Toshiba Personal Computer

TECRA A9 Series

(TECRA S5 / TECRA P5 /Satellite Pro S200)

Maintenace Manual

TOSHIBA CORPORATION

File Number 960-633

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Toshiba Personal Computer TECRA A9,S5,P5, Satellite Pro S200Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA A9,S5,P5,Satellite Pro S200.

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 A9,S5,P5, Satellite Pro S200 system unit and each FRU.

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

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

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

Appendices The appendices describe the following:

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

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

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

```
Format complete
System transferred
```

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Chapter 1

Hardware Overview

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1.1   Features

The Toshiba TECRA A9(S5,P5,Satellite Pro S200) Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features.

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

❑ Microprocessor

The TECRA A9(S5,P5,Satellite Pro S200) computer is equipped with an Intel® Core™ 2 Duo Processor . These processors incorporate a math co-processor, a 2MB or 4MB L2 cache memory.
The PC comes in with one of the following speeds:

Intel® Core™ 2 Duo Processor

- 2.40GHz (T7700) /2.20GHz (T7500) / 2.00GHz (T7300)

    In the case of Processor which built in 4MB L2 cache memory

- 1.80GHz (T7100)

    In the case of Processor which built in 2MB L2 cache memory

These processors operate at 800MHz bus clock.

❑ Chipset

The TECRA A9(S5,P5,Satellite Pro S200) is Equipped with Intel 965GM/GML (Crestline-GM) as North Bridge, Intel ICH8M as South Bridge and PCI7412 as Card Controller.

❑ VGA Controller

As for a TECRA A9 or P5 or Satellite Pro S200 , the internal graphics controller in North Bridge is used.(PTS52*)

As for a TECRA S5 or P5, the graphics controller is nVIDIA G8M-SE or GS.(PTS53*)

❑ Memory

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

❑ HDD

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

- /80/100/120/160 GB

❑ USB FDD

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

❑ Optical Drive

A CD-ROM drive, DVD-ROM&CD-R/RW drive or DVD Super Multi drive (double layer) can be installed.

❑ Display

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

- 15.4" WXGA-TFT color display, resolution 1,280×800
- 15.4" WXGA+TFT color display, resolution 1,680×1050

A video controller and a 128MB VRAM enables an external monitor to display 16M colors at a resolution of 1,280×800 pixels or 1,680×1050 pixels.

❑ Keyboard

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

❑ TOSHIBA Dual Pointing Device

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

❑ Batteries

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

❑ Universal Serial Bus (USB2.0)

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

❑ IEEE 1394 port

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

❑ Serial port

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

❑ External monitor (RGB) port

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

❑ PC card slot

A PC card slot are provided. The PC card slot (PCMCIA) accommodates one Type II card or Express Slot(Choose only one) .

❑ Bridge Media slot

One SD memory card/ SDIO card/Memory stick (PRO)/xD picture card/MultiMedia card slot. Data can be read and written by inserting each media to the slot.

❑ Fingerprint sensor

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

❑ Docking interface port

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

- RJ45 LAN jack
- External monitor port
- DC IN 15V jack
- Security lock slot
- Universal Serial Bus 2.0 port (four)
- DVI port

❑ Sound system

The sound system is equipped with the following features:

- Stereo speakers
- Built-in microphone
- Digital volume control
- Stereo headphone jack
- External microphone jack
- Supports VoIP

❑ Internal modem

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

❑ Internal LAN

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

θ Wireless LAN

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

❑ Bluetooth

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

❑ TOSHIBA Presentation button

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

❑ TOSHIBA Assist button

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

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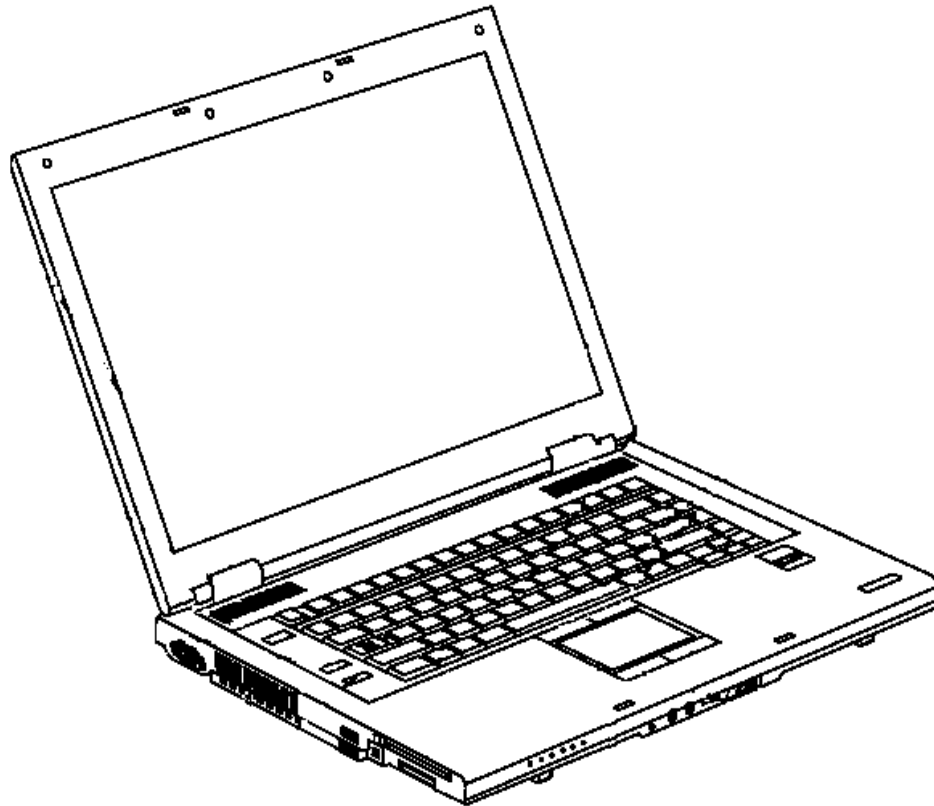
Figure 1-1   Front of the computer

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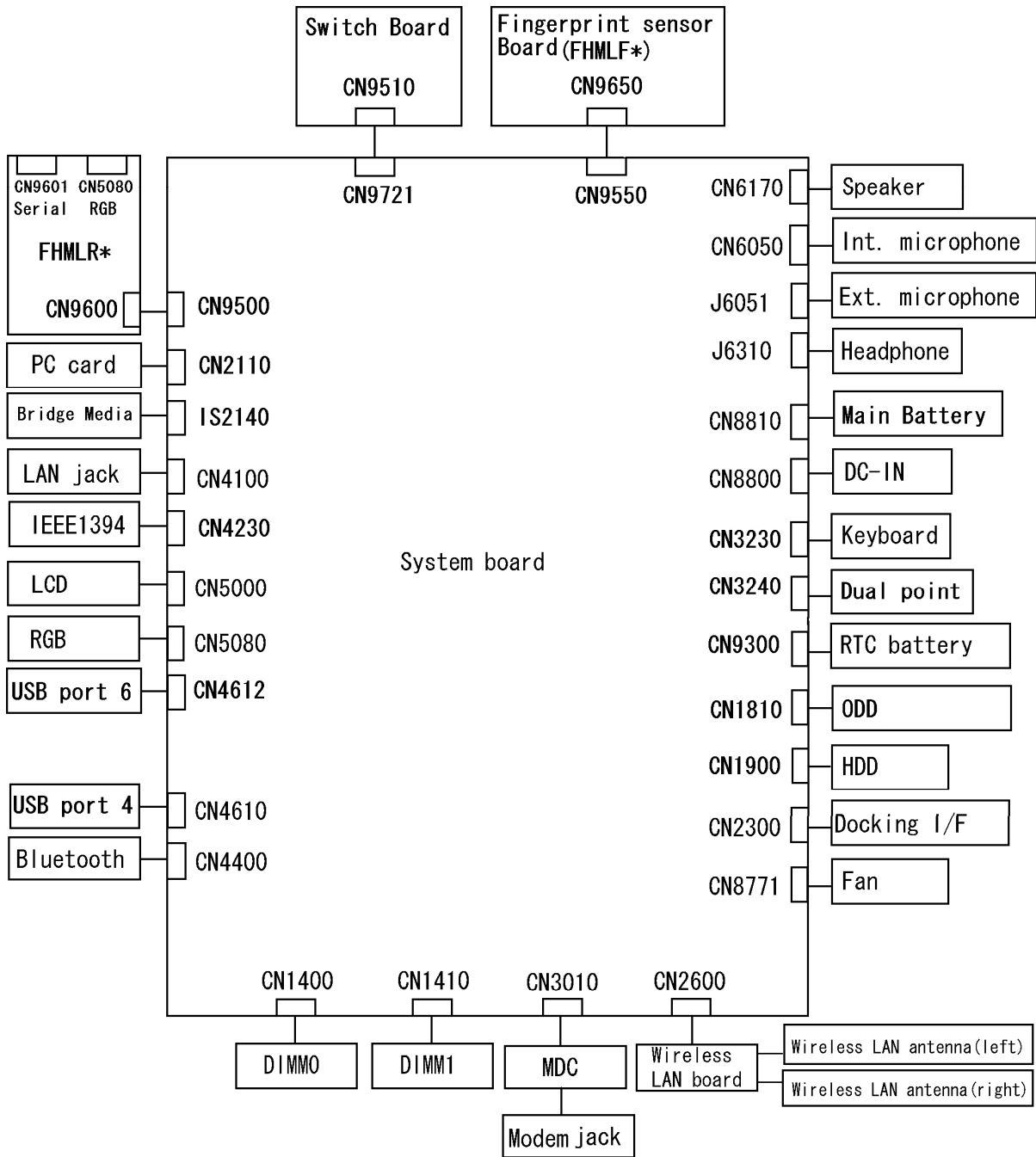
Figure 1-2   System unit configuration

1.2   System Unit Block Diagram

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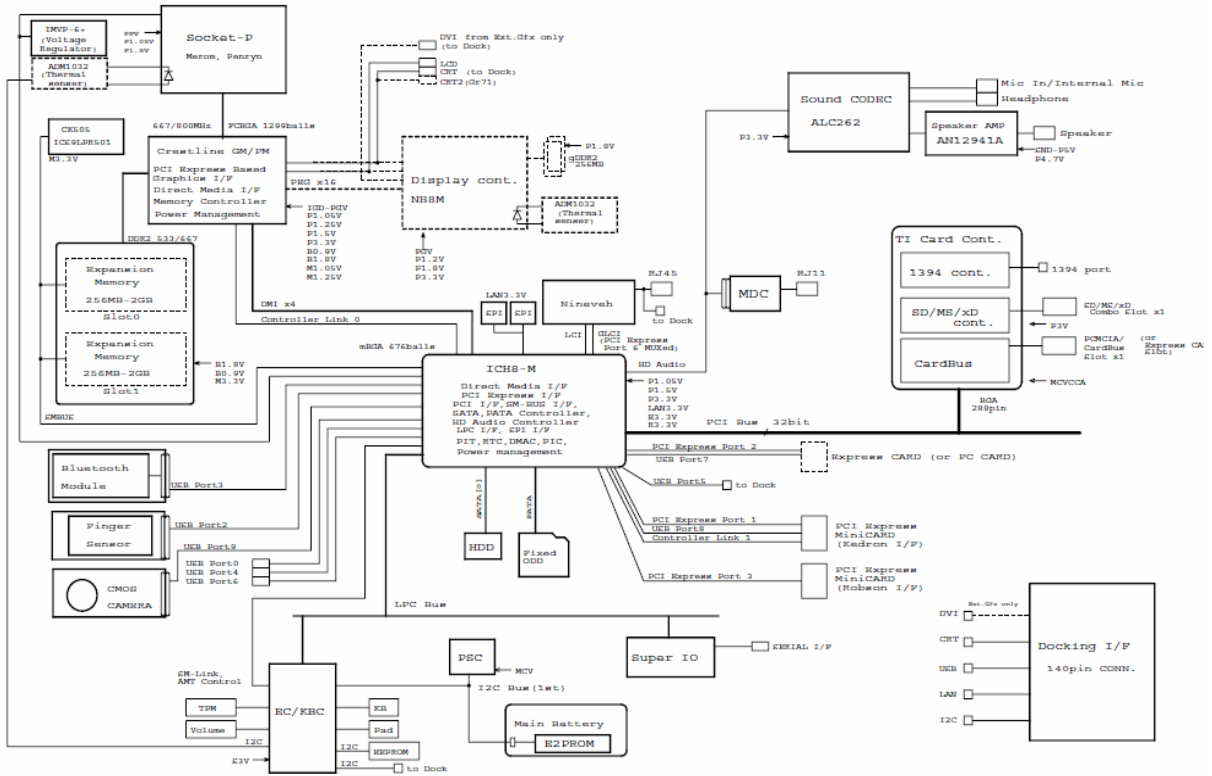
Figure 1-3   System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel® Core™ 2 Duo Processor

- Core speed:
    - 2.40GHz (T7700) /2.20GHz (T7500) / 2.00GHz (T7300)

      In the case of Processor which built in 4MB L2 cache memory

    - 1.80GHz (T7100)

      In the case of Processor which built in 2MB L2 cache memory

              (   ): Processor Number

    - Processor bus speed: 800MHz

    - Core voltage: 0.50V to 1.325V

    - Integrated L2 cache memory of 2MB or 4MB

    - Integrated NDP

    - 478-pin Micro FC-PGA package

❑ Memory

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

Memory

- DDR2-SDRAM

- 667MHz

- 1.8 volt operation

- FBGA

Memory Module

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

- PC 5300

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

❑ Intel 965GM/GML (Crestline-GM (North Bridge))

- Features:
    - Meorom Processor System Bus Supports
    - PCI Express Based Graphics Interface
    - System Memory supports :DDR2-533／DDR2-667, 4GB max.
    - DMI(Direct Media Interface)
    - Power management control (ACPI2.0 conformity)

❑ Intel ICH8M (South Bridge)

- Features:
    - DMI(Direct Media Interface)
    - PCI Express Interface
    - PCI Bus I/F Rev2.3（4 PCI REQ/GNT Pairs）
    - Integrated Serial ATA Host Controller
    - Integrated IDE Controller（Ultra ATA 100/66/33）
    - Intel High Definition controller (Azalia)
    - USB 1.1/2.0 Controller
    - Power Management (ACPI 2.0 compliance)
    - SMBus2.0 controller
    - SPI Interface(BIOS)
    - LPC interface (EC/KBC, Super I/O)
    - IRQ controller
    - Serial Interrupt Function
    - Suspend/Resume control
    - Built –in RTC
    - GPIO

❑ Cardbus controller (TI PCI8412ZHK)

- – PCI Interface(PCI Rev.2.2)

- – SD IO Controller(Ver.1.1)

- – CardBus / Ultra media Controller (Yenta Ver.2.2:1 socket)

- – SD/MMC(SDHC Ver. 1.2 revised edition) , Memory Stick, Memory Stick pro, XD Card Controller

- – 1394 Controller

- – 16 x16x1.4mm BGA Package

❑ VGA
As for a TECRA A9 or Satellite Pro S200 , the internal graphics controller in North Bridge is used.(PTS52*)

As for a TECRA S5, the graphics controller is nVIDIA G8M-SE or GS.(PTS53*)

❑ Sound Controller

- • Azalia

- • Amplifier: Mathushita made AN12941A

- • Stereo speakers

- • Digital volume control

- • Supports VoIP

- • Stereo headphone jack

- • External microphone jack

- • Built-in microphone

❑ EC/KBC (Embedded Controller/Keyboard Controller)

- • One Mitsubishi M306KAFCLPR micon chip functions as both EC and KBC.

❑ PSC (Power Supply Controller)

• One TMP86FS49AUG chip is used.

• This controller controls the power sources.

❑ Clock Generator

• IDT 9LPR501PGLFT is used.

• This device generates the system clock.

❑ Modem Controller

• One MDC is used.

• This controller has the following functions:

    – One RJ11 port

    – Azalia MDC1.5
    – V.92 (V.90) 56K Modem/FAX
    – Ring wake up support

❑ Internal LAN Controller

• Intel made only GigaBit Ether is used.

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

❑ Wireless LAN

- One PCI-Ex MiniCard

- Intel Kedron a/b/g or a/b/g/n

- Supports Wireless Communication SW

- Supports W-LAN via PCMCIA (Euro : GSM/GPRS)

❑ Super I/O

- SMSC LPC47N217−JV chip is used.

- This gate array has the following features:
    - Serial Port Controller
    - GPIO Controller

❑ Bluetooth

- V2.0+EDR

- USB interface connection

❑ Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.

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

- Acceleration Sensor

1.3   3.5-inch Floppy Disk Drive (USB External)

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

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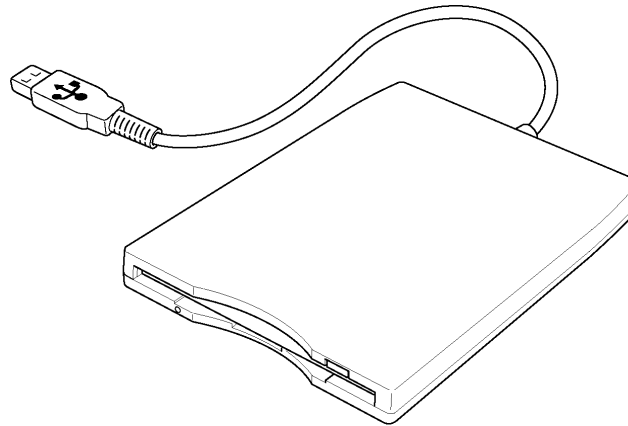
Figure 1-4   3.5-inch FDD (USB External)

Table 1-1   3.5-inch FDD specifications

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

1.4   2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads.
The computer supports a 80GB, 120GB or 160GB.
The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.
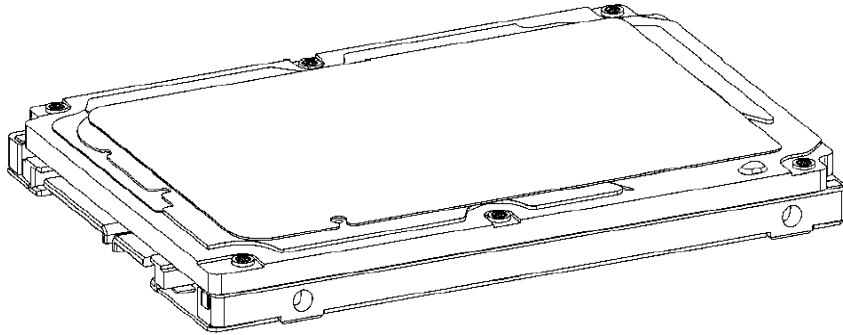
Figure 1-5   2.5-inch HDD

Table 1-2   2.5-inch HDD specifications

Items		Specifications			
		FUJITSU **G8BC0003H060**	**FUJITSU** **G8BC0003J080**	**FUJITSU** **G8BC0003H120**	**FUJITSU** **G8BC0003J160**
Outline Dimensions	Width (mm)	100.0			
	Height (mm)	9.5			
	Depth (mm)	70.0			
	Weight (g)	101 max			
Storage size (formatted)		60GB	80GB	120GB	160GB
Speed (RPM)		5,400			
Data transfer speed (Mb/s) To/Form Media To/Form Host		72.4 MB/s Max 150 MB/s (Genli)			
Data buffer size (MB/s)		8			
Positioning Time(read and seek time)		Read: 12ms			
Motor startup time (s)		4			

1.5   Optical Drive (ODD)

1.5.1 CD-ROM Drive

The CD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM.

The specifications of the CD-ROM are described in Table 1-2.

Table 1-2 CD-ROM drive specifications

Item		Specifications
		TEAC G8CC00039520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7(excluding projections)
	Depth (mm)	129.4 (excluding projections)
	Mass (g)	165 or less
Data transfer speed (Read) CD-ROM		Max. 24x CAV
ATAPI Burst (MB/s) Burst Sustained		33.3Mbytes/sec max. 1,545 -3,600kB/sec
Access time (ms) CD-ROM		110 typ.
Supported Disks		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Enhanced CD

1.5.2 DVD-ROM & CD-R/RW Drive

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

The specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-4.

Table 1-4 DVD-ROM & CD-R/RW drive specifications

Item		Specifications
		MATSUSHITA G8CC0003B520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129 (excluding projections)
	Mass (g)	180±10
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW High Speed CD-RW Ultra Speed CD-RW		Max. 24x CAV Max. 4x CLV Max. 10x CLV Max. 24x CAV
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Data Buffer Capacity		2MB
Access time (ms) CD-ROM DVD-ROM		180 typ. (Random) 130 typ. (Random)
Supported Formats		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW, CD-DA, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text DVD: DVD-ROM, DVD-R, DVD-RW (Ver1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.5.3 DVD-Super Multi Drive

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

The specifications are listed in Table 1-5.

Table 1-5 DVD Super Multi drive specifications

Item		Specifications
		MATSUSHITA G8CC0002Y520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129.4 (excluding projections)
	Mass (g)	190±10
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW DVD-R DVD-RW DVD-R DL DVD+R DVD+R DL DVD+RW DVD-RAM		Max. 24x ZCLV Max. 16x CLV (Ultra speed) Max. 8x ZCLV Max. 4x CLV Max. 2x ZCLV Max. 8x ZCLV Max. 2.4x CLV Max. 4x ZCLV Max. 5x ZCLV (4.7GB)
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Data Buffer Capacity		2MB
Access time (ms) CD-ROM DVD-ROM		150msec typ. 180msec typ.
Supported Disks		CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+RW

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

1.6 Keyboard

The keyboard is mounted 85(US)/87(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-6 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-6   Keyboard

1.7   TFT Color Display

The TFT color display consists of 15.4-inch WXGA/WXGA+ LCD module and FL inverter board.

1.7.1   LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 16M colors with 1,280 x 800 or 1,680x1050 resolution. The Intel Crestline-GM can control internal and external WXGA or WXGA+ support displays simultaneously.

Figure 1-7 shows a view of the LCD module and Table 1-4 lists the specifications.
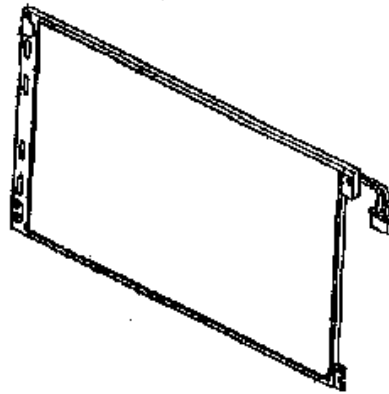
Figure 1-7   LCD module

Table 1-4   LCD module specifications (1/3)

Item	Specifications
	15.41-inch WXGA TFT (G33C0003F110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.25875 (H) x 0.25875 (V)
Display range (mm)	344.0 (H) x 222.0(V)x6.5 (D:Max)

Table 1-4 LCD module specifications (2/2)

Item	Specifications
	15.4-inch WXGA+ TFT (G33C0003Z110)
Number of Dots	1,680 (W) x 1050 (H)
Dot spacing (mm)	0.19725 (H) x 0.19725 (V)
Display range (mm)	344.0 (H) x 222.0(V)x6.5 (D:Max)

1.7.2   FL Inverter Board

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

Table 1-5 lists the FL inverter board specifications.

Table 1-5   FL inverter board specifications

Item		Specifications
		G71C0006A110
Input	Voltage (V)	DC 5
	Power (W)	7
Output	Voltage (V)	750
	Current (mA)	5.90
	Power (mA)	5W/7VA

1.8　Power Supply

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

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

2. Detects DC output and circuit malfunctions.

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

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

5. Turns the power supply on and off.

6. Provides more accurate detection of a low battery.

7. Calculates the remaining battery capacity.

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

The power supply output rating is specified in Table 1-6.

Table 1-6   Power supply output rating (1/4)

Use	Voltage (V)	Name
Clock Gen	3.3	CK-EYV
		M-E3V
		P3V
CPU	1.05	1R05-P1V
	1.5	1R05-P1V
	0.55-1.325	PPV
(G)MCH	1.05	1R05M-E1V
	1.05	1R05-P1V
	1.25	1R25M-E1V
	1.25	1R25-P1V
	1.5	1R5-P1V
	1.8	1R8-B1V
	1.05	IGD-PGV
	3.3	P3V
Memory	0.9	0R9-B0V
	1.8	1R8-B1V
ICH8M(-E)	1.05	1R05-P1V
	1.25	1R25-P1V
	1.5	1R5-P1V
	3.3	E3V
	3.3	LAN-E3V
	3.3	P3V
	2−3.5	R3V

Table 1-6   Power supply output rating (2/4)

Use	Voltage (V)	Name
ODD	3.3	P3V
	5	P5V
	3.3	SB-P3V
	5	SB-P5V
HDD	3.3	P3V
	5	P5V
Card Cont.	3.3	P3V
PC Card	3.3	MCVCCA-PYV
	5	MCVPPA-PYV
PC Card PS	5	P5V
	3.3	P3V
SD Card	3.3	FM-P3V
SD Card PS	3.3	P3V
Express Card	1.5	CRD1R5-P1V
	3.3	CRD-E3V
	3.3	CRD-P3V
Express Card PS	1.5	1R5-P1V
	3.3	E3V
	3.3	P3V
W-LAN	1.5	1R5-P1V
	3.3	E3V
	3.3	P3V

Table 1-6   Power supply output rating (3/4)

Use	Voltage (V)	Name
SIM Card	3.3	UIMPWR-E3V
Robson	1.5	1R5-P1V
	3.3	P3V
SPI	3.3	LAN-E3V
MDC	3.3	E3V
EC/KBC	3.3	S3V
Touch Pad	5	SP-P5V
LED	5	M5V
TPM	3.3	E3V
	3.3	P3V
Accelerometer	3.3	S3V
Finger Sens.	3.3	FS-E3V
	5	FS-E5V
Finger Sens PS.	3.3	E3V
Super I/O	3.3	P3V
RS232C Driver	3.3	P3V
LAN	1.05	LN1R0- E1V
	1.8	LN1R8- E1V
	3.3	LNP -E3V
LAN PS	3.3	E3V
Bluetooth	3.3	BT-P3V
Bluetooth PS	5	P5V
USB	5	USB0PS-E5V
	5	USB1PS-E5V
USB PS	5	E5V

Table 1-6   Power supply output rating (4/4)

Use	Voltage (V)	Name
GPU	1.2	1R2-P1V
	1.8	1R8-P1V
	3.3	P3V
	1.0-1.1	PGV
VRAM	1.8	1R8-P1V
LCD	5	FL-P5V
	3.3	PNL-P3V
LCD PS	5	P5V
	3.3	P3V
DVI Transmitter	2.5	2R5-P2V
AMP	4.7	A4R7-P4V
	5	SND-P5V
CODEC	4.7	A4R7-P4V
	3.3	P3V
Headphone AMP	3.3	P3V
PSC	5	MCV
FAN	5	E5V
	5	P5V

1.9 Batteries

The computer has three types of batteries as follows:

❑   Main battery pack

❑   RTC battery

The battery specifications are listed in Table 1-7.

Table 1-7   Battery specifications

Battery name			Material	Output voltage	Capacity
Main battery	battery	G71C00083110/210	Lithium-Ion	10.8 V	4,000 mAh
	battery	G71C00084110/210	Lithium-Ion	10.8 V	5,100 mAh
	battery	G71C0006B110/210	Lithium-Ion	10.8 V	5,400 mAh
	High capacity battery	G71C0003W910/A10	Lithium-Ion	10.8 V	7,200 mAh
RTC battery		GDM710000041	NiMH	2.4 V	16 mAh

1.9.1   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 sleep mode.

1.9.2   Battery Charging Control

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

Battery Charge

When the AC adaptor is attached, there are two types of charge: When the system is powered off and when the system is powered on. Table 1-8 lists the charging time required for charges.

Table 1-8   Time required for charges

Battery type	Power on (hours)	Power off (hours)
Battery(4,000 mAh)	About 4.5 to 9.5	About 2.5
Battery(5,100 mAh)	About 5.5 to 12.0	About 3.0
Battery(5,400 mAh)	About 5.5 to 12.0	About 3.0
High capacity battery(7,200 mAh)	About 8.0 to 19.5	About 3.5

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

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

1. The battery becomes fully charged.

2. The AC adaptor or battery is removed.

3. The battery or output voltage is abnormal.

❑ Detection of full charge

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

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

2. The charging time exceeds the fixed limit.

1.9.3   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 1-9 lists the charging time and data preservation period of the RTC battery.

Table 1-9   RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	24 hours
Data preservation period (full charge)	30 days

1.10 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-10 lists the AC adapter specifications.

Table 1-10 AC adapter specifications

Parameter	Specification	
	G71C0006Q210 (2-pin)	G71C0006R210 (3-pin)
Power	75W (Peak 90W)	
Input voltage	100V/240V	
Input frequency	50Hz to 60Hz	
Input current	1.5A or less (100V-240V)	
B Output voltage	15V	
Output current	0A to 5A (At constant voltage mode) 5A to 6A (At surge load mode)	

Chapter 2

Troubleshooting Procedures

Chapter 2　　Contents

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2.1 Troubleshooting

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

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

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

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

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

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

3. DOS system FD

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

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

6. An external microphone(for Sound trouble shooting)

7. Headphone(for Sound trouble shooting)

2.2   Troubleshooting Flowchart

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

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

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

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

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

START

Connect the AC adapter to the DC IN socket.

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

Yes

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

Yes

Turn the Power Switch on.

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

No

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

No

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

Yes

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

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

Yes

①

Figure 2-1 Troubleshooting flowchart (1/2)

①

Do typed characters appear correctly? → No → Perform the Keyboard/ Touch pad Troubleshooting Procedures in section 2.7.

Yes

Do the touch pad work correctly? → No → Perform the Keyboard/ Touch pad Troubleshooting Procedures in section 2.7.

Yes

Connect the External USB FDD. Insert the diagnostics disk into the FDD, then hold down the U key and start the computer to run the diagnostics test program.

Is the diagnostics test loaded? → No → Perform the USB FDD Troubleshooting Procedures in section 2.5.

Yes

Perform each test.

Is an error detected by any of the diagnostics tests? → Yes → After confirming which diagnostics test has detected an error, perform the appropriate procedures as outlined below.

No

Perform/repeat running test

Is an error detected by any of the diagnostics tests? → Yes → After confirming which diagnostics test has detected an error, perform the appropriate procedures as outlined below.

No

System is normal.

END

Figure 2-1 Troubleshooting flowchart (2/2)

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

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

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

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

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

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

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

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

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

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

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

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

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

13. If an error is detected on Fingerprint sensor, perform the Fingerprint sensor Troubleshooting Procedures in Section 2.16.

2.3   Power Supply Troubleshooting

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

        Procedure 1:   Icons in the LCD Check

        Procedure 2:   Error Code Check

        Procedure 3:   Connection Check

        Procedure 4:   Charge Check

        Procedure 5:   Replacement Check

Procedure 1   Icons in the LCD Check

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

❑ Battery icon

❑ DC IN icon

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

Table 2-1 Battery icon

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

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights green	DC power is being supplied from the AC adapter.
Flashes orange	There is a problem with the power supply.
Doesn't light	Any condition other than those above.

Procedure 2   Error Code Check

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

The error code begins with the least significant digit.

Table 2-3 Error code

Error code	Where Error occurs
1*h	AC Adaptor
2*h	1st battery
3*h	2nd Battery
4*h	S3V output (P60)
5*h	1R5-C1V output (P61)
6*h	1R5-C1V output (P62)
7*h	PPV output (P63:CH0)
8*h	PTV output (P64)
9*h	E5V output (P65)
A*h	E3V output (P66)
B*h	PPV output (P63:CH1)
C*h	1R35-P1V output (P64)
D*h	1R25-P1V output (P65)
E*h	2R5-B2V output (P66)

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

❑ AC Adaptor

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

❑ 1st Battery

Error code	Meaning
21h	1st battery discharge current over 7.00A..
22h	1st battery discharge current over 3.9A when there is no load.
23h	1st battery charge current is over 3.9A in charging.
24h	Correction value of 0[A] is out of designed value.
25h	1st battery charge current is over 0.3A in not charging.

❑ 3V output (P60)

Error code	Meaning
40h	S3V voltage is 2.81V or less when the computer is powered on/off.
45h	S3V voltage is 2.81V or less in normal conditions.

❑ 1R5-C1V output (P61)

Error code	Meaning
50h	1R5-C1V voltage is over 1.80V when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up
53h	1R5-C1V voltage is 4.50V or less when the computer is suspended.
54h	1R5-C1V voltage is not Normal when the CV support is in Shutdown(s) state.
55h	1R5-C1V voltage is 1.275V or less when the CV support is booting up

❑ 1R5-C1V output (P62)

Error code	Meaning
60h	1R5-C1V voltage is over 2.15V when the computer is powered on/off.
61h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
62h	1R5-C1V voltage is 1.275V or less when the computer is booting up
63h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
64h	1R5-C1V voltage is not Normal when the CV support is in Shutdown(s) state.
65h	1R5-C1V voltage is 1.275V or less when the CV support is booting up

❑ PPV output (P63:MUX- CH0)

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

❑ PGV output (P64:MUX- CH0)

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

❑ PTV output (P65:MUX- CH0)

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

❑ 1R9-B1V output (P66:MUX- CH0)

Error code	Meaning
A0h	1R9-B1V voltage is over 2.40V when the computer is powered on/off.
A1h	1R9-B1V voltage is 1.53V or less when the computer is powered on.
A2h	1R9-B1V voltage is 1.53V or less when the computer is booting up
A3h	1R9-B1V voltage is 1.53 or more when the computer is powered off.
A4h	1R9-B1V voltage is 1.53V or less when the computer is suspended.

❑ PGV output (P63:MUX- CH1)

Error code	Meaning
B0h	PGV voltage is over1.62V when the computer is powered on/off.
B1h	PGV voltage is 0.68V or less when the computer is powered on.
B2h	PGV voltage is 0.68V or less when the computer is booting up
B3h	PGV voltage is 0.68V or more when the computer is powered off.

❑ E3V output (P64:MUX- CH1)

Error code	Meaning
B0h	E3V voltage is over 3.96V when the computer is powered on/off.
B1h	E3V voltage is 2.81V or less when the computer is powered on.
B2h	E3V voltage is 2.81V or less when the computer is booting up
B3h	E3V voltage is 2.81V or more when the computer is powered off.
B4h	E3V voltage is 2.81V or less when the computer is suspended.

❑ PTV output (P65:MUX- CH1)

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

❑ 1R9-B1V output (P66:MUX- CH1)

Error code	Meaning
E0h	1R9-B1V voltage is over 2.40V when the computer is powered on/off.
E1h	1R9-B1V voltage is 1.53V or less when the computer is powered on.
E2h	1R9-B1V voltage is 1.53V or less when the computer is booting up
E3h	1R9-B1V voltage is 1.53 or more when the computer is powered off.
E4h	1R9-B1V voltage is 1.53V or less when the computer is suspended.

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

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

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

Check 3   In the case of error code 2Xh:

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

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

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

Procedure 3   Connection Check

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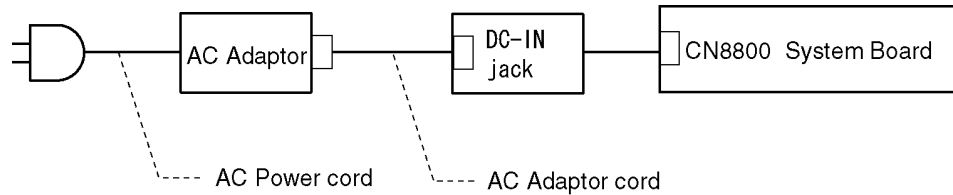
Any of the connectors may be disconnected. Perform Check 1.

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

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

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

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

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

Check 6   Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4   Charge Check

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

1. Reinstall the battery pack.

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

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

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

Table 2-4 Result code

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

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

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

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

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

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

Procedure 5   Replacement Check

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

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

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

2.4　System Board Troubleshooting

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

The procedures described in this section are:

Procedure 1:　Message Check

Procedure 2:　Printer Port LED Check on Boot Mode

Procedure 3:　Diagnostic Test Program Execution Check

Procedure 4:　Replacement Check

Procedure 1   **Message Check**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

If one of the following error messages (1) through (17), (22) or (23) appears, go to
Procedure 4.

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

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

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

(1)	PIT ERROR
(2)	MEMORY REFRESH ERROR
(3)	TIMER CH.2 OUT ERROR
(4)	CMOS CHECKSUM ERROR
(5)	CMOS BAD BATTERY ERROR
(6)	FIRST 64KB MEMORY ERROR
(7)	FIRST 64KB MEMORY PARITY ERROR
(8)	VRAM ERROR
(9)	SYSTEM MEMORY ERROR
(10)	SYSTEM MEMORY PARITY ERROR
(11)	EXTENDED MEMORY ERROR
(12)	EXTENDED MEMORY PARITY ERROR
(13)	DMA PAGE REGISTER ERROR
(14)	DMAC #1 ERROR
(15)	DMAC #2 ERROR
(16)	PIC #1 ERROR
(17)	PIC #2 ERROR
(18)	KBC ERROR
(19)	HDC ERROR
(20)	Built-in HDD ERROR
(21)	Select Bay ERROR
(22)	TIMER INTERRUPT ERROR
(23)	RTC UPDATE ERROR

Procedure 2　　Serial Port Check (Boot Mode)

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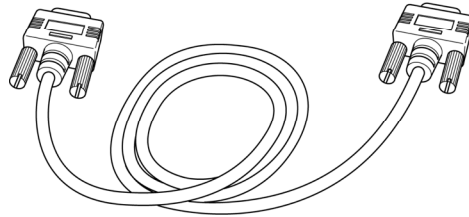
Figure 2-2 A set of tool for serial port test

The test procedures are follows:

1. Connect the RS-232C cross-cable to the connector CN34200 of the system board..

2. Connect the RS-232C Cross-cable to the PC that displays the test results.
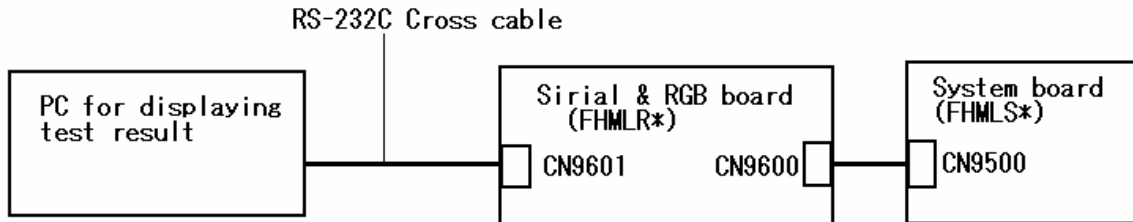
4. Boot the compute1r in DOS mode.

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

   The D port status is displayed in the following form;

6. When the D port status is FFFF (normal status), go to Procedure 4. When the D port status falls into any other status than FFFF, go to Procedure 3.

Table 2-5 Serial port (Boot mode) error status (1/9)

D port Status	Test item	Contents
Boot Block	Permission of A20 and clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCH, ICH	
	Initialization of Super I/O	
	Initialization of debug port (For models supporting debug port)	
	Dummy read of 3rd Bus data	
	Setting of printer port (For models supporting printer port)	
F0B0h	PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite factor flag initialization	
	CHECK SUM CHECK	Transition to protected mode
		Boot block checksum (skipped when returned from S3) Halts when error occurs
		Checksum other than boot block (skipped when returned from S3)
F0B1h	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process"
		Transition to system BIOS IRT （when returned to S3)
	Key input	". When a key is pressed, check if it is Tilde key or Tab key. (skipped when returned from S3)
F0B2h	Initialization of SC	HLT at LED=B3H or B4, when error occurs
F0B6h	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
F0B7h	Transits to System BIOS IRT	
	BIOS rewrite process	
	Initialization of ICH. D31	
	DRAM configuration	
	Permission of cache (L1 cache only)	
	Memory clear	
	Transition to real mode and copy of BIOS to RAM	

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

D port Status	Test item	Contents	
F0B9h	Saving of key scan code		
	Setting of TASK_1ms_TSC		
	FAN control		
	Sound initialization (for BEEP sound)	System speaker permission	
		Cancel of sound mute	
		Setting of volume to max (model that can control volume)	
	When BIOS, EC/KBC rewriting is requested	Blinks green (cycle:2s, on:1s, off:1s)	
	When BIOS ROM is abnormal	Blinks orange (cycle:2s, on:1s, off:1s)	
	When BIOS renewal is prohibited	Blinks orange (cycle:8s, on:4s, off:4s) HLT after BEEP is sounded for 30s (LED=BBH))	
	Key input	Prohibition of USB	
		BEEP	
		Waiting for Key input	
	Reading of CHGBIOSA.EXE/CHGFIRMA.EXE	FDC RESET	
		Setting of parameters for 2HD (1.44MB)	
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.	
		Setting of parameters for 2DD (720KB)	
		Retrieval of "CHGBIOSA.EXE" from the root directory.	
			Calculation of directory start head and sector
			Read 1 sector of the root directory
			Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.
		Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"	
		Key input when error occurred	
		Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"	

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

D port Status	Test item	Message
F100h	Renewal of a microcode（Only support model）	
	Prohibition of cache	
	Permission of L1/L2 cache in FlashROM area	
	Initialization of H/W (before DRAM recognition)	Initialization of MCH
		Initialization of ICH6M D30.Func0
		Initialization of ICH6M.D31.Func0
		Initialization of ICH6M.D31.Func1/2
		Initialization of USB Controller
		Initialization of ICH6M.D31.Func3
		Initialization of ICH6M AC97 Audio
		Initialization of TI Controller
	Initialization of PIT channel 1	(Setting the refresh interval to "30μs")
F101h	Check of DRAM type and size (at cold boot)	When unsupported memory is connected, becoming HLT after beep sound
	SM-RAM stack area test	HLT when DRAM size is 0 HLT When it can not be used as a stack
F102h	Cache configuration	
	Cache permission(L1/L2 cache)	
	CMOS access test (at cold boot)	(HLT when an error is detected)
	Battery level check of CMOS	
	CMOS checksum check	
	Initialization of CMOS data (1)	
	Setting of IRT status	(Setting of boot status and IRT busy flag, The rest bits are 0)
	Storing DRAM size in CMOS	
F103h	Resume branch (at cold boot)	Not resume when a CMOS error occurred
		Not resume when resume status code is not set

		Resume error check
		  S3 returning error (1CH) (Resume error LED=7AH)
		  SM-RAM checksum check (Resume error LED=73H)

Table 2-5 Serial port (Boot mode) error status (4/9)

D port Status	Test item	Contents
(F103h)		Check of memory configuration change (Resume error LED=73H)
		RAM area checksum check in system BIOS (Resume error LED=79H)
		Expansion memory checksum check resume error (Resume error LED=76H)
		PnP RAM checksum check (Resume error LED=77H)
		Transition to RESUME-MAIN
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Turning area of C0000h to EFFFFh to PCI (Prohibition of DRAM)
		Setting of resume error request
	Copying ROM/RAM of system BIOS	(HLT, when error occurs)
F105h	SMRAM initia(model supporting built-in FDD)lization	
	Check of CPU for HyperThreading (model supporting HTT)	
	APIC initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
F106h	Initialization of devices which need initialization before PCI bus initialization.	PIT test (Cold boot only) and initialization
		Setting of test pattern to channel 0 of PIT#0
		Check whether the set test pattern can be read
		Initialization of PIT channel 0, Setting of timer interruption interval to 55ms
		Initialization of PIT channel 2, Setting of the sound generator frequency to 664Hz
		Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval.) HLT, when the time is out.
		Test of PIT channel 2 (Check whether the speaker gate works normally.)
		CPU clock measurement

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

D port Status	Test item	Contents
(F106h)		Check of parameter block A
		Permission of SMI except auto-off function
		Control of excess of rated input power
		Battery discharging current control (1CmA).
		AC adapter rated over current control
		Dividing procedures for time measuring by IRT
		Setting for clock generator

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

F107h	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or other than Japan) based on DMI data	
	CMOS default setting check	Sets default setting if bad battery or bad checksum (ROM, CMOS) is detected
	ACPI table initialization (for execution of option ROM)	
	Initialization of devices which need initialization before PCI bus initialization	Setting of IDE device operation mode
		Setting of AC'97/Azalia operation mode
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Control of built-in LAN permission/ prohibition
		PCI Express initialization
		Sound initialization
		PC multi-box status acquisition (For models supporting Select Bay)
		HC initialization and Device recognition
		SD Memory card recognition and initialization
	PIC initialization	
	PIC test	
	Password Initialization	

Table 2-5 Serial port (Boot mode) error status (6/9)

D port Status	Test item	Contents
F108h	PCI bus initialization (connection of DS Bus)	
	Initialization of LAN information	
	WakeUp factor check	
F109h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
F10Ah	Task generation for waiting PnP resource making completion	
	Serial interruption control	(It carries out, before using interruption processing) (Only YEBISU support model)
	PnP H/W initialization	PC card slot initialization
		SIO initialization (For models supporting SIO)
		FIR initialization (For models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		Configuration
		Saving of VGA configuration result
F10Bh		Task generation for waiting PCI_CONFIGURATION completion
	Initialization of H/W needed after PCI configuration	Printer port setting (model supporting Printer port)
		HDD initialization sequence start
		FDD initialization sequence start (model supporting built-in FDD)
	Enabling power off	
	Output code generation	
F10Ch	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10Dh	INIT_INT_VECTOR	(Initialization of vectors)
F10Eh	INIT_NDP	(Initialization of NDP)

Table 2-5 Serial port (Boot mode) error status (7/9)

D port Status	Test item	Contents
F10Fh	INIT_SYSTEM	(Initialization of system)
		Storing of CMOS error information to IRT_ERR_STS_BUF
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update EDID information for LCD)
F110h	INIT_DISPLAY	(Waiting for VGA chip initialization completion, VGA BIOS initialization)
F111h	VGA POST	
F113h	DISP_LOGO	(Logo displaying)
F114h	SYS_MEM_CHECK	(Check of conventional memory) (Boot)
F115h	EXT_MEM_CHECK	(Exception check in protected mode) (Boot)
F116h	INIT_SYS_MEM	(Initialization of conventional memory) (Reboot) (LED=17h if error occurred during exception check in protected mode)
F118h	CHK_DMA_PAGE	(Check of DMA Page Register) (Boot)
F119h	CHECK_DMAC	(Check of DMAC) (Boot)
F11Ah	INIT_DMAC	(Initialization of DMAC) (Boot)
F11Bh	CHECK_PRT	(Check of printer existence) (For models supporting Printer port)
F11Ch	CHECK_SIO	(Check of SIO) (model supporting SIO)
F11Dh	BOOT_PASSWORD	(Check of password)
		Waiting for FDD initialization completion (For models supporting built-in FDD)
	(In the case of "Reboot")	Waiting for HDD initialization completion
		Check of key input during IRT (waiting for KBC initialization completion)
		Initialization of ATA priority
	(In the case of "Boot")	Loading processing of BM (Only model which is supporting the finger point leader)
		Initialization of BM(Only model which is supporting the finger point leader)
		Check of key input during IRT (waiting for KBC initialization completion)
		A password input is performed.

Table 2-5 Serial port (Boot mode) error status (8/9)

D port Status	Test item	Contents
(F11Dh)		I/O LOCK Processing (For models supporting I/O LOCK)
		Opening of BM (Only model which is supporting the finger point leader)
F11Eh	EX_IO_ROM_CHECK	(Check of option I/O ROM)
F11Fh	PRE_BOOT_SETUP	Saving of value in 40:00h (For SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Acquisition of keys pressed during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource before boot
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion (For models supporting AC-Link)
		Updating of table for DMI
		Copy of ACPI table to top of expansion memory
		Waiting for writing of PSC version to BIOS completion
		Waiting for clock generator setting completion When error occurred, halts at LED=21H
		Waiting for serial port initialization completion (For models supporting SIO)
		Cancel of NMI Mask
		Taking out TIT check sum
		Clear of the IRT flag on Runtime side
		Update of check sum on Runtime side
		Hibernation branch (For models supporting BIOS Hibernation)
		Initialization of Bluetooth (For models supporting Bluetooth)
		Check of existence of object maintenance cards
		Prohibition of unused PC cards
		Setting Wakeup status data for ACPI

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

D port Status	Test item	Contents
(F11Fh)		HW initialization before Boot, Waiting for initialization completion
		Notifies the DVI connection status to VGA BIOS (For models supporting DVI)
		Setting of battery save mode
		Setting of date
		Waiting for Bluetooth initialization completion (For models supporting Bluetooth)
		Update of DMI Wakeup factor, Update of SM-BIOS structure table
		PCI device configuration space close
		Cache control
		Process for CPU (Make the CPU clock to be set by SETUP)
		Waiting of motor-off completion of disabled HDD
		Final setting of USB FDD information

		Post processing of PRE_BOOT_SETUP
		  Clears PWRBTN_STS
		  Enables POWER Button

F121h	Clearness of IRT status	
	Update of Checksum on Runtime side	
FFFFh		

Procedure 3   Diagnostic Test Program Execution Check

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

1. System test

2. Memory test

3. Keyboard test

4. Display test

5. Floppy Disk test

6. Async test

7. Hard Disk test

8. Real Timer test

9. NDP test

10. Expansion test

11. CD-ROM/DVD-ROM test

12. Wireless LAN test

13. Sound test

14. LAN/Modem/Bluetooth/IEEE1394 test

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

Procedure 4   Replacement Check

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

Check 1   Visually check for the following:

       a) Cracked or broken connector housing

       b) Damaged connector pins

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

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

2.5   USB FDD Troubleshooting

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

Procedure 1:   USB FDD Head Cleaning Check

Procedure 2:   Diagnostic Test Program Execution Check

Procedure 3:   Connector Check and Replacement Check

Procedure 1   USB FDD Head Cleaning Check

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

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

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

Procedure 2   Diagnostic Test Program Execution Check

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

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

Table 2-6 FDD error code and status

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

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

```
Write protected
```

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

Procedure 3   Connector Check and Replacement Check

The USB FDD is connected to the System Board.

Check 1   When using the USB port, make sure the USB FDD cable is firmly connected to
CN4612 , CN4611 or CN4610 on the System board.

```
                          ┌─────────────────────────────┐
                          │  <System Board>             │
  ┌──────────────┐        │                             │
  │              │ ┌─┐    │ ┌─┐                          │
  │   USB FDD    ├─┤ ├────┼─┤ │ CN4611 port 4           │
  │              │ └─┘    │ └─┘                          │
  └──────────────┘   ┆    │ ┌─┐                          │
                     └────┼─┤ │ CN4610 port 6           │
                          │ └─┘                          │
                          │                             │
                          └─────────────────────────────┘
```
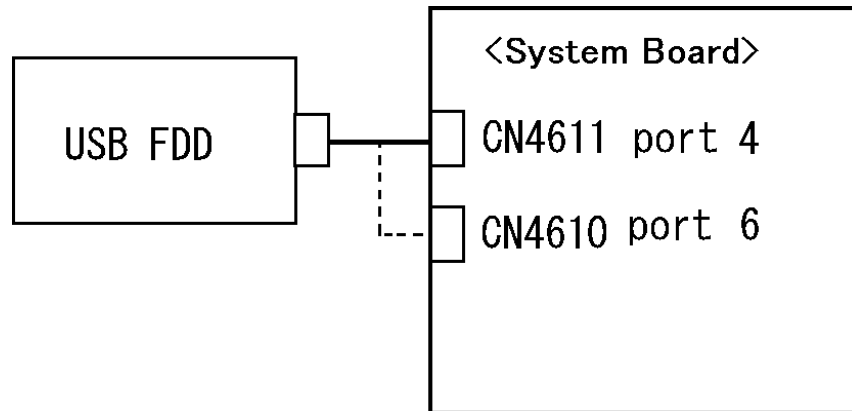
   If any of the connections are loose, reconnect firmly and repeat Procedure 2.
   If any of the connections is damaged, or there is still an error, go to Check 2.

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

2.6   HDD Troubleshooting

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

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

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

Procedure 1   Message Check

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

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

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

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

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

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

Procedure 2   Partition Check

Insert the Toshiba MS-DOS system disk and restart the computer with U key holding down. Perform the following checks:

Check 1   Type `C:` and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.

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

Check 3   If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 3.

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

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

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

```
System transferred
```

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

Procedure 3   Format Check

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

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

          Format complete

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

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

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

          Format complete

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

Procedure 4   Diagnostic Test Program Execution Check

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

If an error is detected during the HDD test, an error code and status will be displayed. Replace the HDD with a new one following the instructions in Chapter 4, *Replacement Procedures*. The error codes and statuses are listed in Table 2-7. If an error code is not generated or the problem still exists, go to Procedure 5.

Table 2-7 HDD error code and status

Code	Status
01h	Bad command error
02h	Address mark not found
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	Overrun error (DRQ ON)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enable
12h	DMA CRC error
20h	HDC error
40h	Seek error
80h	Time out error
AAh	Drive not ready
BBh	Undefined error
CCh	Write fault
E0h	Status error
EEh	Access time error
DAh	No HDD

Procedure 5   Connector Check and Replacement Check

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

Check 1   Make sure the HDD is firmly connected to CN19000 on the system board.
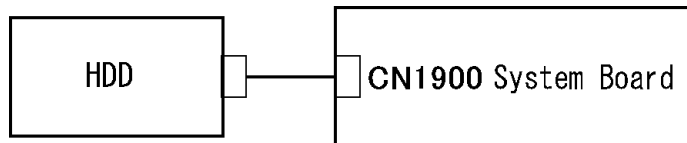
           If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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*.

2.7   Keyboard and Dual point Troubleshooting

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

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

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector Check and Replacement Check

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

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

2. If the Dual point malfunctions, start with Check 3.

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

Check 1   Make sure the keyboard cable is securely connected to CN3230 on the system board.
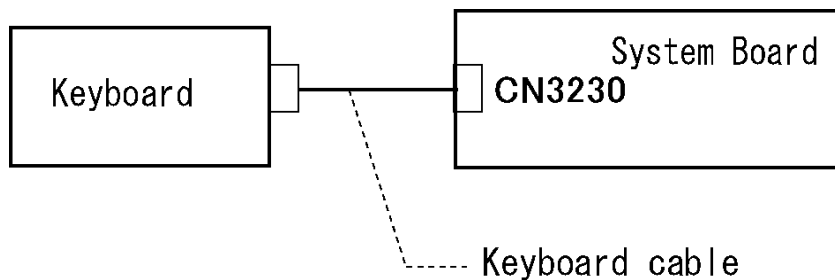
```
  ┌─────────────┐        ┌────────────────────────┐
  │             │┌┐      ┌┐       System Board     │
  │  Keyboard   │││      ││  CN3230                │
  │             │└┘╲     └┘                        │
  └─────────────┘   ╲                              │
                     ╲                             │
                      ╲                            │
                       ╲──── Keyboard cable        │
                                                   │
```

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

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

Check 3   Make sure the Dual point cable is firmly connected to CN3240 on the system board.

```
  ┌─────────────┐        ┌────────────────────────┐
  │             │┌┐      ┌┐       System Board     │
  │ Dual point  │││      ││  CN3240                │
  │             │└┘╲     └┘                        │
  └─────────────┘   ╲                              │
                     ╲                             │
                      ╲──Dual point cable          │
```
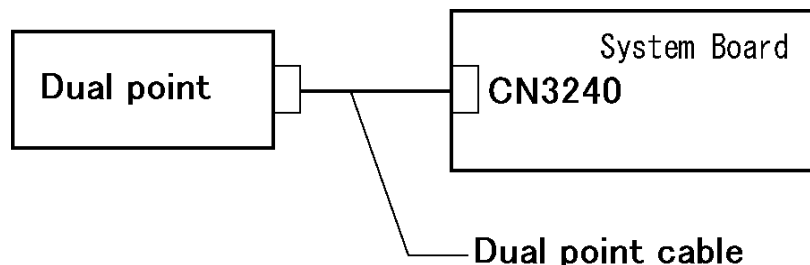
If the connection is loose, reconnect firmly. If there is still an error, go to Check 4.

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

Check 5   The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.8   Display Troubleshooting

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

Procedure 1:   External Monitor Check

Procedure 2:   Diagnostic Test Program Execution Check

Procedure 3:   Connector Check and Cable Check

Procedure 4:   Replacement Check

Procedure 1   External Monitor Check

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

Procedure 2   Diagnostic Test Program Execution Check

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

Procedure 3   Connector Check and Cable Check

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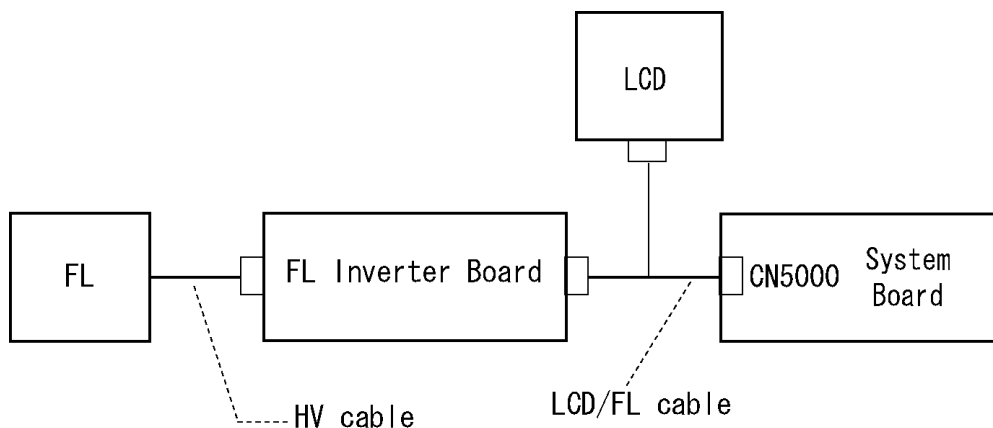
If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 4.

Procedure 4   Replacement Check

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

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

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

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

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

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

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

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

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

2.9 Optical Drive Troubleshooting

This section describes how to determine if the optical drive (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 (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 CN1810 on the system board.
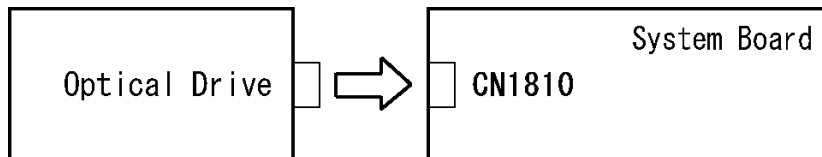
If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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

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

2.10 Modem Troubleshooting

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

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

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector Check and Replacement Check

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

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

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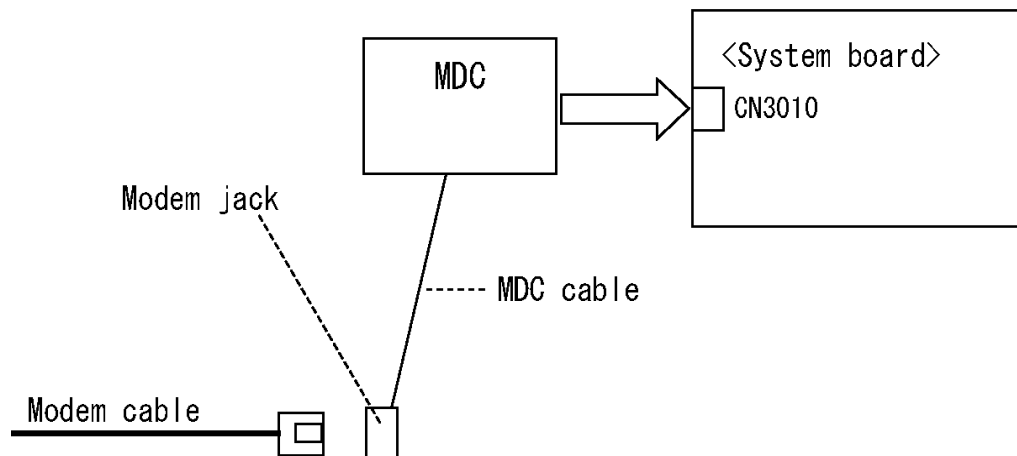
If a connector is disconnected, connect it firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

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

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

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

2.11 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the LAN test program available as part of the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

Procedure 2   Connector Check and Replacement Check

The RJ-45 jack with LAN cable is connected to the system board. If the LAN malfunctions, the system board might be damaged.

