

Toshiba Personal Computer

PORTÉGÉ A600 Maintenance Manual

First edition September 2008

TOSHIBA CORPORATION

File Number 960-710

[CONFIDENTIAL]

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TOSHIBA PORTEGE A600 Maintenance Manual

First edition September 2008

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE A600

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 PORTEGE A600 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 PORTEGE A600 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 Toshiba PORTEGE A600 computer is equipped with an Intel® Core™ 2 Duo ULV Processor. These processors incorporate a math co-processor, a 3MB L2 cache memory.

The PC comes in with one of the following speeds:

Intel® Core™ 2 Duo ULV Processor (Penryn ULV)

- SU9400 (1.40GHz)
- SU9300 (1.20GHz)

These processors operate at 800MHz bus clock (FSB).

Memory

One DDR2-667/DDR2-800 SDRAM slots. Memory modules can be installed to provide a maximum of 5GB (on board memory 1GB). Memory modules are available in 512MB, 1024MB, 2048MB and 4096MB sizes.

Chipset

The PORTEGE A600 is Equipped with Intel Cantiga GS as North Bridge, Intel ICH9M SFF as South Bridge and RICHO R5C847 Card Controller.

VGA Controller

An internal Graphics Controller in North Bridge is used.

HDD

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

- 80/120/160/200/250 GB

SSD

Some models are equipped with a "Solid State Drive (SSD)" instead of a hard disk drive.

- 64GB,128GB

 USB FDD

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

 Optical Drive (SATA ODD)

The computer (Some models) contains a DVD Super Multi drive (double layer).

 Display

LCD : Built-in 12.1inch, 16M colors, WXGA(1280×800dots) thin type low temperature poly-silicon TFT color display.

External monitor : Supported via an RGB connector.

 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.

 Touch pad

A Touch Pad and control buttons in the palm rest enable control of the on-screen pointer and scrolling of windows.

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)

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

 eSATA/USB combo

One eSATA/USB combo port, which complies to. The USB 2.0 standard is provided. This port has eSATA (External Serial ATA) function.

A power supply is always supplied to one USB ports on the left side of a computer.

 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.

 ExpressCard slot

The internal ExpressCard slot is a Universal slot. This slot supports ExpressCard/54 and ExpressCard/34 modules.

 PC card slot (Japanese model only)

PC card slots are provided. The PC card slot (PCMCIA) accommodates one Type II card.

 SD/ SDHC memory card slot

One SD/ SDHC memory 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 Slim Port Replicator II. 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:

- speakers
- Volume control
- Stereo headphone jack
- External microphone jack
- Built-in microphone

Internal modem

The computer (Some models) 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.

Wireless LAN

The computer is equipped with PCI-Ex MiniCard type wireless LAN board that supports 802.11 b/g, 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

Depending on the model, the computer is equipped with a dedicated Bluetooth module. This enables a communication to devices that support Bluetooth. This Bluetooth Stack is based on the Bluetooth Version 1.1/1.2/2.0+EDR/2.1+EDR specification.

 Web Camera

Web Camera is a device that allows you to record video or take photographs with your computer.

Enables the transmission of video and use of video chat via the internet using specialized applications.

The effective pixel count for this web camera is 0.3 million (maximum photograph size: 640x480 pixels).

 Intel Turbo Memory (Robson): PCI Express Mini Card slot (Not Used)

This computer (Some models) is Intel Turbo Memory loading.

 3G: PCI Express Mini Card slot 2.

The computer (Some models) is equipped with PCI Express Mini Card type 3G card

 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".

 TOSHIBA Presentation button

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

 Felica: (Japanese model only)

This manual does not explain. The front of the computer is shown in figure 1-1.

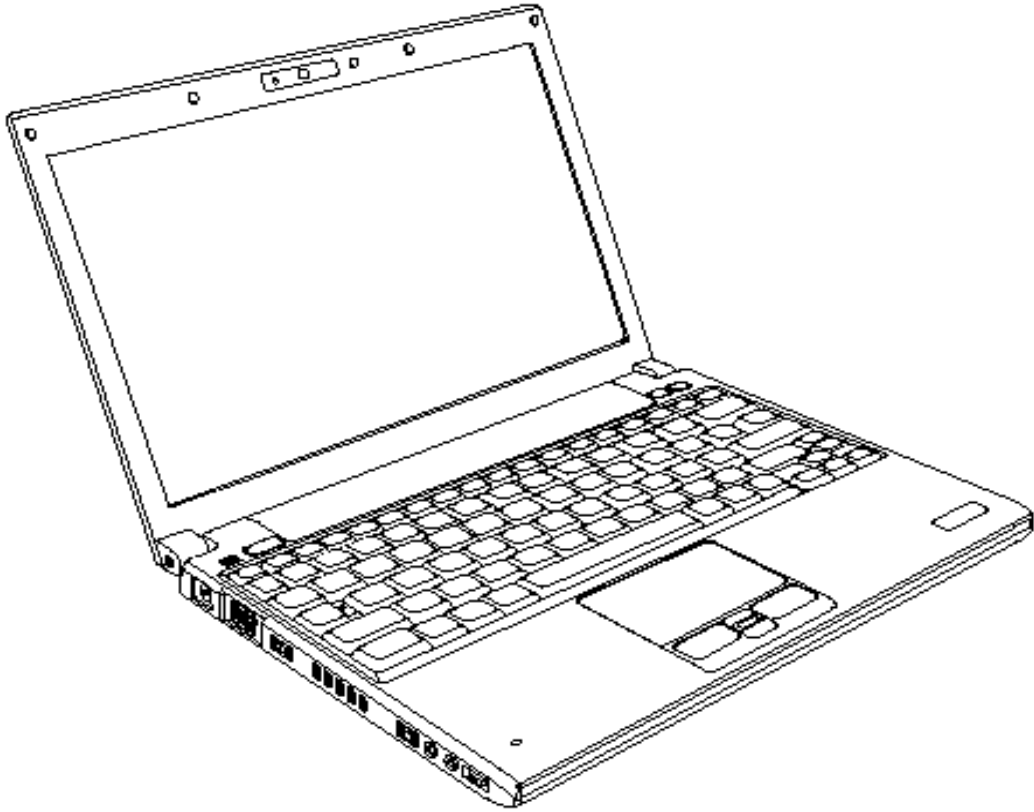


Figure 1-1 Front of the computer

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

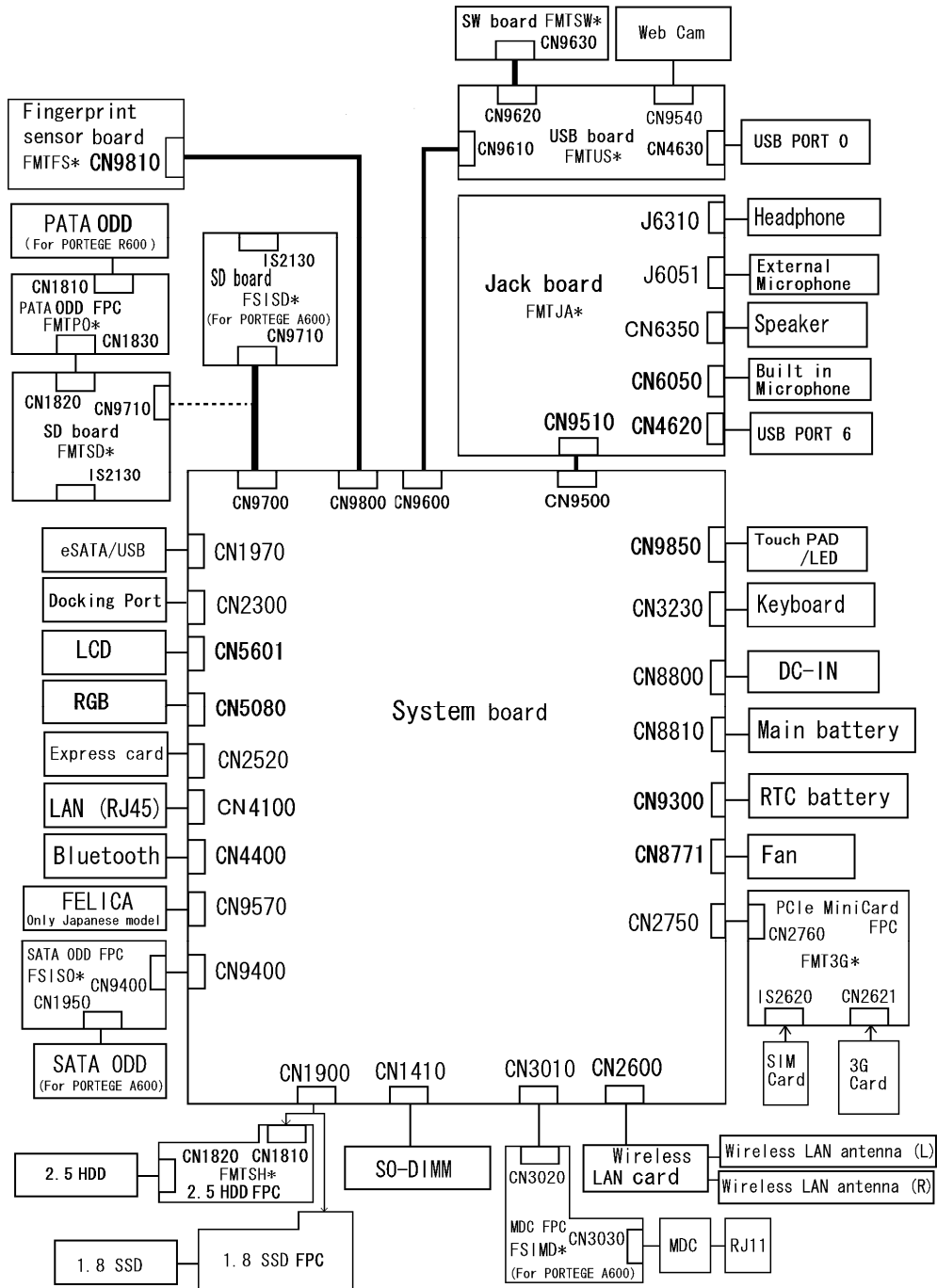


Figure 1-2 System unit configuration

1.2 System Unit Block Diagram

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

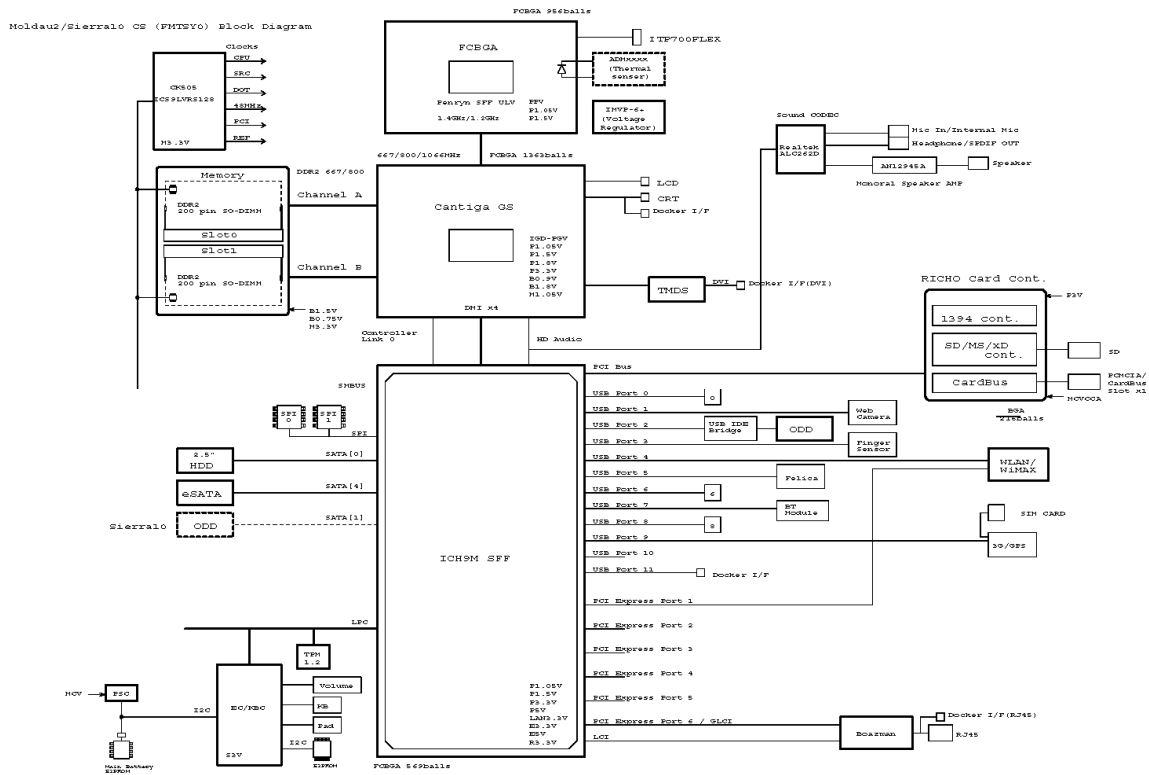


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Microprocessor

The Toshiba PORTEGE A600 computer is equipped with an Intel® Core™ 2 Duo ULV Processor. These processors incorporate a math co-processor, a 3MB L2 cache memory.

The PC comes in with one of the following speeds:

Intel® Core™ 2 Duo ULV Processor (Penryn ULV)

- SU9400 (1.40GHz)
- SU9300 (1.20GHz)

These processors operate at 800MHz bus clock (FSB).

❑ Memory

One DDR2-667/DDR2-800 SDRAM slots. Memory modules can be installed to provide a maximum of 5GB (on board memory 1GB). Memory modules are available in 512MB, 1024MB, 2048MB and 4096MB sizes.

- - 200-pin small-size DIMM
- - 1.8V operation
- - DDR2-667/800 support

❑ BIOS ROM (Flash memory)

- - 8Mbit (512K×16-bit chip)
- 301KB used for Animation
- 288KB used for system BIOS
- 64KB used for VGA-BIOS
- 64KB used for Finger Print
- 32KB used for ACPI
- 24KB used for booting
- 16KB used for Parameter Block
- Others

❑ North Bridge (Intel Cantiga GS :Intel GS45)

- Penryn Processor System Bus Supports
- System Memory supports :DDR2-667 / DDR2-800, 5GB max.
- Internal Graphics
High-performance mode : 533MHz /1.05V
Low-power mode : 320MHz / 1.00V
- DMI(Direct Media Interface)
- Power management control (ACPI 3.0)
- 363-bal 27×25mm FCBGA package (SFF Package)

❑ South Bridge (Intel ICH9M SFF :Intel 82801IEM)

- DMI (Direct Media Interface)
- PCI Express I/F and (6 Prots) PCI Bus I/F Rev2.3 (4 PCI REQ/GNT Pairs)
- Integrated Serial ATA Host Controller and (6 Prots, 300 MB/s) External SATA support
- Intel Matrix Storage Technology (AHCI/RAID)
- Intel High Definition Audio Interface
- USB 2.0 Controller 12 Prots
- LAN controller built-in (IEEE-802.3 conformity) and power management control (ACPI 3.0b conformity)
- SMBus2.0
- SPI Interface (BIOS)
- LPC Interface (EC/KBC, Super I/O)
- Interrupt controller
- RTC built-in
- GPIO
- 569-ball 16x16mm FCBGA Package (SFF Package)

Card controller (R5C847)

- - PCI Interface
- - SD/MMC, Memory Stick, xD card Controller

 VGA Controller

An internal Graphics Controller in North Bridge is used.

 Sound Controller

- HD Audio Link (Intel High Definition Audio I/F) and RealTec ALC262
- Amplifier: Mathushita made AN12945A
- HD Audio
- speakers
- Digital volume control
- Supports VoIP
- Stereo headphone jack
- External microphone jack
- Built-in microphone

 Modem Controller

- One MDC is used.
- This controller has the following functions:
 - One RJ11 port
 - Agere
 - 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
 - Controller : Intel made Boazman (WG82567LM /WG82567LV)
: GLCI(PCI-Ex)/LCI Connection
 - Supports Gigabit Ethernet
 - One RJ45 port
 - WOL support
 - Magic Packet support

 Wireless LAN

- One PCI Express Mini Card slot1
 - 802.11 b/g Askey/Atheros 11b/g(ROW) XB63L
 - 802.11 b/g/n Askey/Atheros 11b/g/n (MoW) XB91L
 - 802.11 a/b/g/n Askey/Atheros 11a/b/g/n, 2x2 (MoW) XB92L
 - 802.11 a/b/g Intel 11a/b/g Shirley Peak (MOW) MC 1x2
 - 802.11 a/b/g/n Intel 11a/b/g/n Shirley Peak (MOW) MC 1x2
- Supports Wireless Communication SW

 Bluetooth

- V2.1
- USB interface connection

 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.

 EEPROM for security

- M24C08-WDW6TP (ST micro) chip is used.

 TPM

- SLB9635 TT 1.2 (Infineon) chip is used.

 Clock Generator

- ICS9LVRS128 BKLF-T (Integrated Device Technology) is used.
- This device generates the system clock.

 Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.
- Thermistor: It is used at seven places. (Cantiga-GS, Memoryx2, for [x4 (FAN getting it blocked normal temperature measurement x2, detection x2)] failure omens)
- Magnetometric sensor: It is used as an object for LCD opening and closing (ferrite magneto system).
- Acceleration Sensor : HDD protection(LIS3L02A)
- Fingerprints sensor: Authen Tec maid(AES1610-C-DF-CA-NI00)

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.

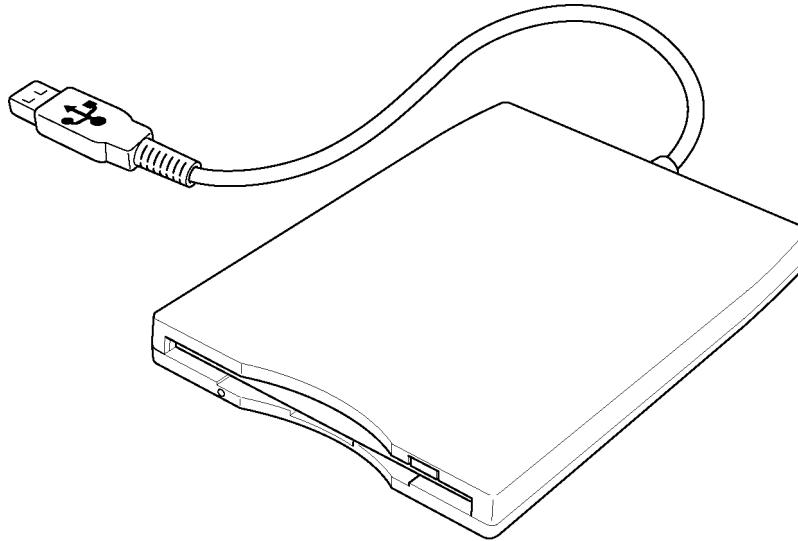


Figure 1-4 3.5-inch FDD (USB External)

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, 160GB, 200GB or 250GB.

The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.

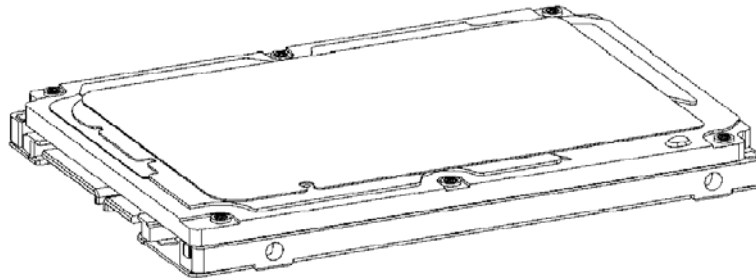


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD specifications

Items		Specifications			
		TOSHIBA G8BC0004G080	TOSHIBA G8BC0004G120	TOSHIBA G8BC0004G160	TOSHIBA G8BC0004G250
Outline Dimensions	Width (mm)	100.0			
	Height (mm)	9.5			
	Depth (mm)	69.85			
	Weight (g)	98 max			102 max
Storage size (formatted)		80GB	120GB	160GB	250GB
Speed (RPM)		5,400			
Data transfer speed		335-613(Mbits/s)			
Internal Transfer rate		300 (Mbytes/s)			
Host Transfer rate		300 (Mbytes/s)			
Data buffer size		8,192Kbyte			
Motor startup time (s)		3.5 typical 9.5 max			

Table 1-2 2.5-inch HDD specifications

Items		Specifications				
		HGST G8BC00051 080	HGST G8BC00051 120	HGST G8BC00051 160	HGST G8BC00046 200	HGST G8BC0005 1250
Outline Dimensions	Width (mm)	100.2±0.25				
	Height (mm)	9.5±0.2				
	Depth (mm)	69.85±0.25				
	Weight (g)	95 max				102 max
Storage size (formatted)		80GB	120GB	160GB	200GB	250GB
Speed (RPM)		5,400			7,200	5,400
Data transfer rate Disk-buffer to/from media(Mbps) Buffer-host data transfer (Ggit/sec)		775 max 3.0/1.5 max.				
Data buffer size (MB/s)		8				
Positioning Time(read and seek time)		Read: 12ms				
Motor startup time (s)		3.5				

1.5 1.8-inch Solid State Drive (SSD)

Some models are equipped with a "Solid State Drive (SSD)" instead of a hard disk drive.

The computer supports a 64GB and 128GB.

The specifications of SSD are listed by the table 1-3.

Table 1-3 1.8-inch Solid State Drive (SSD) specifications

Items		Specifications	
		TOSHIBA G8BC0004X641	TOSHIBA G8BC0004X121
Outline Dimensions	Width (mm)	53.60	
	Height (mm)	3.0	
	Depth (mm)	70.6	
	Weight (g)	15	
Storage size (formatted)		64GB	128GB.
Data transfer speed		Host Interface : Max 300MB/s Sustained Data Read : Max 100MB/s Sustained Data Write : Max 40MB/s	

1.6 DVD-Super Multi Drive Optical Drive (ODD)

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.

The specifications are listed in Table 1-4.

Table 1-4 DVD Super Multi drive specifications

Item		Specifications
		MATSUSHITA G8CC0004D220/22L
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	9.5 (excluding projections)
	Depth (mm)	129 (excluding projections)
	Mass (g)	107±5(bezel included)
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-R DL DVD-RW DVD+R DVD+R DL DVD+RW DVD-RAM		Max. 24x CAV Max. 16x ZCLV (Ultra speed) Max. 8x ZCLV Max. 4x ZCLV Max. 6x ZCLV Max. 8x ZCLV Max. 4x ZCLV Max. 8x ZCLV Max. 3x-5X PCAV (4.7GB)
SATA interface		150MByte/s
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, DVD-R DL(Read only), DVD+R, DVD+R DL(Read only)
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, CD-Extra(CD+), CD-text, Video CD DVD: DVD-R, DVD-RW (Ver. 1.1, 1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM, DVD-ROM DVD-R DL(Read only, DVD+R DL(Read only)

1.7 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

1.8 TFT Color Display

The TFT color display consists of 12.1-inch WXGA LCD module.

1.8.1 LCD Module

The LCD module used for the TFT color display uses a white LED backlight as the light source and can display a maximum of 16M colors with 1,200 x 800 resolutions. The VGA in North Bridge can control internal and external WXGA support displays simultaneously. Figure 1-7 shows a view of the LCD module and Table 1-5 lists the specifications.

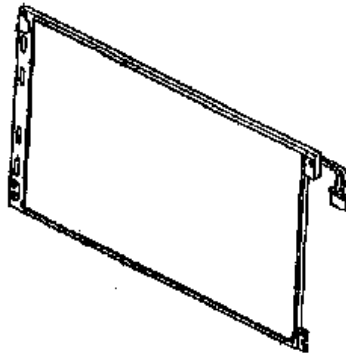


Figure 1-7 LCD module

Table 1-5 LCD module specifications

Item	Specifications
	12.1-inch WXGA TFT (TMD G33C00051110/210 / (TMD G33C00047110/210)
Display system	VMW alignment cell, Transflective, Normally Black / Homogeneous alignment cell, Transflective, Normally White
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.204(H) x 0.204(V)
Display range (mm)	261.12(H) x 163.2(V)
Weight(g)	G33C00051110:135±15/210: 120(Min), 133(Max) G33C00047110:137±15 /210: 134.5(Max)

Item	Specifications
	12.1-inch WXGA TFT (TMD G33C00052110)
Display system	TN alignment cell, Transmissive type, Normally White
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.204(H) x 0.204(V)
Display range (mm)	261.12(H) x 163.2(V)
Weight(g)	-

1.9 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 1-8.

Table 1-6 Power supply output rating

		ACPI state	S3/S4/S5	S3	S3	S4/S5	S4/S5	G3	Object
		M state	M1	Moff	Moff	Moff	Moff		
		Wakeup	-	WOL	No WOL	WOL	No WOL		
Power line name	Voltage [V]	Name							
P	*	PPV	x	x	x	x	x	x	CPU
	*	IGD-PGV	x	x	x	x	x	x	(G)MCH
	1.05	1R05-P1V	x	x	x	x	x	x	CPU, (G)MCH, ICH
	1.50	1R5-P1V	x	x	x	x	x	x	CPU, (G)MCH, ICH
	1.80	1R8-P1V	x	x	x	x	x	x	eSATA Repeater
	3.3	P3V	x	x	x	x	x	x	
	5.0	P5V	x	x	x	x	x	x	
B	1.8	1R8-B1V	o	o	o	x	x	x	(G)MCH, Memory
	0.9	0R9-B0V	o	o	o	x	x	x	Memory
ME	1.05	1R05M-E1V	o	x	x	x	x	x	(G)MCH
	3.3	M-E3V	o	x	x	x	x	x	CK505, SPD
LAN	1.05	LAN1R0-E1V	o	o	x	o	x	x	LAN PHY
	1.8	LAN1R8-E1V	o	o	x	o	x	x	LAN PHY
	3.3	LAN-E3V	o	o	x	o	x	x	ICH, LAN PHY, SPI
E	3.3	E3V	o	o	o	o	x	x	ICH
	5	E5V	o	o	o	o	x	x	ICH, USB
S	3	S3V	o	o	o	o	o	x	EC/KBC
M	5	M5V, MCV	o	o	o	o	o	x	LED, PSC
R	3	R3V	o	o	o	o	o	o	RTC

1.10 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	G71C00085110/210/710/810	Lithium-Ion	10.8 V	2,900 mAh
	G71C00086110/210/710/810	Lithium-Ion	10.8 V	5,800 mAh
RTC battery	GDM710000041	NiMH	2.4 V	15mAh

1.10.1 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.

