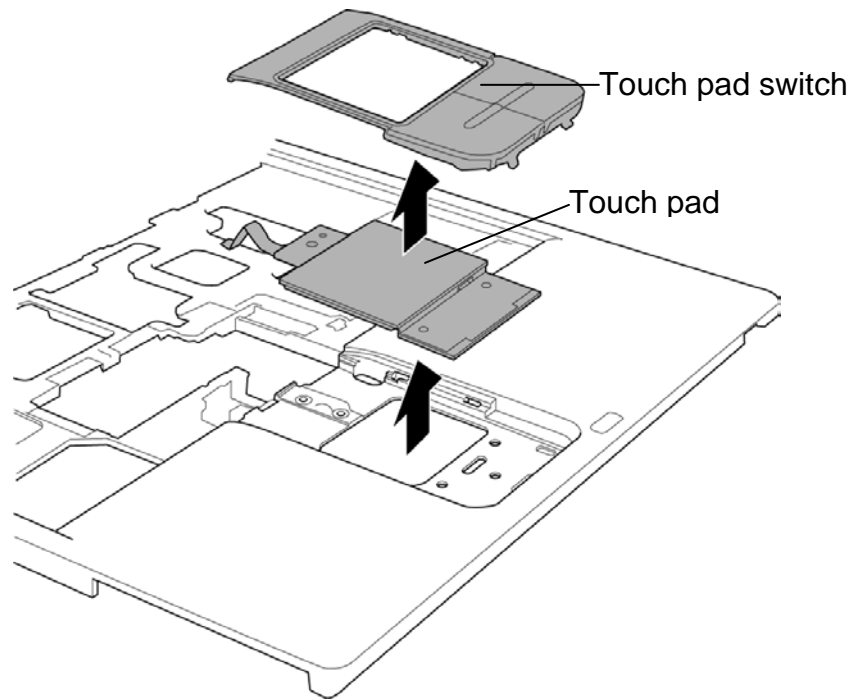
Figure 4-23   Removing the touch pad and touch pad switch

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 figures 4-18 to 4-23.

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   ×3

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 **PJ3201** 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)
   - M2×4   Stick screw   ×1 ("4" in the figure below)

4.12 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 4-24.

1. Press the two **latches** outward and remove the **memory module**.
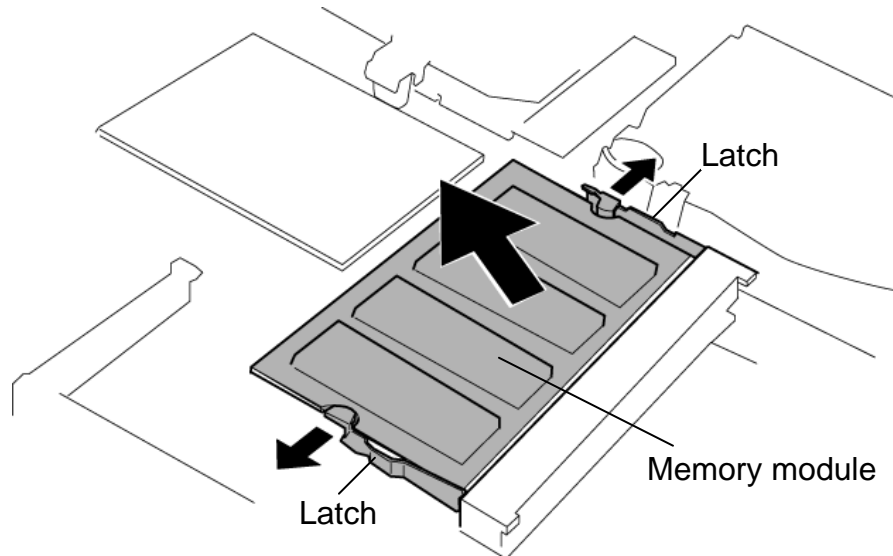
Figure 4-24   Removing the memory module

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 4-24.

CAUTION: *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 the 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.

4.13 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 4-25.

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

> *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. Disconnect the **wireless LAN antenna cables** (black and white) from the wireless LAN board using an antenna coaxial cable disconnector.
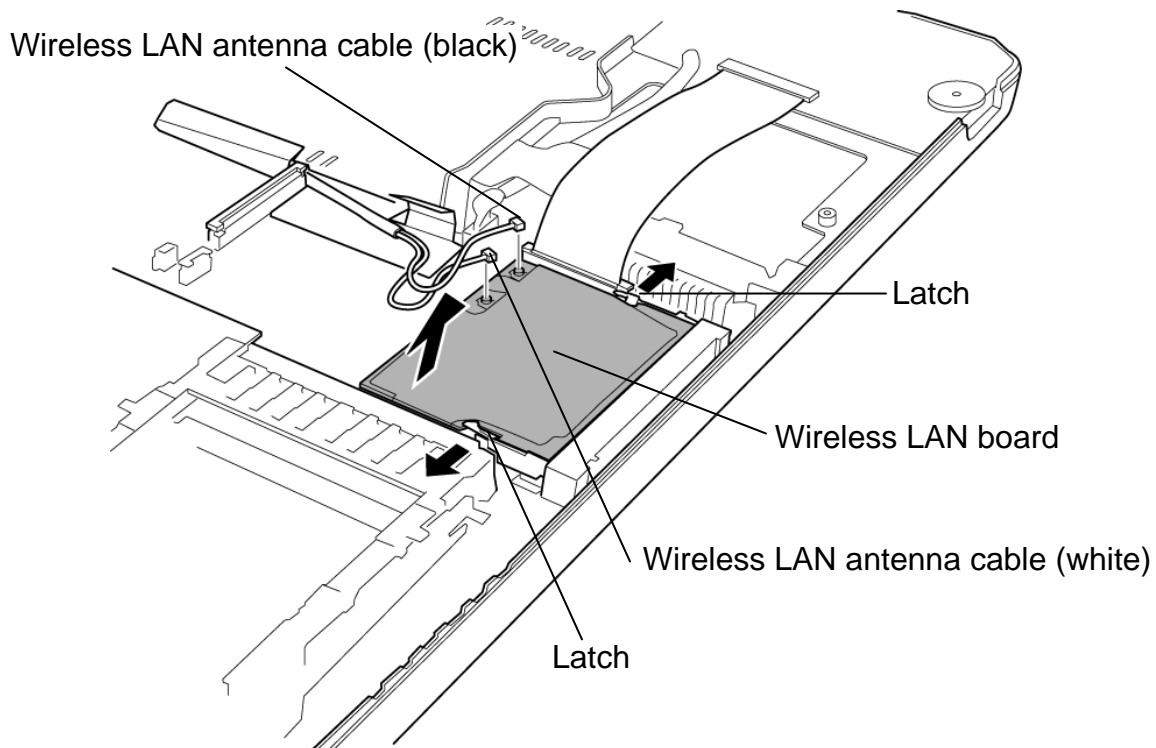
Figure 4-25 Removing the wireless LAN board

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 4-25.

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.

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.*

4.14 Display assembly

Removing the Display assembly

To remove the display assembly, follow the steps below and refer to figures 4-26 to 4-29.

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

M2.5×16B FLAT HEAD
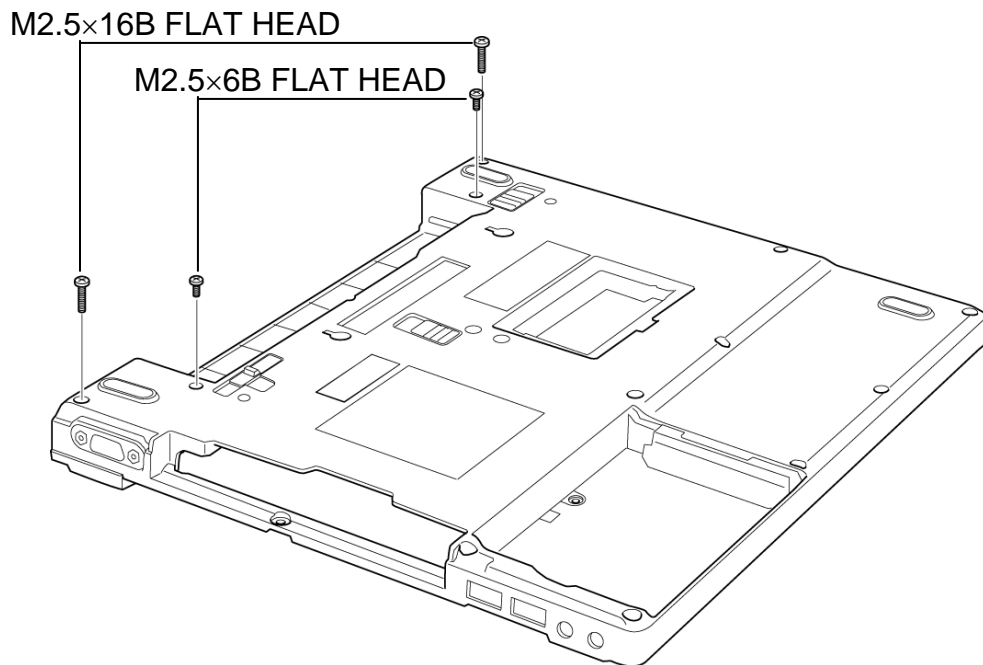
M2.5×6B FLAT HEAD

Figure 4-26 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 **PJ5500** on the system board.

5. Disconnect the **power switch cable** from the connector **PJ9600** on the system board.

6. Disconnect the **RGB cable** from the connector **PJ5621** on the system board.

7. Peel off the **glass tape** and disconnect the **speaker cable** from the connector **PJ3202** on the sound board.

8. Peel the **insulator** securing the wireless LAN cable.
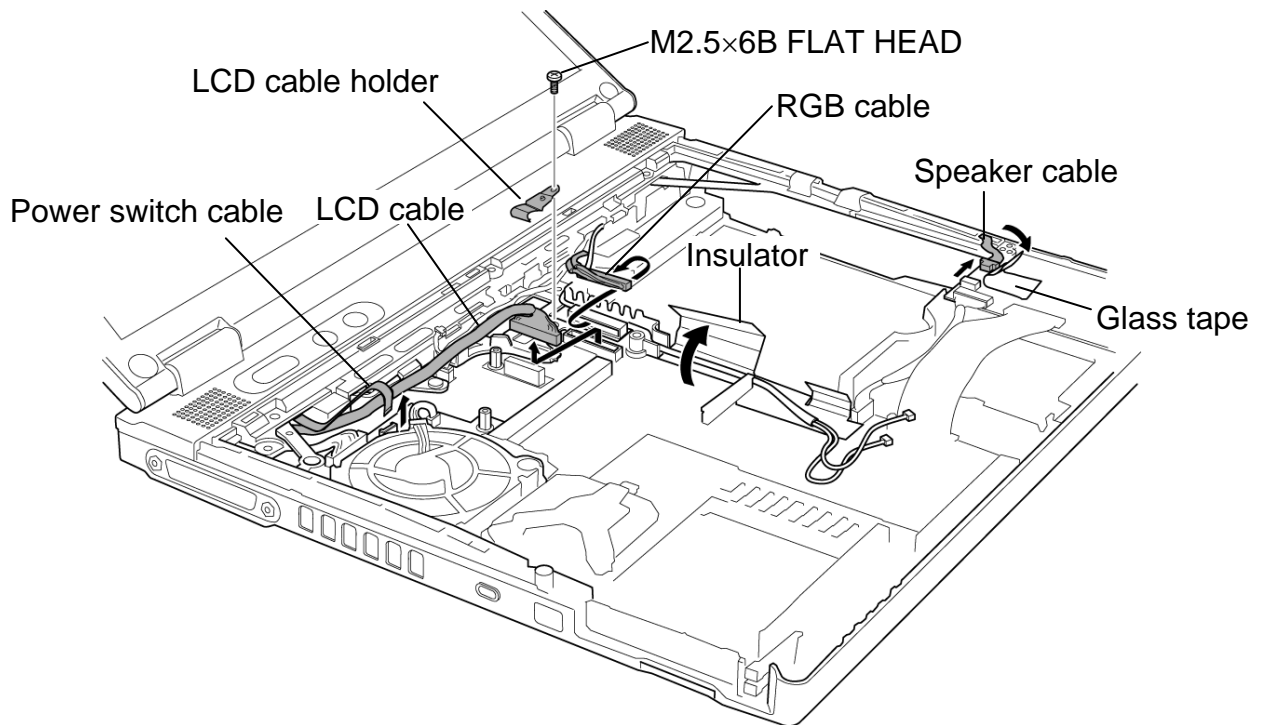
Figure 4-27 Removing the display assembly (2)

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

   - M2.5×6B   FLAT HEAD screw   ×4
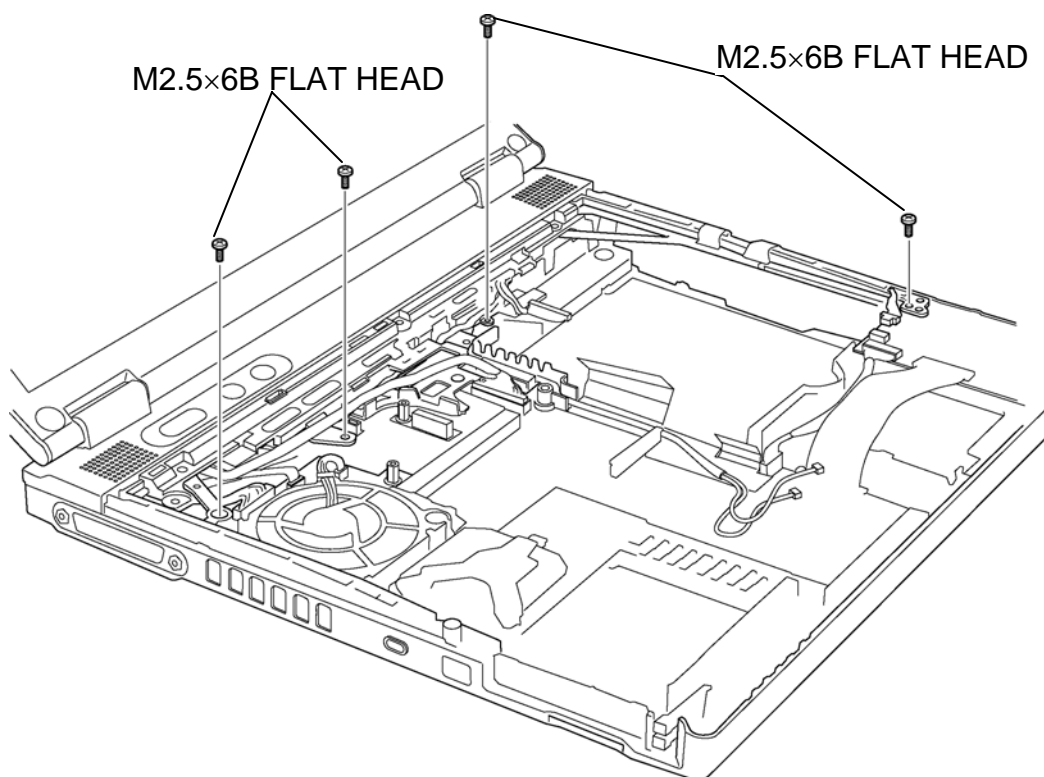
Figure 4-28 Removing the display assembly (3)

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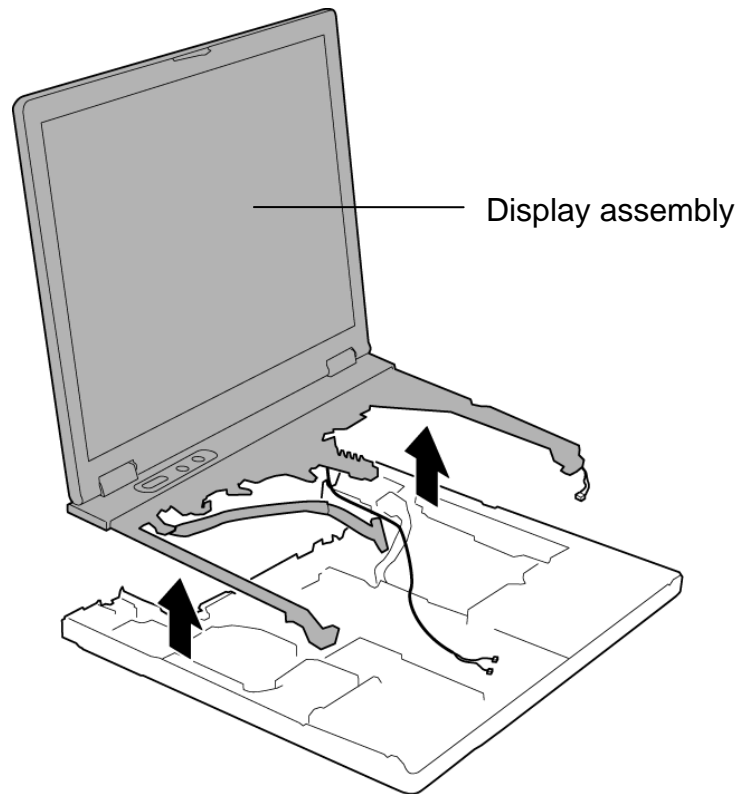
Display assembly

Figure 4-29 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 figures 4-26 and 4-29.

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 **speaker cable** to the connector **PJ3202** on the sound board and stick the **glass tape**.

4. Connect the **RGB cable** to the connector **PJ5621** on the system board.

5. Connect the **power switch cable** to the connector **PJ9600** on the system board.

6. Connect the **LCD cable** to the connector **PJ5500** on the system board.

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

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

   - M2.5×6B   FLAT HEAD screw   ×1

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

   - M2.5×6B   FLAT HEAD screw   ×4

10. 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

4.15 Sound board

Removing the Sound board

To remove the sound board, follow the steps below and refer to figures 4-30 and 4-31.

1. Remove the following **screw** and the **HDD con holder**.

   - M2.5×4B   FLAT HEAD screw   ×1
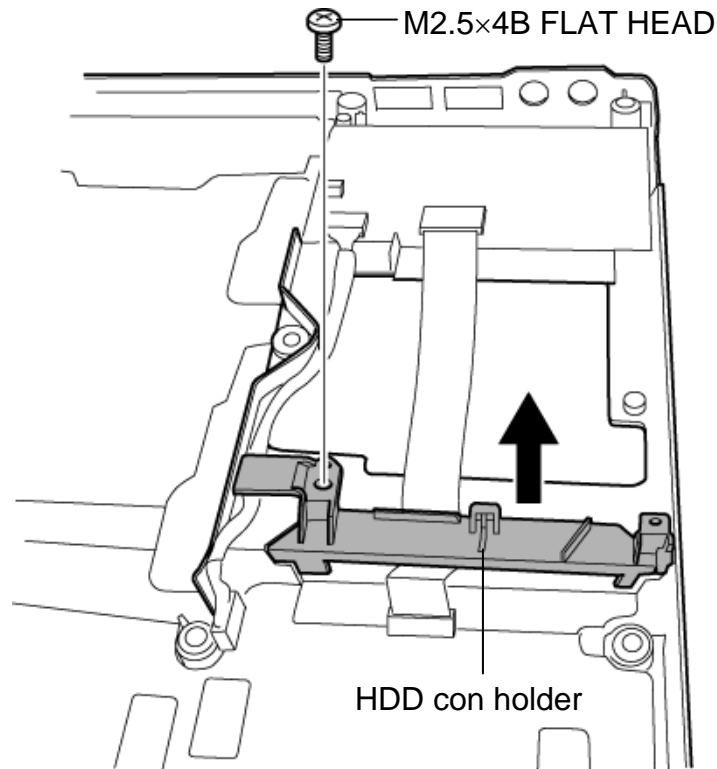
Figure 4-30   Removing the HDD con holder

2. Disconnect the **sound board flexible cable** from the connector **PJ9510** on the sound board and the connector **PJ9500** on the system board.

3. Disconnect the **sound board cable** from the connector **PJ9511** on the sound board and the connector **PJ9501** on the system board.

4. Remove the **sound board** by lifting it up.
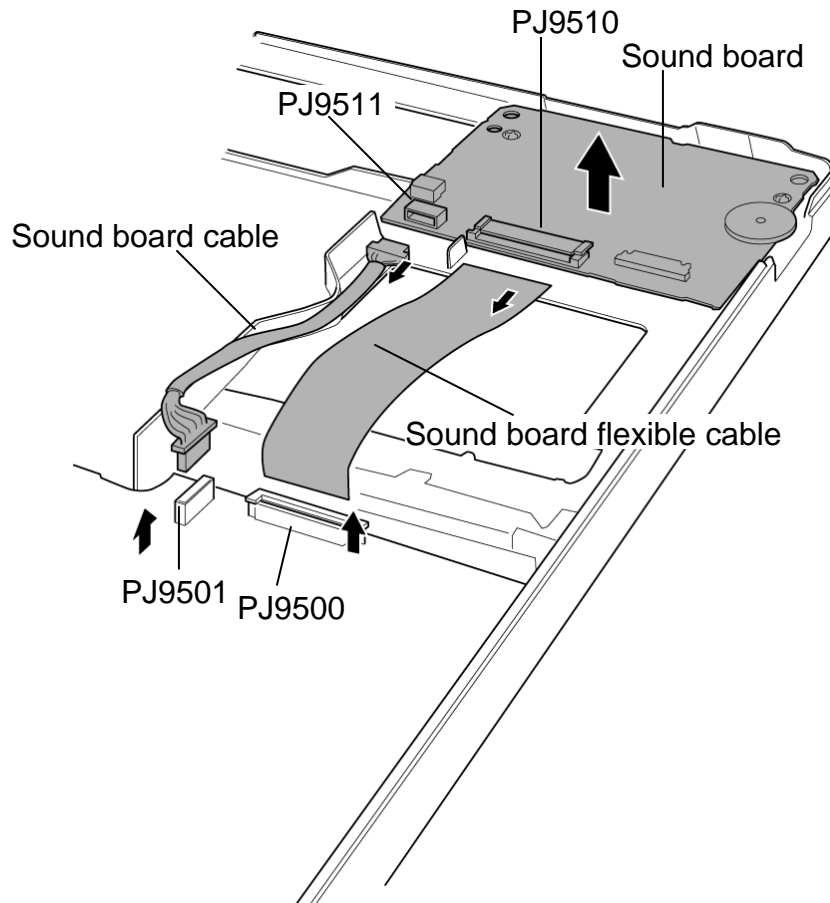
Figure 4-31   Removing the sound board

Installing the Sound board

To install the sound board, follow the steps below and refer to figures 4-30 and 4-31.