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

Check 1   Make sure the RJ-45 jack is firmly connected to J4100 on the system board.

```
  ┌──────────────────┐          ┌──────────────────────────┐
  │                  │          │                          │
  │   LAN jack       │         ┌┤CN4100  System Board      │
  │   (RJ-45)        │         └┤                          │
  │                  │          │                          │
  └──────────────────┘          └──────────────────────────┘
```
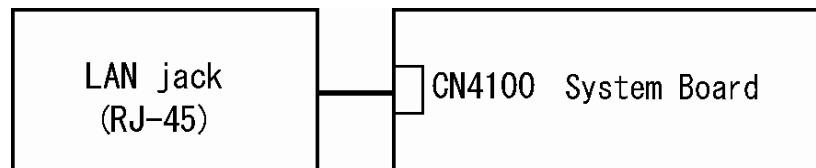
If the connector is disconnected, connect it firmly and repeat Procedure 1. If the LAN port is still not functioning properly, perform Check 2.

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

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

2.12 Bluetooth Troubleshooting

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

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

Procedure 1   Diagnostic Test Program Execution Check

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

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

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

Procedure 2   Connection Check

The Bluetooth function wiring diagram is shown below:

```
                    Antenna cable
                         ╱
                        ╱
 ┌──────────┐      ┌──────────────┐    ┌──────────────────┐
 │          │      │              │    │   System Board   │
 │ Antenna  │──────│Bluetooth module│□⇨ □│CN4400            │
 │  Board   │      │              │    │                  │
 │          │      │              │    │                  │
 └──────────┘      └──────────────┘    └──────────────────┘
```

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

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

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

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

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

Procedure 3   Replacement Check

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

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

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

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

2.13 Wireless LAN Troubleshooting

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

        Procedure 1:   Transmitting-Receiving Check

        Procedure 2:   Antenna Connection Check
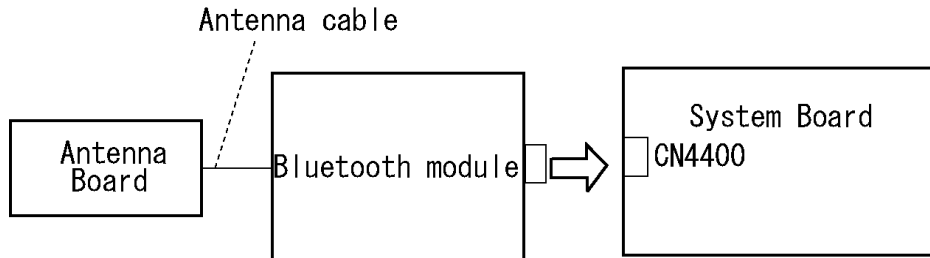
        Procedure 3:   Replacement Check

Procedure 1   Transmitting-Receiving Check

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

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

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

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

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

Procedure 2   Antenna Connection Check

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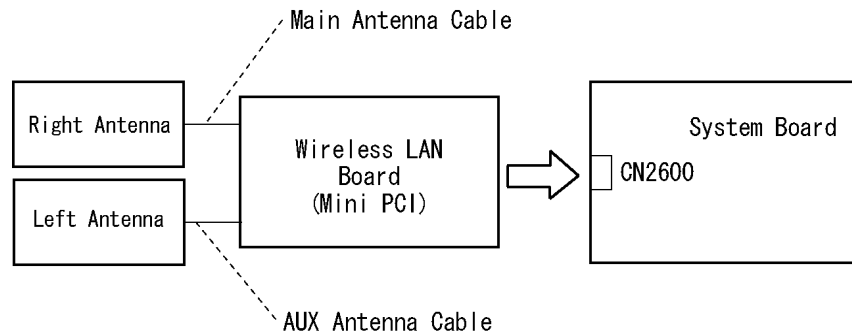
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

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

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

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

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

Procedure 3   Replacement Check

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

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

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

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

2.14 Sound Troubleshooting

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

        Procedure 1:   Diagnostic Test Program Execution Check

        Procedure 2:   Connecor Check

        Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

If an error is detected, go to Procedure 2.

Procedure 2   Connector Check

The sound function-wiring diagram is shown below:
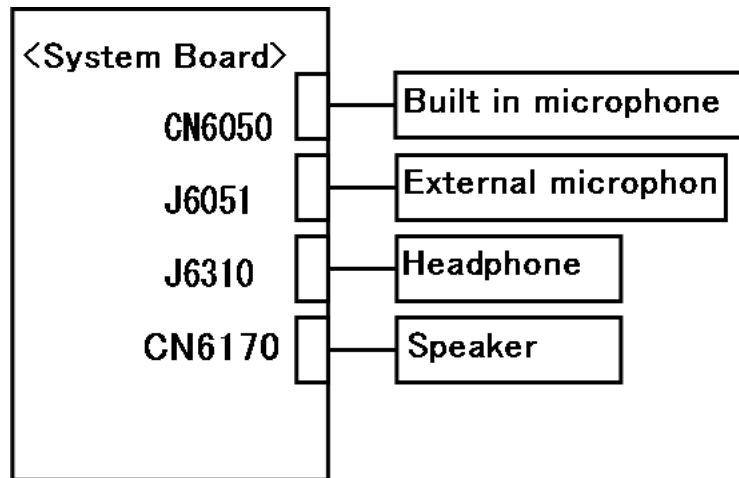
```
┌─────────────────────┐
│ <System Board>      │
│              ┌─┐   ┌──────────────────────┐
│   CN6050     │ ├───┤ Built in microphone  │
│              └─┘   └──────────────────────┘
│              ┌─┐   ┌──────────────────────┐
│   J6051      │ ├───┤ External microphon   │
│              └─┘   └──────────────────────┘
│              ┌─┐   ┌──────────────────────┐
│   J6310      │ ├───┤ Headphone            │
│              └─┘   └──────────────────────┘
│          ┌─┐       ┌──────────────────────┐
│   CN6170 │ ├───────┤ Speaker              │
│          └─┘       └──────────────────────┘
│                     │
└─────────────────────┘
```

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 speakers do not work correctly, perform Check 1.

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

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

4. If the Built in microphones do not work correctly, perform Check 4.

Check 1   If the speakers do not work properly, the speaker cable may be disconnected.
Make sure the speaker cable is firmly connected to CN6170 on the system board.
If the stereo speakers are still not functioning properly, go to Procedure 3.

Check 2   If the headphone does not work properly, the headphone cable may be
disconnected. Make sure the headphone cable is firmly connected to J6310 on the
system board. If the sound function still does not work properly, Procedure 3.

Check 3   If the external microphones do not work properly, external microphone cable may
be disconnected. Make sure the external microphone cable is firmly connected to
J6051 on the system board.
If the external microphones are still not functioning properly, go to Procedure 3.

Check 4   If the Built in microphone do not work properly, the Built in microphone cable
may be disconnected. Make sure the Built in microphone cable is firmly
connected to CN6050 on the system board. If the Built in microphone are still not
functioning properly, go to Procedure 3.

Procedure 3   Replacement Check

Check 1   If the speakers do not sound properly, the speaker may be defective or damaged. Replace it with a new one. If the speakers still do not work properly, go to Check 3.

Check 2   If the Built in microphone do not sound properly, the Built in microphone may be defective or damaged. Replace it with a new one. If the Built in microphone still do not work properly, go to Check 3.

Check 3   If the headphone or external microphone does not sound properly, the system board may be defective or damaged. Replace the system board with a new one.

2.15 Bridge media Slot Troubleshooting

This section describes how to determine if the computer's Bridge media 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 OS

Procedure 2:   Connector Check and Replacement Check

Procedure 1   Check on Windows OS

Insert a Bridge media (SD memory card/SDIO card/Memory stick/Memory stick Pro/ xD Picture card/Multimedia card) into the slot. Check if the installed Windows recognizes automatically the Bridge media and the data in the Bridge media can be read.

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

Procedure 2   Connector Check and Replacement Check

The Bridge media is connected to IS2140 on the system board.

Bridge media supports SD memory card/SDIO card/Memory stick/Memory stick Pro/ xD Picture card/Multimedia card.

```
┌─────────────────────┐        ┌──────────────────────────┐
│                     │        │       System Board       │
│   Bridge media      │ ═══>   │ □ IS2140                 │
│                     │        │                          │
└─────────────────────┘        └──────────────────────────┘
```
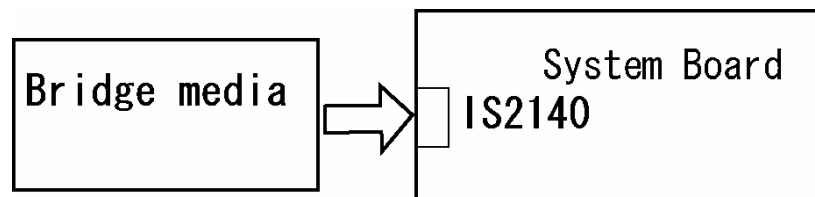
Check 1   Bridge media and system board may be disconnected. Make sure the Bridge media is firmly inserted to IS2140 on the system board. If not, insert it firmly. If the Bridge media is still not functioning properly, perform Check 2.

Check 2   Bridge media 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   System board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.

2.16 Fingerprint sensor Troubleshooting

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

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

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

Procedure 1:   Setting Windows Log-ON password

Procedure 2:   Registration of fingerprint

Procedure 3:   Authentication of fingerprint

Procedure 4:   Connector Check and Replacement Check

CAUTION: *Scan your finger shown below.*
     1. Lay your finger straight to the sensor and put lightly the first joint of your finger at the centerline of the fingerprint sensor.
     2. Slide slowly your finger from the first joint to fingertip at constant speed. When not recognized, adjust the speed.

Fingerprint sensor

Fingerprint sensor
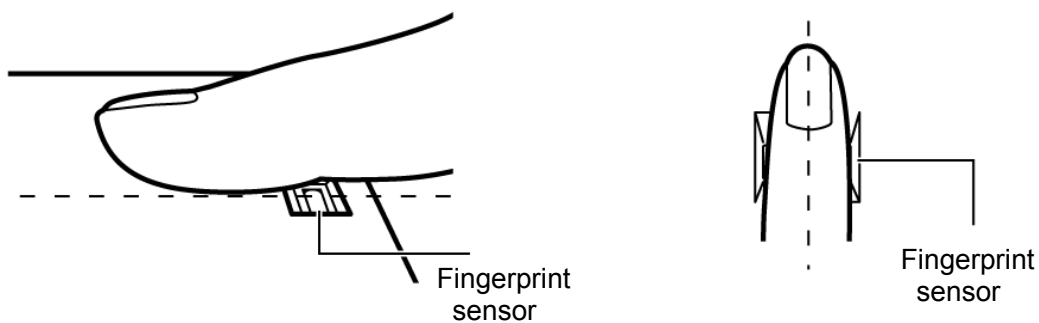
Procedure 1   Setting Windows Log-ON password

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

2. Click [User Account].

3. Click the icon of the account (user's name) that you want to set the password.

4. Click "Create Account".

5. Type a password in "Type a new password".

6. Press **Tab** key.

7. Type the password again.

8. Click "Create Password" button.

9. When "Do you want to make your files and folders private" appears in [Computer administrator], click [Yes, Make Private].

Procedure 2   Registration of fingerprint
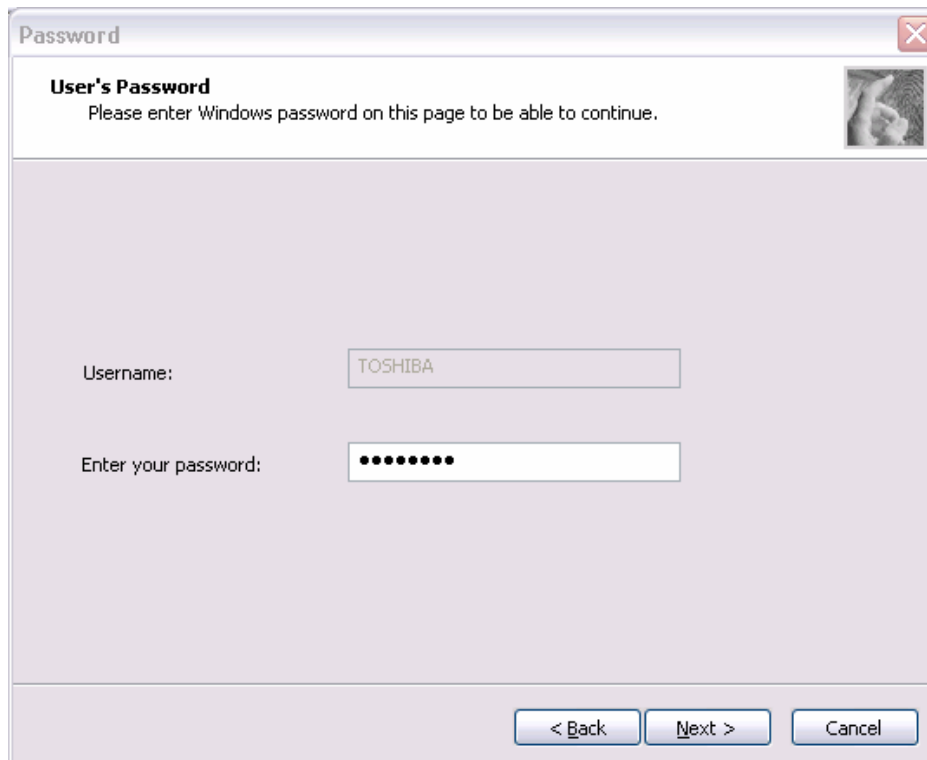
1. Logon by user's account to register the fingerprint.

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

3. After displaying [User Enrollment], click [Next].
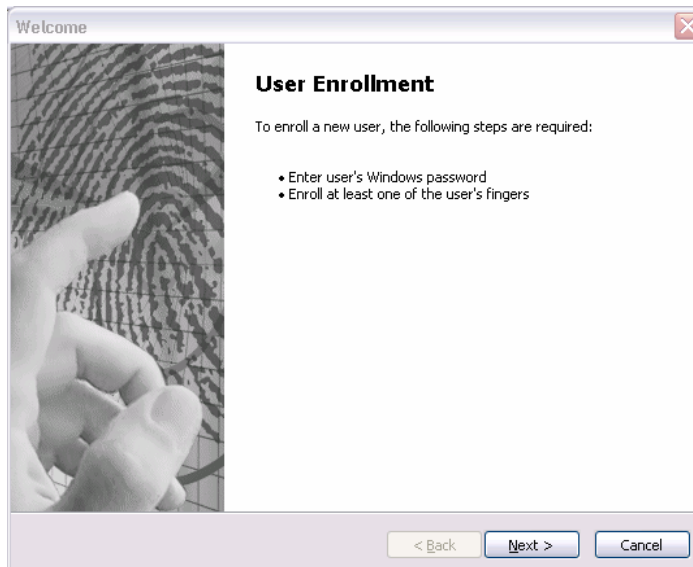
[User's Passport] appears in "Enter your password". Click [Next].

When the finger print has been enrolled, [User's Password] appears. Slide your finger enrolled or type the password. Click [Next].

5. Type the Windows logon password in "Enter your password" and click [Next]. [User's Password] appears.

6. Confirm that the box of [Run interactive tutorial] is checked (when proceeding wit
    seeing Tutorial) and click [Next].
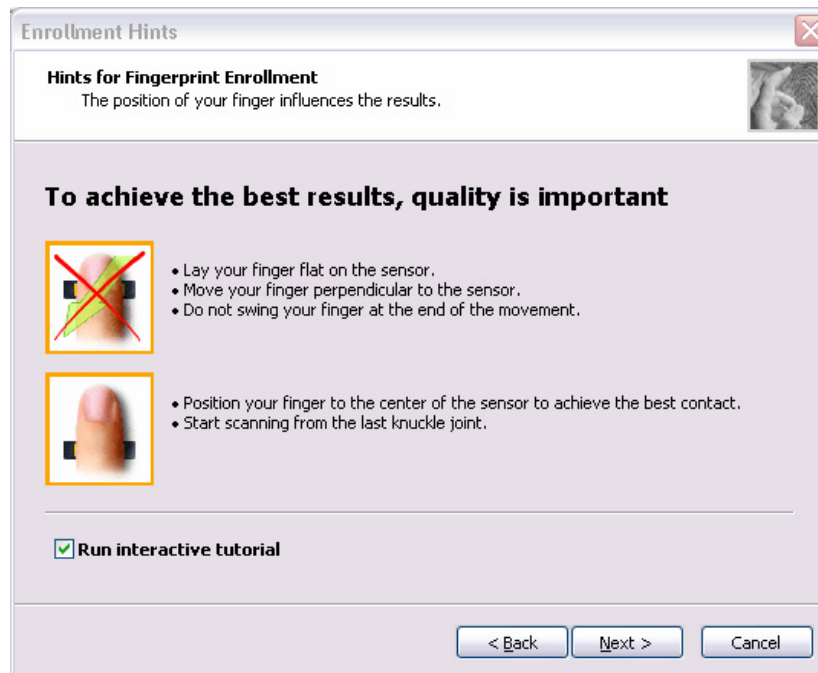
7. Watch the Video carefully, click [Next].
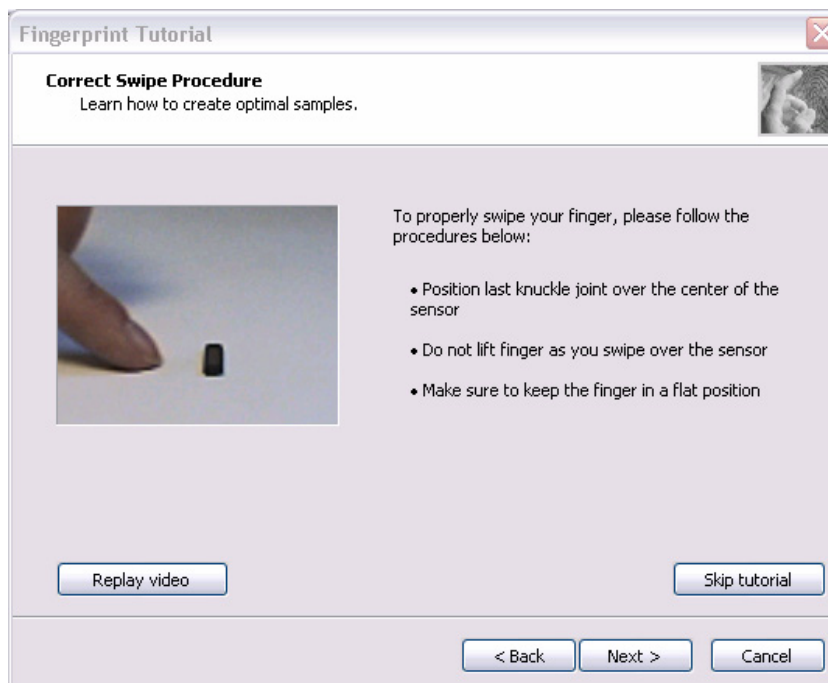
8. Put lightly your finger on the fingerprint sensor at the right side of the touchpad panel and slide your finger sideways
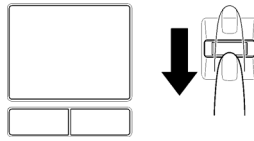
Slide your finger four times. Four boxes are filled with fingerprints. At this time, when you click the [Replay video], you can watch the video that you have watched in Procedure 6.
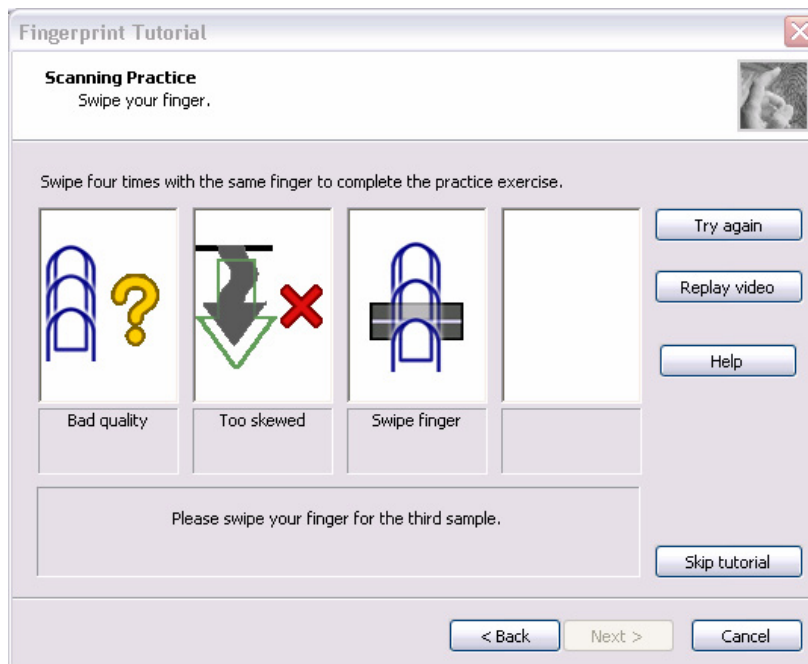
When you have failed in any time of four times reading and want to practice again, click [Try again]. When you have fully succeeded in four times of reading, the message of "Fully succeeded" appears.
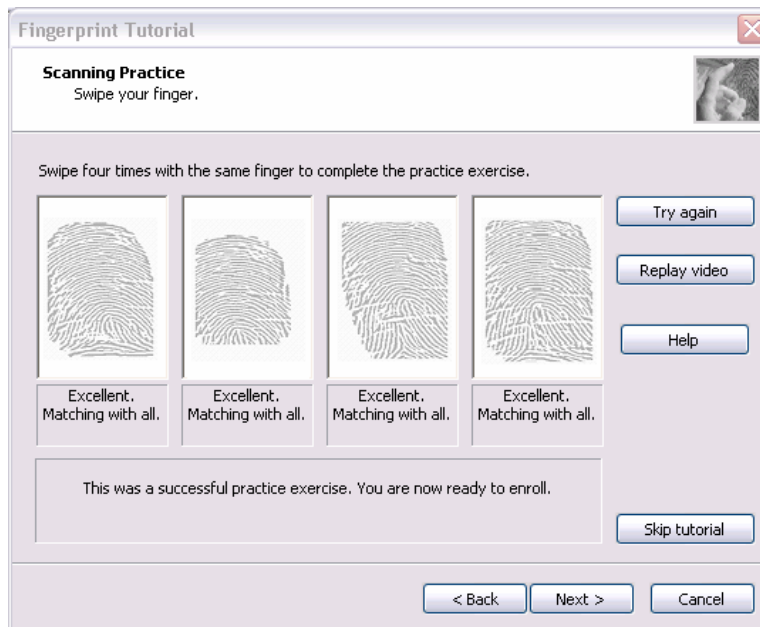
9. Click [Next]. The display of [User's Fingers]

10. Click the box you want to enroll.
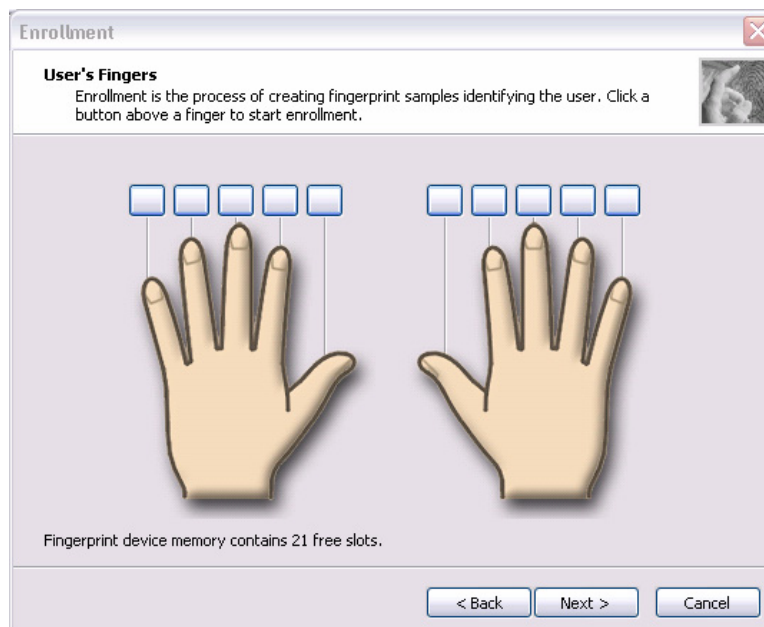
Put lightly the first joint of your finger you want to enroll on the fingerprint sensor and slide your finger sideways. Enroll your finger three times. Every time your finger has been successfully enrolled, one box is checked. When your finger has been successfully enrolled three times, the message of "Succeeded" appears.
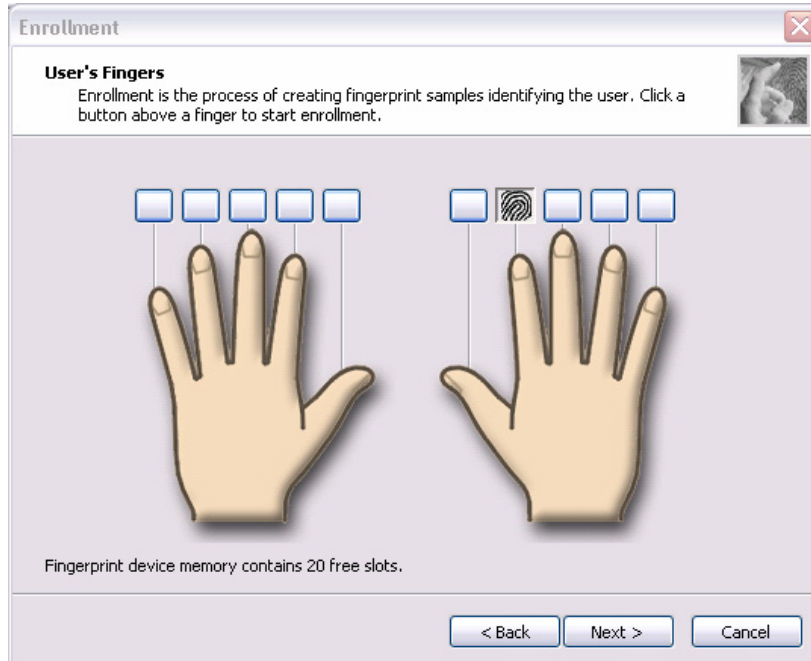
When you do not enroll your finger within two minutes after [User's Fingerprint] has been displayed, an error message appears. At the time, click [OK] and enroll your fingerprint.

When you attempt to enroll your finger that has been enrolled, you can not enroll. Enroll your other finger again.

10. Enroll another finger in Procedure 9. Enroll two fingers at least.

11. The display that recommend you to register a password.

12. Click [OK] in the following display.
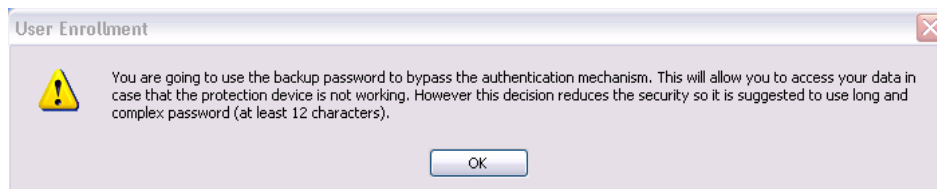
13. Type a backup password two times in the following display. (This password is different from the password of Windows logon.)
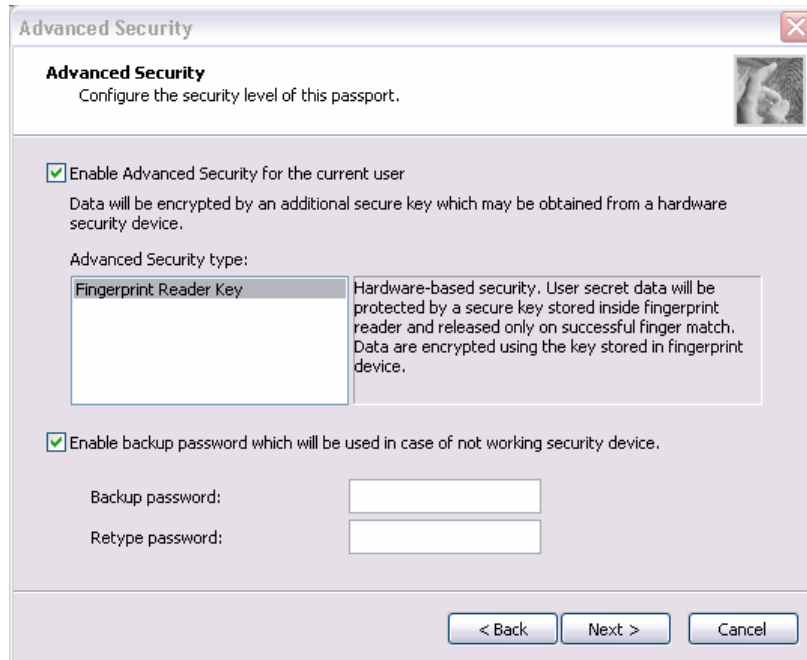
14. Click [Next]. The [Finish] display appears.

15. Click [Finish], "Welcome" display appears.
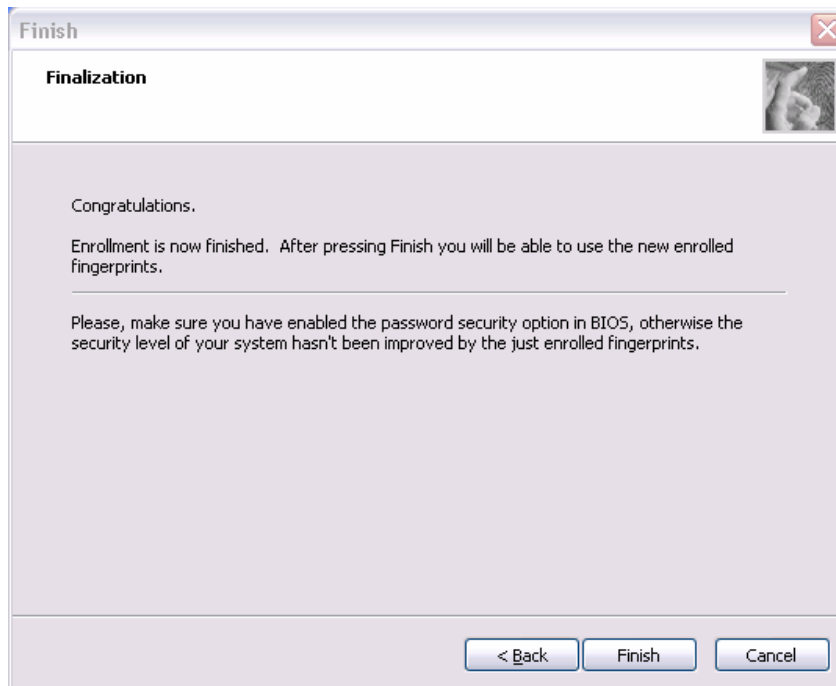
Procedure 3   Authentication of fingerprint

1. Turn on the computer to start up Windows.

2. In the Windows logon window, put lightly the first joint of your finger registered and slide your finger sideways.
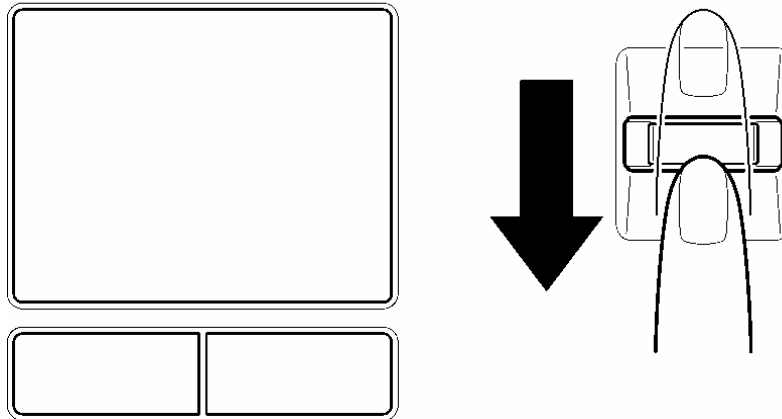
When authenticated, [Success] is displayed in the fingerprint authentication display.

When not authenticated well, warning message appears. If you fail continually ten times or more, you can not use the fingerprint authentication about one minute.

When not authenticated, type the password to logon to Windows.

Procedure 4   Connector Check and Replacement Check

The Fingerprint sensor cable is connected to the connector CN9650 on the Fingerprint sensor board and connector CN9550 on the system board.

```
Fingerprint sensor Board          <System board>
      CN9650      [ ]──────[ ]  CN9550
```
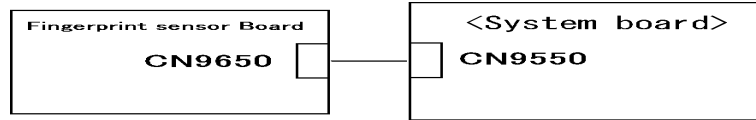
Check 1   Check the Fingerprint sensor cable is firmly connected to the connector CN9650 on the Fingerprint sensor board and connector CN9550 on the system board. If not, connect it firmly. If the Fingerprint sensor is still not functioning properly, perform Check 2.

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

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

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

Chapter 3

Tests and Diagnostics

3

Chapter 3   Contents

Tables

³
3.1 The Diagnostic Test

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

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

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

NOTE: Before starting the diagnostics, be sure to follow these steps:

   1. Check all cables are connected firmly.

   2. Exit any application and close Windows.

   3. Check if [All Devices] is selected in the "Device Config." in SETUP menu.

3.1.1 Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions.

- ❑ DIAGNOSTIC TEST
- ❑ ONLY ONE TEST
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ POWER OFF

The DIAGNOSTIC TEST MENU contains the following functional tests:

- ❑ SYSTEM TEST
- ❑ MEMORY TEST
- ❑ KEYBOARD TEST
- ❑ DISPLAY TEST
- ❑ FLOPPY DISK TEST
- ❑ PRINTER TEST   ［It is not supported］
- ❑ ASYNC TEST
- ❑ HARD DISK TEST
- ❑ REAL TIMER TEST

❑ NDP TEST
❑ EXPANSION TEST
❑ CD-ROM/DVD-ROM TEST
❑ ERROR RETRY COUNT SET   [FDD & HDD]

Other tests are:

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

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

❑ The Diagnostic Disks (T&D for maintenance for Main, LAN/Modem/Bluetooth/IEEE1394, wireless LAN and Sound , 3G)
❑ A formatted working disk (Floppy disk test)
❑ USB FDD (for all tests)
❑ A USB test module (USB test)
❑ A USB cable (USB test)
❑ An external CRT monitor (Expansion test)
❑ A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
❑ A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
❑ A music CD (Sound test)
❑ A store-bought CD-RW media (CD-ROM/DVD-ROM test)
❑ A microphone (Sound test)
❑ Headphones (Sound test)
❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
❑ An exclusive modem test jig (Nitto Electric Manufacture Co.,Ltd-made QE2000P01) (Modem test)
❑ A module cable and RJ11 connector checker (Modem test)
❑ A LAN wraparound connector (LAN test)
❑ PC card wraparound connector (Expansion test)
❑ A display with monitor ID function (Expansion test)
❑ RS232C wraparound connector (Async test)
❑ A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)

3.1.2 H/W (Hardware) initial information setting tool

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

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

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

- ❏ The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

You will need the following equipment to perform this program.

- ❏ The Diagnostics Disk (Main T&D)

3.2   Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

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

2. Turn on the computer while pressing **U** key. The following menu appears.

```
             Repair test program
-------------------------------------------------------------------
1 Repair Main
2 Repair Initial config set
3 Repair Heatrun

Enter a chose…
```

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

NOTE: *When replacing the system board, it is necessary to execute the followings:*

> *1. Before replacing, save the DMI information by executing subtest 03 DMI information save in 3.3 Setting of the hardware configuration.*

> *2. Before replacing, apply the DMI information by executing subtest 04 DMI information recovery and subtest 08 System configuration in 3.3 Setting of the hardware configuration.*

3.2.1 Diagnostics menu (T&D)

To execute this program, press **1** `Repair Main` and press **Enter** in the startup menu, press **Enter**. The following menu appears.

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

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 - ONLY ONE TEST
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - POWER OFF

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

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

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

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

DIAGNOSTIC TEST MENU :

 1 - SYSTEM TEST
 2 - MEMORY TEST
 3 - KEYBOARD TEST
 4 - DISPLAY TEST
 5 - FLOPPY DISK TEST
 6 - PRINTER TEST     [It is not supported]
 7 - ASYNC TEST
 8 - HARD DISK TEST
 9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 - CD-ROM/DVD-ROM TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU


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

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

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

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

```
SYSTEM TEST NAME    XXXXXX  ┌──────────────────────────────┐
                            │ xxxxxxx DIAGNOSTIC TEST VX.XX │
                            │ [Ctrl]+[Break]   : test end   │
                            │ [Ctrl]+[C]       : key stop   │
                            └──────────────────────────────┘


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

SUB-TEST MENU :

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

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

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

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

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

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

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

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

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

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

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

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

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

These three selections have the following functions respectively:

1. Terminates the test program and exits to the subtest menu.

2. Continues the test.

3. Restarts the test from the error.

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

Table 3-1 in section 3.5 describes the function of each test on the subtest. Table 3-2 in section 3.18 describes the error codes and error status names for each error.

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

3.2.2 H/W initial information setting tool

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

```
##################################################################
######    Repair Initial config set                         ####
##################################################################
*     1 ........................... Initial configuration           *
*     2 ........................... DMI information save             *
*     3 ........................... DMI information recovery         *
*     4 ........................... System configuration display     *
*     5 ........................... E2PROM test (MAC/GUID/DMI)        *
******************************************************************
... Press test number [1,2,3,4,5] ?
```

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

3.2.3 Heatrun test program

After selecting this test, the heatrun test starts executing the same subtest as 3.23 RUNNING TEST.

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

3.3 Setting of the hardware configuration

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

Subtest 1   Initial configuration

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

- Setting of the CPU set table
- Setting of the micro code
- Setting of the EHSS
- Inputting and writing of DMI information

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

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

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

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

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

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

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

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

- Setting of the HWSC
- Setting of the UUID
- Display of the DMI information (including UUID)

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

Subtest 2   DMI information save

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

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

Subtest 3   DMI information recovery

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

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

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

Subtest 4   System configuration display

This subtest displays the information of the system configuration.

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

```
        Press [Enter] key
```

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

Subtest 5   E2PROM test (MAC/GUID/DMI)

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

3.4   Heatrun Test

To execute this program, press **3**, Repair Heatrun and press **Enter** in the startup menu, press
Enter.

After selecting this test, the same subtests as 3.23 Running Test are executed successively.

For more details on the procedure and test content, refer to Running Test.

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

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

Press any key and return to the startup menu.

> *NOTE*: *The test result (Errorlog.txt) is stored in the floppy disk. The result is displayed in*
> *the same format as Log Utilities. For more details of the format, refer to 3.22*
> *Log Utilities.*

3.5   Subtest Names

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

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Fan ON/OFF
		03	Geyserville
		04	Quick charge
		05	DMI read
2	MEMORY	01	Conventional memory
		02	Protected Mode
		03	Cache memory (on/off)
		04	Stress
3	KEYBOARD	01	Pressed key code display
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
		08	LCD EDID Information
		09	External EDID read/compare
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER 〔It is not supported〕	01 02 03	Ripple pattern Function Wraparound
7	ASYNC	01 02 03	FIR/SIR Point to point (send) FIR/SIR Point to point (receive) Wraparound (board)
8	HARD DISK	01 02 03 04 05 06 07 08 09	Sequential read Address uniqueness Random address/data Cross talk & peak shift Partial Read Write specified address Read specified address Sequential write W-R-C specified address
9	REAL TIMER	01 02 03	Real time Backup memory Real time carry
10	NDP	01	NDP
11	EXPANSION	01 02	PCMCIA wraparound [Not supported] RGB monitor ID
12	CD-ROM /DVD-ROM	01 02 03 04	Sequential read Read specified address Random address/data RW 1point W/R/C

3.6   System Test

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

Subtest 01   ROM checksum

This subtest executes a checksum test of the BIOS ROM (range: F0000h to FFFFFh, 64KB) on the System Board.

Subtest 02   Fan ON/OFF

The following message will appear.

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

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

The following message will appear.

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

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

The following message will appear.

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

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

The following message will appear.

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

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

After a while, the fan rotating will stop.

*1 `2;FAN#2(GPU)` is not supported in this model.

Subtest 03   Geyserville

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

Subtest 04   Quick charge

This subtest checks the status for the quick charge.

Subtest 05   DMI read

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

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

Model Name          : XXXXXXXXXXX
Version Number      : XXXXXXXXXXX
Serial Number       : XXXXXXXX
Model Number        : XXXXXX-XXXXX
PCN/BND number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
UUID Number         : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

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

3.7 Memory Test

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

Subtest 01   Conventional memory

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

Subtest 02   Protected Mode

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

                     This subtest writes constant data and address data (from 1MB to maximum MB), and reads the new data and compares the result with the original data.

Subtest 03   Protected Mode (cache off)

                     This subtest executes the same way as the subtest 02 with the cache off.

Subtest 04   Cache memory (on/off)

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

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

Subtest 05   Stress

                     Write/Read buffer (1 size = 1B30h) is prepared in the conventional memory. The data is made in the Write Buffer, the data in Write Buffer is written in the area of address of 1MB or after. The data is red in the Read Buffer and data is compared in area up to the maximum size.

                     Data: FFh, FFh, FFh, FFh, FFh, 00h, 00h, 00h, 00h,
                                    FFh, FFh, FFh, 00h, FFh, 00h, 00h, FFh, 00h,
                                    00h, FFh, FFh, FFh, FFh, 00h, 00h, 00h, AAh

3.8   Keyboard Test

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

Subtest 01   Pressed key code display

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

```
KEYBOARD TEST  IN PROGRESS  302000
         Scan code        =
         Character code   =
         Keytop           =
Ins Lock  Caps Lock  Num Lock    Scroll Lock
Alt        Ctrl       Left Shift  Right Shift

PRESS [Enter] KEY
```

3.9   Display Test

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

Subtest 01   VRAM read/write for VGA

This subtest writes the constant data (AAh and 55h) to the video RAM. The data is read and compared to the original data.

Subtest 02   Gradation for VGA

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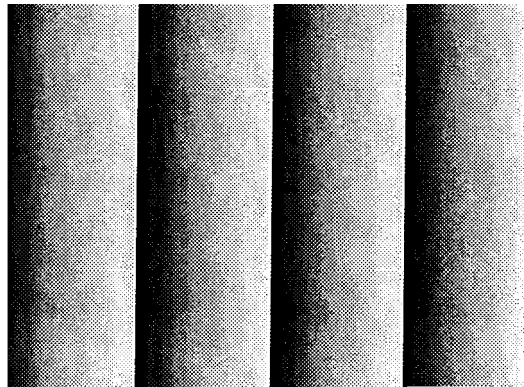
To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03   Gradation for LCD

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

Subtest 04   Gradation & Mode test for VGA

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

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

The display below appears on the screen when this subtest is executed.
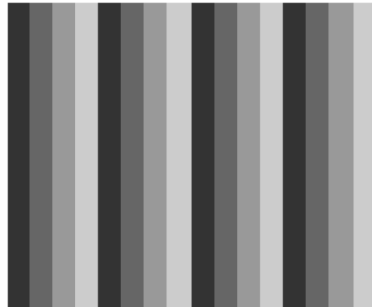
(Display example: Mode 12)

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

Subtest 05   All dot on/off for LCD

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

Subtest 06   "H" pattern display

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

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

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

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

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

Super-Bright → Bright → Semi-Bright → Bright → Super-Bright

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

3.10 Floppy Disk Test

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

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen.

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

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

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

   ```
   FLOPPY DISK            XXXXXXX   XXX DIAGNOSTIC TEST VX.XX
                                     [Ctrl]+[Break] :  test end
                                     [Ctrl]+[C]     :  key stop


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

   SUB-TEST MENU :

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



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

Select the number of the subtest you want to execute and press **Enter**. The following
message will appear during the floppy disk test.

```
FLOPPY DISK  IN PROGRESS  XXXXXXX  ┌──────────────────────────────┐
                                   │ xxx DIAGNOSTIC TEST VX.XX     │
                                   │  [Ctrl]+[Break] :  test end   │
                                   │  [Ctrl]+[C]     :  key stop   │
                                   └──────────────────────────────┘


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

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

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

Subtest 01   Sequential read

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

Subtest 02   Sequential read/write

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

Subtest 03   Random address/data

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

Subtest 04   Write specified address

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

Subtest 05   Read specified address

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

3.11 Printer Test


NOTE: Printer Test is not supported for this model.

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen.

---

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

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

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

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

Subtest 01   Ripple pattern

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

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

Subtest 02   Function

> This subtest is for IBM compatible printers, and tests the following functions:
>
> > Normal print
> > Double-width print
> > Compressed print
> > Emphasized print
> > Double-strike print
> > All characters print
>
> This subtest prints the various print types shown below:

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

Subtest 03   Wraparound

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

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

3.12 Async Test

To execute the Async Test, select **7** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 and 02 require the following data format:

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

Subtest 01   FIR/SIR point to point (send)

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

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

Subtest 02   FIR/SIR point to point (receive)

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

Subtest 03   Wraparound (board)

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

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

3.13 Hard Disk Test

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

CAUTION: *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 08 or 09 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or can not perform the back-up, create back-up disks as described below.*

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

Refer to the operating system instructions.

---

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

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

2. The following message appears for whether or not the HDC status is displayed on the screen. The HDC status is described in section 3.19. Select **1** or **2**.

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

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

```
HARD DISK TEST XXXXXXX          XXX DIAGNOSTIC TEST VX.XX
                                 [Ctrl]+[Break] :  test end
                                 [Ctrl]+[C]     :  key stop

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

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

The first digit of the STATUS indicates the drive being tested and the last two digits indicate the error status code as explained in the table 3-2 of the section 3.18.

Subtest 01   Sequential read

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

Subtest 02   Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03   Random address/data

This subtest writes random data in a random length to random addresses. This data is then read and compared to the original data.

Subtest 04   Cross talk & peak shift

This subtest writes eight types of worst pattern data (listed below) to a cylinder and then reads the data while moving from cylinder to cylinder. (Tests the data interference in the neighbor track.)

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149749'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24974'	7 cylinder

Subtest 05   Partial Read

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

Subtest 06   Write specified address

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

Subtest 07   Read specified address

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

Subtest 08   Sequential write

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

Subtest 09   W-R-C specified address

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

³
3.14 Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Real time

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

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

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

Enter new date:

PRESS [ENTER] KEY TO EXIT TEST
```

2. If the current date is not correct, input the correct date at the "Enter new date" prompt and press **Enter**.

3. The following messages will appear:

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

Enter new time:

PRESS [ENTER] KEY TO EXIT TEST
```

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

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

Subtest 02   Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03   Real time carry

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

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

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

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

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

PRESS [Enter] KEY TO EXIT TEST
```

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

3.15 NDP Test

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

Subtest 01   NDP

This test checks the following functions of NDP:

❑ Control word

❑ Status word

❑ Bus

❑ Addition

❑ Multiplication

3.16 Expansion Test

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

Subtest 01   PCMCIA wrap around [It is not supported]

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

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

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

❑ Address line

❑ REG#, CE#1, CE#2 line

❑ Data line

❑ Speaker line

❑ Wait line

❑ BSY#, BVD1 line

This subtest is executed in the following order:

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

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

Subtest 02   RGB monitor ID

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

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

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

3.17 CD-ROM/DVD-ROM Test

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

Subtest 01   Sequential read

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

Subtest 02   Read specified address

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

Subtest 03   Random address/data

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

Subtest 04   RW 1point W/R/C

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

3.18 Error Code and Error Status Names

Table 3-2 lists the error codes and error status names for the DIAGNOSTIC TEST.

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

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

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

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

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

Device name	Error code	Error status name
(HDD)	CC E0 0A EE DA 12	HDD - WRITE FAULT HDD - STATUS ERROR HDD - BAD SECTOR HDD - ACCESS TIME ERROR HDD - NO HDD HDD - DMA CRC ERROR
NDP	01 02 03 04 05 06	NDP - NO CO-PROCESSOR NDP - CONTROL WORD ERROR NDP - STATUS WORD ERROR NDP - BUS ERROR NDP - ADDITION ERROR NDP - MULTIPLAY ERROR
EXPANSION	C1 C3 C4 C5 C6 C7 C8 CB CC CE CF	ADDRESS LINE ERROR CE#1 LINE ERROR CE#2 LINE ERROR DATA LINE ERROR WAIT LINE ERROR BSY# LINE ERROR BVD1 LINE ERROR ZV-Port ERROR NO PCMCIA CARD TYPE ERROR ZV_CONT# ERROR
CD-ROM /DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 B0	BAD COMMAND ILLEGAL LENGTH UNIT ATTENTION MEDIA CHANGE REQUEST MEDIA DETECTED ADDITIMAL SENSE BOUNDARY ERROR CORRECTED DATA ERROR DRIVE NOT READY SEEK ERROR TIME OUT RESET ERROR ADDRESS ERROR

3.19 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

Table 3-3 Hard disk controller status register contents

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

Table 3-4 Error register contents

Bit	Name	Description
7	BBK (Bad block mark)	"0" … Not used. "1" … A bad block mark is detected.
6	UNC (Uncorrectable)	"0" … There is no uncorrectable data error. "1" … Uncorrectable data error has been detected.
5	——	Not used.
4	IDN (Identification)	"0" … Not used. "1" … There is no ID field in the requested sector.
3	——	Not used
2	ABT (Abort)	"0" … Not used. "1" … Illegal command error or command abort.
1	TK0 (Track 0)	"0" … The hard disk found track 0 during a recalibrate command. "1" … The hard disk could not find track 0 during a recalibrate command.
0	——	Not used.

3.20   ONLY ONE TEST

3.20.1 Program Description

This program tests the unique functions of this model.

3.20.2 Operations

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

```
################################################################
########           ONLY ONE TEST Menu (XXXXXXXXX)      ########
################################################################
*                                                              *
*    1 ............   Pressed Key Display                      *
*    2 ............   Touch Pad /   IPS
*    3 ............   Wireless communication switch            *
*    4 ............   USB Port Select menu                     *
*    5 ............   LED                                      *
*    6 ............   Button                                   *
*    7 ............   Acceleration sensor                      *
*    8 ............   Docker Dock/Undoc                        *
*    9 ............   Exit to Common Test                      *
*                                                              *
****************************************************************
.... Press test number [1-A] ?
```

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

To return to the Common Test menu, select **9** and press **Enter**.

Subtest 1   Pressed key display

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

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

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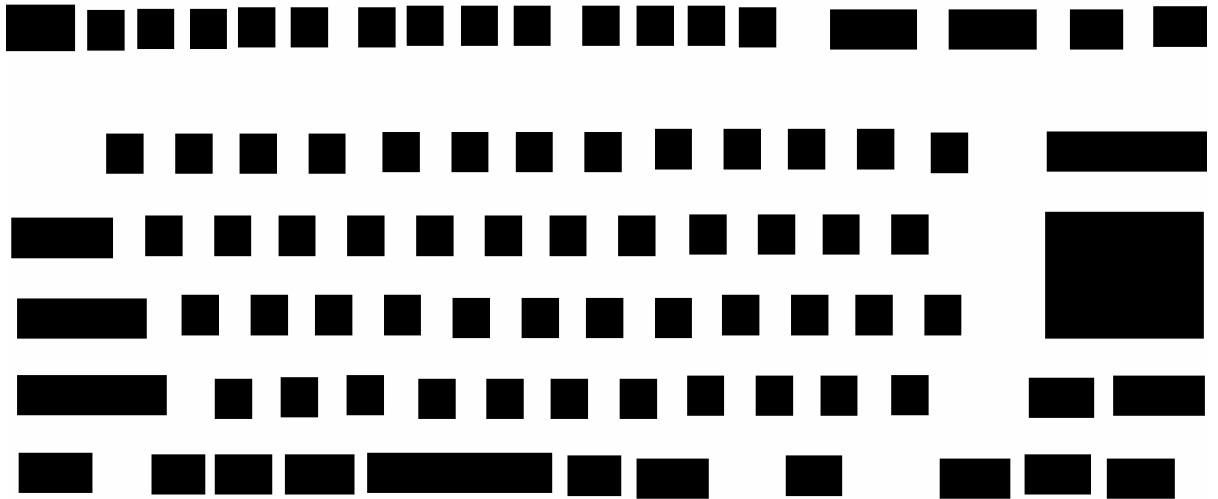


```
IF TEST OK, Press [Del] [Enter] Key
```

NOTE: *The actual display may be different from the above image, according to the model.*

Subtest 2   Touch Pad

This subtest checks the functions of the touch pad as shown below.

A) Direction and parameter
B) Switching function check.

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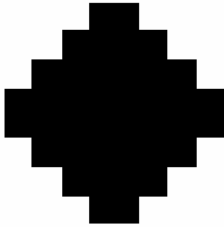
```
    *** IPS TEST PROGRAM (Vx.xx) ***

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

                                  <BUTTON>
                                  (1)     (2)



       << PRESS BUTTON1+BUTTON2 THEN END >>

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

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



                                  <BUTTON>
                                  (1)     (2)



 .      << PRESS BUTTON1+BUTTON2 THEN END >>
```
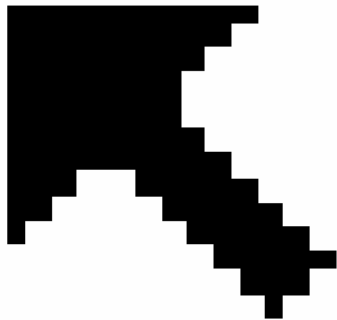
Subtest 3   Wireless communication switch

This subtest checks if the Wireless communication switch works properly.

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

```
        Wireless communication switch is set to a start position (OFF)
```

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

```
        Wireless communication switch ON !!
```

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

```
        Wireless communication switch OFF !!
```

After Sliding the switch to OFF position, return to the ONLY ONE TEST menu automatically.

Subtest 4   USB `Port Select menu`

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

This subtest checks if USB port works properly.

The following menu appears in the display.

```
################################################################
########          Port Select menu                        ######
################################################################
*                                                              *
*   0 ............   Port 0  (right side front)                *
*   1 ............   Port 1  (right side back)                 *
*   2 ............   Port 2  (Left side)                       *
*   9               Exit                                       *
*                                                              *
****************************************************************
.... Press test number[0-2, 9] ?
```

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

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

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

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

Press **9** and **Enter** to return to ONLY ONE TEST menu.

Subtest 5   LED

This subtest checks if each LED lights properly.

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

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

Press any key and following message appears in the display.

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

Confirm corresponding LED lights properly.

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

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

Check if the color of the message changes orange to green alternately.

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

Subtest 6   Buuton

Power Switch   Assist   Presentation

This subtest checks the moving of the of the front operation panel button.

Press the Toshiba Assist button after the following message appears.

Step 1   X   1   2

                                *   *   *.

Press Function button (Assist button)

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

Press any key return to each Steps if **NG!** or **Press any key** message apprears.

Press the Toshiba Presentation button after the following message appears.

Step2   X   1   2

                          *   *   *.

Press Function button (Presentation button)

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

Press any key return to each Steps if **NG!** or **Press any key** message apprears.

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

Subtest 7   Acceleration sensor

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

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

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

2. The vertical wall or plane is necessary.

3. Prevent the machine from shake or shock.

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

Vertical plane

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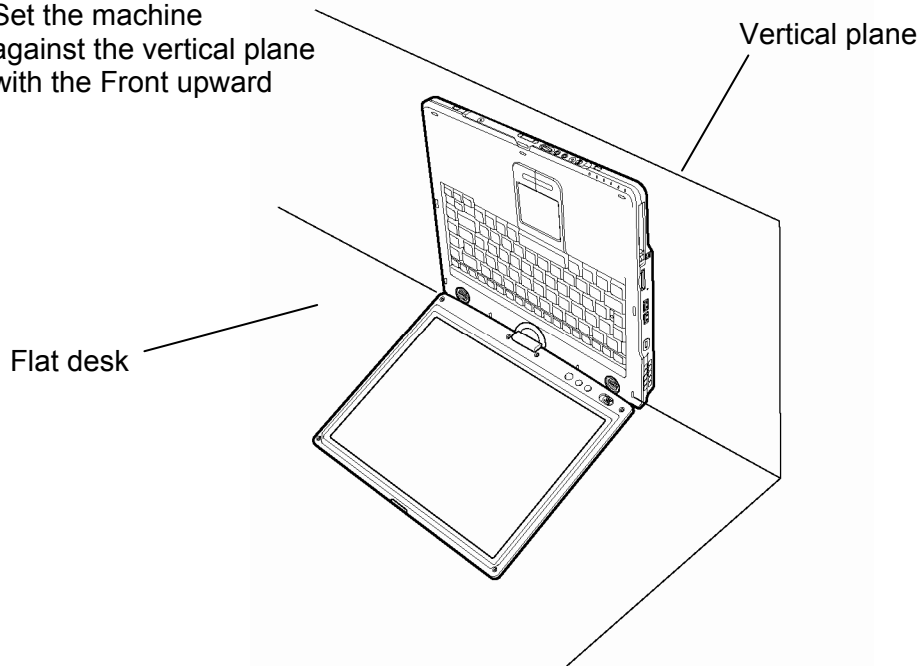
The figure below shows the name and position of each side.

Top
(heaven surface)

Right side

Back

Left side

Front

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

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

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

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

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

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

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

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

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

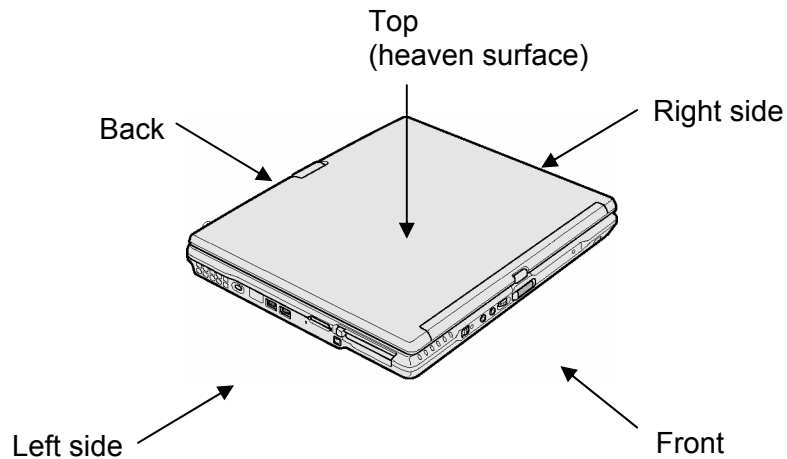Set the machine against the vertical plane on the flat desk with the front of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

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

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

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

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

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

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

Subtest 8   Docker Dock/Undock

This subtest is executed with an Express Port Replicator installed.

Press **Enter** while pushing the eject button of the Express Port Replicatorafter the following message appears.

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

Press **Enter** without pushing the eject button of the Express Port Replicator after the following message appears.

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

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

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

3.21 Head Cleaning

3.21.1 Function Description

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

3.21.2 Operations

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

    ```
    DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX
    Mount cleaning disk(s) on drive(s).
    Press any key when ready.
    ```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.

3. When the "cleaning start" message appears, the FDD head cleaning has begun.

4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

3.22   Log Utilities

3.22.1 Function Description

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

The error information is displayed in the following order:

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

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

3.22.2 Operations

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

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

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

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

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

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

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

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

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

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

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

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

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

3.23   Running Test

3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtest 01)
6. FDD test (subtest 02)

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

3.23.2 Operations

> *NOTE*: *After booting up the Running test, pull out the test program and insert a floppy disk which has been formatted by FORMAT command of DOS.*

1. Pull out the test program and insert a floppy disk which has been formatted by FORMAT command of DOS.

2. Select **6** from the DIAGNOSTIC MENU and press **Enter,** the following messages for selectable tests will appear in the display in order.

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

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

4. After selecting the selectable tests, the running test starts automatically. To terminate the program, press **Ctrl + Break**.

3.24   Floppy Disk Drive Utilities

3.24.1 Function Description

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

1. FORMAT

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

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

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

(b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

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

3. DUMP

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

4. HDD ID READ

This program reads the hard disk ID and displays hard disk information.

3.24.2 Operations

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

   ```
   [ FDD UTILITIES ]

   1 - FORMAT
   2 - COPY
   3 - DUMP
   4 - HDD-ID READ
   9 - EXIT TO DIAGNOSTICS MENU
   ```

2. FORMAT program

   (a) Selecting FORMAT displays the following message.

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

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

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

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

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

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

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

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

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

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

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

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

3. COPY program

    (a) When COPY is selected, the following message appears.

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

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

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

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

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

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

    (d) The following message will appear.

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

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

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

    (f) When the amount of data is too large to be copied in one operation, the message from step (b) is displayed again. After the floppy disk has been copied, the following message will appear.

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

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

4. DUMP program

   (a) When DUMP is selected, the following message appears.

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

   (b) Select a drive type. If `2:HDD` is selected, the display will go to step (h). If
        `1:FDD` is selected, the following message will appear.

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

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

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

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

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

   (e) The following message will appear.

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

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

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

Track number ????
```

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

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

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

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

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

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

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration.

```
[HDD ID Read (VX.XX)] [Drive #1]
Model No.             = XXXXXXX
Press [Enter] key
```

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

3.25 System Configuration

3.25.1 Function Description

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

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

1. Processor Type [Code/L2 cache]
2. Chip set [VRAM]
3. BIOS ROM version [1st ID, 2nd ID]
4. Boot ROM version
5. EC total version
6. PS Microprocessor version
7. SVP Par. version
8. Microcode Revision
9. Total Memory Size [Conventional memory]
10. Battery code
11. HWSC
12. FSB [Voltage]
13. 0 Printer Adapter
14. 1 ASYNC Adapter
15. 1 Math co-processors
16. 1 Floppy Disk Drive [Track/Head/Sector]
17. 1 Hard Disk Drive [Sector/Drive size/Manufacture code]
18. ODD Drive
19. T&D total version

3.25.2 Operations

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

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

*  - Processor Type      = XXXXXX-XXXXXMHz      Code = XX    L2 Cache = XXXXXKB
*  - Chip set            = XXXXXX                VGA Chip =  Intel Corp
*  - BIOS ROM Version    = VX.XX    1st ID = XXH, 2nd ID = XXH
*  - BOOT ROM Version    = VX.XX
*  - EC Total Version    = VX.XX
*  - PS Micon Version    = VX.XX
*  - SVP Par. Version    = VX.XX    (Panel = XXXX*XXXX Menu=XXXX  Prod=XXXX))
*  - Microcode Revision  = VX.XX    (Processor = XXXh)
*  - Total Memory Size   = XXXXXXMB (Conventional Memory = XXXKB)
*  - Battery Code        = XXXXXXXXXXXX          (Present voltage = XXXX)
*  - HWSC                = XXXXXXX
*  - FSB                 = XXXXXMHz (Voltage = XXh)
*  - X Printer Adapter     LPT1 = XXXX  LPT2 = XXXX  LPT3 = XXXX
*  - X ASYNC Adapter       COM1 = XXXX  COM2 = XXXX  COM3 = XXXX
*  - X Math CO-Processor
*  - X Floppy Disk Drive(s) Track = XX  Head = XX, Sector = XX
*  - X Hard Disk Drive(s)     #1 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXX]
                              #2 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXX]
*  - ODD Drive           = XXXXXXXXXXXX
*  - T&D Total Version   = VX.XX

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

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

3.26 Wireless LAN Test Program (Intel-made b/g, a/b/g Setting up of REF PC)

For the test of Intel-made wireless LAN cards, configure the test environment as shown below with the following equipment.