1.10.2 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(2,900 mAh)	About 5.0 to 7.5	About 5.0
Battery(5,800 mAh)	About 6.5 to 15.0	About 5.0

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

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

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The battery or output voltage is abnormal.

Detection of full charge

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

1. The current in the battery charging circuit drops under the predetermined limit.
2. The charging time exceeds the fixed limit.

❑ Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-9.

Table 1-9 Data preservation time

Condition	preservation time
Standby	About 2 days Battery(2,900 mAh)
Shutdown	About 55 days Battery(2,900 mAh)
Standby	About 5 days Battery(5,800 mAh)
Shutdown	About 110 days Battery(5,800 mAh)

1.10.3 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 1-10 lists the charging time and data preservation period of the RTC battery.

Table 1-10 RTC battery charging/data preservation time

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

1.11 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-11 lists the AC adapter specifications.

Table 1-11 AC adapter specifications

Parameter	Specification
	G71C00098210 (2-pin)/ G71C00098310 (2-pin) / G71C00062310(2-pin)
Power	45W
Input voltage	100V/240V
Input frequency	50Hz to 60Hz
Input current	1.2A (100Vac 3Aload)
Output voltage	15V
Output current	0A to 3A (At constant voltage mode)

Parameter	Specification
	G71C0004A610(3-pin)
Power	60W
Input voltage	100V/240V
Input frequency	50Hz to 60Hz
Input current	1.5A or less (100V-240V 4Aload)
Output voltage	15V
Output current	0A to 4A (At constant voltage mode)

Chapter 2

Troubleshooting Procedures

[CONFIDENTIAL]

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2.1 Troubleshooting

Chapter 2 describes how to determine which Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. (The “FRU” means the replaceable unit in the field.)

The FRUs covered are:

- | | | |
|--------------------|-----------------------|------------------------|
| 1. Power supply | 8. Optical Disk Drive | 15. SD Card Slot |
| 2. System Board | 9. Modem | 16. Fingerprint Sensor |
| 3. USB FDD | 10. LAN | 17. Web camera |
| 4. Hard Disk Drive | 11. Wireless LAN | 18. Intel Turbo Memory |
| 5. Keyboard | 12. Bluetooth | |
| 6. Touch pad | 13. Sound | |
| 7. Display | 14. 3G | |

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

NOTE: Before replacing the system board, it is necessary to execute the subtest 03 DMI Information save of the 3.4 Setting of the hardware configuration in Chapter 3.

After replacing the system board, it is necessary to execute the subtest 04 DMI Information recovery and subtest 08 System configuration display of the 3.4 Setting of the hardware configuration in Chapter 3. Also update with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures”.

After replacing the LCD, update with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures” to set the SVP parameter.

The implement for the Diagnostics procedures is referred to Chapter 3. Also, following implements are necessary:

1. Phillips screwdrivers (For replacement procedures)
2. Implements for debugging port check
 - Toshiba MS-DOS system FD
 - RS-232C cross cable
 - Test board with debug port test cable
 - PC for displaying debug port test result

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

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

2.2 Troubleshooting Flowchart

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

- Ask him or her to enter the password if a password is registered.
- Verify with the customer that Toshiba Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.

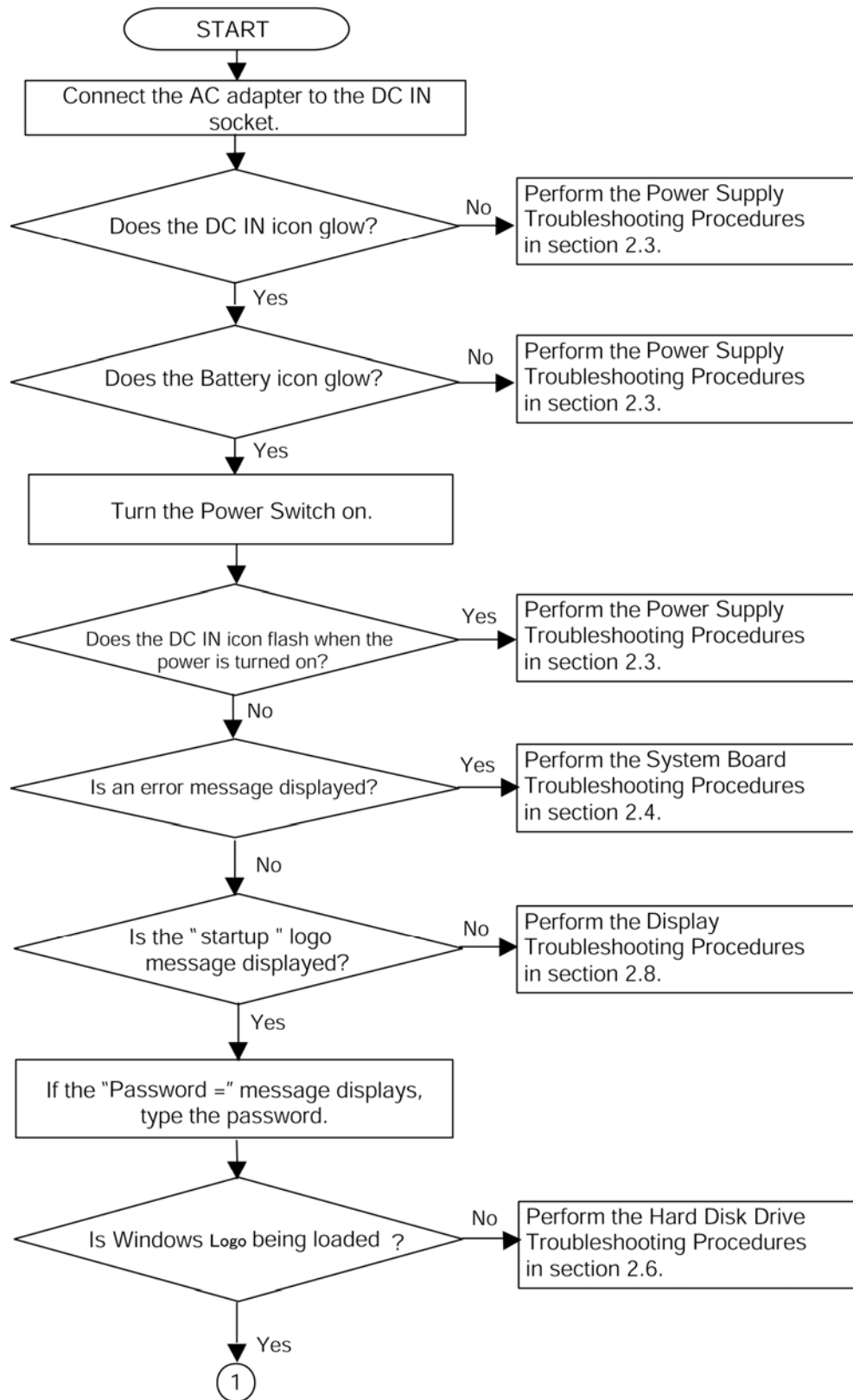


Figure 2-1 Troubleshooting flowchart (1/2)

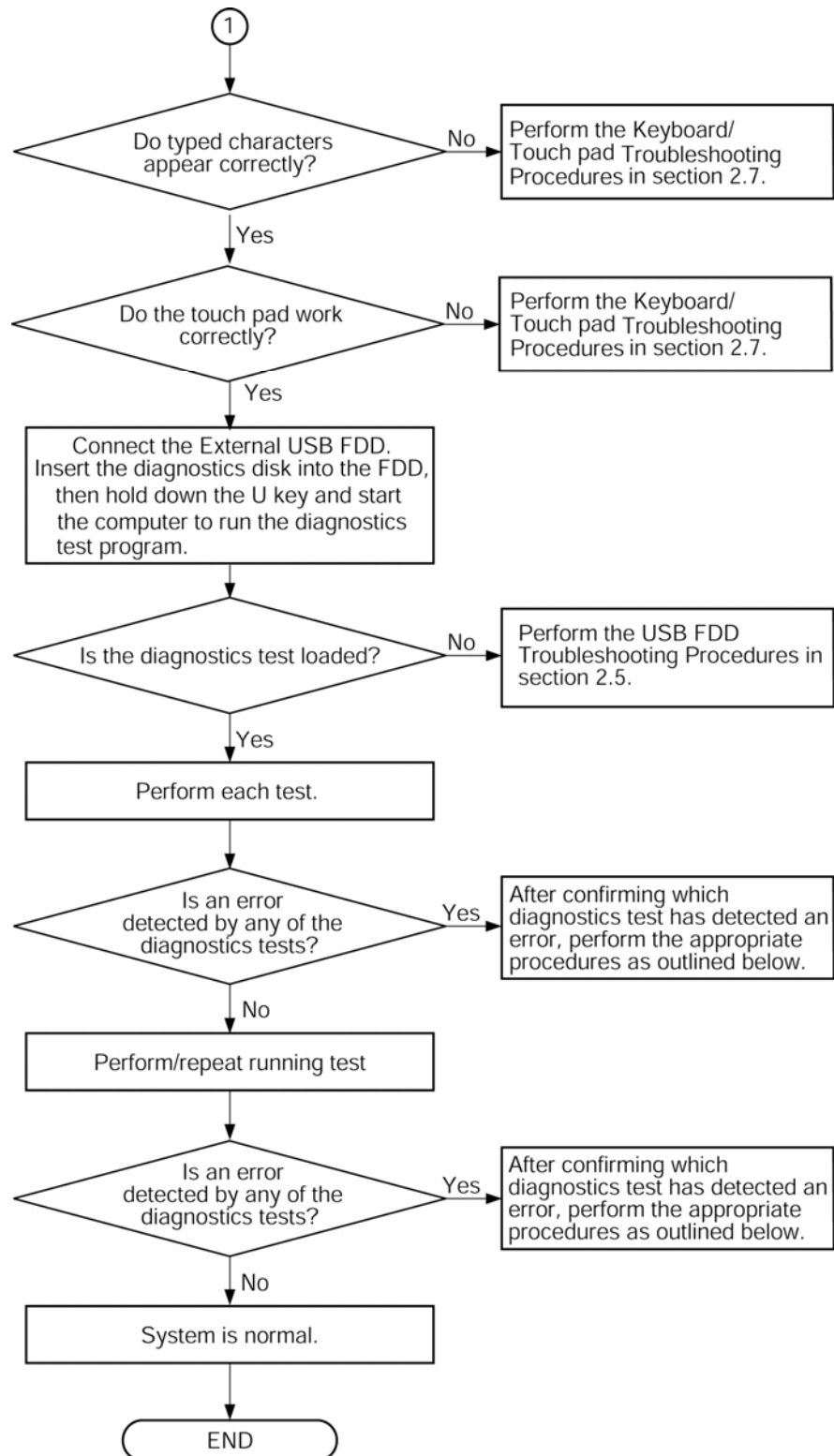


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, display test, CD-ROM/DVD-ROM test, expansion test, real timer test, sound test or Modem/LAN/Bluetooth /IEEE1394 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 found on the keyboard test (DIAGNOSTICS TEST) and pressed key display test (ONLY ONE TEST), perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is found on the touch pad test (ONLY ONE TEST), perform the touch pad Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Disk Drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test, perform the LAN 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 Bluetooth test, perform the Bluetooth Troubleshooting Procedures in Section 2.14.
12. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.15.
13. If an error is detected on the 3G, perform the 3G Troubleshooting Procedures in Section 2.16.
14. If an error is detected on SD card, perform the SD Card Slot Troubleshooting Procedures in Section 2.17.

15. If a malfunction is detected on the fingerprint sensor, perform the Fingerprint Sensor Troubleshooting Procedures in Section 2.18.
16. If a malfunction is detected on the Web camera, perform the Web camera Troubleshooting Procedures in Section 2.19.
17. If a malfunction is detected on the Intel Turbo Memory, perform the Intel Turbo Memory Troubleshooting Procedures in Section 2.20.

2.3 Power Supply Troubleshooting

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

- Procedure 1: Power Status Check
- Procedure 2: Error Code Check
- Procedure 3: Connection Check
- Procedure 4: Charging Check
- Procedure 5: Replacement Check

Procedure 1 Power Status Check

The following icons indicate the power supply status:

- Battery icon
- DC IN icon

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

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights blue	Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power.
Flashes orange	Battery charge is low. The AC adaptor must be connected to recharge the battery.
Blinks orange (even intervals)	The battery level is low while the system power is ON.
Blinks orange once (at being switched on)	The system is driven by only a battery and the battery level is low.
Doesn't light	Any condition other than those above.

Table 2-2 DC IN icon

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

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

When the icon is blinking, perform the following procedure.

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

If the icon is still blinking after the operation above, check the followings:

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

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

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

NOTE: Use a supplied AC adapter G71C0002R710, G71C0002R810 (2-pin)/
G71C00067210, G71C00067110 (3-pin).

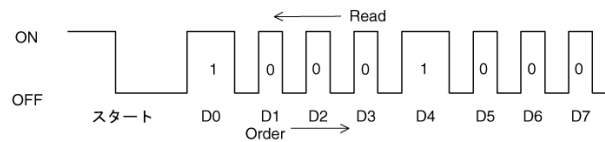
Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN icon blinks orange. The blink pattern indicates an error as shown below.

- | | |
|---|---------------------|
| <input type="checkbox"/> Start | Off for 2 seconds |
| <input type="checkbox"/> Error code (8 bit) | |
| “1” | On for one second |
| “0” | On for half second |
| Interval between data bits | Off for half second |

The error code begins with the least significant digit.

Example: Error code 11h (Error codes are given in hexadecimal format.)



Start

Check 1 Convert the DC IN icon blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

Table 2-3 Error code

Error code	Where error occurs
1*h	DC Power (AC Adapter)
2*h	Main battery
3:h	2nd battery
4*h	S3V output
5*h	E5V output
6*h	E3V output
7*h	1R5-E1V output
8*h	IGD-PGV output
9*h	PPV output
A*h	1R05-E1V output
B*h	1R5-E1V output
C*h	1R8-E1V output
D*h	1R8-E1V output
E*h	-
F*h	-

DC power supply (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	Common Dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 6.60A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	The compensation value of [0A] is not within the limits from design data ($\pm 481\text{mA}$).

Main Battery

Error code	Meaning
22h	Main battery discharge current is over 0.5A.
23h	Main battery charge current is over 2.3A.
24h	The compensation value of [0A] is not within the limits from design data ($\pm 15\text{LSB}$).
25h	Main battery charge current is over 0.3A when the charging is off.

 2nd Battery

Error code	Meaning
32h	Second battery discharge current is over 0.5A.
33h	Second battery charge current is over 2.3A.
34h	The compensation value of [0A] is not within the limits from design data ($\pm 15\text{LSB}$).
35h	Second battery charge current is over 0.3A when the charging is off.

 S3V output

Error code	Meaning
40h	S3V voltage is over 3.47V.
45h	S3V voltage is under 3.14V.
46h	S3V voltage is under 3.14V or less when the computer is powered on.

 E5V output

Error code	Meaning
50h	E5V voltage is over 6.00V.
51h	E5V voltage is under 4.50V when the computer is powered on.
52h	E5V voltage is under 4.50V when the computer is booting up.
54h	E5V voltage is under 4.50V when EV power is maintained.

E3V output

Error code	Meaning
60h	E3V voltage is over 3.96V.
61h	E3V voltage is under 2.81V when the computer is powered on.
62h	E3V voltage is under 2.81V when the computer is booting up.
64h	E3V voltage is under 2.81V when EV power is maintained.

1R5-E1V output

Error code	Meaning
70h	1R5-E1V voltage is over 1.80V.
71h	1R5-E1V voltage is under 1.275V when the computer is powered on.
72h	1R5-E1V voltage is under 1.275V when the computer is booting up.
74h	1R5-E1V voltage is under 1.275V when EV power is maintained.

1GD-PGV output

Error code	Meaning
80h	1GD-PGV voltage is over 1.26V.
81h	1GD-PGV voltage is under 0.425V when the computer is powered on.
82h	1GD-PGV voltage is under 0.425V when the computer is booting up.

PPV output

Error code	Meaning
90h	PPV voltage is over 1.44V.
91h	PPV voltage is under 0.27V when the computer is powered on.
92h	PPV voltage is under 0.59V when the computer is booting up.

1R05-E1V output

Error code	Meaning
A0h	1R05-E1V voltage is over 1.26V.
A1h	1R05-E1V voltage is under 0.89V when the computer is powered on.
A2h	1R05-E1V voltage is under 0.89V when the computer is booting up.
A4h	1R05-E1V voltage is under 0.89V when EV power is maintained.

1R5-E1V output

Error code	Meaning
B0h	1R5-E1V voltage is over 1.80V.
B1h	1R5-E1V voltage is under 1.275V when the computer is powered on.
B2h	1R5-E1V voltage is under 1.275V when the computer is booting up.
B4h	1R5-E1V voltage is under 1.275V when EV power is maintained.

1R8-E1V output

Error code	Meaning
C0h	1R8-E1V voltage is over 2.16V.
C1h	1R8-E1V voltage is under 1.53V when the computer is powered on.
C2h	1R8-E1V voltage is under 1.53V when the computer is booting up.
C4h	1R8-E1V voltage is under 1.53V when EV power is maintained.

1R8-E1V output

Error code	Meaning
D0h	1R8-E1V voltage is over 2.16V.
D1h	1R8-E1V voltage is under 1.53V when the computer is powered on.
D2h	1R8-E1V voltage is under 1.53V when the computer is booting up.
D4h	1R8-E1V voltage is under 1.53V when EV power is maintained.

Miscellaneous

Error code	Meaning
F0h	The sub clock does not oscillate.

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

- Make sure the AC adapter and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected firmly, go to the following step.
- Connect a new AC adapter and AC power cord. If the problem still occurs, go to Procedure 5.

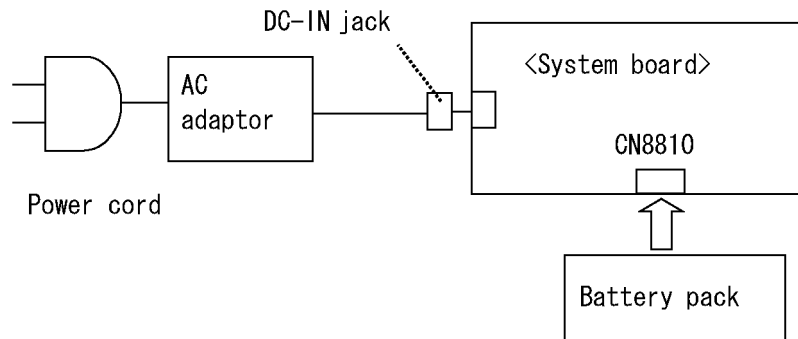
Check 3 In the case of error code 21h:

- Go to Procedure 3.

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

Procedure 3 Connection Check

The wiring diagram related to the power supply is shown below:



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

Check 1 Make sure the AC adaptor and the AC power cord are firmly plugged into the DC IN jack and wall outlet. If these cables are connected firmly, go to Check 2.

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

- If the DC IN icon does not light, go to Procedure 5.
- If the battery icon does not light, go to Check 3.

Check 3 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4 Charging Check

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

Check 1 Make sure the AC adaptor is firmly plugged into the DC IN jack.

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

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

Check 4 The battery's temperature is too high or low. Leave the battery for a while to adjust it in the right temperature. If the battery pack is still not charged, go to Check 5.

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

Procedure 5 Replacement Check

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

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

When AC adapter is connected:

- Check 1 AC adapter may be faulty. Replace the AC adapter with a new one. If the problem still occurs, perform Check 2.
- Check 2 System board may be faulty. Replace the system board with a new one.

When AC adapter is not connected:
(When driving with battery pack)

- Check 1 Battery pack may be faulty. Replace it with a new one. If the problem still occurs, perform Check 2.
- Check 2 System board may be faulty. Replace it with a new one.

2.4 System Board Troubleshooting

This section describes how to determine if the system board is malfunctioning or not. 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: Debugging Port Check

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

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

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If MS-DOS or Windows OS is properly loaded, go to Procedure 4.

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

If you press the **F1** key as the message instructs, the **SETUP** screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, 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 If the following error message is displayed on the screen, press any key as the message instructs.

The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

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

If any other error message displays, perform Check 3.

Check 3 The IRT checks the system board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (17), (23) or (24) is displayed, go to Procedure 4.

If error message (18) is displayed, go to the Keyboard Troubleshooting Procedures.

If error message (19), (20) or (21) is displayed, go to the HDD Troubleshooting Procedures.

If error message (22) is displayed, go to the USB FDD Troubleshooting Procedures.

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

Procedure 2 Debugging Port Check (Boot Mode)

Check the D port status by a serial port test. The tool for serial port test is shown below.

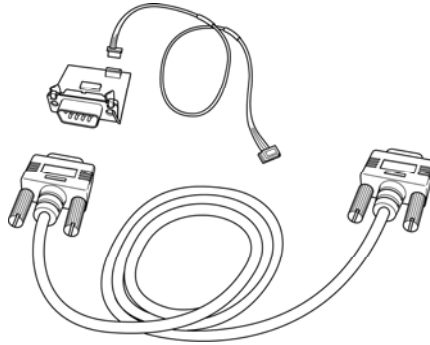
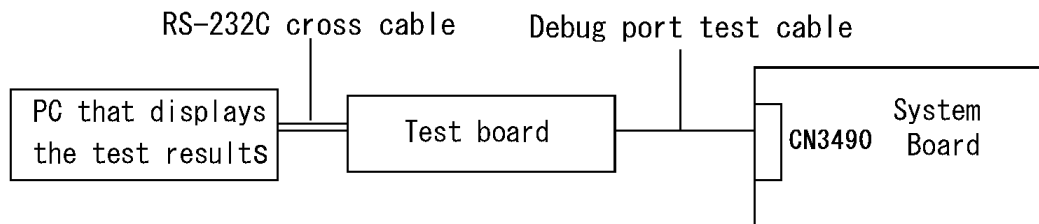


Figure 2-2 Debug port (Boot mode) error status

The test procedures are follows:

1. Connect the debug port test cable to the connector CN3490 of the system board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C Cross-cable to the PC that displays the test results.



4. Boot the computer in MS-DOS mode.
5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into FDD and input “FD starting drive:>dport”.)

The D port status is displayed in the following form;

F100 : 000.000382		IRT_CHK_IN\SYSTEM_START
—	—	—
D port status	Time (second) to process	Contents of process

6. When the D port status is FFFFh (normal status), go to Procedure 4.
7. When the D port status falls into any status in Table 2-4, execute Check 1.