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

2. Connect the **sound board cable** to the connector **PJ9511** on the sound board and the connector **PJ9501** on the system board.

3. Connect the **sound board flexible cable** to the connector **PJ9510** on the sound board and the connector **PJ9500** on the system board.

4. Install the **HDD con holder** and secure it with the following **screw**.

   • M2.5×4B FLAT HEAD screw   ×1

4.16 LAN jack

Removing the LAN jack

To remove the LAN jack, follow the steps below and refer to figure 4-32.

1. Peel off the **glass tape** and disconnect the **LAN jack cable** from the connector **PJ4100** on the system board.

2. Remove the **LAN jack** from the slot.
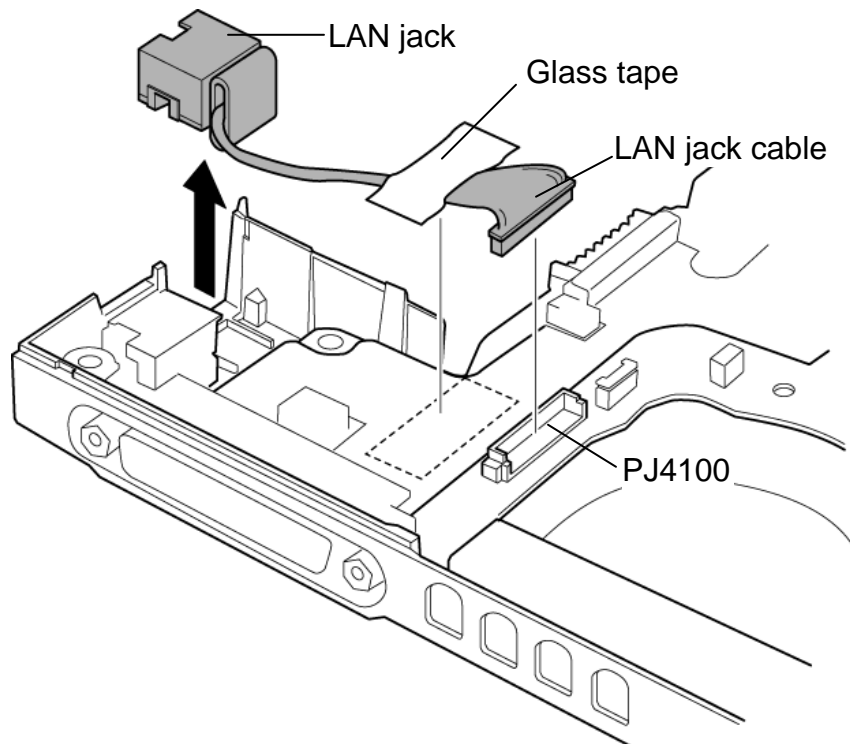
Figure 4-32   Removing the LAN jack

Installing the LAN jack

To install the LAN jack, follow the steps below and refer to figure 4-32.

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

2. Connect the **LAN jack cable** to the connector **PJ4100** on the system board and stick the **glass tape**.

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 figures 4-33 to 4-35.

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.
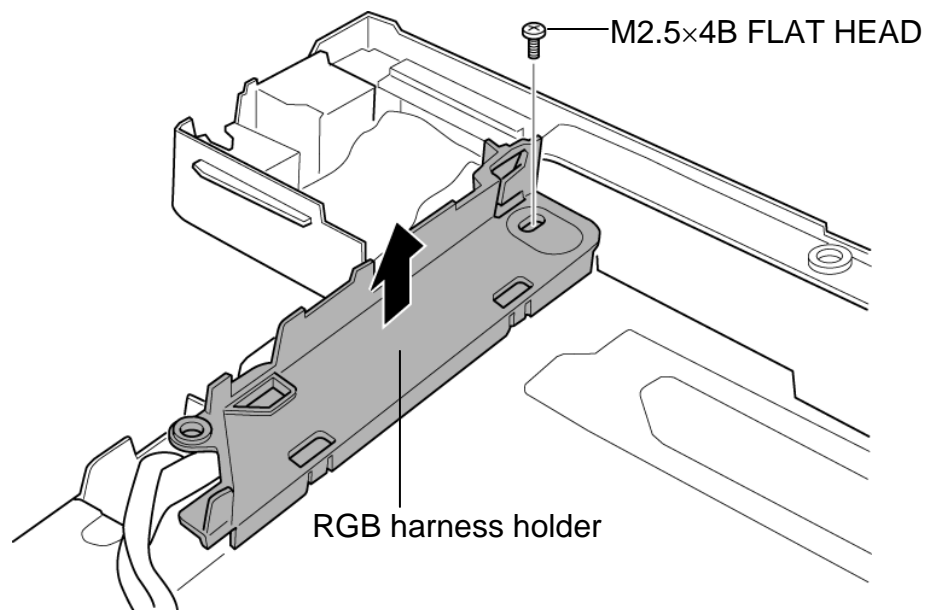
Figure 4-33   Removing the RGB harness holder

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

4. Disconnect the **modem cable** from the connector **PJ3001** on the system board.

5. Take out the **modem jack** from the slot.
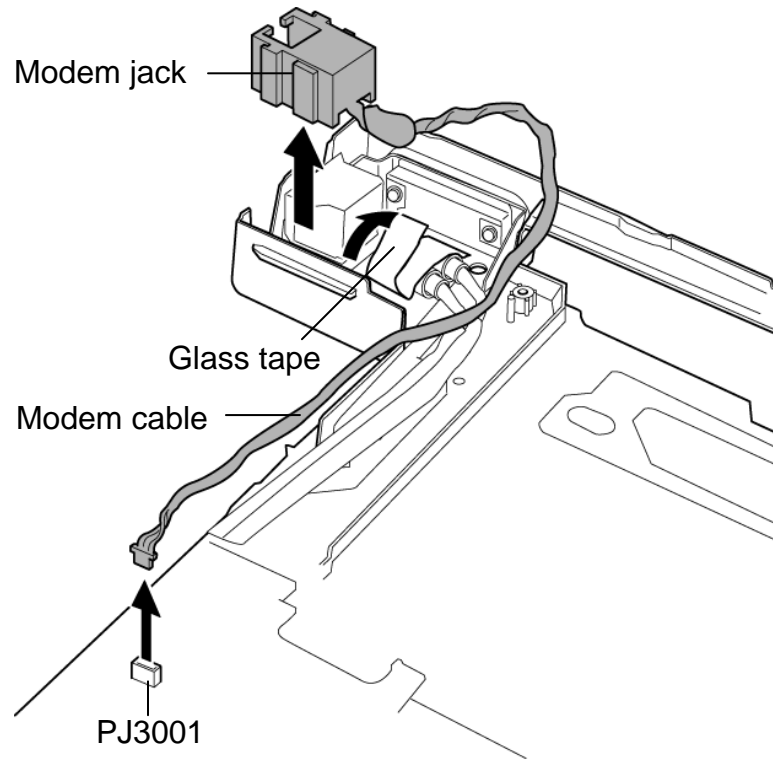
Figure 4-34   Removing the modem jack

6. Remove the following **screw**.

- M2.5×2.8B   FLAT HEAD screw   ×1

7. Remove the **RGB board** and disconnect the **RGB cable** from the connector **PJ5622** on the RGB board.
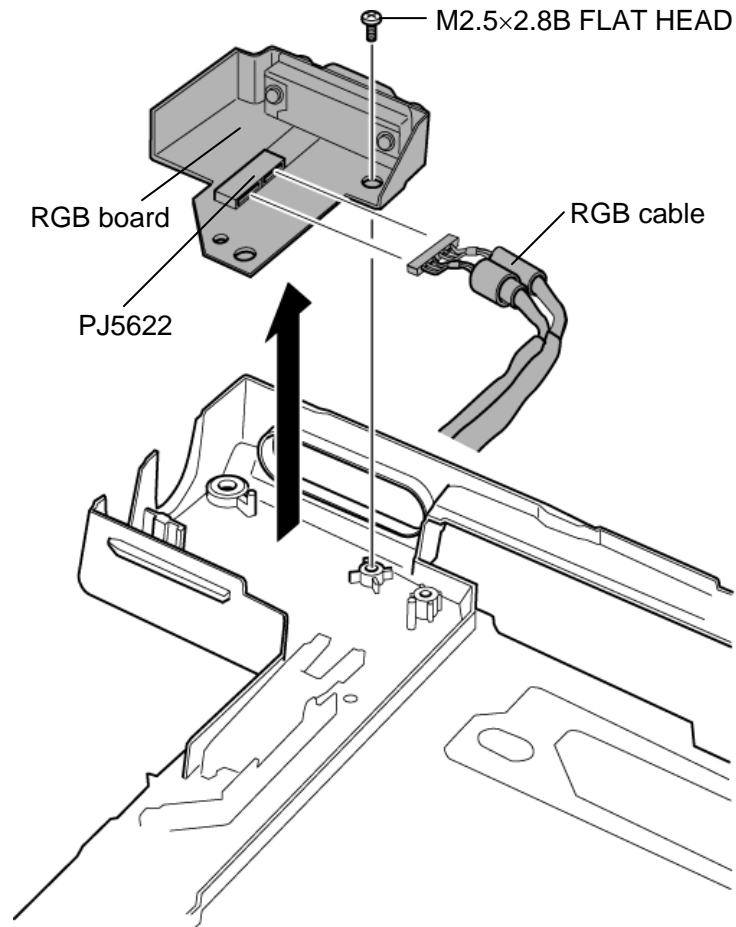
Figure 4-35   Removing the RGB board

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 figures 4-33 to 4-35.

1. Connect the **RGB cable** to the connector **PJ5622** 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. Connect the **modem cable** to the connector **PJ3001** on the system board.

6. Stick the **glass tape**.

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

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

    - M2.5×4B   FLAT HEAD screw   ×1

4.18 Fan

Removing the Fan

To remove the fan, follow the steps below and refer to figure 4-36.

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

   - M2.5×4B   FLAT HEAD screw   ×2

2. Disconnect the **fan cable** from the connector **PJ8770** on the system board.

3. Remove the **fan**.
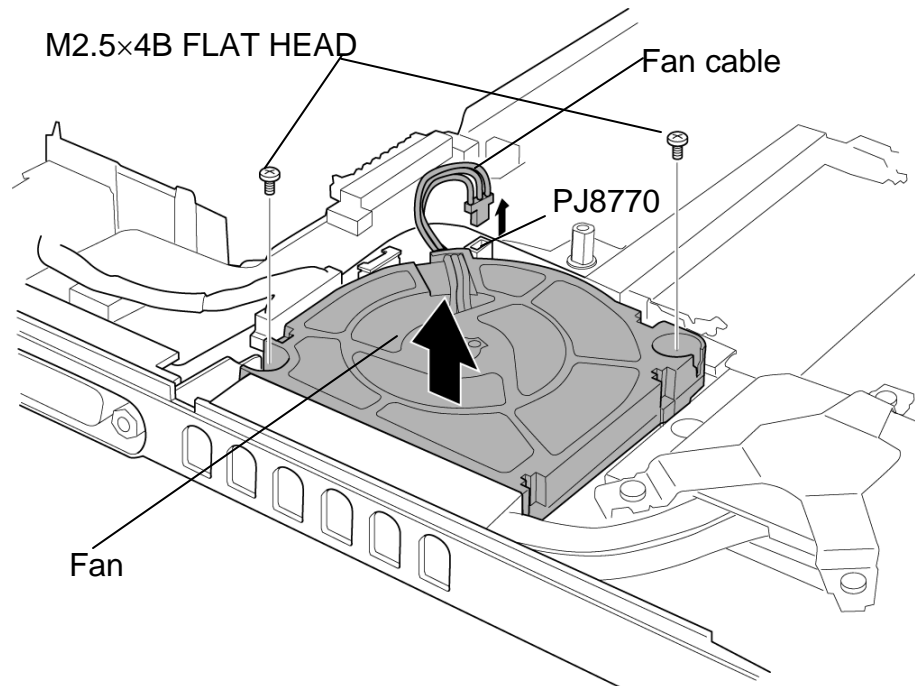
Figure4-36 Removing the fan

Installing the Fan

To install the fan, follow the steps below and refer to figure 4-36.

1. Place the **fan**.

2. Connect the **fan cable** to the connector **PJ8770** on the system board.

3. 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 figures 4-37 to 4-39.

> *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

2. Remove the **CPU holder**.
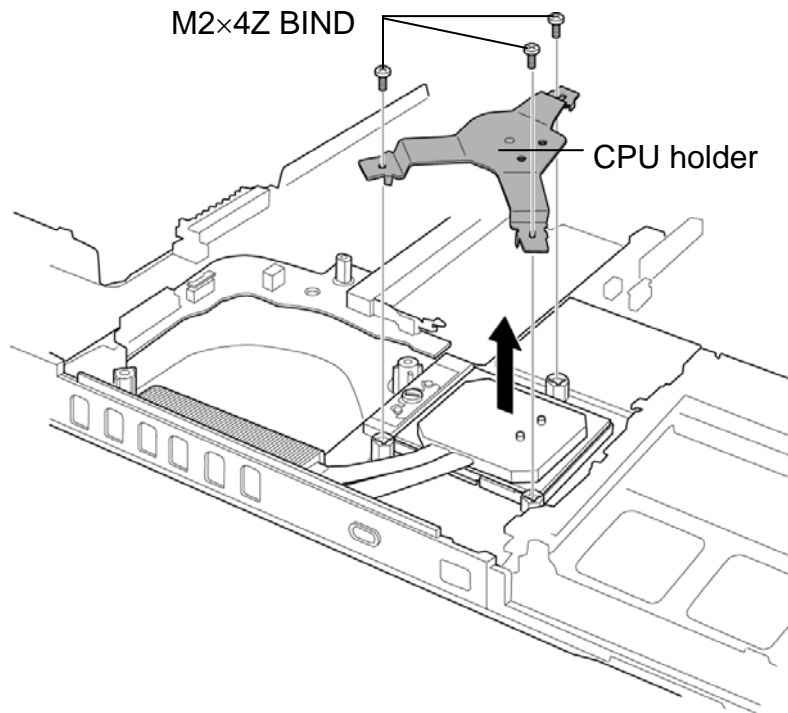
Figure4-37 Removing the CPU holder

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.*
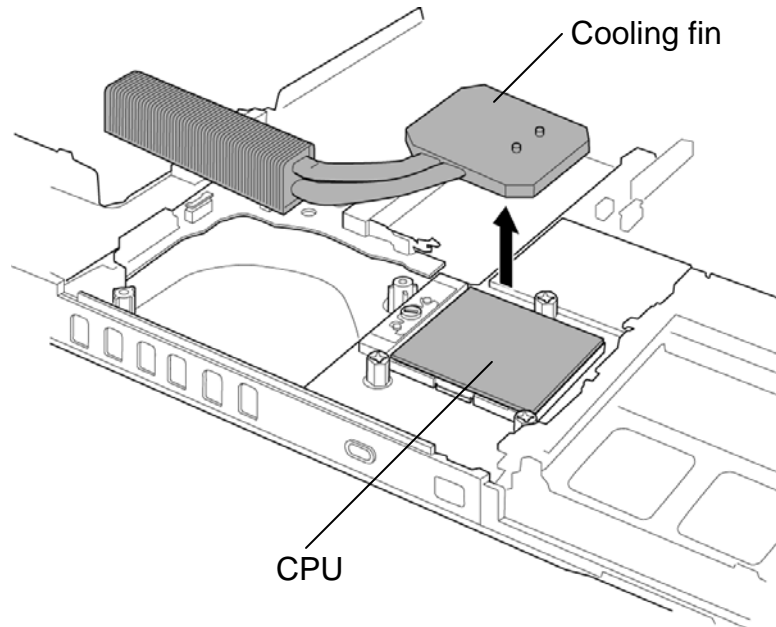
Figure4-38 Removing the cooling fin

4. Unlock the **CPU** by turning the **cam** on the CPU socket 90 degrees to the counterclockwise with a flat-blade screwdriver (in the order shown in the figure below).
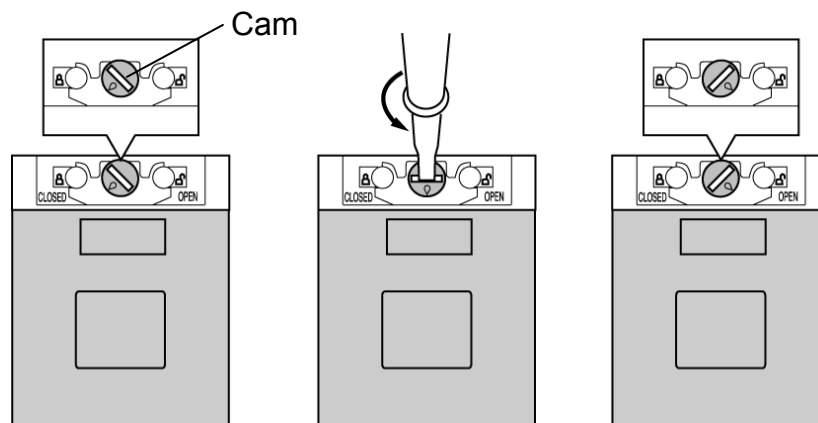
Figure 4-39   Unlocking the CPU

5. Remove the **CPU**.

Installing the CPU

To install the CPU, follow the steps below and refer to figures 37 to 4-41.

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 90 degrees to the clockwise with a flat-blade screwdriver (in the order shown in the figure below).
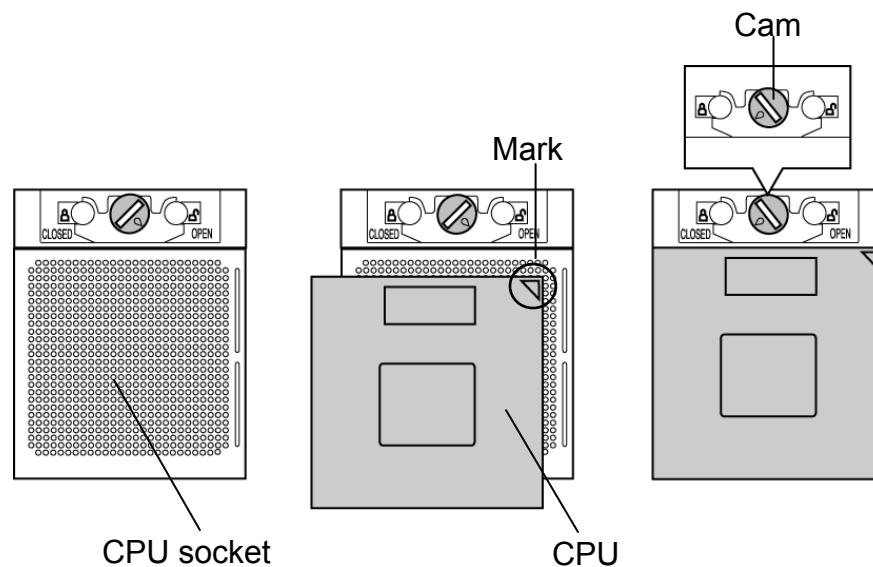
Figure 4-40   Installing the CPU

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.*
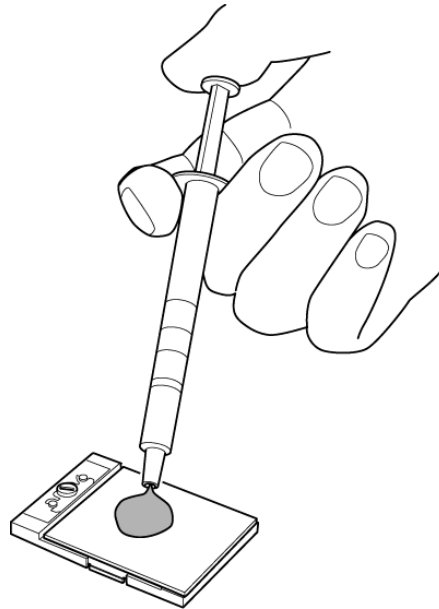
Figure 4-41   Applying new grease

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

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 4-42.

1. Remove the following **screws** 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 **PJ8800** on the system board.
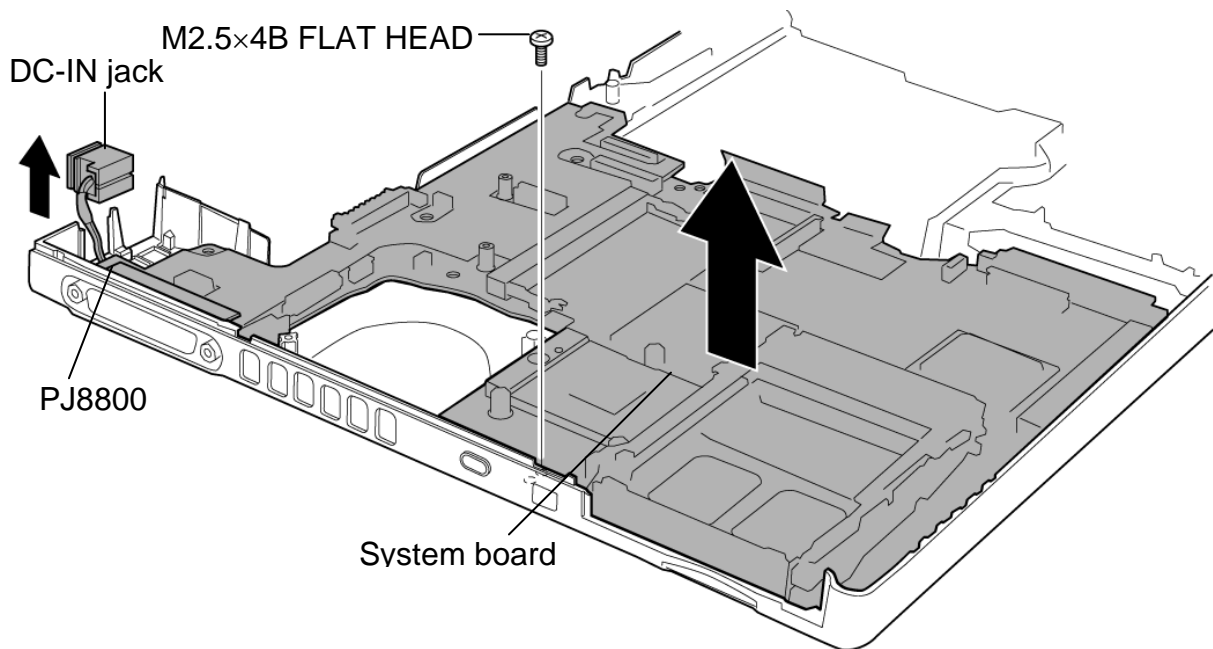
Figure 4-42   Removing the system board/DC-IN jack

Installing the System board/DC-IN jack

To install the system board/DC-IN jack, follow the steps below and refer to figure 4-42.