- ・   AP（which can operate on Windows XP and is corresponding to access point 11a, 11b and 11g）

> *NOTE: Set the SSID of AP as follows. (Note that upper case and lower case*
> *characters are recognized as different characters.)*
> *AP for check of 11a : 11aAP*
> *AP for check of 11b : 11bAP*
> *AP for check of 11g : 11gAP*
> *Make the security functions of AP (WEP, WPA, etc.) invalid.*

- ・   REF (Reference) PC
- ・   Cross cable
- ・   DUT (Device Under Testing)
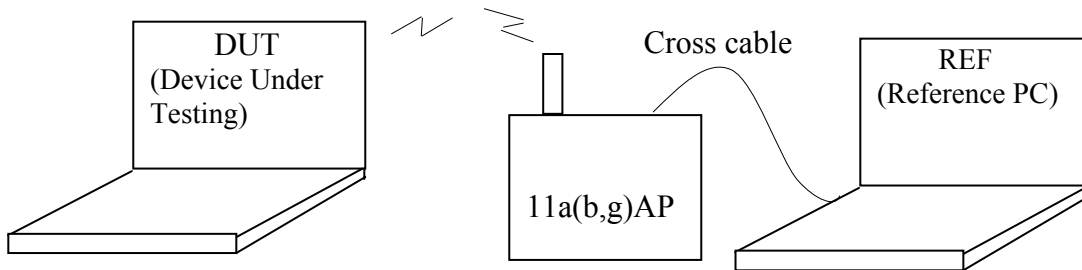
Configuration of equipment for transmitting-receiving test

How to setup the REF PC

Set up the wireless LAN environment needed for the test before the start of Responder program on REF PC.

1. Copy the R100VWL5.ZIP (wireless LAN program for maintenance, common to Calexico, Golan and Kedron) to REF PC and unzip it. Then "Clx_Res" folder is created and the following three programs are copied in it.

   - • PACKET.SYS
   - • PACKET.INF
   - • WTWINSVR.EXE

2. Open "My Computer" window and click "My Network places" on the left column.
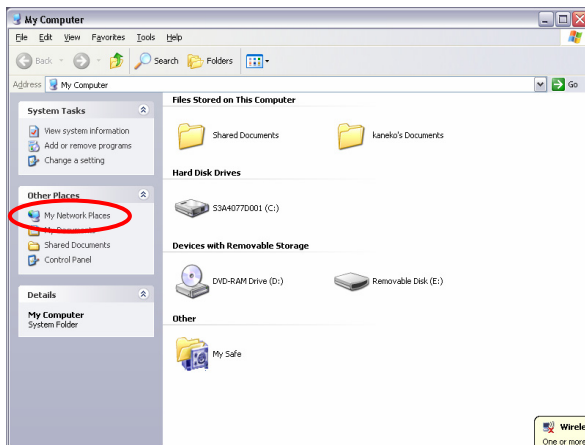
3. Click "View network connections" on the left column.
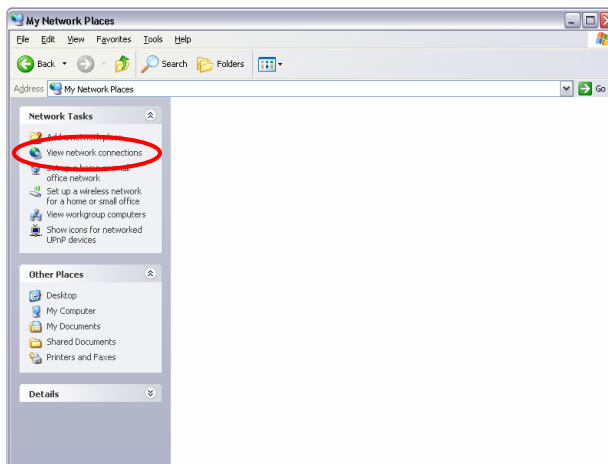
4. The "Network Connections" window appears. Double-click "Local Area Connection".
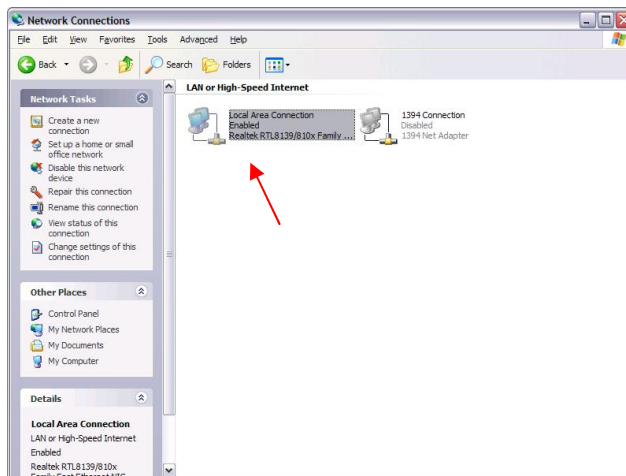
Network Connections window

5. Click "Install…" button on the "Local Area Connection Properties" window.
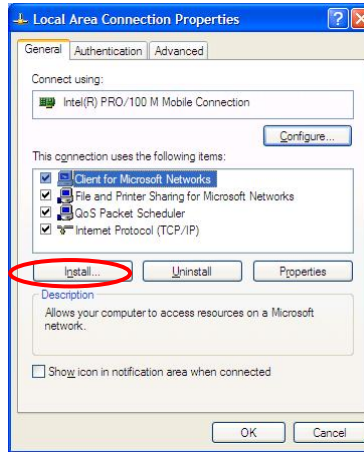
Local Area Connection Properties window

6. Select "Protocol" on the "Select Network Component Type" window and click "Add…" button.
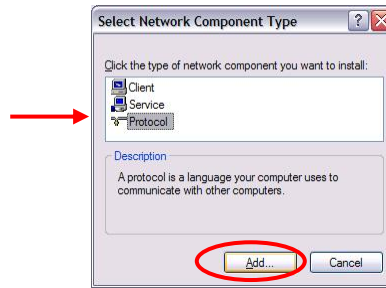
Select Network Component Type window

7. Click "Have Disk…" button on the "Select Network Protocol" window.
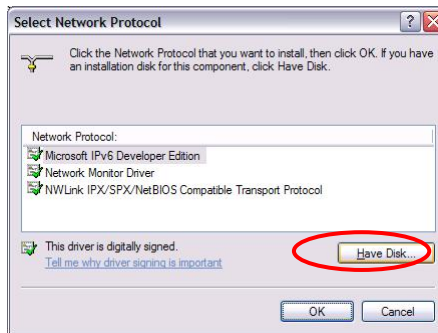
Select Network Protocol window

8. When "Install From Disk" window appears, click "Browse…" and specify the created "Clx_Res" folder. Then Click "OK". (For the test, "PACKET.INF" file is used.)
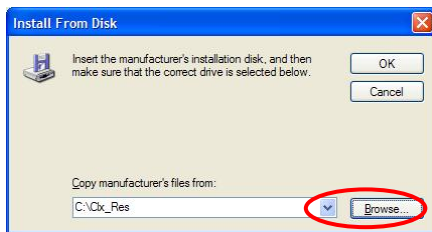
Install From Disk window

9. The "Select Network Protocol" window appears again. In the "Network Protocol", "DDK PACKET Protocol" will appear. Then click "OK" to start the installation.
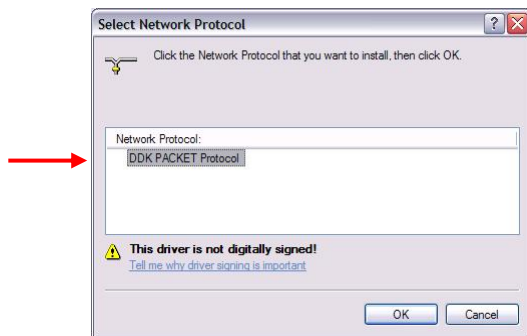
Select Network Protocol window

10. When the installation is completed, "Local Area Connection Properties" will appear. Confirm that the "DDK PACKET Protocol" is added. Click "Close" button to finish the setup of REF PC.
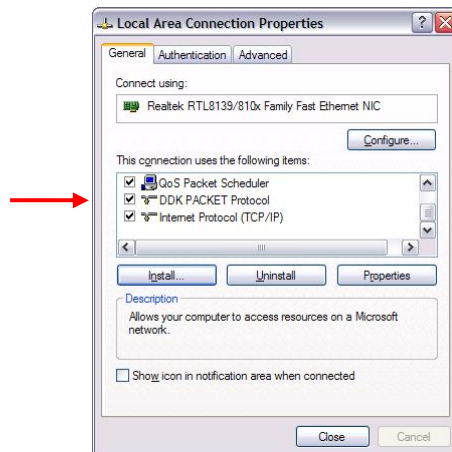
Local Area Connection Properties window

After the completion of REF PC setup, restart the WINDOWS. Then perform the Responder test program for Windows (WTWINSVR.EXE) in the Clx_Res folder.

・WTWINSVR.EXE

      Function   : Transmitting/receiving of data to/from DUT via AP
      OS available   : Windows XP only
      How to start   : Double-click WTWINSVR icon.

How to start

1. Double-click wtwinsvr icon. The following screen will appear.
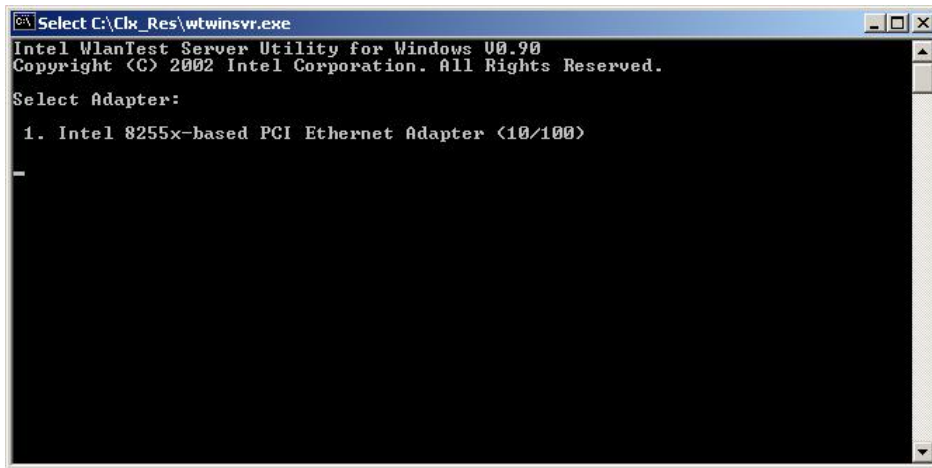
Startup screen of wtwinsvr program

2. Enter the number of Network Adapter used on REF PC (enter **1** for example above). Then the following screen will appear. Start the test program on DUT.
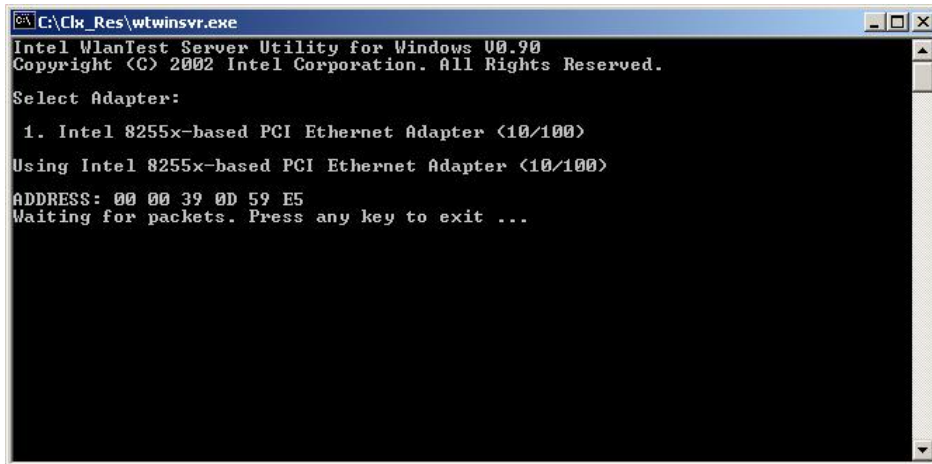
Screen while running the wtwinsvr program

The REF PC is waiting for the start of the test program on DUT.

3.27 Wireless LAN Test Program on DUT PC(Intel-made)

3.27.1 Wireless LAN Test Program (Intel-made :Golan) on DUT PC

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 b/g or 802.11 a/b/g Golan). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test.

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

The following menu appears in the display.

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

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

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

Subtest01   SKU check of module

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

```
**********************************************************
*                                                        *
*     Module  : Module : Intel PRO/Wireless XXXXABG      *
*              Network Connection (Mow1)                 *
*     G-code  : G360001U110                              *
*     TA No.  : D26539                                   *
*                                                        *
**********************************************************
```

Press any key and return to the test menu.   If a defective is found during the test, **NG** message will appear in the display.

Press any key and return to the test menu.

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

- Connection of wireless LAN card

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

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

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

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

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

Press any key and return to the test menu.

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

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Antenna check & communication test of 11b mode

This subtest execute transmitting/receiving test in 802.11b mode using the main antenna first. If a defective is not found during the test, transmitting/receiving test in 802.11b mode using the AUX antenna is automatically executed.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display. When pressing any key, the following message (which antenna is defective) is displayed

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

Press any key and return to the test menu.

Subtest04   Communication test of 11a mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest05   Communication test of 11g mode

                 This subtest execute transmitting/receiving test in 802.11g mode using the main antenna.

                 If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

               Checking the connection, execute the subtest again.

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

                 All the tests is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11b mode, Communication test of 11a mode and Communication test of 11g mode.

                 When any error has detected, the test finishes.

3.27.2 Wireless LAN Test Program (Intel-made:Kedron) on DUT PC

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 a/b/g or 802.11 a/b/g/n: kedron). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test.

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

The following menu appears in the display.

```
************************************************************
*      Intel PRO/Wireless XXXABG Network Connection        *
*                Maintenance T&D Menu                      *
*                                                          *
*      1  : SKU check of Module                            *
*                                                          *
*      2  : MAC Address Check                             *
*                                                          *
*      3  : Communication test of 11a mode          *     *
*                                                          *
*      4  : Communication test of 11b mode                *
*                                                          *
*      5  : Communication test of 11g mode                *
*                                                          *
*      6  : All the tests of Wireless WiFi Link 4965 Module *
*         (SKU & MAC Check, communication test)            *
*                                                          *
************************************************************

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

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

Subtest01　　　SKU check of module

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

```
************************************************************
*                                                          *
*      Module  : Module : Intel PRO/Wireless XXXXABG       *
*               Network Connection (Mow1)                  *
*      G-code  : G360001U110                               *
*      TA No.  : D26539                                    *
*                                                          *
************************************************************
```

　　　　　　　　Press any key and return to the test menu.　　If a defective is found during the test, **NG** message will appear in the display.

Press any key and return to the test menu.

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

- Connection of wireless LAN card

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

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

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

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

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

Press any key and return to the test menu.

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

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Communication test of 11a mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again

Subtest04   Communication test of 11b mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest05   Communication test of 11g mode

This subtest execute transmitting/receiving test in 802.11g mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

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

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest06   All the tests of Wireless WiFi Link 4965 Module

All the tests is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11a mode, Communication test of 11b mode and Communication test of 11g mode.

When any error has detected, the test finishes.

3.28 LAN/Modem/Bluetooth/IEEE1394 Test Program

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

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

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

        1.   LAN

        2.   Modem

        3.   Bluetooth

        4.   IEEE1394

Enter a choice:
```

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

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

3.28.1   LAN test

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

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

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

Subtest01   (i82562 + ICHx)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip.
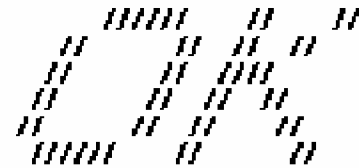
The following message will appear:

```
[LAN transmit & receive test !]
                        COMPLETED  Repeat count  =    00000
                                   Error count   =    00000
LOOPBACK TEST

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

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

```
                                                   //////  //   //
                                                  //    //  //  //
                                                  //      //////
                                                  //      //  //
                                                  //    //  //  //
                                                   //////  //   //
```

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

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

Subtest02   (GbE)

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

The following message will appear:

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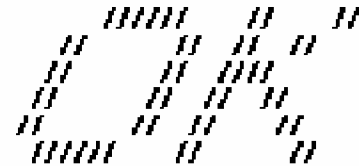
NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

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

Subtest03   (Marvel)

NOTE: *This Subtest is not supported in this computer.*

3.28.2   Modem test

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

> *NOTE:*   *Modem test is not supported for this model.*

```
################################################################
######     AC97' Modem Controller Diagnostics program      #######
################################################################
*                                                              *
*               1 ............  (ICHx)                         *
*                                                              *
*               2 ...........   (ICH6)                         *
*                                                              *
****************************************************************
.... Press test number[1-2] ?
```

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

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize         :OK
* Digital Loopback Test            :OK
* RJ11 Connector Check (LED)       :(Operator's Check!!)
```

OK is displayed when a error is detected, **NG** is display when a error is not detected.

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

RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

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

If the color in the LED of the connection checker is orange, press **Y**, otherwise, press **N**.

### 3.28.3   Bluetooth test

Preparation

- For the test of Bluetooth function, use the Windows program installed on the target computer (computer to be tested). A responder device (device for transmitting/receiving data) is also needed. (A mobile phone with the Bluetooth function is also available.)
- A Bluetooth card should be installed on the target computer. Install the Bluetooth function by clicking [All Programs] -> [TOSHIBA] -> [Bluetooth] -> [Bluetooth Settings].
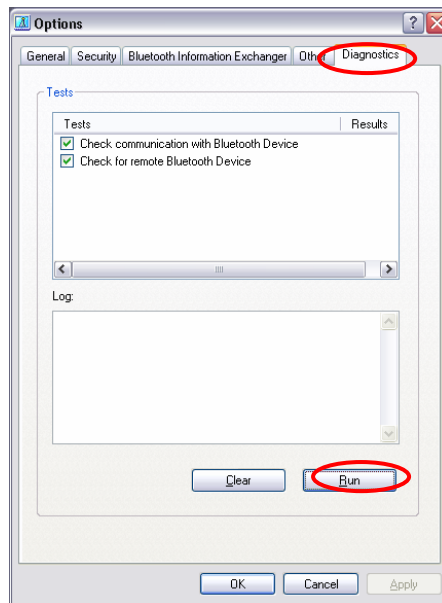
Test procedure

1. Enable the Bluetooth function of the responder device.

2. Make sure the wireless communication switch of the target computer is set to "ON" position.

3. Right-click the Bluetooth icon on the lower right screen of the target computer.

4. Select "Options…".
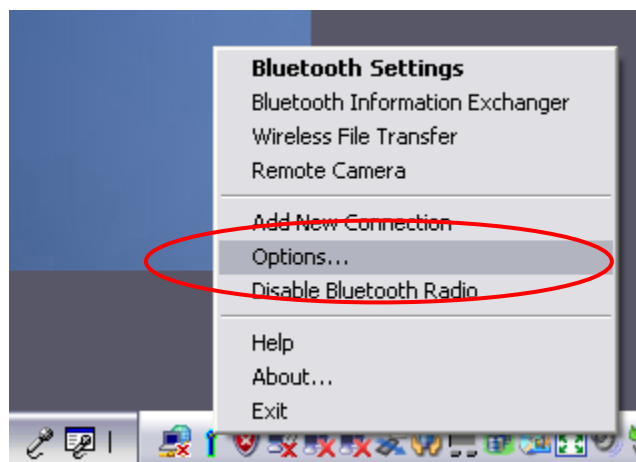
5. Select "Diagnostics" tab and click "Run".

6. Check the "Log" to confirm the test result.

BT address of test computer

BT address of responder device
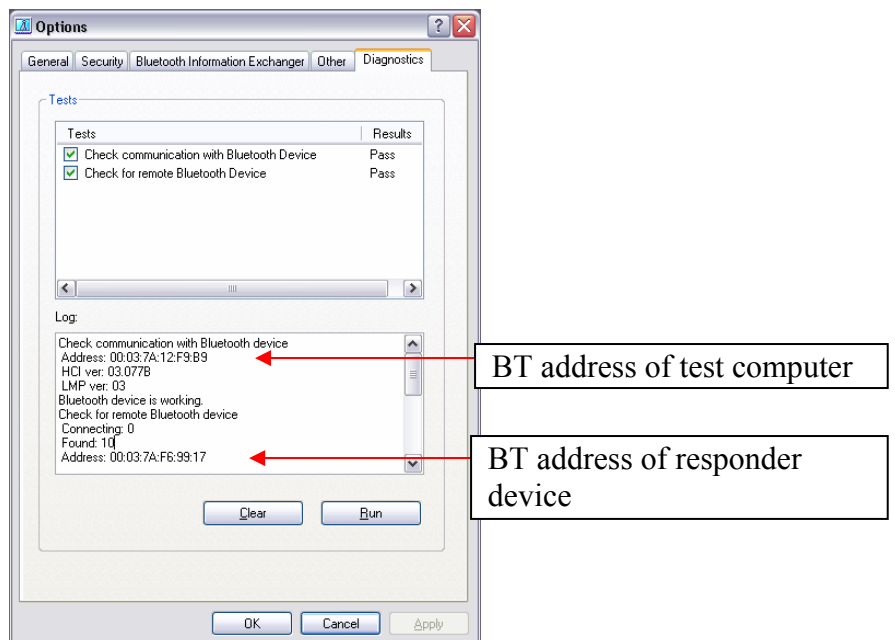
7. When the BT (Bluetooth) address of the responder device appears, the Bluetooth card and antenna connection are OK.
   If the BT address of the responder device does not appear, check the Bluetooth card condition and antenna cable connection to the Bluetooth card by disassembling the computer following the steps described in Chapter 4, *Replacement Procedures*.

3.28.4   IEEE1394 test

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

NOTE:	*IEEE1394 test is not supported for this model.*

NOTE:	*Use another computer that can communicate by IEEE1394 (i. Link) cable as a reference machine to perform this test.*

The following menu will appear:

```
*********************************************************************
********     IEEE1394[XXXXX] Diagnostics program     **************
*********************************************************************
*                                                                   *
*          1 ....(Transmit & Receive test)                          *
*                                                                   *
*          2 ....(Responder set)                                    *
*                                                                   *
*          3 ....(1394 GUID Display)                                *
*                                                                   *
*********************************************************************
.... Press test number[1-3] ?
```

To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest01   Transmit & Receive test

NOTE:	*Before executing subtest 01, be sure to execute subtest 02 in the responder machine.*

This program checks the data transporting between responder machine and target machine and compare them with the original data through the IEEE1394 cable.

Subtest 02   Responder set

This program is executed in the responder machine to initialize the responder machine with the IEEE1394 cable connected to the target machine before executing subtest 01.

Subtest 03   1394 GUID Display

This program checks the GUID of IEEE1394.

3.29 Sound Test program

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

Prepare a HDD and format it on DOS. Copy all files in the floppy disk in which the Sound test program is stored to the HDD. Reboot the computer from the HDD. The following message will appear:

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

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

3.29.1 Sound (Standard) test

To execute the Sound (Standard) test, press **1** and **Enter**. The following menu will appear in the display.

```
##############################################################
######      ICH4-M + AD1981A Diagnostics program    ######
##############################################################
*                                                            *
*     1 ...........        ( Microphone recording & play )   *
*     2 ...........        ( Sine wave )                     *
*     3 ...........        ( Line IN recording & play )      *
*                                                            *
*     9 ...........        Exit to Main                      *
*                                                            *
**************************************************************
.... Press test number[1-3, 9] ?
```

To return to the Sound test menu, press **9** and **Enter**. Then following message will appear in the display.

```
***********************************
********   May I Restart ?  *******
***********************************
Press any key to continue…
```

After pressing any key, the machine starts rebooting and sound test menu will appear in the display.

Subtest 01   Microphone recording & play

This subtest checks the function of the CODEC A/D, D/A converter.

When this subtest is selected, the following message will appear.

```
[Recording & play test !]
```

And the following message will appear.

```
DOS/4GW Protected Mode Run-time Version X.XX
Copyright (c) Tenberry Software, Inc. XXXX
```

After this message appears, display stops briefly. In this timing, sound is recorded from internal microphone.

After the recording is completed, the computer plays back the sound recorded after the following message.

```
STACWAVE Version X.XX
Build data: XXX XX XXXX at XX:XX:XX
Loading "mic.wav".
```

NOTE: *The message in the display might have slight difference from those above.*

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

Subtest 02   Sine wave

This subtest is executed by loading the COM file (ADSIN.COM). The program expands sine wave data table from 16KB to 64KB, and creates the play data. Then it transfers the data between the DMA and the CODEC to play the sine wave. (It sounds like a continuous beep). By using wave measurable devices such as an oscilloscope, the data can be measured as a sine wave.

When the subtest is executed, the sine wave is played while expanding sine wave from 16KB to 64KB.

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

Subtest 03   Line IN recording & play

This subtest executes the same test as the subtest01 by recorded sound from the different port (Line-in port).

For more details on the subtest, refer to the subtest01 Microphone recording & play.

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

3.29.2 Sound (Legacy) test

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

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

3.29.3 CD Sound (Standard) test

To execute the CD Sound (Standard) test, press **3** and **Enter**. Insert the test media (TOSHIBA TEST CD-ROM or ABEX TEST CD-ROM) or music CD on the market (if the test media can not be prepared). Following menu appears in the display.

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

3.29.3.1 Test media (Toshiba-made test media)

```
CD/DVD TEST  IN PROGRESS XXXXXXXX │ xxxxxxx DIAGNOSTIC TEST VX.XX
                                  │ [Ctrl]+[Break] : test end
                                  │ [Ctrl]+[C]     :  key stop


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


01 – Japanese Narration
02 – English Narration
03 – Test Tone A (100Hz – 20Hz)
04 - Test Tone B (400Hz – 3KHz L-R)


                         Drive # = 0, ATAPI status =00
                         Command = XX
                         [[Block address = XXXXXXXX]]
                         [[Block length  = XXXXXXXX]]
                         Final : Block address = XXXXXXXXX
```

Subtest 01   Japanese Narration

Selected this subtest, narration in Japanese starts and following message appears in the display.

```
Play start CD sound !
Press any key <Play stop>.
```

Press any key and stop the narration. Then return to the CD Sound (Standard) test menu.

Subtest 02   English Narration

                Selected this subtest, narration in English starts.

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

Subtest 03   Test Tone A

CAUTION: *Before starting subtest03, be sure to set the sound at proper volume.*

                This subtest plays sine wave while changing its table from 100Hz to 20Hz.

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

Subtest 04   Test Tone B

                This subtest plays sine wave while changing its table from 400Hz to 3KHz and also changing the channel from left speaker to right speaker.

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

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

3.29.3.2 Audio CD

Insert an audio CD and the following menu appears in the display.

```
CD/DVD TEST  IN PROGRESS XXXXXXXX  xxxxxxx DIAGNOSTIC TEST VX.XX
                                   [Ctrl]+[Break] ; test end
                                   [Ctrl]+[C]     ; key stop


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


CD Sound track number (01-98 : Track) ?
                           Drive # = 0, ATAPI status =00
                           Command = XX
                           [[Block address = XXXXXXXX]]
                           [[Block length  = XXXXXXXX]]

                           Final : Block address = XXXXXXXXX
```

Select the track number you want to test and press **Enter** twice.

The following message appears in the display and selected track is played.

```
Play start CD sound !
Press any key <play stop>
```

After pressing any key, the music stops and the display returns to the selection menu of the track number.

NOTE:	*When the CD-ROM test is executed, [ALL DEVICE] must be selected in the "Device Config.=" of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.*

3.29.4 CD Sound (Legacy) test

To execute the CD Sound (Legacy) test, select **4** and press **Enter**.

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

3.30 BIOS SETUP

3.30.1 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)

4. Password

    (a) User Password

    (b) Supervisor Password

5. HDD Password

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

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority

7. Others

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

8. Configuration

    (a) Device Config.

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

10. I/O ports
    (a) Serial
11. Drives I/O

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

12. PCI Bus

    (a) PCI Bus

13. Display
    (a) Power On Display

14. Peripheral
    (a) Internal Pointing Device

15. Legacy Emulation

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

16. PCI LAN

    (a) Built-in LAN

17. Security Controller

    (a) TPM

3.30.2 Accessing the BIOS SETUP Program

Turn on the power while pressing **ESC,** the following menu appears.

        `Check system. Then press [F1] key.`

Then press **F1**. The following display appears.

```
                        SYSTEM SETUP (1/2)        ACPI BIOS version = *.***
      ┌──── MEMORY ────────────┐    ┌──── BOOT PRIORITY ────────┐
      │Total              = 512MB    │    │Boot Priority = HDD→FDD→CD−ROM→LAN │
      │                              │    │HDD Priority  = Built−in HDD→USB   │
      └──────────────────────────────┘    └───────────────────────────────────┘
      ┌──── SYSTEM DATE/TIME ──┐
      │Date (MM−DD−YYYY)  = 01−01−2000    ┌──── OTHERS ───────────────┐
      │Time (HH:MM:SS)    = 00:00:00      │Core Multi−Processing = Enabled    │
      └──────────────────────────────┘    │Dynamic CPU Frequency Mode         │
                                          │             = Dynamically Switchable │
      ┌──── PASSWORD ──────────┐    │Execute−Disable Bit Capability     │
      │User Password        = Not Registered  │             = Available            │
      │Supervisor Password  = Not Registered  │Virtualization Technology = Disabled │
      └──────────────────────────────┘    │Auto Power On       = Enabled      │
      ┌──── HDD PASSWORD ──────┐    │Beep Volume         = Medium       │
      │HDD                = Built−in HDD  │Diagnostic Mode     = Disabled     │
      │HDD Password Mode  = User Only     │USB Sleep and Charge= Disabled     │
      │User Password      = Not Registered │Language During Bootup = English   │
      └──────────────────────────────┘    └───────────────────────────────────┘

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

```
                        SYSTEM SETUP (2/2)        ACPI BIOS version = *.***
  ┌───── CONFIGURATION ──────┐        ┌────── DISPLAY ──────┐
  │ Device Config. = Setup by OS │    │ Power On Display    = Auto-Selected │
  └──────────────────────────┘        │ LCD Display Stretch = Enabled │
                                       └─────────────────────┘
  ┌──────── BATTERY ─────────┐
  │ Battery Save Mode   = Full Power │ ┌────── PERIPHERAL ──────┐
  │ PCI Express Link ASPM = Enabled  │ │ Internal Pointing Device = Enabled │
  │ Enhanced C-States   = Enabled    │ └────────────────────────┘
  └──────────────────────────┘
                                       ┌──── LEGACY EMULATION ────┐
  ┌──────── I/O PORTS ───────┐         │ USB KB/Mouse Legacy Emulation │
  │ Serial        = COM1(3F8H/IRQ4) │ │                   = Enabled │
  └──────────────────────────┘         │ USB-FDD Legacy Emulation = Enabled │
                                        │ USB Memory BIOS Support Type = HDD │
  ┌──────── DRIVES I/O ──────┐          └──────────────────────────┘
  │ Built-in HDD  = Serial ATA Port0 │
  │ CD-ROM       = Primary IDE(1F0H/IRQ14) │ ┌──── PCI LAN ────┐
  │ SATA Controller Mode = AHCI     │      │ Built-in LAN    = Enabled │
  └──────────────────────────┘            └─────────────────┘

  ┌──────── PCI BUS ─────────┐            ┌── SECURITY CONTROLLER ──┐
  │ PCI BUS       = IRQ10, IRQ11 │       │ TPM            = Disabled │
  └──────────────────────────┘            └─────────────────────────┘


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

Moving Within the SETUP Menu and Changing Values

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

2. Press either the **Space bar** or **Back Space** to change the value.

Accepting Changes and Exiting the SETUP Window

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

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

   ```
           Are you sure? (Y/N)
   ```

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

```
Are you sure? (Y/N)
The changes you made will cause the system to reboot.
```

2. To make other changes, press **N**. Repeat the steps above.

3. To accept the changes, press **Y**.

NOTE: *You can press* **Esc** *to quit at any time without saving changes. SETUP asks you to confirm that you do not want to save your changes. When SETUP is displayed at the next time, the current configuration appears.*

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.

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

NOTE: *When you execute the default setting, the following settings are not changed:*
Password
Execute-Disable Bit function

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.

    (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. Password

    (a) User Password

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

Registered	A password has been registered.
Not Registered	Change or remove the password. (Default)

    (c) Supervisor Password

    This setting, which is displayed on the first page of the setup screen, allows you to register a Supervisor Password of the computer.

Registered	Supervisor Password has been registered.
Not Registered	Supervisor Password has not been registered (Default).

    For details on setting the password, refer to the Online Manual.

4. 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

(b) HDD Password Mode

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

User Only   Sets only User HDD Password (Default)

Master+User   Sets Master HDD Password and User HDD Password

(c) User Password

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

(d) Master Password

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

5. 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-R/RW drive or DVD Super Multi drive.*

(b) HDD Priority

This option enables to select the priority for the Built-in HDD, Second HDD or USB.

Built-in HDD→ Second HDD→USB (Default)

Second HDD→Built-in HDD→ USB

Built-in HDD→ USB →Second HDD

Second HDD→ USB →Built-in HDD

USB →Built-in HDD → Second HDD

USB → Second HDD →Built-in HDD

7. Others

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

   (a) Core-Multi Processing

   ┌───┐
   │ **NOTE:** *This is not displayed in PCs with a single core CPU.* │
   └───┘

   The Core Multi-Processing sets the CPU operating mode.

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

   (b) Dynamic CPU Frequency Mode

   Use this option to choose a setting from the followings.

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

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

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

   (c) Execute-Disable Bit Capability

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

   Available Reports that the function is available. (Default)

   Not Available Reports that the function is not available.

   (d) Virtualization Technology

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

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

   Enabled Enables Virtualization Technology.

   Disabled Disables Virtualization Technology. (Default)

Virtualization Technology

(e) Auto Power On

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

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

Set the parameters for the Auto Power On (automatic power on) function and the Wake-up on LAN in the "OPTIONS" window. To set the time, use **Space** or **BackSpace**. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

For the **Alarm Time**, set the time to turn on the power automatically. The "second" cannot be set. When it is set to "Disabled", the time to turn on automatically is not set.

The **Wake-up on LAN** is a function to turn on the power automatically by the call from the administrator. It can be set to "Enabled" only when "Built-in LAN" is set to "Enabled". To activate this function, use the AC adapter.

On Battery

The following settings can be changed when the Wake-up on LAN is Enabled.

Enabled   Wake-up on LAN function whenoperating from the battery.

Disabled   Wake-up on LAN function whenoperating from the battery (Default).

NOTE: *1. Do not remove the AC adapter and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.*

2. When a password is set in Password Security, the system is in standby mode, the Timer on function (Auto Power PN) is set and the system is booted, "Password =" is displayed. When the password set in Password Security is input, the computer returns to Windows from standby mode.

3. This function is effective only once, it is released after booting up.

Critical Battery Wake-up

Configures what action is taken when the remaining battery power is close to running out while the system is in Sleep Mode. This setting is only available when the Critical battery action within Power Options in Windows is set to Hibernate. (Default)
The operation of this function is dependent upon battery status.
Note: The Critical Battery Wake-up only operates with Windows Vista™.

Enabled	When the remaining battery power is about to run out while the system is in Sleep Mode, the system is automatically woken up and then switched to Hibernation Mode (Default).
Disabled	No action is taken even if the remaining battery power is about to run out while the system is in Sleep Mode.
Warning	Turning off your computer where electronic devices are regulated or controlled. When you have to turn off your computer aboard an aircraft or in places where electronic devices are regulated or controlled, always shut down the computer completely or put the computer into Hibernation Mode instead of allowing it to go into Standby Mode (Sleep Mode) and turn off any wireless communication switches or devices. While in Standby Mode (Sleep Mode), the computer operating system may reactivate itself to run preprogrammed tasks or to preserve unsaved data, and might interfere with aviation or other systems, possibly causing serious injury.

(f) Beep Volume

This option selects the volume of beep (Warning). "OFF", "Low", "Medium" (Default) or "High" can be selected. If a memory module that does not comply with the standards, the computer beeps at maximum volume.

(f) Diagnostic Mode

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

Disabled	The Diagnostic test is disabled. (Default)
Enabled	The Diagnostic test is enabled.

8. Configuration

   This option displays the configuration method.

   (a) Device Config.

   The devices are initialized when the PNP OS loads.

Setup by OS	Initializes devices, which is needed to load an operating system. Operating system initializes other devices. (Default)
All Devices	All devices will be initialized.

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

   Device Config. = All Devices

9. Battery

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

   Full Power   The following shows full power settings.

   ```
   ┌──────── Full Power ────────┐
   │ Processing Speed  = High                    │
   │ CPU Sleep Mode    = Enabled                 │
   │ LCD Brightness    = Super-Bright            │
   │ Cooling Method                              │
   │                   = Maximum Performance     │
   └─────────────────────────────────────────────┘
   ```

   Low Power   The following shows low power settings.

   ```
   ┌──────── Low Power ────────┐
   │ Processing Speed  = Low                     │
   │ CPU Sleep Mode    = Enabled                 │
   │ LCD Brightness    = Bright                  │
   │ Cooling Method                              │
   │                   = Battery Optimized       │
   └─────────────────────────────────────────────┘
   ```

NOTE: *The brightness is when a AC adaptor is connected. When powered by a battery*
        it is displayed as follows.
        Battery Save Mode = Full power : LCD Bright ness = Bright.
        Battery Save Mode = Low power: LCD Bright ness = Semi-Bright.

(a) Battery Save Mode

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

Processing Speed

This feature changes the CPU processing speed.

High   CPU operates at high speed. (Default)

Low   CPU operates at low speed.

CPU Sleep Mode

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

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility. (Default)

Semi-Bright   Less than full brightness for saving power.

Cooling Method

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

Maximum performance   If the CPU becomes too hot, the fan turns on
                           automatically at a high speed to cool down the
                           CPU.(Default)

Performance   If the CPU becomes too hot, the fan turns on
                           automatically. When the CPU temperature falls
                           to a normal range, the fan turns off.

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

Cooling optimized   If the CPU becomes too hot, the fan turns on. automatically in a high speed to cool down the CPU. Gives priority to the decrease of temperature at the bottom of the PC.

(b) PCI Express Link ASPM

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

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

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

(c) Enhanced C-States

This feature enables or disables the Enhanced C-States.

Enabled   This lowers the power consumption.

Disabled   This does not lower the power consumption

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		

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

This item displays the Serial ATA Port Number. It is for information only and cannot be changed.

Serial ATA Port0

(b) CD-ROM

This option displays the setting of the address and interrupt level of the installed drive. This cannot be changed. Even if an installed drive is not CD-ROM drive, "CD-ROM" is displayed.

(c)   SATA Controller Mode

This feature sets the SATA Controller Mode.

AHCI   Sets AHCI which is the mode for VistaTM (default)

Compatibility   Sets the mode for legacy OS. Use this mode when the driver corresponding to AHCI is not used.

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. 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.*

---

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 Dual Point.

Enabled   Enables the Dual Point. (Default)

Disabled   Disables the Dual Point.

15. Legacy Emulation.

    (a) USB KB/Mouse Legacy Emulation.

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

Enabled	USB Legacy Support can be used. (Default)
Disabled	USB Legacy Support cannot be used.

    (b) USB-FDD Legacy Emulation.

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

Enabled	USB Legacy Support can be used. (Default)
Disabled	USB Legacy Support cannot be used.

    (c) USB Memory BIOS Support Type

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

HDD	Set the type of the USB memory to be equivalent to the HDD (Default).
	Based on the [HDD] order in the [Boot Priority Options] item. The order with respect to the other HDD can be set in the [HDD Priority Options] item.
FDD	Set the type of the USB memory to be equivalent to the FDD.
	Based on the [FDD] order in the [Boot Priority Options] item.

16. PCI LAN

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

    (a) Built-in LAN

Enabled	Enables Built-in LAN functions. (Default)
Disabled	Disables Built-in LAN functions.

17. Security controller

    (a) TPM

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

Disabled	Disables the TPM. (Default)
Enabled	Enables the TPM.

    (b) Clear TPM Owner

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

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1   Overview

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

```
┌─────────────────────────────────────────────────────────────────────┐
│ 4.2 Battery pack                                                      │
└─────────────────────────────────────────────────────────────────────┘
┌─────────────────────────────────────────────────────────────────────┐
│ 4.3 PC card   4.4  Bridge media                                      │
└─────────────────────────────────────────────────────────────────────┘
┌─────────────────────────────────────────────────────────────────────┐
│ 4.5  HDD      4.6 MDC/Memory module                                  │
└─────────────────────────────────────────────────────────────────────┘
┌─────────────────────────────────────────────────────────────────────┐
│      4.7 Keyboard                                                    │
└─────────────────────────────────────────────────────────────────────┘
┌───────────────────────────┐  4.11   Wireless LAN card
┊ 4.8  Bluetooth module     ┊  4.12   Optical drive
┊          ↓                ┊         ┌─────────────────────────────────┐
┊ 4.9   SW membrane         ┊         │ 4.24   LCD unit / FL inverter   │
┊          ■                ┊         │          ↓                      │
┊ 4.10 Fan hood             ┊         │ 4.30   Fluorescent Lamp         │
└───────────────────────────┘         │ 4.25   Cover latch              │
                                       │ 4.26   Wireless LAN antenna/    │
                                       │          Bluetooth antenna      │
                                       └─────────────────────────────────┘
┌─────────────────────────────────────────────────────────────────────┐
│             4.13 Cover assembly and Base assembly                    │
└─────────────────────────────────────────────────────────────────────┘
┌──── Base assembly ────────────────────┐  ┌──── Cover assembly ───────┐
│ 4.16  RTC battery 4.17  Microphone 4.18  RGB board │ 4.14 Touch pad   │
│ 4.19   System board                   │  │ 4.15 Fingerprint sensor board │
│ 4.20   Battery lock/Battery latch     │  ┌───────────────────────────┐
│ 4.21   HDD cable/LAN jack/RGB board cable │ 4.27  LCD cable          │
│ 4.22   North bridge(GPU)heat sink/CPU heat sink/ │ 4.28  Hinge       │
│           Fan/CPU                      │  │          ↓                │
│ 4.23   PC card slot                   │  │ 4.29  Speaker             │
└───────────────────────────────────────┘  └───────────────────────────┘
```

⇧

Chart Notation

The chart shows the case for the following example:

- Removing the SW membrane

All FRUs down to the "4.2 Battery pack" to "4.8 Bluetooth module" above the 4.9 SW membrane must be removed.

```
┌─────────────────────────────────────────────────┐
│ 4.2  Battery pack                                │
├─────────────────────────────────────────────────┤
│ 4.3 PC card  4.4  Bridge media                   │
├─────────────────────────────────────────────────┤
│ 4.5  HDD      4.6 MDC/Memory module              │
├─────────────────────────────────────────────────┤
│       4.7 Keyboard                               │
├──────────────────────┬──────────────────────────┤
│ 4.8  Bluetooth module │ 4.11   Wireless LAN card │
│          ↓            │ 4.12   Optical drive     │
│ 4.9  SW membrane      │        ┌─────────────────────┐
│          ↓            │        │ 4.24  LCD unit / FL inverter │
│ 4.10  Fan hood        │        │          ↓          │
│                       │        │ 4.30  Fluorescent Lamp │
│                       │        │ 4.25  Cover latch   │
│                       │        │ 4.26  Wireless LAN antenna/ │
│                       │        │         Bluetooth antenna │
├───────────────────────────────────────────────────┤
│        4.13 Cover assembly and Base assembly     │
├──── Base assembly ────────┬─── Cover assembly ───┤
│ 4.16  RTC battery  4.17  Microphone 4.18  RGB board │ 4.14 Touch pad │
│ 4.19  System board        │ 4.15 Fingerprint sensor board │
│ 4.20  Battery lock/Battery latch │               │
│ 4.21  HDD cable/LAN jack/RGB board cable │ 4.27  LCD cable │
│ 4.22  North bridge(GPU) heat sink/ CPU heat sink/ │ 4.28  Hinge │
│         Fan/CPU           │               │ 4.29 Speaker │
│ 4.23  PC card slot        │               │
└───────────────────────────┴───────────────────┘
```

Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

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

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section "4.2. Battery Pack".

Do not disassemble the computer unless it is operating abnormally.

Use the designated tools.

Ensure that the environment for working on and storing parts does not contain any of the following.

- Dust or dirt

- Static electricity

- Extremely hot, cold, or humid conditions

Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.

Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly procedures in this manual.

Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.

Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.

When re-assembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.

As all parts have sharp edges and corners, take care not to cut yourself.

After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedure

Four main types of cable connector are used.

- Pressure plate connector

- Spring connector

- Back flip connector

- Normal pin connector

For pressure plate connectors, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting the cable to the pressure plate connector, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and insert the cable into the connector. Push both tags of the pressure plate such that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected.

For spring connectors, lift up the stopper frees the cable and allow it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable. Pull the cable to ensure that it is securely connected.

For back flip connectors, lift up the flip plate frees the cable and allow it to be pulled out. To reconnect, hold the flip plate in the up position and insert the cable, then lower the flip plate to secure the cable. Pull the cable to ensure that it is securely connected.

Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.

Pressure plate connector   Spring connector   Back flip connector
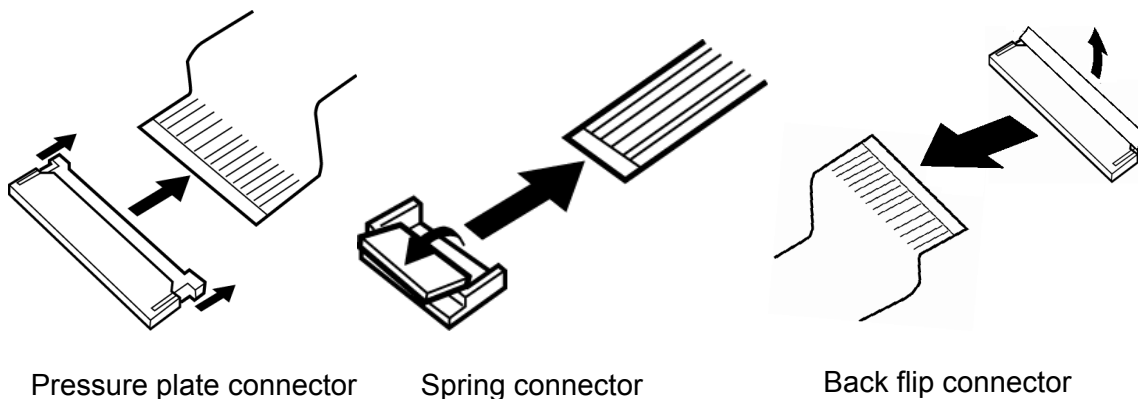
Assembly Procedures

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

- Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.

- Check that all cables and connectors are securely connected.

- Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.

- Check that all latches are securely closed.

- Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

- One Philips screwdriver with type 0 bit (for S-THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- One flat-blade screwdriver
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap and heel grounder
- Anti-static carpet or flooring
- A pair of needle-nose pliers
- Air-ionizers in highly static sensitive areas
- Antenna coaxial cable disconnector

Screw Tightening Torque

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

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

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

- M2   0.167 N·m (1.7 kgf·cm)

- M2.5   0.294 N·m (3.0 kgf·cm)

- M3   0.549 N·m (5.6 kgf·cm)

NOTE: *To prevent damage to THIN HEAD screws, use type 0 bit philips screwdriver.*
Use, however, the PH point size "1" screwdriver for screws fixing the memory
slot cover and keyboard. Press along the axis of the screwdriver while turning
the screw. This is because the contact area between the screw and driver is less
than for a pan head screw (standard pan-shaped screw head).
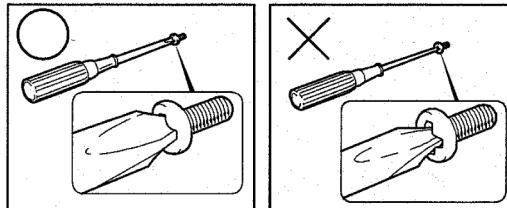
Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

❑ Even numbered length screws: Brown

❑ Odd numbered length screws: White

❑ Special length screw: Blue

"Special length screw" means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.6 mm and so on.

} Grip area

Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Format:

Screw type + Screw length (mm)

Screw type

B: Bind screw
F: Flat head screw
S: Super thin head screw
T: Tapping screw
U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm BIND screw

4.2 Battery pack

Removing the Battery pack

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

> *CAUTION:*   *Take care not to short circuit the terminals when removing the battery pack.*
>   *Similarly, do not drop, knock, scratch, disassemble, twist, or bend the*
>   *battery pack.*

1. Turn off the power of the computer.

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

3. Turn the computer face down.

4. Release the **battery lock**.

5. Remove the **battery pack** while sliding the **battery release latch** as shown in the following figure.

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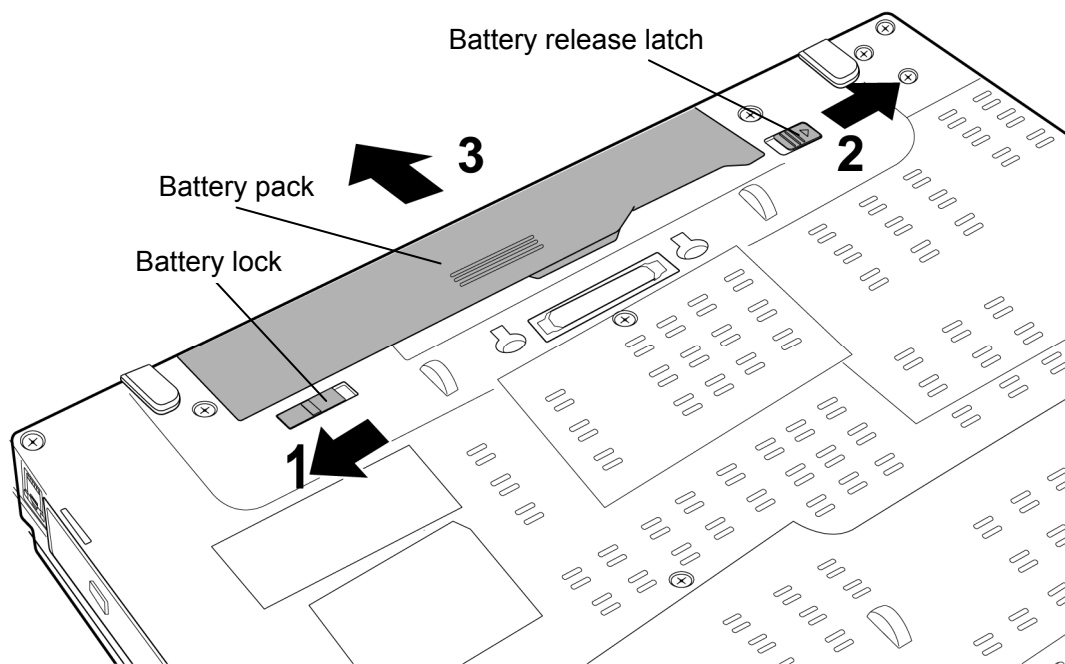
Figure 4-1   Removing the battery pack

Installing the Battery pack

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

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

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

---

1. Turn off the power of the computer.

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

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

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 the PC card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.*

1. Press the **eject button** for the PC card to extend the button.

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

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

Eject button
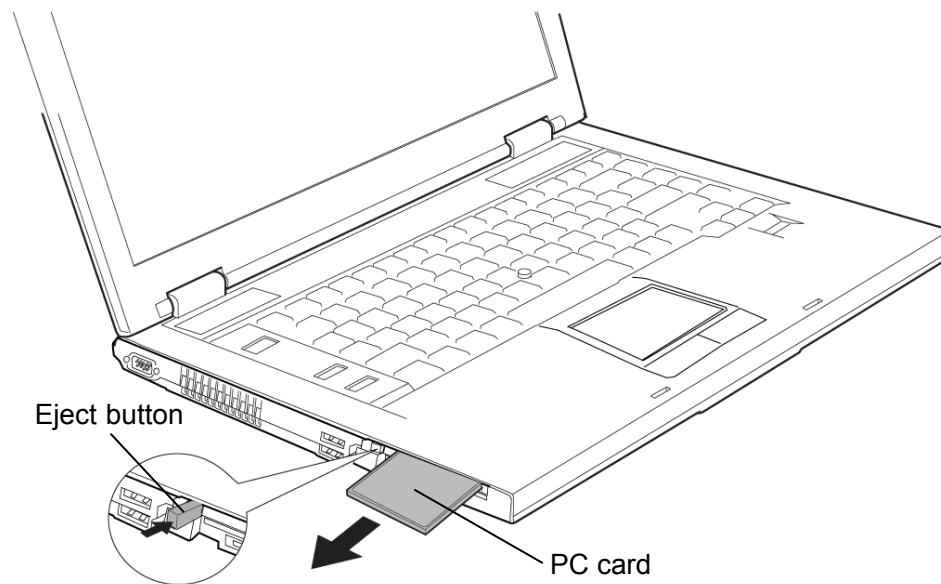
PC card

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** into the card slot.

2. Push it carefully to ensure a firm connection.

4.4　Bridge media

Removing the Bridge media

To remove the Bridge media, follow the steps below and refer to Figure 4-3.

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

　　1.　Push the **Bridge media**. It will pop out partly, so pull out the card. (For an instance, SD card is described in the figure 4-3.).

Bridge media (SD card)
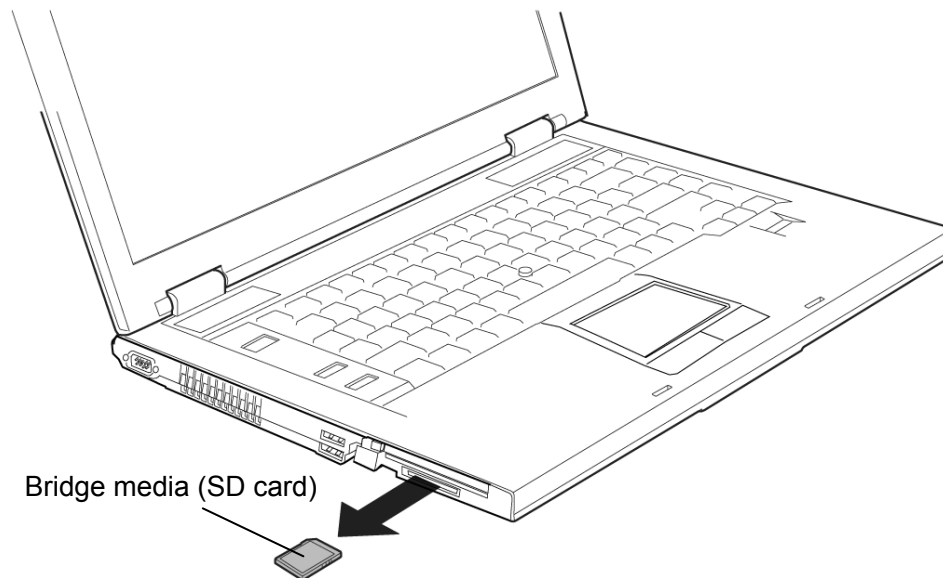
Figure 4-3　Removing the Bridge media

Installing the Bridge media

To install the Bridge media, follow the steps below and refer to Figure 4-3.