Table 2-4 Debug port error status (1/8)

System BIOS Boot block processing			
Debug Code	BIOS processing	Target Device	IC No.
	CPU setup	CPU MCH(register) ICH (register, PIT controller, MEM I/O) EC/KBC(EC) BIOSROM, Super I/O	IC1050(CPU) IC1200(MCH) IC1600(ICH) IC3200(EC/KBC) IC3001(BIOS ROM)
	MCH initialization		
	ICH initialization		
	EC access check		
	setup of PIT		
	Initialization of ICH and Super I/O		
F000	BIOS ROM check	BIOSROM	IC3001(BIOS ROM)
	Problematic to BIOS ROM data.		
F001	EC/KBC rewriting check	EC/KBC(KBC) BIOSROM	IC3200(EC/KBC) IC3001(BIOS ROM)
F002	Initialization of EC	EC/KBC(EC,KBC) BIOSROM	IC3200(EC/KBC) IC3001(BIOS ROM)
	Initialization of EC		
	Initialization of KBC		
F003	Initialization failure of EC		
F004	Initialization failure of EC (HW failure)		
F005	CPU setup	CPU BIOSROM	IC1050(CPU) IC3001(BIOS ROM)
F006			
F007	BIOS ROM check BIOS	EC/KBC(EC) BIOSROM	IC3200(EC/KBC) IC3001(BIOS ROM)
F008	BIOS ROM check 2	BIOSROM	IC3001(BIOS ROM)
F009	End of Boot Block processing		

Table 2-5 Debug port error status (2/8)

System BIOS IRT processing			
Debug Code	BIOS processing	Target Device	IC No.
F100	CPU setup	CPU ICH(PCIRegister,PITController) MCH(PCIRegister) SDController BIOSROM	IC1050(CPU) IC1600(ICH) IC1200(MCH) IC2000(SDController) IC3001(BIOS ROM)
	Initialization of ICH, MCH, and Super I/O		
	setup of SD controller		
	setup of PIT		
F101			
F102	Memory initialization	MCH(PCIRegister) RAM(SPD,Memory) ICH(PCIRegister,CMOS) CPU BIOSROM	IC1200(MCH) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.) IC1600(ICH) IC1050(CPU) IC3001(BIOS ROM)
	Memory error		
	setup for using RAM area		
	check memory error of RAM area		
	memory error		
F103	CPU setup	CPU ICH(CMOS) BIOSROM	IC1050(CPU) IC1600(ICH) IC3001(BIOS ROM)
	CMOS setup		
	CMOS error		
F104	Resume branch	ICH(CMOS) BIOSROM RAM	IC1200(MCH) IC3001(BIOS ROM) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
	BIOS processing reading		
	ROM read error		
F105	check of BIOS processing	EC/KBC(EC) TPM CPU	IC3200(EC/KBC) IC3300(TPM) IC1050(CPU)
F106	RAM setup	CPU ICH(CMOS,PICController,I/O,MEM I/O) RAM	IC1050(CPU) IC1600(ICH) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
	Initialization of ICH (APIC)		
F107	Initialization of ICH (PIT)	CPU ICH(PITController,MEM I/O,CMOS,I/O) Clock Generator	IC1050(CPU) IC1600(ICH) IC1000(Clock Generator)
	PIT initialization error		
	CPU check		
	check of ROM data		
	SMI setup		
	Part number data distinction		
	Panel distinction		
	CMOS check		
	Clock generator setup		
CPU initialization			

Table 2-6 Debug port error status (3/8)

F108	EC data reading	EC/KBC(EC,KBC)	IC3200(EC/KBC)
	BIOS processing reading 2	ICH (CMOS,PICController, IDEController,SoundController, ModeController,PCI Express, USBController,PCIRegister, MEM IO)、 MCH RAM BIOSROM VGA CPU	IC1600(ICH)
	setup of ICH (IDE)		IC1200(MCH)
	setup of ICH (Azalia)		IC1420,1421,1430,1431(RAM)
	setup of MCH		IC1440,1441,1450,1451(RAM)
	Thermal control setup		CN1410(RAM Conn.)
	Initialization of KBC		IC3001(BIOS ROM)
	Display setup		IC1200(VGA)
	BIOS processing reading 3		IC1050(CPU)
	Setup of Built in LAN		
	PCI Express initialization		
	Initialization of a sound		
	SelectableBay Device Check		
	setup of ICH		
setup of ICH (PIC)			
F109	PCI initialization	ICH(PCIRegister) EC/KBC(EC)	IC1600(ICH) IC3200(EC/KBC)
	LAN initialization	LAN Controller	IC4000(LAN Controller)
F10A	CMOS initialization	ICH(CMOS)	IC1600(ICH)
	setup of a setup item	EC/KBC(EC)	IC3200(EC/KBC)
F10B	PnP device initialization	PCI Device	IC1600(ICH)
	PCI device initialization		IC2000(Card Controller)
F10C	PCI ExpressCard setup	ICH(PCIRegisterMEM I/O, IDEController)	IC1600(ICH)
	HDD setup	EC/KBC(EC) HDD	IC3200(EC/KBC) CN1900(HDD Conn.)
F10D	Memory access check	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F10E	Memory data setup	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F10F	NDP initialization	ICH(CMOS,PICController)	IC1600(ICH)
F110	TIMER initialization	ICH(PITController,CMOS,PCIRegister) EC/KBC(EC,KBC)	IC1600(ICH) IC3200(EC/KBC)
	Initialization of EC and battery access	PSC Battery(E2PROM)	IC8972(PSC) CN8810(Battery Conn.)
F111	Display setup	EC/KBC(EC) VGA RAM	IC3200(EC/KBC) IC1200(VGA) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)

Table 2-7 Debug port error status (4/8)

F112	BIOS ROM check	EC/KBC(EC)	IC3200(EC/KBC)
	Display setup	VGA	IC1200(VGA,MCH)
	Display setup	MCH(MEM I/O)	IC1420,1421,1430,1431(RAM)
	Display setup	RAM	IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F113	Display check	ICH(CMOS)	IC1600(ICH)
F114	Display setup	ICH(CMOS)	IC1600(ICH)
	BIOS Boot logo display	VGA	IC1200(VGA)
F115	CMOS reading	ICH(CMOS)	IC1600(ICH)
	Memory check	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F116	CPU error checking	CPU RAM	IC1050(CPU) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F117	Memory check	ICH(CMOS)	IC1600(ICH)
	Memory initialization	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F118	Exception check error (it does not HALT)	CPU	IC1050(CPU)
F119	setup of ICH (DMAC)	ICH(DMAC)	IC1600(ICH)
F11A	setup of ICH (DMAC)	ICH(DMAC)	IC1600(ICH)
F11B	setup of ICH (DMAC)	ICH(DMAC)	IC1600(ICH)
F11E	Display setup	VGA	IC1200(VGA)
F11F	Password processing	EC/KBC(EC) VGA ICH(USB Controller) RAM	IC3200(EC/KBC) IC1200(VGA) IC1600(ICH) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F120	setup of RAM data	LAN Controller	IC4000(LAN Controller)
	LAN initialization	MCH(PCI Register)	IC1200(MCH,VGA)
	LAN setup	VGA CPU BIOSROM	IC1050(CPU) IC3001(BIOS ROM)

T Table 2-8 Debug port error status (5/8)

F121	Display setup	ICH(CMOS, MEM I/O)	IC1600(ICH)
	Keystroke check	VGA	IC1200(VGA)
	setup of RAM data	EC/KBC(EC, KBC)	IC3200(EC/KBC)
	PC card setup	RAM	IC1420,1421,1430,1431(RAM)
	Display setup	BIOSROM	IC1440,1441,1450,1451(RAM)
	setup of RAM data	PC Card Controller	CN1410(RAM Conn.)
	setup of ICH (PCI)	CPU	IC3001(BIOS ROM)
	CPU setup		IC2000(Card Controller)
	setup of ICH (MEM IO)		IC1050(CPU)
F122		Clock Generator	IC1000(Clock Generator)
F123	Initialization of EC	EC/KBC(EC) VGA	IC3200(EC/KBC) IC1200(VGA)
F166	initialization error of EC	EC/KBC(EC)	IC3200(EC/KBC)
F124	LAN setup	LAN Controller	IC4000(LAN Controller)
F125	setup of ICH (PIC)	ICH(PIC Controller, DMAC, PCI Express, CMOS) EC/KBC(EC)	IC1600(ICH)
	setup of ICH (DMAC)		
	setting error of ICH (PCI Express)		
	setup of ICH (CMOS)		
	EC setup		
F126	setup of RAM data	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F127	setup of RAM data	RAM	IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
FFFF	setup of RAM data	MCH(PCIRegister)	IC1200(MCH)
	setup of CPU and MCH	CPU	IC1050(CPU)
	CPU setup	RAM	IC1420,1421,1430,1431(RAM)
	KBC setup	EC/KBC(KBC)	IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.) IC3200(EC/KBC)

AMT processing			
F148	AMT Mode only: ME power supply OFF setup	MCH(ME) ICH(MEM I/O) BIOS ROM	IC1200(MCH) IC1600(ICH) IC3001(BIOS ROM)
F149	AMT Mode only: ME Restart processing	MCH(ME) BIOS ROM	IC1200(MCH) IC3001(BIOS ROM)
F14A	AMT Mode only: ME communication Error (transmission)	MCH(ME) BIOS ROM	IC1200(MCH) IC3001(BIOS ROM)
F14B	AMT Mode only: ME communication Error (reception)	MCH(ME) BIOS ROM	IC1200(MCH) IC3001(BIOS ROM)

Table 2-9 Debug port error status (6/8)

System BIOS SUSPEND processing			
F137			
F138			
F139	CPU setup	CPU	IC1050(CPU)
	It branches to Resume (F13C)/Boot (F141).		
F13A	setup of ICH	ICH(USB Controller)	IC1600(ICH)
F13B	setup of ICH	ICH(USBController,PITControll er, PICController, DMAC, PCIRegister) CPU HDD VGA PCIDevice	IC1600(ICH) IC1050(CPU) CN1900(HDD Conn.) IC1200(VGA)
	Preservation of CPU		
	HDD setup		
	Preservation of PCI		
	Preservation of PIT		
	Display preservation		
	Preservation of ICH (PIC)		
	Preservation of ICH (DMAC)		
F13C			
F13F	Display setup (Boot)	VGA HDD	IC1200(VGA) CN1900(HDD Conn.)
	HDD setup (Boot)	ICH(IDEController)	IC1600(ICH)
F140			
F141			
F142	setup of a sound	EC/KBC(EC)	IC3200(EC/KBC)
F143			
F144			
F145	CPU setup	CPU	IC1050(CPU)

Table 2-10 Debug port error status (7/8)

System BIOS RESUME processing			
F100	Refer to IRT processing		
F101	Refer to IRT processing		
F102	Refer to IRT processing		
F103	Refer to IRT processing		
F128			
F12A	Initialization of ICH (PIT)	CPU	IC1050(CPU)
	PIT initialization error	ICH (PIT Controller, MEM	IC1600(ICH)
	CPU check	I/O, CMOS,	IC1000(Clock Generator)
	check of ROM data	I/O, PIC Controller,	IC3200(EC/KBC)
	SMI setup	IDE Controller, Sound	IC1200(MCH, VGA)
	Part number data distinction	Controller,	IC1420, 1421, 1430, 1431(RA M)
	CMOS check	Modem Controller, P	IC1440, 1441, 1450, 1451(RA M)
	Clock generator setup	CI Express,	CN1410(RAM Conn.)
	CPU initialization	USB Controller, PCIR	IC3001(BIOS ROM)
	EC data reading	egister)	
	BIOS processing reading 2	Clock Generator	
	setup of ICH (IDE)	EC/KBC(EC, KBC)	
	setup of ICH (Azalia)	CECC	
	setup of MCH	ICH	
	Thermal control setup	MCH	
	Initialization of KBC	RAM	
	Display setup	BIOSROM	
	BIOS processing reading 3	VGA	
setup of built-in LAN			
PCI Express initialization			
Initialization of a sound			
setup of ICH			
setup of ICH (PIC)			
F12B	PCI initialization	ICH(PCI Register) EC/KBC(EC)	IC1600(ICH) IC3200(EC/KBC)
	LAN initialization	LAN Controller	IC4000(LAN Controller)
F12C	PCI device initialization	PCI Device	IC1600(ICH)
	PCI ExpressCard setup		
F12D	Initialization of EC and battery access	EC/KBC(EC, KBC) PSC	IC3200(EC/KBC) IC8972(PSC)
	setup of a setup item	Battery(E2PROM)	CN8810(Battery Conn.)
	setup of ICH (DMAC)	ICH(DMAC)	IC1600(ICH)
F12E	Display setup	EC/KBC(EC) VGA MCH(MEM I/O) RAM	IC3200(EC/KBC) IC1200(VGA, MCH) IC1420, 1421, 1430, 1431(RA M) IC1440, 1441, 1450, 1451(RA M) CN1410(RAM Conn.)
F12F			

Table 2-11 Debug port error status (8/8)

F130	Password processing	EC/KBC(EC) VGA ICH(USBController) RAM	IC3200(EC/KBC) IC1200(VGA) IC1600(ICH) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.)
F131	setup of ICH (DMAC)	ICH(DMAC)	IC1600(ICH)
F132	setup of ICH (PCI)	ICH(CMOS, MEM I/OS, PITController, PICController) EC/KBC(EC, KBC) RAM BIOSROM CPU	IC1600(ICH) IC3200(EC/KBC) IC1420,1421,1430,1431(RAM) IC1440,1441,1450,1451(RAM) CN1410(RAM Conn.) IC3001(BIOS ROM) IC1050(CPU)
	CPU setup		
	setup of ICH (MEM IO)		
	Display setup		
	setup of PIT		
	setup of ICH (PIC)		
F133			
F134			
F135			
F136			

NOTE: Status outputted by the test means the last error detected in the debug port test.

Check 1 If the D port is status F11Eh or F120h is displayed, go to “HDD Trouble shooting Procedure in Section 2.6.

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

D port error code is as follows:

Error code	Contents
F003h or F004h	SC initialization error
F00Bh	BIOS update error
F117h	Exception check error
F121h	Clock generator error

Procedure 3 Diagnostic Test Program Execution Check

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

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. Printer test [It is not supported]
7. Async test [It is not supported]
8. Hard Disk test
9. Real Timer test
10. NDP test
11. Expansion test
12. CD-ROM/DVD-ROM test
13. Only One test
14. Wireless LAN test
15. LAN/Modem/Bluetooth/IEEE1394 test
16. Sound test

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

Procedure 4 Replacement Check

System board may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and replace system board with a new one.

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

Procedure 4: 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 and Procedure 4.

Procedure 2 Diagnostic Test Program Execution Check

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-7. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-5 FDD error code and status

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

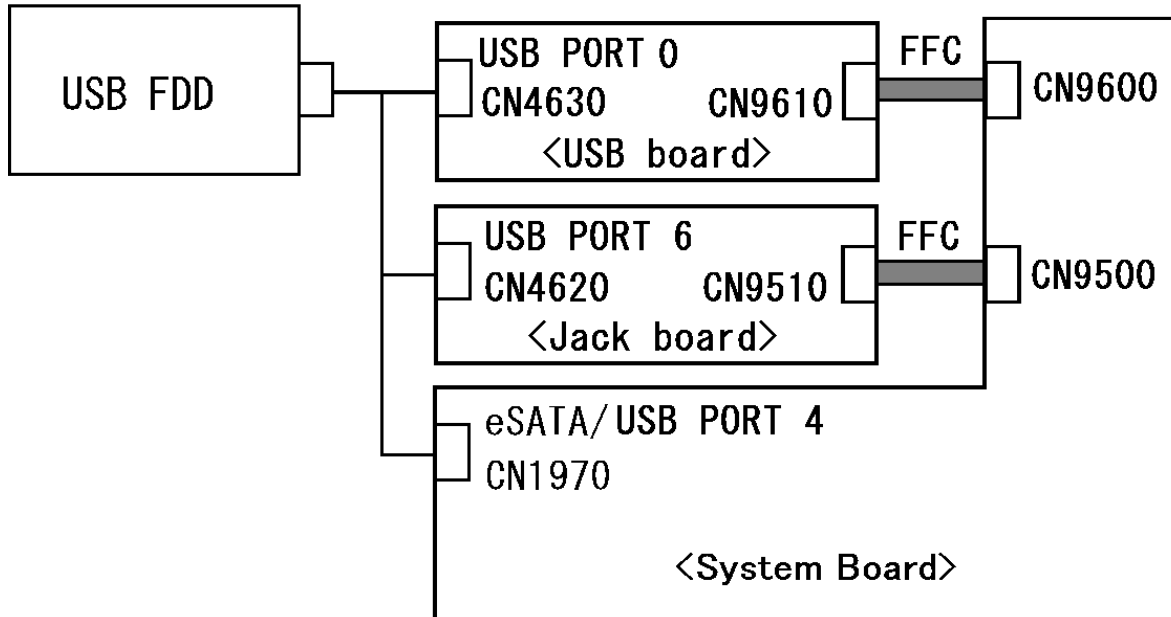
Check 1 If the following message is displayed, disable the write protect tab on the floppy disk by sliding the write protect tab to “write enable”. If any other message appears, perform Check 2.

Write protected

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

Procedure 3 Connector Check

The connection of USB port is shown in the following figure.



- Check 1 Check the connection of the USB FDD. If the USB FDD is still not functioning properly, perform Check 2.
- Check 2 As the connection may be defective, disassemble the computer and check each connection. If the problem still occurs, go to Procedure 4.

Procedure 4 Replacement Check

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 the following.

- If USB port 0 does not work properly, perform check 1.
- If USB port 6 does not work properly, perform check 3.
- If eSATA/USB port 4 does not work properly, perform check 5.

- Check 1 USB board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.
- Check 2 USB board FFC may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.
- Check 3 Jack board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 4.
- Check 4 Jack board FFC may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.
- Check 5 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.6 HDD/SSD Troubleshooting

To check if the HDD/SSD is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

Procedure 1 Partition Check

Insert the Toshiba MS-DOS system disk and start the computer. Perform the following checks:

- Check 1 Input **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Input **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still occurs, go to Procedure 2.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.
- Check 4 Remove the system disk from the FDD and reboot the computer. If the problem still occurs, go to Procedure 2. Otherwise, the 2.5" HDD is operating normally.

Procedure 2 Message Check

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

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

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

HDC ERROR

or

HDD #X ERROR (After 5 seconds this message will disappear.)

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

Insert system disk in drive
Press any key when ready

or

Non-System disk or disk error
Replace and press any key when ready

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

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

System Transferred

If an error message appears on the display, perform Check 4.

Check 4 2.5" HDD(s) and the connector(s) of system board may be defective (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling.). Insert HDD(s) to the connector(s) firmly. If it is (or they are) firmly connected, go to Procedure 3.

Procedure 3 Format Check

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

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

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

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

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

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

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

Procedure 4 Diagnostic Test Program Execution Check

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

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are described in Table 2-8. If an error code is not displayed but the problem still occurs, go to Procedure 5.

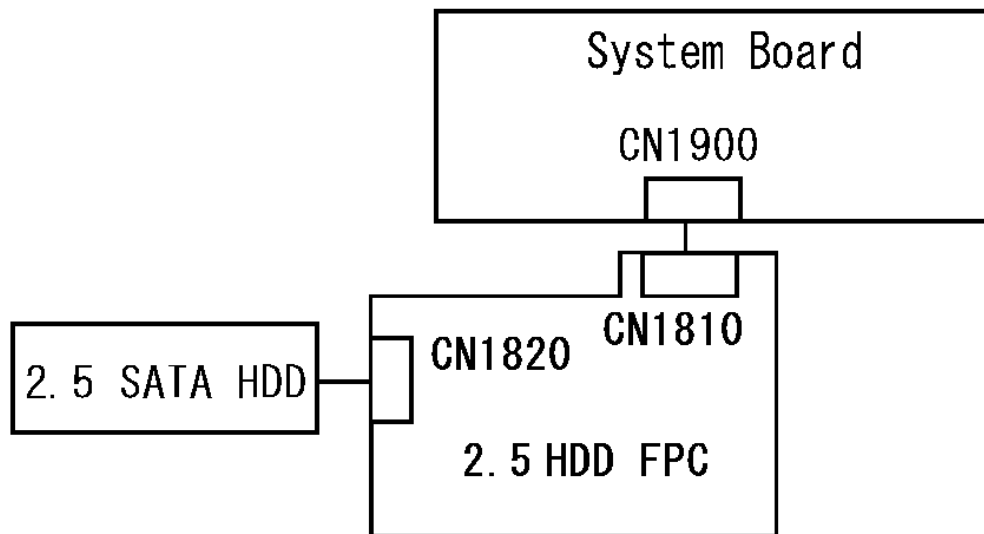
Table 2-6 2.5" Hard disk drive error code and status

Code	Status
05	HDD - HDC NOT RESET ERROR
07	HDD - DRIVE NOT INITIALIZE
09	HDD - DMA BOUNDARY ERROR
0B	HDD - BAD TRACK ERROR
BB	HDD - UNDEFINED ERROR
08	HDD - OVERRUN ERROR (DRQ ON)
01	HDD - BAD COMMAND ERROR
02	HDD - ADDRESS MARK NOT FOUND
04	HDD - RECORD NOT FOUND ERROR
10	HDD - ECC ERROR
20	HDD - HDC ERROR
40	HDD - SEEK ERROR
80	HDD - TIME OUT ERROR
11	HDD - ECC RECOVER ENABLE
AA	HDD - DRIVE NOT READY
CC	HDD - WRITE FAULT
E0	HDD - STATUS ERROR
0A	HDD - BAD SECTOR
EE	HDD - ACCESS TIME ERROR
DA	HDD - NO HDD
12	HDD - DMA CRC ERROR

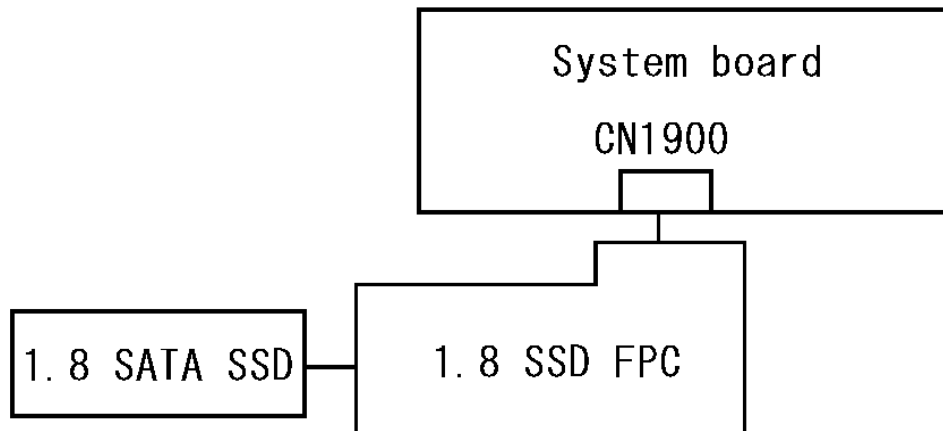
Procedure 5 Connector Check and Replacement Check

The SATA HDD/ SATA SSD may be disconnected, or the 2.5 SATA HDD/ 1.8 SATA SSD, 2.5HDD FPC/1.8 SSD FPC or 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 SATA HDD/ SATA SSD is firmly connected to CN1900 on the system board.



In the case of 2.5 SATA HDD model



In the case of 1.8 SATA SSD model

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 2.5 SATA HDD/ 1.8 SATA SSD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still exists, perform Check 3.
- Check 3 The 2.5HDD FPC/1.8 SSD FPC may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 4.
- Check 4 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*

2.7 Keyboard and Touch Pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

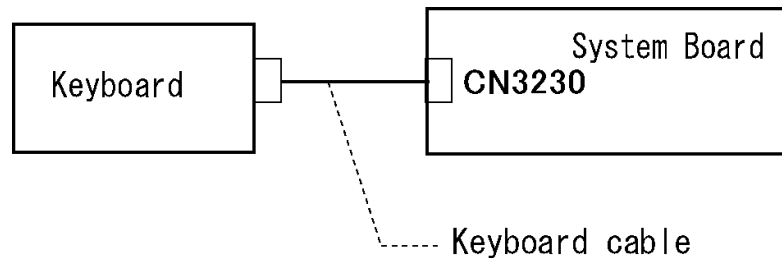
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

Procedure 2 Connector Check and Replacement Check

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

1. If the keyboard malfunctions, start with Check 1.
2. If the touch pad malfunctions, start with Check 3.

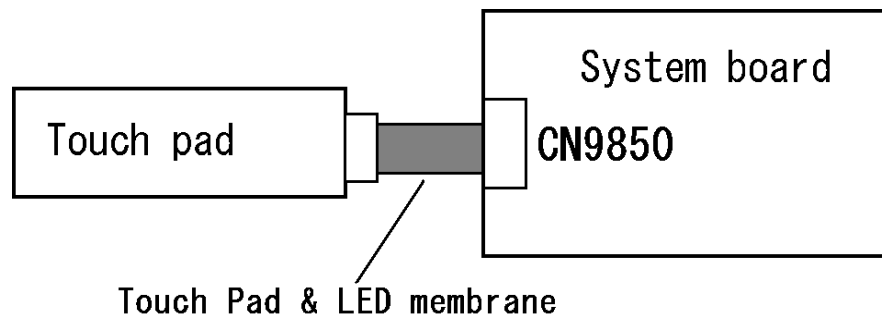
Check 1 Make sure the keyboard cable is securely connected to CN3230 on the system board.



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

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

Check 3 Make sure the touch pad cable is securely connected to CN9850 on the system board.



If the connection is loose, reconnect firmly and go to Procedure 1. If there is still an error, go to Check 4.

Check 4 The touch pad or Touch pad & LED member may be damaged. Replace it with a new one and repeat Procedure 1. If there is still an error, go to Check5.

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: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Cable Check

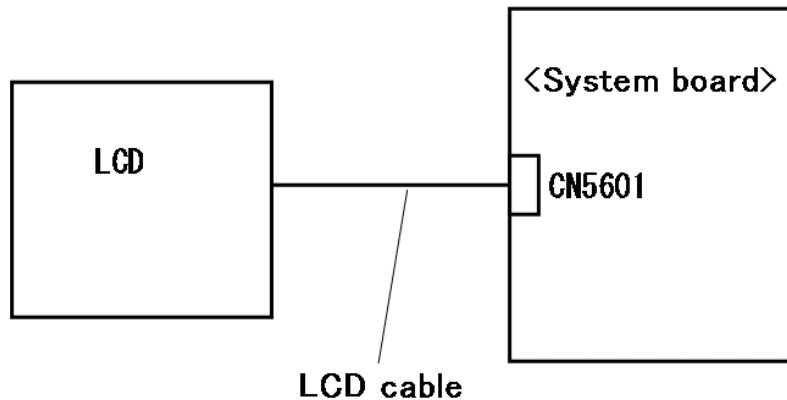
Procedure 3: Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 2.

Procedure 2 Connector Check and Cable Check

Check 1 Make sure the LCD cable is securely connected to CN5601 on the system board.



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

Procedure 3 Replacement Check

The LCD module and system board are connected to display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*.

- Check 1 Replace the 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 2.
- 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 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.

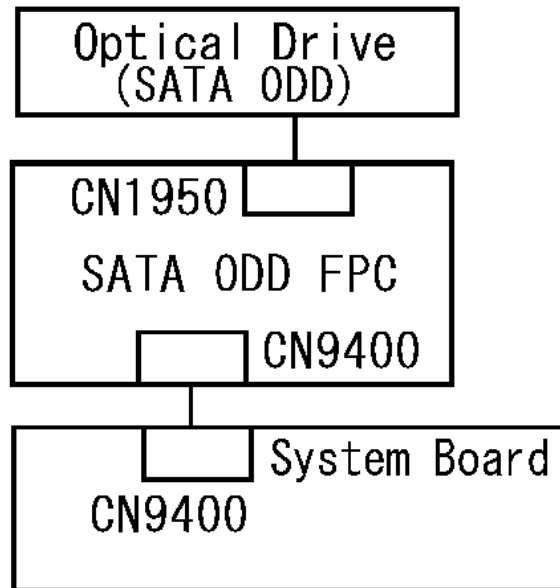
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

**Procedure 2 Connector Check and Replacement Check
(for SATA ODD model)**

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

Check 1 The connection of Optical drive system is shown in the following figure..