1. Connect the **DC-IN jack cable** to the connector **PJ8800** on the system board.

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

   - 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 figures 4-43 and 4-44.

1. Remove the following **screw** and the **speaker holder** (left).

    - M2.5×6B   FLAT HEAD screw   ×1

2. Peel off the **acetate tape** and remove the **speaker** (left) from the slot.

3. Remove the following **screw** and the **speaker holder** (right).

    - M2.5×6B   FLAT HEAD screw   ×1

4. Peel off the **acetate tape** and remove the **speaker** (right) from the slot.
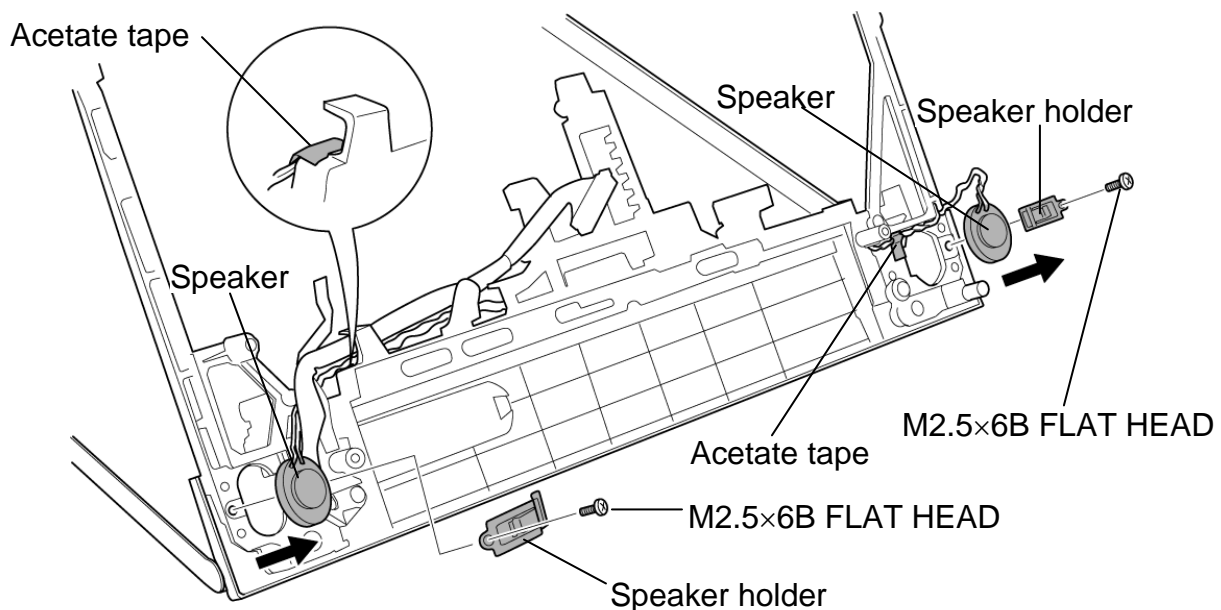
Figure 4-43   Removing the speakers

5. Peel off the **acetate tape** and open the **insulators** securing the **speaker cable** on the hinge (Refer to figure 4-44).

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

Installing the Speaker

To install the speaker, follow the steps below and refer to figures 4-43 and 4-44.

1. Install the **speaker** (left) to the slot.

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

   - M2.5×6B   FLAT HEAD screw   ×1

3. Install the **speaker** (right) to the slot.

4. Install the **speaker holder** (right) while inserting its tip to the slot and secure it with the following **screw**.

   - M2.5×6B   FLAT HEAD screw   ×1

5. Install the **speaker cable** into to the slot and fix it with the **insulators** and **acetate tape**.
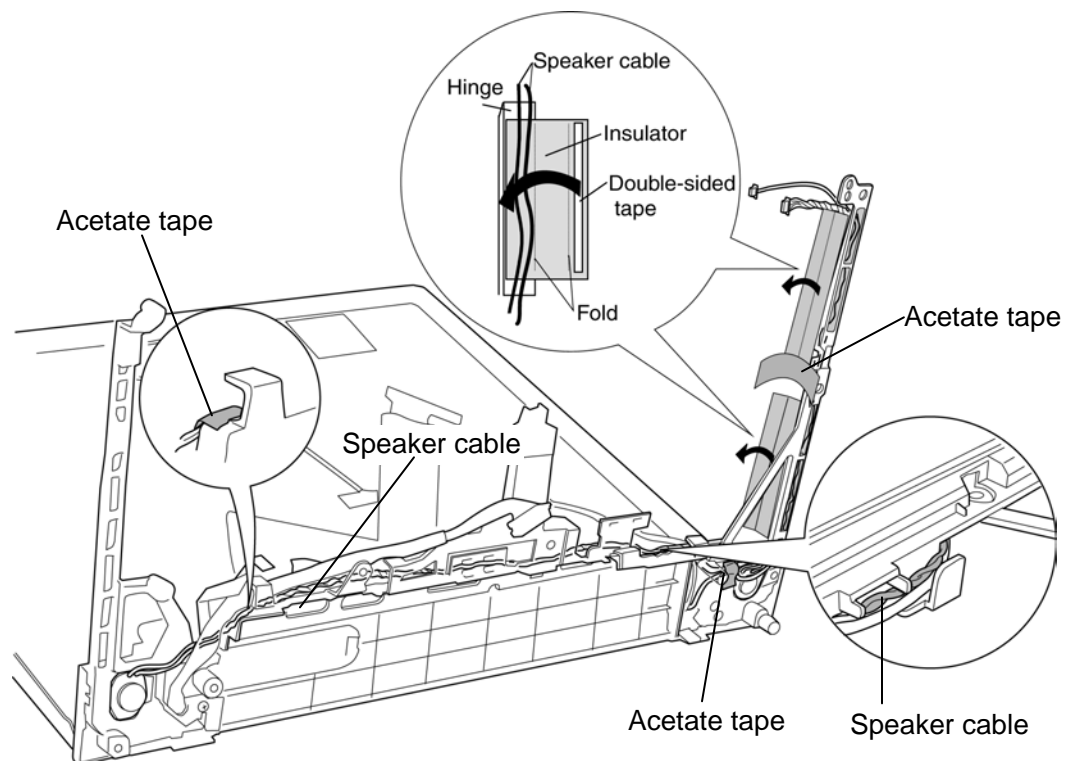
Figure 4-44 Installing the speaker cable

6. Stick the two **acetate tapes** to secure the 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 figures 4-45 and 4-46.

1. Remove the **power button holder** while pushing two **latches** from the back.
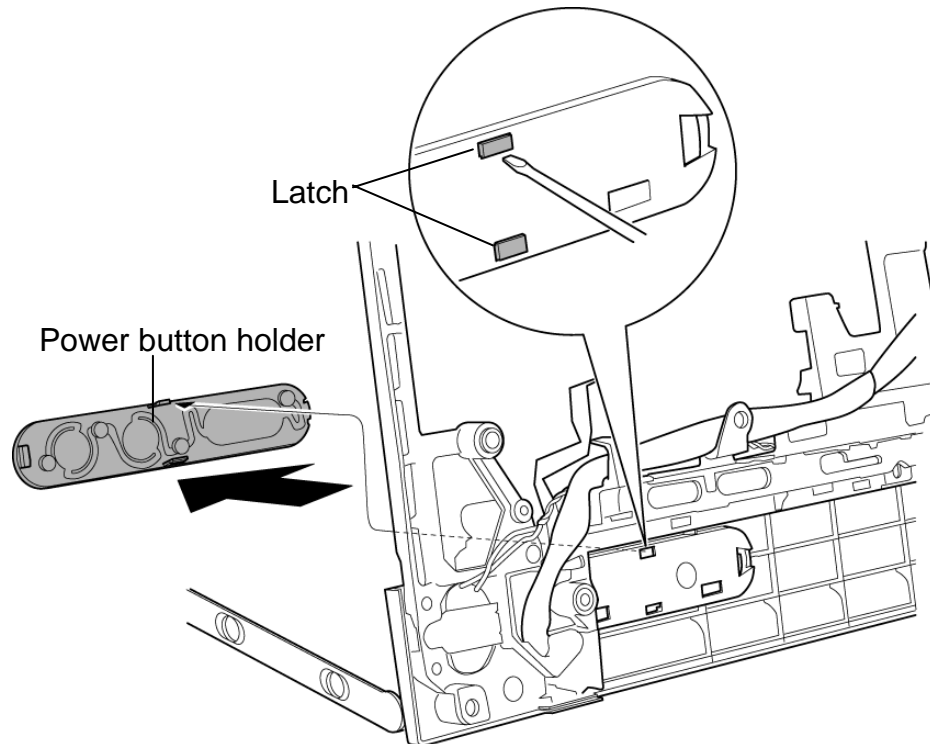
Figure 4-45   Removing the power button holder

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

3. Disconnect the **power switch cable** from the connector **PJ9610** on the power switch board.

Power switch cable

PJ9610
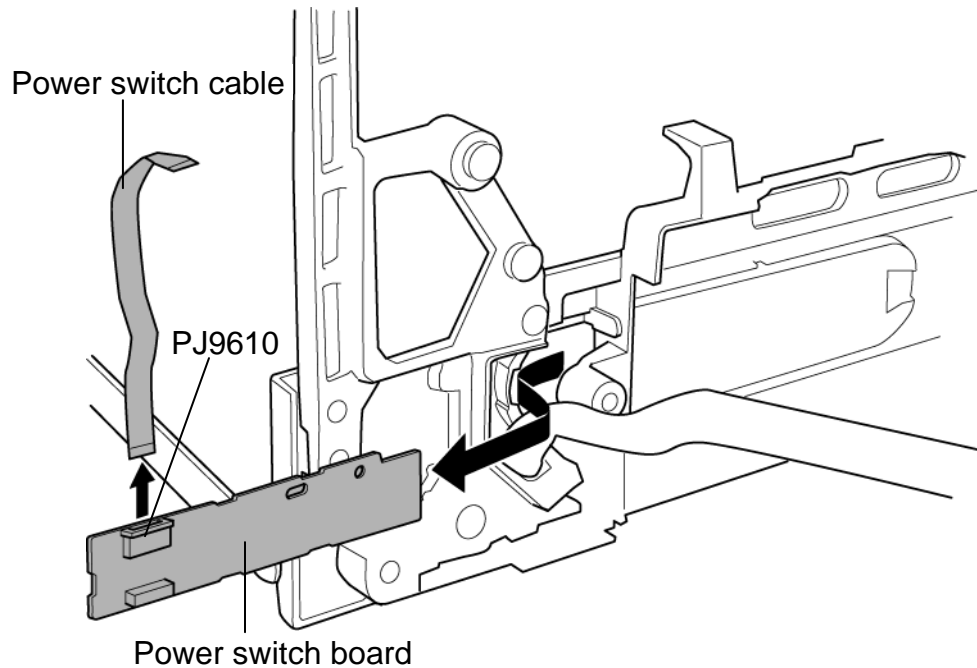
Power switch board

Figure 4-46   Removing the power switch board

Installing the Power switch board

To install the power switch board, follow the steps below and refer to the figures 4-45 and 4-46.

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 two **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 figures 4-47 to 4-52.

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

   - M2.5×6B   FLAT HEAD screw   ×2
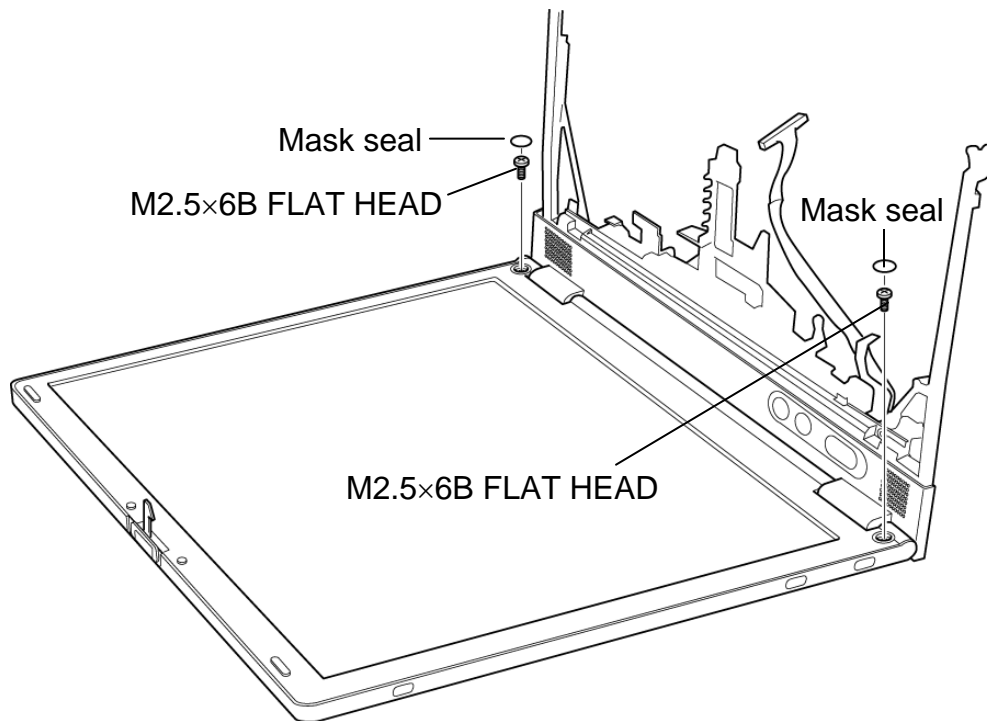
Figure 4-47 Removing the mask seals and screws

2. Remove the **LCD mask** while releasing the latches.
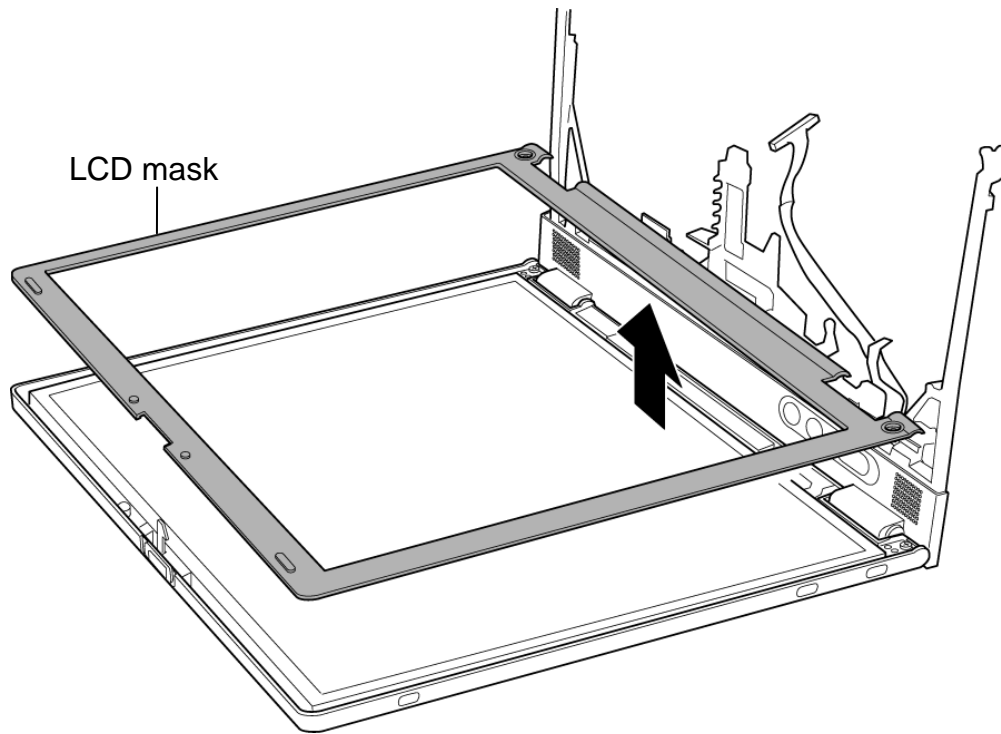
Figure 4-48   Removing the LCD mask

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**.
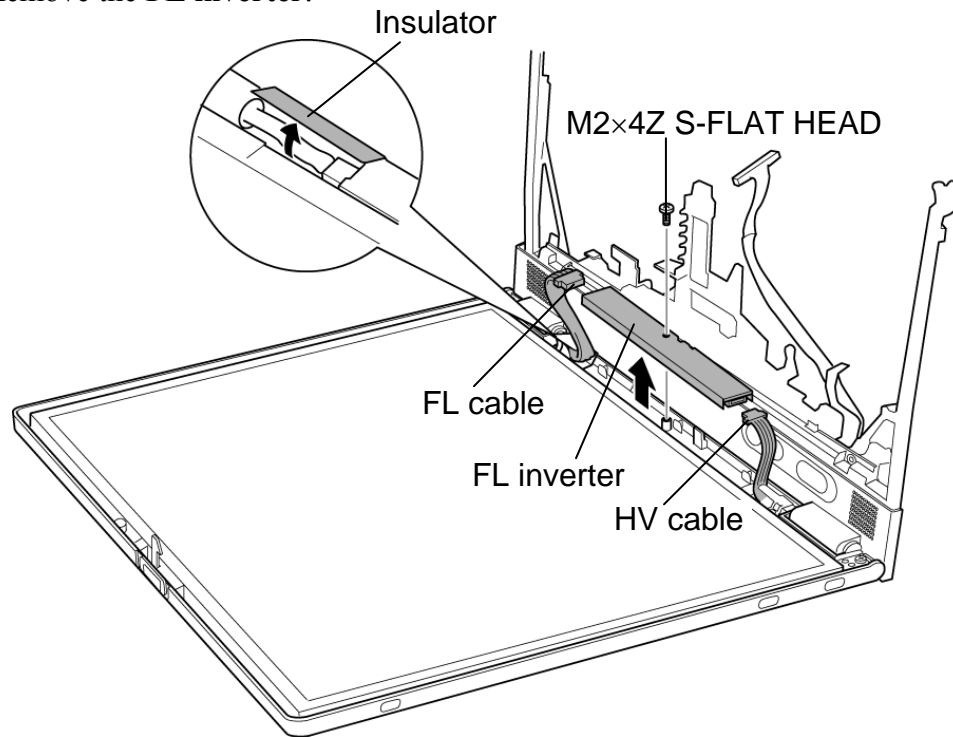
Figure 4-49   Removing the FL inverter

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

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

Mask seal

M2×4Z S-FLAT HEAD

M2×4Z S-FLAT HEAD

Mask seal
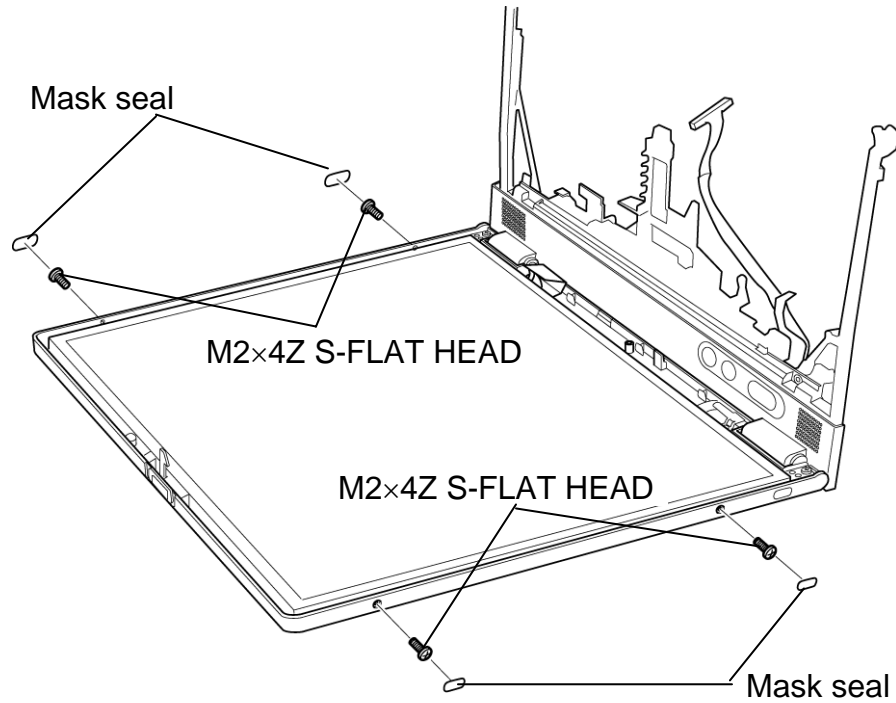
Figure 4-50   Removing the LCD unit (1)