　　1.　Insert the **Bridge media** into the card slot.

　　2.　Push it carefully to ensure a firm connection.

4.5 HDD

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

HDD
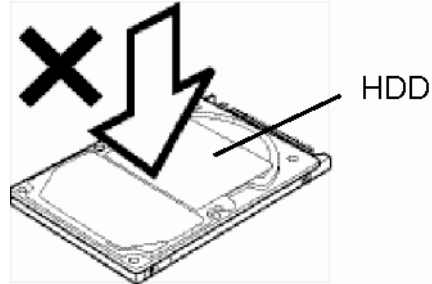
Removing the HDD

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

1. Turn the computer upside down.

2. Remove the following **screws** securing the HDD cover.

3. Insert your finger into the **slot** and lift the **HDD cover** to remove.

   - M2.5×6B   FLAT HEAD screw   ×2

HDD cover

M2.5×6B FLAT HEAD

Slot
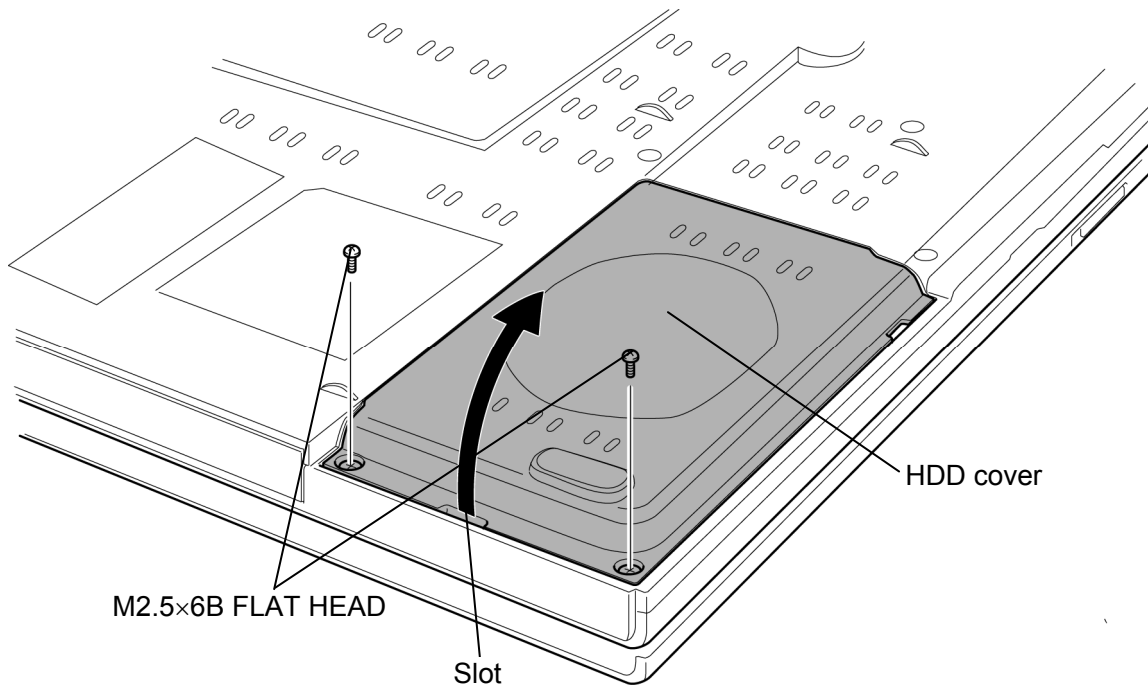
Figure 4-4   Removing the HDD cover

---

4. Remove the **HDD assembly** from the connector of the **HDD cable**. Be careful not to damage the connector.

HDD assembly

HDD cable
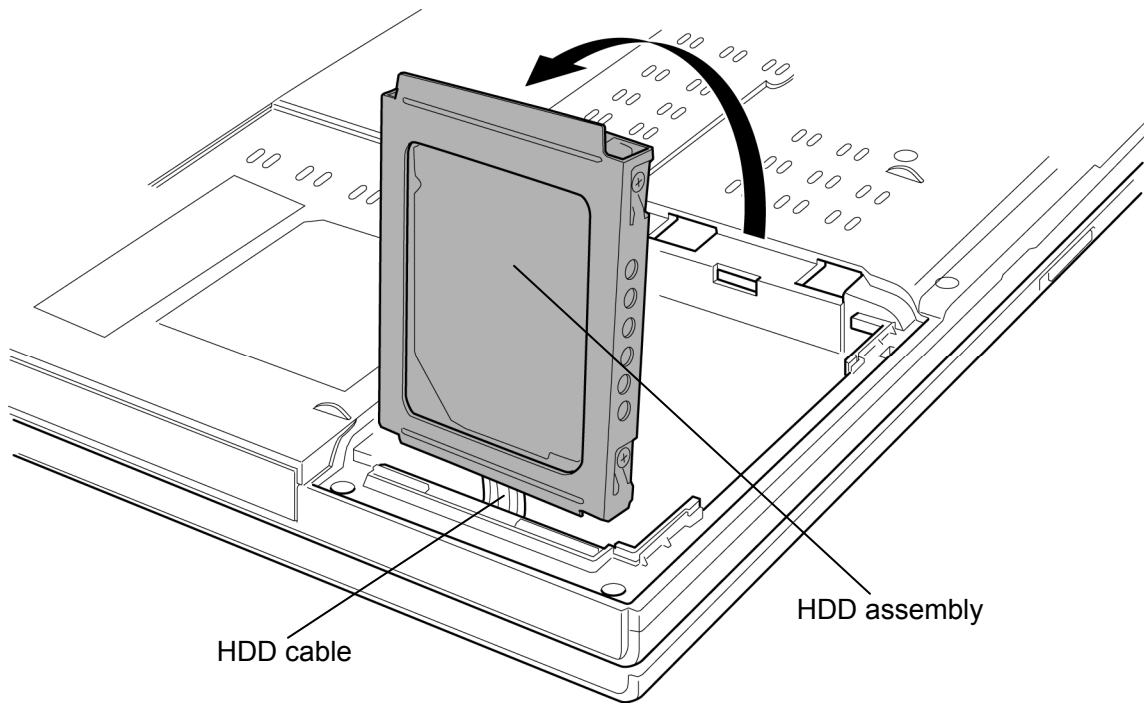
Figure 4-5   Removing the HDD assembly

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

---

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

    • M3×4C   FLAT HEAD screw   ×4

6. Separate the **HDD** and **HDD Holder**.

CAUTION: *Do not apply pressure to the center of the HDD assembly. It may damage the HDD assembly. Hold the HDD assembly by its corners.*
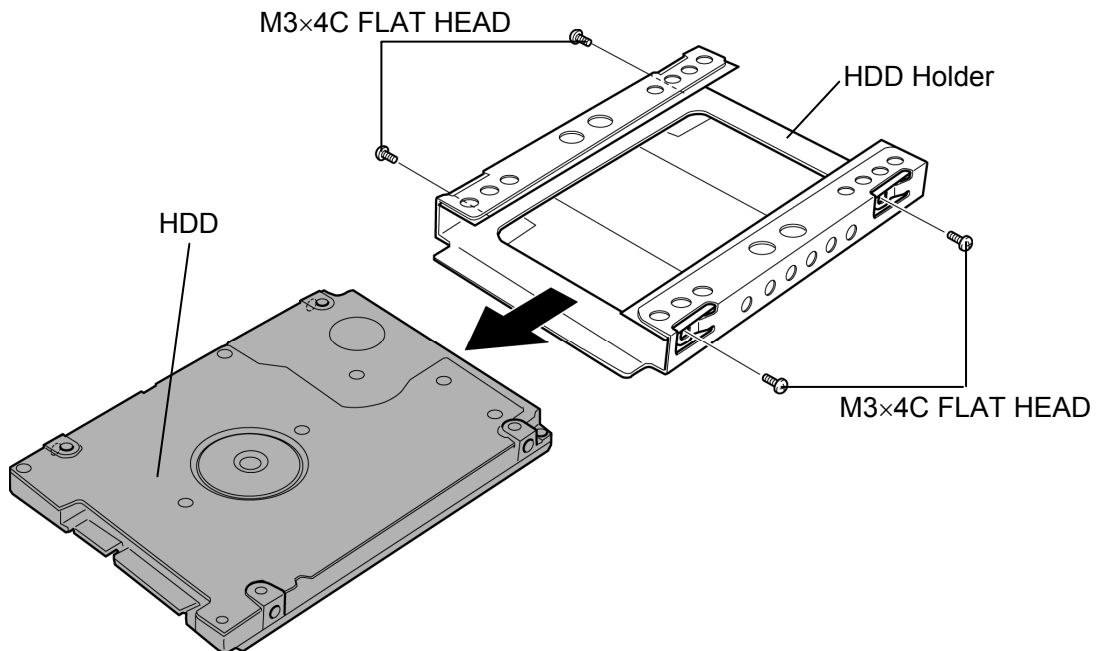
Figure 4-6   Separating the HDD and HDD holder

Installing the HDD

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

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

---

1. Install the **HDD** to the **HDD Holder** and secure them with the following **screws**.

   - M3×4C   FLAT HEAD screw   ×4

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

---

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

3. Install the **HDD cover** and secure it with the following **screws**.

   - M2.5×6B   FLAT HEAD screw   ×2

4.6   MDC/Memory module

Removing the MDC/Memory module

To remove the MDC/memory module, follow the steps below and refer to Figure 4-7 and 4-8.

1. Loosen the **screw** and remove the **memory module cover**.

2. Open the left and right **latches** outside and remove the **memory module(s)**.

CAUTION: *When removing the memory module, make sure the computer is in boot mode and powered off.*

Never press hard or bend the memory module.
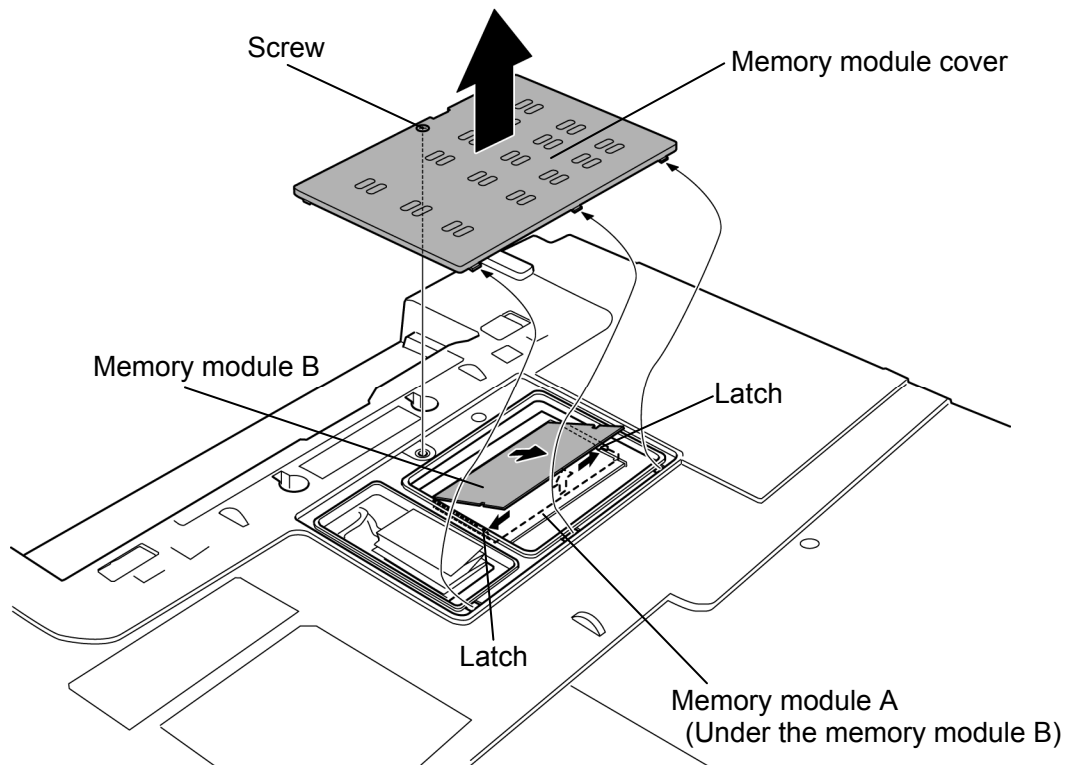
Figure 4-7   Removing the memory module

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

    - M2×4B   BIND screw   ×2

4. Lift the **MDC** straight above and remove it from the **CN3010** on the system board.

5. Disconnect the **MDC cable** from the connector on the MDC.
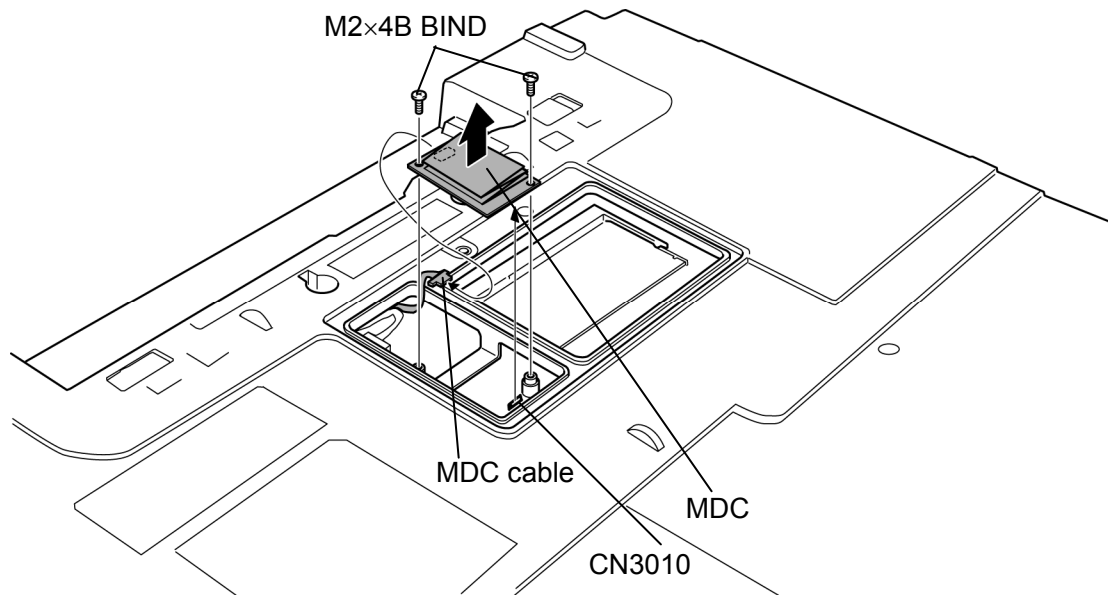
Figure 4-8   Removing the MDC

Installing the MDC/Memory module

To install the MDC/memory module, follow the steps below and refer to Figure 4-7 and 4-8.

NOTE: *When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.*
If the memory is not detected, check that it is connected correctly.

---

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

2. Connect the **MDC** to the connector **CN3010** on the system board by pressing it carefully. Be careful not to damage the MDC and connector.

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

   - M2×4B   BIND screw   ×2

CAUTION: *When installing the memory module, make sure the computer is in boot mode and powered off. Inserting a memory module with the power on might damage the module or the computer itself.*

When installing only one memory module, be sure to insert it into the slot A. Otherwise, the computer or the memory may not work properly.

Do not touch the connectors on the memory module or on the computer. Dust and stains on the connectors may cause memory access problems.

---

4. Insert the **memory module(s)** into the connector(s) slantwise and press it to connect firmly.

NOTE: *When replacing the memory module A, do it after removing the memory module B.*

---

5. Press down the memory module until it is latched firmly.

6. Install the **memory module cover** and secure it with the **screw**.

4.7   Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-9 to 4-11.

1. Turn over the computer.

2. Open the **display** and make it flat.

3. Insert your fingers into the **slots** on both sides and remove the **keyboard holder**.
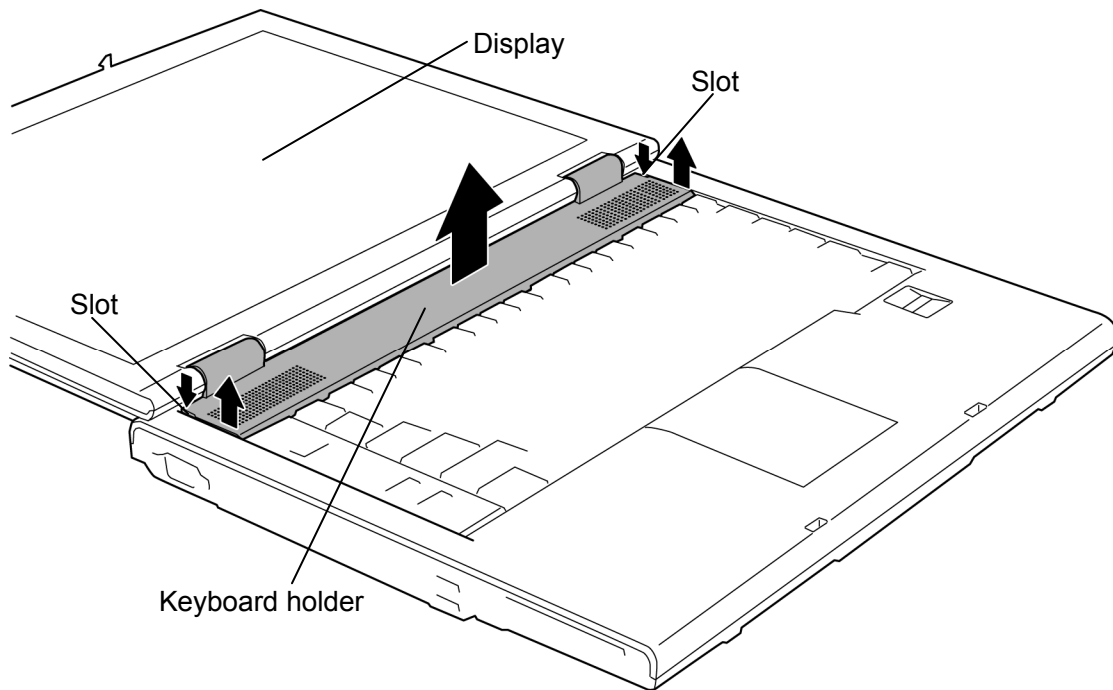
Figure 4-9   Removing the keyboard holder

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

   - M2.5×4B   FLAT HEAD screw   ×2

5. Lift the top edge of the **keyboard** while releasing the **hook** and turn the keyboard face down on the palm rest.
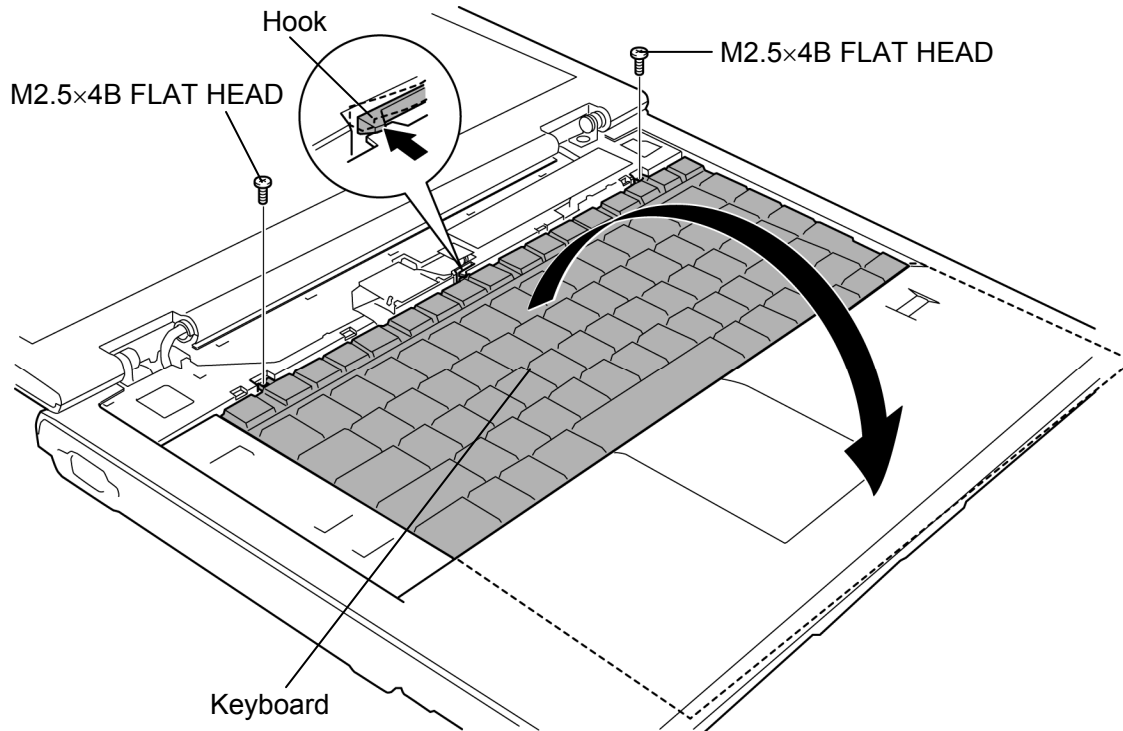
Figure 4-10   Removing the keyboard (1)

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

   - M2.5×6B   FLAT HEAD screw   ×1

7. Disconnect the **keyboard cable** from the connector **CN3230** on the system board and remove the **keyboard**.
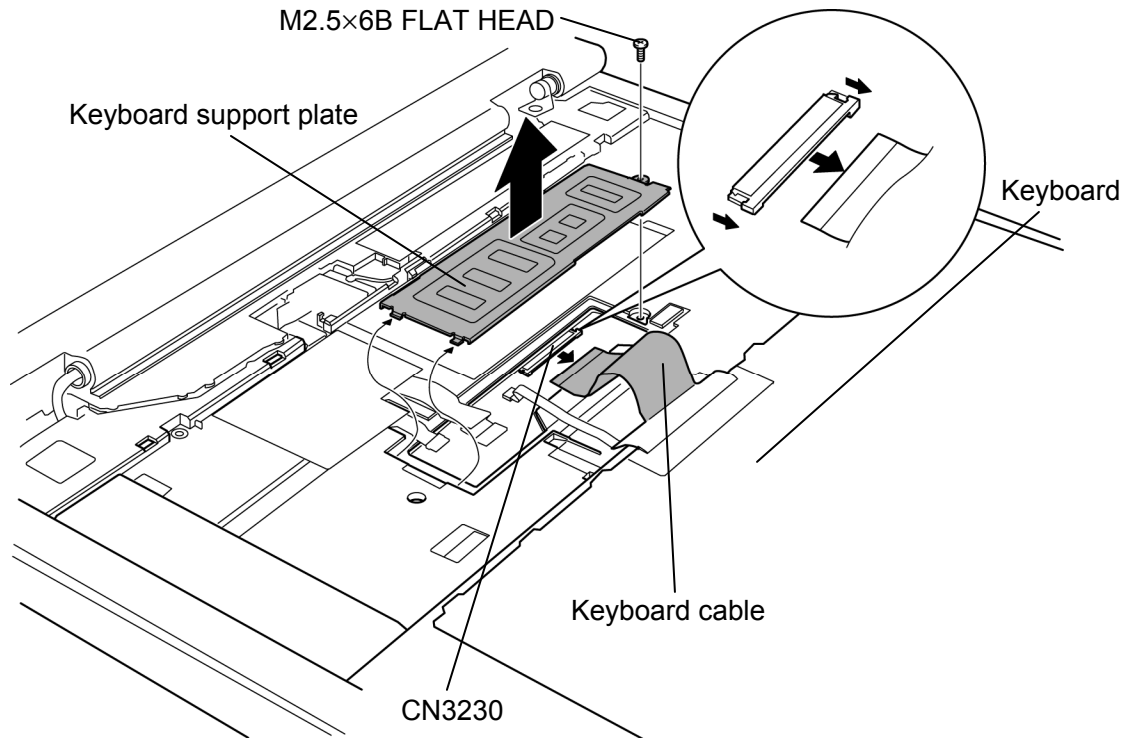
Figure 4-11   Removing the keyboard (2)

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figure 4-9 to 4-11.

1. Place the **keyboard** face down on the palm rest.

2. Connect the **keyboard cable** to the connector **CN3230** on the system board.

CAUTION: *Extra portion of the keyboard cable must be put under the palm rest.*

3. Install the **keyboard support plate** and secure it with the following **screw**.

    - M2.5×6B   FLAT HEAD screw   ×1

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

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

    - M2.5×4B   FLAT HEAD screw   ×2

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

4.8 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-12.

1. Disconnect the **Bluetooth antenna cable** from the Bluetooth module using an antenna coaxial cable disconnector.

2. Push the **hook** in the direction in the following figure and remove the **Bluetooth module** from the slot.

3. Disconnect the **Bluetooth cable** from the connector on the Bluetooth module.

4. Peel off the **insulator** that prevents a waterdrop from entering the computer and disconnect the **Bluetooth cable** from the connector **CN4400** on the system board.
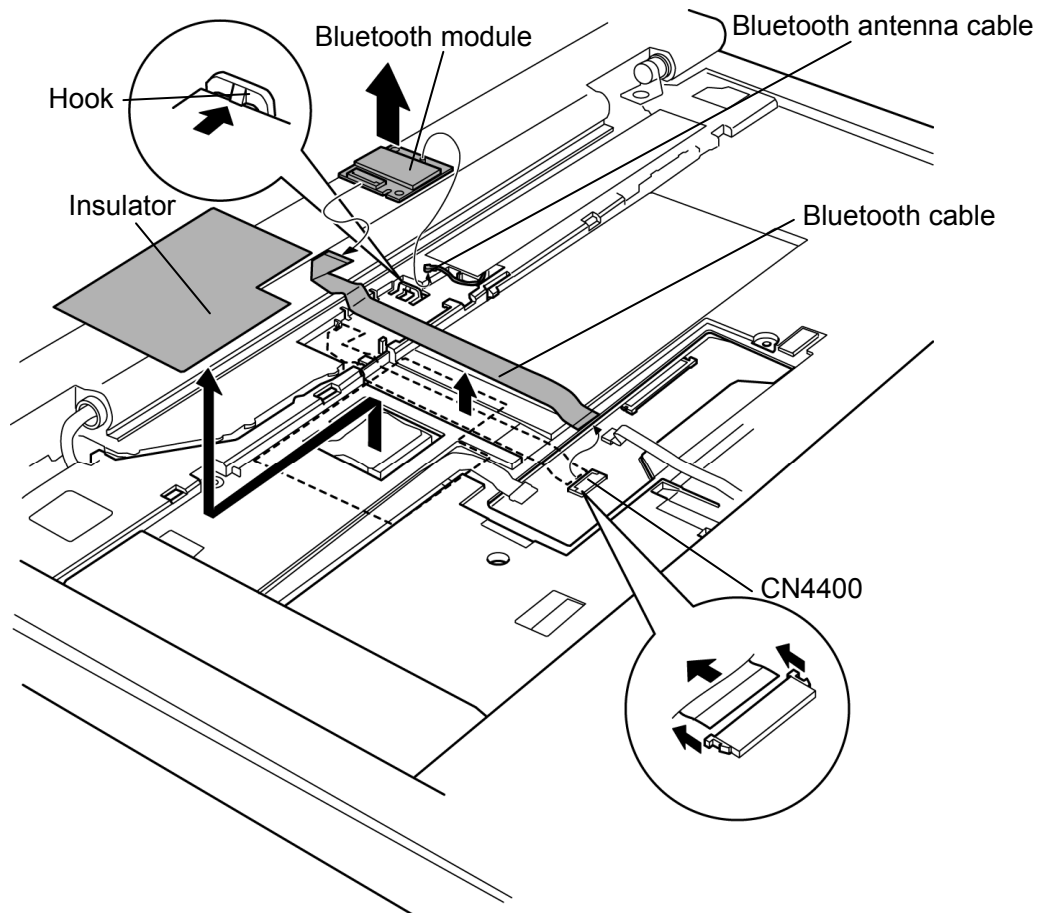
Figure4-12   Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below and refer to Figure 4-12.

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

2. Stick a new **insulator** that prevents a waterdrop from entering the computer.

NOTE: *Do not reuse the removed insulator.*

3. Connect the **Bluetooth cable** to the connector on the Bluetooth module.

4. Install the **Bluetooth module** to the slot until the **hook** latches.

5. Connect the **Bluetooth antenna cable** to the connector on the Bluetooth module.

4.9   SW membrane

Removing the SW membrane

To remove the SW membrane, follow the steps below and refer to Figure 4-13 and 4-14.

1. Lift the **switch cover** up while pushing the portion shown in the figure below.
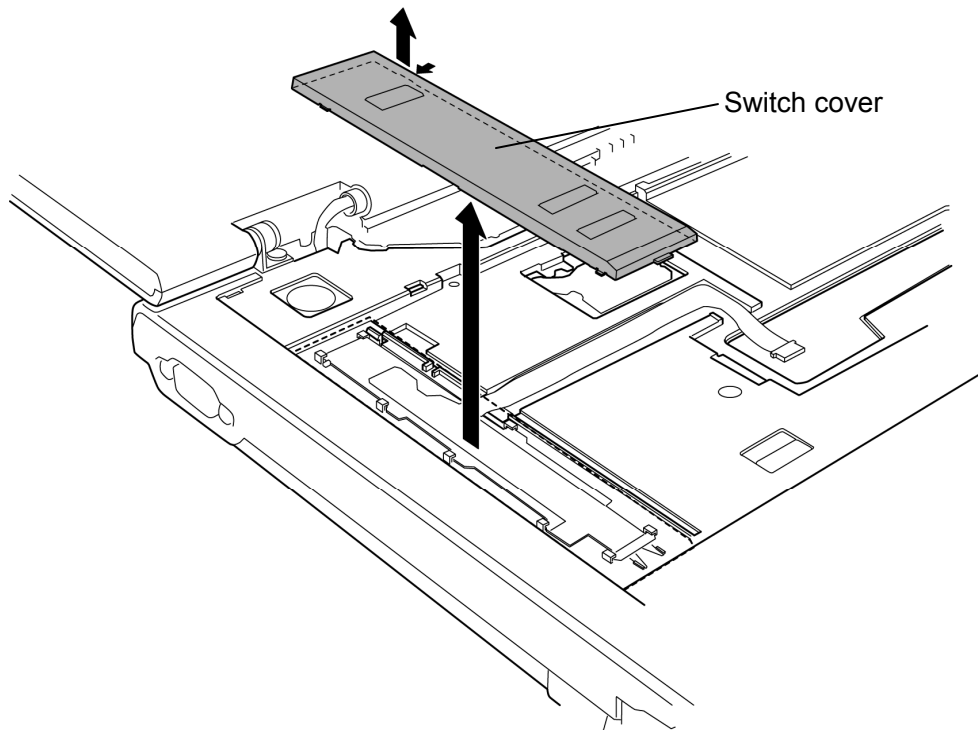
Switch cover

Figure 4-13   Removing the switch cover

2. Disconnect the **SW membrane cable** from the connector **CN9550** on the system board.

3. Push down the **hook** and slide the **SW membrane** in the direction in the figure below.

4. Remove the **SW membrane**.
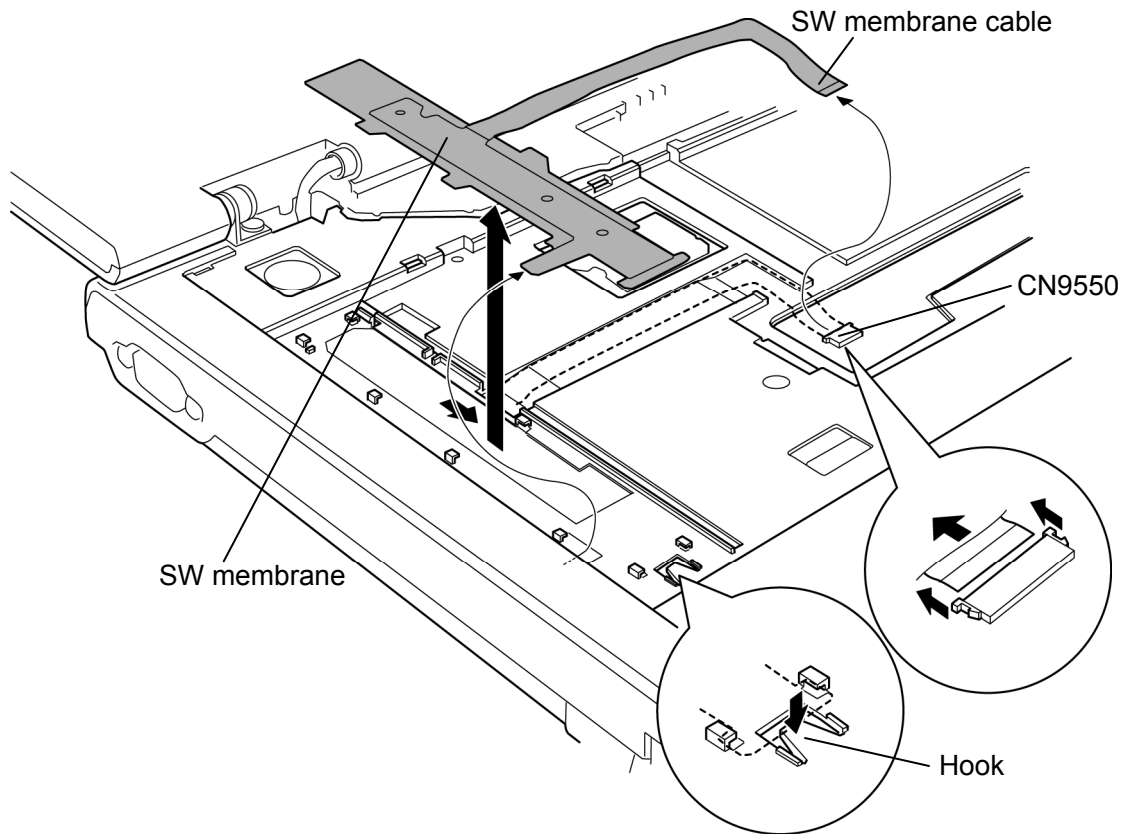
Figure 4-14   Removing the SW membrane

Installing the SW membrane

To install the SW membrane, follow the steps below and refer to Figure 4-13 and 4-14.

1. Install the **SW membrane** to the slot while sliding it in the opposite direction in removing.

2. Connect the **SW membrane cable** to the connector **CN9550** on the system board.

3. Install the **switch cover** while engaging latches.

4.10 Fan hood

NOTE: *When repairing the PC, clean the fan hood and cooling fin with a vacuum*
cleaner and cotton sticks, and remove dusts with tweezers.

Removing the Fan hood

To remove the fan hood, follow the steps below and refer to Figure 4-15.

   1. Peel off the **insulator** that prevents a waterdrop from entering the computer and
      remove the **fan hood** from the slot.
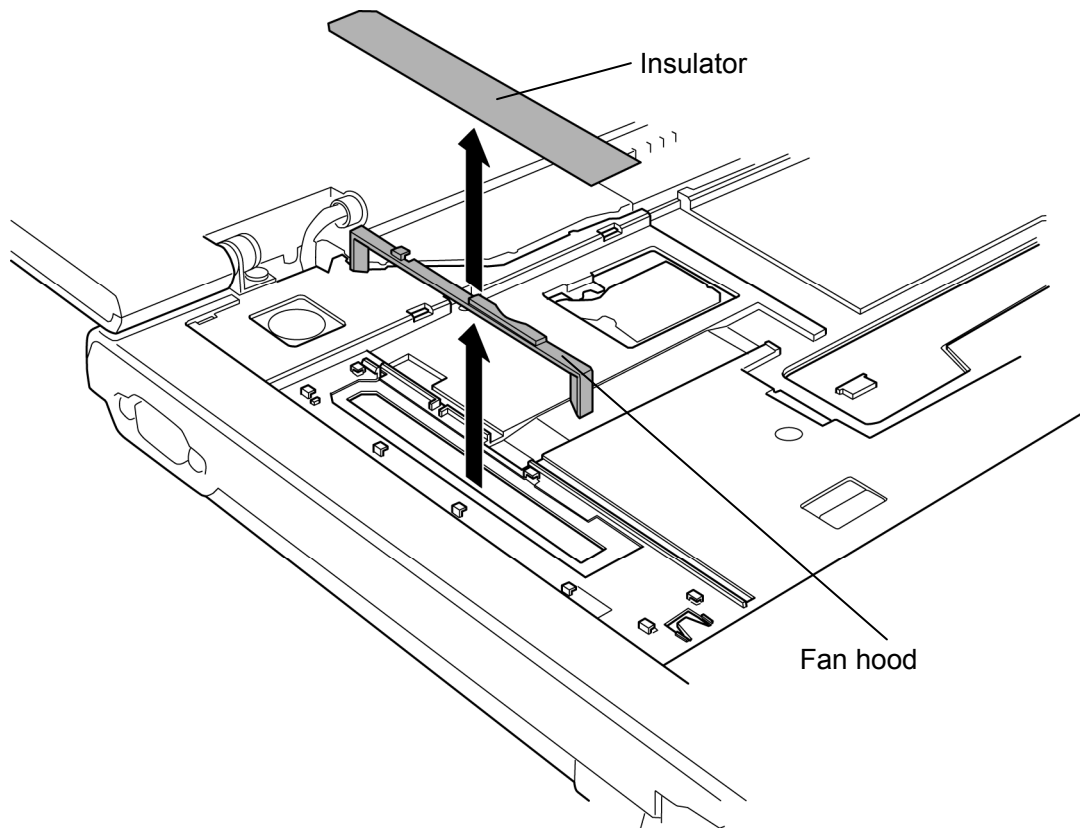
Figure4-15   Removing the fan hood

Installing the Fan hood

To install the fan hood, follow the steps below and refer to Figure 4-15.

1. Install the **fan hood** into the slot.

2. Stick a new **insulator** that prevents a waterdrop from entering the computer.

NOTE: *Do not reuse the removed insulator.*

4.11 Wireless LAN card

Removing the Wireless LAN card

To remove the wireless LAN card, follow the steps below and refer to Figure 4-16 to 4-18.

CAUTION: *Do not try to remove the wireless LAN card with the computer turned on. It may cause damages to the computer or the wireless LAN card. Do not touch the connectors on the wireless LAN card on the computer. Debris on the connectors may cause the wireless LAN card access problems.*

---

1. Peel off the **insulator** that prevents a waterdrop from entering the computer.

2. Disconnect the **wireless LAN antenna cables** from the wireless LAN card using an antenna coaxial cable disconnector.

NOTE: *There are two types of wireless LAN card. One type has two antenna connectors to which white and black antenna cables are connected and the other type has three connectors to which white, black and gray antenna cables are connected.*

---

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

    - M2×4B   BIND screw   ×2

4. Disconnect the **wireless LAN card** from the connector on the system board.

(Three antenna cables)
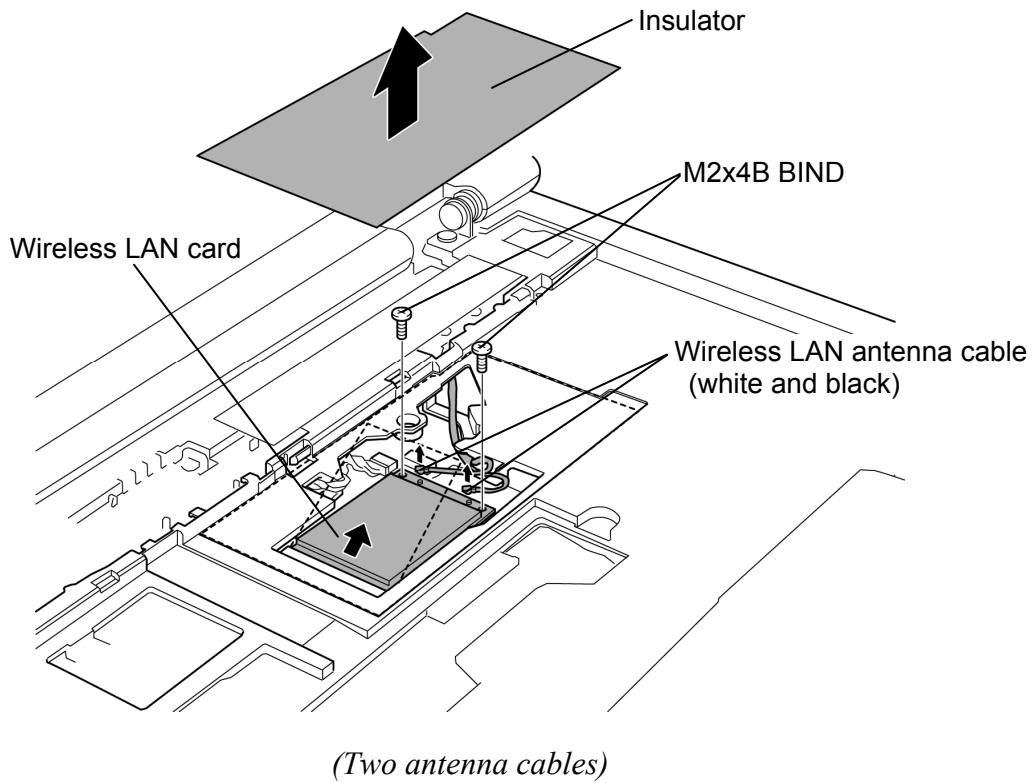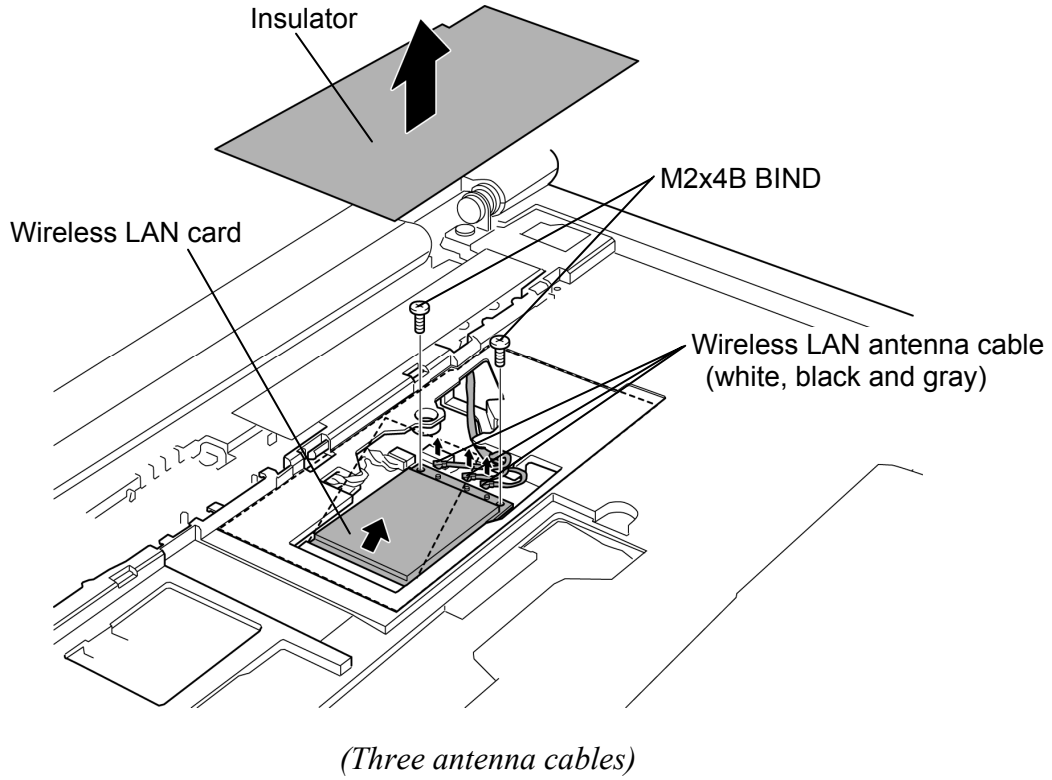
(Two antenna cables)

Figure 4-16   Removing the wireless LAN card

5. Peel off the **insulator** that prevents a waterdrop from entering the computer.
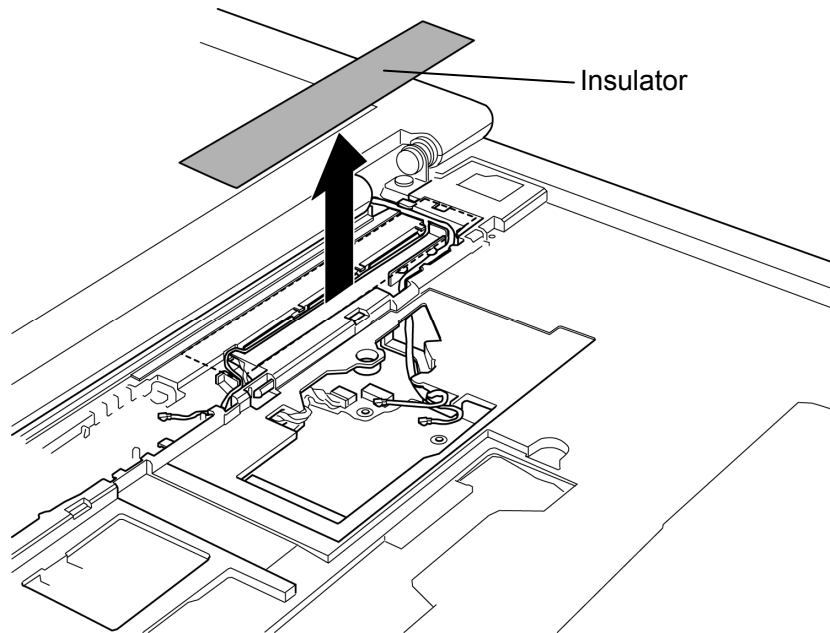
Figure 4-17   Removing the insulator

6. Pull out the **wireless LAN antenna cables** from the **hole** of the cover assembly.

7. Pass the **Bluetooth antenna cable** and **wireless LAN antenna cables** from the **hole** of the cover assembly.
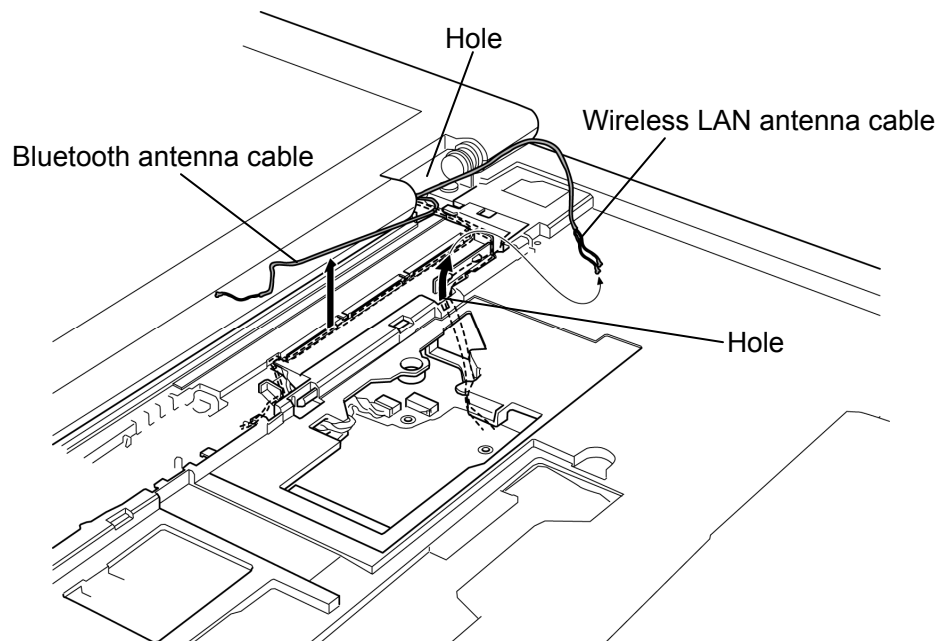
Figure 4-18   Removing the antennas

Installing the Wireless LAN card

To install the wireless LAN card, follow the steps below and refer to Figure 4-16 to 4-18.

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

---

1. Pass the **Bluetooth antenna cable** through the hole of the cover assembly and arrange it into the slot of the cover assembly in place.

2. Pass the **wireless LAN antenna cables** through the holes of the cover assembly and arrange them in place.

3. Stick a new **insulator** that prevents a waterdrop from entering the computer in place.

NOTE: *Do not reuse the removed insulator.*

---

4. Insert the **wireless LAN card** to the connector on the system board slantwise and press it to connect firmly.

5. Connect the **wireless LAN antenna cables** to the connectors on the wireless LAN card.

NOTE: *In the wireless LAN card that has three connectors, connect the white cable to 1, black to 2 and gray to 3 marked on the wireless LAN card.*

---

6. Secure the **wireless LAN card** with the following **screws**.

   - M2×4B   BIND   ×2

7. Stick a new **insulator** that prevents a waterdrop from entering the computer.

NOTE: *Do not reuse the removed insulator.*

4.12 Optical drive

Removing the Optical drive

To remove the optical drive, follow the steps below and refer to Figure 4-19 and 4-20.

CAUTION: After removing the optical drive, do not put fingers inside the slot. It may cause injury.

1. Close the display and turn over the computer.

2. Remove the following **screw** securing the optical drive.

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

3. Turn over the computer and open the display.

4. Remove the **optical drive** from the connector on the system board while pushing it in the direction in the figure below.
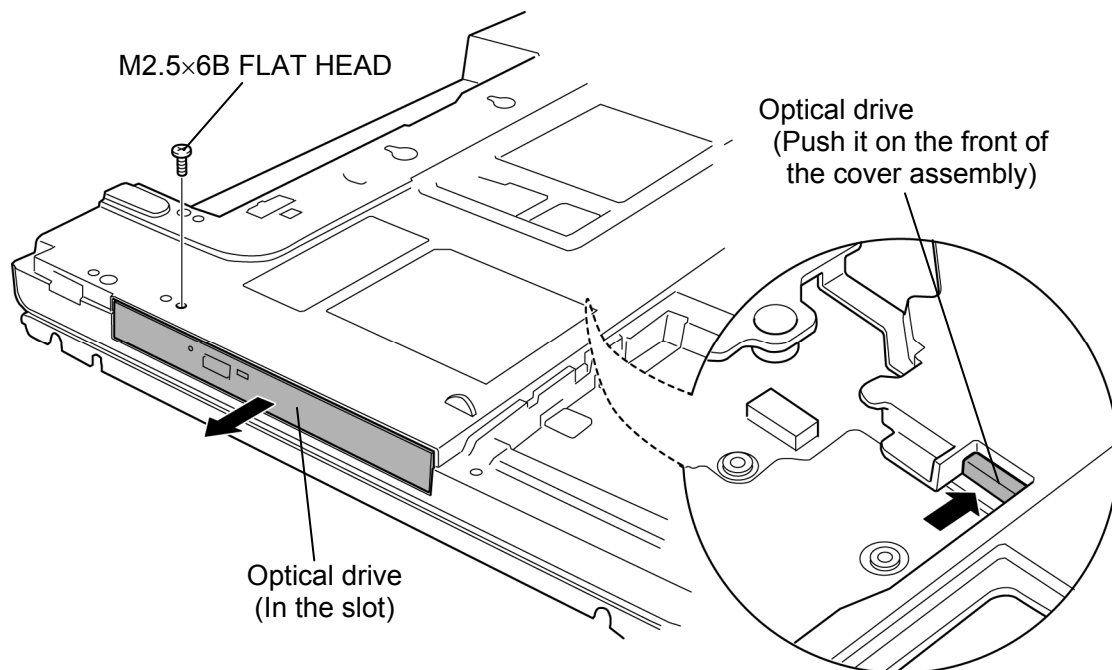
Figure 4-19   Removing the optical drive

5. Remove the following **screws** and **pushing plate**.

   - M2×2.7C   S-THIN HEAD screw   ×2

6. Remove the following **screw** and **mounting plate**.

   - M2×3C   S-THIN HEAD screw   ×1
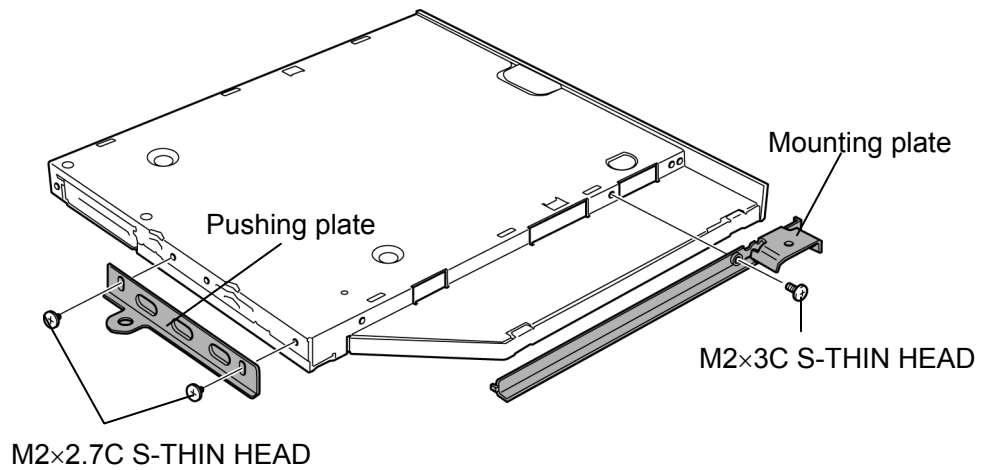
Figure 4-20 Disassembling the optical drive

Installing the Optical drive

To install the optical drive, follow the steps below and refer to Figure 4-19 and 4-20.

1. Set the **mounting plate** and secure it with the following **screw**.

    - M2×3C   S-THIN HEAD screw   ×1

2. Set the **pushing plate** and secure it with the following **screws**.

    - M2×2.7C   S-THIN HEAD screw   ×2

3. Insert the **optical drive** into the slot and push it until it is firmly connected to the connector on the system board.

4. Turn over the computer and secure the **optical drive** with the following **screw.**

    - M2.5×6B   FLAT HEAD screw   ×1

4.13 Cover assembly and Base assembly

Removing the Cover assembly and Base assembly

To remove the cover assembly and base assembly, follow the steps below and refer to Figure 4-21 and 4-22.

1. Close the display and turn over the computer.

2. Remove the following **screws**.

   - M2.5×6B   FLAT HEAD screw   ×8 ("6" in the figure below)

   - M2.5×16B   FLAT HEAD screw   ×5 ("16" in the figure below)

3. Disconnect the **USB cable** from the connector **CN4612** on the system board.

USB cable
(Connected to CN4612)
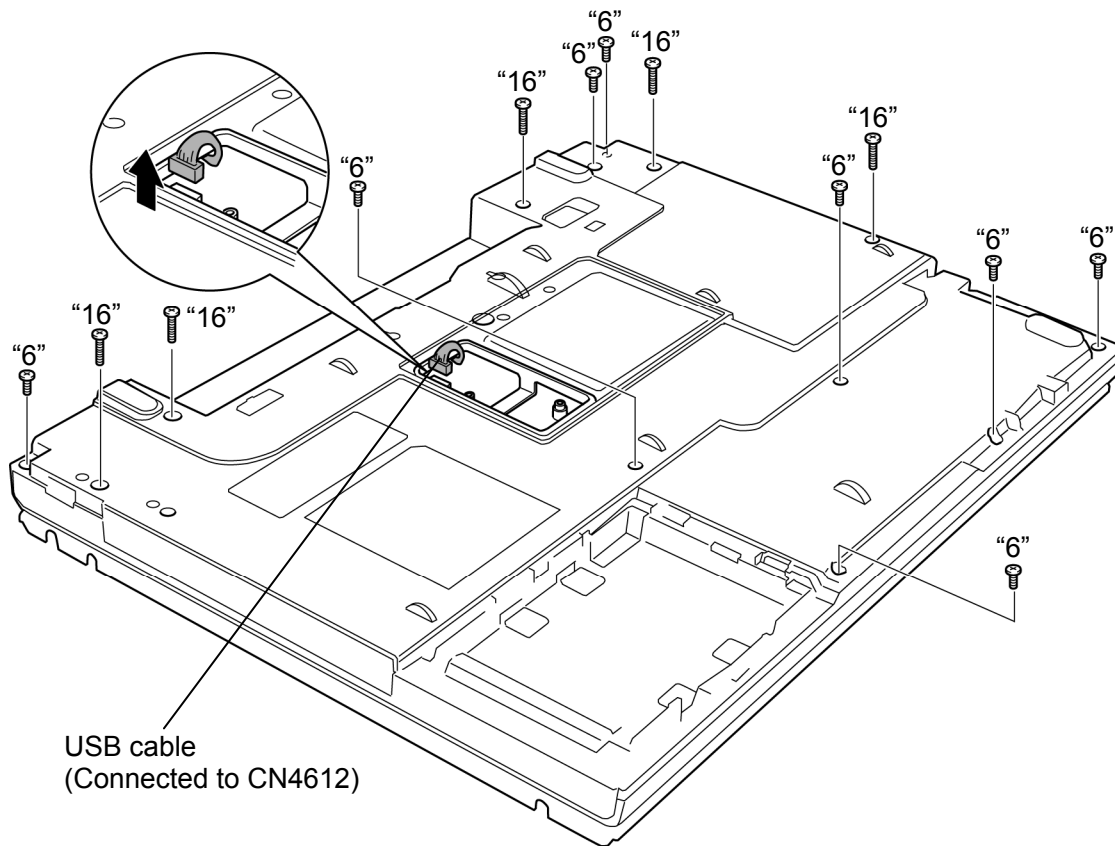
Figure 4-21   Removing the cover assembly and base assembly (1)

4. Turn over the computer and open the display.

5. Disconnect the **LCD cable, speaker cable**, **fingerprint sensor cable** and **touch pad cable** from the connector **CN5000**, **CN6170**, **CN 9550** and **CN3240** on the system board.

6. Remove the following **screws**.

   - M2.5×6B   FLAT HEAD screw   ×3

7. Separate the **cover assembly** and **base assembly** while releasing the latches.
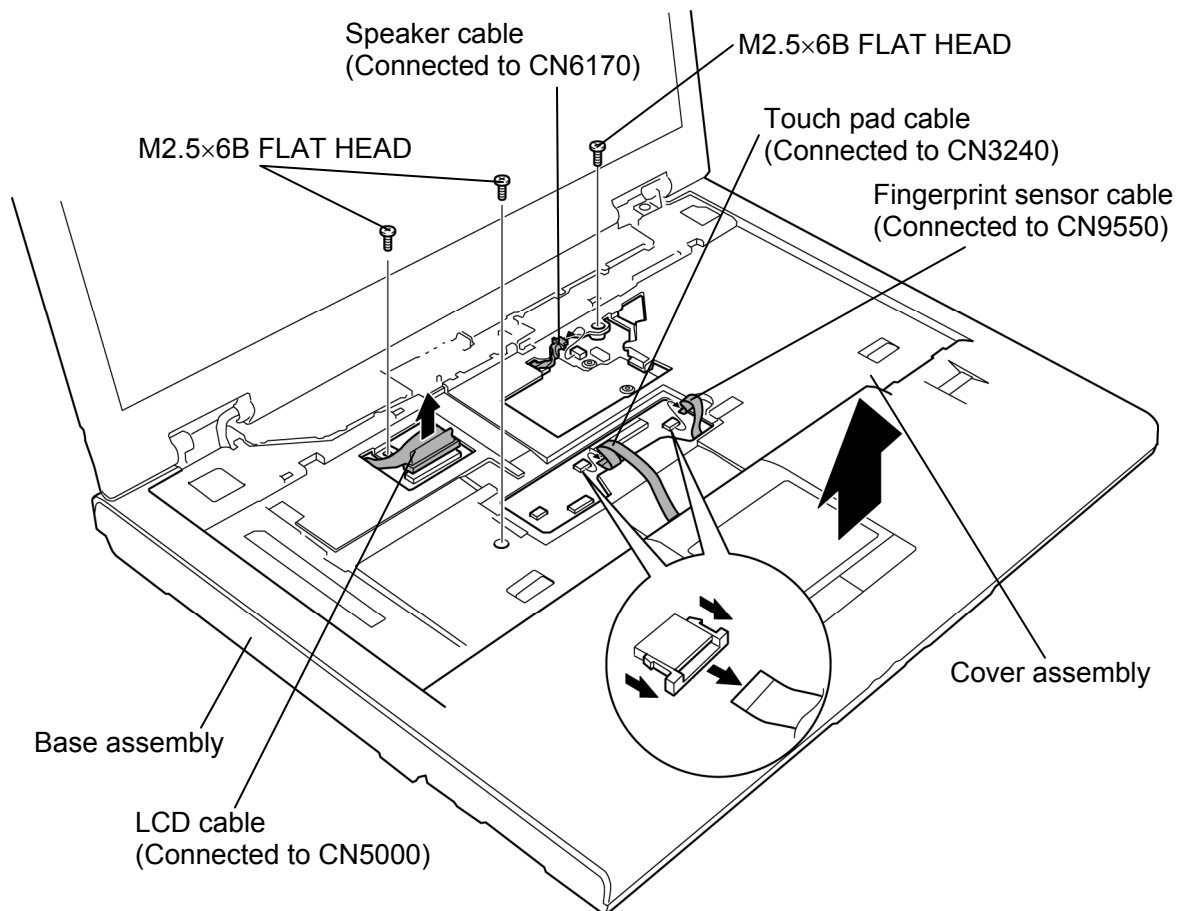
Figure 4-22 Removing the cover assembly and base assembly (2)

Installing the Cover assembly and Base assembly

To install the cover assembly and base assembly, follow the steps below and refer to Figure 4-21 to 4-22.