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

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

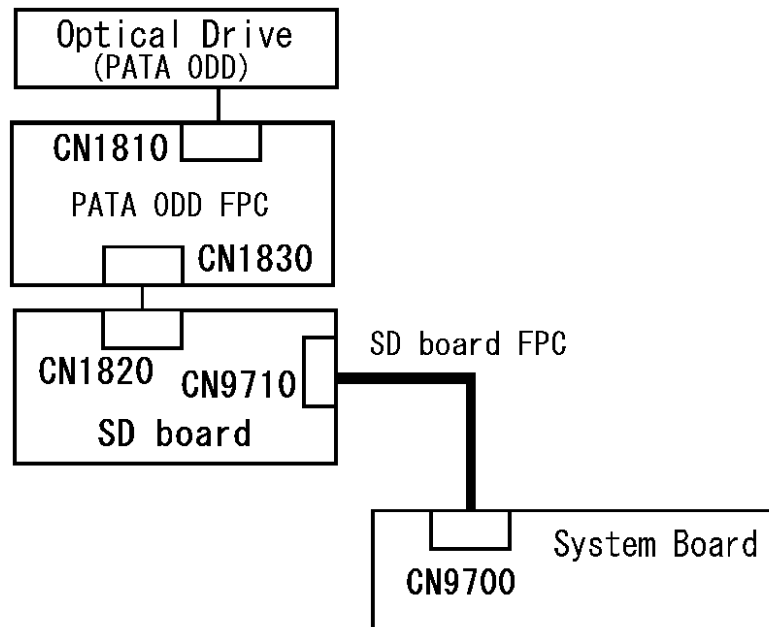
Check 3 The SATA ODD FPC may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 4.

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

Procedure 2 Connector Check and Replacement Check (for PATA ODD model)

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

Check 1 The connection of Optical drive system is shown in the following figure..



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

- Check 2 The Optical drive (PATA ODD) may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 3.
- Check 3 The PATA ODD FPC may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 4.
- Check 4 The SD board may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 5.
- Check 5 The SD board FPC may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 6.
- Check 6 Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.10 Modem Troubleshooting

To check if modem is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

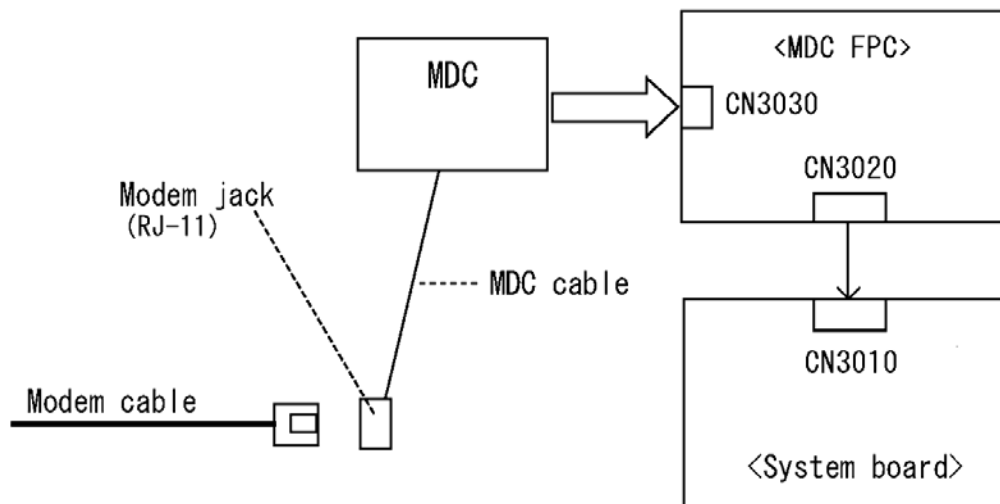
If any error is detected, perform Procedure 2.

Procedure 2 Connector Check and Replacement Check

MDC (Modem Daughter Card) is used as the modem for this computer. MDC is connected to the system board. If modem malfunctions, the connection of cable, board and module may be defective. Otherwise, they may be faulty.

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

Check 1 Make sure the following connections are firmly connected.



If any connector is disconnected, connect it firmly and return to Procedure 1. If the problem still occurs, perform Check 2.

- Check 2 Modem cable or MDC cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.
- Check 3 MDC may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedure*. If the problem still occurs, perform Check 4.
- Check 4 MDC FPC may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.
- Check 5 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.11 LAN Troubleshooting

To check if the computer's LAN is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

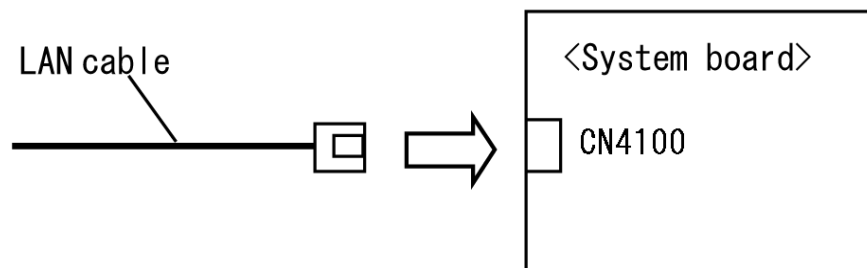
Execute LAN test in the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

LAN cable is connected to system board. If LAN malfunctions, the connection of the cable and board may be defective. Otherwise, they may be faulty.

Check 1 Make sure LAN cable is firmly connected to the LAN jack on the system board. If the problem still occurs, perform Check 2.



Check 2 LAN cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 3 System board may be faulty. Replace it with a new one following the instruction in Chapter 4, *Replacement Procedure*.

2.12 Wireless LAN Troubleshooting

To check if the computer's Wireless LAN is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

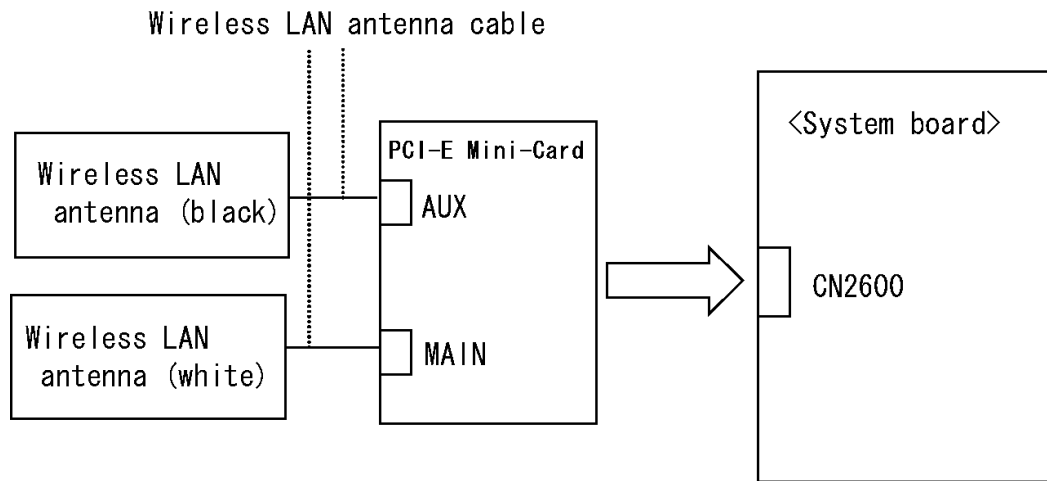
Before starting the test, make sure the wireless communication switch is set in the ON position.

Check 1 Execute Wireless LAN test program to check the transmitting-receiving function of wireless LAN. You will need a second computer that can communicate by wireless LAN. Perform the test following the instructions described in Chapter 3, *Tests and Diagnostics*.

If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

Procedure 2 Antennas' Connection Check

The wireless LAN function-wiring diagram is shown below:



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

- Check 1 Make sure the wireless communication switch is “On”.
- If the switch is “Off”, turn it “On”. If the problem still occurs, perform Check 2.
- Check 2 Make sure wireless LAN card (PCI-E Mini-Card) is firmly connected to the CN2600 on the system board. If the connection is loose, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.
- Check 3 Make sure that wireless LAN antenna cables (black and white) are firmly connected to the connectors on Wireless LAN card. If wireless LAN antenna cables are not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

Procedure 3 Replacement Check

Wireless LAN card, wireless LAN antenna or system board may be faulty. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

- Check 1 Wireless LAN antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.

- Check 2 Wireless LAN card may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.

- Check3 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.13 Bluetooth Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connection Check

Procedure 3: Replacement Check

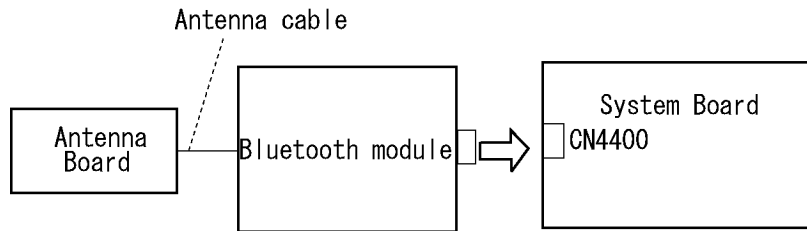
Procedure 1 Diagnostic Test Program Execution Check

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

- Check 1 Execute Bluetooth test program. Perform the test following the instructions described in Chapter 3, Bluetooth Test Program. You will need a second computer that can communicate by the Bluetooth.
If the computer passes the test, the function is correctly working. If the computer does not pass the test, go to check 2.
- Check 2 The Bluetooth module may be defective or damaged. Replace it with a new one. Then perform the test program again.
If the computer still does not pass the test, go to Procedure 2.

Procedure 2 Connection Check

The Bluetooth function wiring diagram is shown below:



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

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

If the connector is disconnected, connect it firmly. 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*.

2.14 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: Connector Check

Procedure 3: Replacement Check

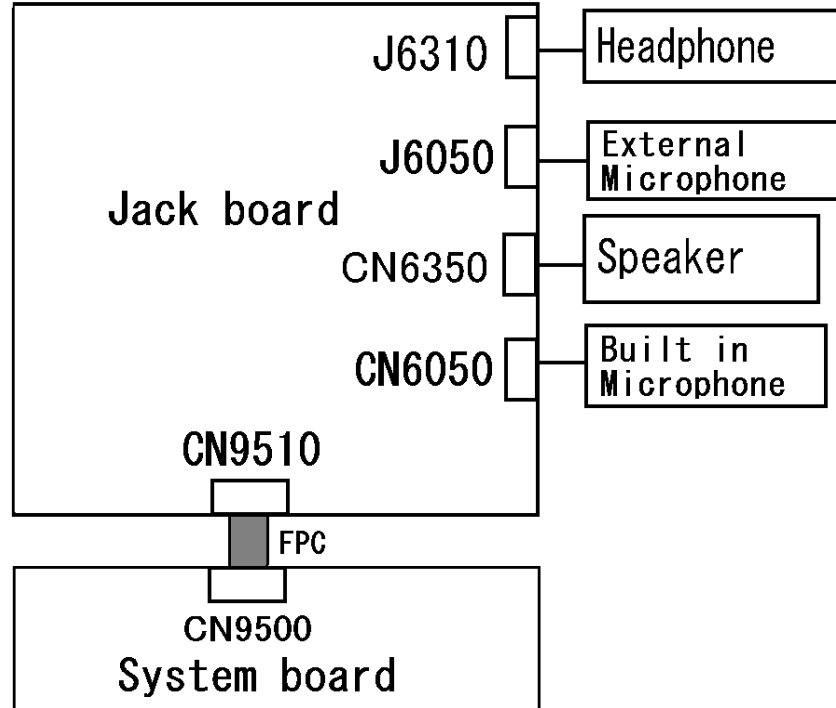
Procedure 1 Diagnostic Test Program Execution Check

Execute the Sound test in Sound Test program disk. 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

The connection of sound system is shown in the following figure.



As the connection may be defective, disassemble the computer and check each connection. If the problem still occurs, go to Procedure 3.

Procedure 3 Replacement Check

- If headphone does not work properly, perform check 1.
- If external microphone does not work properly, perform check 2.
- If speaker does not work properly, perform check 3.
- If internal microphone does not work properly, perform check 4.

Check 1 Headphone may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.

Check 2 External microphone may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5

Check 3 Speaker may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5

Check 4 Internal microphone may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5

Check 5 Jack board or FPC may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 6

Check 6 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.15 3G Troubleshooting

This section describes how to determine if the computer's 3G 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 3G function to check the transmitting-receiving function of the 3G. You will need a second computer that can communicate by the 3G.

3G test program for DOS is an object for EV620TV2.

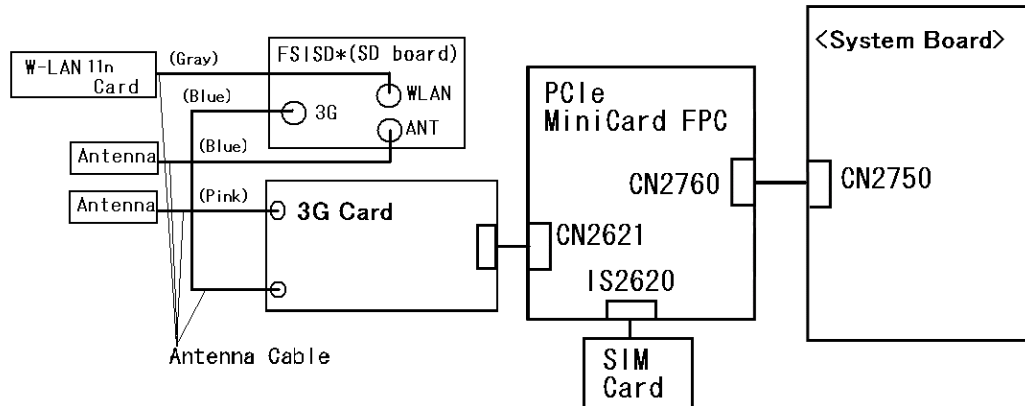
The test program for EU870DT1 should use the WINDOWS version.

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 3G 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 3G antenna cables are firmly connected to the 3G card and FSISD*(SD board).
If the 3G antenna cables are disconnected, connect them firmly and go to Procedure 1. If the 3G card is still not functioning properly, go to Check 2.
- Check2 Make sure the 3G card connected to CN2621 on the PCIe Mini Card FPC. If the connector is disconnected, connect it firmly and go to Procedure 1. If the 3G card is still not functioning properly, perform Check 3.
- Check3 Make sure the SIM card connected to IS2620 on the PCIe Mini Card FPC. If the connector is disconnected, connect it firmly and go to Procedure 1. If the 3G card is still not functioning properly, perform Check 4.
- Check4 Make sure the CN2760 on the PCIe Mini Card FPC is firmly connected to CN2750 on the system board, connect it firmly and go to Procedure 1. If the 3G card is still not functioning properly, perform Procedure 3.

Procedure 3 Replacement Check

The 3G antenna, 3G card, SIM card, PCIe Mini Card FPC, FSISD*(SD 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 how to disassemble the computer and then perform the following checks:

- Check 1 The 3G card, SIM card and FSISD*(SD board) may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.
- Check 2 The 3G antennas may be defective or damaged. Replace the antennas with new ones following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 The PCIe Mini Card FPC may be defective or damaged. Replace the PCIe Mini Card FPC with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 4
- Check 4 The system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.16 SD card 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

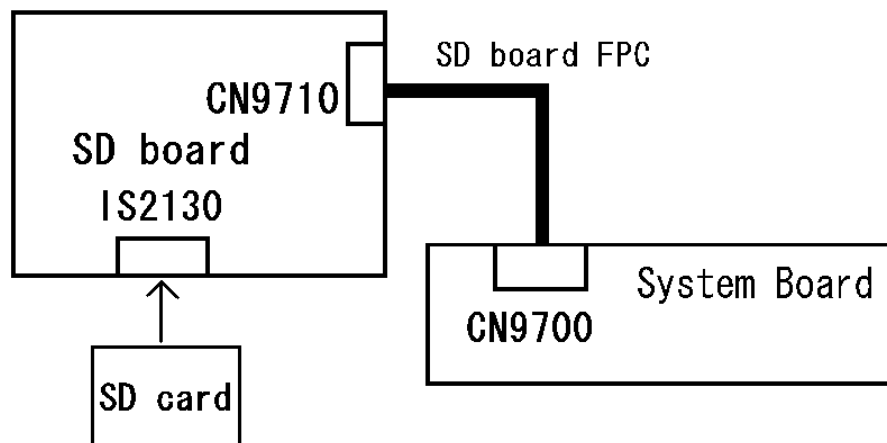
Procedure 1 Check on Windows OS

Insert a SD card into the slot. Check if the installed Windows recognizes automatically the SD card and the data in the SD card can be read.

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

Procedure 2 Connector Check and Replacement Check

Check 1 The connection of SD system is shown in the following figure..



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

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

Check 3 The SD board FPC may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 4

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

2.17 Fingerprint sensor Troubleshooting

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

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

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

Procedure 1: Setting Windows Log-ON password

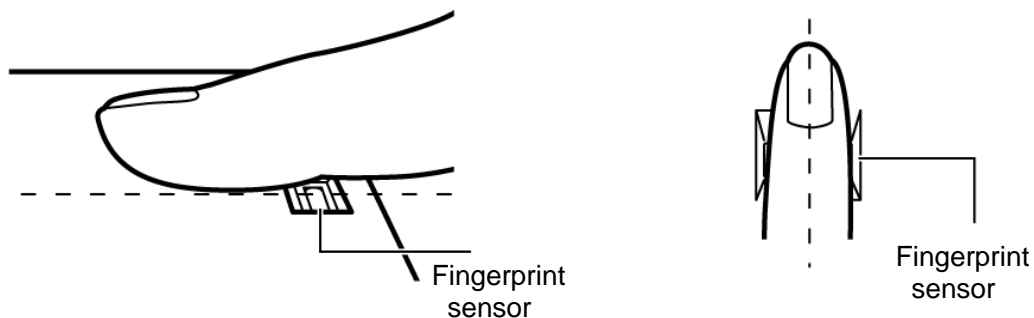
Procedure 2: Registration of fingerprint

Procedure 3: Authentication of fingerprint

Procedure 4: Connector Check and Replacement Check

CAUTION: Scan your finger shown below.

1. 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.



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].

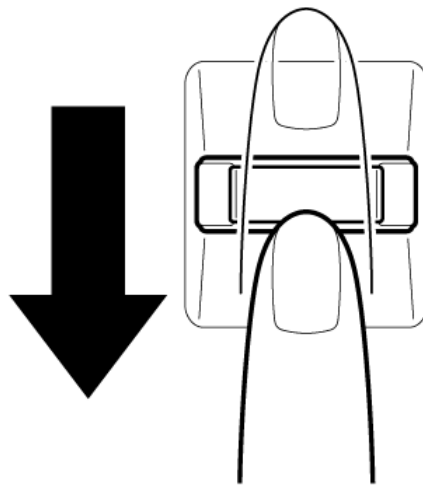
Procedure 2 Registration of fingerprint

1. To run this program, click Start -> All Programs -> TrueSuite Access Manager -> TrueSuite Access Manager ->.
2. The Verify screen will be displayed, enter the Windows logon password and click the Next button.
3. On the User's Fingers screen click the box above the finger you wish to register. If any of the previously enrolled fingerprints is selected again, the latest information will be enrolled and any previous information over-written.
4. The Fingerprint Enrollment screen will be displayed and the tutorial will begin. First click "Replay video" and confirm the proper movement for the finger you wish to register. Then confirm the message displayed on this screen and ensure that there is a check mark in the Run Interactive Tutorial box. Once this has been done, click Next.
5. At the Scanning Practice screen, you are able to practice swiping (three times) your finger to ensure you use the correct method. Click "Try again" to if you wish to practice again. You have finished practicing, click Next button.
6. Register your fingerprint on the Fingerprint Image Capture screen. Let the computer read the finger to be registered 3 times. An image of your fingerprint will be shown on the screen each time the fingerprint is successfully read. Once the fingerprint is successfully read for the third time, the message successfully combined will be displayed beneath the fingerprint images. Click the Next button.

7. When the Store to Sensor screen is displayed, check Store fingerprint to Sensor. Click Finish to complete fingerprint registration.

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.

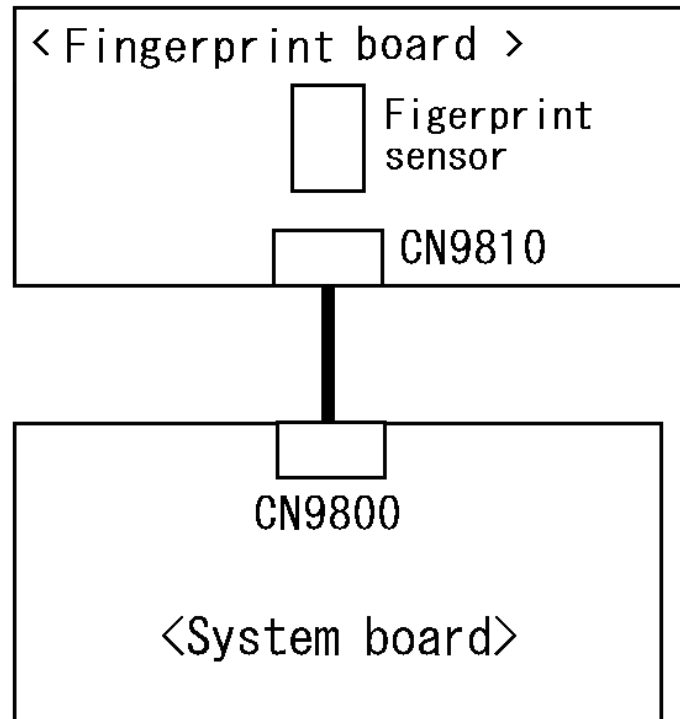
If you fail continually five times or more, you can not use the fingerprint authentication about two minute.

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

Procedure 4 Connector Check and Replacement Check

The connection of the cable and board may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

- Check 1 Make sure the cables are firmly connected to the Finger/pad board and system board.



If the connection is loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

- Check 2 Fingerprint board or the cable may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.
- Check 3 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.18 Web camera Troubleshooting

To check if the computer's web camera is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Check on Windows OS

Procedure 2: Connector Check and Replacement Check

Procedure 1 Check on Windows OS

Use the software, Camera Assistant Software, which is originally prepared in the computer to check if the web camera can record/replay still images and moving images (including sound) without problems.



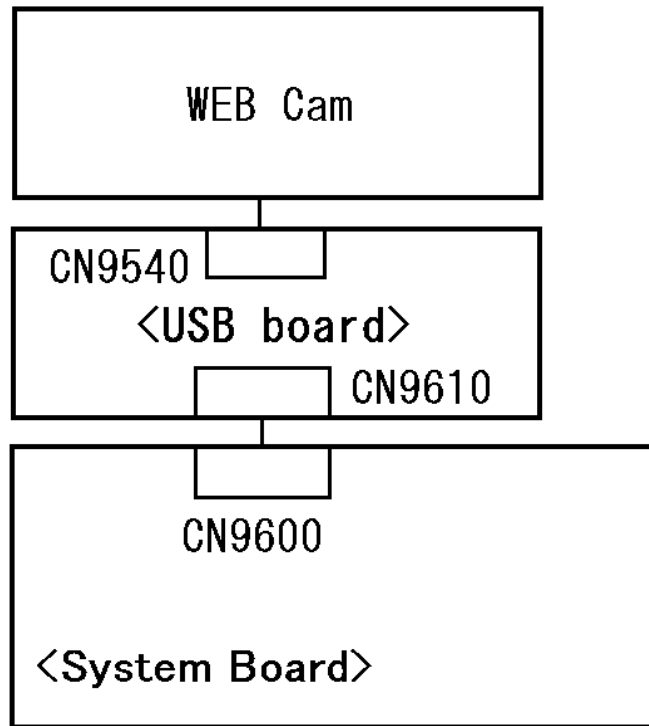
When the Camera Assistant Software is installed, the menu will stay on the screen but hide at the left edge of the screen. Move the pointer to the left on the screen to show the menu. When the menu appears, double-click the icon for Web Camera to operate the web camera.

If any troubles occur on recording/replaying of still or moving images, perform Procedure 2.

Procedure 2 Connector Check and Replacement Check

The connection of cables, web camera and microphone may be defective. Otherwise, they may be faulty. disassemble the computer following the steps described in Chapter 4 and perform the following checks.

Check 1 If the connection is loose, reconnect it firmly and check each connection. If the problem still occurs, perform Check 2.



- Check 2 The Web camera may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 3.
- Check 3 The USB board may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 4
- Check 4 System board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.

2.19 Intel Turbo Memory Troubleshooting (Not Used)

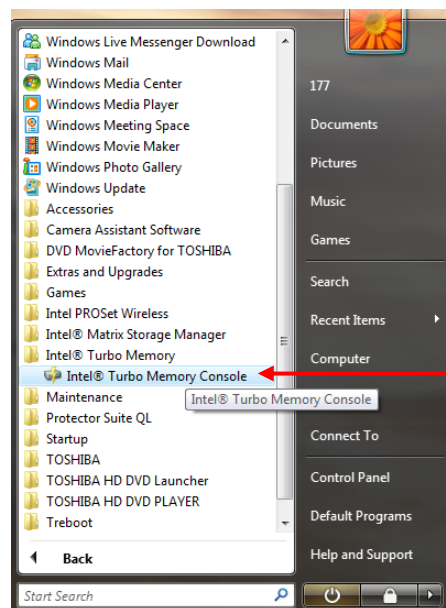
To check if Intel Turbo Memory is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Check on Windows OS

Procedure 2: Connector Check and Replacement Check

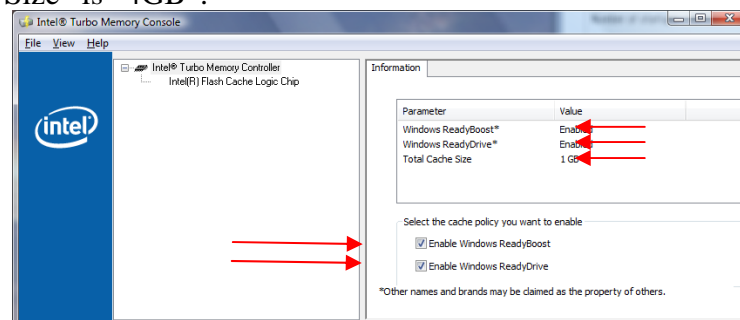
Procedure 1 Check on Windows OS

Use the software, Intel Turbo Memory Console, which is originally prepared in the computer to check if the Intel Turbo Memory is operating without problems.