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.*
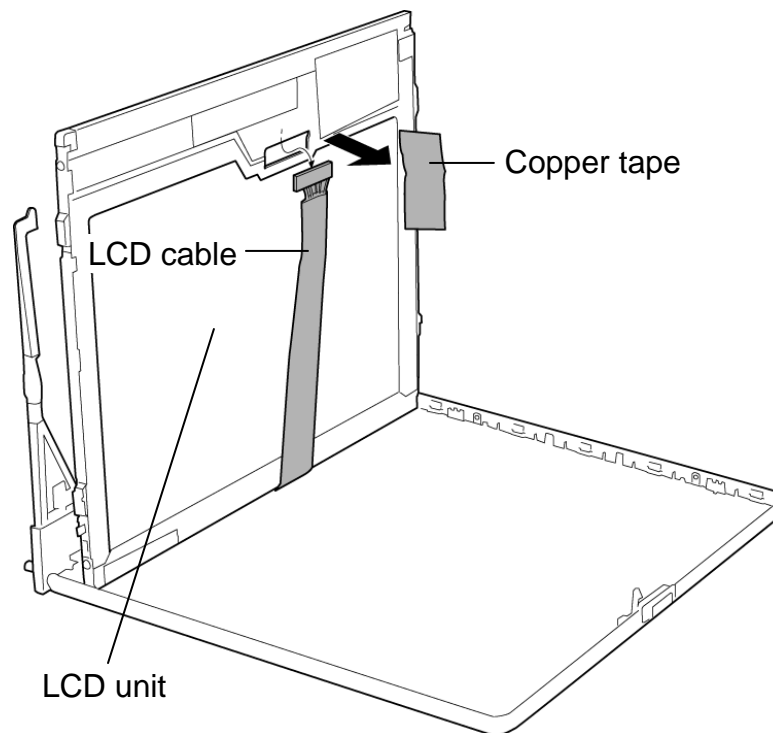
Figure 4-51   Removing the LCD unit (2)

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

- M2×3C   S-FLAT HEAD screw   ×4

M2×3C S-FLAT HEAD screw

LCD unit

LCD support

M2×3C S-FLAT HEAD screw
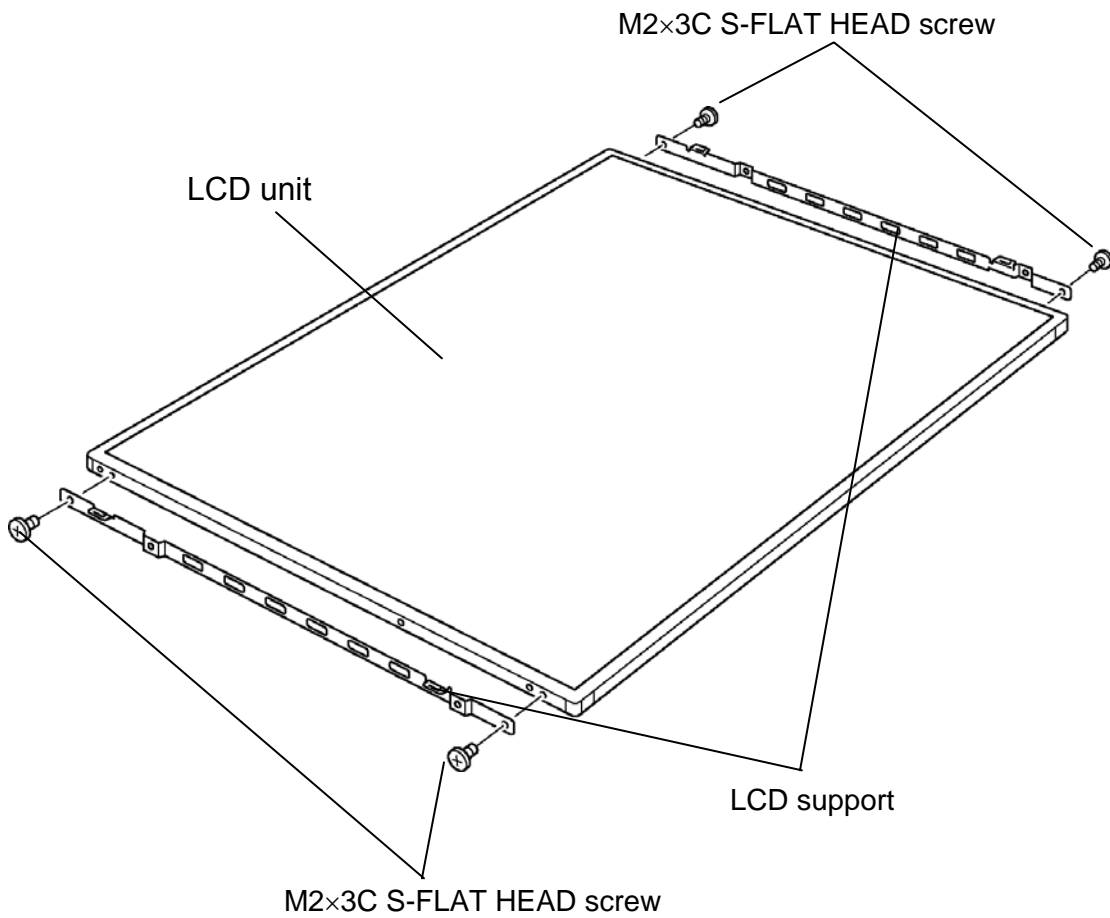
Figure 4-52   Detaching the LCD supports

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

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

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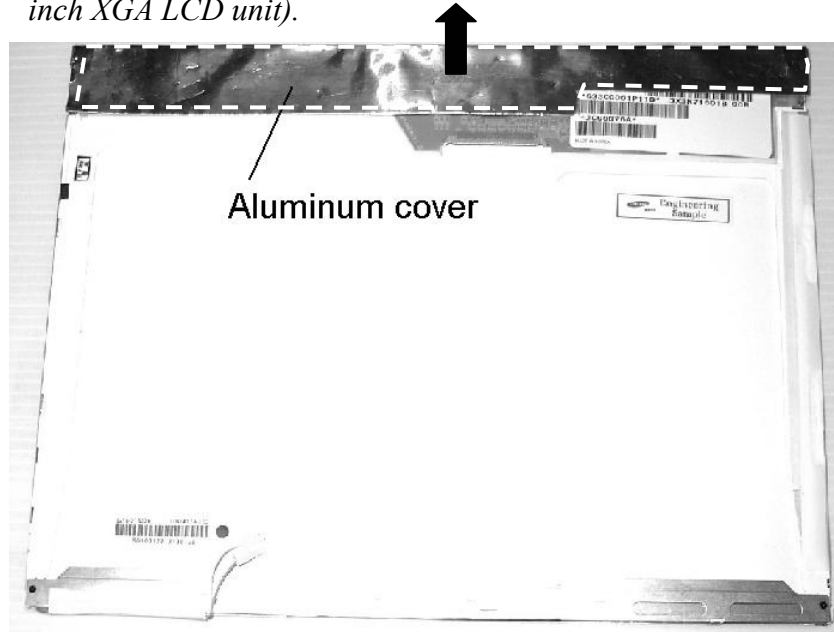
NOTE: *1) Be careful not to apply pressure to the ICs along the edge of LCD unit. The ICs are easily damaged.*

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 figures 4-47 to 4-52.

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.
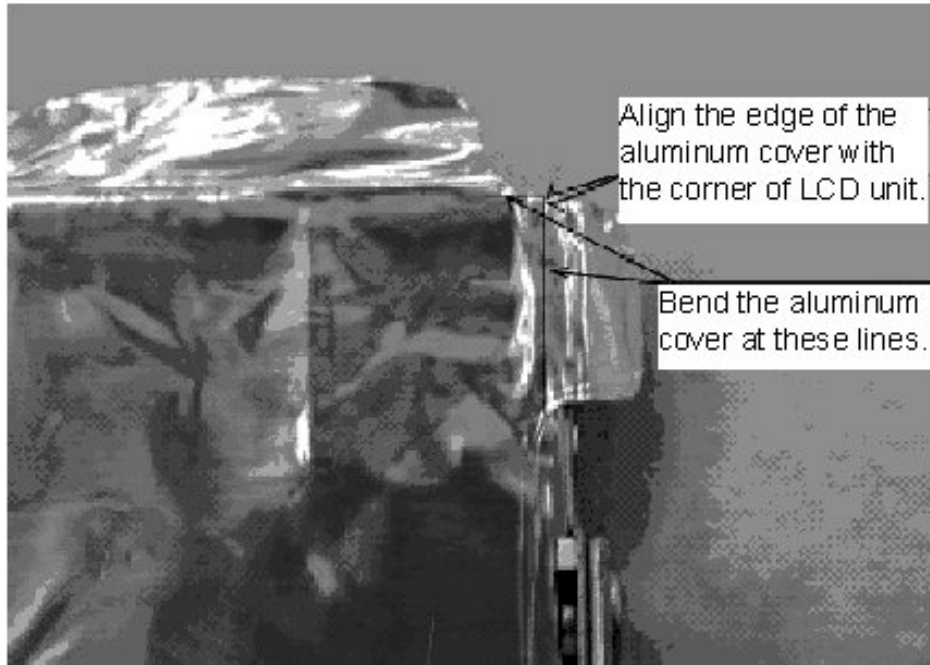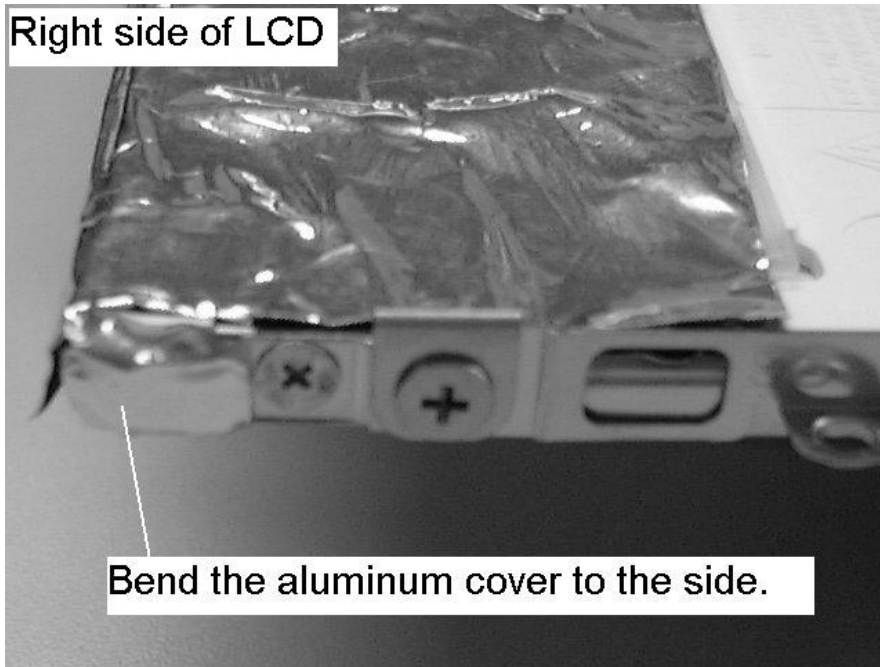
Right side of LCD

Bend the aluminum cover to the side.

Left side of LCD

Bend the aluminum cover to the side.

Top of the LCD

Bend the aluminum cover to the top of LCD

G33C0001P110   3X3J45711

3A00344A

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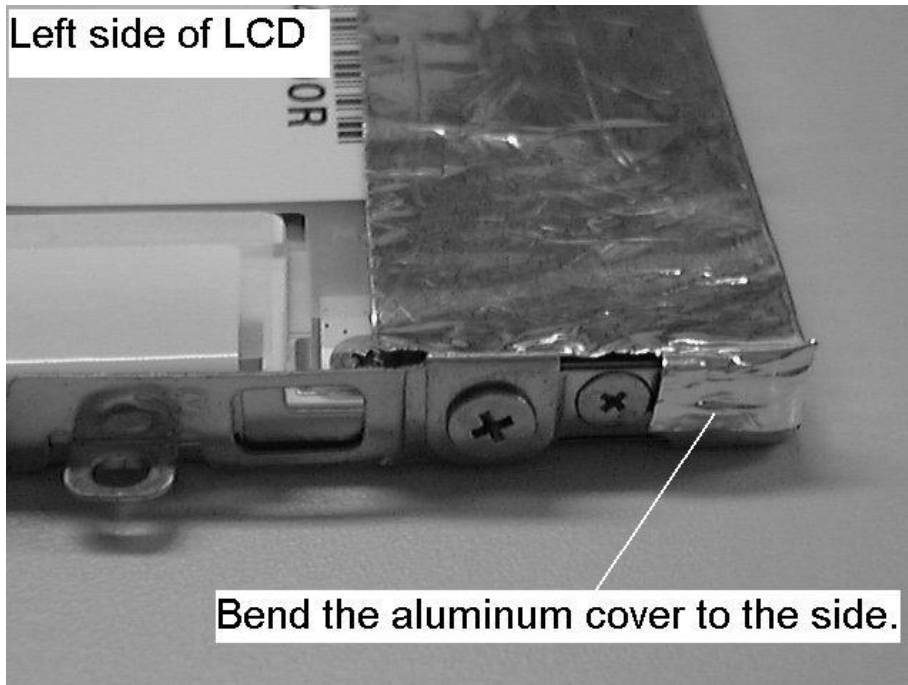
When sticking the aluminum cover, do not cover the bar code.
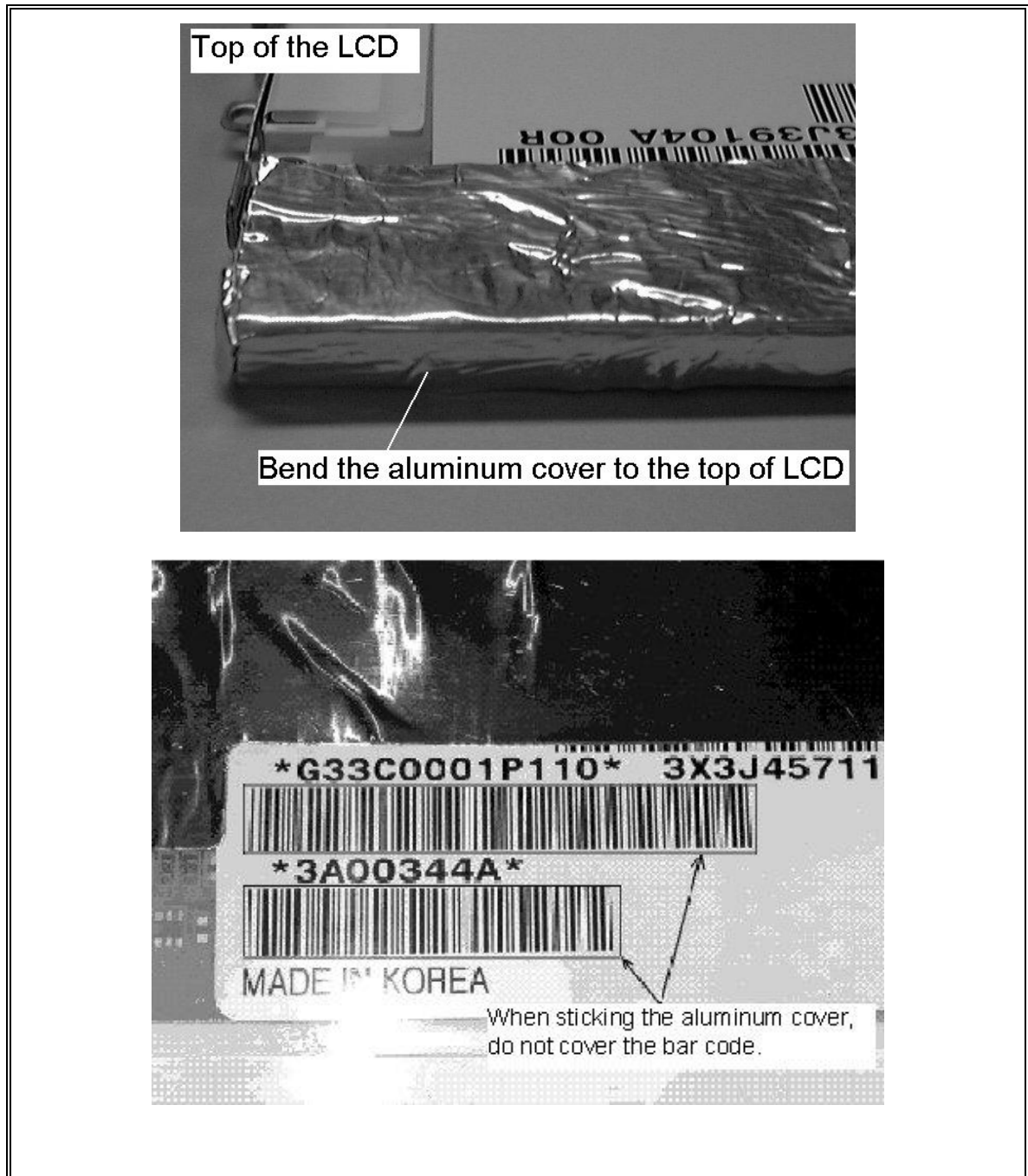
2. Secure the two **LCD supports** to the LCD unit with the following **screws**.

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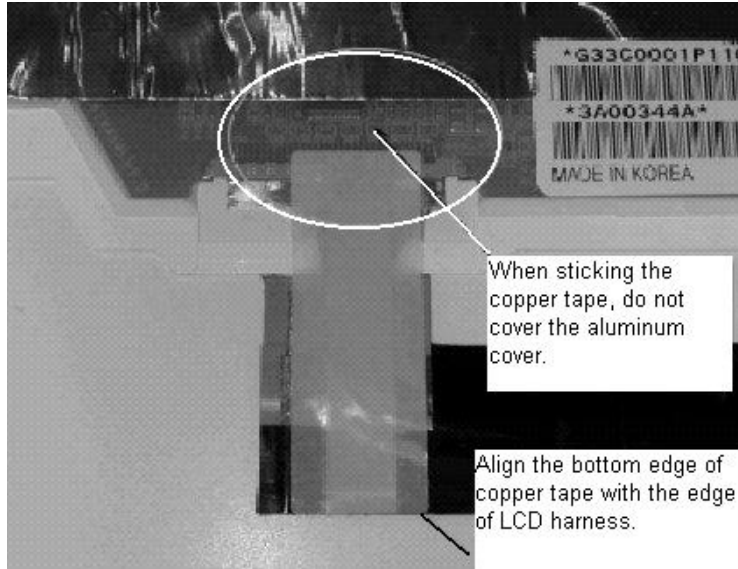
5. Seat the **LCD unit** and secure it with the following **screws**.

    • 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 Wireless LAN antenna

Removing the Wireless LAN antenna

To remove the wireless LAN antenna, follow the steps below and refer to figures 4-53 and 4-54.

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

2. Remove the **aluminum tape**.
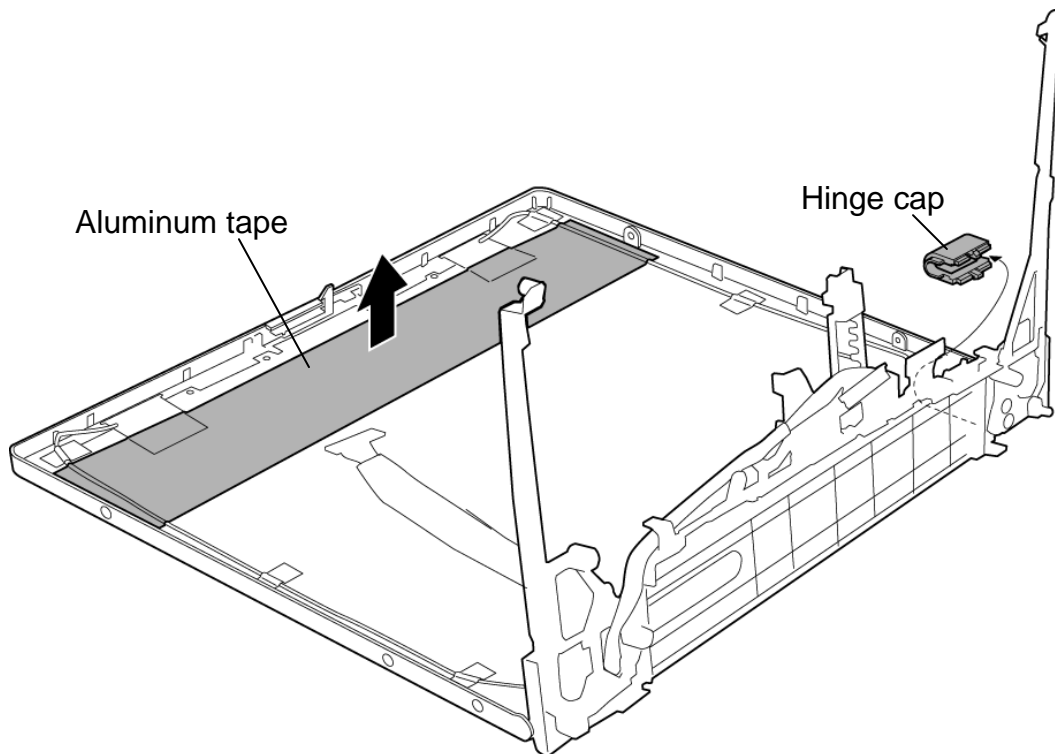
Figure 4-53   Removing the hinge cap and aluminum tape

3. Remove the ten **acetate tapes** securing the wireless LAN antenna cables (for wireless LAN models only).

4. Peel off the **wireless LAN antennas** from the display cover.

5. Remove these **antennas** from the guides and pull them out from the hole of the display cover.
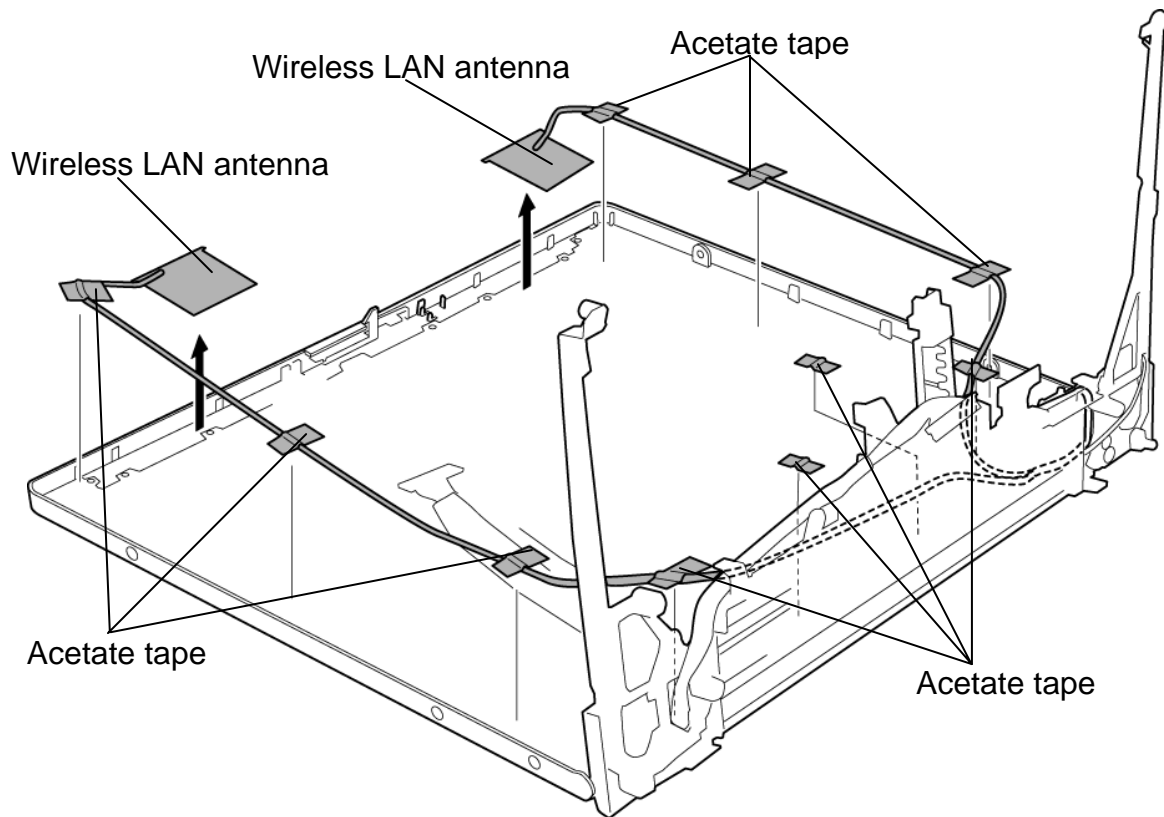
Figure 4-54   Removing the wireless LAN antenna

Installing the Wireless LAN antenna

To install the wireless LAN antenna, follow the steps below and refer to figures 4-53 and 4-54.