1. Place the **cover assembly** on the **base assembly** and engage the latches.

2. Connect the **LCD cable, speaker cable**, **fingerprint sensor cable** and **touch pad cable** to the connector **CN5000**, **CN6170**, **CN 9550** and **CN3240** on the system board.

3. Secure the cover assembly with the following s**crews**.

    -   M2.5×6B   FLAT HEAD screw   ×3

4. Close the display and turn over the computer.

5. Connect the **USB cable** to the connector **CN4612** on the system board.

6. Secure the cover assembly with the following **screws**.

    -   M2.5×6B   FLAT HEAD screw   ×8 ("6" in the figure 4-21)

    -   M2.5×16B   FLAT HEAD screw   ×5 ("16" in the figure 4-21)

4.14 Touch pad

Removing the Touch pad

To remove the touch pad, follow the steps below and refer to Figure 4-23 and 4-24.

1. Lift the **tip portions** up first and remove the **touch pad cover** while releasing latches.

2. Remove the following **screw** and **touch pad assembly** from the slot.

   - M2.5×10B   FLAT HEAD screw   ×1
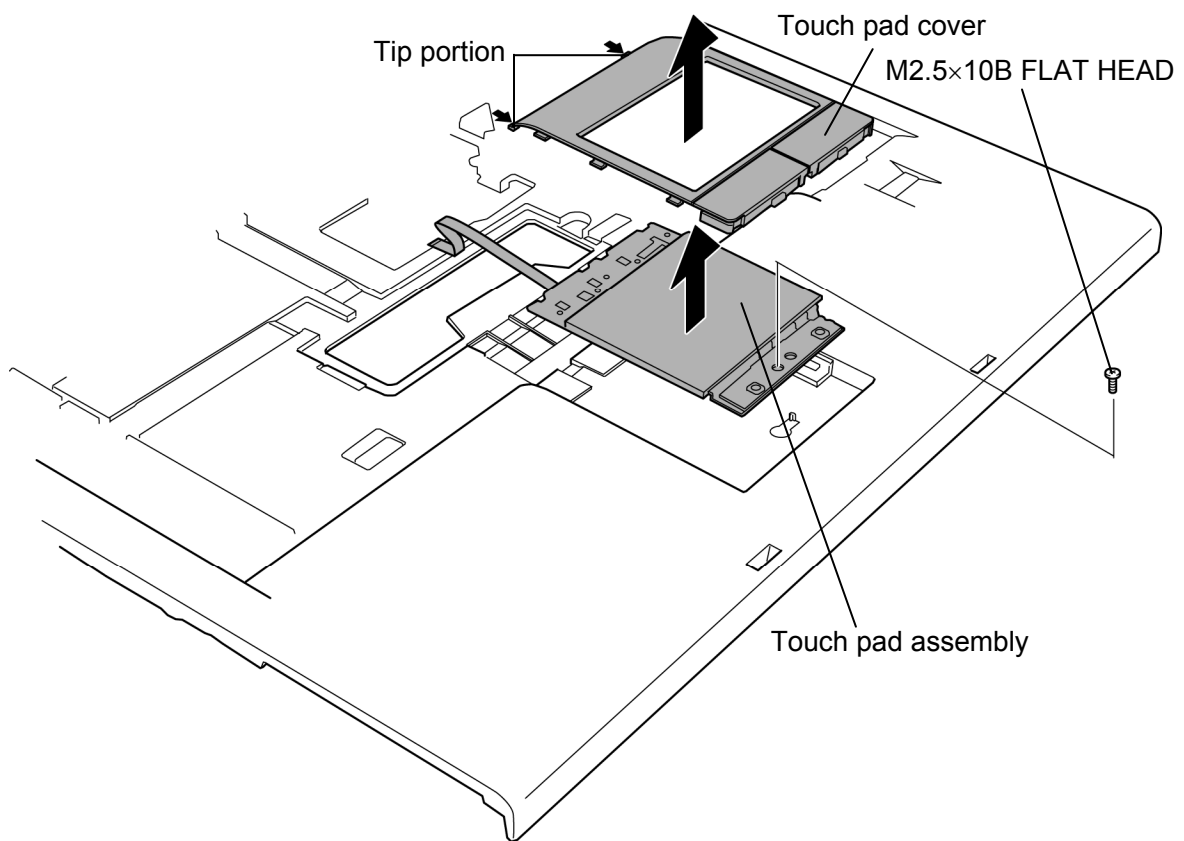
Figure 4-23   Removing the touch pad (1)

3. Turn over the **touch pad assembly** and peel off the **glass tape** and disconnect the **touch pad cable** from the **connector** on the touch pad assembly.
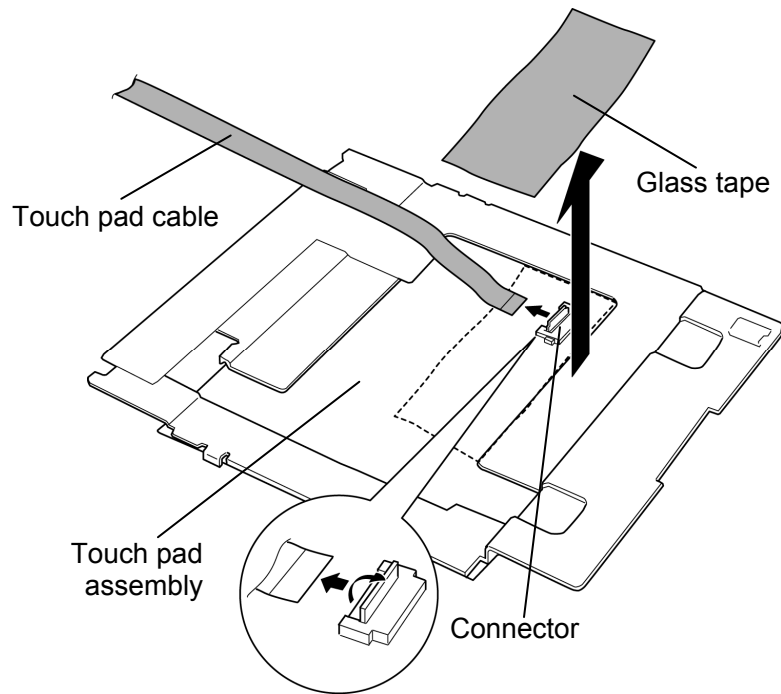
Figure 4-24   Removing the touch pad (2)

Installing the Touch pad

To install the touch pad, follow the steps below and refer to Figure 4-23 and 4-24.

1. Connect the **touch pad cable** to the **connector** on the touch pad and stick the **glass tape** in place.

2. Turn over the **touch pad assembly** and seat it to the slot.

3. Secure the touch pad assembly with the following **screw**.

   - M2.5×10B   FLAT HEAD screw   ×1

4. Install the **touch pad cover** while engaging latches.

4.15 Fingerprint sensor board

Removing the Fingerprint sensor board

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

1. Push the **hook** down and remove the **fingerprint sensor board hold plate** while sliding it from the **guides** in the direction of the arrow in the figure below.

2. Peel off the **glass tape**.
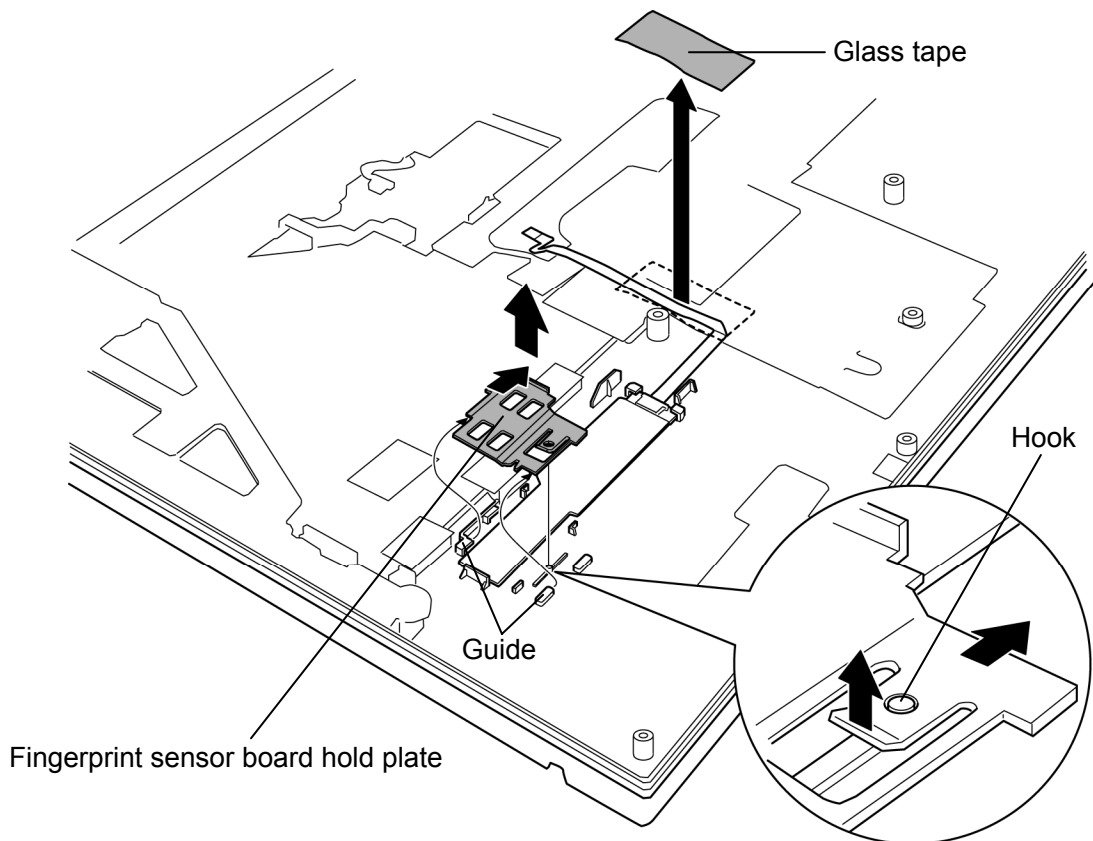
Figure 4-25   Removing the fingerprint sensor board hold plate

3. Remove the **fingerprint sensor board** fixed with the double-sided tape and peel off the **double-sided tape** that prevents a waterdrop from entering the computer.

4. Disconnect the **fingerprint sensor cable** from the **connector** on the fingerprint sensor board.
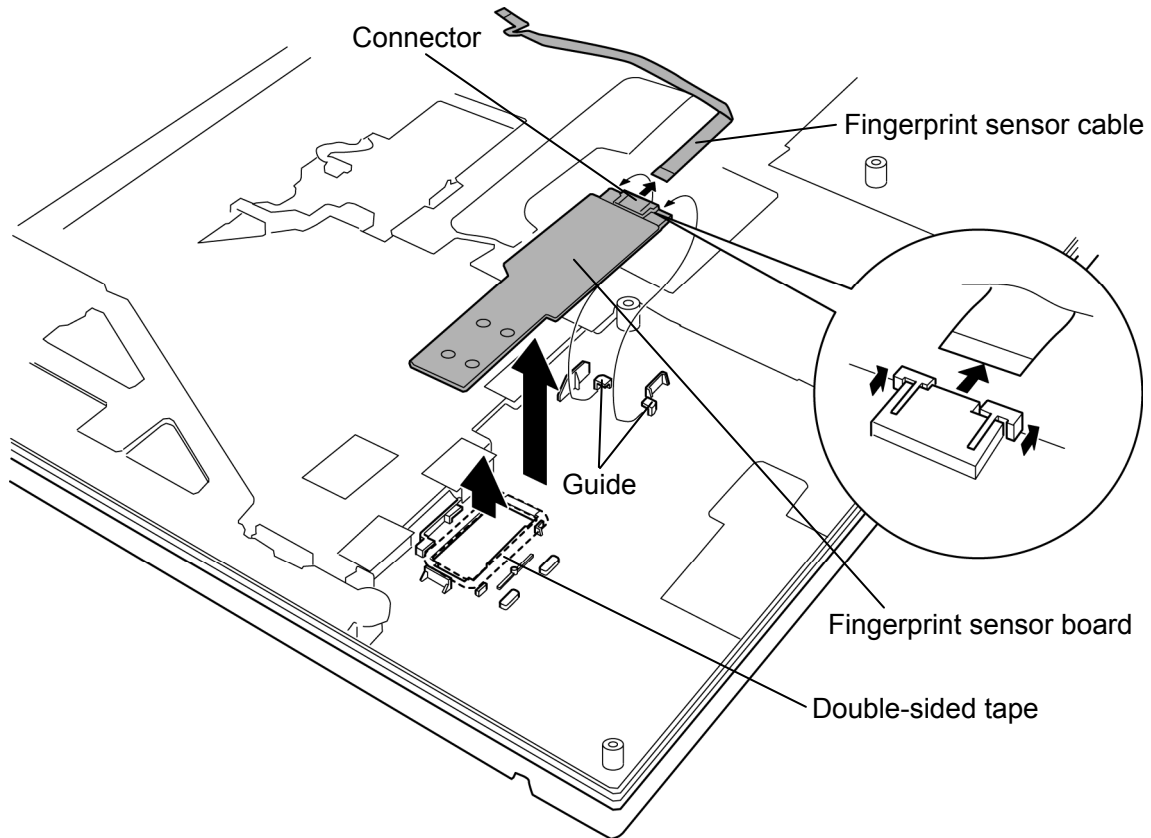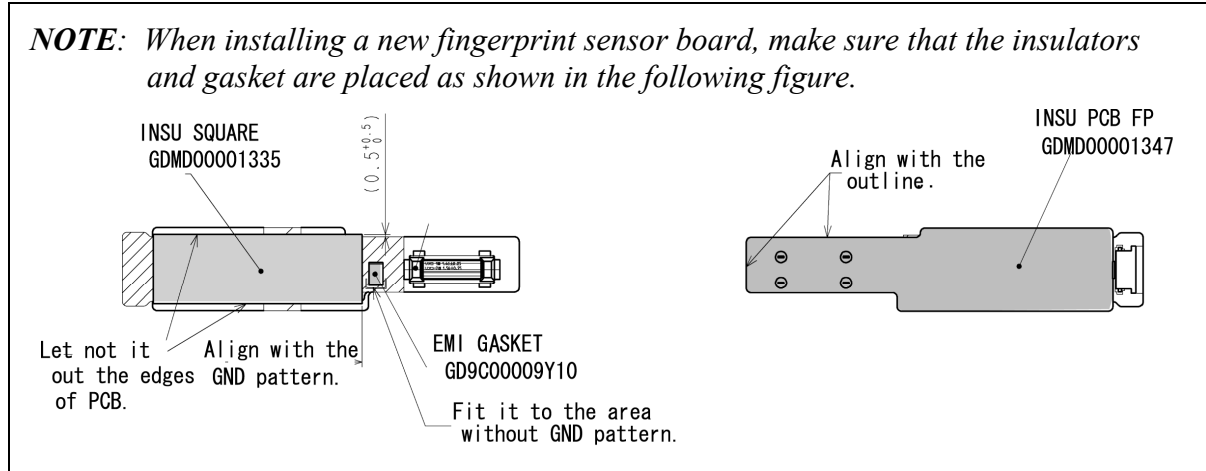

Figure 4-26   Removing the fingerprint sensor board

Installing the Fingerprint sensor board

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

NOTE: *When installing a new fingerprint sensor board, make sure that the insulators and gasket are placed as shown in the following figure.*

---

1.   Connect the **fingerprint sensor cable** to the connector on the fingerprint sensor board.

2.   Stick a new **double-sided tape** in place and install the **fingerprint sensor board** while inserting it into the **guides**.

CAUTION: *Do not reuse the removed double-sided tape.*

---

3.   Install the **fingerprint sensor board hold plate** while sliding it into the **guides**.

4.   Arrange the **fingerprint sensor cable** and stick the **glass tape** in place.

4.16 RTC battery

> ***WARNING:*** *When replacing the RTC battery, be sure to use a genuine battery authorized by Toshiba. Installing the wrong battery could cause a battery explosion or other damage.*
>
> *If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.*
>
> *Check for any of the following signs of damage:*
>
> *1) Electrolyte leakage*
>
> - *Corrosion (greenish color) on the battery connector or cable*
> - *Corrosion on the computer's battery connector*
> - *White powder on any part of the battery*
> - *White powder in the battery tray*
> - *Clear liquid on the battery*
> - *Clear liquid in the battery tray*
> - *Clear liquid on any board near the battery*
>
> *2) Damage to the connection cable*
>
> *3) Damage to the connector housing*
>
> *If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.*
>
> *If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.*

Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to Figure 4-27.

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

2. Disconnect the **RTC battery cable** from the connector **CN9300** on the system board and remove the **RTC battery**.
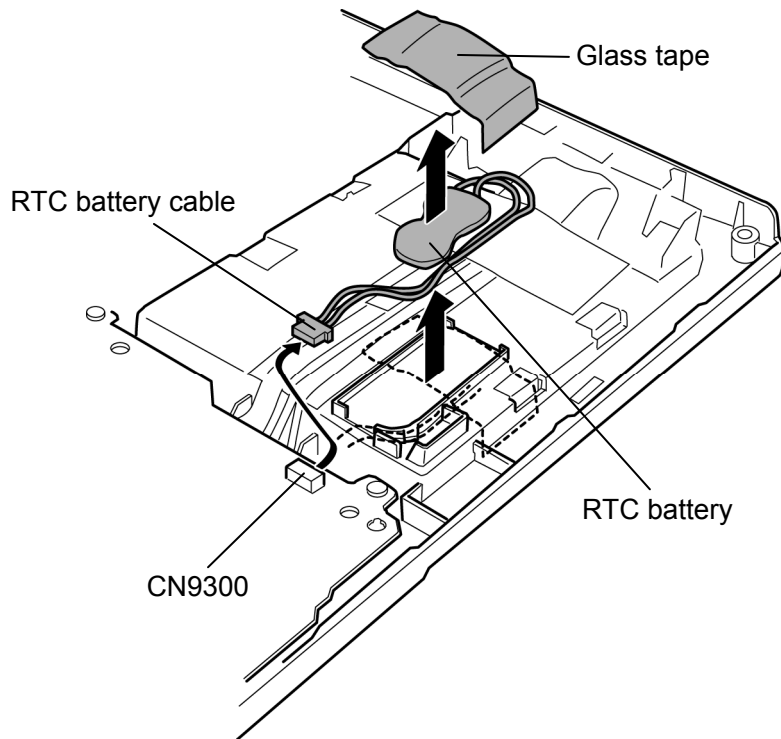

Figure 4-27   Removing the RTC battery

Installing the RTC battery

To install the RTC battery, follow the steps below and refer to Figure 4-27.

1. Connect the **RTC battery cable** to the connector **CN9300** on the system board.

2. Seat the **RTC battery** in place while arranging the RTC battery cable in the guide and stick the **glass tape** on it.

4.17 Microphone

Removing the Microphone

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

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

2. Disconnect the **microphone cable** from the connector **CN6050** on the system board and remove the **microphone** from the slot of the base assembly.
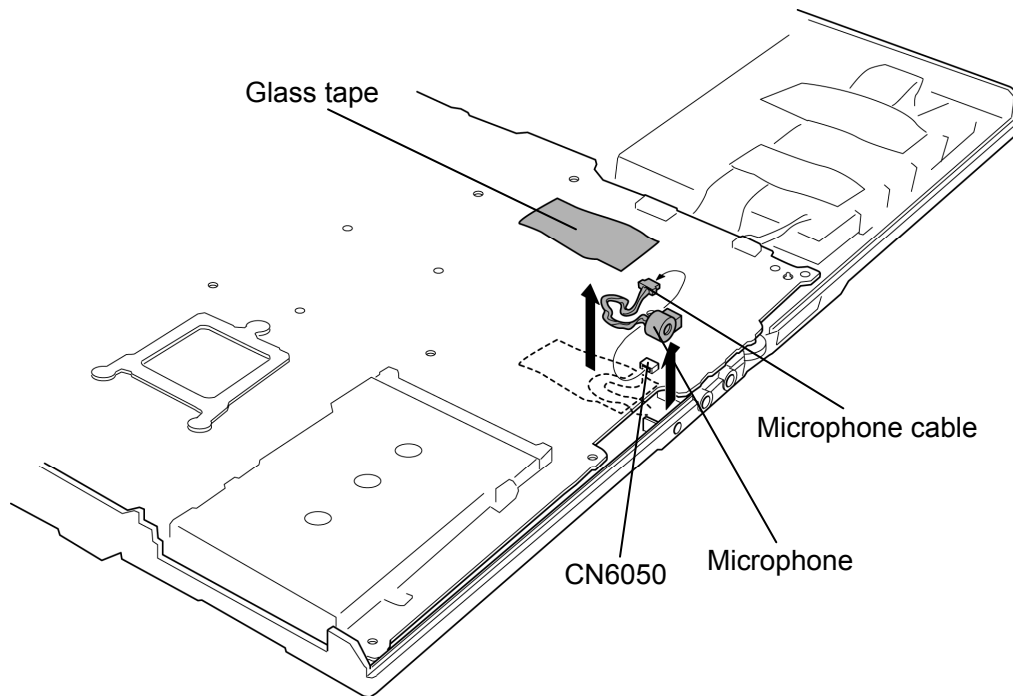

Figure 4-28   Removing the microphone

Installing the Microphone

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

1. Connect the **microphone cable** to the connector **CN6050** on the system board.

2. Install the **microphone** into the slot of the base assembly and secure it with the **glass tape**.

4.18 RGB board

Removing the RGB board

To remove the RGB board, follow the steps below and refer to Figure 4-29 and 4-30.

1. Peel the **insulator** and take out the **LAN jack** from the slot. (Be careful, because the LAN jack cable is still connected to the connector on the back of the system board.)
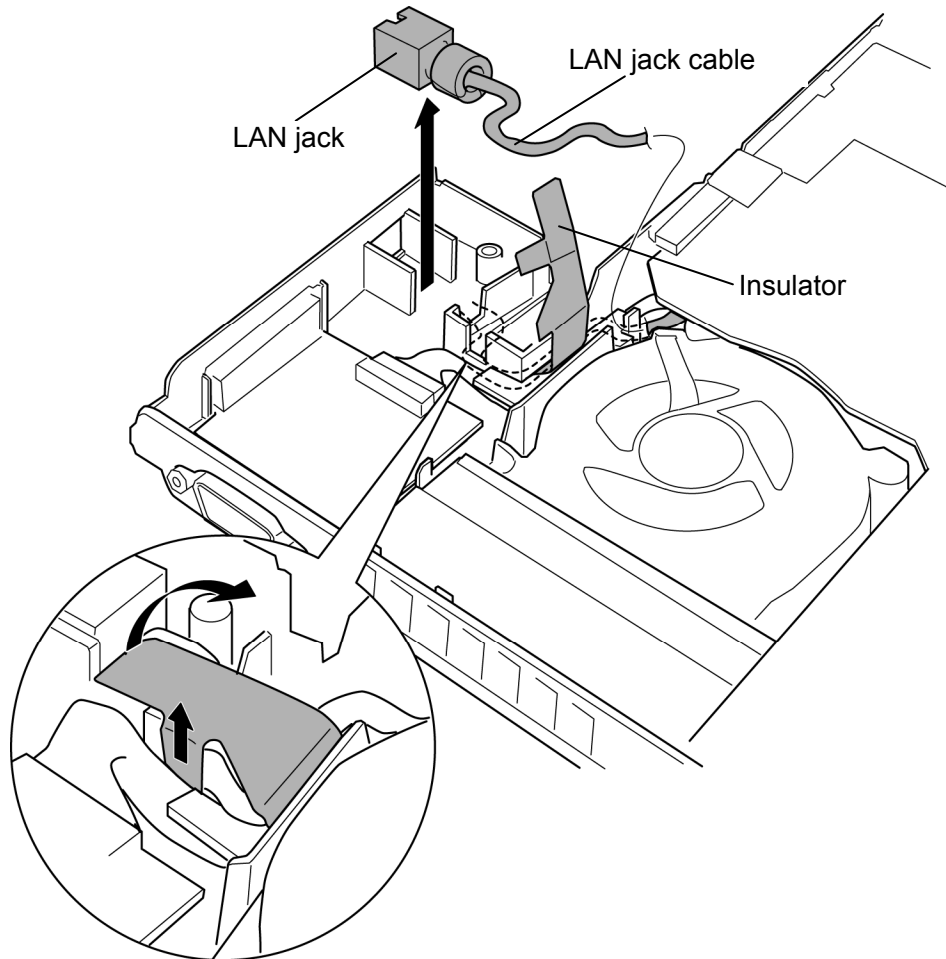

Figure 4-29 Removing the RGB board (1)

2. Remove the **cushion** from the slot.

3. Disconnect the **RGB board cable** from the connector on the RGB board. (Be careful, because the RGB board cable is still connected to the connector on the back of the system board.)

4. Remove the **RGB board** while pushing the base assembly in the direction of the arrow in the figure below.
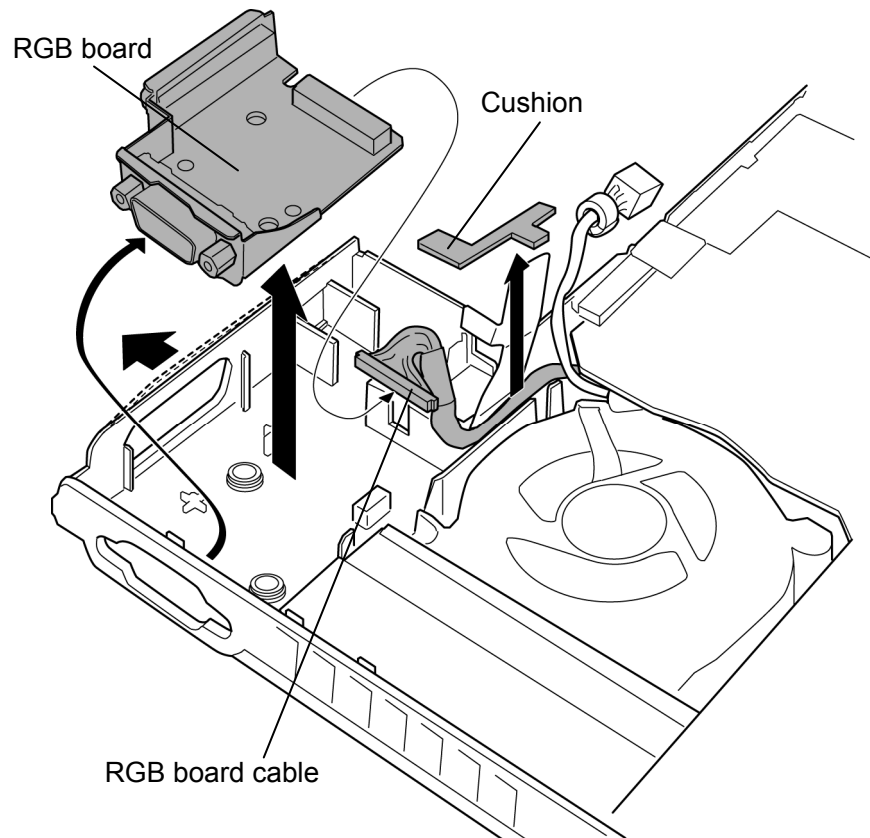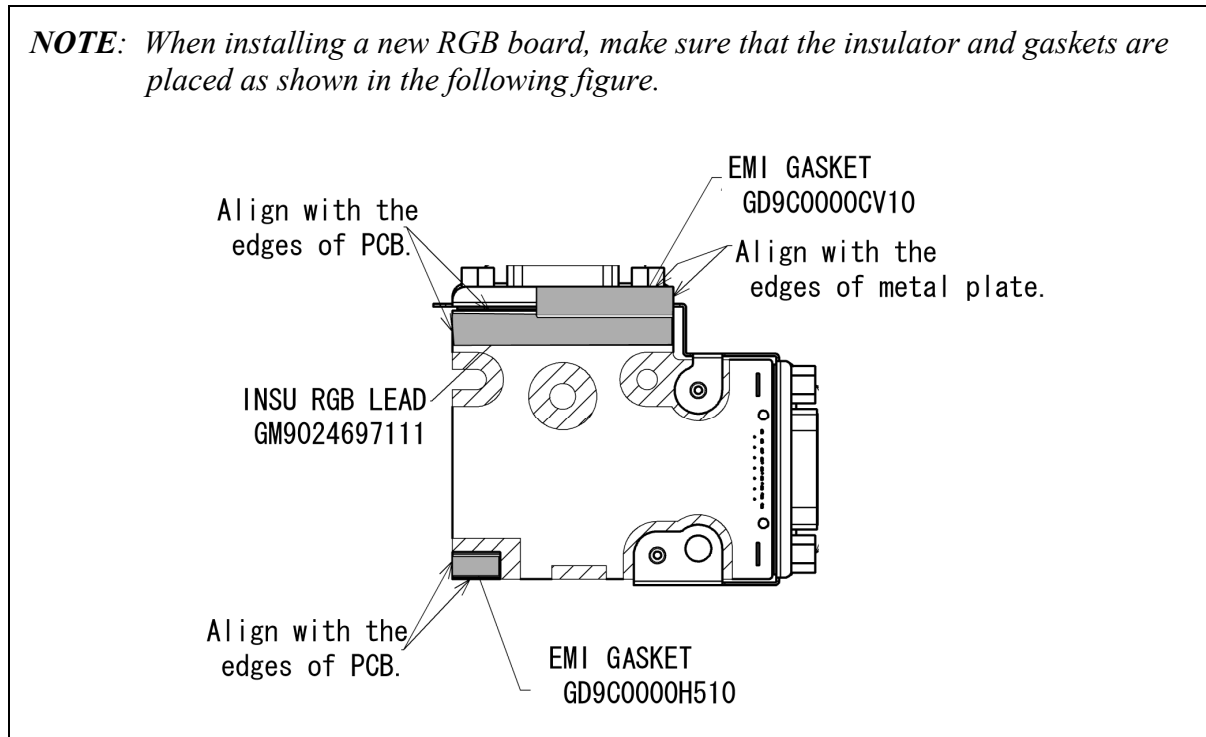
RGB board

Cushion

RGB board cable

Figure 4-30 Removing the RGB board (2)

Installing the RGB board

To install the RGB board, follow the steps below and refer to Figure 4-29 and 4-30.

NOTE: *When installing a new RGB board, make sure that the insulator and gaskets are placed as shown in the following figure.*

---

1. Connect the **RGB board cable** to the connector on the RGB board.

2. Install the **RGB board** to the slot of the base assembly while insert the RGB connecter into the hole of the base assembly.

3. Install the **cushion** into the slot.

4. Open the insulator on the cushion and arrange the **LAN jack cable** on the insulator.

5. Install the **LAN jack** into the slot.

6. Stick the **insulator** over the LAN jack cable, referring to the figure 4-29.

4.19 System board

Removing the System board

To remove the system board, follow the steps below and refer to Figure 4-31 to 4-33.

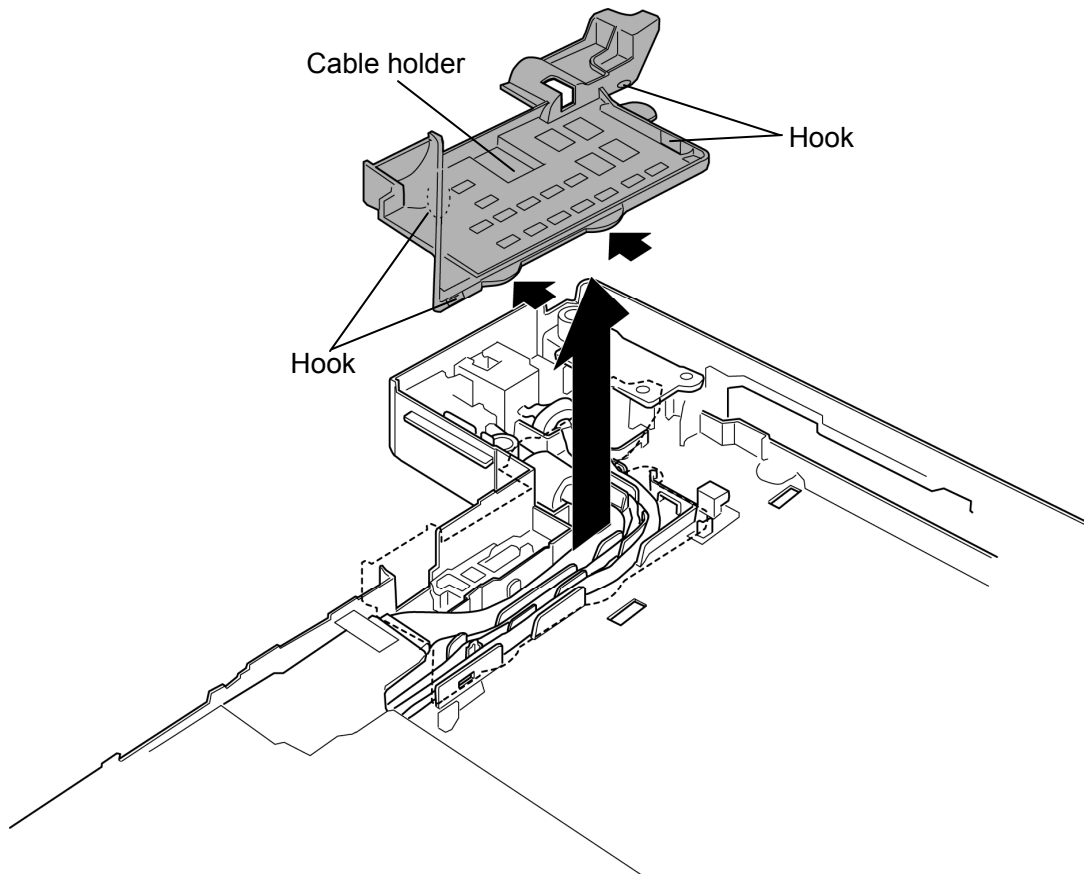1. Remove the **cable holder** while pushing four **hooks** up.

Figure 4-31 Removing the cable holder

2. Disconnect the **DC-IN jack** from the connector **CN8800** on the system board.

3. Peel off the **glass tape** and take out the **HDD cable** from the slot. (Be careful, because the HDD cable is still connected to the connector on the back of the system board.)

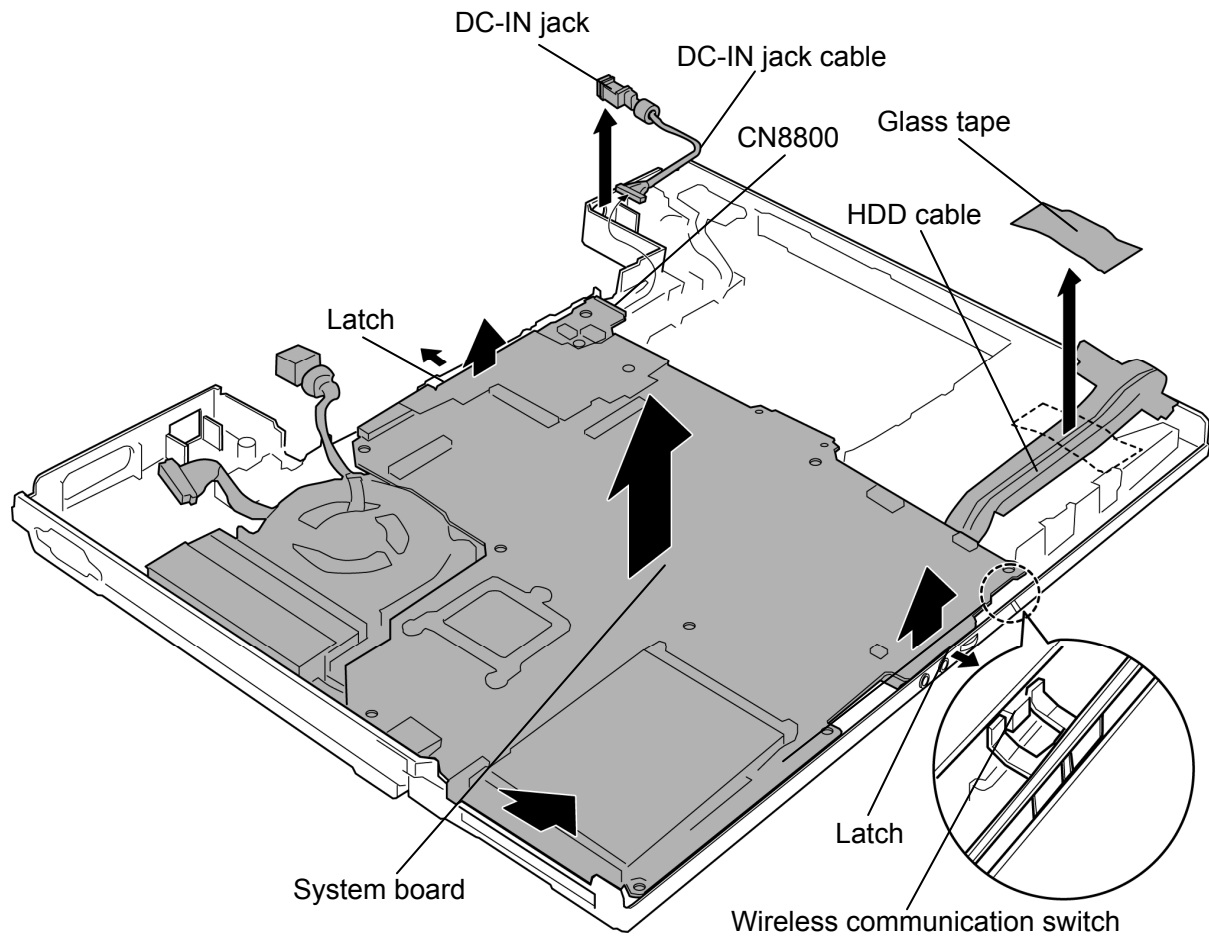4. Remove the **system board** while releasing two **latches**.

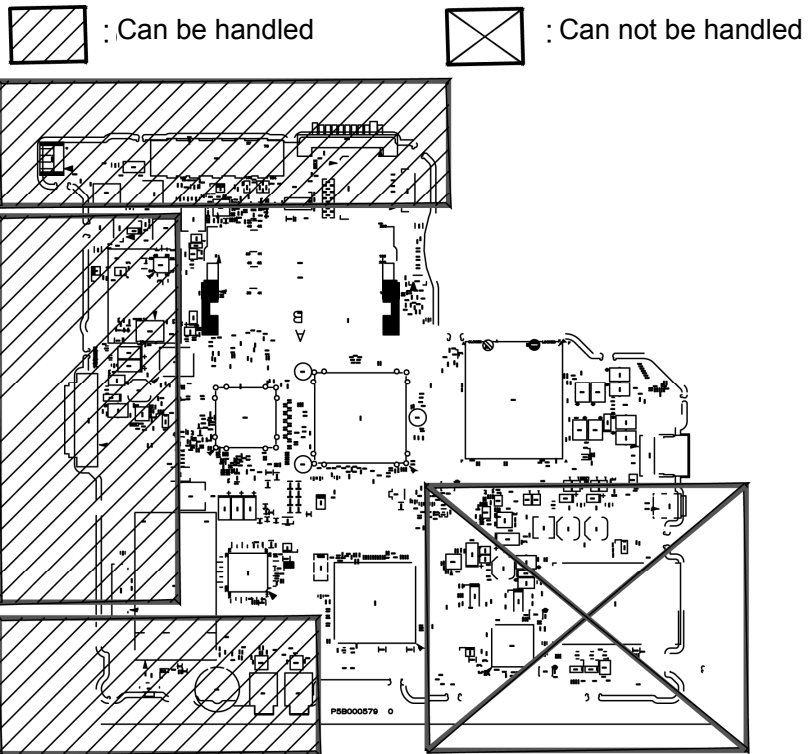*Figure 4-32   Removing the system board*

CAUTION: *When removing/installing the system board, handle the "Can be handled" areas and do not handle the "Can not be handled" area as shown in the figure below.*

     : Can be handled   : Can not be handled

5. Peel the **insulator** and remove the **modem jack** and **USB board** from the slots.
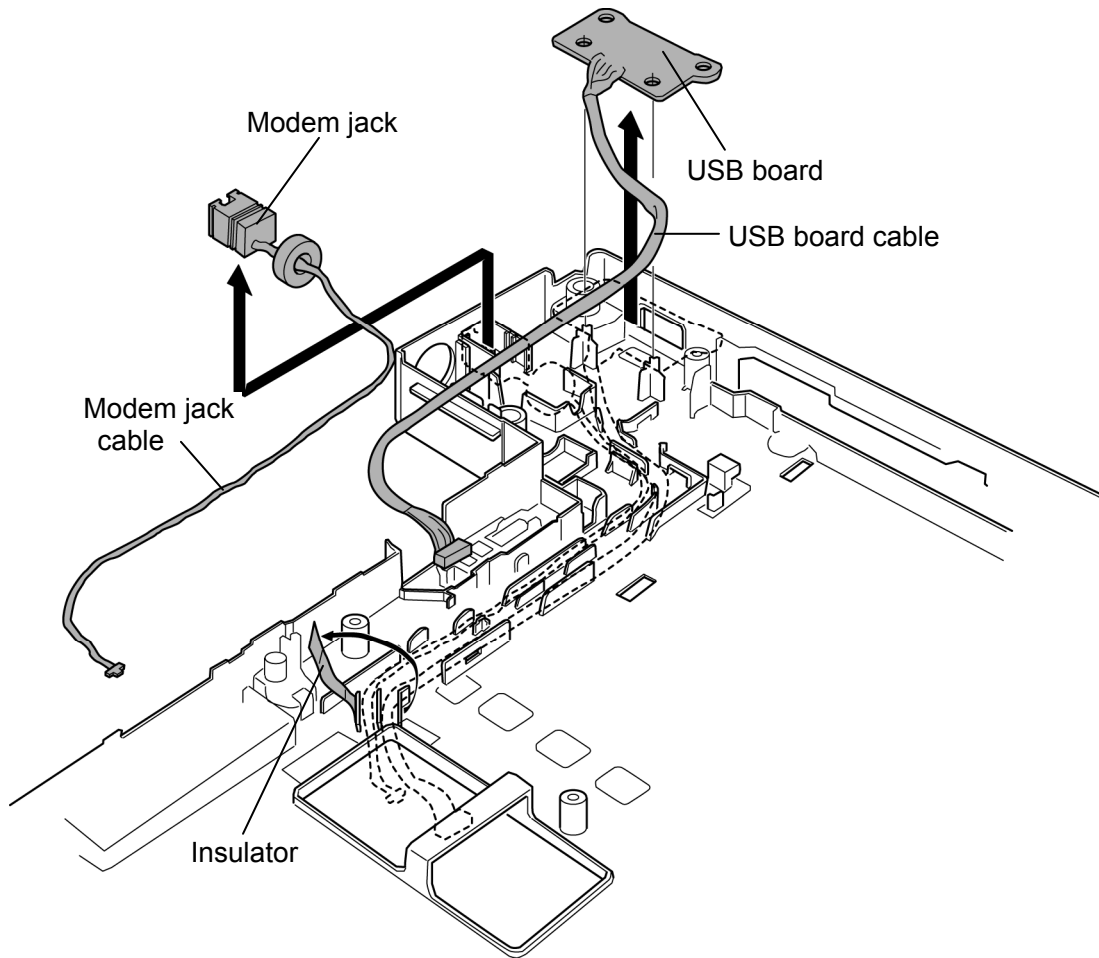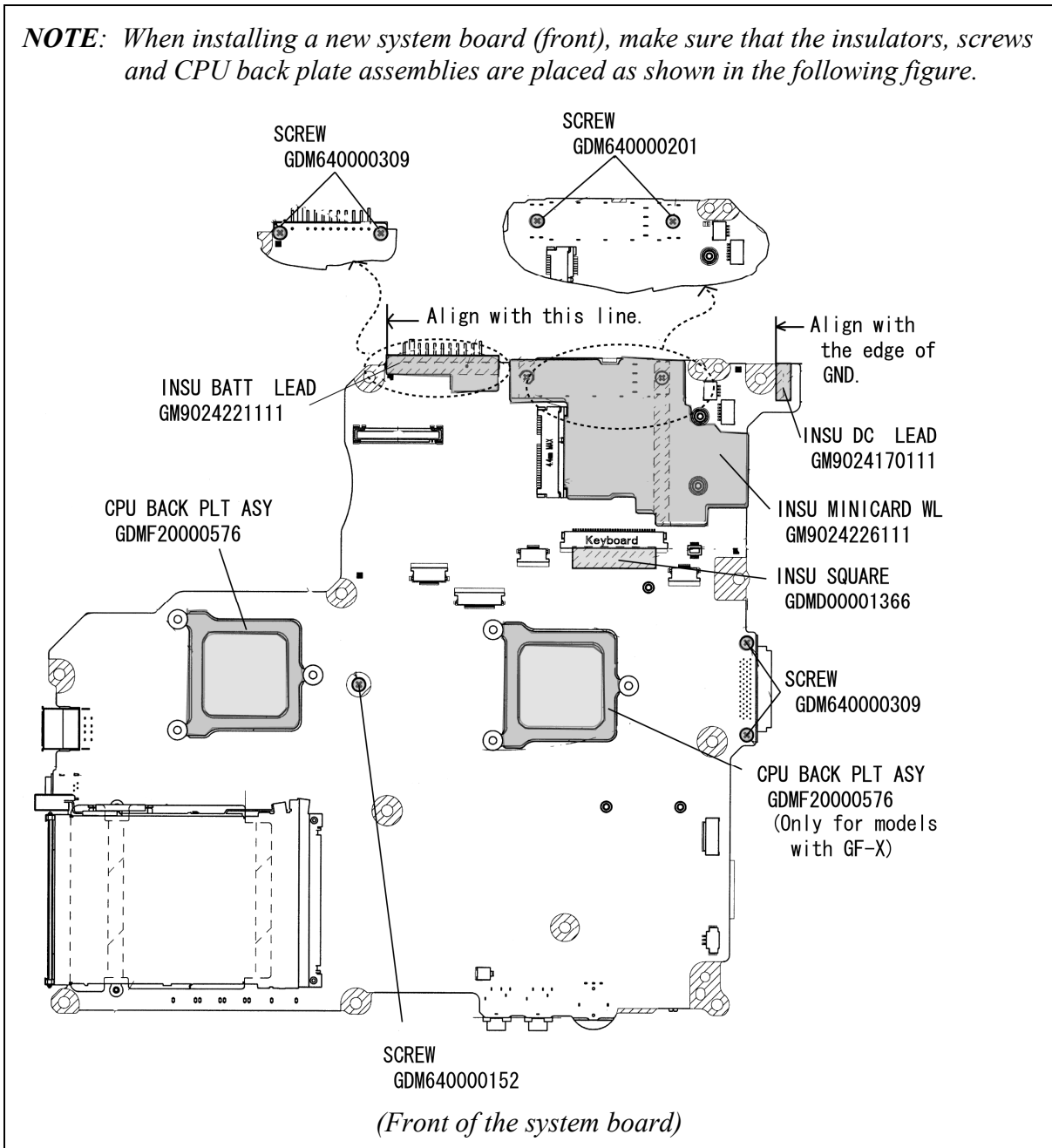

Figure 4-33   Removing the modem jack/USB board

Installing the System board

To install the system board, follow the steps below and refer to Figure 4-31 to 4-33.

NOTE: When installing a new system board (front), make sure that the insulators, screws and CPU back plate assemblies are placed as shown in the following figure.

(Front of the system board)

NOTE: *When installing a new system board (back), make sure that the insulators, gasket,*
        screws and studs are placed as shown in the following figure.

INSU DOCK CONN
GM9024225111

Push it as far as
it goes.

INSU BATT CONN
GM9024220111

INSU MEMORY
GM9024222111

STUD (CPU)
GDM640000289

to the edges
of PCB.

INSU HEATPIPE
GM9024223111

EMI GASKET
GD9C0000D610

INSU WL HNS
GDMD00001577

SCREW
GDM640000266

SCREW
GDM640000152

STUD
GDM640000316

INSU SQUARE
GDMD00001643

Models without GF-X

STUD (CPU)
GDM640000289

STUD
GDM640000316

Models with GF-X

INSU SQUARE
GDMD00001643

(Back of the system board)

1. Install the **modem jack** and **USB board** into the slot.

2. Arrange the **modem jack cable** and **USB board cable** to the guides and stick the **insulator** in place.

3. Install the **system board** while engaging two **latches**.

CAUTION: *When installing the system board, make sure that the wireless communication switch is engaged to the guide.*

---

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

5. Install the **HDD cable** into the slot and stick the **glass tape** in place.

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

CAUTION: *Arrange the DC-IN jack cable, modem jack cable and USB board cable as shown in the figure below.*

Modem jack cable

DC-IN jack cable

USB board cable

---
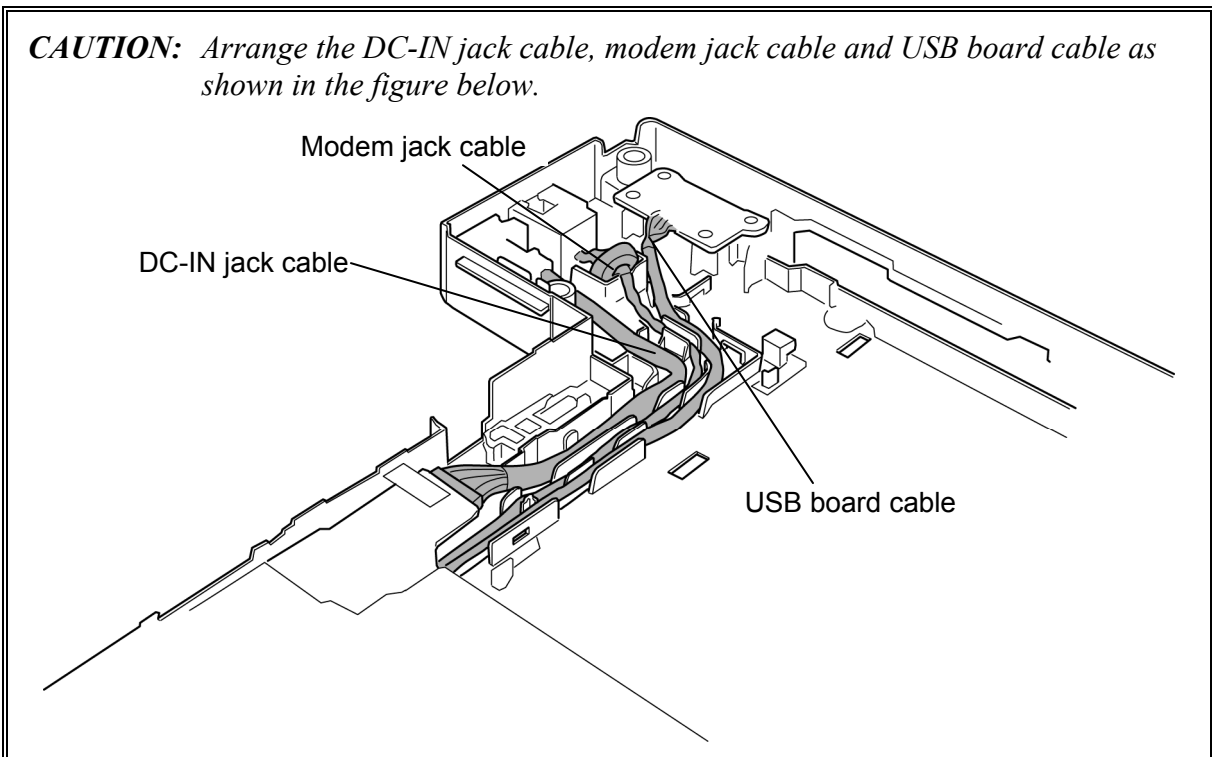
7. Install the **cable holder** to the slot while engaging the latches.

4.20 Battery lock/Battery latch

Removing the Battery lock/Battery latch

To remove the battery lock/battery latch, follow the steps below and refer to Figure 4-34.

1. Remove the **battery lock cap** while pushing **latches** inside to release them.

2. Remove the **battery lock** from the slot. Be careful not to lose the **spring**.

3. Remove the **battery latch cap** while pushing **latches** inside to release them.

4. Remove the **battery latch** from the slot. Be careful not to lose the **spring**.
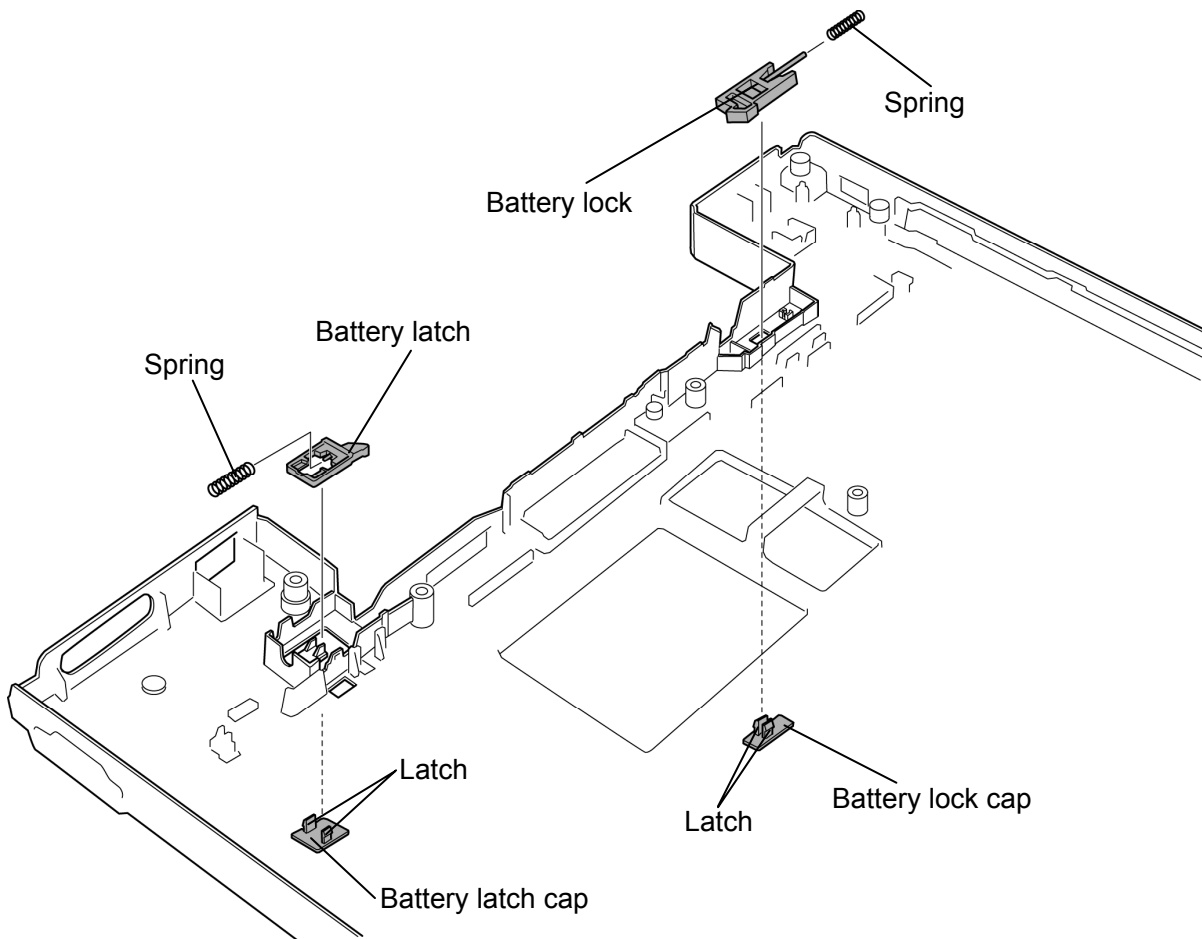
Figure 4-34 Removing the battery lock/battery latch

Installing the Battery lock/Battery latch

To install the battery lock/battery latch, follow the steps below and refer to Figure 4-34.

1. Insert the stick of battery lock into the **spring**.

2. Install the **battery lock** to the slot of the base assembly.

3. Install (push) the **battery lock cap** to the battery lock through the hole of the base assembly until the latches are engaged.

4. Insert the stick of the battery latch into the **spring**.

5. Install the **battery latch** to the slot of the base assembly.

6. Install (push) the **battery latch cap** to the battery latch through the hole of the base assembly until the latches are engaged.

4.21 HDD cable/LAN jack/RGB board cable

Removing the HDD cable/LAN jack/RGB board cable

To remove the HDD cable/LAN jack/RGB board cable, follow the steps below and refer to Figure 4-35.