Start the Intel Turbo Memory Console and confirm the followings:

- ❑ Check marks are attached to “Enable Windows ReadyBoost” and “Enable Windows ReadyDrive”.
- ❑ The values for “Windows ReadyBoost” and “Windows ReadyDrive” are “Enabled” and “Total Cache Size” is “4GB”.

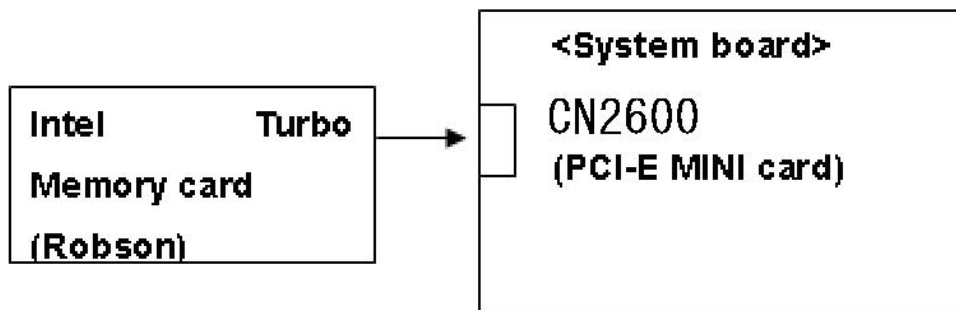


If any problems are found, perform the Procedure 2.

Procedure 2 Connector Check and Replacement Check

The connection of Intel Turbo Memory card may be faulty or the card may be defective. Disassemble the computer following the steps described in Chapter 4 and perform the following checks.

- Check 1 Check the following connection. To disassemble the computer for the check, follow the steps described in Chapter 4. If the connection is loose, reconnect the card firmly. If the problem still occurs, perform Check 2.



- Check 2 The Intel Turbo Memory card may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*, and check the operation again. If the problem still occurs, perform Check 3.
- Check 3 System board may be faulty. Replace it with a new one following the step in Chapter 4, *Replacement Procedures*.

Chapter 3

Tests and Diagnostics

[CONFIDENTIAL]

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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 that 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 that executes the some tests successively.

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

1. Check all cables are connected firmly.
2. Exit any application and close Windows.
3. Check if [ALL Device] is selected in the "Device Config." in SET UP menu. After checking the diagnostics, be sure to select [Setup by OS] in the "Device Config."

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 [It is not supported]
- 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.

- USB FDD
- The Diagnostic Disks (T&D for maintenance, LAN/Modem/Bluetooth/IEEE1394 for maintenance, wireless LAN for maintenance and Sound for maintenance)
- A formatted working disk (Floppy disk test)
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- An external display supporting monitor ID (Expansion test)
- A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
- A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
- A music CD (Sound test)
- A CD-RW test media (CD-ROM/DVD-ROM test)
- A USB test module (USB test)
- A USB cable (USB test)
- LAN wraparound connector (LAN test)
- RGB wraparound connector (Expansion test)
- Module cable and RJ11 connector checker (Modem test)
- Headphones (Sound test)
- A microphone (Sound test)
- A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)
- PC card wraparound connector (Expansion test) [Not necessary for this model]

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 Repair test program, follow these steps:

1. Insert the Repair test program disk in the USB floppy disk drive or Optical disk drive.
2. Turn on the computer while pressing **U** key. The following menu appears.

NOTE: The following menu is an example when Repair test program is performed from the floppy disk.

Repair test program

V*.*

1. DMI Entry utility
2. Repair Heatrun (T&D)
3. Repair Main (T&D)

Enter a choice:

To start the Diagnostics menu (T&D), press **3** and **Enter**.

To start the H/W initial information setting tool, press **1** and **Enter**.

To start the Heatrun test, press **2** and **Enter**.

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

1. Before replacing the system board, execute subtest03 “DMI information save” in 3.4 Setting of the hardware configuration in order to save the DMI information from system board to floppy disk.
2. After replacing the system board, execute the subtest04 “DMI information recovery” and subtest08 “System configuration display” in 3.4 Setting of the hardware configuration in order to copy the DMI information and system information from the floppy disk.

3.2.1 Diagnostics menu (T&D)

Set the highlight bar to **3**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

```
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  
0 - Exit to Repair menu
```

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        [It is not supported]
 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
```

NOTE: Only when a 2nd HDD is installed in the computer, [There is a second hard disk] message appears in the display.

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

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

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

```
SYSTEM TEST NAME   XXXXXX
```

```
xxxxxxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break] : test end
[Ctrl]+[C]      : key stop
```

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

SUB-TEST MENU :

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

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

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

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

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

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

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

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

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

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

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

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                                1: Test end
                                2: Continue
                                3: Retry

```

These three selections have the following functions respectively:

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

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

Table 3-1 in section 3.6 describes the function of each test on the subtest menu. Table 3-2 in section 3.19 describes the error codes and error status for each error.

3.2.2 H/W initial information setting tool

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

```

#####
#####   Repair Initial config set                               #####
#####
*      1 ..... Entry of the DMI information                      *
*      2 ..... DMI information save                              *
*      3 ..... DMI information recovery                          *
*
*      9 ..... Exit to Repair test menu                          *
*****
... Press test number [1-3,9] ?

```

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

3.2.3 Heatrun test program

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

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

3.3 Setting of the hardware configuration

To execute this program, input **1** in the startup menu. Then press **Enter** to select the (2) - Initial config set. The H/W initial information setting tool consists of four subtests.

Input the number you want to execute and press **Enter**.

NOTE: Connect USB FDD, when you perform the Repair test program from the CD-ROM. DMI information on the subtest 02 is written in floppy disk.

Subtest 01 Initial configuration

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

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

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

1. "Enter Model Name?" is displayed. Input the computer's model name and press **Enter**. (e.g. DynaBook)
2. "Enter Version Number?" is displayed. Input the computer's version number and press **Enter**. (e.g. PC18070C313S)
3. "Enter Serial Number?" is displayed. Input the computer's serial number and press **Enter**. (e.g. 12345678)
4. "Enter Model Number?" is displayed. Input the computer's sales model number and press **Enter**. (e.g. PP200-AAAAA)
5. "Enter Bundle Number?" is displayed. Input the computer's PCN/Bundle number and press **Enter**. (e.g. PMSREQ3Q34H/S0123456789)
6. "Write data OK (Y/N)?" is displayed. To write the DMI information to the Flash ROM, press **Y**, and then **Enter**.

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

Setting of the HWSC

Setting of the UUID

Display of the DMI information (including UUID)

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

Subtest 02 DMI information save

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

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

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

Subtest 03 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.

3.4 Heatrun Test

To execute this program, press **2**, Repair Heatrun and press **Enter** in the startup menu, press **Enter**.

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

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

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

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

Press any key and return to the startup menu.

3.5 Subtest Names

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

Table 3-1 Subtest names (1/2)

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

Table 3-1 Subtest names (2/2)

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

3.6 System Test

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

Subtest 01 ROM checksum

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

Subtest 02 Fan ON/OFF

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

The following message will appear.

```
Fan number select (1:FAN#1, 2:FAN#2, 0:FAN#1&#2) ?
```

To check the CPU fan, press **1** and **Enter**.

To check the VGA fan, press **2** and **Enter**.

To check both CPU fan and VGA fan, press **0** and **Enter**.

The following message will appear.

```
Fan test execute now ... (CPU:xxxxRpm / GPU:xxxxRpm)
```

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

Make sure the specified fan does not rotate and the message of fan revolution is "0000Rpm". Then press **Enter**.

The following message will appear.

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

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

The following message will appear.

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

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

After a while, the fan rotating will stop.

Subtest 03 Geyserville

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

If the CPU does not support Gerserville (SpeedStep), the following message is displayed and the test is ended.

```
This chip is not supported
```

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       : XXXXXXXXXXXXX  
Version Number  : XXXXXXXXXXXXXXX  
Serial Number   : XXXXXXXXX  
UUID Number     : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
Model Number    : XXXXXX-XXXXXX  
PCN/BND Number  : XXXXXXXXXXXXX  
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 Cache memory (on/off)

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

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → Fail

Subtest 04 Stress

Write/Read buffer (1 size = B30h) 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 D.

```
KEYBOARD TEST IN PROGRESS 302000
```

```
Scan code      =
```

```
Character code =
```

```
Keytop        =
```

```
Ins Lock  Caps Lock  Num Lock  Scroll Lock
```

```
Alt       Ctrl       Left Shift  Right Shift
```

```
PRESS [Enter] KEY
```

3.9 Display Test

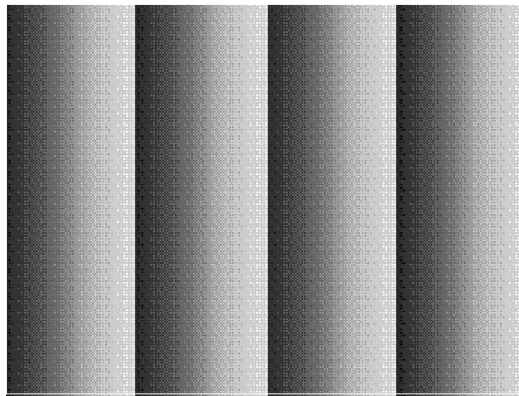
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

This subtest writes the constant data (AAAAh and 5555h) 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

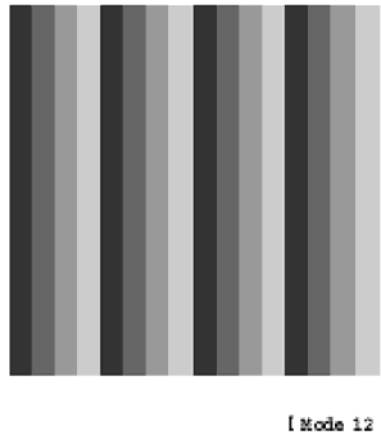
This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

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, then 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. 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, then press **Enter**.

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

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

```
FLOPPY DISK          XXXXXXXX
```

```
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       : XXXXXXX 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  XXXXXXXX  xxx DIAGNOSTIC TEST VX.XX
                                         [Ctrl]+[Break] : test end
                                         [Ctrl]+[C]   : key stop

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

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

```

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

Subtest 01 Sequential read

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

Subtest 02 Sequential read/write

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

Subtest 03 Random address/data

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

Subtest 04 Write specified address

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

Subtest 05 Read specified address

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

3.11 Printer Test

CAUTION: Printer Test is not supported for this model.

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

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.

```
: "#$%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
: "#$%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
"#$%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopq
#$%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqr
$%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
%E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrst
E'()*+,-./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:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ [\]^_`abcdefghijklmnop
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

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

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

Subtests 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 cannot perform the back-up, create back-up disks as described below.*

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

Refer to the operating system instructions.

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

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

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

1. Input the number of HDD test and press **Enter**.
2. This message is used to select the error dump operation when a data compare error is detected. Select **1** or **2**.

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

3. This message is used to select whether or not the HDD status is displayed on the screen. The HDC status is described in section 3.20. Select **1** or **2**.

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

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

HARD DISK TEST XXXXXXXX

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

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

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

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in table 3-2 of the section 3.19.

Subtest 01 Sequential read

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

Subtest 02 Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03 Random address/data

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

Subtest 04 Cross talk & peak shift

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

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'151149'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D25114'	7 cylinder

Subtest 05 Partial Read

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

Subtest 06 Write specified address

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

Subtest 07 Read specified address

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

Subtest 08 Sequential write

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

Subtest 09 W-R-C specified address

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

3.14 Real Timer Test

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

Subtest 01 Real time

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

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

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

```
Current time : XX:XX:XX
```

```
Enter new date:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

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

3. The following messages will appear:

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

```
Current time : XX:XX:XX
```

```
Enter new time:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

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

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

Subtest 02 Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03 Real time carry

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

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

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

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

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

```
PRESS [Enter] KEY TO EXIT TEST
```

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

3.15 NDP Test

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

CAUTION: Judge the existence of high-speed operation processor by 1bit of the composition byte. If exists, the bit is "1". Test only when the high-speed operation processor exists.

Subtest 01 NDP test

This test checks the following functions of NDP:

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

3.16 Expansion Test

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

Subtest 01 PCMCIA wraparound [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 number 01, 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, monitor supporting EDID (Extended Display Identification Data) is required.

Connect a wraparound connector to CRT monitor for the test of ID acquisition. This subtest is executed by using VESA command.

CAUTION: It becomes NG because the priority is given to the internal monitor in a simultaneous display mode.

3.17 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **12** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

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

Subtest 01 Sequential read

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

Subtest 02 Sequential read (CD)

This subtest is a sequential reading of all the logical addresses.

Subtest 03 Sequential read (DVD)

This subtest is a sequential reading of all the logical addresses.

NOTE: It is the way of making the test data of the CD-ROM/DVD-ROM test for 2 of sub test, 3.

A data-organization tool, "FMAKE.EXE", is added to the T&D test media of CD or FD.

The manner of use starts up a prompt from the accessories of Windows XP or Vista and executes it with the DOS window.

Because a result, an about 5 GB test data are created, using the tool of the various Windows, it makes the test media of the CD or the DVD be complete.

CDDTEST0.DAT.....

It writes only this dater in one sheet of CD-R, CD-RW.

DVDTEST1.DAT.....

It writes all of the dater from 1 to 5 in one sheet of DVD-R, DVD-RW

DVDTEST2.DAT.....

DVDTEST3.DAT.....

DVDTEST4.DAT.....

DVDTEST5.DAT.....

When starting up this tool, the hard disk needs equal to or more than 5 GB room.

3.18 Error Code and Error Status Names

Table 3-2 lists the error codes and error status names for the Diagnostic Test.

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

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

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

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

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

Device name	Error code	Error status name
(HDD)	CC E0 0A EE DA 12	HDD - WRITE FAULT HDD - STATUS ERROR HDD - BAD SECTOR HDD - ACCESS TIME ERROR HDD - NO HDD HDD - DMA CRC ERROR
NDP	01 02 03 04 05 06	NDP - NO CO-PROCESSOR NDP - CONTROL WORD ERROR NDP - STATUS WORD ERROR NDP - BUS ERROR NDP - ADDITION ERROR NDP - MULTIPLY 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.

Tables 3-4 HDC 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          #####
#####
*
*  1 ..... Pressed Key Display          *
*  2 ..... Touch pad                    *
*  3 ..... Wireless communication Switch *
*  4 ..... USB Port select menu         *
*  5 ..... LED                          *
*  6 ..... Button                       *
*  7 ..... Acceleration sensor          *
*  8 ..... Docker Dock/Undoc           *
*  9 ..... Fan control                   *
*  A ..... E2PROM (MAC/GUID)           *
*  B ..... Intel AMT                    *
*  C ..... Intel Shirley Peak (MAC)     *
*  D ..... SD Card (R5C847 Writh/Read)  *
*
*  99 ..... Exit to Common Test         *
*
*****
.... Press test number [1-9,A-D,99] ?
```

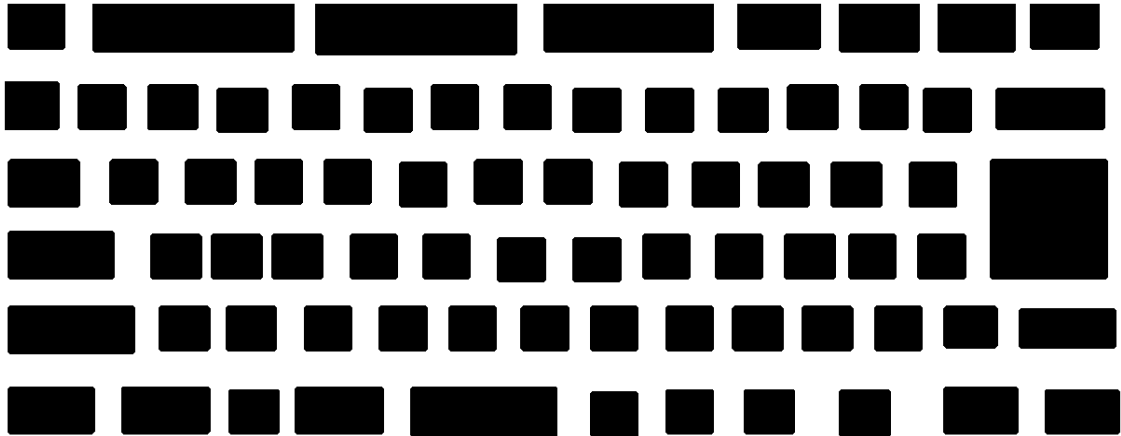
Select the subtest number you want to test and press **Enter**.

To return to the DIAGNOSTIC TEST menu, select **99** and press **Enter**.

Subtest 01 Pressed Key Display

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

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



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

Subtest 02 Touch Pad

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


- A) Direction and parameter
- B) Switching function check.

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

```

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


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

          <BUTTON>
          (1)    (2)
          

<< PRESS BUTTON1+BUTTON2 THEN END >>

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

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

          <BUTTON>
          (1)    (2)
          

<< PRESS BUTTON1+BUTTON2 THEN END >>

```

Subtest 03 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 04 USB

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

This subtest checks if USB port works properly.

The following menu appears in the display.

```
#####
#####          Port Select menu          #####
#####
*
*  0 ..... Port 0 (Right side )          *
*  1 ..... Port 1 (Left side back)       *
*  2 ..... Port 2 (Left side front)      *
*  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 05 LED

This subtest checks if each LED lights properly.

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

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

Confirm the LED of HDD status blinks properly.

Press any key and following message appears in the display.

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

Confirm each LED lights properly.

- (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)

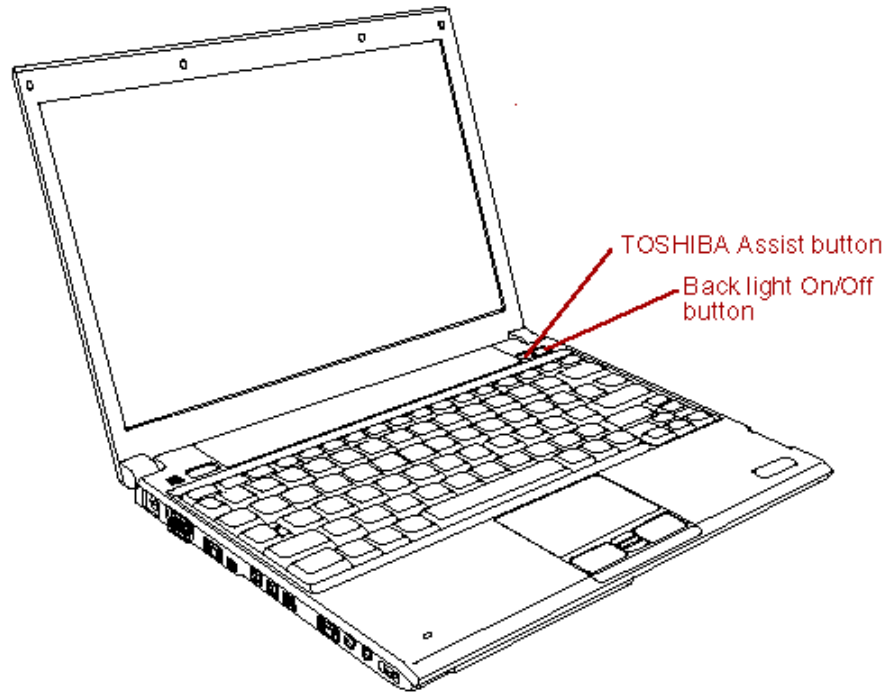
Press **Enter** and following message appears in the display.

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

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

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

Subtest 06 Button



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

Press the Toshiba Assist button and Back light On/Off button after the following message appears.

Step 1 X 1 2
 * * *

Press Function button (Toshiba 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 appears.

Press the Toshiba Presentation button after the following message appears.

Step2 X 1 2
 * * *

Press Function button (Back light On/Off 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 appears.

The following message appears in the display.

```

*          < -----  Volume Down
*          ----- >  Volume Up!

```

Step5

Volume dial is turned to the left.

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 appears

```

*          < -----  Volume Down
*          ----- >  Volume Up!

```

Step6

Volume dial is turned to the right.

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 appears.

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

Subtest 7 Acceleration sensor

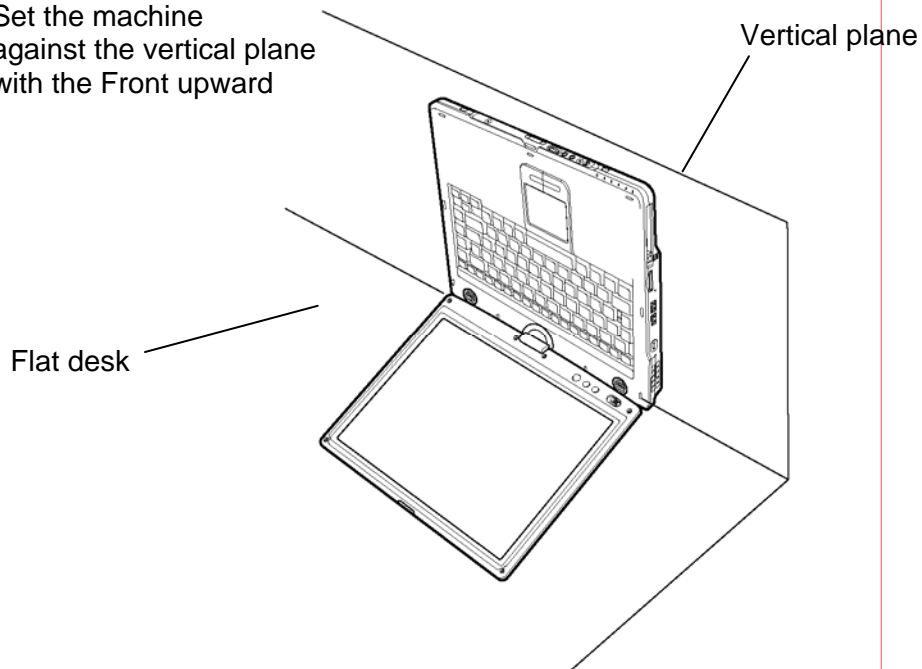
This subtest detects and corrects the each axis (X, Y, Z).

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

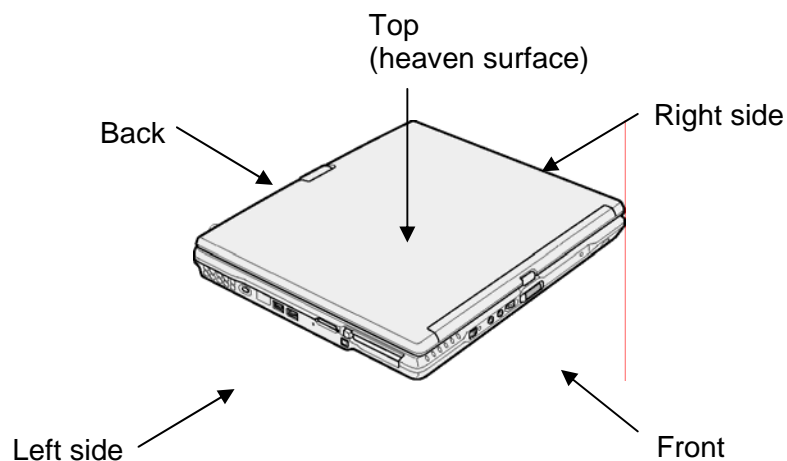
1. Flat desk with vertical plane to get the stability of machine.
2. The vertical wall or plane is necessary.
3. Prevent the machine from shake or shock.

<Example>

Set the machine against the vertical plane with the Front upward



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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

When 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 Slim Port Replicator II. installed.

Press **Enter** while pushing the eject button of the Slim Port Replicator II. the following message appears.

Pushing Eject-SW, and press [Enter] Key

Press **Enter** without pushing the eject button of the Slim Port Replicator II. 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.

Subtest 09 Fan control

This subtest checks if FAN works properly.

The following message appears in the display in order.

! Start low-speed rotation.....Waits 8 seconds
! Start reading of rotation.....Waits 3 seconds
! Start High-speed rotation.....Waits 8 seconds
! Start reading of rotation.....Waits 3 seconds

FAN Low-speed----> Target Low: 3900 Rpm Result Low: XXXX Rpm OK!

FAN High-speed---> Target High: 3800 Rpm Result High: XXXX Rpm OK!

OK message appears in the display if the test ends without a defective.

NG message appears in the display if a defective is found during the test.

Subtest A E2PROM (MAC/GUID)

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

Subtest B Intel AMT

It checks whether the Intel AMT code versions information are written.
Intel Redron is required for an Intel AMT check.
BIOS should be Intel AMT correspondence.

Subtest C Intel Shirley Peak (MAC)

The functional check of Shirley Peak and a MAC Address check are carried out.

Subtest D SD Card (R5C847 Write/Read)

The functional check of SD Card.

Enter the E key and insert an SD card.
Pressing any key will start the test.

If the test result is O.K., remove the SD card.

If it is NG, check the error message.

NOTE:SD card specifications which can be used for this test are shown below.

- *Classical SD Card (V1.00) for Normal Speed (max 25MHz)*
- *High Speed SD Card (V1.10 optional) for High Speed (max 50MHz)*
- *SDHC (>= 4GB) Supported*
- * *SDIO devices are not supported*

As for the SD card specification which can be used in WINDOWS, check the product specification.

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.

NOTE: Connect USB FDD, when you perform the DIAGNOSTIC PROGRAM from the DVD-ROM. The data is stored in floppy disk.

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.

3.23 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

1. Select **6** from the Diagnostic Menu and press **Enter**, the following messages will appear in the display in order.
FDD write/read test (Y/N) ?
Printer wrap around test (Y/N) ?
Serial wrap around test (Y/N) ?
CD-ROM/DVD-ROM test (Y/N) ?
2. To execute the test, press **Y (yes)** and **Enter**. To cancel the test, press **N (no)** and **Enter**. If you execute the selectable test, follow the indication message in the display.
3. After setting the selectable test, the 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. The option is different from the Toshiba MS-DOS FORMAT command.*

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

- (a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

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

3. DUMP

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

4. HDD ID READ

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

3.24.2 Operations

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

```
[ FDD UTILITIES ]

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

2. FORMAT program

- (a) Selecting **FORMAT** displays the following message:

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

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

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

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

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

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

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

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

Format start

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

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

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

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

3. COPY program

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

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

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

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

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

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

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

- (d) The following message will appear.