1. Stick the **wireless LAN antennas**.

2. Pass the **wireless LAN antenna cables** through the hole and set them in place.

3. Secure the **wireless LAN antenna cables** with the ten **acetate tapes**.

4. Stick the **aluminum tape**.

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

4.25 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to figures 4-55 to 4-58.

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

   - M2.5×4B   FLAT HEAD screw   ×1
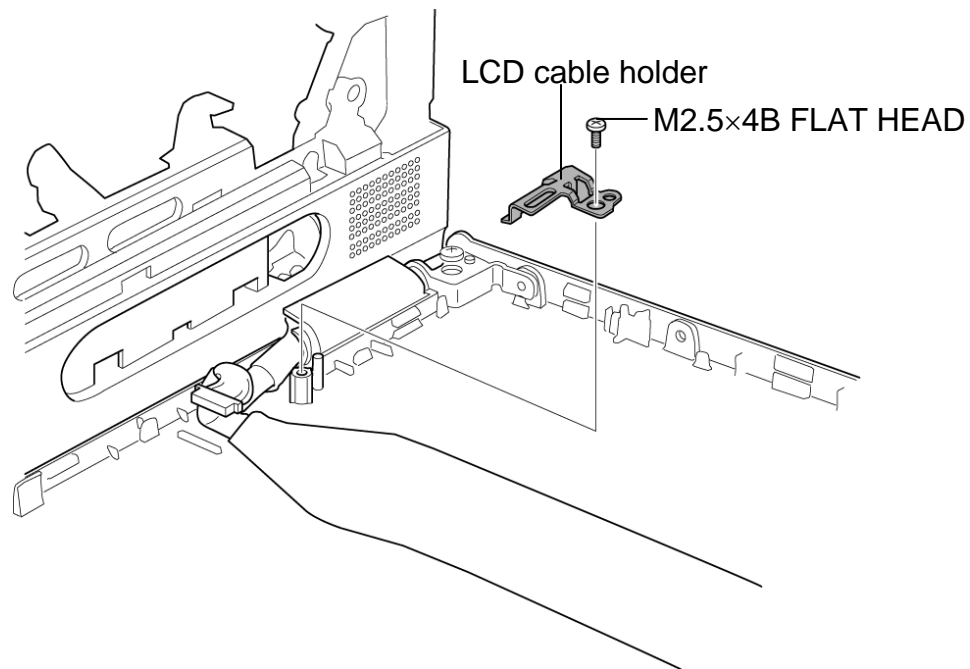
Figure 4-55   Removing the LCD cable holder

2. Remove the **hinge cap** (at the LCD cable side).
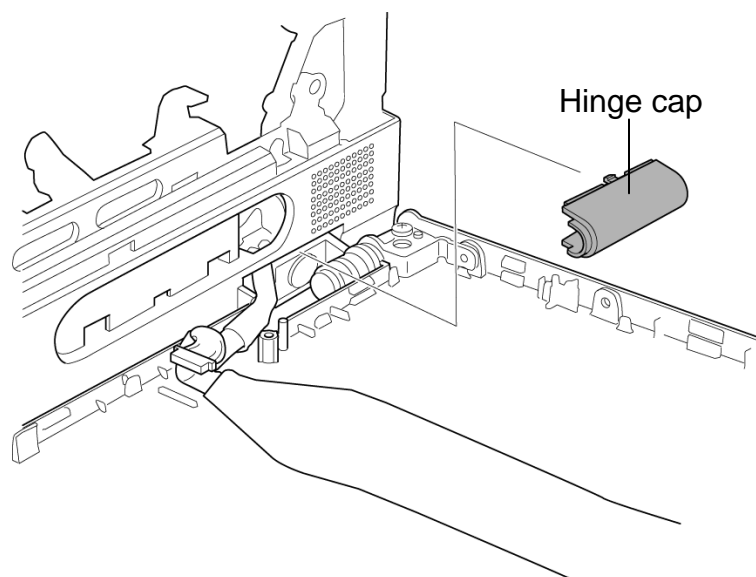
Figure 4-56   Removing the hinge cap

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

Mask seal

M2.5×2.8B FLAT HEAD
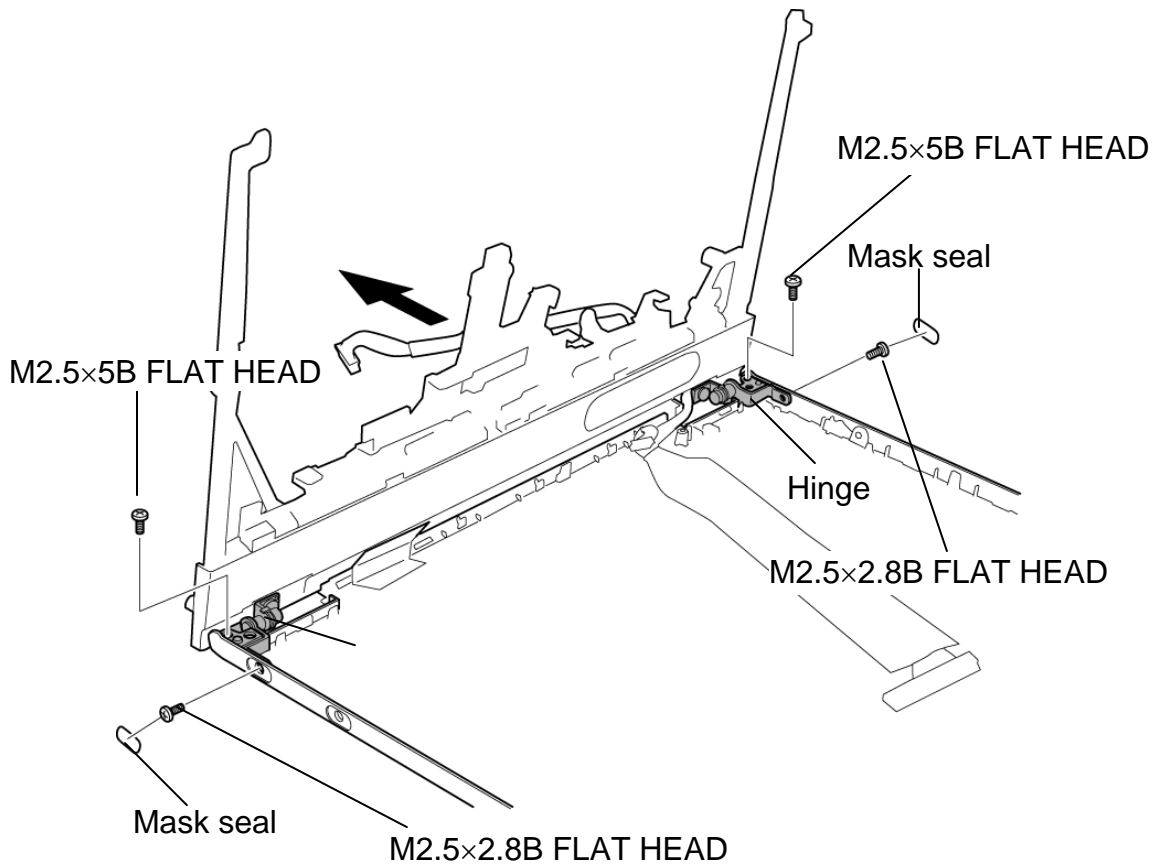
Figure 4-57   Removing the hinge (1)

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

   - M2.5×6   Tapping screw   ×2
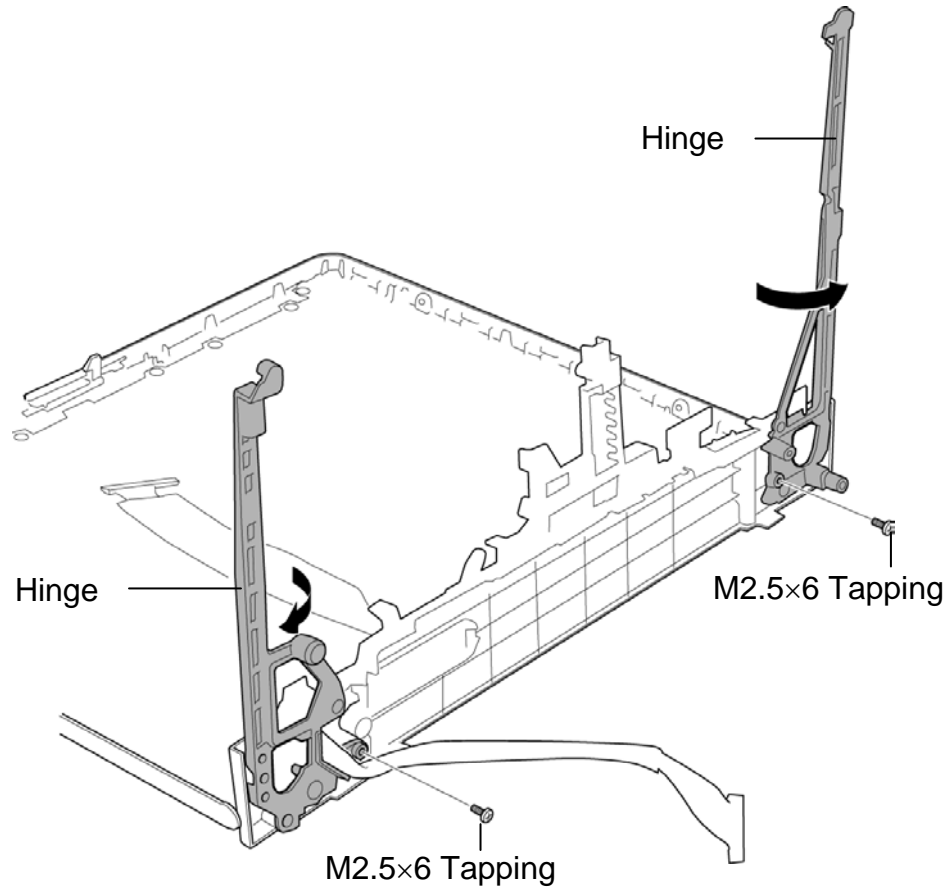
Figure 4-58   Removing the hinge (2)

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

Installing the Hinge

To install the hinge, follow the steps below and refer to figures 4-55 to 4-58.

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 the **both sides 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

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 figures 4-59 to 4-69.

1. Remove the PCB cover and COF cover.

CAUTION: *Handle with care not to damage the COF of S/D and G/D ICs.*
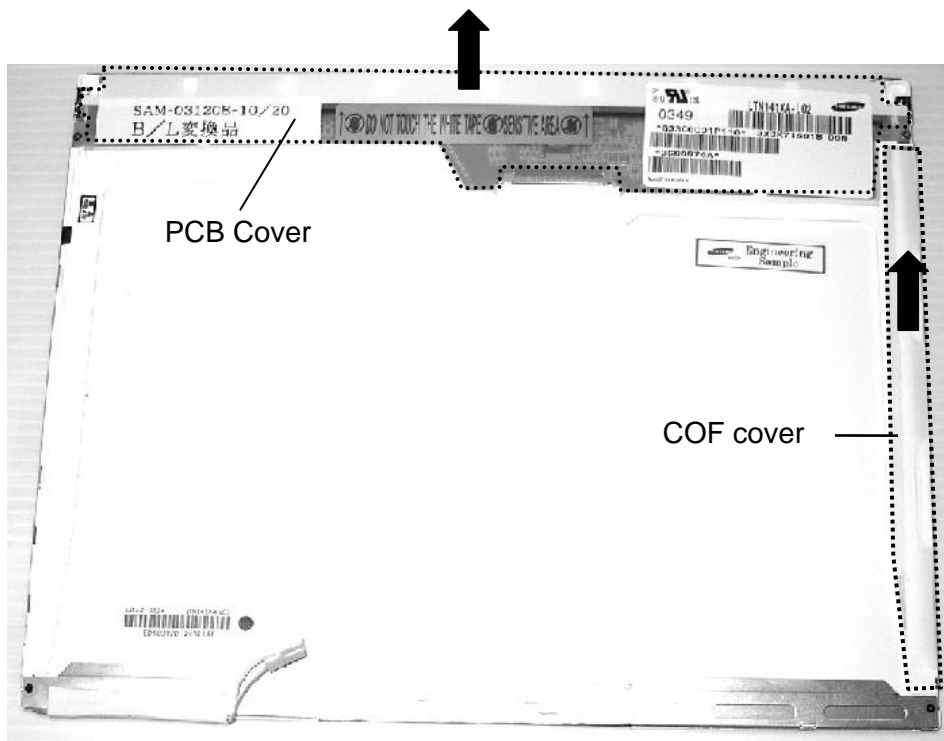
Figure 4-59   Replacing Samsung fluorescent lamp (XGA) (1)

2.   Remove the lamp-wire tape and aluminum tape.
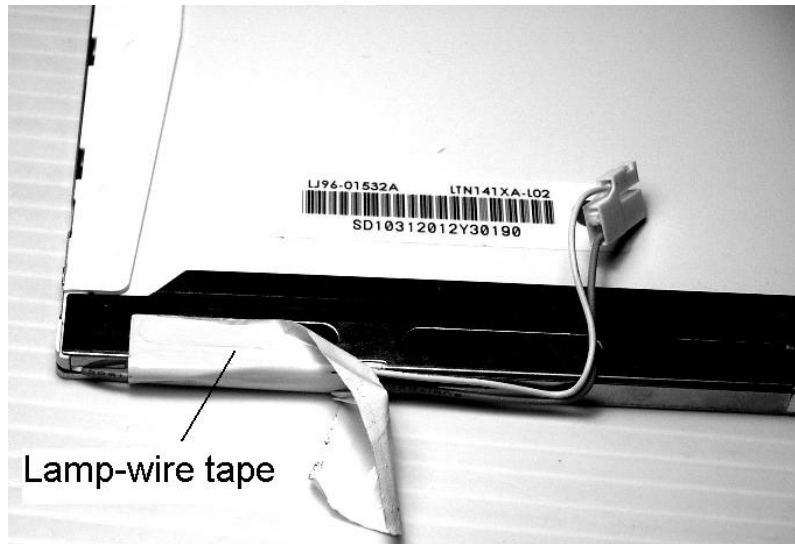
Figure 4-60   Replacing Samsung fluorescent lamp (XGA) (2)
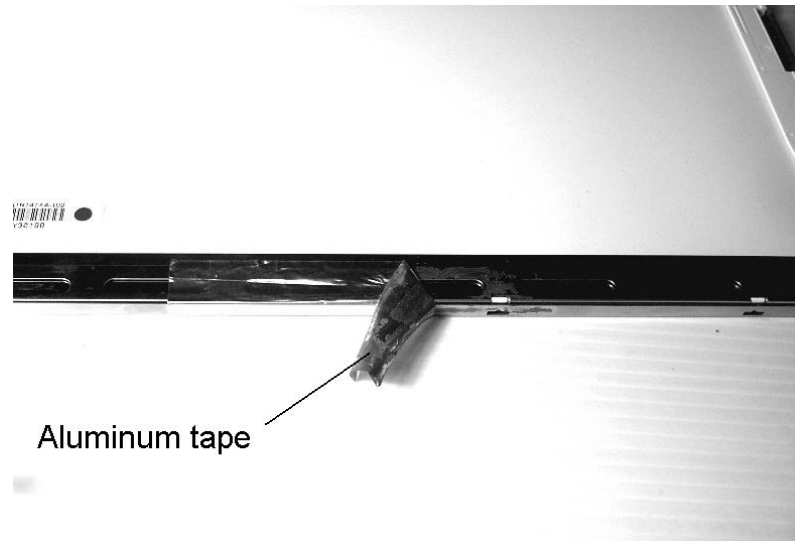
Figure 4-61   Replacing Samsung fluorescent lamp (XGA) (3)

3. Remove the two screws from the PCB.
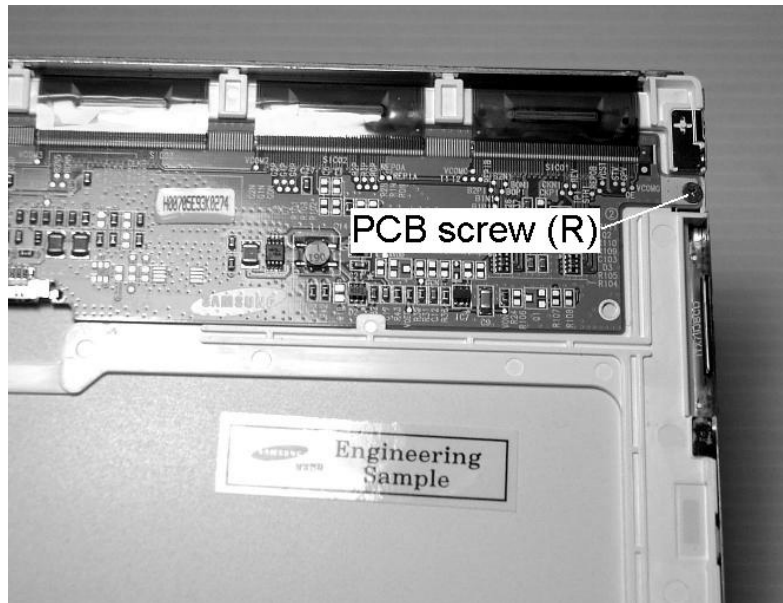
Figure 4-62   Replacing Samsung fluorescent lamp (XGA) (4)
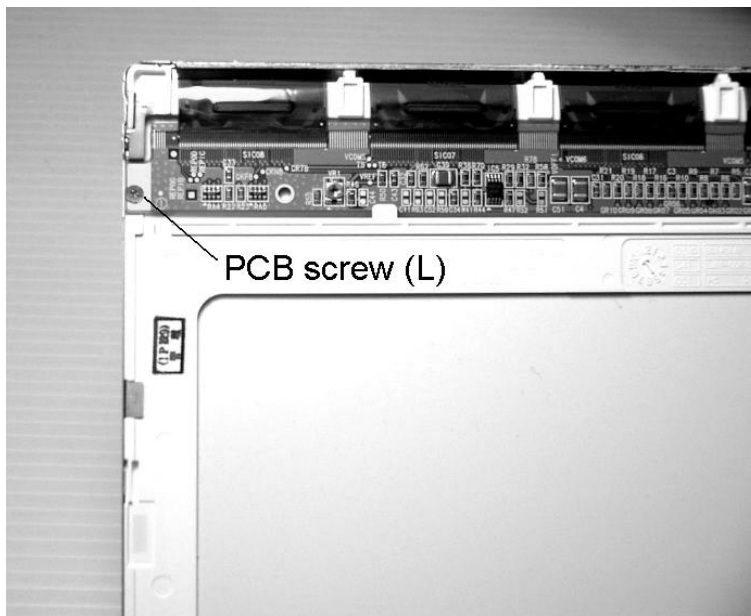
Figure 4-63   Replacing Samsung fluorescent lamp (XGA) (5)