1. Turn over the system board.

2. Peel off the **insulator** and disconnect the **HDD cable** from the connector **CN1900** on the system board.

3. Disconnect the **LAN jack** and **RGB board cable** from the connector **CN4100** and **CN9500** on the system board.
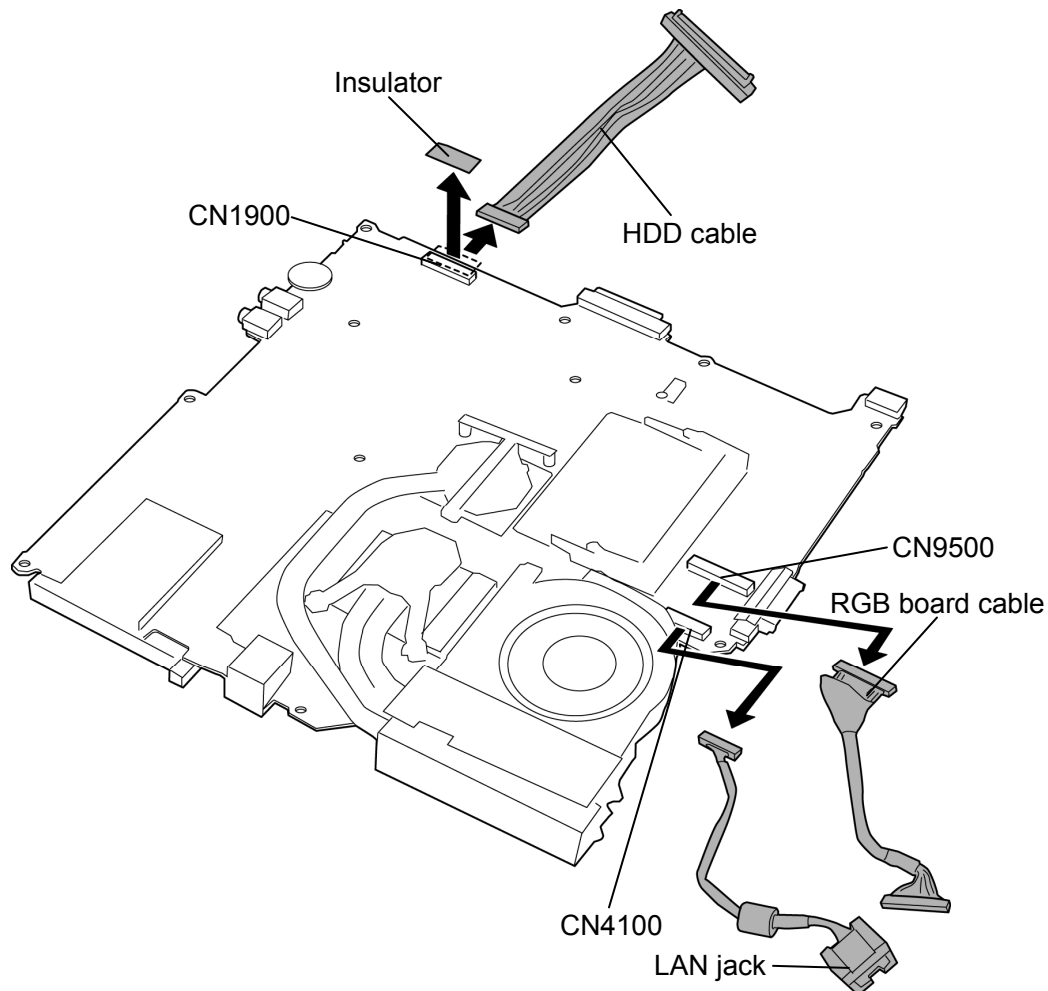
Figure 4-35   Removing the HDD cable/LAN jack/RGB board cable

Installing the HDD cable/LAN jack/RGB board cable

To install the HDD cable/LAN jack/RGB board cable, follow the steps below and refer to
Figure 4-35.

1. Connect the **LAN jack** and **RGB board cable** to the connector **CN4100** and **CN9500**
    on the system board.

2. Connect the **HDD cable** to the connector **CN1900** on the system board and stick the
    insulator in place.

4.22 North bridge (and GPU) heat sink/CPU heat sink/Fan/CPU

Removing the North bridge (and GPU) heat sink/CPU heat sink/Fan/CPU

To remove the North bridge (and GPU) heat sink/CPU heat sink/fan/CPU, follow the steps below and refer to Figure 4-36 to 4-40.

1. Remove the following **screws** and remove the **North bridge and GPU hold plate**. (In the case of the GPU model.)

   - M2×4B   BIND screw   ×4

2. Remove the **North bridge and GPU heat sink**.
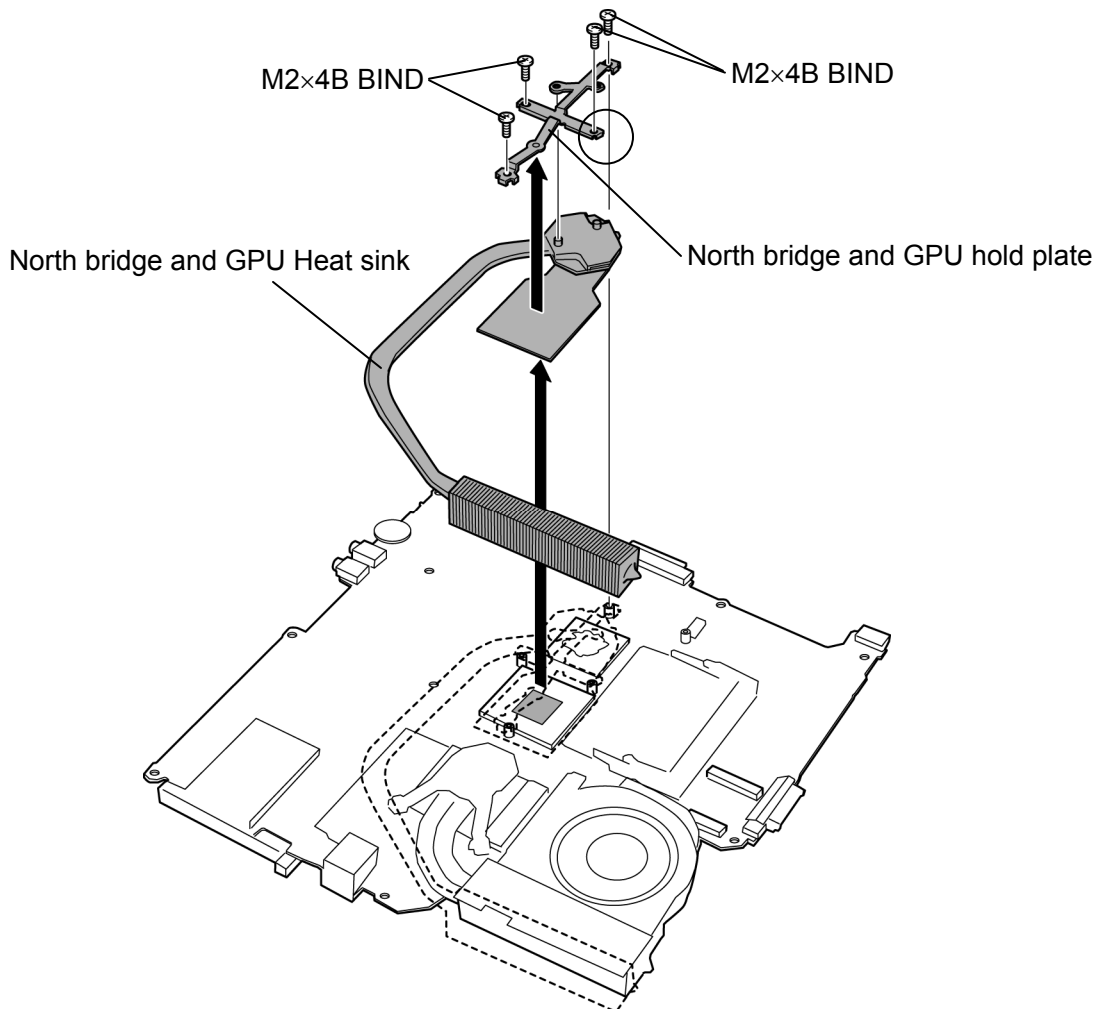
Figure 4-36   Removing the North bridge and GPU hold plate

3. Remove the following **screws** in the reverse order of the numbers marked on the North bridge holder and remove the **North bridge hold plate**. (In the case of the Built-in GPU model.)

   - M2×4B   BIND screw   ×3

4. Remove the **North bridge heat sink**.
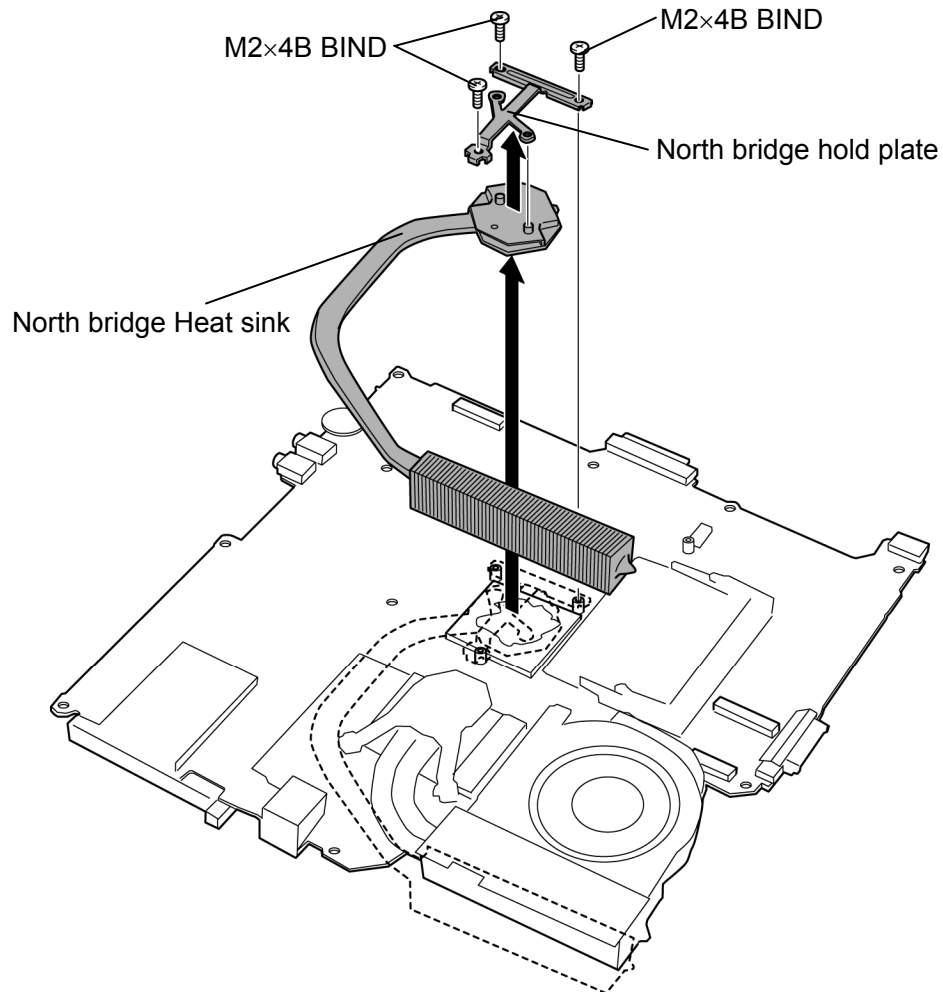
Figure 4-37   Removing the North bridge hold plate

5. Remove the following **screws** in the reverse order of the numbers marked on the CPU hold plate.

   - M2×4B   BIND screw   ×3

6. Remove the **CPU hold plate**.

7. Peel off the **acetate tape** and disconnect the **fan cable** from the connector **CN8771** on the system board.

8. Remove the **CPU heat sink** (with a fan).
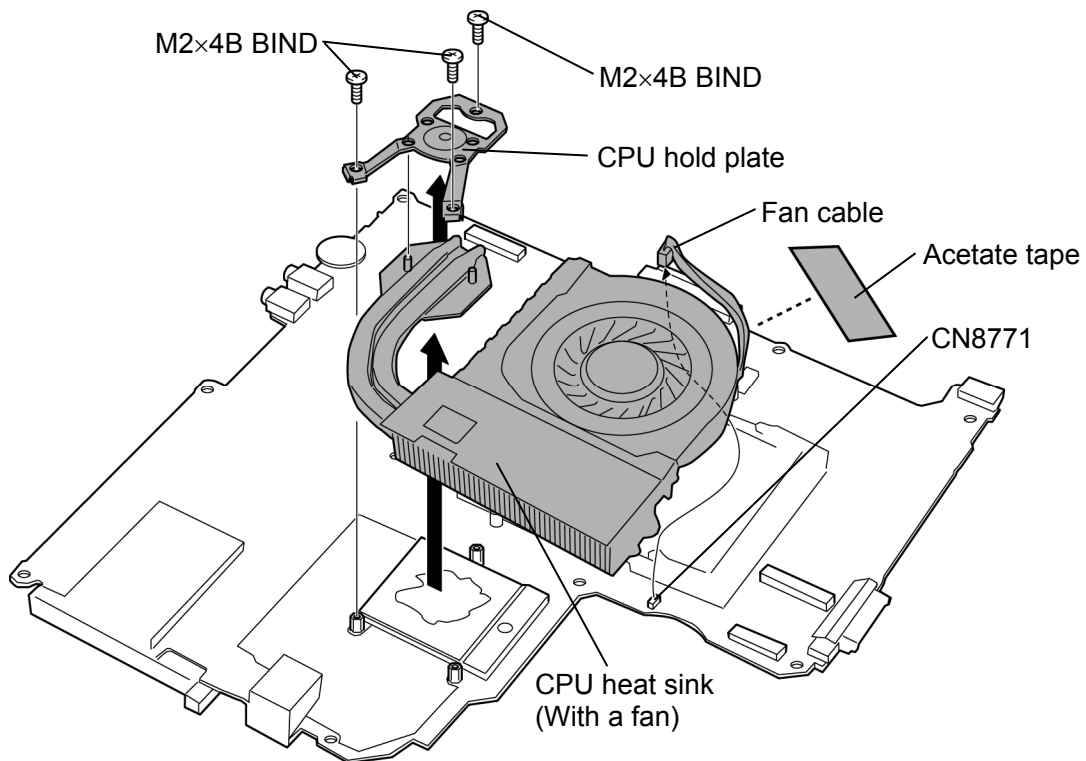
Figure 4-38   Removing the CPU heat sink (with a fan)

9. Remove the **fan hood**.

10. Remove the following **screws** and separate the **CPU heat sink** and **fan**.

- M2.5×4B   FLAT HEAD screw   ×2
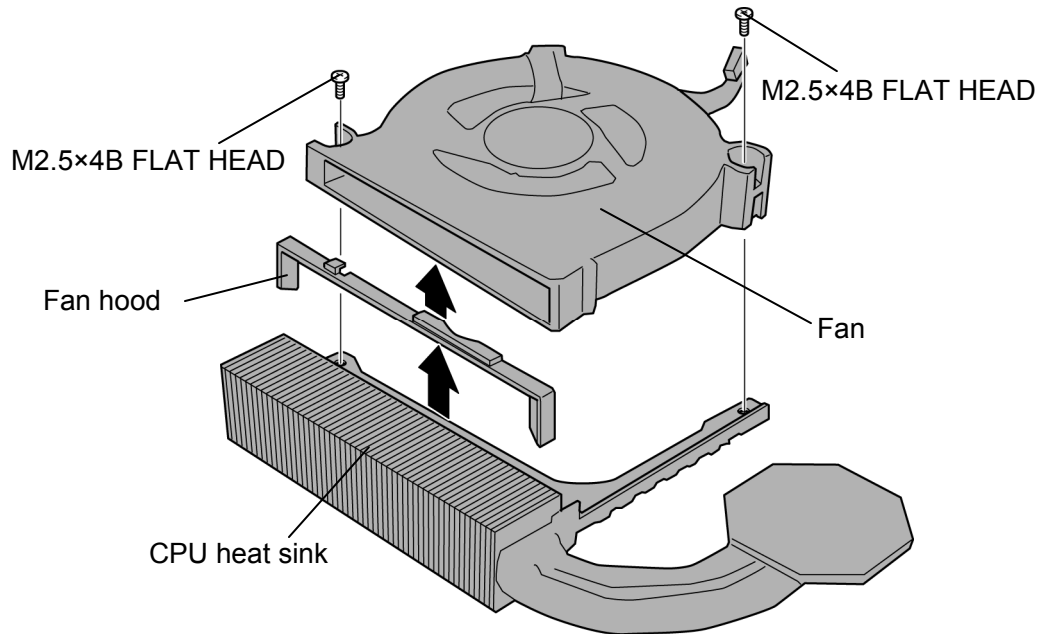
Figure 4-39   Removing the fan

11. Unlock the **CPU** by turning the **cam** counterclockwise on the CPU socket by 180
     degrees with a flat-blade screwdriver.
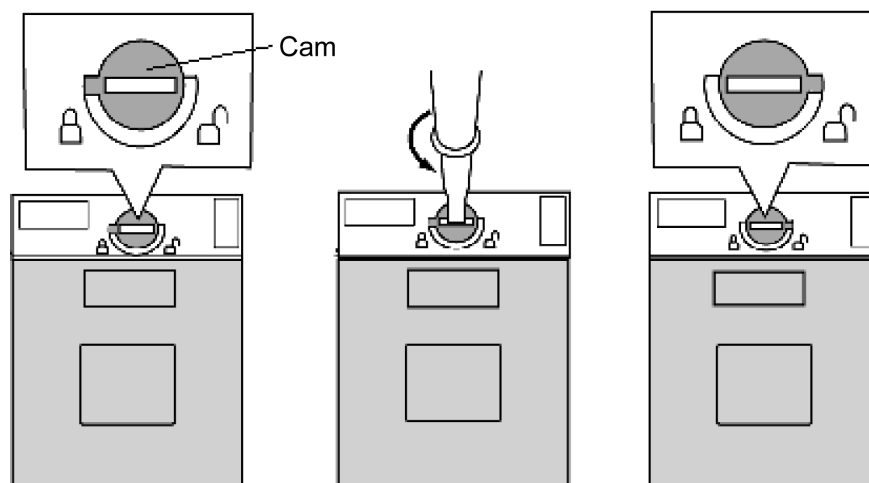
Figure 4-40   Removing the CPU

12. Remove the **CPU**.

> *CAUTION:* *When removing the CPU, lift it up right above. Otherwise, pins of the CPU*
> *may be damaged.*

Installing the North bridge (and GPU) heat sink/CPU heat sink/Fan/CPU

To install the North bridge (and GPU) heat sink/CPU heat sink/Fan/CPU, follow the steps below and refer to Figure 4-36 to 4-42.

1. Make sure that the **cam** of the CPU socket is in the unlock (OPEN) position.

2. Install the **CPU** on the **CPU socket** and check the CPU is installed on the correct position.

3. Lock the CPU by rotating clockwise the **cam** on the CPU socket by 180 degrees with a flat-blade driver.

CPU socket

Mark

CPU
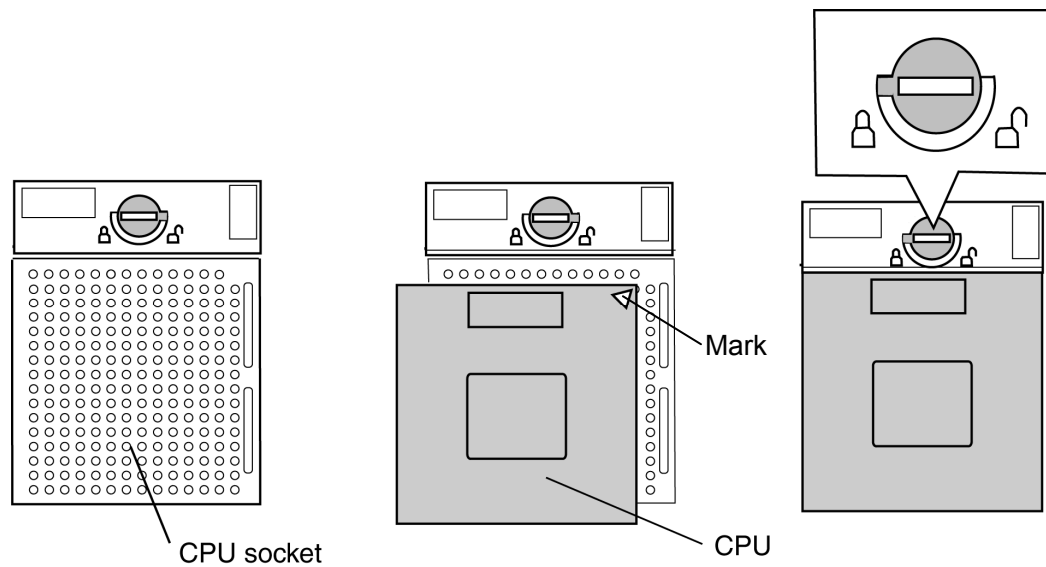
Figure 4-41   Installing the CPU

4. Apply new **grease** on the CPU and North bridge using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip and North bridge chip. When silicon grease is already applied to the CPU, wipe them off with a cloth in advance. (In the case of the Built-in GPU model.)

5. Apply new **grease** on the CPU and North bridge using a special syringe as shown in the following figure and stick the blue sheets on the GPU. 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 cloth in advance. (In the case of the GPU model.)
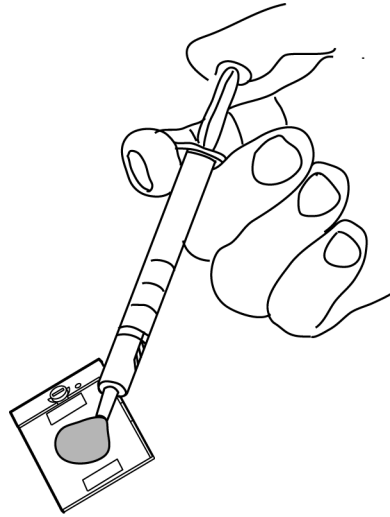
Figure 4-42   Applying new grease

6. Install the **fan** to the **CPU heat sink** and secure them with the following **screws**.

    - M2.5×4B   FLAT HEAD screw   ×2

7. Install the **fan hood** in place.

8. Install the **CPU heat sink** (with the fan) in place.

9. Connect the **fan cable** to the connector **CN8771** on the system board.

10. Stick the **acetate tape** in place.

11. Install the **CPU hold plate** on the CPU heat sink and secure them with the following **screws** in the order of the number marked on the CPU hold plate.

    - M2×4B   BIND screw   ×3

12. Install the **North bridge and GPU heat sink** in place. (In the case of the GPU model.)

13. Install the **North bridge and GPU hold plate** on the North bridge and GPU heat sink and secure them with the following **screws** (Secure the circled portion first in the figure 4-35.). (In the case of the GPU model.)

    - M2×4B   BIND screw   ×4

14. Install the **North bridge heat sink** in place. (In the case of the Built-in GPU model.)

15. Install the **North bridge hold plate** on the North bridge heat sink and secure them with the following **screws** in the order of the number marked on the North bridge hold plate. (In the case of the Built-in GPU model.)

    - M2×4B   BIND screw   ×3

4.23 PC card slot

Removing the PC card slot

To remove the PC card slot, follow the steps below and refer to Figure 4-43.

1. Remove the following **screws** securing the PC card slot.

   - M2×3C   S-THIN HEAD screw   ×2

   - M2×8C   S-THIN HEAD screw   ×2

2. Remove the **PC card slot** while pulling out the **latch** to release it.
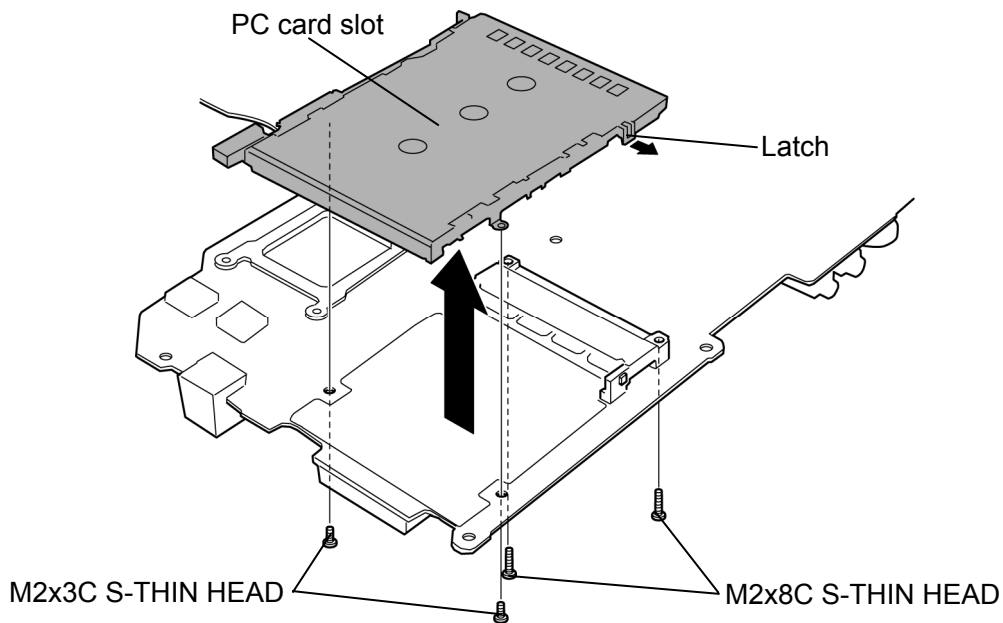
Figure 4-43 Removing the PC card slot

Installing the PC card slot

To install the PC card slot, follow the steps below and refer to Figure 4-43.

1. Install the **PC card slot** while engaging the latches and secure it with the following **screws**.

   - M2×3C   S-THIN HEAD screw   ×2

   - M2×8C   S-THIN HEAD screw   ×2

4.24 LCD unit/FL inverter

Removing the LCD unit/FL inverter

To remove the LCD unit/FL inverter, follow the steps below and refer to Figure 4-44 to 4-46.

1. Open the display and make it flat.

2. Remove the **mask seals** and following **screws** securing the LCD mask.

    - M2.5×6B   FLAT HEAD screw   ×2

3. Close the display.

4. Insert your fingers into the **slits** and remove the **display rear cover** while releasing latches.

CAUTION: *Release the **cover latch** when removing the display rear cover.*
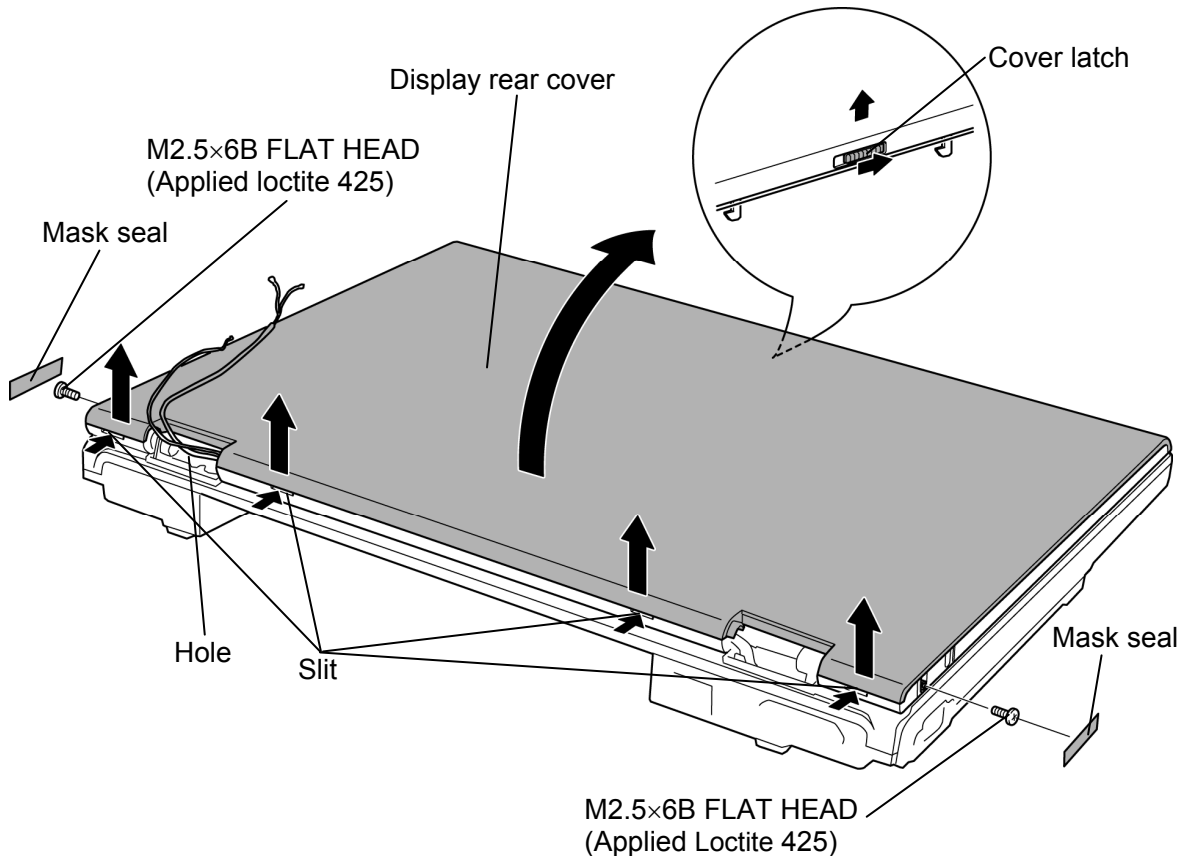
Figure 4-44 Removing the display rear cover

5. Peel off two **glass tapes** on the FL inverter.

6. Disconnect the **cables** from the both sides of FL inverter and remove the **FL inverter**.
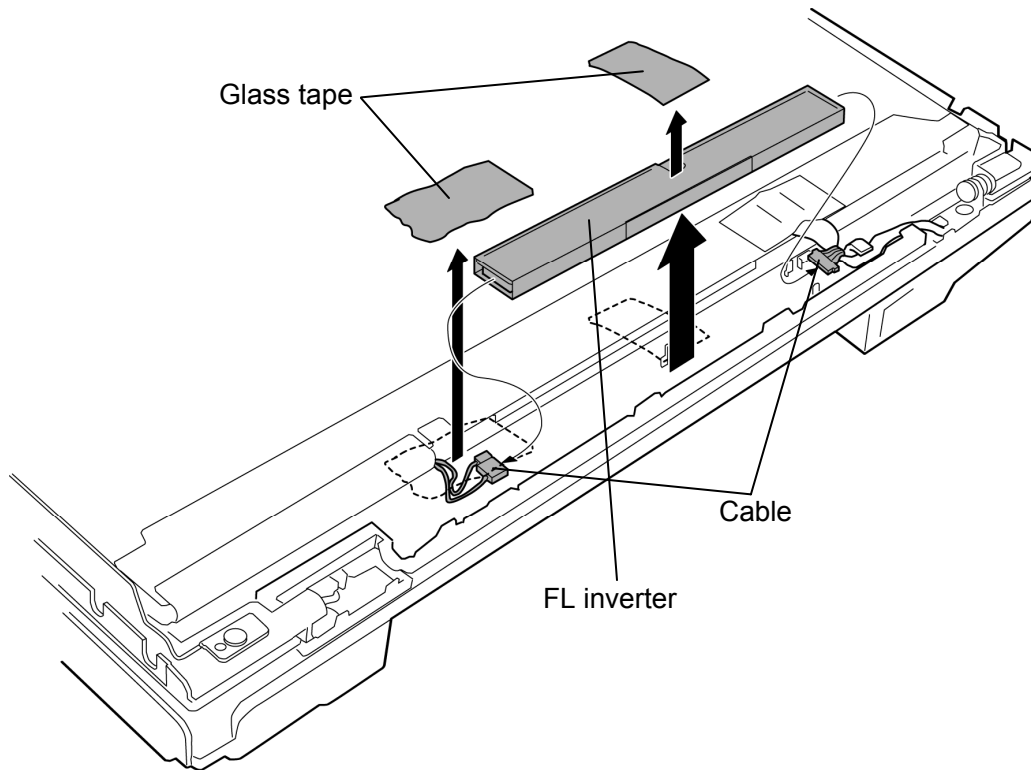
Figure 4-45   Removing the FL inverter

7. Remove two **glass tapes** securing the LCD cable and disconnect the **LCD cable** from the connector on the LCD unit.

CAUTION: When removing the LCD cable, be careful not to damage the connector.

---

8. Remove the following **screws** and **LCD unit**.

- M2×3C   BIND screw   ×4

CAUTION: 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.
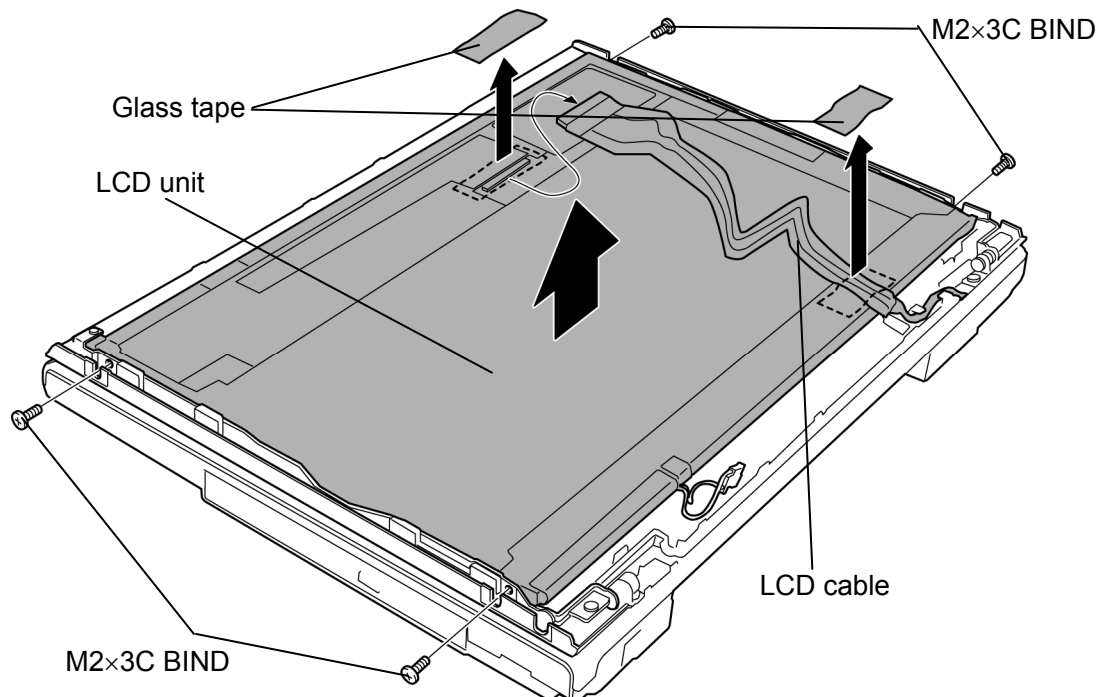
Figure 4-46   Removing the LCD unit

Installing the LCD unit/FL inverter

To install the LCD unit/FL inverter, follow the steps below and refer to Figure 4-43 to 4-45.

1. Install the **LCD unit** to the display cover and secure it with the following **screws**.

    *   M2×3C   BIND screw   ×4

2. Connect the **LCD cable** to the connector on the back of the LCD unit. Stick two **glass tapes** in place.

3. Connect two **cables** to the FL inverter and install the **FL inverter** in place.

4. Stick two **glass tapes** on the FL inverter in place.

5. Pass the **Bluetooth antenna cable** and **wireless LAN antenna cable** through the hole of the cover assembly.

6. Install the **display rear cover** while engaging the **latches**.

7. Apply **loctite 425** to the screws.

8. Secure the LCD unit with the following **screws** and stick two **mask seals** in place.

    *   M2.5×6B   FLAT HEAD screw   ×2

4.25 Cover latch

Removing the Cover latch

To remove the cover latch, follow the steps below and refer to Figure 4-47.

1. Remove the **latch knob** while pushing three hooks.

2. Remove the **latch hook**.

*CAUTION: Be careful not lose the **spring**.*
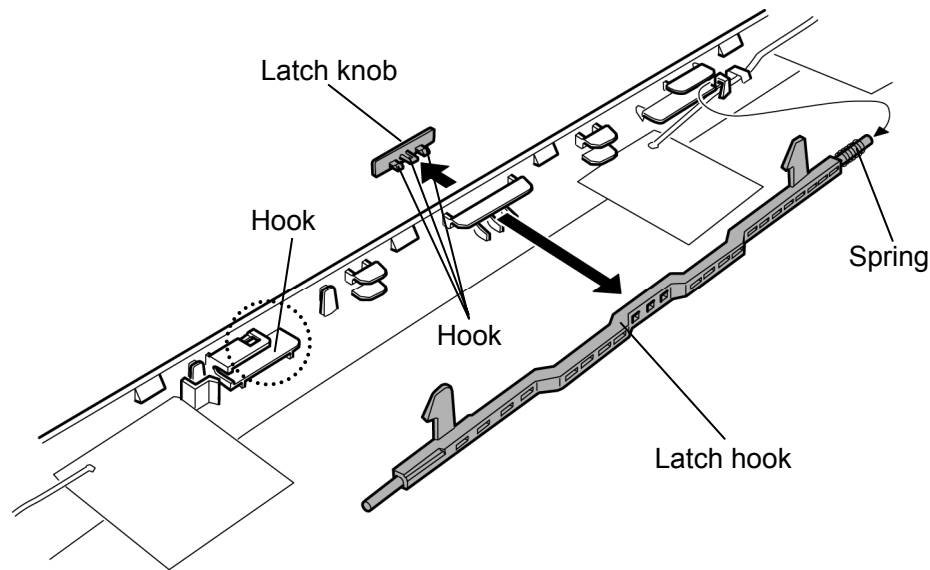
Figure 4-47   Removing the cover latch

Installing the Cover latch

To install the cover latch, follow the steps below and refer to Figure 4-47.

1. Insert the stick of the latch hook into the **spring**.

2. Install the **latch hook** in place.

3. Set the **latch knob** and push it until the hooks are engaged to the latch hook.

4.26 Wireless LAN antenna/Bluetooth antenna

Removing the Wireless LAN antenna/Bluetooth antenna

To remove the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-48.

1. Peel the **insulator** and peel off the **acetate tapes** securing the wireless LAN antenna cables and Bluetooth antenna cable.

2. Remove the **wireless LAN antennas** (two or three) and **Bluetooth antenna** from the display rear cover.
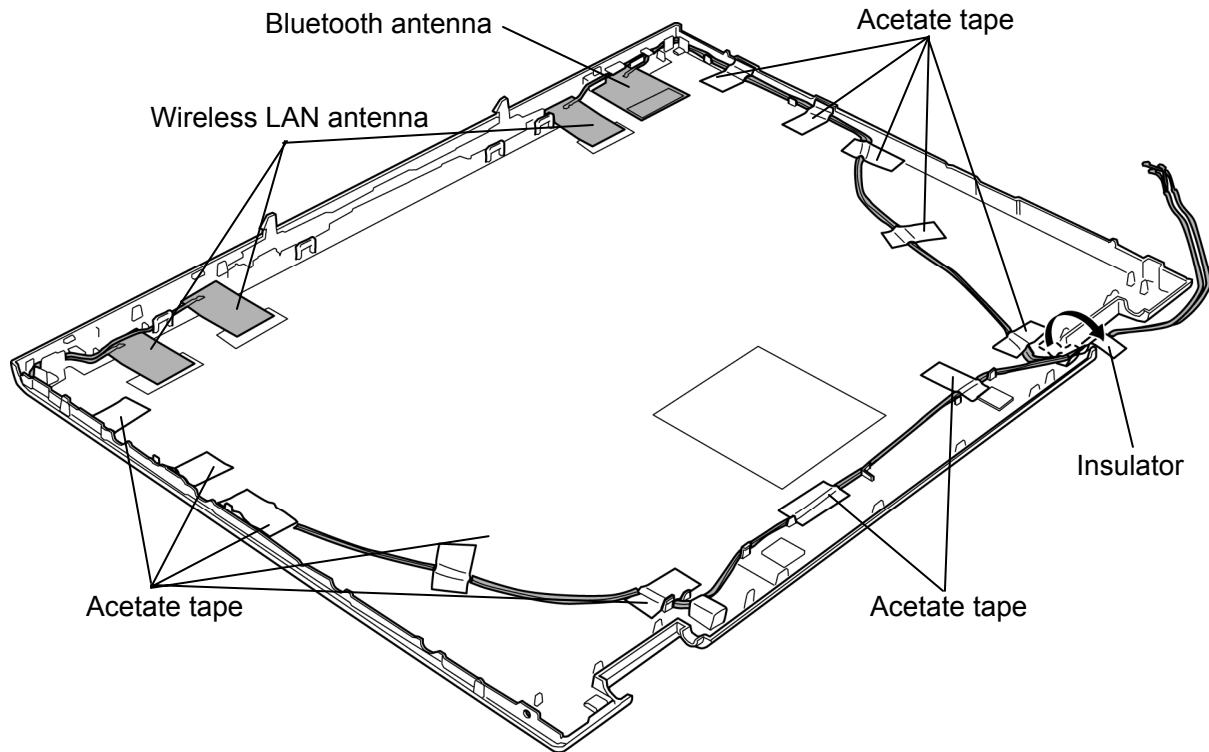
Figure 4-48   Removing the wireless LAN antenna/Bluetooth antenna

Installing the Wireless LAN antenna/Bluetooth antenna

To install the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-48.

1. Install the **wireless LAN antennas** (two or three) and **Bluetooth antenna** to the display cover.

2. Arrange the **wireless LAN antenna cables** and **Bluetooth antenna cable** on the display rear cover and secure it with the **insulator** and **acetate tapes**.

CAUTION: *Arrange the wireless LAN antenna cables and Bluetooth antenna cable with care of the followings:*

(Upper right)

Peel off the separator of the Wireless LAN antenna (black cable) and stick the **wireless LAN antenna (black cable)** *to the display rear cover.*

Wireless LAN antenna (black cable)
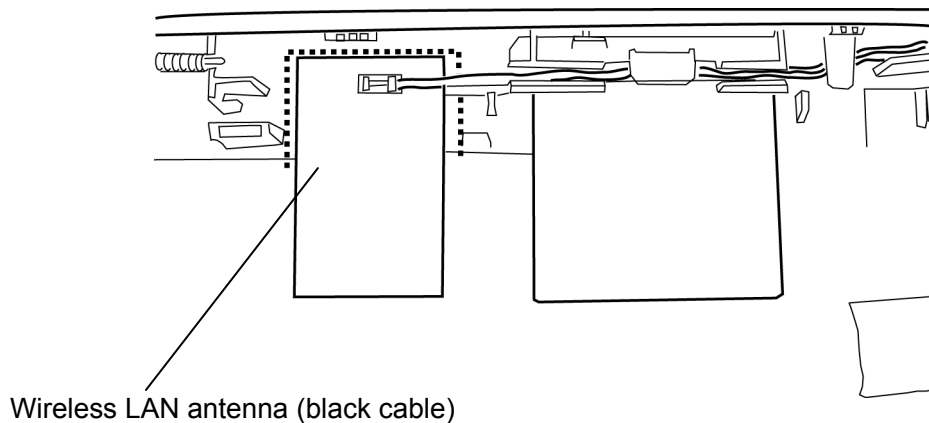
CAUTION: **(Center right)**

> *Arrange the* **wireless LAN antenna cable (black)** *and* **Bluetooth antenna cable (brown)***, and stick three* **acetate tapes** *in place.*

Wireless LAN antenna cable (black)

Bluetooth antenna cable (brown)

②

③

①
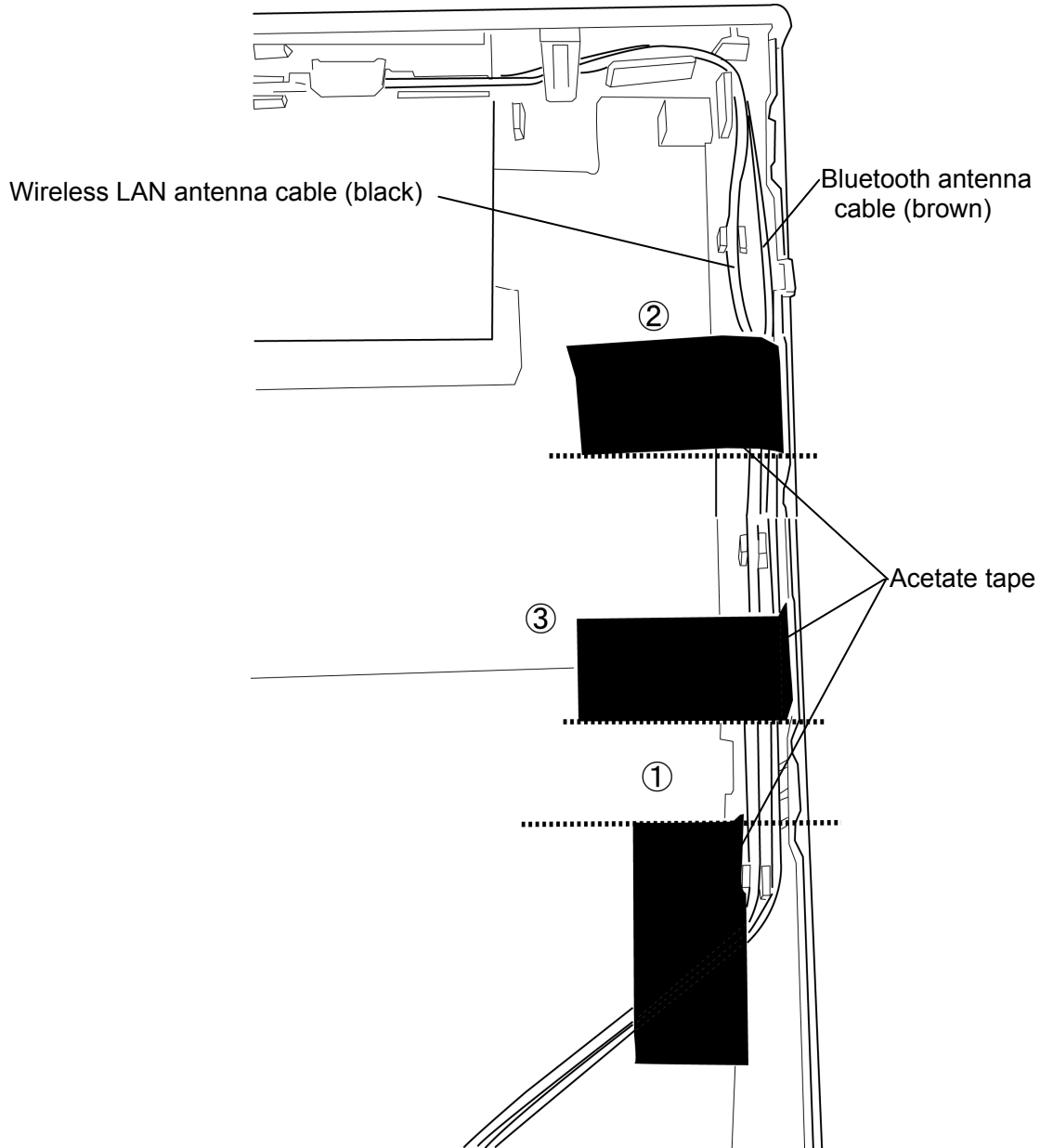
Acetate tape

1. Arrange the Bluetooth antenna cable (brown).

2. Arrange the wireless LAN antenna cable (black).

3. Secure the Bluetooth antenna cable (brown) and Wireless LAN antenna cable (black) with the three acetate tapes.

* When arranging the cables, be careful not to put the cables on top of each other.

CAUTION: *(Lower right)*

> *Arrange the **wireless LAN antenna cable (black)** and **Bluetooth antenna cable (brown)**, and stick two **acetate tapes** in place.*

Wireless LAN antenna cable (black)

Acetate tape

Bluetooth antenna cable (brown)

Stand

Acetate tape

Ruled line

⑤

④
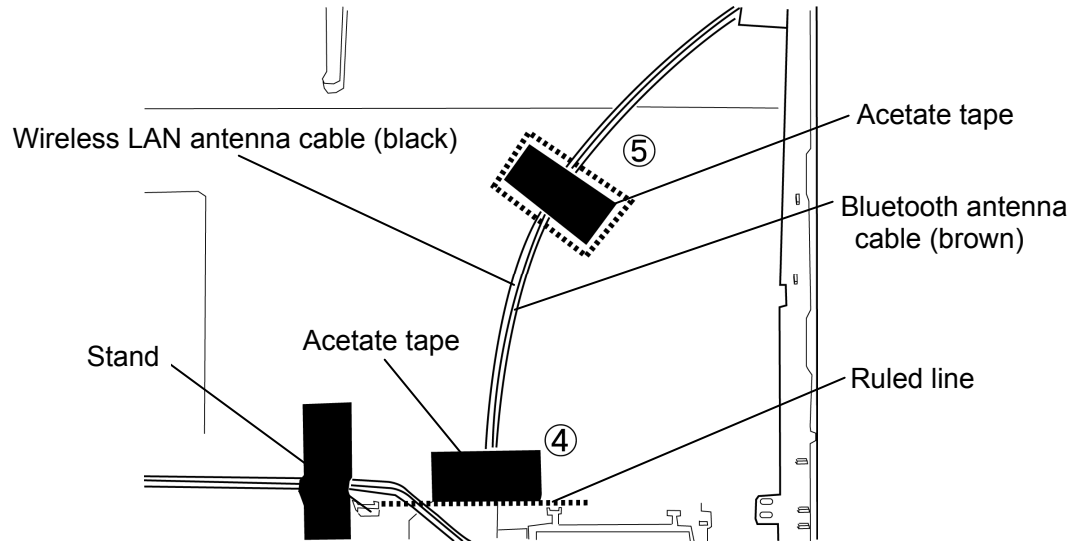
1. Stick the acetate tape (4), aligning it with the stand.

2. Stick the acetate tape (5) in place.

* When arranging the cables, be careful not to put the cables on top of each other.

CAUTION: (Right side)

Bluetooth antenna
(brown cable)

Acetate tape

Wireless LAN antenna (black cable)

Wireless LAN antenna cable (black)

Bluetooth antenna
cable (brown)
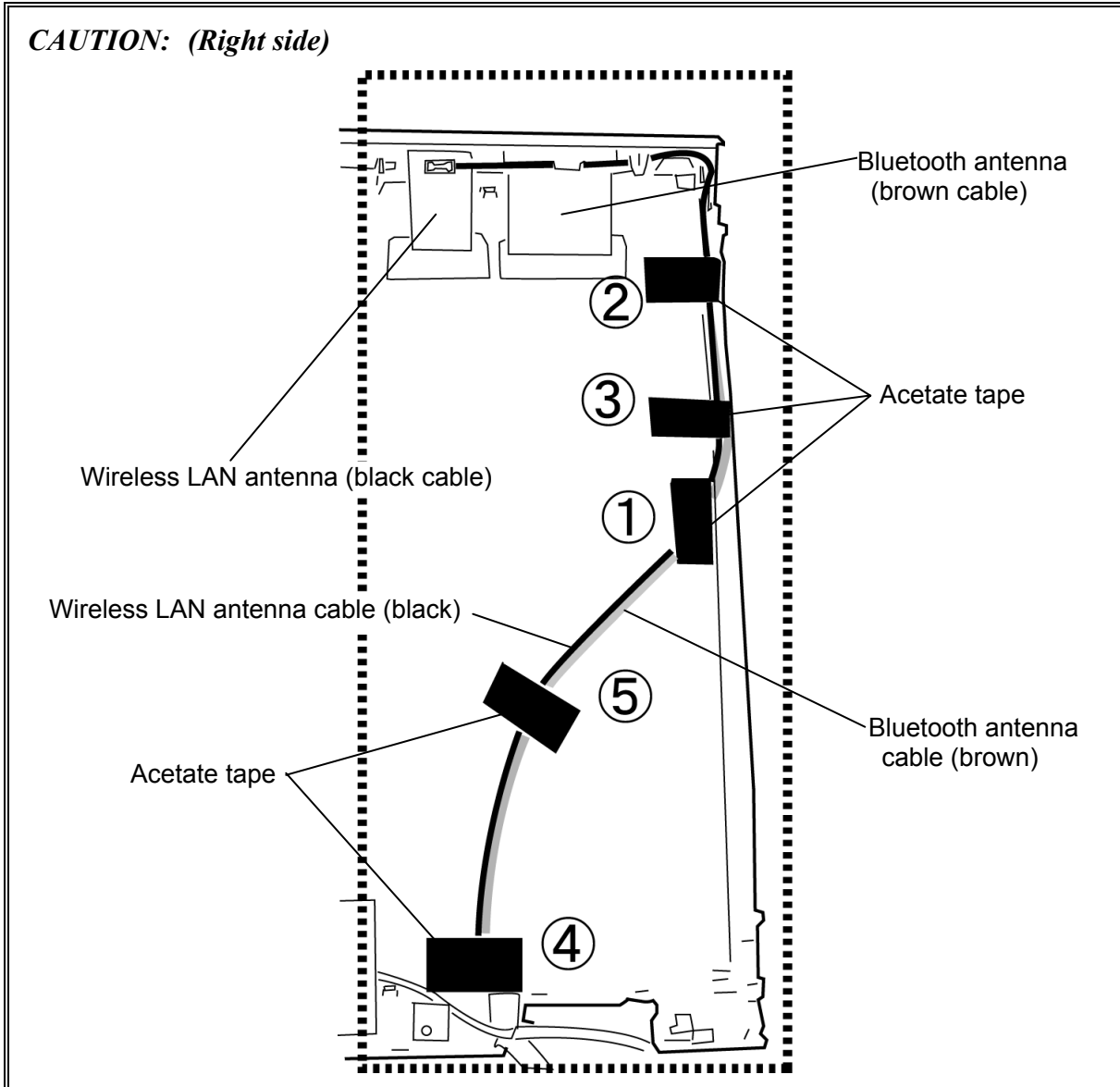
Acetate tape

CAUTION: *(Lower center)*

    Secure the **wireless LAN antenna cables** *and* **Bluetooth antenna cable** *with the* **insulator**.

Wireless LAN antenna cable (black)

Wireless LAN antenna cable (gray)

Bluetooth antenna cable (brown)

Insulator

Wireless LAN antenna cable (white)

Wireless LAN antenna cable (black)

Wireless LAN antenna cable (gray)

Bluetooth antenna cable (brown)

Insulator

Wireless LAN antenna cable (white)
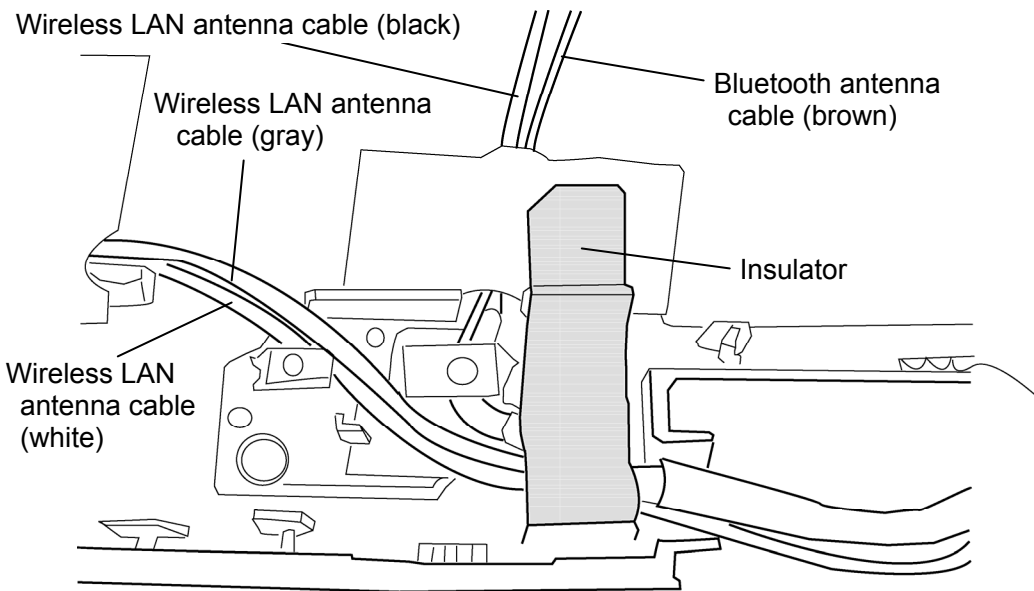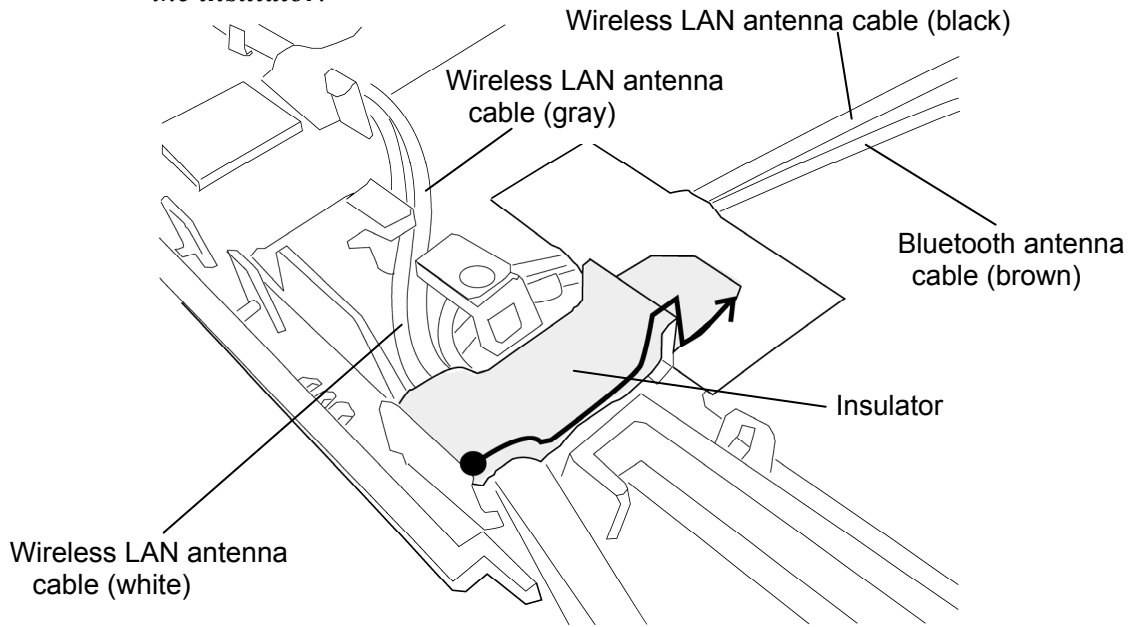
CAUTION: (Lower center)

> *Arrange the **wireless LAN antenna cables (white and gray)** and stick two **acetate tapes** in place.*
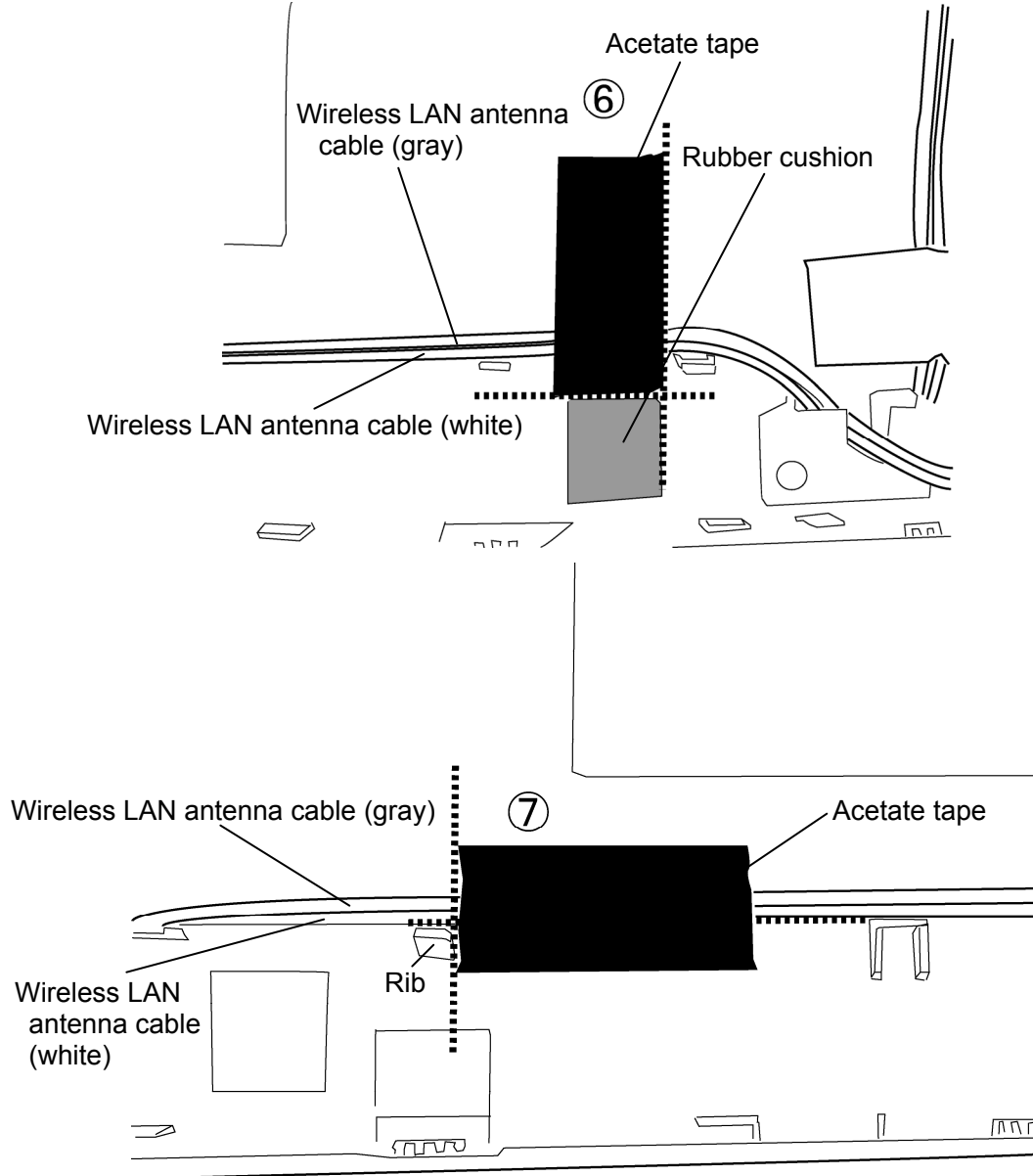
1. Arrange the wireless LAN antenna cables (white and gray) while aligning them to the rubber cushion and secure them with the acetate tape (6).