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

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

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

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

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

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

4. DUMP program

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

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

- (b) Select a drive type. If 2:HDD is selected, the display will go to step (h). If 1:FDD is selected, the following message will appear:

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

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

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

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

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

- (e) The following message will appear:

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

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

```
— Max. address —
[Track ] = XXXX
[Head  ] = XX
[Sector] = XX
Track number ?????
```

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

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

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

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

```
---Max. address ---
[LBA ] = XXXXXXXXXXXX
LBA number ??????????
```

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

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

NOTE: Only when a 2nd HDD is installed, [Drive #2] message appears in the display.

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

3.25 System Configuration

3.25.1 Function Description

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

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

3.25.2 Operations

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

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

* - Processor Type      = XXXXXX-XXXXXXMHz      Code = XX      L2 Cache = XXXXXXKB
* - Chip set           = XXXXXX                      VGA Chip = XXXXXX
* - BIOS ROM Version   = VX.XX              1st ID = XXH, 2nd ID = XXH
* - BOOT ROM Version   = VX.XX
* - EC/KBC Version     = VX.XX
* - PS Micon Version   = VX.XX
* - SVP Par. Version   = VX.XX      (Panel=XXXXXXXX, Manu=XXXX, Prod=XXXX)
* - Micro code Revision = VX.XX      (Processor=XXXh)
* - Total Memory Size  = XXXXXXMB (Conventional Memory = XXXXKB)
* - Battery Code       = XXXXXXXXXXXX
* - HWSC               = XXXXXXXX
* - FSB                = XXXXXXMHz (Voltage = XEh)
* - X Printer Adapter  LPT1 = XXXX   LPT2 = XXXX   LPT3 = XXXX
* - X ASYNC Adapter    COM1 = XXXX   COM2 = XXXX   COM3 = XXXX
* - X Math CO-Processor
* - X Floppy Disk Drive(s)  Track = XX   Head = XX, Sector = XX
* - X Hard Disk Drive(s)   #1 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]
*                           #2 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]
* - ODD                 = XXXX XXXXXXXX XXXXXXXX [XXXXXXXXXXXX]
* - T&D Total Version    = VX.XX

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

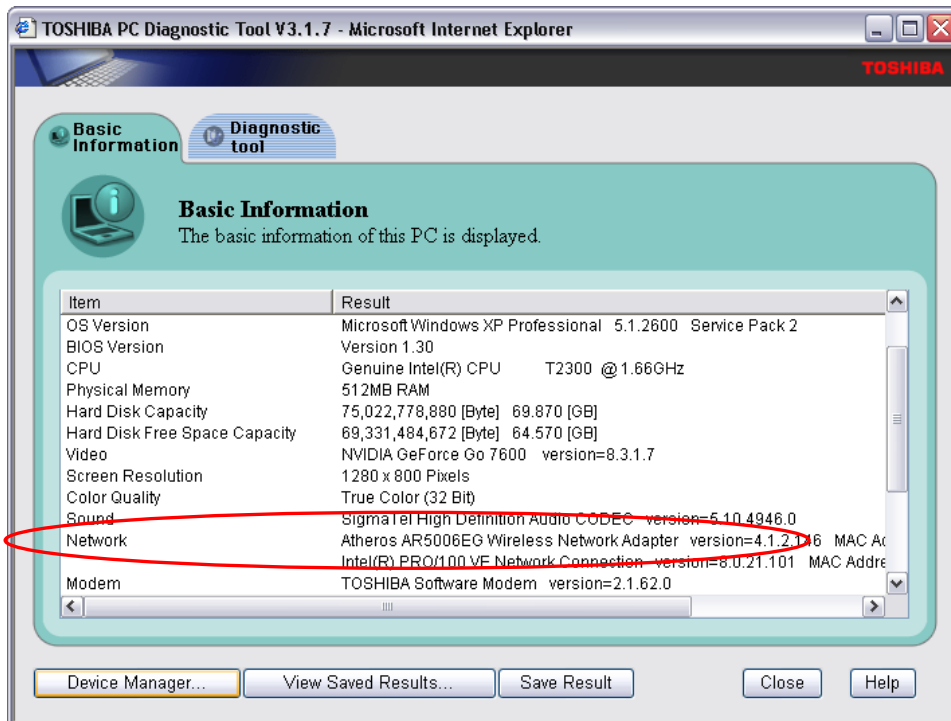
Press **Enter** to return to the DIAGNOSTIC MENU.

3.26 Wireless LAN Test Program (Atheros)

Since there is no test program for Atheros-made wireless LAN cards, check the wireless LAN card type of the computer and the antenna connection by using Windows programs.

Check of the wireless LAN card type

1. Slide the wireless communication switch to “ON” position.
2. Check the card type according to the following procedure:
 - Click [Start] -> [All Programs] -> [TOSHIBA] -> [Utilities] -> [PC Diagnostic Tool].
 - Check the “Network”. If the “Atheros AR5007EG(11b/g)”, “Atheros AR5006EX(11a/b/g)”, “Atheros AR9281(11b/g/n)” or “Atheros 9280(11a/b/g/n)” is shown, the correct card is installed in the computer.

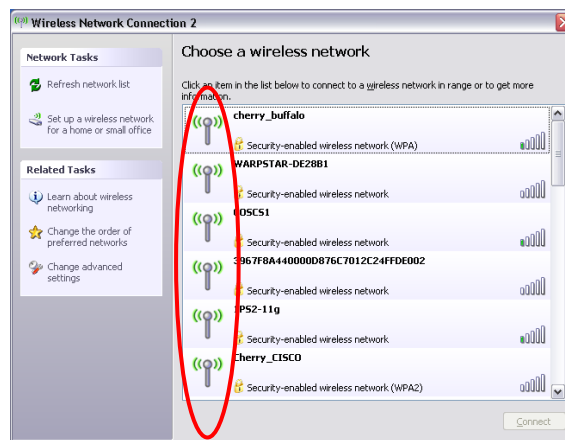


Check of the antenna connection

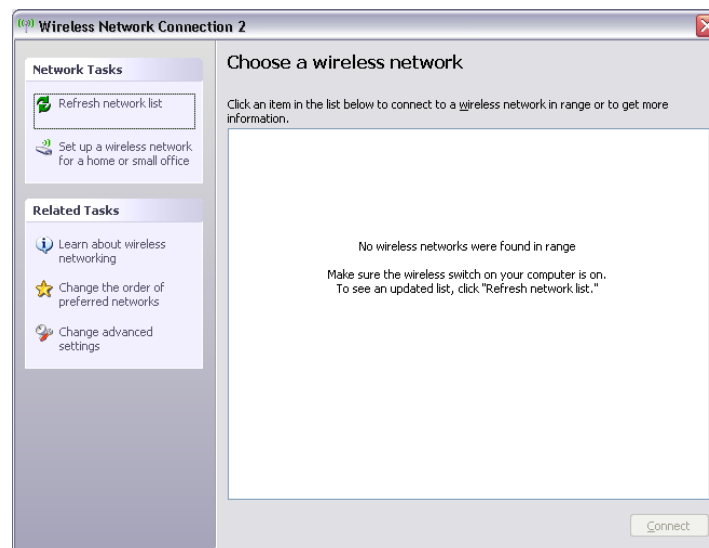
1. Confirm that the icon for wireless LAN appears at the lower right of the screen under the circumstances the wireless LAN communication is available. (It is no problem if a cross is shown on the icon.)



2. Double-click the icon. If the computer finds any AP (Access Point), the antenna marks like as follows will appear. It shows the antenna cables are surely connected to the wireless LAN card.



3. The following message will appear if the antenna cables are not connected to the wireless LAN card or no available access point is found. In this case, check the antenna cable connection to the wireless LAN card by disassembling the computer following the steps described in Chapter 4, Replacement Procedures.



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

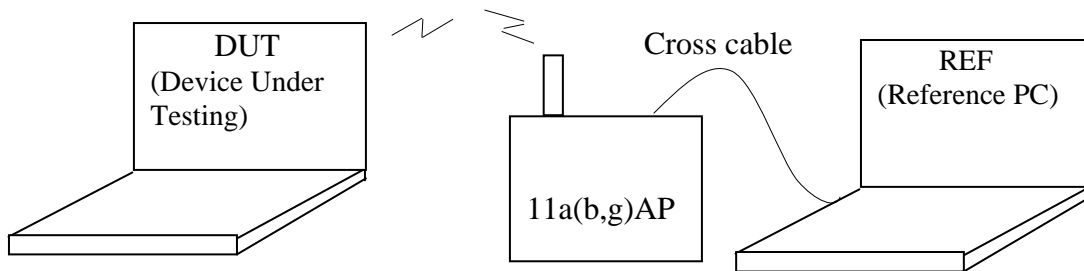
AP for check of 11a : 11aAP

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)



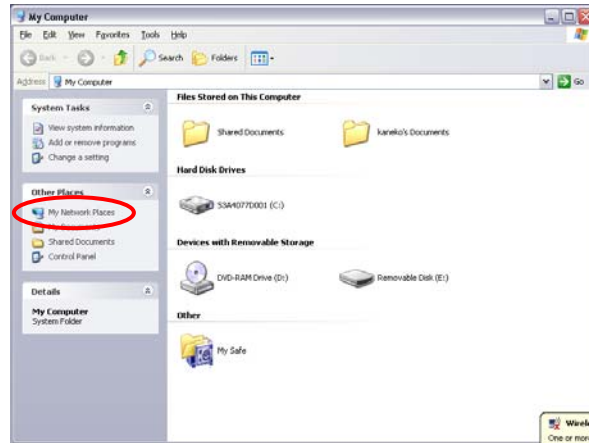
Configuration of equipment for transmitting-receiving test

How to setup the REF PC

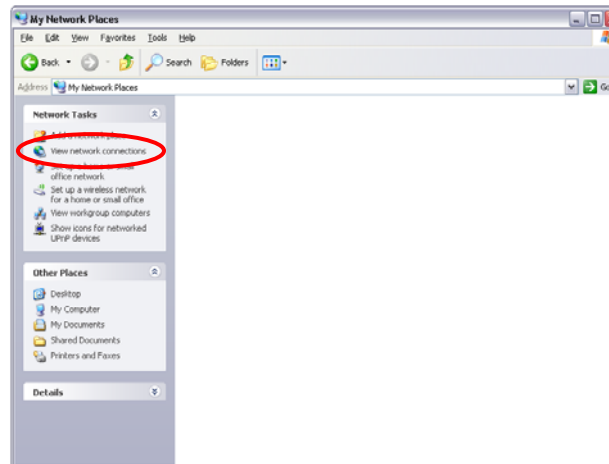
Set up the wireless LAN environment needed for the test before the start of Responder program on REF PC.

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

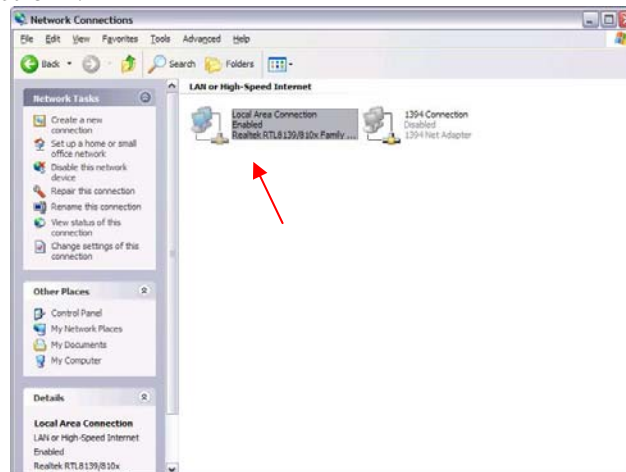
Open “My Computer” window and click “My Network places” on the left column.



- Click “View network connections” on the left column.

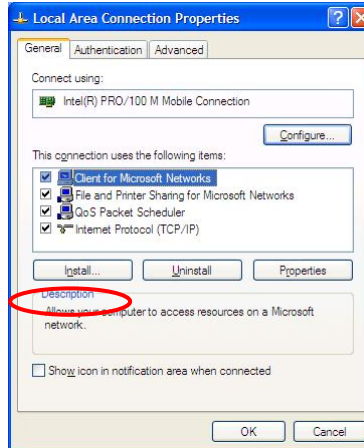


- The “Network Connections” window appears. Double-click “Local Area Connection”.



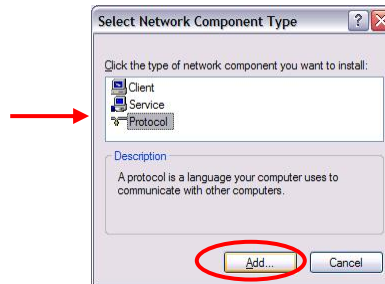
Network Connections window

- Click “Install...” button on the “Local Area Connection Properties” window.



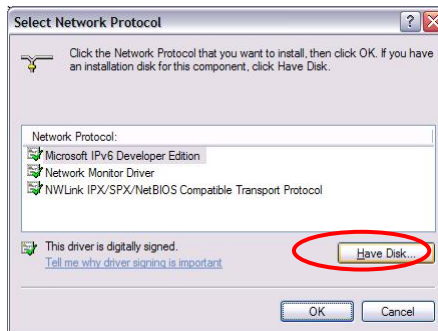
Local Area Connection Properties window

- Select “Protocol” on the “Select Network Component Type” window and click “Add...” button.



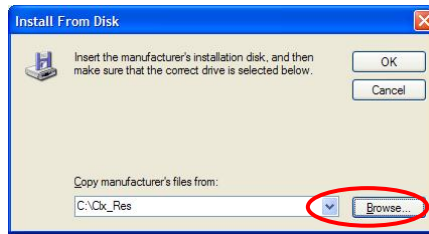
Select Network Component Type window

- Click “Have Disk...” button on the “Select Network Protocol” window.



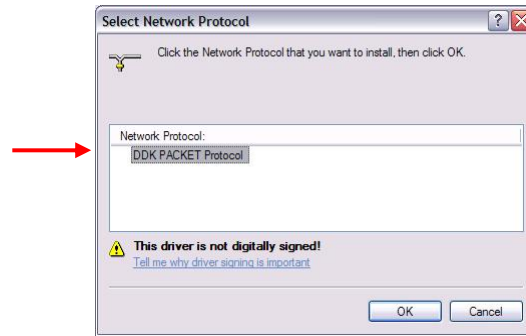
Select Network Protocol window

- 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.)



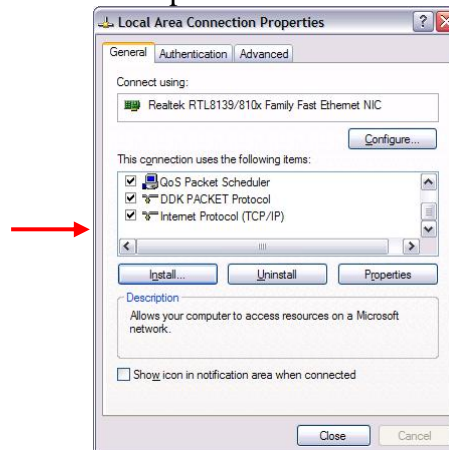
Install From Disk window

- 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

- 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

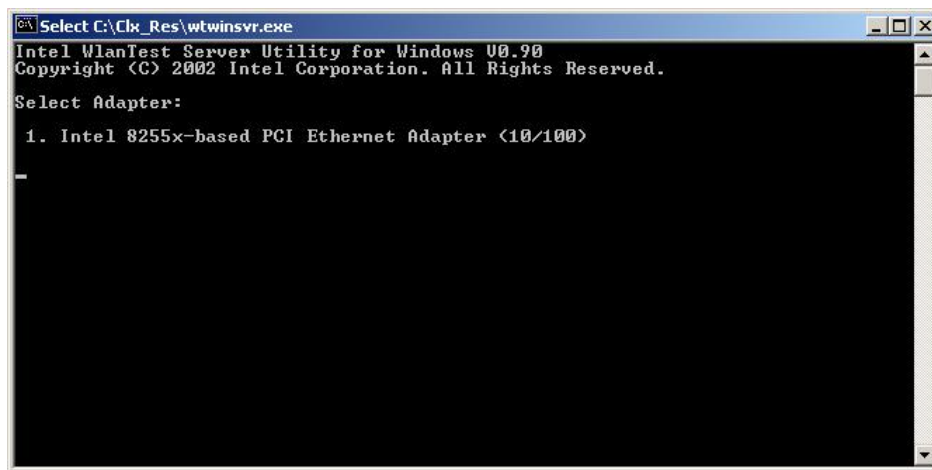
After the completion of REF PC setup, restart the WINDOWS. Then perform the Responder test program for Windows (WTWINSVR.EXE) in the Clx_Res folder.

- WTWINSVR.EXE

Function : Transmitting/receiving of data to/from DUT via AP
OS available : Windows XP only
How to start : Double-click WTWINSVR icon.

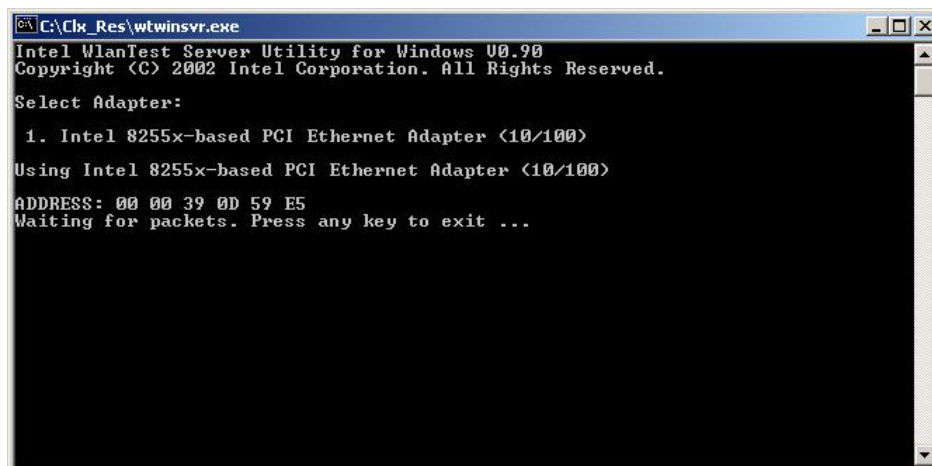
How to start

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.

3.28 Wireless LAN Test Program on DUT PC (Intel-made)

3.28.1 Wireless LAN Test Program (Intel-made : Shirley Peak) on DUT PC

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 a/b/g). 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 WiFi Link 5100/5300 Maintenance T&D Menu               *
*                                                                 *
*   1 : Communication test of 11a mode for 5100/5150 module     *
*                                                                 *
*   2 : Communication test of 11b mode for 5100/5150 module     *
*                                                                 *
*   3 : Communication test of 11g mode for 5100/5150 module     *
*                                                                 *
*   4 : All the tests of WiFi Link 5100/5150 Module              *
*       (MAC Check,communication test)                           *
*                                                                 *
*   5 : Communication test of 11a mode for 5300/5350 module     *
*                                                                 *
*   6 : Communication test of 11b mode for 5300/5350 module     *
*                                                                 *
*   7 : Communication test of 11g mode for 5300/5350 module     *
*                                                                 *
*   8 : All the tests of WiFi Link 5300/5350 Module              *
*       (MAC Check,communication test)                           *
*                                                                 *
*****

```

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

Subtest01 Communication test of 11a mode for 5100/5150 module (Two antenna type)

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 !!   *
*      tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest02 Communication test of 11b mode for 5100/5150 module (Two antenna type)

This subtest execute transmitting/receiving test in 802.11b 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

```
*****
*                                     *
*      11b Communication Test : NG !!   *
*      tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest03 Communication test of 11g mode for 5100/5150 module (Two antenna type)

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 !!   *
*   tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest04 All the tests of WiFi Link 5100/5150 Module
(MAC Check, communication test: Two antenna type)

All the tests is executed in the order of Communication test of 11a mode, Communication test of 11b mode and Communication test of 11g mode.

When any error has detected, the test finishes.

Subtest05 Communication test of 11a mode for 5100/5150 module (Three antenna type)

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 !!   *
*   tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest06 Communication test of 11b mode for 5100/5150 module (Three antenna type)

This subtest execute transmitting/receiving test in 802.11b 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

```
*****
*                                     *
*      11b Communication Test : NG !!   *
*      tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest07 Communication test of 11g mode for 5100/5150 module (Three antenna type)

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 !!   *
*      tx=a antenna : rx = a antenna   *
*                                     *
*****
```

Press any key and return to the test menu.

Subtest08 All the tests of WiFi Link 5100/5150 Module
(MAC Check, communication test: Three antenna type)

All the tests is executed in the order of Communication test of 11a mode, Communication test of 11b mode and Communication test of 11g mode.

When any error has detected, the test finishes.

3.29 LAN/Modem/Bluetooth/IEEE1394 Test Program

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

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

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

1. LAN
2. Modem
3. Bluetooth
4. IEEE1394

Enter a choice:

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

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

3.29.1 LAN test

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

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

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

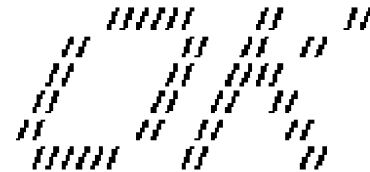
Subtest01 (i82562 + ICHx)

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

The following message will appear:

```
[LAN transmit & receive test !]
                                COMPLETED Repeat count = 00000
                                Error count = 00000

LOOPBACK TEST
100Mbps Auto-negotiation TxRx Test
Destination Address = xxxxxxxxxxxxxx
Source Address = xxxxxxxxxxxxxx
** 100Base-TX Full-Duplex **
< TRANSMIT >
< RECEIVE >
```



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

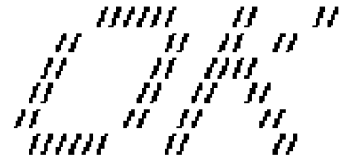
If a defective is found, **NG** message will appear in the display.

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.