4. Remove the four screws from the top chassis.
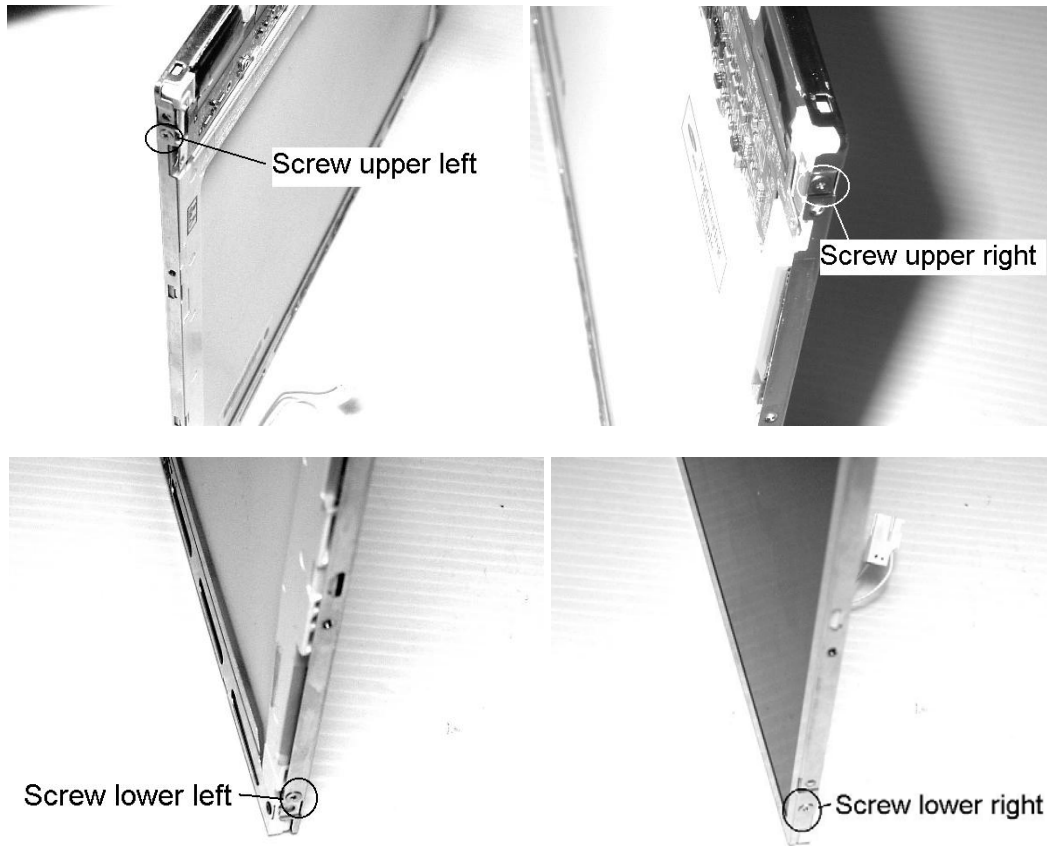
Figure 4-64   Replacing Samsung fluorescent lamp (XGA) (6)

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.*
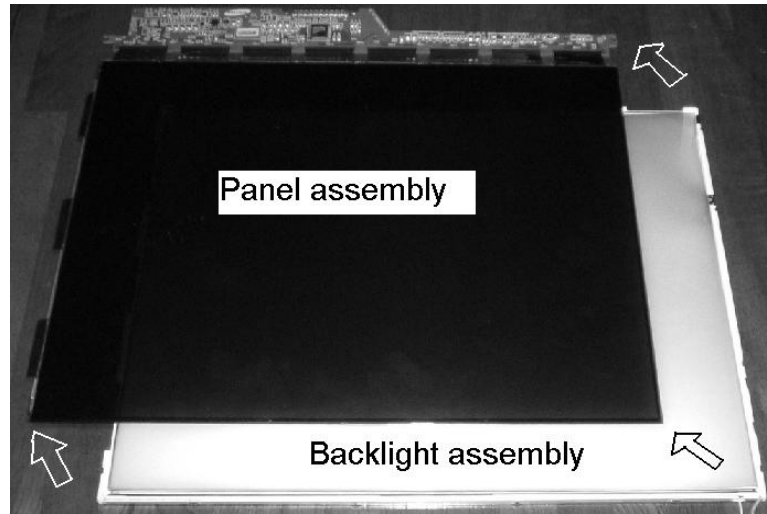
Figure 4-65   Replacing Samsung fluorescent lamp (XGA) (7)

6. Remove the two clips.

7. Remove the backlight assembly.
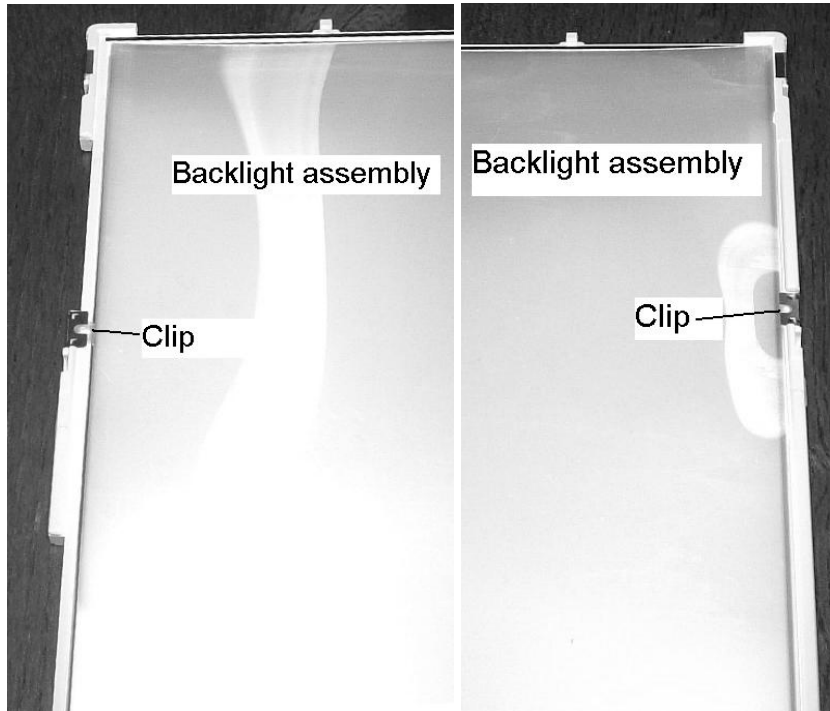
Figure 4-66   Replacing Samsung fluorescent lamp (XGA) (8)

8. Remove the two screws fixing the back cover of the fluorescent lamp.
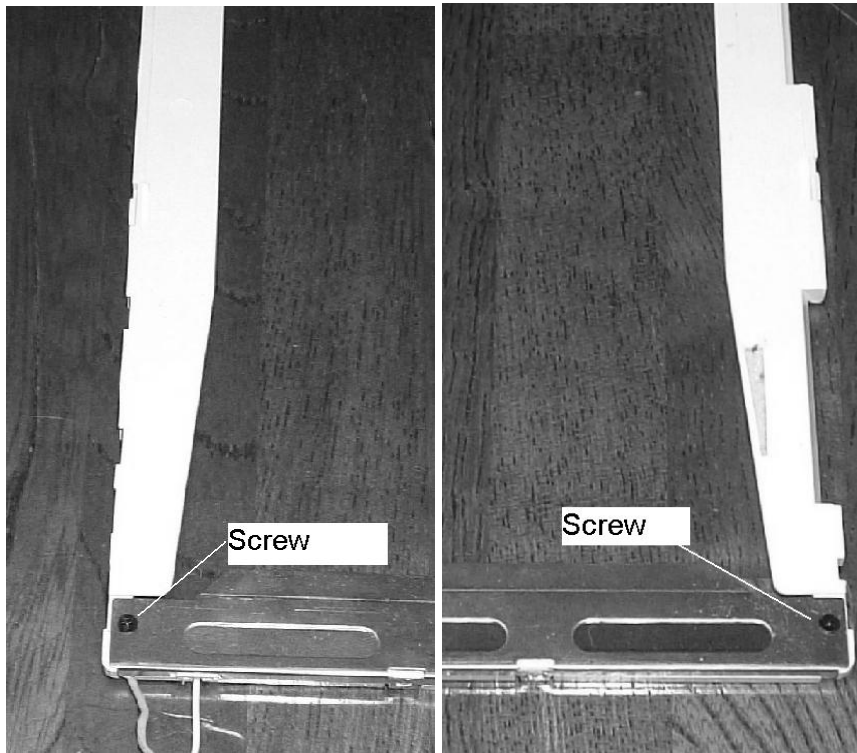
Figure 4-67   Replacing Samsung fluorescent lamp (XGA) (9)

9. Remove the grounding wire of the fluorescent lamp from the frame.
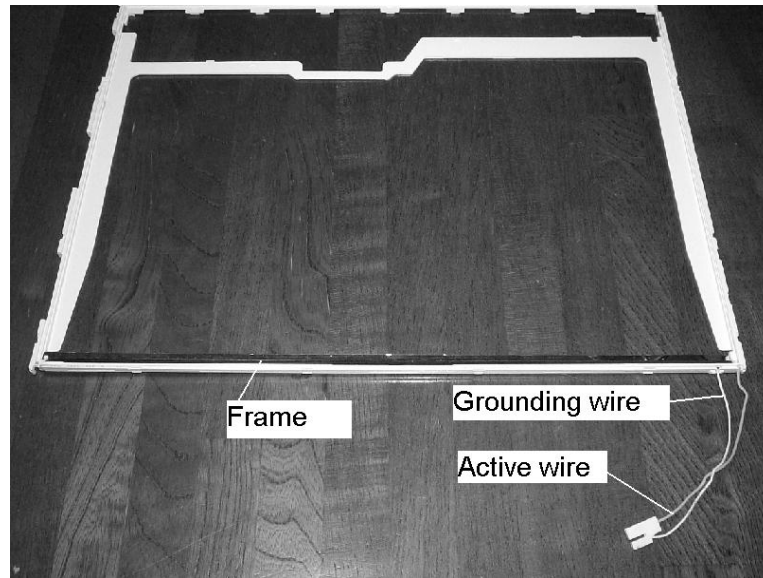
Figure 4-68   Replacing Samsung fluorescent lamp (XGA) (10)

10. Remove the fluorescent lamp from the frame.
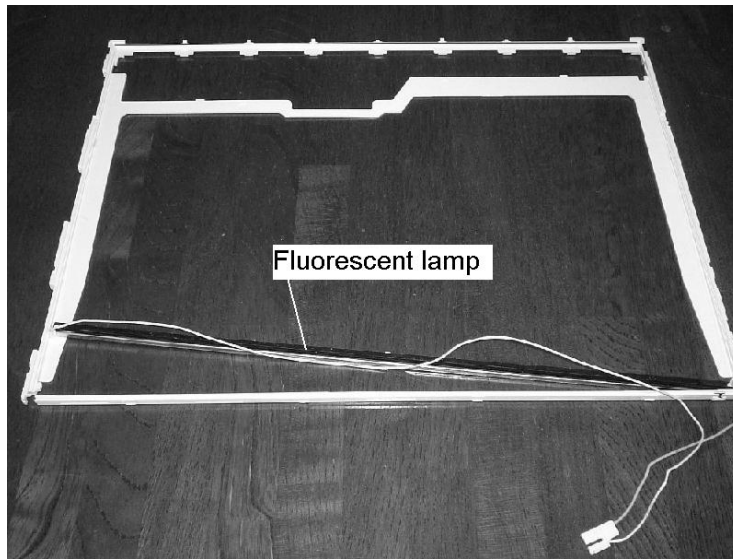
Figure 4-69   Replacing Samsung fluorescent lamp (XGA) (11)

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 figures 4-59 to 4-69.

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.

Appendices

Appendix   Contents

Figures

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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.
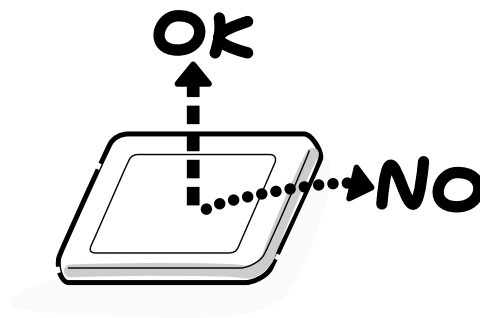
2. For the LCD module, be careful to align the four holes at the right side and left side of the LCD module with the corresponding holes in the LCD cover before securing the module with four screws.
   Do not force the module into place, because stress can affect its performance.

   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.
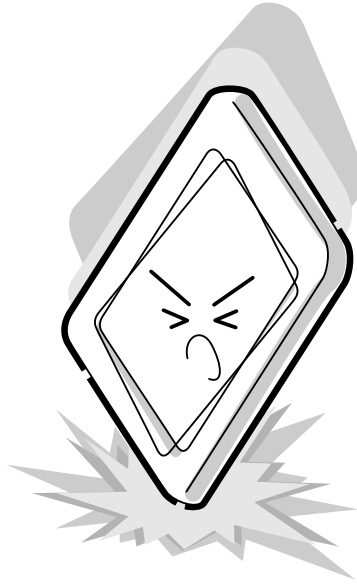
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
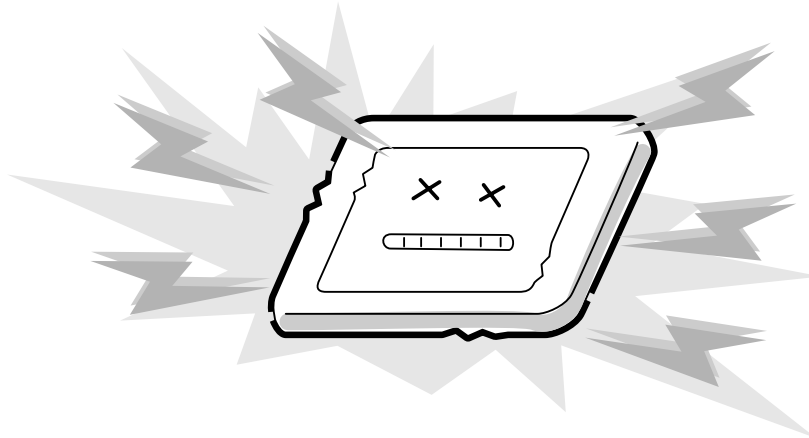
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long
    periods.
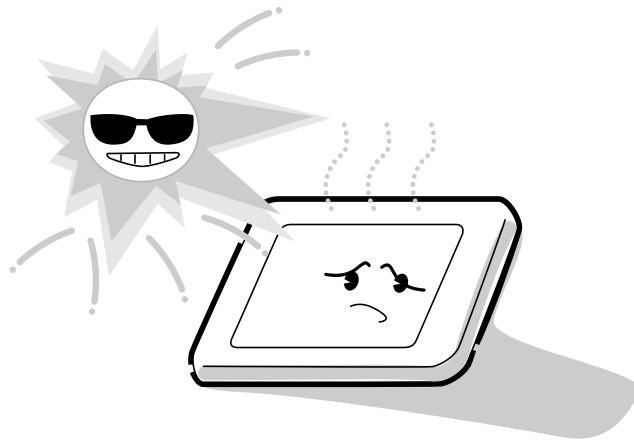
8. Do not store the module at temperatures below specifications. Cold can cause the
    liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
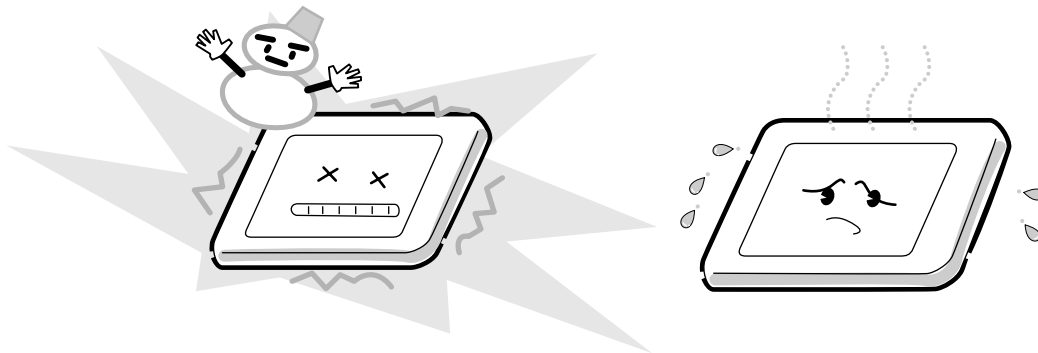
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
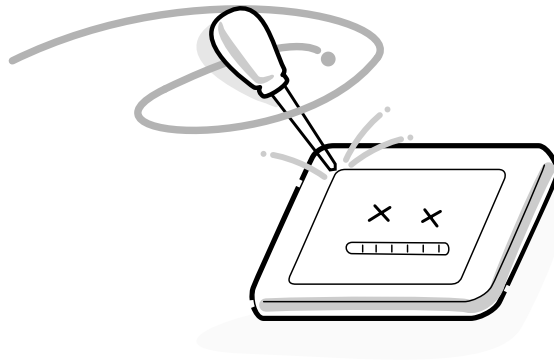
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
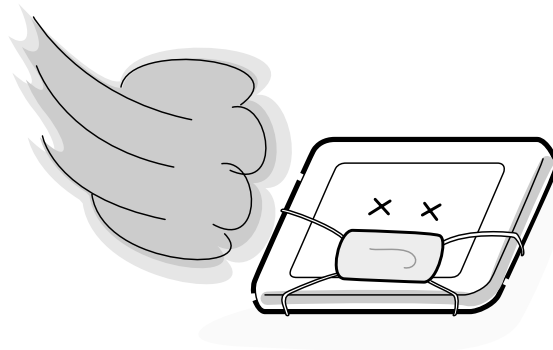
Appendix B   Board Layout

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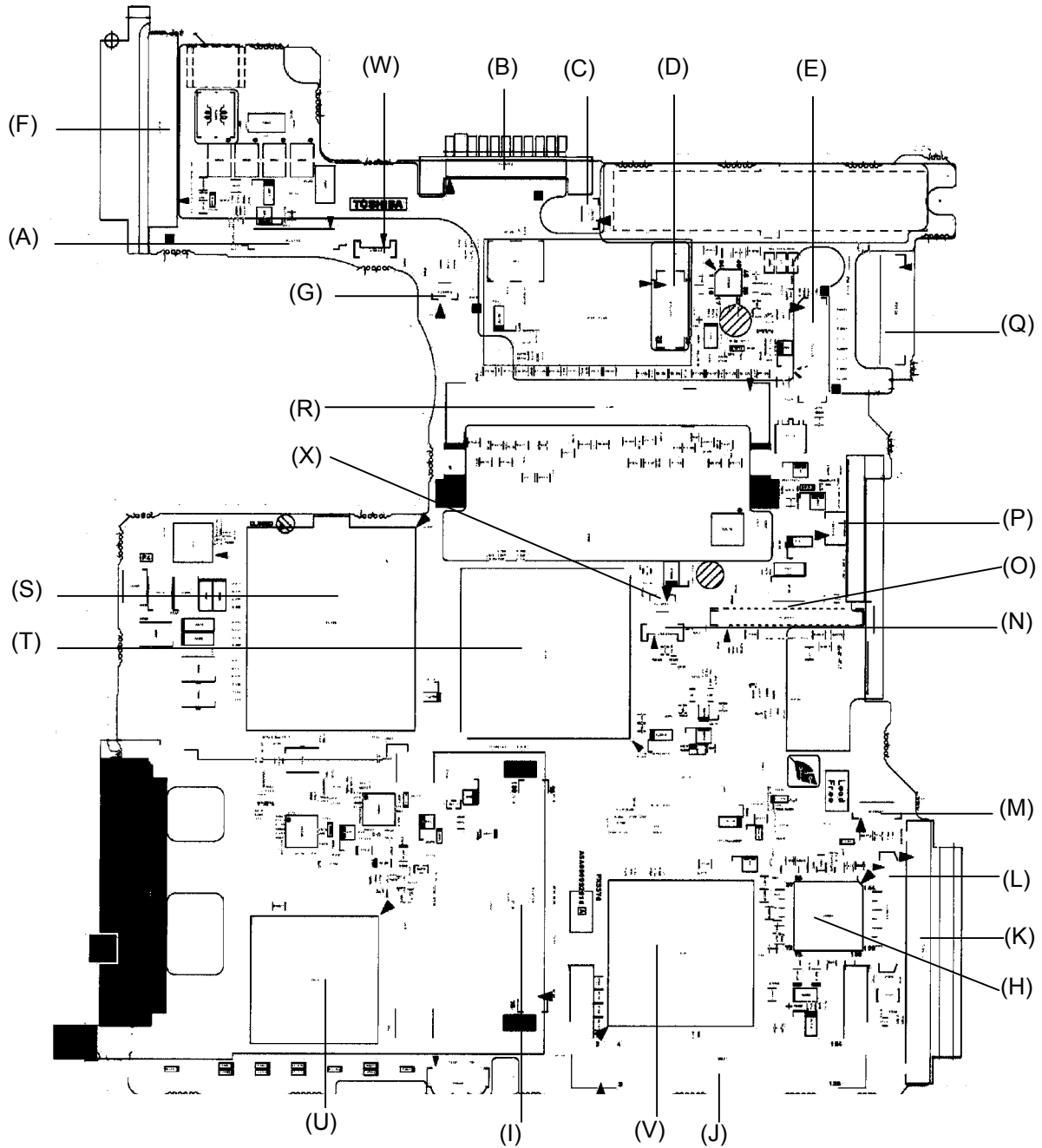
Figure B-1 System board (FXSSY) layout (front)*

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

Mark	Number	Name
(A)	PJ4100	Network interface connector
(B)	PJ8810	Main Battery connector
(C)	PJ3001	MODEM connector
(D)	PJ3000	MDC connector
(E)	PJ5500	LCD interface connector
(F)	PJ3401	Parallel port connector
(G)	PJ8770	Fan connector
(H)	IC3200	EC/KBC
(I)	PJ2100	PC card interface connector
(J)	PJ2200	Mini PCI interface connector
(K)	PJ1800	HDD connector
(L)	PJ9500	SN board interface connector
(M)	PJ9501	SN card interface connector
(N)	PJ3201	Touch pad connector
(O)	PJ3200	Keyboard connector
(P)	PJ2000	Debugging connector
(Q)	PJ5621	RG board interface connector
(R)	IS1401	Internal memory connector
(S)	IS1050	CPU socket
(T)	IC1200	Montara GM+
(U)	IC2000	YEBISU3S
(V)	IC1600	ICH4-M
(W)	PJ9600	SW board connector
(X)	PJ1005	RTC battery connector