2. Arrange the wireless LAN antenna cables (white and gray) while aligning them to the rib and secure them with the acetate tape (7).

* When arranging the cables, be careful not to put the cables on top of each other.

CAUTION: *(Upper left)*

*Peel off the separators of the Wireless LAN antennas (white cable and gray cable) and stick the **wireless LAN antenna (white cable and gray cable)** to the display rear cover.*

Wireless LAN antenna (gray cable)   Wireless LAN antenna (white cable)
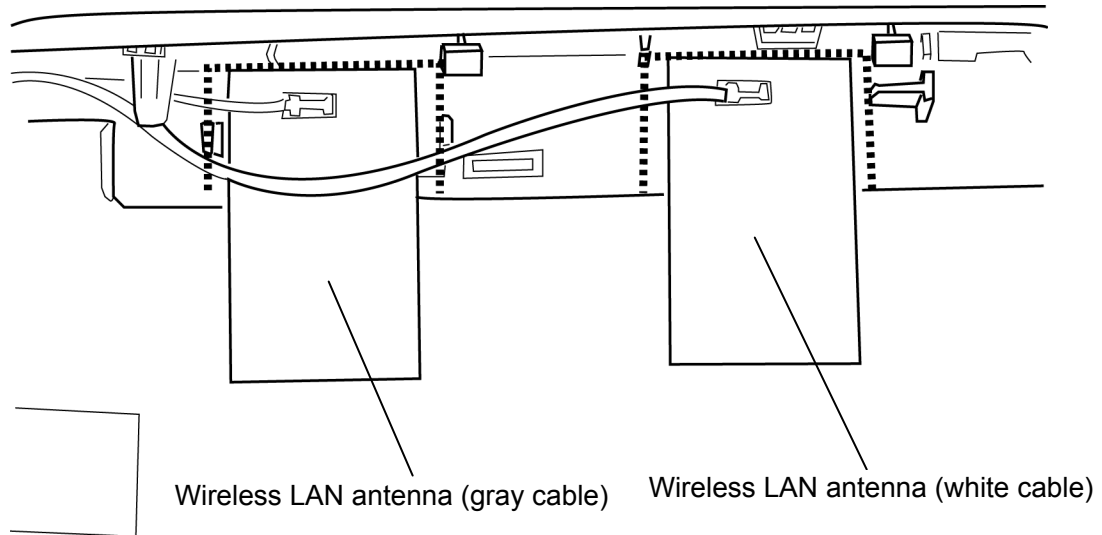
CAUTION: (Left side)

*Arrange the **wireless LAN antenna cables (white and gray)** and stick three **acetate tapes** in place.*

Wireless LAN antenna cable (white)

Wireless LAN antenna cable (gray)

⑨

Acetate tape

⑩

⑧

Acetate tape

Wireless LAN antenna cable (white)

Wireless LAN antenna cable (gray)
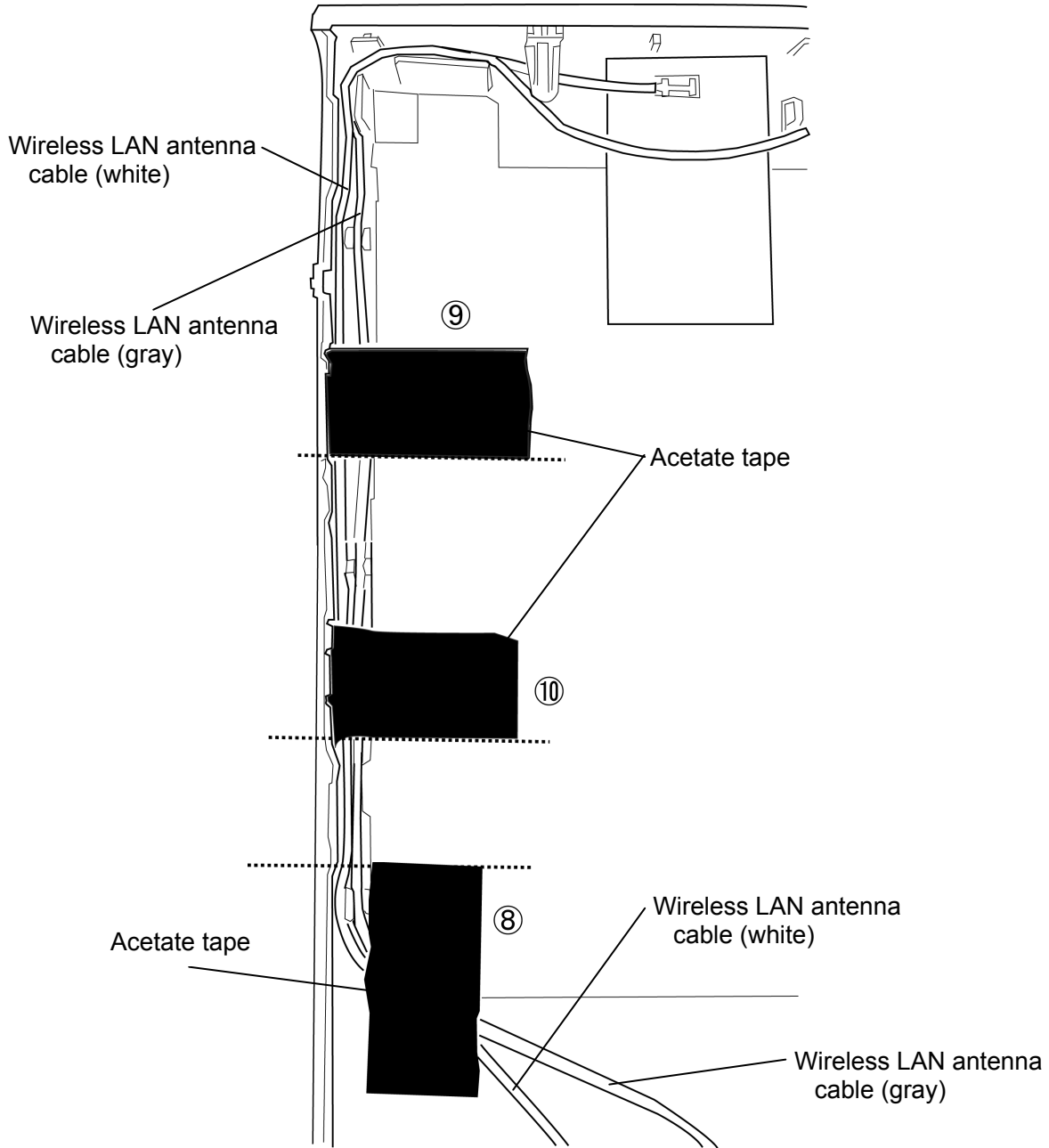
1. Arrange the wireless LAN antenna cable (gray).

2. Arrange the wireless LAN antenna cable (white).

3. Secure the Wireless LAN antenna cables by the three acetate tapes.

* When arranging the cables, be careful not to put the cables on top of each other.

CAUTION: (Lower left)

*Arrange the **wireless LAN antenna cable (black)** and **Bluetooth antenna cable (brown)**, and stick two **acetate tapes** in place.*

Arrange the cables outside.

⑫

Acetate tape

Wireless LAN antenna cable (white)

Wireless LAN antenna cable (gray)

Acetate tape

⑪

Ruled line
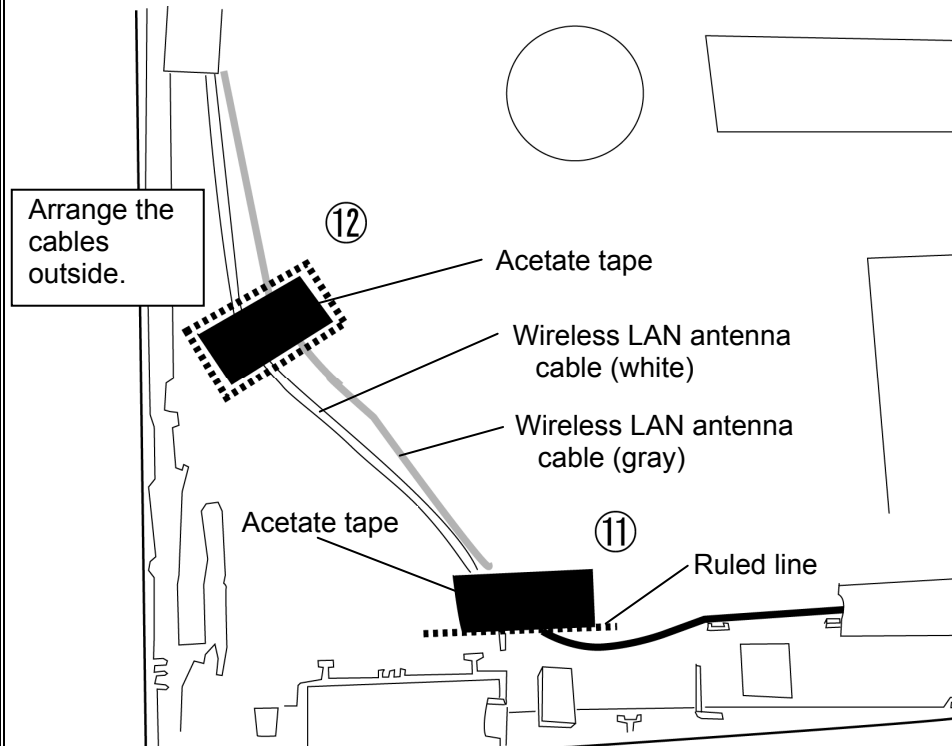
1. Stick the acetate tape (11) in place.

2. Stick the acetate tape (12) in place.

* When arranging the cables, be careful not to put the cables on top of each other.

CAUTION: (left side)

Acetate tape

⑨

⑩

⑧

Wireless LAN antenna
cable (white)

Wireless LAN antenna
cable (gray)

Acetate tape

Acetate tape

⑫

⑪

⑦

⑥
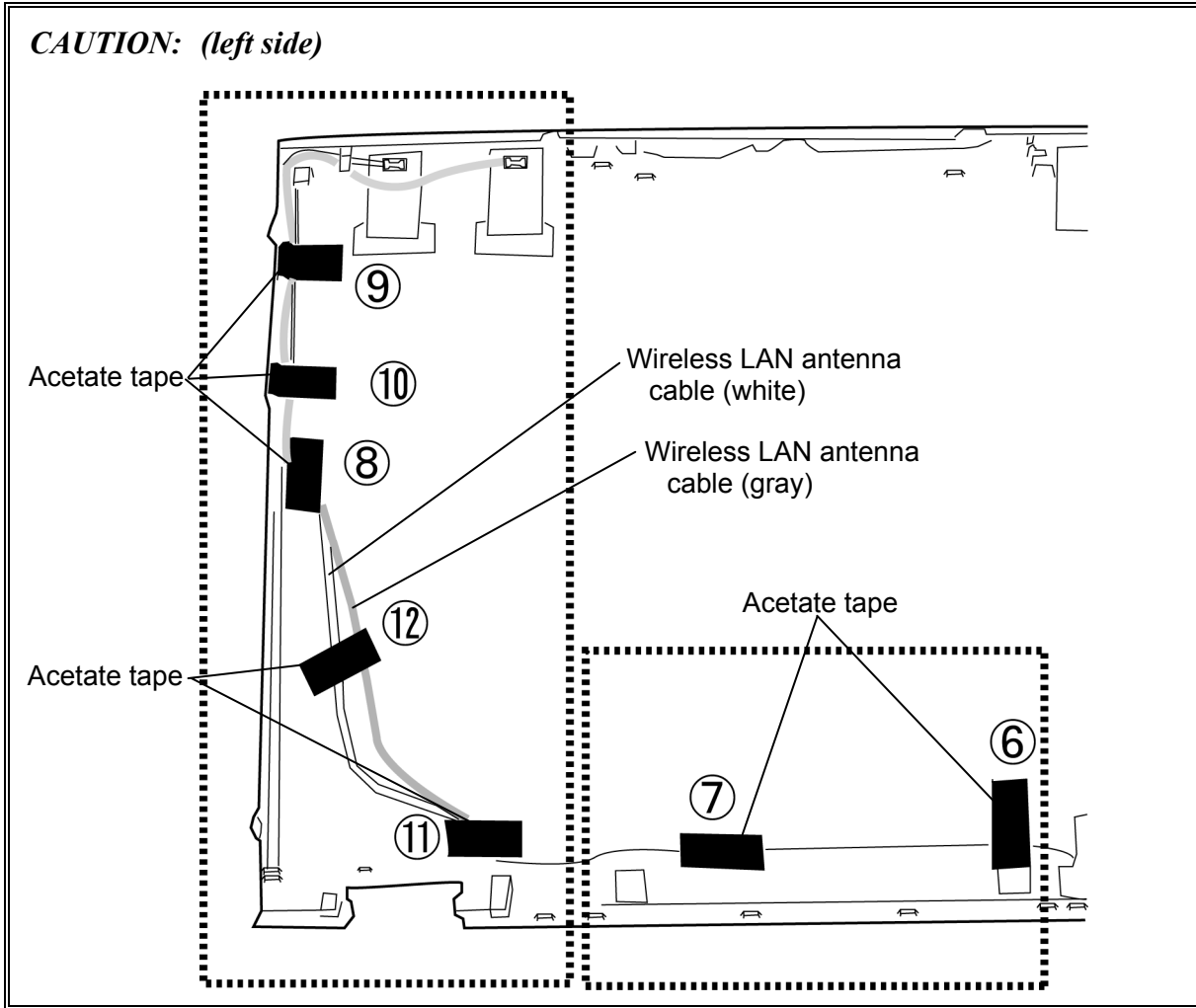
4.27 LCD cable

Removing the LCD cable

To remove the LCD cable, follow the steps below and refer to Figure 4-49.

1. Pass the **LCD cable** and the **connector** through the **hole** of the cover assembly and remove the **LCD cable** from the cover assembly.
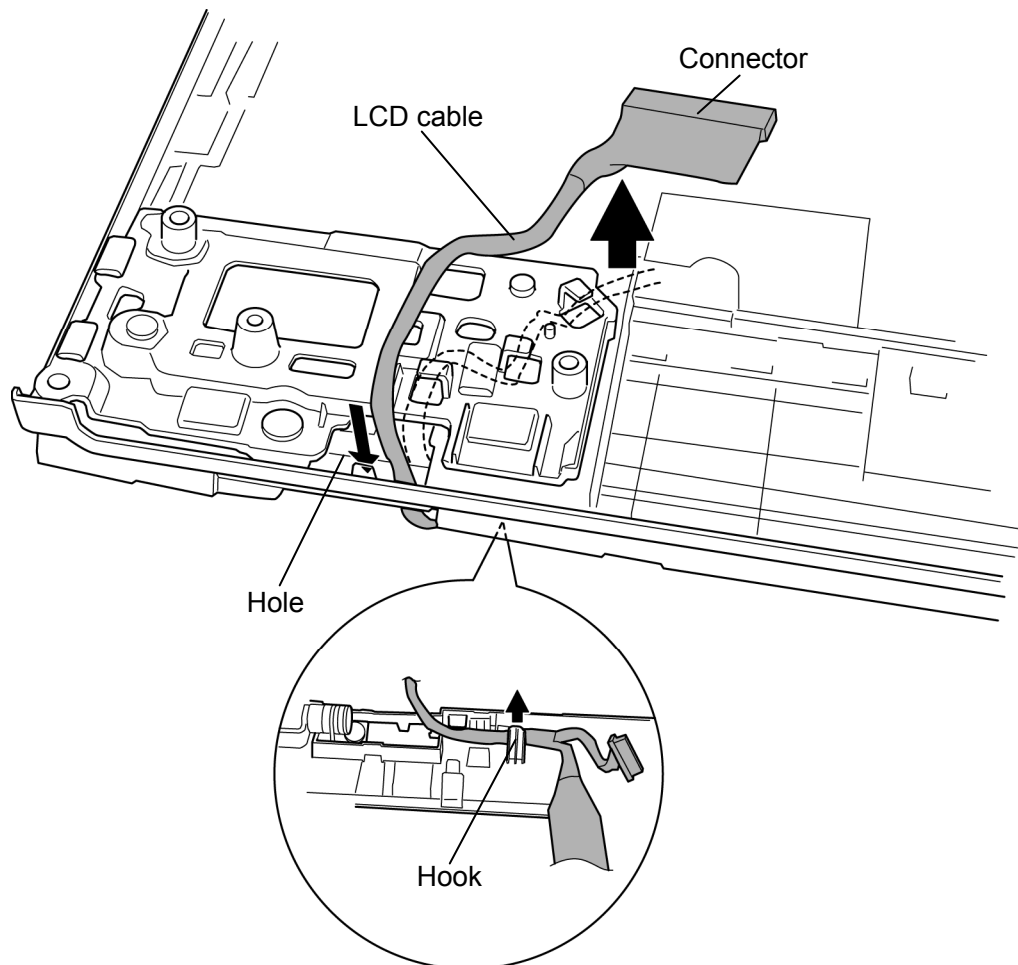
Figure 4-49   Removing the LCD cable

Installing the LCD cable

To install the LCD cable, follow the steps below and refer to Figure 4-49.

1. Arrange the **LCD cable** to the **hook** of the cover assembly on the front.

2. Pass the **LCD cable** and the **connector** through the hole of the cover assembly and arrange the LCD cable along the guides of the cover assembly on the back.

4.28 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to Figure 4-50 and 4-51.

1. Remove the following **screws**.

    - M2.5×4B   FLAT HEAD screw   ×2

    - M2.5×6C   Tapping screw   ×4

2. Stand the **LCD mask** and remove it.

CAUTION: When standing the LCD mask, be careful not to hold the top portion.
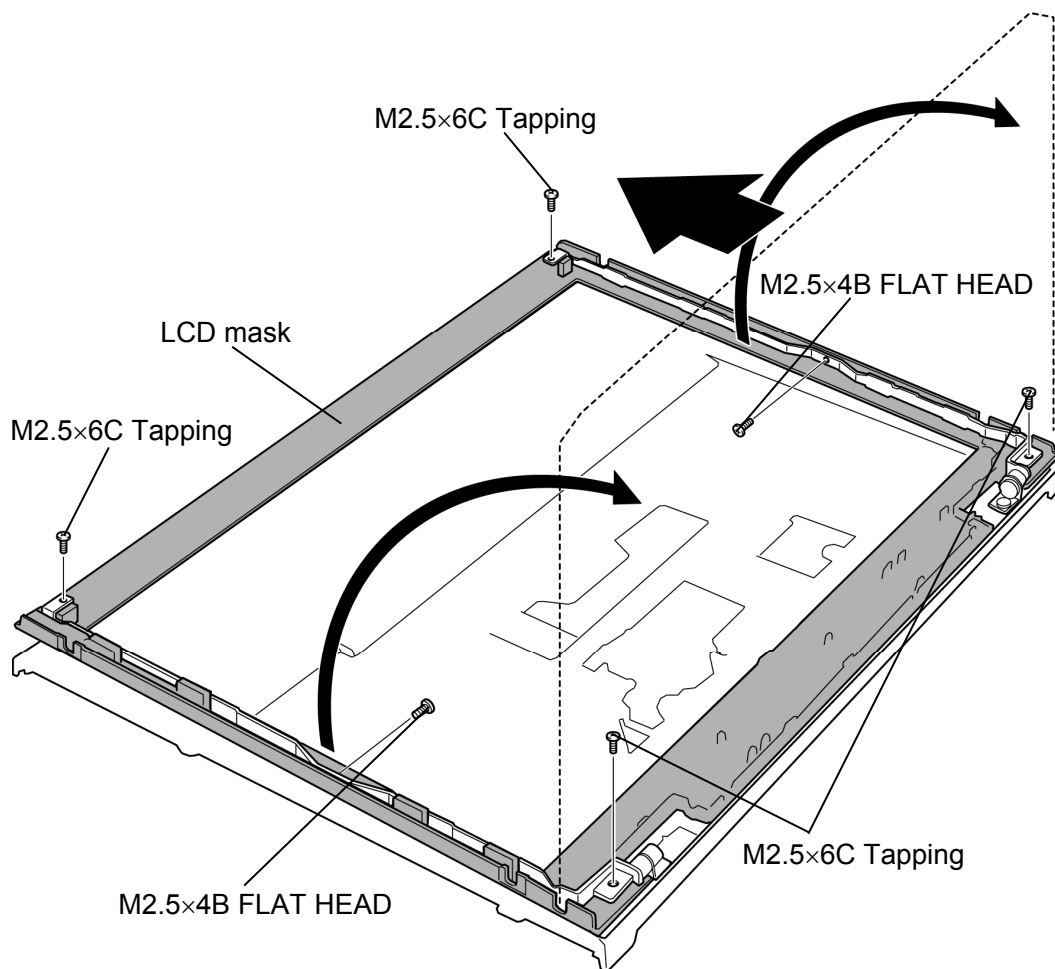
Figure 4-50 Removing the LCD mask

3. Remove the following **screws** securing the right hinge.

    - M2.5×4B   FLAT HEAD screw   ×1

    - M2.5×6C   Tapping screw   ×1

4. Release two **hooks** and slide the **right hinge** inside to remove it through the hole.

5. Remove the following **screw** securing the left hinge.

    - M2.5×6C   Tapping screw   ×1

6. Release the **hook** and slide the **left hinge** inside to remove it through the hole.
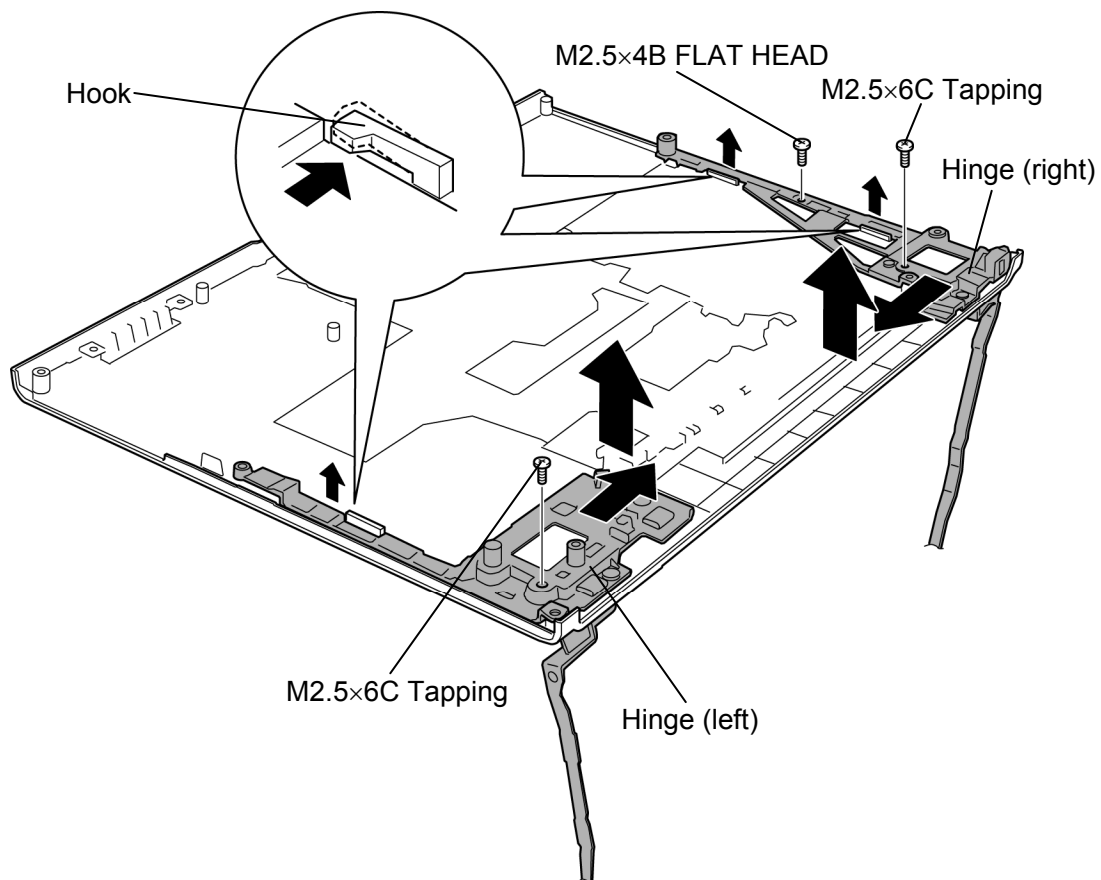
Figure 4-51 Removing the hinge

Installing the Hinge

To install the hinge, follow the steps below and refer to Figure 4-50 and 4-51.

1. Install the **left hinge** while engaging the **hook** and secure it with the following **screw**.

    *   M2.5×6C   Tapping screw   ×1

2. Install the **right hinge** while engaging two **hooks** and secure it with the following **screws**.

    *   M2.5×6C   Tapping screw   ×1

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

3. Install the **LCD mask** and lay it down.

CAUTION: When laying the LCD mask down, be careful not to hold the top portion.

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

    *   M2.5×4B   FLAT HEAD screw   ×2

    *   M2.5×6C   Tapping screw   ×4

4.29 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-52 to 4-54.

1. Peel off the **insulator** and pass the **speaker cable** through the hole of the cover assembly.

2. Remove the **speakers** from the slots and pass them through the **holes** of the cover assembly.
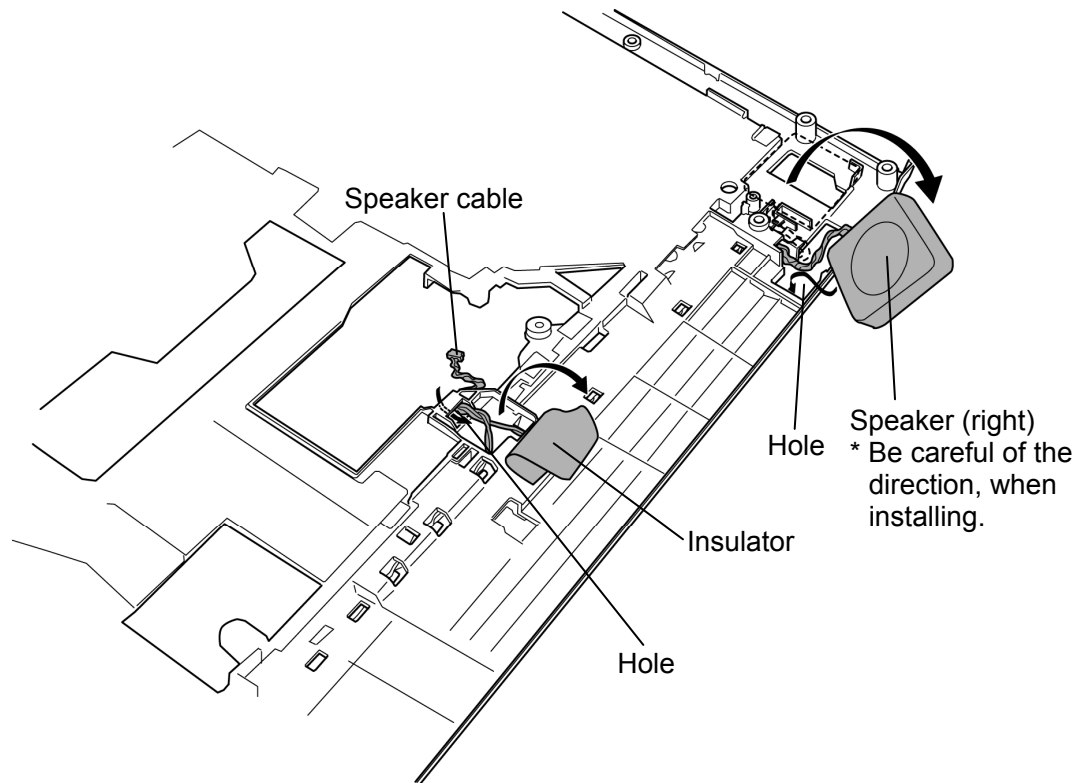
Figure 4-52 Removing the speaker (1)
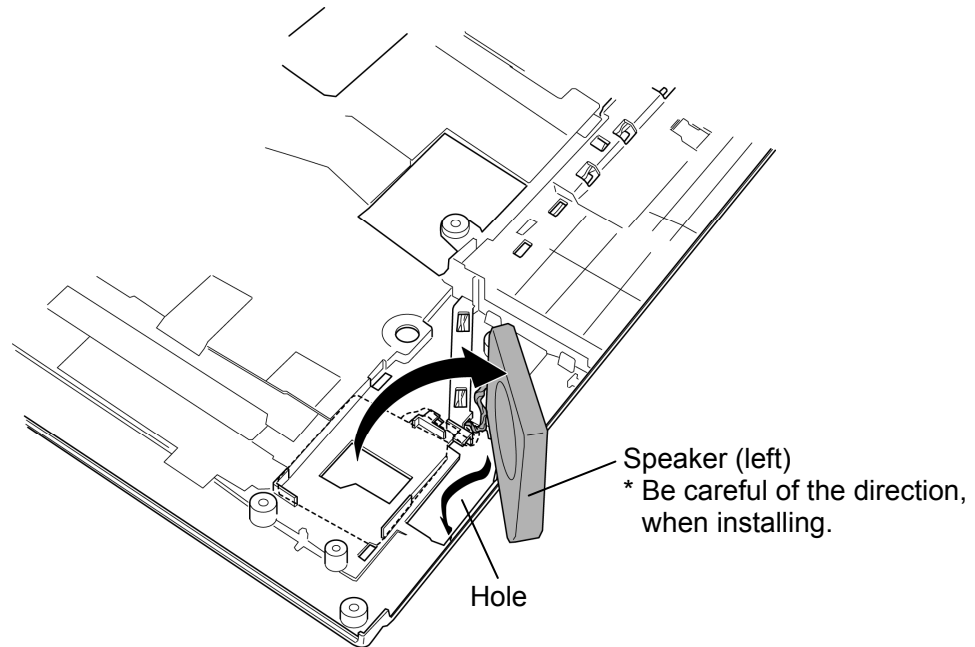
Figure 4-53 Removing the speaker (2)

3. Separate the **speakers** (left and right) and **speaker covers** (left and right).
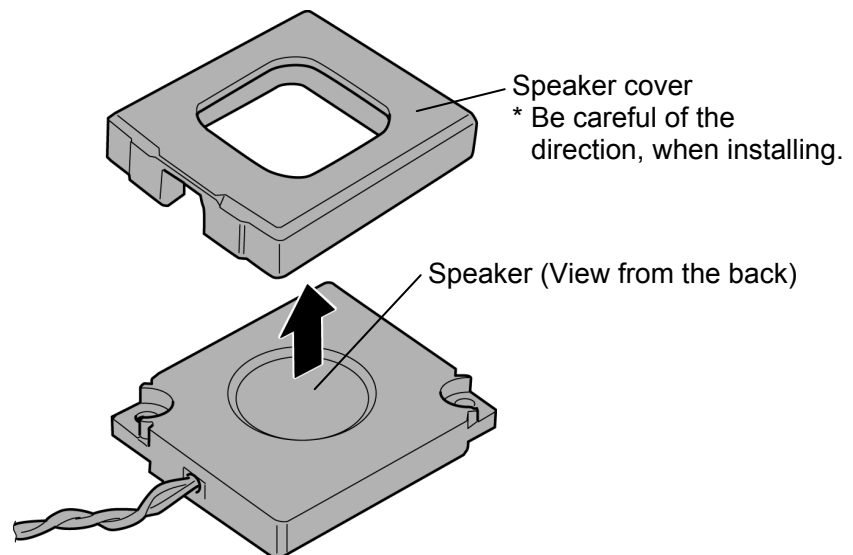
Figure 4-54 Removing the speaker (3)

Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-52 to 4-55.

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

2. Arrange the **speaker cable** into the slot of the front of the cover assembly.

3. Pass the **speakers** through the holes of the cover assembly.
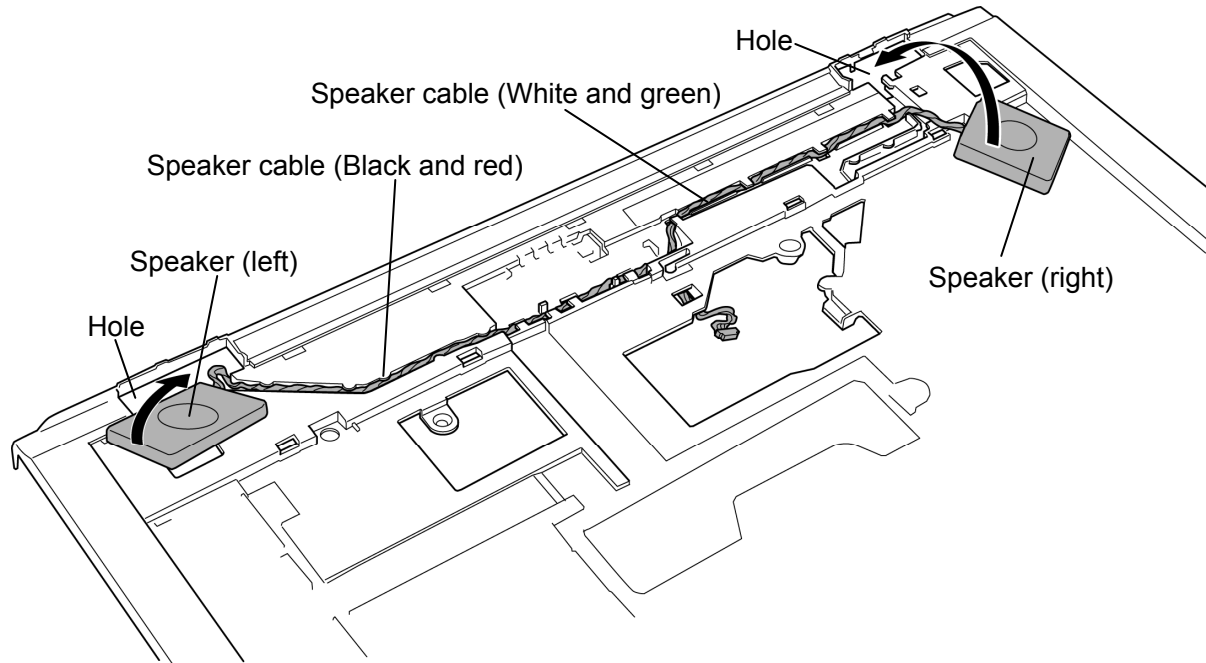
Figure 4-55 Installing the speaker

4. Install the **speakers** (left and right) to the slots (left and right).

5. Pass the **speaker cable** through the hole of the cover assembly and stick the **insulator** in place.

4.30 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
15.4-inch (WXGA)	G33C0003F110	SAMSUNG	4.30.1
15.4-inch (WSXGA+)	G33C0003Z110		4.30.2

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.*

4.30.1 Replacing the 15.4-inch WXGA Samsung Fluorescent Lamp

To replace the 15.4-inch WXGA Samsung fluorescent lamp, follow the steps below and refer to figures 4-56 to 4-59.

Removing the fluorescent lamp

1. Remove the PCB cover.

CAUTION: Handle with care not to damage COF of S/D ICs.

PCB cover
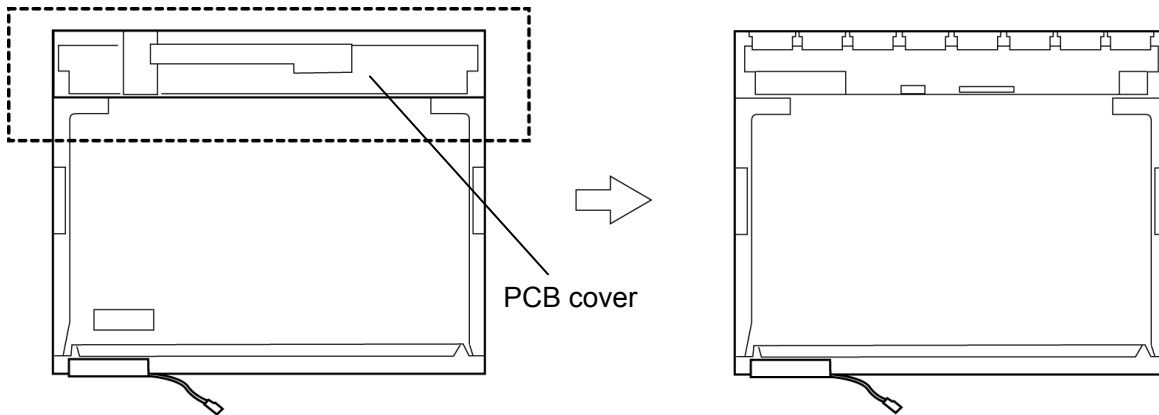
Figure 4-56 Replacing Samsung fluorescent lamp (WXGA) (1)

2. Remove the yellow tapes, lamp-wire tape and Al tape.

Yellow tape (left)

Yellow tape (right)

Lamp-wire tape

Bottom Al tape
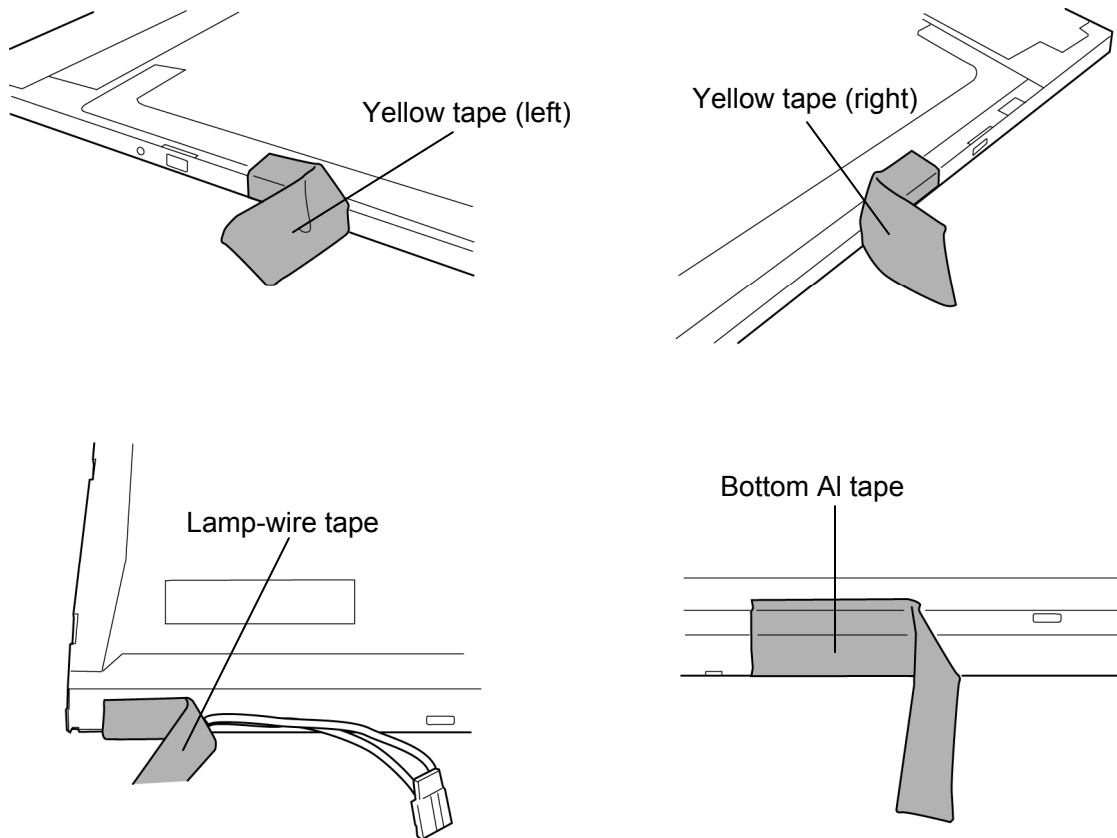
Figure 4-57 Replacing Samsung fluorescent lamp (WXGA) (2)

3. Remove the top chassis from the molded frame.

CAUTION: Remove in the order of bottom hook and side hook.
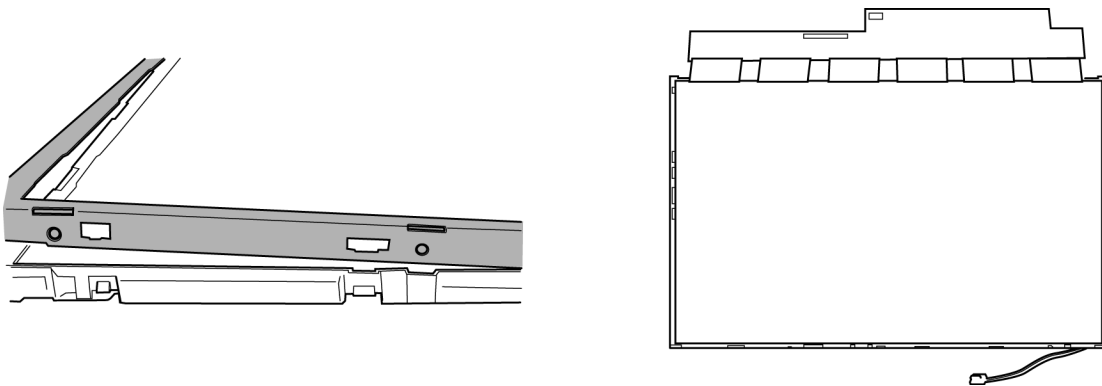
Figure 4-58 Replacing Samsung fluorescent lamp (WXGA) (3)

4. Separate the panel assembly and backlight unit.

CAUTION*: Handle with care not to damage COF of S/D ICs.*

Panel assembly
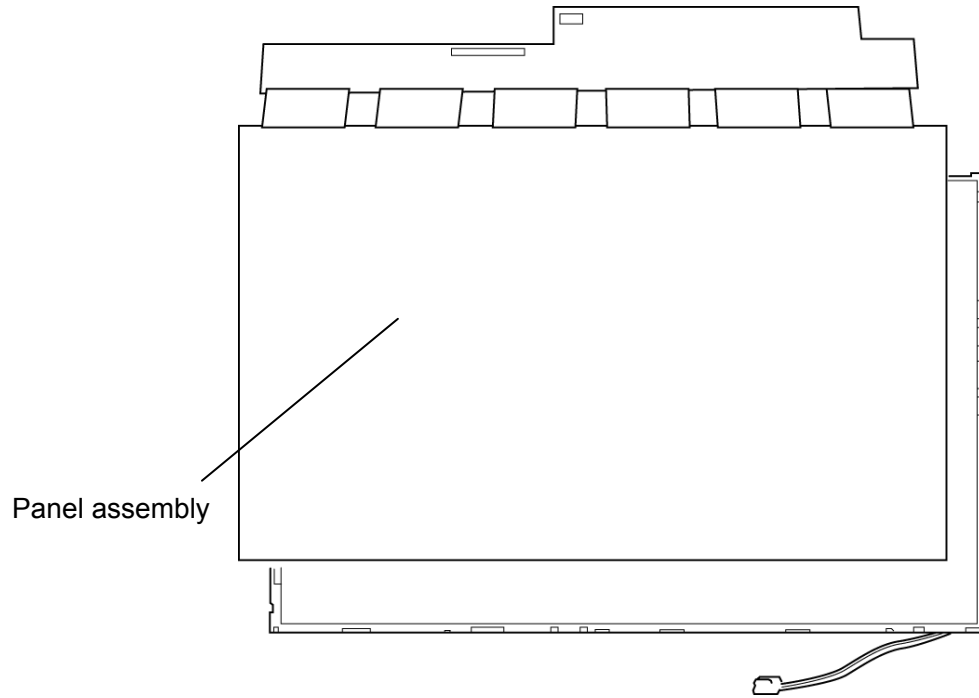
Figure 4-59 Replacing Samsung fluorescent lamp (WXGA) (4)

Assembling the fluorescent lamp

The assembly procedure of the 15.4-inch Samsung fluorescent lamp is the reverse of the
above disassembly procedure. Refer to figures 4-56 to 4-59.

1. Install the panel assembly on the backlight unit.

2. Install the top chassis on the molded frame.

3. Stick the yellow tapes, lamp-wire tape and Al tape.

4. Stick the PCB cover.

4.30.2 Replacing the 15.4-inch WSXGA+ Samsung Fluorescent Lamp

To replace the 15.4-inch WSXGA+ Samsung fluorescent lamp, follow the steps below and refer to figures 4-60 to 4-63.

Removing the fluorescent lamp

1. Remove the PCB cover.

CAUTION: Handle with care not to damage COF of S/D and G/D ICs.

PCB cover
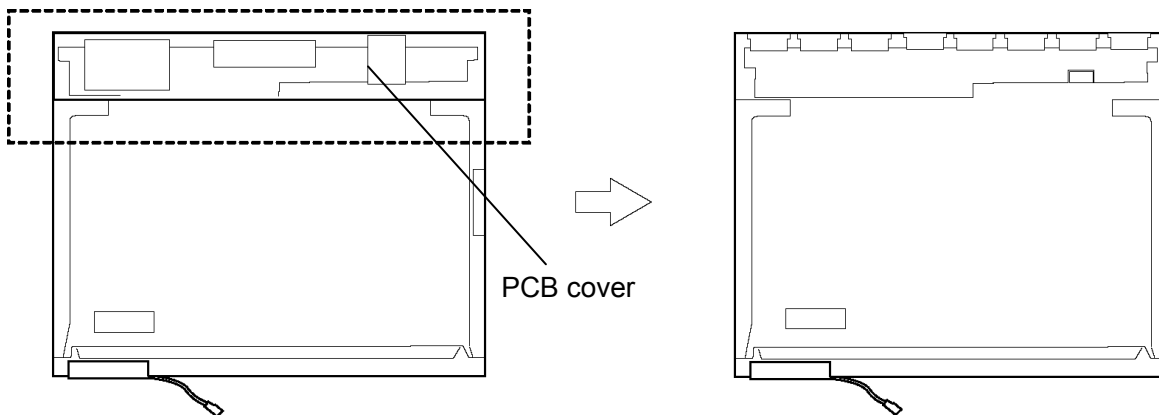
Figure 4-60 Replacing Samsung fluorescent lamp (WSXGA+) (1)

2. Remove the white tapes, lamp-wire tape and Al tape.
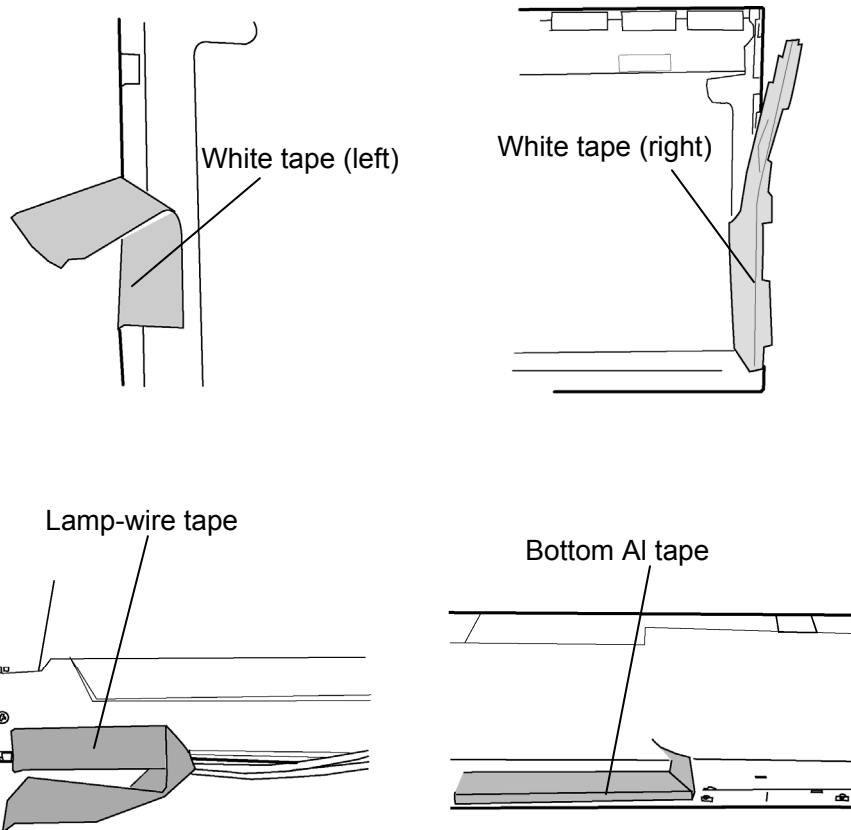
Figure 4-61 Replacing Samsung fluorescent lamp (WSXGA+) (2)

3. Separate the top chassis and molded frame.

CAUTION: Remove in the order of bottom hook and side hooks.
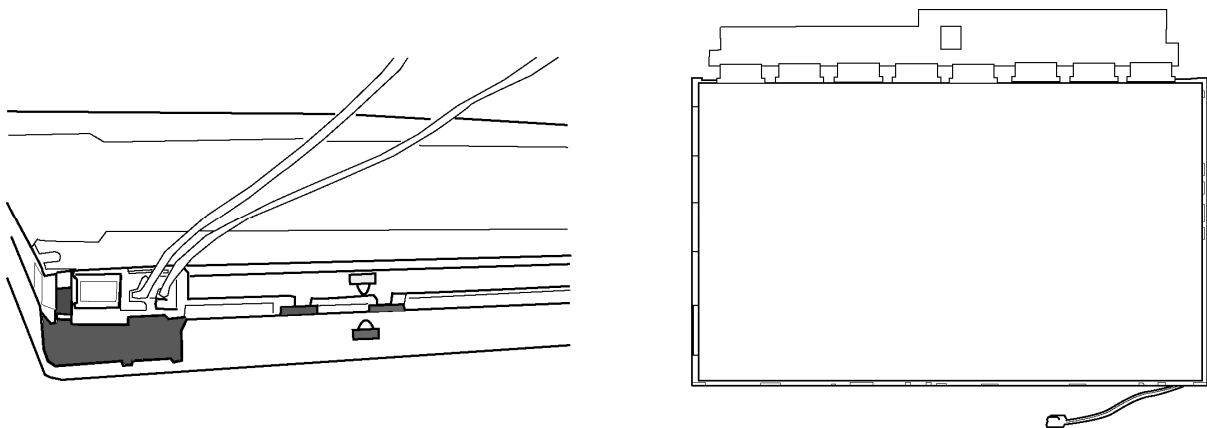
Figure 4-62 Replacing Samsung fluorescent lamp (WSXGA+) (3)

4. Separate the panel assembly and backlight unit.

CAUTION*: Handle with care not to damage COF of S/D and G/D ICs.*

Panel assembly
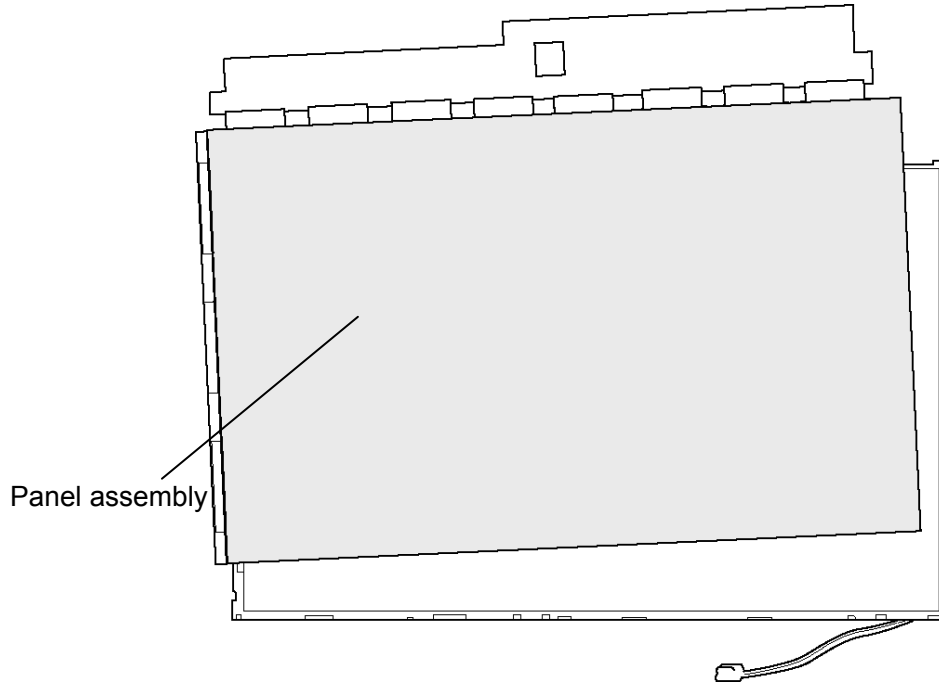
Figure 4-63 Replacing Samsung fluorescent lamp (WSXGA+) (4)

Assembling the fluorescent lamp

The assembly procedure of the 15.4-inch Samsung fluorescent lamp is the reverse of the above disassembly procedure. Refer to figures 4-60 to 4-63.

1. Install the panel assembly on the backlight unit.

2. Install the top chassis on the molded frame.

3. Stick white tapes, lamp-wire tape and Al tape.

4. Stick the PCB cover.

Appendices

Appendix   Contents

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Tables

System board

Appendix A   Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the
following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is
   properly aligned and maximum visibility of the display is maintained.
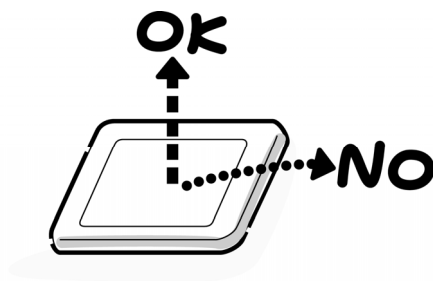
2. For the LCD module, be careful to align the four holes at the right side and left side
   of the LCD module with the corresponding holes in the LCD cover before securing
   the module with four screws.