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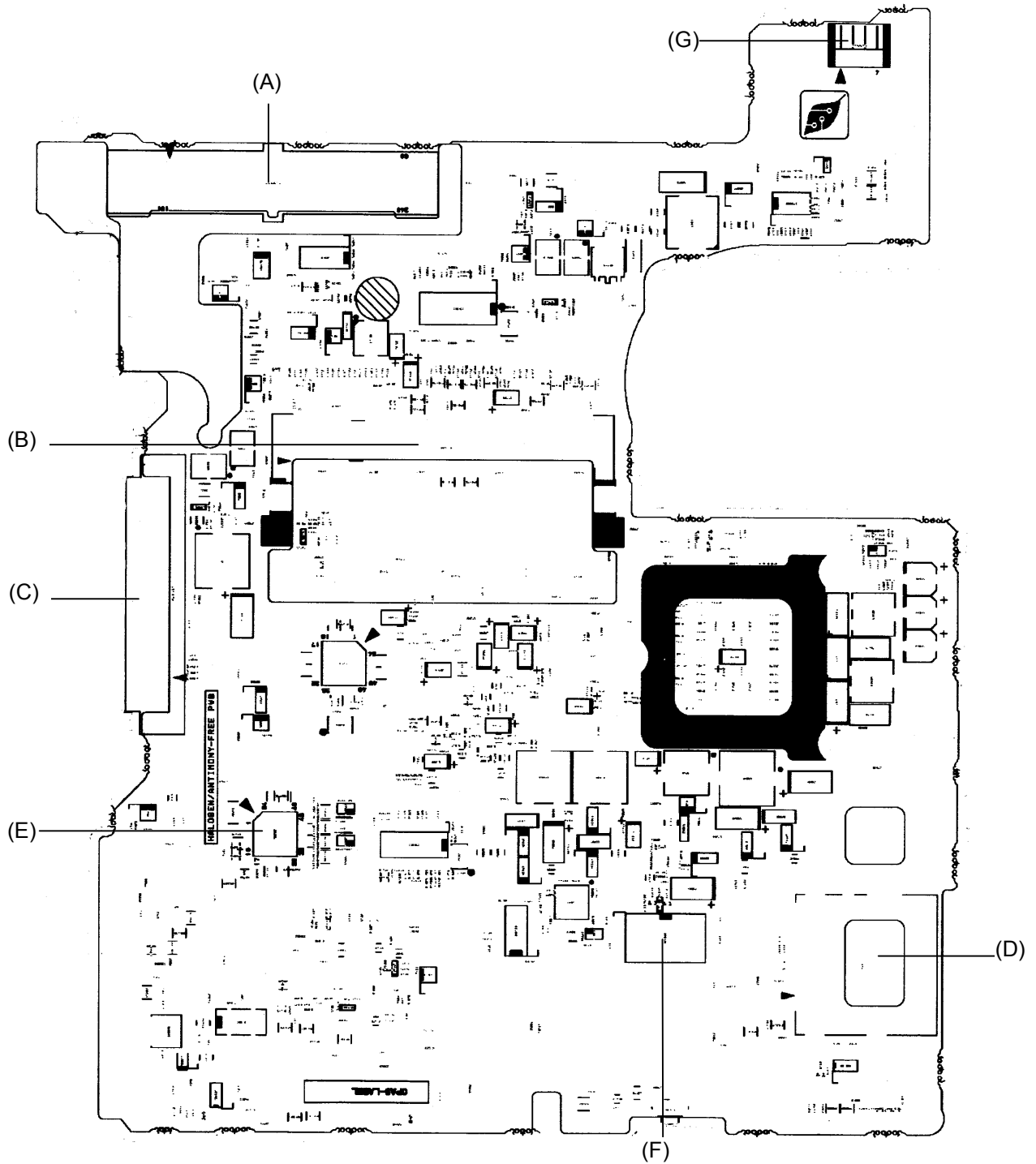
Figure B-2 System board (FXSSY) layout (back)*

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

Mark	Number	Name
(A)	PJ2300	Docking interface connector
(B)	IS1400	Extension memory connector
(C)	PJ1801	Select-bay interface connector
(D)	IS2101	SD card interface connector
(E)	IC8972	PSC
(F)	IC3000	HWH
(G)	PJ8800	DC-IN connector

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

(front)

(back)

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

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

Mark	Number	Name
(A)	PJ6000	Headphone connector
(B)	PJ6002	External microphone connector
(C)	PJ4600	USB port 0 connector
(D)	PJ4601	USB port 1 connector
(E)	PJ3202	Speaker connector
(F)	PJ9511	USB harness connector
(G)	PJ9510	System board I/F connector
(H)	VR6000	Volume

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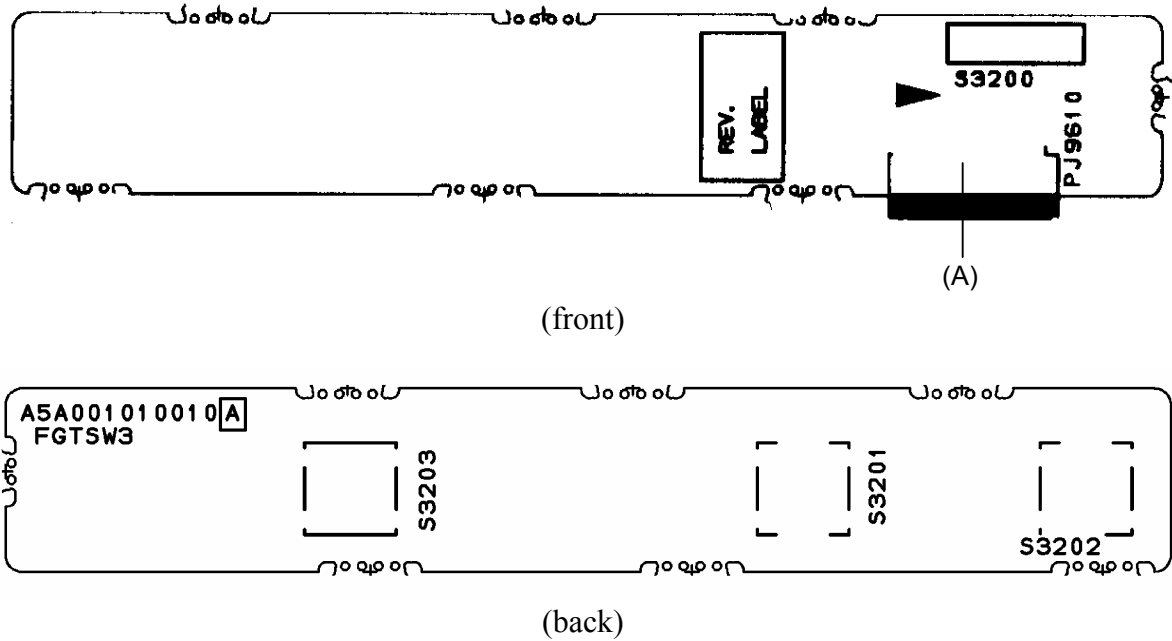
(front)

(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 (FXSRG*) Front and Back View

(front)

(A)

(B)
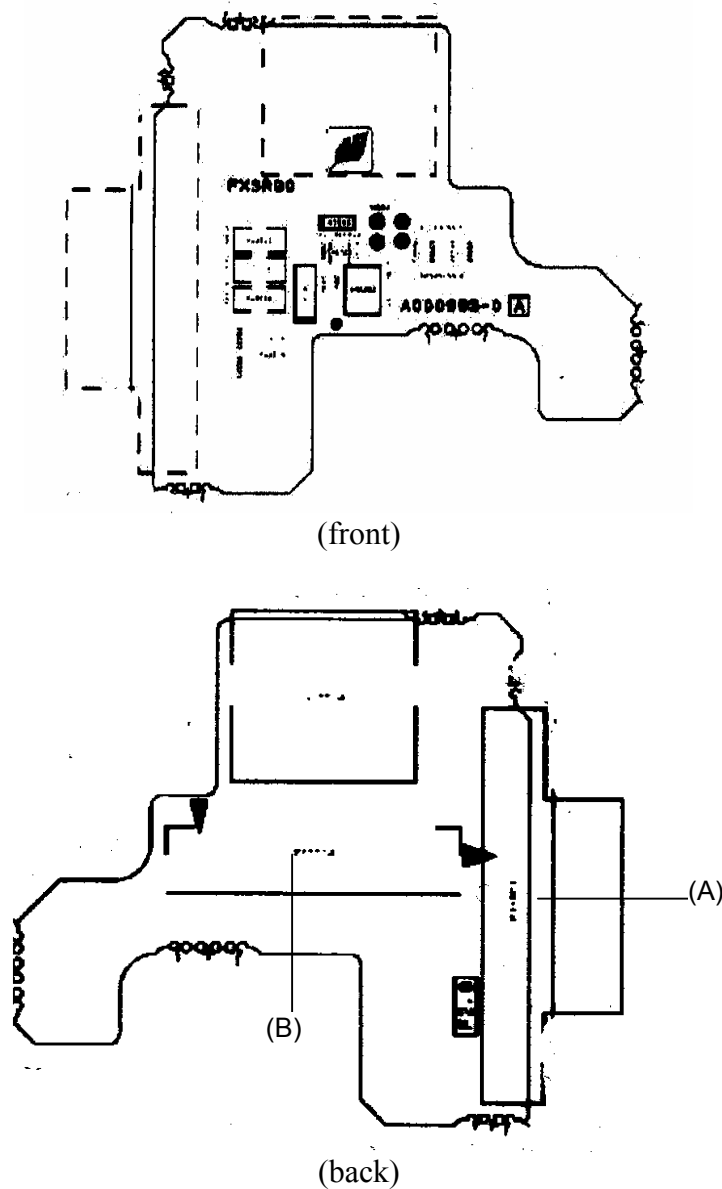
(back)

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

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

Mark	Number	Name
(A)	PJ5622	System board interface connector
(B)	PJ5620	CRT connector

Appendix C   Pin Assignments

System board

C.1   IS1400   Expansion memory connector (200-pin)

Table C-1 Expansion memory connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-B1V	-	2	MR1R25-B1V	-
3	GND	-	4	GND	-
5	SDQ04-B2P	I/O	6	SDQ01-B2P	I/O
7	SDQ00-B2P	I/O	8	SDQ03-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0-B2P	I/O	12	SDM00-B2P	I
13	SDQ06-B2P	I/O	14	SDQ02-B2P	I/O
15	GND	-	16	GND	-
17	SDQ05-B2P	I/O	18	SDQ07-B2P	I/O
19	SDQ13-B2P	I/O	20	SDQ14-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08-B2P	I/O	24	SDQ15-B2P	I/O
25	SDQS1-B2P	I/O	26	SDM01-B2P	I
27	GND	-	28	GND	-
29	SDQ09-B2P	I/O	30	SDQ11-B2P	I/O
31	SDQ12-B2P	I/O	32	SDQ10-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK0-B2P	I	36	2R5-B2V	-
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ22-B2P	I/O	42	SDQ16-B2P	I/O
43	SDQ18-B2P	I/O	44	SDQ20-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2-B2P	I/O	48	SDM02-B2P	I
49	SDQ23-B2P	I/O	50	SDQ17-B2P	I/O
51	GND	-	52	GND	-
53	SDQ19-B2P	I/O	54	SDQ21-B2P	I/O
55	SDQ27-B2P	I/O	56	SDQ24-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ26-B2P	I/O	60	SDQ25-B2P	I/O
61	SDQS3-B2P	I/O	62	SDM03-B2P	I

Table C-1 Expansion memory connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	GND	-	64	GND	-
65	SDQ30-B2P	I/O	66	SDQ29-B2P	I/O
67	SDQ31-B2P	I/O	68	SDQ28-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE1-B2P	I	96	SCKE0-B2P	I
97	NC	-	98	NC	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMA05-B2P	I	108	SMA04-B2P	I
109	SMA03-B2P	I	110	SMA02-B2P	I
111	SMA01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS0-B2N	I	122	SCS1-B2N	I
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ38-B2P	I/O	128	SDQ36-B2P	I/O
129	SDQ34-B2P	I/O	130	SDQ37-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4-B2P	I/O	134	SDM04-B2P	I
135	SDQ39-B2P	I/O	136	SDQ33-B2P	I/O
137	GND	-	138	GND	-

Table C-1 Expansion memory connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	SDQ35-B2P	I/O	140	SDQ32-B2P	I/O
141	SDQ45-B2P	I/O	142	SDQ46-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ44-B2P	I/O	146	SDQ42-B2P	I/O
147	SDQS5-B2P	I/O	148	SDM05-B2P	I
149	GND	-	150	GND	-
151	SDQ41-B2P	I/O	152	SDQ43-B2P	I/O
153	SDQ40-B2P	I/O	154	SDQ47-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK1-B2N	I
159	GND	-	160	SCK1-B2P	I
161	GND	-	162	GND	-
163	SDQ48-B2P	I/O	164	SDQ51-B2P	I/O
165	SDQ53-B2P	I/O	166	SDQ52-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6-B2P	I/O	170	SDM06-B2P	I
171	SDQ49-B2P	I/O	172	SDQ55-B2P	I/O
173	GND	-	174	GND	-
175	SDQ54-B2P	I/O	176	SDQ50-B2P	I/O
177	SDQ60-B2P	I/O	178	SDQ62-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56-B2P	I/O	182	SDQ63-B2P	I/O
183	SDQS7-B2P	I/O	184	SDM07-B2P	I
185	GND	-	186	GND	-
187	SDQ57-B2P	I/O	188	SDQ59-B2P	I/O
189	SDQ61-B2P	I/O	190	SDQ58-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.2   IS1401 Internal memory connector (200-pin)

Table C-2 Internal memory connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B1V	-	2	MRVREF-B1V	-
3	GND	-	4	GND	-
5	SDQ03-B2P	I/O	6	SDQ04-B2P	I/O
7	SDQ01-B2P	I/O	8	SDQ00-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0-B2P	I/O	12	SDM00-B2P	I
13	SDQ02-B2P	I/O	14	SDQ06-B2P	I/O
15	GND	-	16	GND	-
17	SDQ07-B2P	I/O	18	SDQ05-B2P	I/O
19	SDQ15-B2P	I/O	20	SDQ08-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ14-B2P	I/O	24	SDQ13-B2P	I/O
25	SDQS1-B2P	I/O	26	SDM01-B2P	I
27	GND	-	28	GND	-
29	SDQ10-B2P	I/O	30	SDQ09-B2P	I/O
31	SDQ11-B2P	I/O	32	SDQ12-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK3-B2P	I	36	2R5-B2V	-
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20-B2P	I/O	42	SDQ18-B2P	I/O
43	SDQ16-B2P	I/O	44	SDQ22-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2-B2P	I/O	48	SDM02-B2P	I
49	SDQ17-B2P	I/O	50	SDQ23-B2P	I/O
51	GND	-	52	GND	-
53	SDQ21-B2P	I/O	54	SDQ19-B2P	I/O
55	SDQ24-B2P	I/O	56	SDQ27-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ25-B2P	I/O	60	SDQ26-B2P	I/O
61	SDQS3-B2P	I/O	62	SDM03-B2P	I

Table C-2 Internal memory connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	GND	-	64	GND	-
65	SDQ28-B2P	I/O	66	SDQ31-B2P	I/O
67	SDQ29-B2P	I/O	68	SDQ30-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	NC	-	98	NC	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMAB05-B2P	I	108	SMAB04-B2P	I
109	SMA03-B2P	I	110	SMAB02-B2P	I
111	SMAB01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS2-B2N	I	122	SCS3-B2N	I
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ37-B2P	I/O	128	SDQ34-B2P	I/O
129	SDQ36-B2P	I/O	130	SDQ38-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4-B2P	I/O	134	SDM04-B2P	I
135	SDQ32-B2P	I/O	136	SDQ39-B2P	I/O
137	GND	-	138	GND	-

Table C-2 Internal memory connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	SDQ33-B2P	I/O	140	SDQ35-B2P	I/O
141	SDQ46-B2P	I/O	142	SDQ44-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ42-B2P	I/O	146	SDQ45-B2P	I/O
147	SDQS5-B2P	I/O	148	SDM05-B2P	I
149	GND	-	150	GND	-
151	SDQ43-B2P	I/O	152	SDQ41-B2P	I/O
153	SDQ47-B2P	I/O	154	SDQ40-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ52-B2P	I/O	164	SDQ48-B2P	I/O
165	SDQ51-B2P	I/O	166	SDQ53-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6-B2P	I/O	170	SDM06-B2P	I
171	SDQ50-B2P	I/O	172	SDQ49-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55-B2P	I/O	176	SDQ54-B2P	I/O
177	SDQ62-B2P	I/O	178	SDQ60-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ63-B2P	I/O	182	SDQ56-B2P	I/O
183	SDQS7-B2P	I/O	184	SDM07-B2P	I
185	GND	-	186	GND	-
187	SDQ58-B2P	I/O	188	SDQ57-B2P	I/O
189	SDQ59-B2P	I/O	190	SDQ61-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	P3V	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.3   PJ1800 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	IDRSTA-P5N	O
3	PDD08-P3P	I/O	4	PDD07-P3P	I/O
5	PDD09-P3P	I/O	6	PDD06-P3P	I/O
7	PDD10-P3P	I/O	8	PDD05-P3P	I/O
9	PDD11-P3P	I/O	10	PDD04-P3P	I/O
11	PDD12-P3P	I/O	12	PDD03-P3P	I/O
13	PDD13-P3P	I/O	14	PDD02-P3P	I/O
15	PDD14-P3P	I/O	16	PDD01-P3P	I/O
17	PDD15-P3P	I/O	18	PDD00-P3P	I/O
19	N.C	-	20	GND	-
21	GND	I	22	PDDREQ-P3P	I
23	GND	I	24	PDIOW-P3N	O
25	GND	I	26	PDIOR-P3N	O
27	GND	I	28	PIORDY-P3P	I
29	GND	I	30	PDDACK-P3N	O
31	N.C	I	32	IRQ14-P3P	I
33	N.C	I	34	PDA1-P3P	O
35	PDA2-P3P	O	36	PDA0-P3P	O
37	PDCS3-P3N	O	38	PDCS1-P3N	O
39	GND	I	40	HDDLED-P5N	O
41	P5V	-	42	P5V	-
43	N.C	-	44	GND	-

C.4   PJ1801 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	CDAUDR-PXP	O	4	CDAUDL-PXP	O
5	GND	-	6	CD-GND	-
7	IDRSTB-P5N	O	8	GND	-
9	GND	-	10	SDD07-P3P	I/O
11	SDD08-P3P	I/O	12	SDD06-P3P	I/O
13	SDD09-P3P	I/O	14	SDD05-P3P	I/O
15	SDD10-P3P	I/O	16	GND	-
17	GND	-	18	SDD04-P3P	I/O
19	SDD11-P3P	I/O	20	SDD03-P3P	I/O
21	SDD12-P3P	I/O	22	SDD02-P3P	I/O
23	SDD13-P3P	I/O	24	SB-P5V	-
25	SB-P5V	-	26	SDD01-P3P	I/O
27	SDD14-P3P	I/O	28	SDD00-P3P	I/O
29	SDD15-P3P	I/O	30	GND	-
31	GND	-	32	SDDREQ-P3P	O
33	GND	-	34	SDIOW-P3N	O
35	GND	-	36	SDIOR-P3N	O
37	GND	-	38	SIORDY-P3P	O
39	NC	-	40	SDDACK-P3N	O
41	GND	-	42	IRQ15-P5P	O
43	NC	-	44	SDA1-P3P	I
45	SB-P5V	-	46	SB-P5V	-
47	SB-P5V	-	48	SDA0-P3P	I
49	SDA2-P3P	I	50	SDCS1-P3N	O
51	SDCS3-P3N	O	52	CDRLED-P5N	O
53	GND	-	54	MBSTS2-S3N	O
55	MBSTS1-S3N	O	56	MBSTS0-S3N	O
57	GND	-	58	DBT20V-S3N	O
59	PSDA-S5P	O	60	BT2VD	I
61	PSCL-S5P	O	62	BTMP2-SXP	O
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   PJ2100 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	ACCD2-E3N	I	4	ACCLKR-EYN	I/O
5	ACAD31-EYP	I/O	6	ACD02-EYP	I/O
7	ACAD30-EYP	I/O	8	ACAD29-EYP	I/O
9	GND	-	10	ACAD28-EYP	I/O
11	ACAD27-EYP	I/O	12	ACSTSC-EYP	I
13	ACAD26-EYP	I/O	14	ACAUDI-EYP	I
15	ACAD25-EYP	I/O	16	ACCBE3-EYN	I/O
17	GND	-	18	ACAD24-EYP	I/O
19	ACREQ-EYN	I	20	ACAD23-EYP	I/O
21	ACSERR-EYN	I	22	ACAD22-EYP	I/O
23	ACRST-EYN	I/O	24	ACAD21-EYP	I/O
25	GND	-	26	ACVS2-B3P	I/O
27	ACAD20-EYP	I/O	28	ACAD19-EYP	I/O
29	ACAD18-EYP	I/O	30	ACAD17-EYP	I/O
31	ACCBE2-EYN	I/O	32	ACFRAM-EYN	I/O
33	GND	-	34	ACIRDY-EYN	I/O
35	ACTRDY-EYN	I/O	36	ACCLK-EYP	I/O
37	MCVPPA-EYV	-	38	MCVCCA-EYV	-
39	MCVCCA-EYV	-	40	ACINT-EYN	I
41	ACDEVS-EYN	I/O	42	ACGNT-EYN	O
43	GND	-	44	ACSTOP-EYN	I/O
45	ACPERR-EYN	I/O	46	ACLOCK-EYN	I/O
47	ACPAR-EYP	I/O	48	ACA18-EYP	I/O
49	ACCBE1-EYN	I/O	50	ACAD16-EYP	I/O
51	GND	-	52	ACAD14-EYP	I/O
53	ACAD15-EYP	I/O	54	ACAD12-EYP	I/O
55	ACAD13-EYP	I/O	56	ACAD11-EYP	I/O
57	ACVS1-E3P	I/O	58	ACAD09-EYP	I/O
59	GND	-	60	ACAD10-EYP	I/O
61	ACCBE0-EYN	I/O	62	ACAD08-EYP	I/O
63	ACAD07-EYP	I/O	64	ACD14-EYP	I/O
65	ACAD05-EYP	I/O	66	ACAD06-EYP	I/O
67	GND	-	68	ACAD03-EYP	I/O
69	ACAD04-EYP	I/O	70	ACAD01-EYP	I/O

Table C-5 PC card interface connector (150-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
71	ACAD02-EYP	I/O	72	ACAD00-EYP	I/O
73	ACCD1-E3N	I	74	GND	-
75	GND	-	76	GND	-
77	GND	-	78	BCCD2-E3N	I
79	BCCLKR-EYN	I/O	80	BCAD31-EYP	I/O
81	BCD02-EYP	I/O	82	BCAD30-EYP	I/O
83	BCAD29-EYP	I/O	84	GND	-
85	BCAD28-EYP	I/O	86	BCAD27-EYP	I/O
87	BCSTSC-EYP	I	88	BCAD26-EYP	I/O
89	BCAUDI-EYP	I	90	BCAD25-EYP	I/O
91	BCCBE3-EYN	I/O	92	GND	-
93	BCAD24-EYP	I/O	94	BCREQ-EYN	I
95	BCAD23-EYP	I/O	96	BCSERR-EYN	I/O
97	BCAD22-EYP	I/O	98	BCRST-EYN	I/O
99	BCAD21-EYP	I/O	100	GND	-
101	BCVS2-E3P	I/O	102	BCAD20-EYP	I/O
103	BCAD19-EYP	I/O	104	BCAD18-EYP	I/O
105	BCAD17-EYP	I/O	106	BCCBE2-EYN	I/O
107	BCFRAM-EYN	I/O	108	GND	-
109	BCIRDY-EYN	I/O	110	BCTRDY-EYN	I/O
111	BCCLK-EYP	I/O	112	MCVPPB-EYV	-
113	MCVCCB-EYV	-	114	MCVCCB-EYV	-
115	BCINT-EYN	I	116	BCDEVS-EYN	I/O
117	BCGNT-EYN	O	118	GND	-
119	BCSTOP-EYN	I/O	120	BCPERR-EYN	I/O
121	BCLOCK-EYN	I/O	122	BCPAR-EYP	I/O
123	BCA18-EYP	I/O	124	BCCBE1-EYN	I/O
125	BCAD16-EYP	I/O	126	GND	-
127	BCAD14-EYP	I/O	128	BCAD15-EYP	I/O
129	BCAD12-EYP	I/O	130	BCAD13-EYP	I/O
131	BCAD11-EYP	I/O	132	BCVS1-E3P	I/O
133	BCAD09-EYP	I/O	134	GND	-
135	BCAD10-EYP	I/O	136	BCCBE0-EYN	I/O
137	BCAD08-EYP	I/O	138	BCAD07-EYP	I/O
139	BCD14-EYP	I/O	140	BCAD05-EYP	I/O
141	BCAD06-EYP	I/O	142	GND	-
143	BCAD03-EYP	I/O	144	BCAD04-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	BCAD01-EYP	I/O	146	BCAD02-EYP	I/O
147	BCAD00-EYP	I/O	148	BCCD1-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	O
11	GND	-	12	SDWP-E3P	I

C.7   PJ2200 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	PIRQD-P3N	I	18	P5V	-
19	P3V	-	20	PIRQG-P3N	I
21	NC	-	22	NC	-
23	GND	-	24	E3V	-
25	X33MPC-P3P	I	26	PCIRS3-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	E3V	-

C.8　PJ2300 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
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	IF-P5V	-
5	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	NC	-
9	DPCONF-S5P	I	10	GND	-
11	GND	-	12	DDCACK-P3P	I/O
13	DRED-PXP	O	14	DGREEN-PXP	O
15	DBLUE-PXP	O	16	DVSYNC-P3P	O
17	NC	-	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	(DVIPDC)	O	34	NC	-
35	(QSWON-B3P)	O	36	(DIRQD-S3N)	I/O
37	GND	-	38	(PCM2SP-B3P)	I
39	(DPMRST-S3N)	O	40	(DAD00-P3P)	I/O
41	GND	-	42	(DAD00-P3P)	I/O
43	(DAD02-P3P)	I/O	44	(DAD05-P3P)	I/O
45	GND	-	46	(XDPCI-P3P)	O
47	(DAD09-P3P)	I/O	48	(DAD11-P3P)	I/O
49	GND	-	50	(DAD11-P3P)	I/O
51	(DAD15-P3P)	I/O	52	(DINTA-P3N)	I/O
53	Not Mount	-	54	Not Mount	-
55	BIDDP-EXP	O	56	BIDDN-EXN	O
57	Not Mount	-	58	Not Mount	-
59	MDMRNG-E3P	I/O	60	MDMTIP-E3P	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	GND	-	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	DDCADA-P3P	I/O
73	GPU-GND	-	74	GPU-GND	-
75	GPU-GND	-	76	DHSYNC-P3P	O
77	(DVISDA-P3P)	I/O	78	NC	-
79	GND	-	80	(DVITX5-P3P)	-
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	(USBON1-E5N)	O	130	(USBOC1-E3N)	I
131	GND	-	132	(USBON2-E5N)	O
133	(USBOC2-E3N)	I	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-EYN	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	(DPGNT-P3N)	O	156	(DAD30-P3P)	I/O
157	GND	-	158	(DAD28-P3P)	I/O
159	(DAD26-P3P)	I/O	160	(DAD24-P3P)	I/O
161	GND	-	162	(DIDSL-P3P)	I/O
163	(DAD22-P3P)	I/O	164	(DAD20-P3P)	I/O
165	GND	-	166	(DCBE0-P3N)	I/O
167	(DAD18-P3P)	I/O	168	(DAD16-P3P)	I/O
169	GND	-	170	(DCBE2-P3N)	I/O
171	(DTRDY-P3N)	I/O	172	(DSTOP-P3N)	I/O
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-B3N)	I/O
187	GND	-	188	(DTPB-B3N)	I/O
189	USBP3-S3P	I/O	190	USBP3-S3N	I/O
191	GND	-	192	(USBP3-S3P)	I/O
193	(USBP3-S3N)	I/O	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	(DPREQ-P3N)	I	216	(DAD31-P3P)	I/O
217	GND	-	218	(DAD29-P3P)	I/O

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
219	(DAD27-P3P)	I/O	220	(DAD25-P3P)	I/O
221	GND	-	222	(DCBE23-P3P)	I/O
223	(DAD23-P3P)	I/O	224	(DAD21-P3P)	I/O
225	GND	-	226	(DCPCLR-P3P)	I/O
227	(DAD19-P3P)	I/O	228	(DAD17-P3P)	I/O
229	GND		230	(DFRAME-P3N)	I/O
231	(DIRDY-P3N)	I/O	232	(DDEVSL-P3N)	I/O
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   PJ3000 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-P3P	O
23	M97OT2-P3P	O	24	NC	-
25	M97RS2-S3N	O	26	M97IN2-E3P	I
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O

C.10   PJ3001 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   PJ3200 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   PJ3201 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   PJ3401 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   PJ4100 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	BIDCP-EXP	-	2	BIDCN-EXN	-
3	BIDDP-EXP	-	4	BIDDN-EXN	-
5	TDP-E3P	O	6	TDN-E3N	O
7	RDP-E3P	I	8	RDN-E3N	I
9	NC	-	10	NC	-
11	LINK-E3N	O	12	ACT-E3N	O
13	LAN-E3V	-	14	LAN-E3V	-

C.15   PJ5500 LCD interface connector (40-pin)

Table C-15 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	TXDTB2-PtN	O
5	BRT2DA-S3P	O	6	TXDTB2-PYP	O
7	PNL2-P3P	I	8	TXDTB0-PYN	O
9	PNL1-P3P	I	10	TXDTB0-PYP	O
11	PNL0-P3P	I	12	TXCLKB-PYN	O
13	GND	-	14	TXCLKB-PYP	O
15	GND	-	16	TXDTB1-PYN	O
17	GND	-	18	TXDTB1-PYP	O
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	TXDTA1-PYN	O
25	GND	-	26	TXDTA1-PYP	O
27	GND	-	28	TXDTA2-PYN	O
29	GND	-	30	TXDTA2-PYP	O
31	BRT0-P5P	O	32	TXDTA0-PYN	O
33	BRT1-P5P	O	34	TXDTA0-PYP	O
35	FL-P5V	-	36	TXCLKA-PYN	O
37	GND	-	38	TXCLKA-PYP	O
39	FL-P5V	-	40	GND	-

C.16   PJ8800 DC-IN connector (4-pin)

Table C-16   DC-IN connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ADPDC	-	2	ADPDC	-
3	GND	-	4	GND	-

C.17   PJ8810 1st Battery connector (10-pin)

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(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.18   PJ1005 RTC Battery connector (3-pin)

Table C-18   RTC Battery connector (3-pin)

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

C.19   PJ8770 FAN interface connector (3-pin)

Table C-19   FAN interface connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	FAN VCC	-	2	GND	-
3	FANG-P3P	O			

C.20   PJ9500 SN board interface connector (40-pin)

Table C-20 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	BTIFOF-S3N	O
7	VOLBYP-P3N	O	8	CDAUDL-PXP	I
9	CDAUDR-PXP	I	10	CD-GND	-
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.21   PJ9501 USB harness connector (8-pin)

Table C-21 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.22   PJ5621 RG board interface connector (20-pin)

Table C-22 RG board interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRED-PXP	O	2	VGA-GND	-
3	MGREEN-PXP	O	4	VGA-GND	-
5	MBLUE-PXP	O	6	VGA-GND	-
7	GND	-	8	GND	-
9	MVSYNC-P3P	O	10	MHSYNC-P3P	O
11	E5V	-	12	E5V	-
13	CRTSCL-P5P	O	14	CRTSDA-P5P	O
15	GND	-	16	PVON-S5P	I
17	CHROMA-PYP	O	18	TV-GND	-
19	LUMINA-PYP	O	20	TV-GND	-

C.23   PJ9600 SW board interface connector (8-pin)

Table C-23 SW board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PWRSW-S3N	I	2	KBSC16-S3N	O
3	KBRT00-S3N	I	4	KBRT03-S3N	I
5	PNLOFF-S3N	I	6	NC	-
7	GND	-	8	GND	-

SN Board

C.24   PJ9510 SN board interface connector (40-pin)

Table C-24   SN 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	CD-GND	-	32	CDAUDR-PXP	O
33	CDAUDL-PXP	O	34	VOLBYP-P3N	I
35	BTIFOF-S3N	I	36	BTMDL-P3N	O
37	BTRST-S3N	I	38	USBP4-S3P	I/O
39	USBP4-S3N	I/O	40	BT-P3V	-

C.25   PJ4600 USB0 interface connector (4-pin)

Table C-25   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.26   PJ4601 USB3 interface connector (4-pin)

Table C-26 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	USBP3-S3P	I/O	4	GND	-

C.27   PJ6002 External microphone connector (6-pin)

Table C-27 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	I	4	NC	-
5	NC	-	6	(MICIN-PXP)	I

C.28   PJ3202 Speaker connector (4-pin)

Table C-28 Speaker connector (4-pin)

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

C.29   PJ6000 Headphone connector (6-pin)

Table C-29 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.30　PJ9511　USB harness connector (8-pin)

Table C-30 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.31   PJ5622 RG board interface connector (20-pin)

Table C-31 RG board interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TV-GND	-	2	LUMINA-PYP	I
3	TV-GND	-	4	CHROMA-PYP	I
5	GND	-	6	PVON-S5P	O
7	E5V	-	8	E5V	-
9	CRTSCL-P5P	I	10	CRTSDA-P5P	I
11	GND	-	12	MVSYNC-P3P	I
13	MHSYNC-P3P	I	14	VGA-GND	-
15	BLUE-PXP	I	16	VGA-GND	I
17	GREEN-PXP	I	18	VGA-GND	-
19	RED-PXP	I	20	GND	-

C.32   PJ5620 CRT interface connector (15-pin)

Table C-32   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	MHSYNC-P5P	O	14	MVSYNC-P5P	O
15	CRTSCL-P5P	I/O			

SW Board

C.33   PJ9610 SW board interface connector (8-pin)

Table C-33 SW 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. * Combined 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
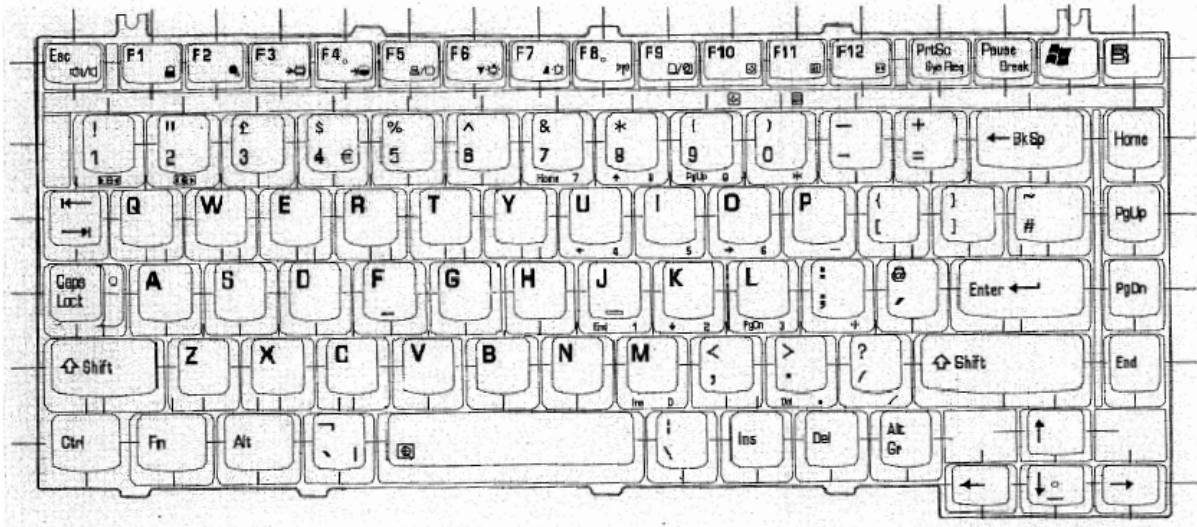
E.1   United Kingdom (UK) Keyboard

Figure E-1 UK keyboard

E.2   United States (US) Keyboard
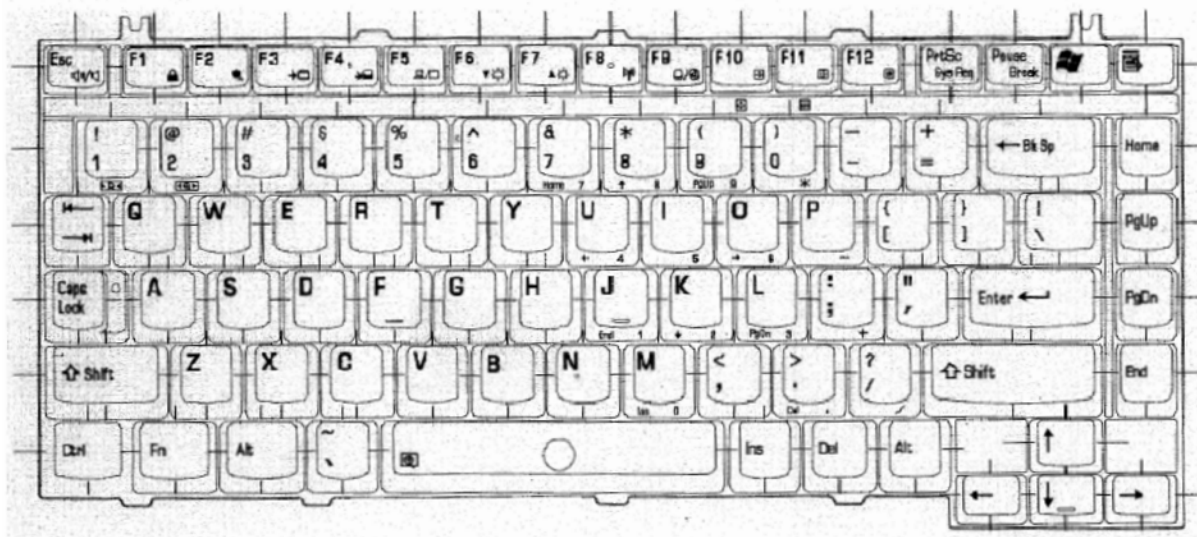

Figure E-2 US keyboard

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
```
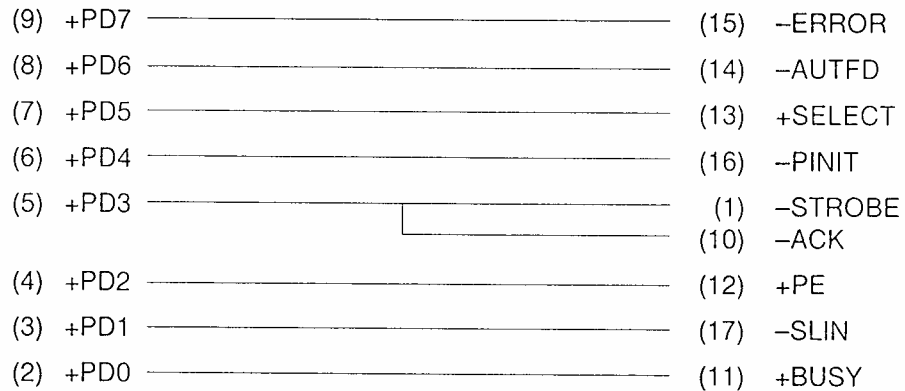
Figure F-1 Parallel port wraparound connector

F.2   RS-232C Wraparound Connector

```
(3)  TD   ──────────────────────  (2)  RD
(7)  RTS  ──────────────┐          (8)  CTS
                        └────────  (1)  CD
(4)  DTR  ───────────────┐         (6)  DSR
                         └───────  (9)  RI
```
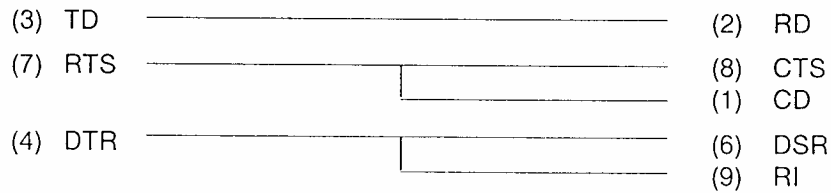
Figure F-2 RS-232C wraparound connector

F.3   RS-232C Cable (9-pin to 9-pin)

```
(3)  TD    ──────────────────────────────   (2)  RD
(4)  DTR   ──────────────────┐               (6)  DSR
                             ├───────────    (8)  CTS
                             └───────────    (9)  RI

(7)  RTS   ──────────────────────────────   (1)  CD
(5)  GND   ──────────────────────────────   (5)  GND
(2)  RD    ──────────────────────────────   (3)  TD
(1)  CD    ──────────────────────────────   (7)  RTS
(6)  DSR   ──────────────────┐               (4)  DTR
(8)  CTS   ───────────────┐  │
(9)  RI    ───────────────┴──┘
```
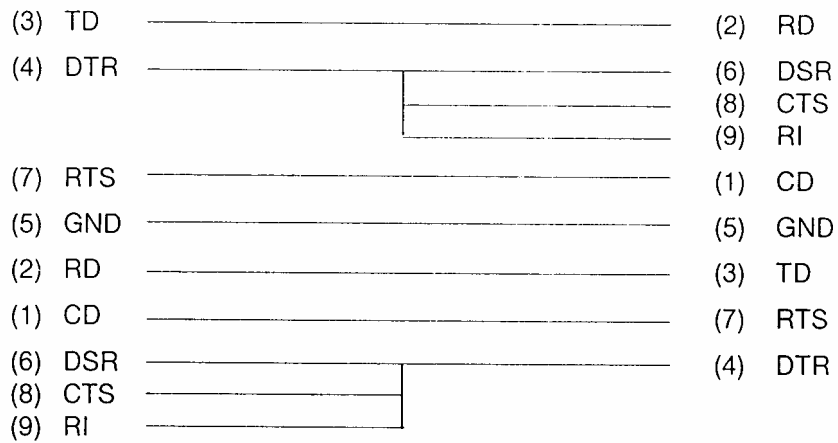
Figure F-3 RS-232C cable (9-pin to 9-pin)

F.4   RS-232C Cable (9-pin to 25-pin)

```
(1)  CD    ──────────────────────────────   (4)   RTS
(2)  RD    ──────────────────────────────   (2)   TD
(3)  TD    ──────────────────────────────   (3)   RD
(4)  DTR   ──────────────────┐               (5)   CTS
                             ├───────────    (6)   DSR
                             └───────────    (22)  RI

(5)  GND   ──────────────────────────────   (7)   GND
(7)  RTS   ──────────────────────────────   (8)   CD
(6)  DSR   ──────────────────┐               (20)  DTR
(8)  CTS   ───────────────┐  │
(9)  RI    ───────────────┴──┘
```
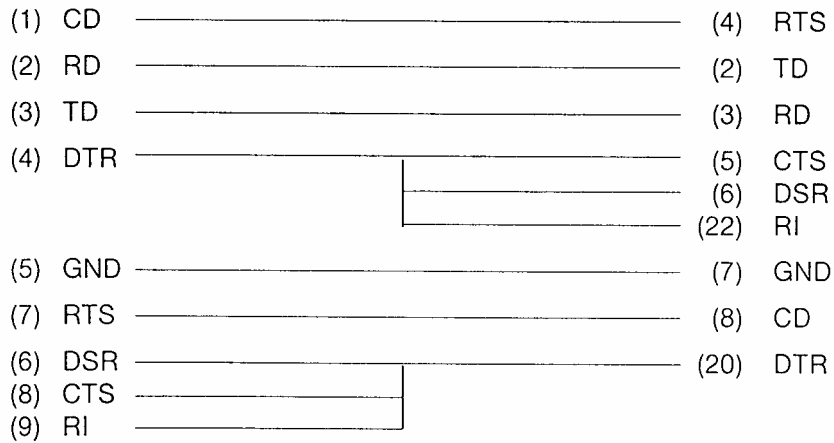
Figure F-4 RS-232C cable (9-pin to 25-pin)

F.5   LAN Loopback Connector

```
(1) BIBAP (TX+)   ─────────────────────   (3) BIDBP (RX+)

(2) BIDAN (TX-)   ─────────────────────   (6) BIDBN (RX-)
```
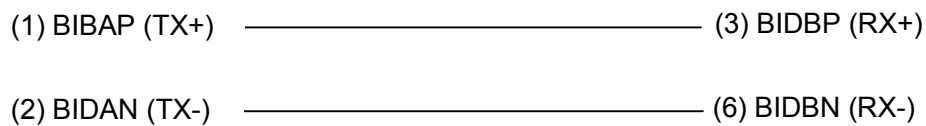
Figure F-5 LAN loopback connector

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	5,056.3