   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.
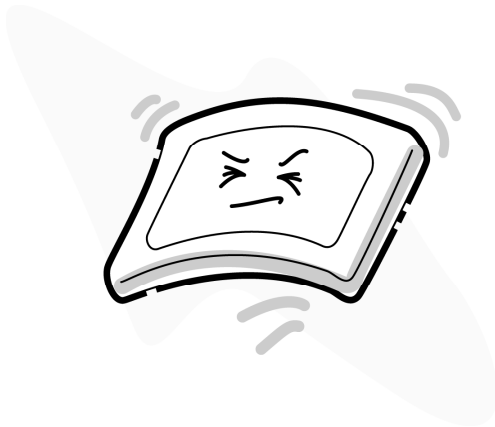
3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

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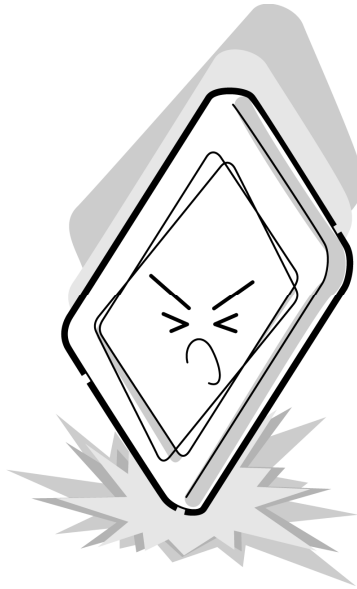
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
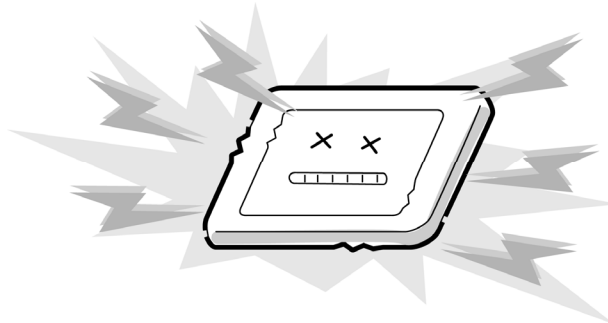
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

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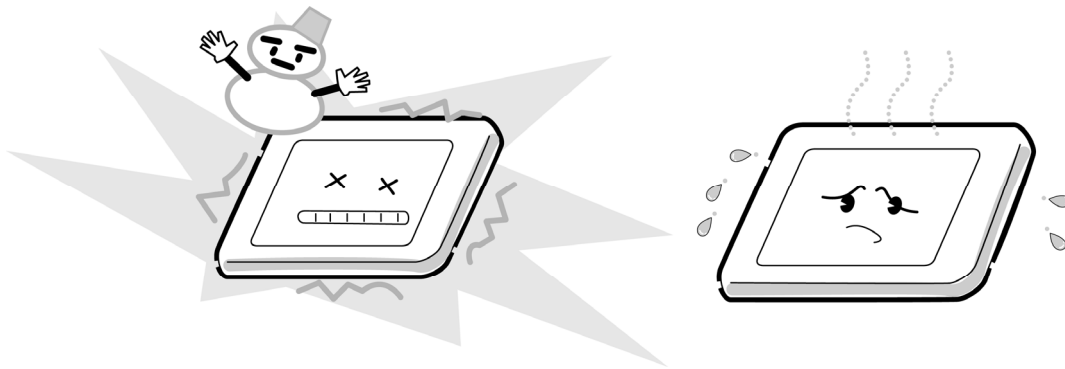
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
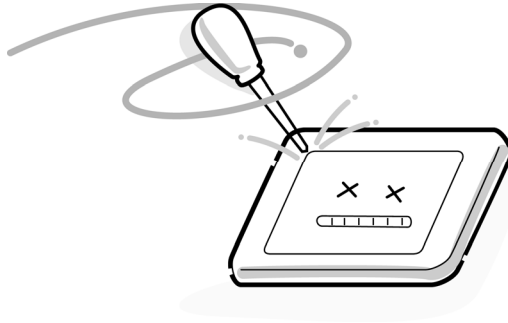
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
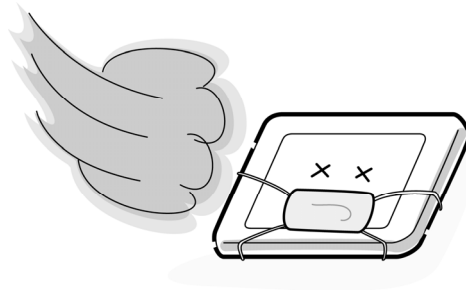
Appendix B   Board Layout

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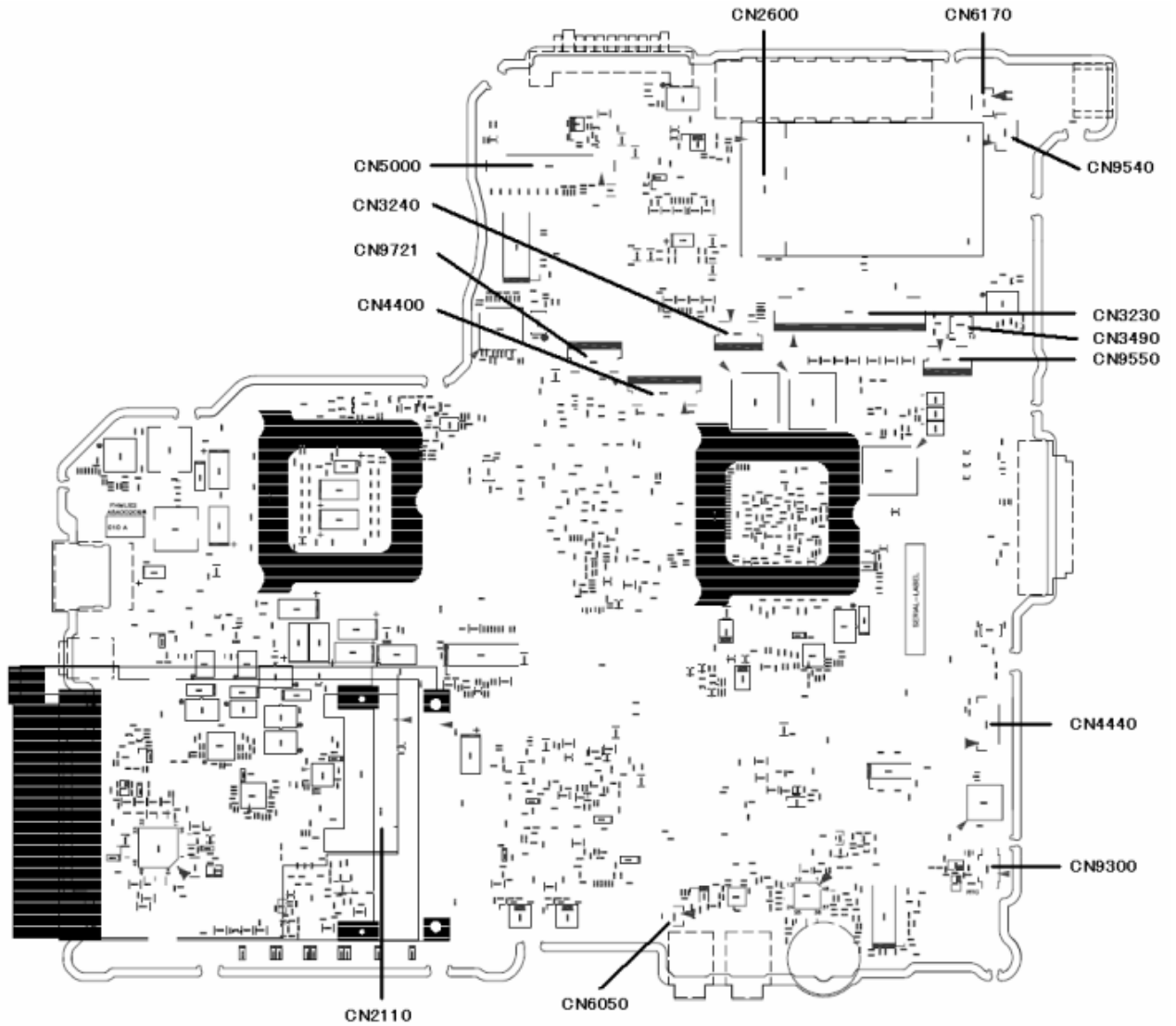
Figure B-1 System board (FHMLS) layout (front)*

Table B-1 System board (FHMLS*) connectors (front)

Number	Name
CN2110	PC card interface connector
CN2600	Mini PCI Express interface connector (Wireless LAN)
CN3230	Keyboard interface connector
CN3240	Dual Point interface connector
CN3490	(Debug Port interface connector)
CN4400	Bluetooth interface connector
CN4440	(Bluetooth2 interface connector)
CN5000	LCD interface connector
CN6050	Internal microphone connector
CN6170	Speaker interface connector
CN9300	RTC Battery interface connector
CN9540	(Web Camera interface connector)
CN9550	Fingerprint sensor(FHMLF*) board I/F connector
CN9721	Switch interface connector

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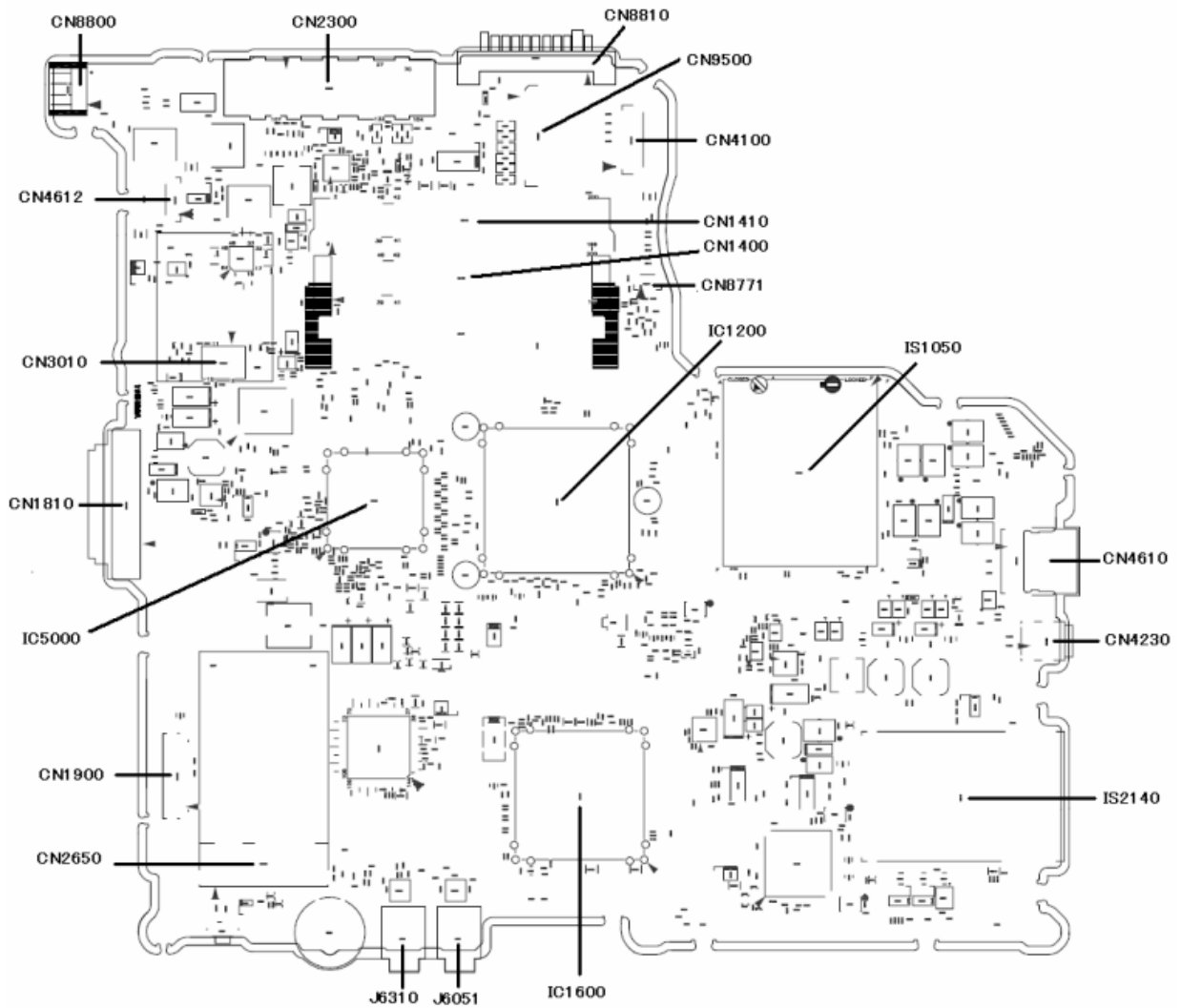
Figure B-2 System board (FHMLS) layout (back)*

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

Number	Name
IS1050	CPU socket
IC1200	Intel 965GM/GML (Northbridge)
IC1600	ICH8-M(Southbridge)
IC5000	nVIDIA G8M
CN1400	SO-DIMM0 connector A
CN1410	SO-DIMM0 connector B
CN1810	ODD interface connector
CN1900	HDD(SATA) interface connector
IS2140	Bridge Media interface connector
CN2300	Docking interface connector
CN2650	(Mini PCI Express I/F connector (Robson: not used))
CN3010	MDC interface connector
CN4100	LAN interface connector
CN4230	IEEE 1394 interface connector
CN4610	USB port 4 connector
CN4612	USB port 6 connector
J6051	External microphone connector
J6310	Headphone connector
CN8771	FAN interface connector
CN8800	DC-IN connector
CN8810	Main Battery connector
CN9500	Serial & RGB(FHMLR*) board I/F connector

B.3   Serial & RGB Board (FHMLR*) Front View
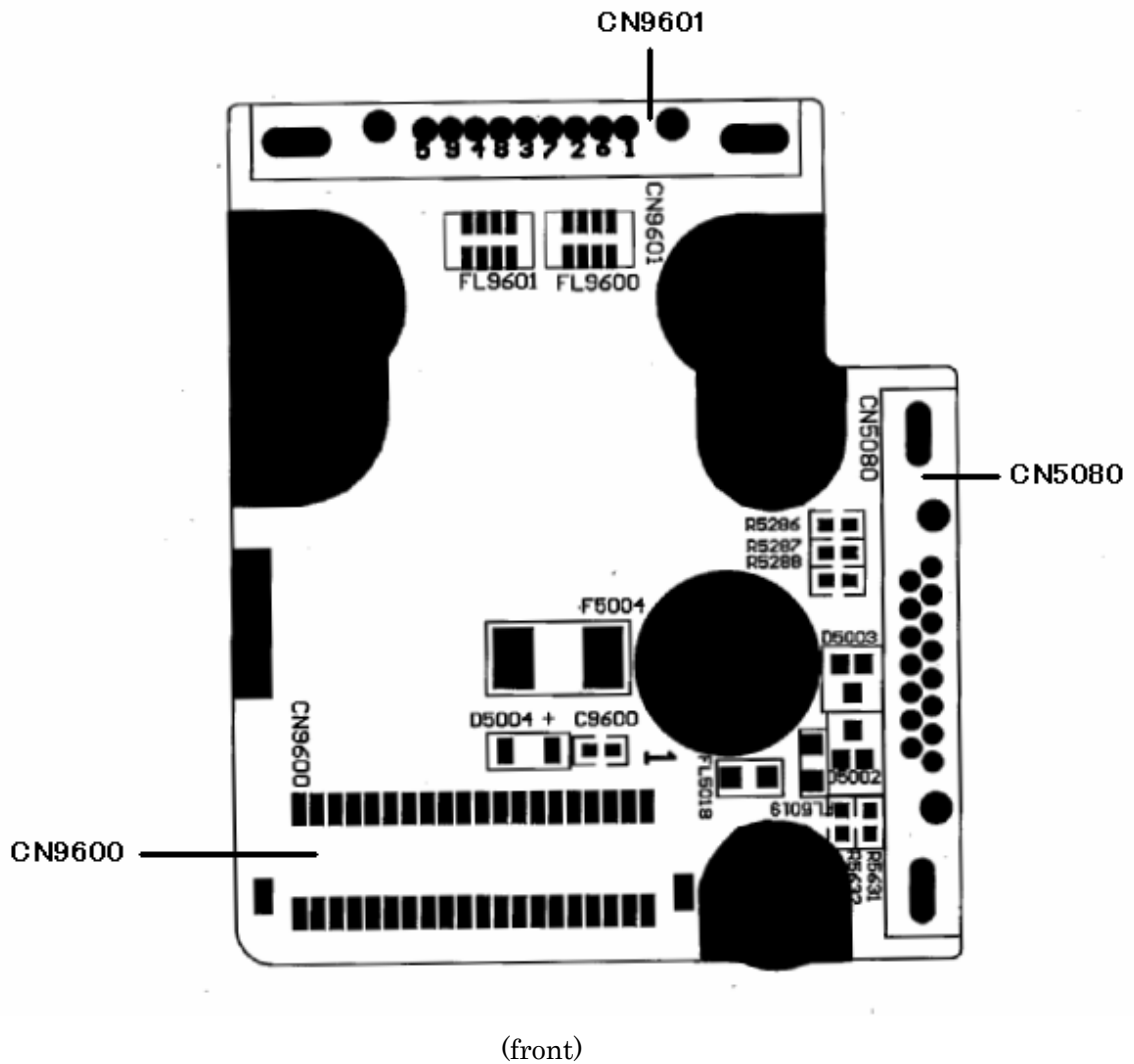
(front)

Figure B-3 Serial & RGB Board (FHMLR) layout (front)*

Table B-3 Serial & RGB (FHMLR) connectors (front)*

Number	Name
CN5080	RGB interface connector
CN9600	System board interface connector
CN9601	Serial interface connector

B.4   Fingerprint sensor Board (FHMLF*) Front and Back View
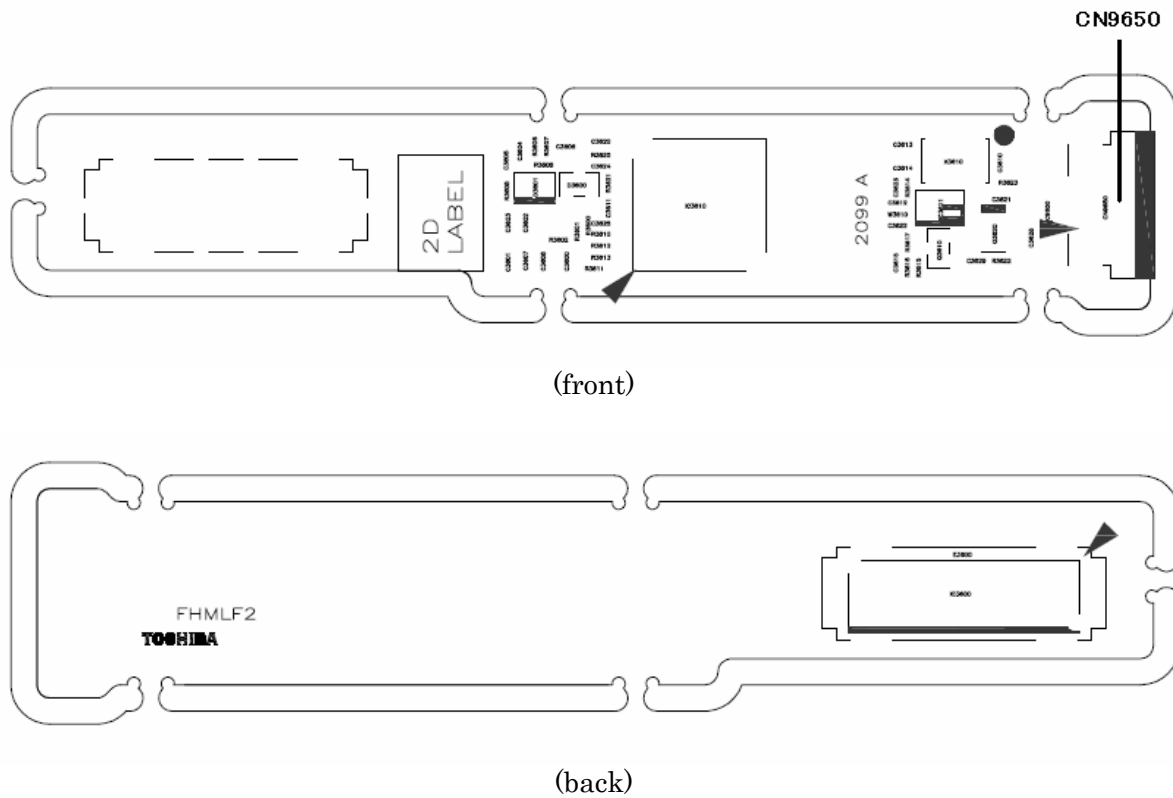
(front)

(back)

Figure B-4 Fingerprint sensor Board (FHMLF) layout (front/back)*

Table B-4 Fingerprint sensor Board (FHMLF) connector (front)*

Number	Name
CN9650	System board interface connector

Appendix C   Pin Assignments

System board (FHMLS*)

C.1   CN1400 SO-DIMM0 connector (200-pin)

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B0V	I	2	GND	-
3	GND	-	4	ADQ04-B1P	I/O
5	ADQ00-B1P	I/O	6	ADQ06-B1P	I/O
7	ADQ05-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I/O
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ07-B1P	I/O
15	GND	-	16	ADQ01-B1P	I/O
17	ADQ03-B1P	I/O	18	GND	-
19	ADQ02-B1P	I/O	20	ADQ08-B1P	I/O
21	GND	-	22	ADQ12-B1P	I/O
23	ADQ14-B1P	I/O	24	GND	-
25	ADQ13-B1P	I/O	26	ADM1-B1P	I
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	XMCK0-B1P	I
31	ADQS1-B1P	I/O	32	XMCK0-B1N	I
33	GND	-	34	GND	-
35	ADQ15-B1P	I/O	36	ADQ09-B1P	I/O
37	ADQ11-B1P	I/O	38	ADQ10-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ21-B1P	I/O	44	ADQ16-B1P	I/O
45	ADQ20-B1P	I/O	46	ADQ17-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	TSDIMA-P3N （NC）	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I
53	GND	-	54	GND	-
55	ADQ18-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ23-B1P	I/O	58	ADQ22-B1P	I/O
59	GND	-	60	GND	-
61	ADQ28-B1P	I/O	62	ADQ25-B1P	I/O

Table C-1 SO-DIMM0 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	ADQ29-B1P	I/O	64	ADQ24-B1P	I/O
65	GND	-	66	GND	-
67	ADM3-B1P	I	68	ADQS3-B1N	I/O
69	N.C.	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ30-B1P	I/O	74	ADQ31-B1P	I/O
75	ADQ27-B1P	I/O	76	ADQ26-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	I	80	MCKE1-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	ABS2-B1P	I	86	AMA14-B1P	I
87	1R8-B1V	I	88	1R8-B1V	I
89	AMA12-B1P	I	90	AMA11-B1P	I
91	AMA09-B1P	I	92	AMA07-B1P	I
93	AMA08-B1P	I	94	AMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	AMA05-B1P	I	98	AMA04-B1P	I
99	AMA03-B1P	I	100	AMA02-B1P	I
101	AMA01-B1P	I	102	AMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	AMA10-B1P	I	106	ABS1-B1P	I
107	ABS0-B1P	I	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	ACAS-B1N	I	114	MODT0-B1P	I
115	MCS1-B1N	I	116	AMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT1-B1P	I	120	N.C.	-
121	GND		122	GND	-
123	ADQ36-B1P	I/O	124	ADQ35-B1P	I/O
125	ADQ32-B1P	I/O	126	ADQ33-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	I
131	ADQS4-B1P	I/O	132	GND	-

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
133	GND	-	134	ADQ37-B1P	I/O
135	ADQ38-B1P	I/O	136	ADQ34-B1P	I/O
137	ADQ39-B1P	I/O	138	GND	-
139	GND	-	140	ADQ41-B1P	I/O
141	ADQ44-B1P	I/O	142	ADQ45-B1P	I/O
143	ADQ40-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	ADM5-B1P	I	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ42-B1P	I/O	152	ADQ47-B1P	I/O
153	ADQ46-B1P	I/O	154	ADQ43-B1P	I/O
155	GND	-	156	GND	-
157	ADQ49-B1P	I/O	158	ADQ48-B1P	I/O
159	ADQ52-B1P	I/O	160	ADQ53-B1P	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	XMCK1-B1P	I
165	GND	-	166	XMCK1-B1N	I
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	ADM6-B1P	I
171	GND	-	172	GND	-
173	ADQ51-B1P	I/O	174	ADQ55-B1P	I/O
175	ADQ50-B1P	I/O	176	ADQ54-B1P	I/O
177	GND	-	178	GND	-
179	ADQ58-B1P	I/O	180	ADQ61-B1P	I/O
181	ADQ62-B1P	I/O	182	ADQ60-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	I	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ59-B1P	I/O	190	GND	-
191	ADQ63-B1P	I/O	192	ADQ56-B1P	I/O
193	GND	-	194	ADQ57-B1P	I/O
195	SMBDT1-E3P	I/O	196	GND	-
197	SMBCK1-E3P	I/O	198	GND	-
199	M-E3V	I	200	GND	I
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.2   CN1410 SO-DIMM1 connector (200-pin)

Table C-2 SO-DIMM1 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B0V	I	2	GND	-
3	GND	-	4	BDQ01-B1P	I/O
5	BDQ04-B1P	I/O	6	BDQ00-B1P	I/O
7	BDQ05-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ07-B1P	I/O
15	GND	-	16	BDQ06-B1P	I/O
17	BDQ03-B1P	I/O	18	GND	-
19	BDQ02-B1P	I/O	20	BDQ11-B1P	I/O
21	GND	-	22	BDQ08-B1P	I/O
23	BDQ13-B1P	I/O	24	GND	-
25	BDQ12-B1P	I/O	26	BDM1-B1P	I
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	XMCK3-B1P	I
31	BDQS1-B1P	I/O	32	XMCK3-B1N	I
33	GND	-	34	GND	-
35	BDQ10-B1P	I/O	36	BDQ15-B1P	I/O
37	BDQ09-B1P	I/O	38	BDQ14-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ21-B1P	I/O	44	BDQ16-B1P	I/O
45	BDQ22-B1P	I/O	46	BDQ20-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	TSDIMB-P3N (NC)	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I
53	GND	-	54	GND	-
55	BDQ19-B1P	I/O	56	BDQ23-B1P	I/O
57	BDQ17-B1P	I/O	58	BDQ18-B1P	I/O
59	GND	-	60	GND	-
61	BDQ24-B1P	I/O	62	BDQ25-B1P	I/O

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	BDQ29-B1P	I/O	64	BDQ28-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	BDQS3-B1N	I/O
69	N.C.	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ31-B1P	I/O	74	BDQ27-B1P	I/O
75	BDQ30-B1P	I/O	76	BDQ26-B1P	I/O
77	GND	-	78	GND	-
79	MCKE3-B1P	I	80	MCKE4-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	BBS2-B1P	I	86	BMA14-B1P	-
87	1R8-B1V	I	88	1R8-B1V	I
89	BMA12-B1P	I	90	BMA11-B1P	I
91	BMA09-B1P	I	92	BMA07-B1P	I
93	BMA08-B1P	I	94	BMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	BMA05-B1P	I	98	BMA04-B1P	I
99	BMA03-B1P	I	100	BMA02-B1P	I
101	BMA01-B1P	I	102	BMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	BMA10-B1P	I	106	BBS1-B1P	I
107	BBS0-B1P	I	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	BCAS-B1N	I	114	MODT2-B1P	I
115	MCS3-B1N	I	116	BMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT3-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	BDQ38-B1P	I/O	124	BDQ39-B1P	I/O
125	BDQ36-B1P	I/O	126	BDQ37-B1P	I/O
127	GND	-	128	GND	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	I
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ34-B1P	I/O

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
135	BDQ35-B1P	I/O	136	BDQ32-B1P	I/O
137	BDQ33-B1P	I/O	138	GND	-
139	GND	-	140	BDQ43-B1P	I/O
141	BDQ40-B1P	I/O	142	BDQ46-B1P	I/O
143	BDQ45-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BDM5-B1P	I	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ47-B1P	I/O	152	BDQ42-B1P	I/O
153	BDQ41-B1P	I/O	154	BDQ44-B1P	I/O
155	GND	-	156	GND	-
157	BDQ52-B1P	I/O	158	BDQ55-B1P	I/O
159	BDQ49-B1P	I/O	160	BDQ50-B1P	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	XMCK4-B1P	I
165	GND	-	166	XMCK4-B1N	I
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	BDQ53-B1P	I/O	174	BDQ54-B1P	I/O
175	BDQ48-B1P	I/O	176	BDQ51-B1P	I/O
177	GND	-	178	GND	-
179	BDQ56-B1P	I/O	180	BDQ62-B1P	I/O
181	BDQ57-B1P	I/O	182	BDQ63-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	I	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ60-B1P	I/O	190	GND	-
191	BDQ61-B1P	I/O	192	BDQ59-B1P	I/O
193	GND	-	194	BDQ58-B1P	I/O
195	SMBDT1-E3P	I/O	196	GND	-
197	SMBCK1-E3P	I/O	198	GND	-
199	M-E3V	I	200	M-E3V	I
1T	GND	-	2T	GND	-

C.3 CN1810 ODD interface connector (50-pin)

Table C-3 ODD interface connector (50-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1		-	2		-
3		-	4		-
5	RLTRS3&RSTIDB	O	6	PDD08-P3P	I/O
7	PDD07-P3P	I/O	8	PDD09-P3P	I/O
9	PDD06-P3P	I/O	10	PDD10-P3P	I/O
11	PDD05-P3P	I/O	12	PDD11-P3P	I/O
13	PDD04-P3P	I/O	14	PDD12-P3P	I/O
15	PDD03-P3P	I/O	16	PDD13-P3P	I/O
17	PDD02-P3P	I/O	18	PDD14-P3P	I/O
19	PDD01-P3P	I/O	20	PDD15-P3P	I/O
21	PDD00-P3P	I/O	22	PDDREQ-P3P	I
23	GND	-	24	PDIOR-P3N	O
25	PDIOW-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	PDDACK-P3N	O
29	IDEIRQ-P3P	I	30		-
31	PDA1-P3P	O	32		-
33	PDA0-P3P	O	34	PDA2-P3P	O
35	PDCS1-P3N	O	36	PDCS3-P3N	O
37		-	38	P5V	-
39	P5V	-	40	P5V	-
41	P5V	-	42	P5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47		-	48	GND	-
49		-	50		-

C.4   CN1900 HDD(SATA) interface connector (11-pin)

Table C-4 HDD(SATA) interface connector (11-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZSATT0-P1P	O	2	ZSATT0-P1N	O
3	GND	-	4	ZSATR0-P1N	I
5	ZSATR0-P1P	I	6	GND	-
7	P3V	-	8	GND	-
9	P5V	-	10	GND	-
11	GND	-			
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.5   CN2110 PC card interface connector (70-pin)

Table C-5 PC card interface connector (70-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ACAD00-PYP	I/O
3	ACAD01-PYP	I/O	4	ACAD03-PYP	I/O
5	ACAD05-PYP	I/O	6	ACAD07-PYP	I/O
7	ACCBE0-PYN	I/O	8	ACAD09-PYP	I/O
9	ACAD11-PYP	I/O	10	ACAD12-PYP	I/O
11	ACAD14-PYP	I/O	12	ACCBE1-PYN	I/O
13	ACPAR-PYP	I/O	14	ACPERR-PYN	I/O
15	ACGNT-PYN	I/O	16	ACINT-PYN	
17	MCVCCA-PYV	I	18	MCVPPA-PYV	I
19	ACCLK-PYP		20	ACIRDY-PYN	I/O
21	ACCBE2-PYN	I/O	22	ACAD18-PYP	I/O
23	ACAD20-PYP	I/O	24	ACAD21-PYP	I/O
25	ACAD22-PYP	I/O	26	ACAD23-PYP	I/O
27	ACAD24-PYP	I/O	28	ACAD25-PYP	I/O
29	ACAD26-PYP	I/O	30	ACAD27-PYP	I/O
31	ACAD29-PYP	I/O	32	ACD02-PYP	I/O
33	ACCLKR-PYN	I/O	34	GND	-
35	GND	-	36	ACCD1-P3N	O
37	ACAD02-PYP	I/O	38	ACAD04-PYP	I/O
39	ACAD06-PYP	I/O	40	ACD14-PYP	I/O
41	ACAD08-PYP	I/O	42	ACAD10-PYP	I/O
43	ACVS1-P3P	I/O	44	ACAD13-PYP	I/O
45	ACAD15-PYP	I/O	46	ACAD16-PYP	I/O
47	ACA18-PYP		48	ACLOCK-PYN	I/O
49	ACSTOP-PYN	I/O	50	ACDEVS-PYN	I/O
51	MCVCCA-PYV	I	52	MCVPPA-PYV	I
53	ACTRDY-PYN	I/O	54	ACFRAM-PYN	I/O
55	ACAD17-PYP	I/O	56	ACAD19-PYP	I/O
57	ACVS2-P3P	I/O	58	ACRST-PYN	
59	ACSERR-PYN		60	ACREQ-PYN	
61	ACCBE3-PYN	I/O	62	ACAUDI-PYP	
63	ACSTSC-PYP		64	ACAD28-PYP	I/O
65	ACAD30-PYP	I/O	66	ACAD31-PYP	I/O
67	ACCD2-P3N	O	68	GND	-
69	GND	-	70	GND	-

C.6   IS2150 Bridge Media interface connector (46-pin)

Table C-6 Bridge Media interface connector (46-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SDCD-P3N	O	2	GND	-
3	MSDAT1-P3P	I/O	4	MSSDIO-P3P	I/O
5		-	6	GND	-
7		-	8	MSCLK-P3P	I/O
9	GND	-	10	MSBS-P3P	I/O
11	MSDAT1-P3P	I/O	12	MSSDIO-P3P	I/O
13	MSDAT2-P3P	I/O	14	MSCD-P3N	O
15	MSDAT3-P3P	I/O	16	MSCLK-P3P	I/O
17	FM-P3V	-	18	GND	-
19	FM-P3V	-	20	GND	-
21		-	22	MSBS-P3P	I/O
23		-	24	MSDAT3-P3P	I/O
25	MSDAT2-P3P	I/O	26	GND	-
27	GND	-	28	MXDCD-P3N	I
29	SMRDY-P3P	I	30	MXDRE-P3N	I
31	MXDCE-P3N	I	32	SMCLE-P3P	I/O
33	SDCMD-P3P	I/O	34	MXDWE-P3N	I
35	MSCLK-P3P	I/O	36	GND	-
37	MSSDIO-P3P	I/O	38	MSDAT1-P3P	I/O
39	MSDAT2-P3P	I/O	40	MSDAT3-P3P	I/O
41	SDAT0-P3P	I/O	42	SDAT1-P3P	I/O
43	SDAT2-P3P	I/O	44	SDAT3-P3P	I/O
45	FM-P3V	I	46	SDWP-P3P	O
1T	GND	-	2T	GND	-
3T	GND		4T	GND	

C.7   CN2300 Docking interface connector (133-pin)

Table C-7 Docking interface connector (133-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCOUT	I	2	DCOUT	I
3	DOCDT1-S3N	O	4	GND	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	GND	-	10	ZUSBDC-E3P	I/O
11	ZUSBDC-E3N	I/O	12	GND	-
13	GND	-	14	NC	-
15	NC	-	16	GND	-
17	NC	-	18	NC	-
19	GND	-	20	GND	-
21	GND	-	22	ZNDTX2-P3P	I
23	ZNDTX2-P3N	I	24	GND	-
25	ZNDTX1-P3P	I	26	ZNDTX1-P3N	I
27	GND	-	28	DVIDET-P3N	O
29	-	-	30	-	-
31	-	-	32	-	-
33	-	-	34	-	-
35	-	-	36	DCOUT	I
37	DCOUT	I	38	NC	-
39	NC	-	40	NC	-
41	NC	-	42	GND	-
43	NC	-	44	GND	-
45	DPCONF-S5P	O	46	GND	-
47	GND	-	48	XNDCK0-P3N	I
49	XNDCK0-P3P	I	50	GND	-
51	NC	-	52	NC	-
53	GND	-	54	ZNDTX0-P3P	I
55	ZNDTX0-P3N	I	56	GND	-
57	GND	-	58	GND	-
59	GND	-	60	NVBSCL-P3P	I/O
61	NVBSDA-P3P	I/O	62	LAN-E3V	I
63	LINK-E3N	O	64	-	-
65	-	-	66	-	-
67	ZBIDDP-EXP		68	ZBIDDN-EXN	

Table C-7   Docking interface connector (133-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	ZBIDCN-EXN		70	ZBIDCP-EXP	
71	DCOUT	I	72	DCOUT	I
73	PWRSW-S3N	O	74	DDCON-P5P	I
75	NC	-	76	NC	-
77	GND	-	78	GND	-
79	GND	-	80	NC	-
81	GND	-	82	GND	-
83	GND	-	84	GND	-
85	NC	-	86	GND	-
87	NC	-	88	GND	-
89	GND	-	90	DBLUE-PXP	I
91	GND	-	92	DRED-PXP	I
93	GND	-	94	GND	
95	DCRTSD-P3P	I/O	96	DCRTSC-P3P	I/O
97	GND	-	98	ACT-E3N	O
99	-	-	100	-	-
101	-	-	102	ZBIDBN-EXN	I
103	ZBIDBP-EXP	I	104	ZBIDAN-EXN	O
105	ZBIDAP-EXP	O	106	DCOUT	I
107	DCOUT	I	108	EJCTRQ-S3N	O
109	M5V	I	110	NC	-
111	NC	-	112	GND	-
113	DHSYNC-P3P	I/O	114	DVSYNC-P3P	I/O
115	GND	-	116	GND	-
117	NC	-	118	NC	-
119	GND	-	120	GND	-
121	GND	-	122	NC	-
123	NC	-	124	GND	-
125	GND	-	126	DGREEN-PXP	I
127	GND	-	128	GND	-
129	GND	-	130	PSCL-S5P	I/O
131	PSDA-S5P	I/O	132	GND	-
133	DOCDT2-S3N	O			

Table C-7   Docking interface connector (133-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	GND	-	A2	GND	-
A3	DSKDC	-	A4		-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-
7T	GND	-	8T	GND	-
9T	GND	-	10T	GND	-
11T	GND	-	12T	GND	-
13T	GND	-	14T	GND	-
15T	GND	-	16T	GND	-
17T	GND	-	18T	GND	-

C.8   CN2600 Mini PCI Express I/F connector (W-LAN)(52-pin)

Table C-8 Mini PCI Express interface connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	O	2	P3V	I
3	WCHDAT-P3P	O	4	GND	-
5	WCHCLK-P3P	O	6	1R5-P1V	I
7	MPEXRQ-P3N	I	8	NC	-
9	GND	-	10	NC	-
11	XPEMPE-P0N	O	12	NC	-
13	XPEMPE-P0P	O	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	WLRFON-S3N	O
21	GND	-	22	PLTRS3-E3N	-
23	ZERWL-P1N	I	24	E3V	I
25	ZERWL-P1P	I	26	GND	-
27	GND	-	28	1R5-P1V	I
29	GND	-	30	NC	-
31	ZETWL-P1N	O	32	NC	-
33	ZETWL-P1P	O	34	GND	-
35	GND	-	36	ZUSBWL-E3N	I/O
37	GND	-	38	ZUSBWL-E3P	I/O
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	GND	-	44	NC	-
45	XCLCK1-E1P	I/O	46	NC	-
47	CLDAT1-E1P	I/O	48	1R5-P1V	I
49	CLRST1-E3N	I/O	50	GND	-
51	NC	-	52	P3V	I
1T	GND	-	2T	GND	-

C.9   CN2650 Mini PCI Express I/F connector(Robson) (52-pin)

Table C-9 Mini PCI Express interface connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1			2	P3V	
3			4	GND	
5			6	1R5-P1V	
7	ROBXRQ-P3N	I	8		
9	GND		10		
11	XPEROB-P0N	I	12		
13	XPEROB-P0P	I	14		
15	GND		16		
17			18	GND	
19			20		
21	GND		22	PLTRS2-E3N	O
23	ZERROB-P1N	O	24		
25	ZERROB-P1P	O	26	ROBMDL-P3N	O
27	GND		28	1R5-P1V	
29	GND		30		
31	SIG42832	I	32		
33	SIG42833	I	34	GND	
35	GND		36		
37	GND		38		
39			40	GND	
41			42		
43			44		
45			46		
47			48	1R5-P1V	
49			50	GND	
51			52	P3V	
1T	GND		2T	GND	

C.10 CN3010 MDC interface connector (12-pin)

Table C-10 MDC interface connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	AZSDO1-P3P	I/O	4	NC	-
5	GND	-	6	E3V	I
7	AZSYC1-P3P		8	GND	-
9	(IC3010-1)	I/O	10	GND	-
11	AZRST1-E3N		12	XAZBC1-P3P	I
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.11   CN3230 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	I
7	KBSC14-S3N	O	8	KBSC13-S3N	O
9	KBSC12-S3N	O	10	KBSC15-S3N	O
11	KBSC07-S3N	O	12	KBSC11-S3N	O
13	KBSC01-S3N	O	14	KBSC10-S3N	O
15	KBSC08-S3N	O	16	KBSC06-S3N	O
17	KBSC04-S3N	O	18	KBSC05-S3N	O
19	KBSC02-S3N	O	20	KBSC03-S3N	O
21	KBSC09-S3N	O	22	KBSC00-S3N	O
23	KBRT00-S3N	I	24	KBRT07-S3N	I
25	KBRT04-S3N	I	26	KBRT01-S3N	I
27	KBRT05-S3N	I	28	KBRT03-S3N	I
29	KBRT02-S3N	I	30	KBRT06-S3N	I
31	P5V	I	32	CAPLED-P5N	O
33	ARWLED-P5N	O	34	NUMLED-P5N	O
1T	GND	-	2T	GND	-

C.12   CN3240 Dual Point interface connector (8-pin)

Table C-12   Dual Point 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	I
1T	GND	-	2T	GND	-

C.13   CN3490 Debug Port interface connector (8-pin)

Table C-13   Debug Port 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	I
1T	GND	-	2T	GND	-

C.14   CN4100 LAN interface connector (14-pin)

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ACT-E3N	O	2	LINK-E3N	O
3	LNP-E3V	I	4	LNP-E3V	I
5			6		
7	ZBIDCN-EXN	I/O	8	ZBIDDP-EXP	I/O
9	ZBIDCN-EXN	I/O	10	ZBIDCP-EXP	I/O
11	ZBIDAP-EXP	I/O	12	ZBIDAN-EXN	I/O
13	ZBIDBP-EXP	I/O	14	ZBIDBN-EXN	I/O

C.15 CN4230 IEEE 1394 interface connector (4-pin)

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

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZTPB0-P3N	I/O	2	ZTPB0-P3P	I/O
3	ZTPA0-P3N	I/O	4	ZTPA0-P3P	I/O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.16 CN4400 Bluetooth1 interface connector (20-pin)

Table C-16 Bluetooth1 interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	BTMDL1-P3N	O	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	BTRST1-S3N	I
9	NC	-	10	NC	-
11	GND	-	12	NC	-
13	(GND)	-	14	WCHCL1-P3P	O
15	NC	-	16	ZUSBBT-E3P	I/O
17	ZUSBBT-E3N	I/O	18	WCHDA1-P3P	I
19	NC	-	20	BT1-P3V	-
1T	GND	-	2T	GND	-

C.17 CN4440 Bluetooth2 interface connector (20-pin)

Table C-17 Bluetooth2 interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ZUSBB2-E3P	I/O
3	ZUSBB2-E3N	I/O	4	WCHCL2-P3P	O
5	BTMDL2-P3N	I	6	BTRST2-S3N	O
7	WCHDA2-P3P	O	8	BT2-P3V	-
9	(GND)	-	10	GND	-

C.18   CN4610 USB port 4 connector (8-pin)

Table C-18 USB port 4 connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB0PS-E5V	O	2	ZUSBP0-E3N	I/O
3	ZUSBP0-E3P	I/O	4	GND	-
5	USB0PS-E5V	O	6	ZUSBP4-E3N	I/O
7	ZUSBP4-E3P	I/O	8	GND	-
1T	GND	-	2T	GND	--

C.19   CN4612 USB port 6 connector (8-pin)

Table C-19 USB port 6 connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	O	2	USB1PS-E5V	I/O
3	USB1PS-E5V	I/O	4	ZUSBP6-E3N	-
5	ZUSBP6-E3P	-	6	GND	-
7	GND	-	8	GND	-

C.20　CN5000 LCD interface connector (40-pin)

Table C-20 LCD interface connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	FL-P5V	I	2	FL-P5V	I
3	FL-P5V	I	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	(BRT2DA-S3P)	-
9	(BRT10-P5P)	-	10	(BRT0)	-
11	GND	-	12	PNL-P3V	I
13	PNL-P3V	I	14	P3V	I
15	TSCL-P3P	I/O	16	TSDA-P3P	I/O
17	ZTXDA0-PYN	I	18	ZTXDA0-PYP	I
19	GND	-	20	ZTXDA1-PYN	I
21	ZTXDA1-PYP	I	22	GND	-
23	ZTXDA2-PYN	I	24	ZTXDA2-PYP	I
25	GND	-	26	XTXCKA-PYN	I
27	XTXCKA-PYP		28	GND	-
29	ZTXDB0-PYN	I	30	ZTXDB0-PYP	I
31	GND	-	32	ZTXDB1-PYN	I
33	ZTXDB1-PYP	I	34	GND	-
35	ZTXDB2-PYN	I	36	ZTXDB2-PYP	I
37	GND	-	38	XTXCKB-PYN	I
39	XTXCKB-PYP	I	40	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.21 CN6050 Internal microphone connector (2-pin)

Table C-21 Internal microphone connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(IMICIN-PXP)	I	2	A-GND	-

C.22 J6051 External microphone connector (6-pin)

Table C-22External Microphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	(EMICIN-PXP)	-
3	(EMICB-P2V)	-	4	A-GND	-
5	DETCTA-P4N	I	6	EMICB-P2V	I

C.23 CN6170 Speaker connector (4-pin)

Table C-23 Speaker (Right) 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.24   J6310   Headphone connector (6-pin)

Table C-24 Headphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	DETCTA-P4N	O
5	A-GND	-	6	NC	-

C.25   CN8771   FAN interface connector (4-pin)

Table C-25   FAN interface connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	FANGO-E3P	I
3	GND	-	4	FPWMO-S3P	O

C.26   CN8800   DC-IN connector (4-pin)

Table C-26 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.27   CN8810   Main Battery connector (10-pin)

Table C-27 Main Battery connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(Q8811-1)	-	2	BTMP1	I
3	(Q8811-4)	-	4	M5V	I
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT1OV-S5N	I
9	GND	-	10	GND	-

C.28   CN9300 RTC Battery connector (3-pin)

Table C-28 RTC Battery connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(R3V)	-	2	NC	-
3	GND	-			
1T	GND	-	2T	GND	-

C.29   CN9500 Serial & RGB board(FHMLR*) I/F connector (40-pin)

Table C-29 Serial & RGB board I/F connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND		2	GND	
3			4		
5	P5V		6	P5V	
7	P5V		8	P5V	
9			10		
11	GND		12	GND	
13	CRT1SD−P5P	O	14	CRT1SC−P5P	O
15	M1VSYN−P3P	O	16	M1HSYN−P3P	O
17	GND		18	TXD−PYN	
19	DTR-PYP	I	20	DSR-PYP	O
21	RTS-PYP	I	22	RXD-PYN	O
23	GND		24	GND	
25	CTS-PYP	O	26	GND	
27	DCD-PYP	O	28	GND	
29	RING-PYP	O	30	GND	
31	GND		32	GND	
33	MBLUE-PXP	O	34	GND	
35	M1GRN−PXP	O	36	GND	
37	M1RED−PXP	O	38	GND	
39	GND		40	GND	

C.30   CN9540 Web Camera interface connector (3-pin)

Table C-30 Web Camera interface connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	ZUSBCM−E3N	I
3	ZUSBCM−E3P	I	4	GND	-
5	GND	-	6	GND	-

C.31   CN9550 Fingerprint sensor board interface connector (8-pin)

Table C-31 System board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ZUSBFS-E3P	I/O
3	ZUSBFS-E3N	I/O	4	GND	-
5	FGSPON-S3N	I	6	E3V	I
7			8	GND	
1T	GND	-	2T	GND	-

C.32   CN9721 Switch interface connector (13-pin)

Table C-32 Switch interface connector (13-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF−S3N	I	2	S3V	-
3			4	GND	-
5			6		
7	PWRSW−S3N	I	8		
9			10	GPBTNA−S3N	I
11			12		
13	GPBTNB−S3N	I			
1T	GND	-	2T	GND	-

Serial & RGB board (FHMLR*)

C.33   CN5080 RGB interface connector (15-pin)

*Table C-33 **RGB interface connector** (15-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRED-PXP	O	2	MGRN-PXP	O
3	MBLU-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	-	10	GND	-
11	NC	-	12	CRTSDA-P5P	I/O
13	MHSYNC-P5P	O	14	MVSYNC-P5P	O
15	CRTSCL-P5P	I/O			
1T	GND	-	2T	GND	-

C.34   CN9600 System board(FHMLS*)interface connector (40-pin)

Table C-34 System board I/F connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND		2	GND	
3			4		
5	P5V		6	P5V	
7	P5V		8	P5V	
9			10		
11	GND		12	GND	
13	CRT1SD−P5P	O	14	CRT1SC−P5P	O
15	M1VSYN−P3P	O	16	M1HSYN−P3P	O
17	GND		18	TXD−PYN	
19	DTR-PYP	I	20	DSR-PYP	O
21	RTS-PYP	I	22	RXD-PYN	O
23	GND		24	GND	
25	CTS-PYP	O	26	GND	
27	DCD-PYP	O	28	GND	
29	RING-PYP	O	30	GND	
31	GND		32	GND	
33	MBLUE-PXP	O	34	VGAGND	
35	M1GRN−PXP	O	36	VGAGND	
37	M1RED−PXP	O	38	VGAGND	
39	GND		40	GND	

C.35   CN9601 Serial interface connector (9-pin)

Table C-35 Serial interface connector (9-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD-PYN	I	2	RXD-PYN	I
3	TXD-PYN	O	4	DTR-PYP	O
5	GND	-	6	DSR-PYP	I
7	RTS-PYP	O	8	CTS-PYP	I
9	RING-PYP	I			
1T	GND	-	2T	GND	-

Fingerprint Sensor board (FHMLF*)

C.36   CN9650 System board(FHMLS*) interface connector (8-pin)

Table C-35 System board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	E3V	-	4	FGSPON-S3N	O
5	GND	-	6	ZUSBFS-E3N	I/O
7	ZUSBFS-E3P	I/O	8	GND	-
1T	GND	-			-

Appendix D

Appendix D   Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	**Break**	**Make**	**Break**		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 $	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*1
09	8 *	09	89	3E	F0	3E	*1
10	9 (	0A	8A	46	F0	46	*1
11	0)	0B	8B	45	F0	45	*1
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*1
24	I	17	97	43	F0	43	*1
25	O	13	98	44	F0	44	*1
26	P	19	99	4D	F0	4D	*1
27	[{	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	**Break**	**Make**	**Break**		
29	\ ¦	2B	AB	5D	F0	5D	*2
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*1
38	K	25	A5	42	F0	42	*1
39	L	26	A6	4B	F0	4B	*1
40	; :	27	A7	4C	F0	4C	*1
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*1
53	, <	33	B3	41	F0	41	*1
54	. >	34	B4	49	F0	49	*1
55	/ ?	35	B5	4A	F0	4A	*1
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	**Break**	**Make**	**Break**		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0 11		
75	Ins	E0 52	E0 D2	E0 70	E0 F0 70		*4
76	Del	E0 53	E0 D3	E0 71	E0 F0 71		*4
79	←	E0 4B	E0 CB	E0 6B	E0 F0 6B		*4
80	Home	E0 47	E0 C7	E0 6C	E0 F0 6C		*4
81	End	E0 4F	E0 CF	E0 69	E0 F0 69		*4
83	↑	E0 48	E0 C8	E0 75	E0 F0 75		*4
84	↓	E0 50	E0 D0	E0 72	E0 F0 72		*4
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0 7D		*4
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0 7A		*4
89	→	E0 4D	E0 CD	E0 74	E0 F0 74		*4
110	Esc	01	81	76	F0 76		
112	F1	3B	BB	05	F0 05		
113	F2	3C	BC	06	F0 06		
114	F3	3D	BD	04	F0 04		
115	F4	3E	BE	0C	F0 0C		
116	F5	3F	BF	03	F0 03		
117	F6	40	C0	0B	F0 0B		
118	F7	41	C1	83	F0 83		
119	F8	42	C2	0A	F0 0A		
120	F9	43	C3	01	F0 01		
121	F10	44	C4	09	F0 09		*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break			Note
122	F11	57		D7		78		F0	78		*3
123	F12	58		D8		07		F0	07		*3
124	PrintSc	Refer to table 2-25									
126	Pause	Refer to table 2-25									
202	Fn										*5
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F	
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F	

Notes:

1. * Scan codes differ by overlay function.
2. * This key corresponds to key No. 42 in the 102 key mode.
3. * Combination with the **Fn** key makes different codes.
4. * Scan codes differ by mode.
5. * The Fn key does not generate a code by itself..

Table D-2 Scan codes with left Shift key

Cap 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 the case of Key no. 55 Overlay mode only.

In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1								Code set 2								
		Make				Break				Make				Break				
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

Table D-4 Scan codes with Fn key

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
121	ARROW	45		C5		77		F0	77
122	NUMERIC	45		C5		77		F0	77
123	Scrl	46		C5		7E		F0	7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2		
			Make	**Break**	**Make**	**Break**	
09	8	(8)	48	C8	75	F0	75
10	9	(9)	49	C9	7D	F0	7D
11	0	(*)	37	B7	7C	F0	7C
23	U	(4)	4B	CB	6B	F0	6B
24	I	(5)	4C	CC	73	F0	73
25	O	(6)	4D	CD	74	F0	74
26	P	(−)	4A	CA	7B	F0	7B
37	J	(1)	4F	CF	69	F0	69
38	K	(2)	50	D0	72	F0	72
39	L	(3)	51	D1	7A	F0	7A
40	;	(+)	4E	CE	79	F0	79
52	M	(0)	52	D2	70	F0	70
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0　35	E0　B5	40　4A	E0　F0　4A	

Table D-6 No.124 key scan code

Key top	Shift	Code set 1		Code set 2	
		Make	**Break**	**Make**	**Break**
Prt Sc	Common	E0　2A　E0　37	E0　B7　E0　AA	E0　12　E0　7C	E0　F0　7C　E0　F0　12
	Ctrl +	E0　37	E0　B7	E0　7C	E0　F0　7C
	Shift +	E0　37	E0　B7	E0　7C	E0　F0　7C
	Alt +	54	D4	84	F0　B4

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2						
		Make						Make						
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E		

*: This key generates only make codes.

Appendix E   Key Layout

4.31 E.1   United Kingdom (UK) Keyboard

Figure E-1 UK keyboard

4.31 E.2   United States (US) Keyboard

Figure E-2 US keyboard

Appendix F   Wiring diagrams

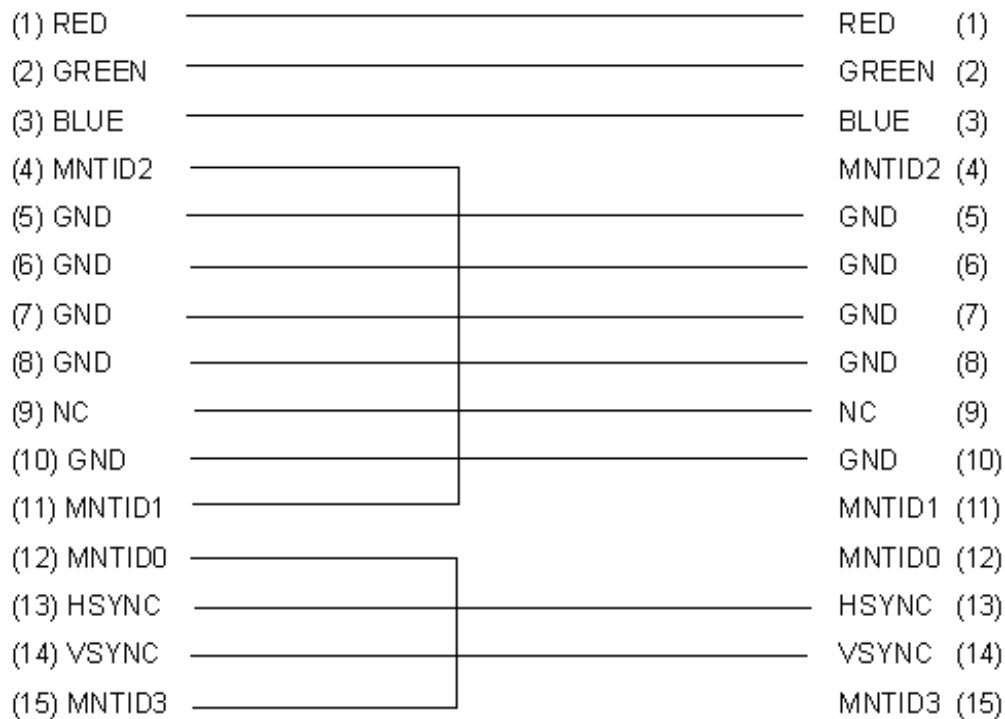## F.1   RGB Monitor Loopback Connector

Figure F-1 RGB Monitor Loopback Connector
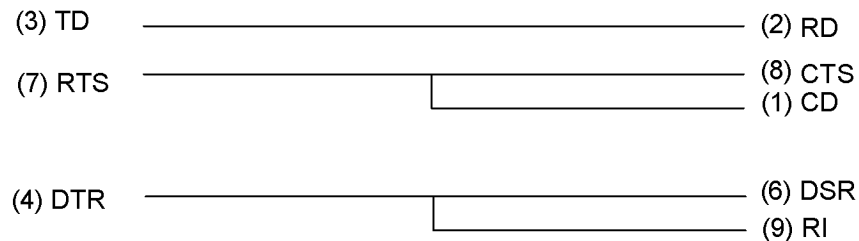
F.2   RS-232C Loopback Connector

Figure F-2 RS-232C Loopback Connector

F.3   RS-232C direct connection cable (9-pin to 9-pin)
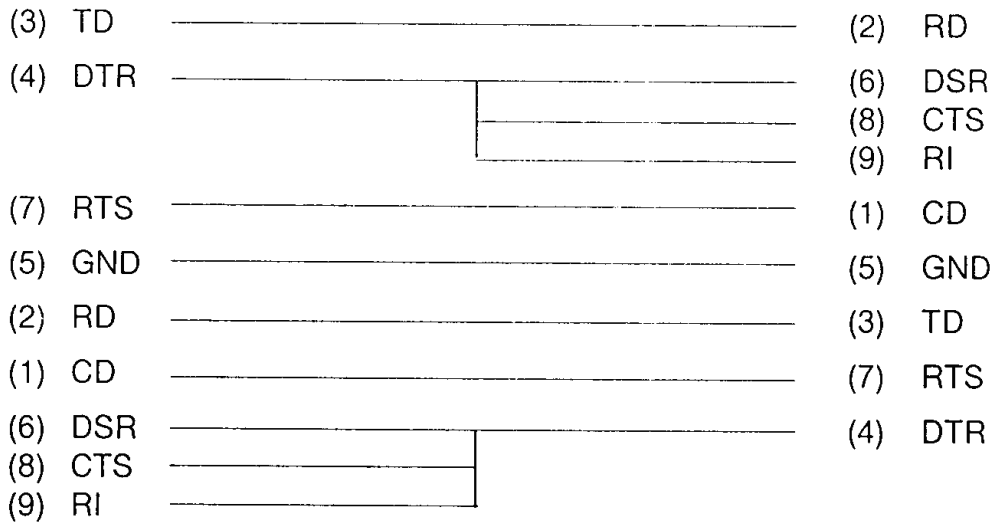

Figure F-3   RS-232C direct connection cable (9-pin to 9-pin)

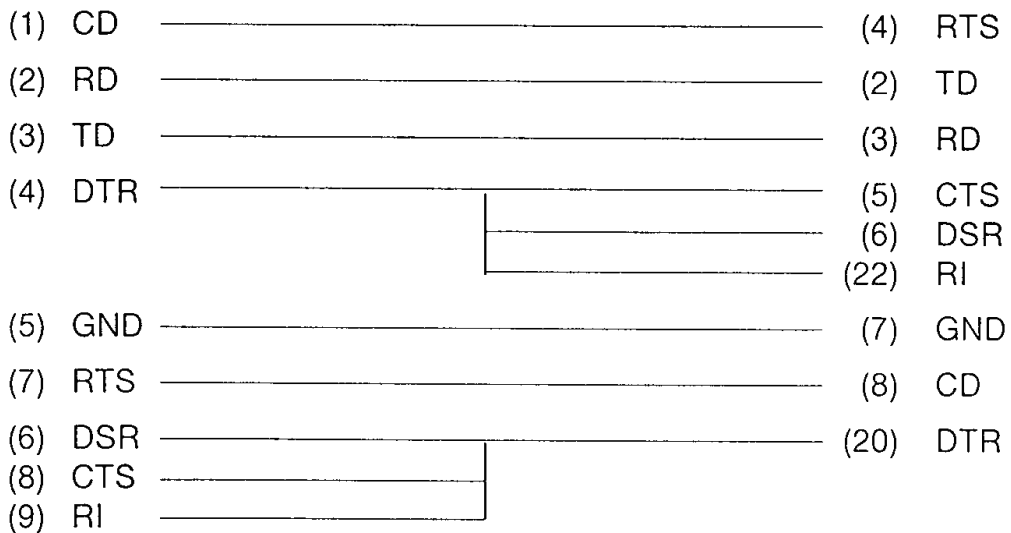## F.4   RS-232C direct connection cable (9-pin to 25-pin)

Figure F-4   RS-232C direct connection cable (9-pin to 25-pin)

F.5   LAN Loopback Connector

```
(1)  TX+ ─────────┐
(2)  TX- ──────┐  │
(3)  RX+ ──────┼──┘
(4)  (Not used)│
(5)  (Not used)│
(6)  RX- ──────┘
(7)  (Not used)
(8)  (Not used)
```
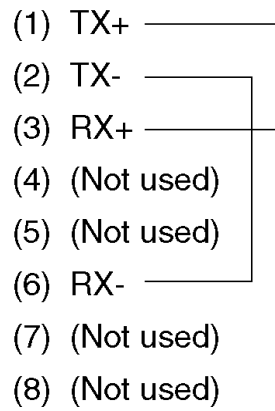
Figure F-5 LAN Loopback Connector

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 tilde character key until a beep sounds.

   For example

    (US Keyboard)

    (UK Keyboard)

6. The BIOS rewriting starts
7. When the process is completed, it beeps and the system automatically reboots.

NOTE: *1.   Connect the AC adapter to the computer when you rewrite the BIOS.*

   2.   Do not turn off the power while you are rewriting the BIOS. If the rewrite fails, it might be impossible to start up the computer.

   3   If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been erased. In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.

Appendix H   EC/KBC rewrite procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

❑ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

> *NOTE:* 1. *Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.*
>
> 2. *Connect the AC adaptor to the computer when you rewrite the EC/KBC.*
>
> 3. *Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.*
>
> 4. *If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC have been erased. In this case, insert the BIOS/EC/KBC rewriting disk and the EC/KBC will be rewritten.*
>
> 5. *Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.*

1. Set the system to boot mode.

2. Turn off the power to the computer.

3. Remove the external cable and PC Card.

4. Connect an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.

5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a beep sounds.) The EC/KBC rewriting starts.

6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I   Reliability

The following table shows MTBF (Mean Time Between Failures).

Table I-1 MTBF

	Time (hours)
MTBF	**5161**