3.29.2 Modem test

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

```
#####
#####   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**.

3.29.3 Bluetooth test

Preparation

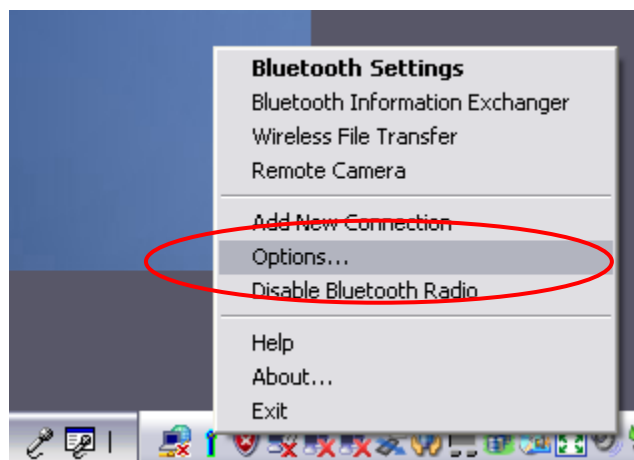
- For the test of Bluetooth function, use the Windows program installed on the target computer (computer to be tested). A responder device (device for transmitting/receiving data) is also needed. (A mobile phone with the Bluetooth function is also available.)
- A Bluetooth card should be installed on the target computer. Install the Bluetooth function by clicking [All Programs] -> [TOSHIBA] -> [Bluetooth] -> [Bluetooth Settings].

Test procedure

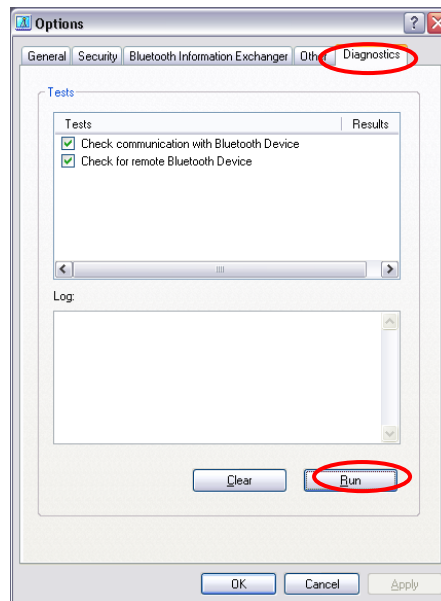
1. Enable the Bluetooth function of the responder device.
2. Make sure the wireless communication switch of the target computer is set to “ON” position.
3. Right-click the Bluetooth icon on the lower right screen of the target computer.



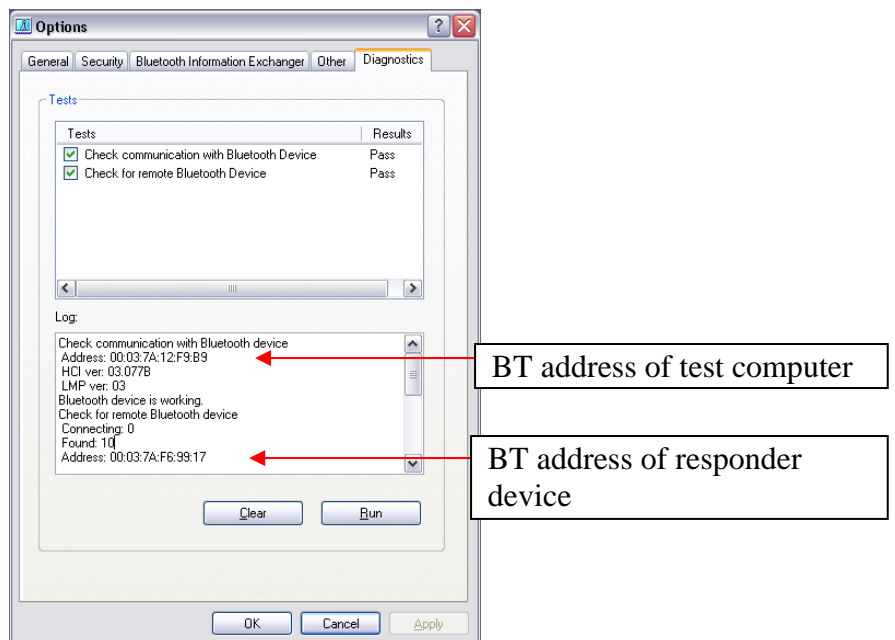
4. Select “Options...”.



5. Select “Diagnostics” tab and click “Run”.



6. Check the “Log” to confirm the test result.



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*.

3.29.4 IEEE1394 test

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

NOTE: Use another computer that can communicate by IEEE1394 (i. Link) cable as a reference machine to perform this test.

The following menu will appear:

```

*****
*****      IEEE1394[XXXXX] Diagnostics program      *****
*****
*                                                     *
*      1 .... Transmit & Receive test                  *
*                                                     *
*      2 .... Responder set                            *
*                                                     *
*      3 .... 1394 GUID Display                        *
*                                                     *
*****
.... Press test number[1-3] ?

```

To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest01 Transmit & Receive test

NOTE: Before executing subtest 01, be sure to execute subtest 02 in the responder machine.

This program checks the data transporting between responder machine and target machine and compare them with the original data through the IEEE1394 cable.

Subtest02 Responder set

This program is executed in the responder machine to initialize the responder machine with the IEEE1394 cable connected to the target machine before executing subtest 01.

Subtest03 1394 GUID Display

This program checks the GUID of IEEE1394.

3.30 Sound Test program

Sound TEST disk cannot be used in PORTEGE A600.

Therefore, please test the sound on Windows OS.

1) Play a music file.

2) click TOSHIBA-> utility -> "PC diagnostic tool." to test the sound

Please check operation of speakers by one of methods.

3.31 3G Test program

Therefore, please test the sound on Windows OS.

All the programs included in EU870 test CD are install.

A procedure should look at ToshibaTestTools_ReleaseNotes.txt.

Please uninstall after the completion of a EU870 test.

3.32 SETUP

3.32.1 Function Description

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

1. Memory
2. System Date/Time
4. Password
 - (a) User Password
 - (b) Supervisor Password
3. HDD Password
 - (a) HDD
 - (b) HDD Password Mode
 - (c) User Password
 - (d) Master Password
5. Boot Priority
 - (a) Boot Priority
 - (b) HDD Priority
6. Others
 - (a) Core Multi-Processing
 - (b) Dynamic CPU Frequency Mode
 - (c) Execute-Disable Bit Capability
 - (d) Virtualization Technology
 - (e) Trusted Execution Technology
 - (f) Auto Power On
 - (g) Beep Volume
 - (h) Diagnostic Mode
 - (i) USB Sleep and Charge
7. Configuration
8. Battery
 - (a) Battery Save Mode
 - (b) PCI Express Link ASPM
 - (c) Enhanced C-States

- 9. Drives I/O
 - (a) Built-in HDD
 - (b) ODD
 - (c) eSATA
 - (d) SATA Controller Mode

- 10. PCI Bus
- 11. Display
 - (a) LCD Display Stretch
- 12. Peripheral
 - (a) Internal Pointing Device
 - (b) Web Camera
- 13. Legacy Emulation
 - (a) USB KB/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation
 - (c) USB Memory BIOS Support Type

- 14. PCI LAN
 - (a) Built-in LAN
 - (b) Wireless LAN
- 15. Security Controller
 - (a) TPM
 - (b) Hide TPM
 - (c) Clear TPM Owner

- 16. Intel(R)AMT
 - (a) MEBx SETUP

3.32.2 Accessing the SETUP Program

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

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

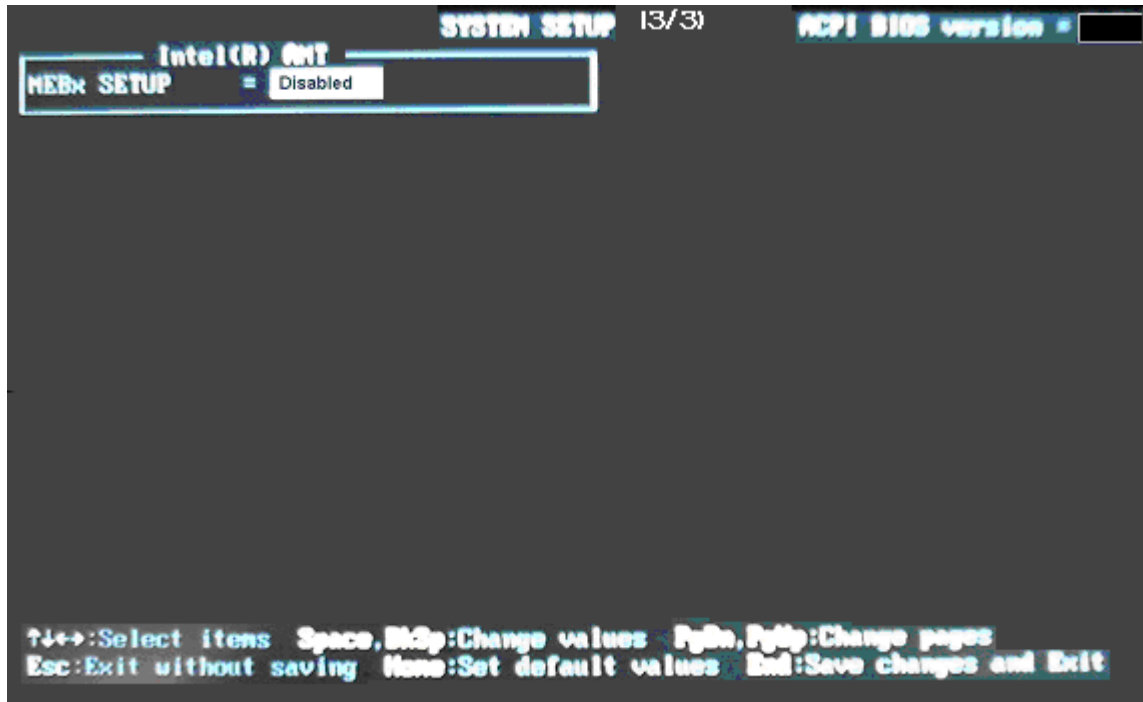
<p>MEMORY</p> <p>Total = XXXXMB</p> <hr/> <p>SYSTEM DATE/TIME</p> <p>Date (MM-DD-YYYY) = XX-XX-XXXX</p> <p>Time (HH:MM:SS) = XX:XX:XX</p> <hr/> <p>PASSWORD</p> <p>User Password = Not Registered</p> <p>Supervisor Password = Not Registered</p> <hr/> <p>HDD PASSWORD</p> <p>HDD = Built-In HDD</p> <p>HDD Password Mode = Master+User</p> <p>User Password = Not Registered</p> <p>Master Password = Not Registered</p>	<p>BOOT PRIORITY</p> <p>Boot Priority = HDD → FDD → CD-ROM → LAN</p> <p>HDD Priority = Built-In HDD → USB</p> <hr/> <p>OTHERS</p> <p>Core Multi-Processing = Enabled</p> <p>Dynamic CPU Frequency Mode = Dynamically Switchable</p> <p>Execute-Disable Bit Capability = Not Available</p> <p>Virtualization Technology = Disabled</p> <p>Trusted Execution Technology = Disabled</p> <p>Auto Power On = Enabled</p> <p>Beep Volume = Medium</p> <p>Diagnostic Mode = Disabled</p> <p>USB Sleep and Charge = Disabled</p>
--	--

↑↓←→ | 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 (2/3) ACPI BIOS version = X.XX

<p>CONFIGURATION</p> <p>Device Config. = Setup by OS</p> <hr/> <p>BATTERY</p> <p>Battery Save Mode = Full Power</p> <p>PCI Express Link ASPM = Enabled</p> <p>Enhanced C-States = Enabled</p> <hr/> <p>DRIVES I/O</p> <p>Built-In HDD = Serial ATA Port0</p> <p>ODD = Serial ATA Port1</p> <p>eSATA = Serial ATA Port4</p> <p>SATA Controller Mode = AHCI</p> <hr/> <p>PCI BUS</p> <p>PCI BUS = IRQ10, IRQ11</p>	<p>DISPLAY</p> <p>Power On Display = Auto-Selected</p> <hr/> <p>PERIPHERAL</p> <p>Internal Pointing Device = Enabled</p> <p>Web Camera = Enabled</p> <hr/> <p>LEGACY EMULATION</p> <p>USB KB/Mouse Legacy Emulation = Enabled</p> <p>USB-FDD Legacy Emulation = Enabled</p> <p>USB Memory BIOS Support Type = HDD</p> <hr/> <p>PCI LAN</p> <p>Built-In LAN = Enabled</p> <p>Wireless LAN = Enabled</p> <hr/> <p>SECURITY CONTROLLER</p> <p>TPM = Disabled</p> <p>Hide TPM = No</p>
--	---

↑↓←→ | 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. To accept the default settings, press **End** and then press **Y**.

NOTE: When you execute the default setting, the following settings are not changed:

- (1) *HDD Mode*
- (2) *Password*
- (3) *Write Policy*

SETUP Options

The SETUP screen is divided into 14 functionally related groups. This section describes each group and its options.

1. Memory

This group of options displays the computer's memory.

This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

Sets the date and time.

System Date Sets date.

System Time Sets time.

3. 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)

(a) 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

(a) Boot Priority

Use this option to set the priority for booting of the computer and the priority for the HDD for booting.

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 (*1) and LAN

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

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

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

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

NOTE: CD-ROM refers to a DVD Super Multi drive.

(b) HDD Priority

Use this option to set the booting priority from HDD or USB (USB Memory stick).

Built-in HDD→USB (Default)

USB →Built-in HDD

6. Others

Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

(a) Core-Multi Processing

The Core Multi-Processing sets the CPU operating mode.

The configuration for the Core Multi - Processing is carried out in the BIOS setup program.

Enabled is Dual Core mode.

Disabled is Single Core 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® Core™ Duo processor featuring Intel SpeedStep technology. (Default)

Always High Disables Intel® Core™ Duo processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.

Always Low Disables Intel® Core™ Duo processor featuring Intel SpeedStep technology and always runs the processor at its default speed.

(c) Execute-Disable Bit Capability

This option set the Execute-Disable Bit function of CPU to the operation system. Execute-Disable Bit gives higher security function preventing the PC from the computer viruses and buffer overflow problem on unauthorized access.

- Available** Enable the Execute-Disable Bit function.
Not Available Disable the Execute-Disable Bit function. (Default)

(d) Virtualization Technology

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

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

- Enabled** Enables Virtualization Technology.
Disabled Disables Virtualization Technology. (Default)

(e) Trusted Execution Technology

Permission/prohibition of Trusted Execution Technology are set up. Trusted Execution Technology is the security technology of making it cooperating with TPM using Virtualization Technology.

- Disabled** Trusted Execution Technology is set as prohibition. (Default)

- Enabled** Trusted Execution Technology is set as permission.

When Trusted Execution Technology is set as permission, Please set both of "Virtualization Technology" of [6 "OTHERS"], and "TPM(s)" of [16 "SECURITY CONTROLLER"] as "Enabled" in advance.

(f) 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	= 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 adaptor.

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 adaptor and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.
2. If you have set a password and the computer boots by the Auto Power On function and Standby is on, the computer will start with the instant security function enabled. The **password** = message is not displayed; however, you must enter the password to use the computer.
3. This option is enabled only once, the setting is reset, after booting up.

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 in Windows is set to Hibernate (Default).

To access it, Start -> Control Panel -> System and Maintenance ->

Power Options -> Edit Plan Settings -> Change advanced power settings -> Battery.

The operation of this function is dependent upon battery status.

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.

(g) Beep Volume

This Option sets up the volume of a Beep sound.

Medium→High→OFF→Low

(h) Diagnostic Mode

This option enables/disables the HW Diagnostic test function.

Enabled Disables the HW Diagnostic test function. (Default)

Disabled Enables the HW Diagnostic test function.

(i) USB Sleep and charge

This Option sets up whether a power supply is supplied to a USB device, when PC is in a Sleep mode state.

Disabled (Default) A power supply is not supplied in a Sleep mode state.

Enabled (Mode1) A power supply is supplied in a Sleep mode state.

Enabled (Mode2) A power supply is supplied in a Sleep mode state.

Enabled (Mode3) A power supply is supplied in a Sleep mode state.

Enabled (Mode4) A power supply is supplied in a Sleep mode state.

7. Configuration

This option lets you set the device configuration.

All Devices	BIOS sets all devices.
Setup by OS	Initializes devices, which is needed to load an operating system. Operating system initializes other devices. (Default)

NOTE: 1. When using installed OS, selecting "Setup by OS" is recommended.
2. When executing test programs, be sure to select "ALL Device". And after the test end, select "Setup by OS".

8. Battery

(a) Battery Save Mode

This option is used to select **Full Power**, **Low Power** or **User Setting** of the battery save mode. When you select the battery save mode, the followings will appear.

Full Power The following shows full power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= High
CPU Sleep Mode	= Enabled
LCD Brightness	= Bright (*1) = Super-Bright (*2)
Cooling Method	= Maximum Performance

Low Power The following shows low power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= Low
CPU Sleep Mode	= Enabled
LCD Brightness	= Semi-Bright (*1) = Bright (*2)
Cooling Method	= Battery Optimized

NOTE: Display of the LCD Brightness will be changed in the condition below:
(*1) Operating the battery
(*2) Using the AC adapter

User Setting Use this option to set the battery save parameters on the sub-window, **BATTERY SAVE OPTIONS**.

Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

High CPU operates at high speed. (Default in Full Power Mode)

Low CPU operates at low speed. (Default in Low Power Mode)

CPU Sleep Mode

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

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility.

Semi-Bright Less than full brightness for saving power.

Cooling Method

Maximum Performance If the CPU becomes too hot, the fan turns on automatically in a high speed to cool down the CPU.

Performance If the CPU becomes too hot, the fan turns on automatically. When the CPU temperature falls to a normal range, the fan turns off.

Battery optimized If the CPU becomes too hot, the processing speed is lowered. If the temperature is still too high, the fan turns on. When the CPU temperature falls to a normal range, the fan is turned off and the processing speed is increased.

***NOTE:** Too hot condition may cause defect on the CPU. When the hot condition continues, the power is automatically turned off in resume mode.*

(b) PCI Express Link ASPM

This option set the power-saving function of PCI Express on the following conditions.

Auto	PCI Express devices are not used while battery operation. (Default)
Disabled	Disable the Power-saving function and drive with maximum performance.
Enabled	PCI Express devices are not used.

(c) Enhanced C-States
*Core2 model only

This option set the power-saving function of Enhanced C-States on the following conditions.

Enabled	This lowers the power consumption. (Default)
Disabled	This does not lower the power consumption.

9. Drives I/O

This option displays the address and interrupts level for hard disk drive and optical disk drive. 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) ODD

This item displays the Serial ATA Port Number. It is for information only and cannot be changed.

Serial ATA Port1

(c) eSATA

This item displays the Serial ATA Port Number. It is for information only and cannot be changed.

Serial ATA Port4

(d) SATA Controller Mode

This feature sets the SATA Controller Mode.

AHCI	Sets AHCI which is the mode for Vista™ (default)
Compatibility	Sets the mode for legacy OS. Use this mode when the driver corresponding to AHCI is not used.

10. PCI Bus

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

PCI BUS = IRQ10, IRQ11

11. Display

This group of options configures the computer's display.

(a) Power On Display

This option is used to select the display when booting up.

Auto-Selected	Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)
LCD+AnalogRGB	Selects both the internal LCD and the external monitor for simultaneous display.

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

12. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

Enabled	Enables the touch pad. (Default)
Disabled	Disables the touch pad.

(b) Web Camera

This option enables or disables the Web Camera

Enabled Enables the Web Camera (Default)

Disabled Disables the Web Camera

13. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

This option sets the Legacy support condition of the USB keyboard and the USB mouse.

Enabled Enables LEGACY support. (Default)
USB keyboard/USB mouse are available without the driver.

Disabled Disables LEGACY support

(b) USB-FDD Legacy Emulation

This option sets the Legacy support condition of the USB floppy disk drive. When a computer is FDD built-in model, this option is not displayed.

Enabled Enables LEGACY support. (Default)
USB floppy disk is available without the driver.

Disabled Disables LEGACY support

(c) USB Memory BIOS Support Type

A setup about the USB flash memory used for a startup of a computer.

HDD The priority as HDD turns into ranking of HDD in "BootPriority" in a USB flash memory. The priority with other HDD can be set up by "HDD Priority." (Default).

FDD A USB flash memory is treated as FDD. The priority as a drive to start turns into ranking of FDD in "Boot Priority."

14. PCI LAN

This option sets the Enable / Disable of the built-in LAN or Wireless LAN functions.

(a) built-in LAN

Enabled Enables built-in LAN functions. (Default)

Disabled Disables built-in LAN functions.

(b) Wireless LAN

- Enabled** Enables wireless LAN functions. (Default)
Disabled Disables Wireless LAN functions.

15. 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) Hide TPM

- Yes** It prevents from checking TPM on Windows.
No It enables it to check TPM on Windows (Default).

In order to set "TPM" as "Enabled", please set "Hide TPM" as "No" first. Moreover, if it is set as "Yes", TPM cannot be checked on Windows.

(d) 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.

16. Intel(R)AMT

*AMT model only

(a) MEBx SETUP

This setting enables or disables the computer's MEBx SETUP Intel(R) AMT.

Enabled Enables the MEBx SETUP.

Disabled Disables the MEBx SETUP. (Default)

Chapter 4

Replacement Procedures

[CONFIDENTIAL]

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4.1 Overview

CAUTION: The case and parts of this machine are delicate (thin) because this machine is lighter than a usual machine. Handle with care of installing/removing.

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

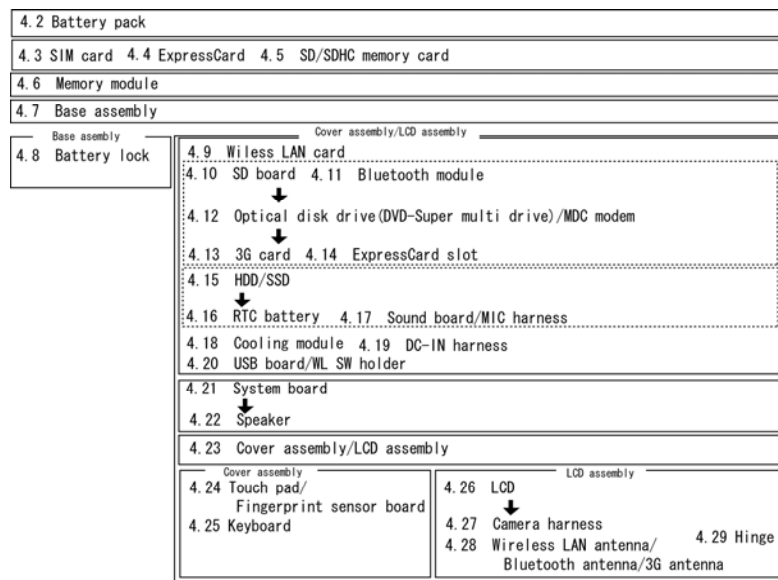
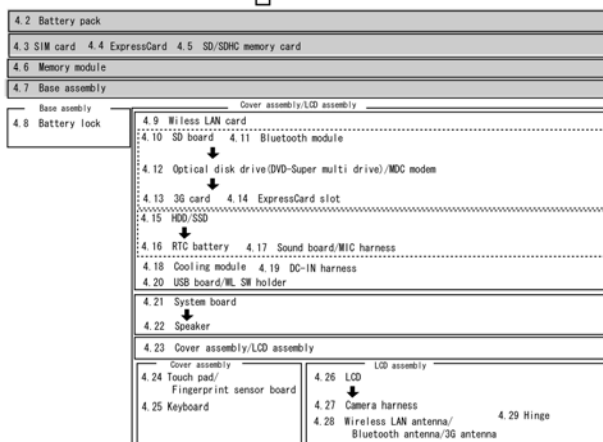


Chart Notation

The chart shows the case for the following example:

- Removing the Wireless LAN card

All FRUs down to the “4.2 Battery pack” to “4.7 Base assembly” above the 4.9 Wireless LAN card slot must be removed.



Please prepare required parts in advance, when replacing the following items.

ITEM	Parts List ITEM No	PART NAME	Quantity
COVER ASSY	50	COVER ASSY	1
	20	TOUCH PAD	1
	30	MEMBRANE SWITCH	1
	44	TP BTN COV ASSY	1
	06	PCB ASSY FMTFSx (Fingerprint sensor board)	1
	15	KEYBOARD UNIT	1
	45	INSULATOR KB	1

ITEM	Parts List ITEM No	PART NAME	Quantity
LCD COVER ASSY	51	LCD COVER ASSY	1
	42	CAMERA MODULE	1
	72, 73	ANTENNA 2.4/5.2GHZ (Wireless LAN antenna)	1
		ANTENNA 2.4/5.2GHZ (3G antenna)	1
	36	ANTENNA 2.4GHZ (Bluetooth antenna)	1

Parts which can not be reused are (1) Touch pad, (2) Membrane switch, (3) TP BTN COV ASSY, (4) Fingerprint sensor board (PCB ASSY FMTFSx), (5) Keyboard, (6) INSULATOR KB, (7) Camera module, (8) Wireless LAN antenna (ANTENNA 2.4/5.2GHZ), (9) 3G antenna (ANTENNA 2.4GHZ) and (10) Bluetooth antenna (ANTENNA 2.4GHZ).

The main parts in this manual are indicated in the part list by the following names.

Parts List ITEM No	Manual NAME	PART NAME
01A	System board	PCB ASSY FMTXSx
01B	SW board	PCB ASSY FMTXWx
02A	USB board	PCB ASSY FMTUSx
02B	Sound board	PCB ASSY FMTJAx
03	HDD FPC	PCB ASSY FMTSHx
04	SD board	PCB ASSY FSISDx
05	ODD FPC	PCB ASSY FSISOx
06	Fingerprint sensor board	PCB ASSY FMTFSx
08	Memory module	DDR2 800 2GB
10	Wireless LAN card	WL-LAN (802.11a/g/n)
14	RTC battery	BTN N/H BATTERY
15	Keyboard	KEYBOARD UNIT
19	Optical disk drive	DVD SUPER MULTI DRIVE
23	MIC harness	MIC WITH HARNESS
26	USB board FPC	FPC FMTSU1
27	Sound board FPC	FPC FMTSJ1
28	SD board FPC	FPC FSISP1
29	Fingerprint sensor board FFC	0.5MM PITCH FFC
32	ExpressCard slot	EXPRESS CARD CONNECTOR
35	Bluetooth FFC	0.5MM PITCH FFC
36	Bluetooth antenna	ANTENNA 2.4GHZ
40	Base assembly	BASE ASSY
40F	Memory cover	MEM COVER ASSY
44	TP BTN cover	TP BTN COV ASSY
50	Cover assembly	COVER ASSY
50A	Speaker	SPEAKER ASSY
51	LCD cover	LCD COVER ASSY
52	LCD mask	LCD MASK ASSY
72、73	Wireless LAN antenna	ANTENNA 2.4/5.2GHZ
S01	M2x3B S-THIN HEAD Screw	SCREW M2X3BN
S02	M2x4C BIND Screw	G SCREW M2X4CR
S03	M2x6C BIND Screw	G SCREW M2X6CR
S04	M2x3.2B FLAT HEAD Screw	SCREW M2X3.2BN
S05	M1.4x3B S-THIN HEAD	
S06	M2.5x10B FLAT HEAD Screw	SCREW M2.5X10 3CR
S07	M3x5C BIND Screw	4-40X5 UNIFIED SCREW
S08	M2x6C S-THIN HEAD Screw	
S09	M2x2.4C S-THIN HEAD Screw	

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”.

1. Do not disassemble the computer unless it is operating abnormally.
2. Use the designated tools.
3. Ensure that the environment for working on and storing parts does not contain any of the following.
 - Dust or dirt
 - Static electricity
 - Extremely hot, cold, or humid conditions
4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.
5. Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly procedures in this manual.
6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.
7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.
8. When 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.
9. As all parts have sharp edges and corners, take care not to cut yourself.
10. After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedures

Four main types of cable connector are used.

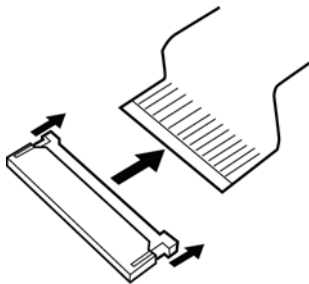
- Pressure plate connector
- Spring connector
- Back flip connector
- Normal pin connector

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.

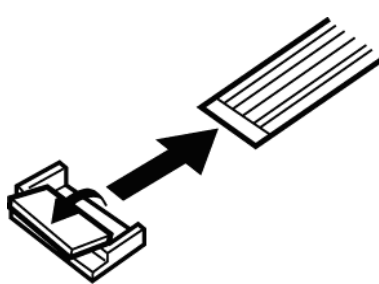
For spring connectors, lift up the stopper frees the cable and allow it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable. Pull the cable to ensure that it is securely connected.

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.

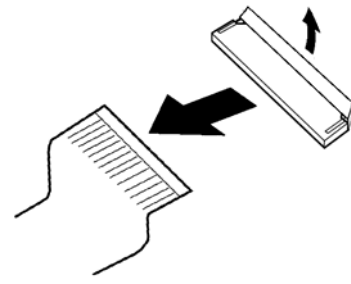
Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.



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

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

- One Philips screwdriver with type 0 bit (for S-THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap or heel grounder
- Anti-static carpet or flooring
- Air-ionizers in highly static sensitive areas
- Antenna coaxial cable disconnecter

Screw Tightening Torque

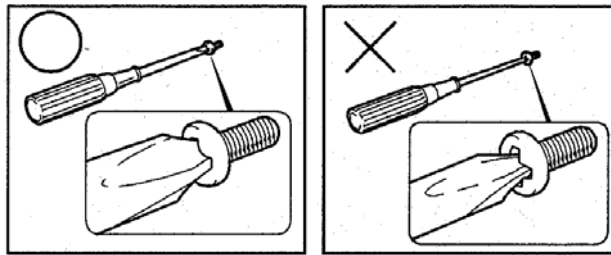
When you fasten screws, be sure to follow the torque list below.

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 screwdriver for quick and easy operations. (except a M1.4 screw)
Use a non electric screwdriver to fasten a M1.4 screw, because a boss for M1.4 screw maybe broken if the screw is driven with an electric screwdriver.

- M1.4 (1.4mm) 0.098 N·m(1.0 kgf·cm)
- M2.0 (2mm) 0.167 N·m(1.7 kgf·cm)
- M2.5 (2.5mm) 0.294 N·m(3.0 kgf·cm)
- M3.0 (3mm) 0.294 N·m(3.0 kgf·cm)

NOTE: To prevent damage to *THIN HEAD* screws, use type 0 bit philips screwdriver. 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.

[Normal grip]

- Even numbered length screws: Brown
- Odd numbered length screws: White
- Special length screw: Blue



[Special grip]

- Even numbered length screws: Yellow
- Odd numbered length screws: Pink
- Special length screw: Green

“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.

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 shape

- B: Bind screw
- F: Flat head screw
- S: Super thin head screw
- T: Tapping screw
- U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm BIND screw

Screw color/material

- B: Black/Nickel
- C: Silver/Non-Hexavalent Chromate
- U: Other screws (Unique screws: such as stud, etc.)

4.2 Battery pack

Removing the Battery pack

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

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

1. Turn off the power of the computer.
2. Disconnect the AC adapter and other external devices from the computer.
3. Turn the computer face down.
4. Release the **battery lock**. Pull out the **battery pack** while sliding the **battery latch** as shown in the following figure.

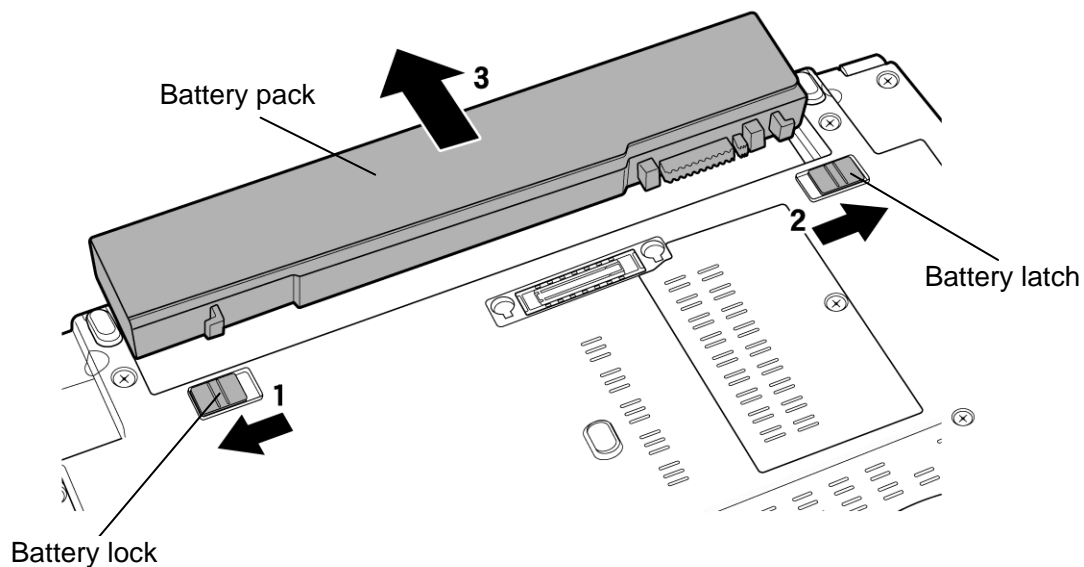


Figure 4-1 Removing the battery pack

NOTE: Dispose of used batteries according to the laws and ordinances of your local authority.

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 from the computer.
3. Install the **battery pack** into the battery slot. Make sure the battery pack is installed securely.
4. Slide the **battery lock** into the lock position.

4.3 SIM card

Removing the SIM card

To remove the SIM card, follow the steps below and refer to Figure 4-2.

1. Release the **hook**.
2. Push the **SIM card**. It will pop out partly when you release, so pull out the card.

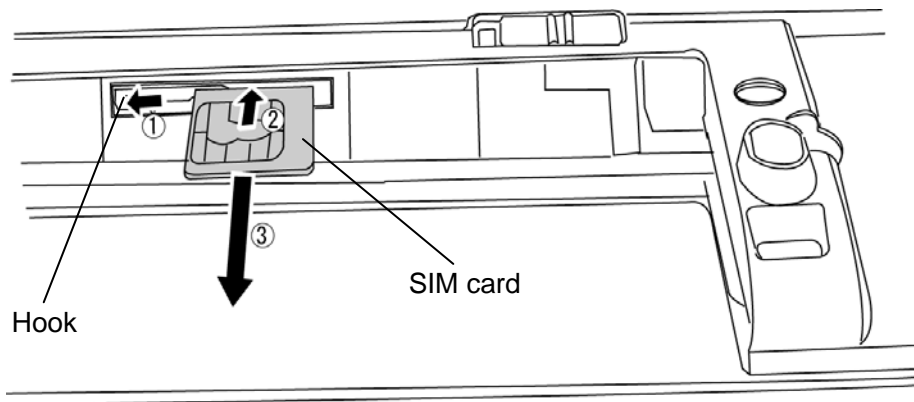


Figure 4-2 Removing the SIM card

Installing the SIM card

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

1. Insert the **SIM card** and press it until it is securely connected.

4.4 ExpressCard

Removing the ExpressCard

To remove the ExpressCard, follow the steps below and refer to Figure 4-3.

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

1. Push the **ExpressCard**. It will pop out partly when you release, so pull out the card.

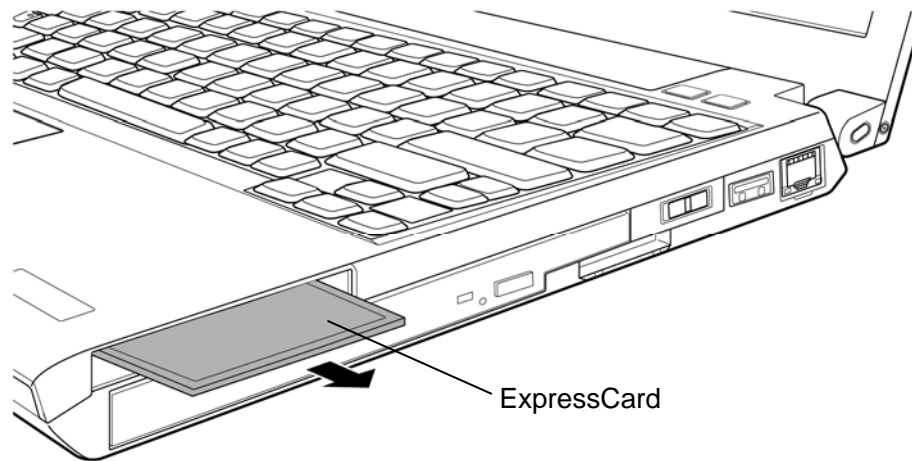


Figure 4-3 Removing the ExpressCard

Installing the ExpressCard

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

1. Insert the **ExpressCard** and press it until it is securely connected.

4.5 SD/SDHC memory card

Removing the SD/SDHC memory card

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

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

1. Push the **SD/SDHC memory card**. It will pop out partly when you release, so pull out the card.

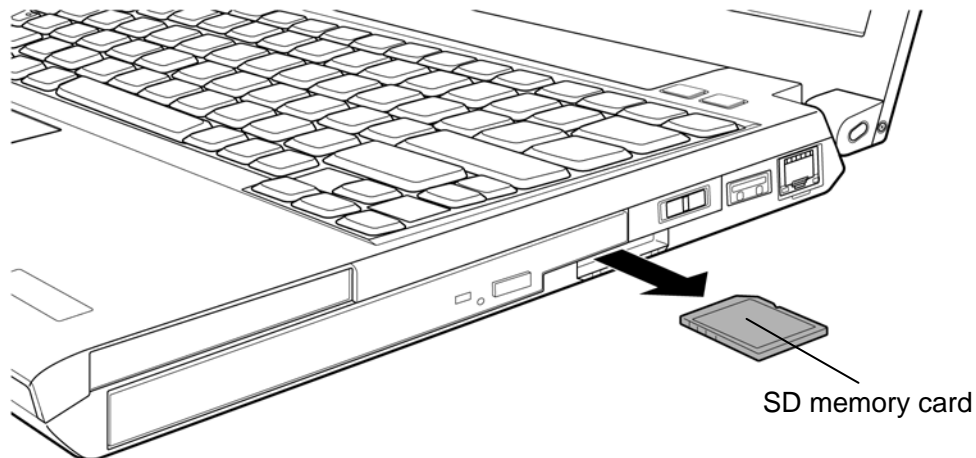


Figure 4-4 Removing the SD/SDHC memory card

Installing the SD/SDHC memory card

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

1. Insert the **SD/SDHC memory card** in the card slot and push it carefully to ensure a firm connection.

4.6 Memory module

Removing the Memory module

To remove the memory module, confirm that the computer is shut down. Then follow the steps below and refer to Figure 4-5 and 4-6.

CAUTION: When removing the memory module, make sure the computer is powered off. Removing a memory module with the power on might damage the module or the computer itself.

Do not touch the connectors on the memory module or on the computer.
Dust and stains on the connectors may cause memory access problems.

Never press hard or bend the memory module.

1. Loosen the **screw** fixing the memory cover.
2. Remove the **memory cover**.

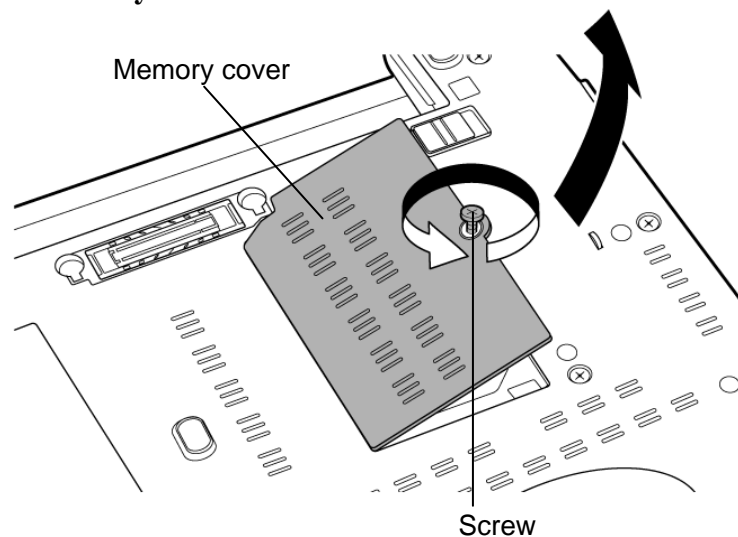


Figure 4-5 Removing the memory cover

3. Open the left and right **latches** outside and remove the **memory module**.

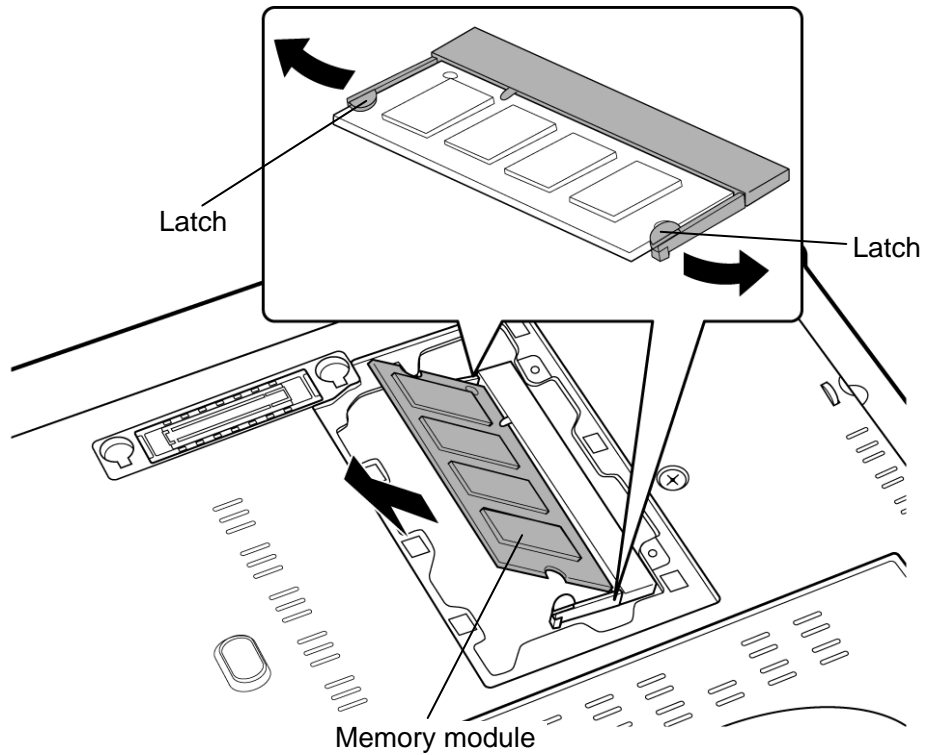


Figure 4-6 Removing the memory module

Installing the Memory module

To install the memory module, confirm that the computer is shut down. Then follow the steps below and refer to Figure 4-5 and 4-6.

CAUTION: *When installing the memory module, make sure the computer is powered off. Inserting a memory module with the power on might damage the module or the computer itself.*

Never press hard or bend a memory module.

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

CAUTION: *After installing the memory module, make sure that the memory module is secured with the left and right latches.*

2. Set the **memory cover** and secure it with the **screw**.
3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.
4. If the memory is not detected, check that it is connected correctly.

4.7 Base assembly

Removing the Base assembly

To remove the base assembly, follow the steps below and refer to Figure 4-7.

1. Remove the following **screws** securing the base assembly.
 - M2×4C BIND screw ×1 (Described as “A” in the figure)
 - M2×6C BIND screw ×15 (Described as “B” in the figure)
 - M2.5×10C FLAT HEAD screw ×2 (Described as “C” in the figure)
2. Remove the **base assembly** while lifting the RJ45 connector side first.

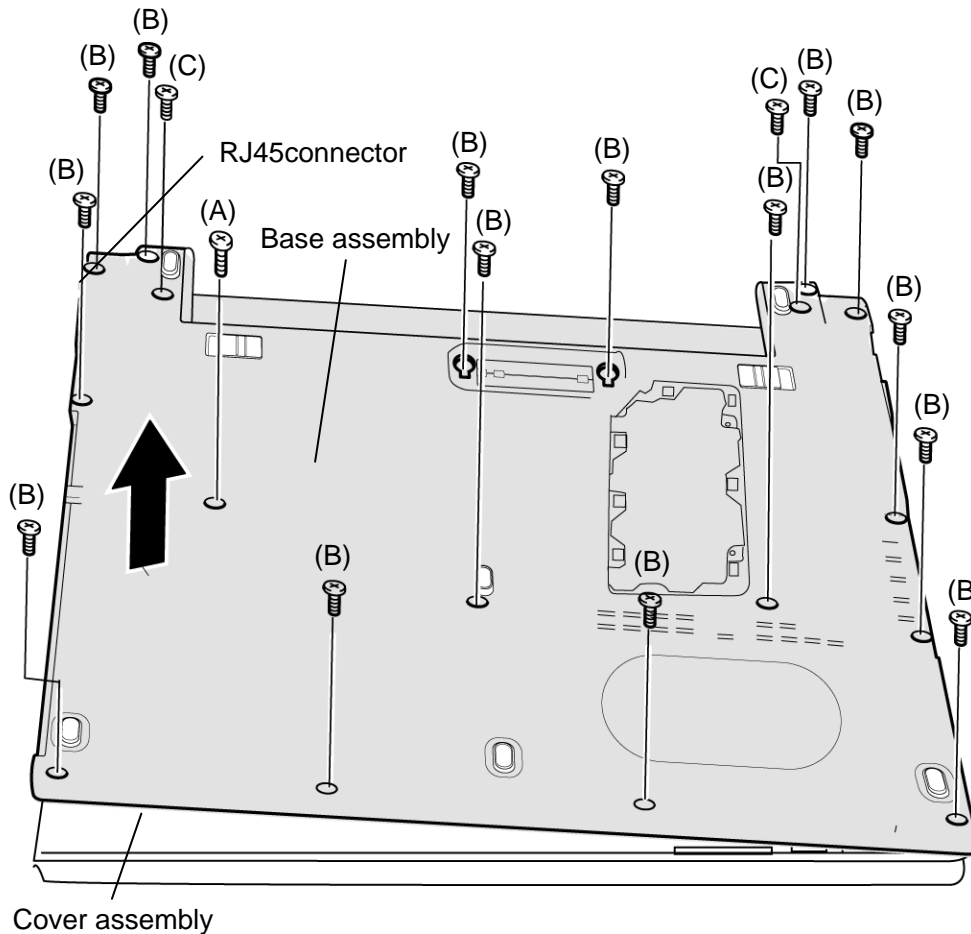


Figure 4-7 Removing the base assembly

Installing the Base assembly

To install the base assembly, follow the steps below and refer to Figure 4-7.

1. Set the **base assembly** to the cover assembly.
2. Secure the **base assembly** and cover assembly with the following **screws**.
 - M2×4C BIND screw ×1 (Described as “A” in the Figure 4-7)
 - M2×6C BIND screw ×15 (Described as “B” in the Figure 4-7)
 - M2.5×10C FLAT HEAD screw ×2 (Described as “C” in the Figure 4-7)

4.8 Battery lock

Removing the Battery lock

To remove the battery lock, follow the steps below and refer to Figure 4-8.

1. Remove the **battery locks** while pushing hooks inside to release them.

CAUTION: When removing the battery lock L, be careful not to lose the SPG battery lock.

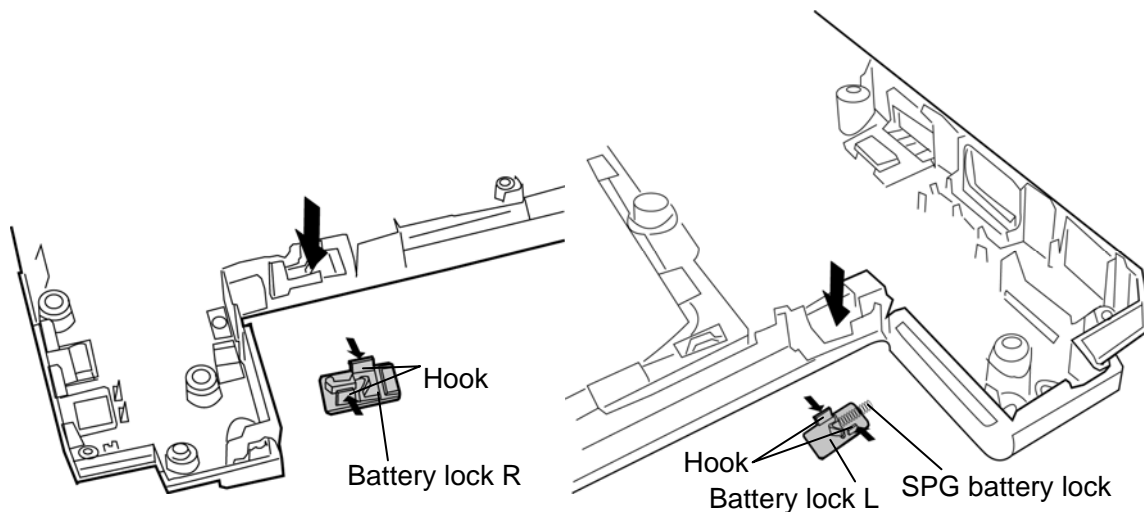


Figure 4-8 Removing the battery lock

Installing the Battery lock

To install the battery lock, follow the steps below and refer to Figure 4-8.

1. Set (push) the **battery locks** to the base assembly from the bottom until the **hooks** are engaged.

CAUTION: When installing the battery locks, make sure that the direction of installing is correct. After installing, check that the battery locks are moved properly.

4.9 Wireless LAN card

Removing the Wireless LAN card

To remove the wireless LAN card, follow the steps below and refer to Figure 4-9.

1. Turn up the **insulator** and disconnect three (or two) **wireless LAN antenna cables** from the connectors on the wireless LAN card.
2. Remove the following **screws** and disconnect the **wireless LAN card** from the connector on the system board.

- M2×4C BIND screw ×2

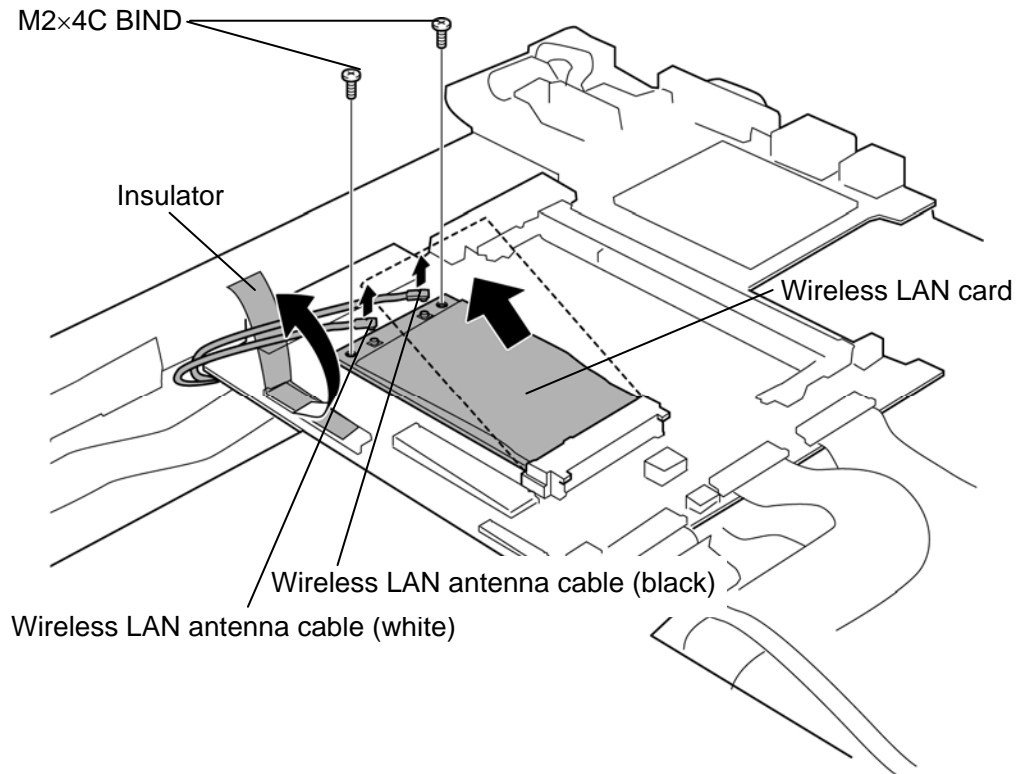


Figure 4-9 Removing the wireless LAN card

Installing the Wireless LAN card

To install the wireless LAN card, follow the steps below and refer to Figure 4-9.

1. Insert the **wireless LAN card** to the connector on the system board slantwise and press it to connect firmly.
2. Secure the wireless LAN card with the following **screws**.
 - M2×4C BIND screw ×2
3. Connect three (or two) **wireless LAN antenna cables** to the connectors on the wireless LAN card.
4. Arrange the **wireless LAN antenna cables** and secure them with the **insulator**.

NOTE: Connect the white cable to “Main” and black cable to “Aux” marked on the wireless LAN card.

4.10 SD board

Removing the SD board

To remove the SD board, follow the steps below and refer to Figure 4-10.

1. Remove the following **screws** and lift up the SD board (Be careful that the SD board FPC, wireless LAN antenna cable, 3G antenna cable and antenna relay cable are connected to the connector on the back of the SD board).
 - M2×3B S-THIN HEAD ×2
2. Disconnect the **SD board FPC** from the connector **CN9710** on the back of the SD board.
3. Disconnect the **wireless LAN antenna cable**, **3G antenna cable** and **antenna relay cable** from the connectors on the back of the SD board (only for antenna relay model).

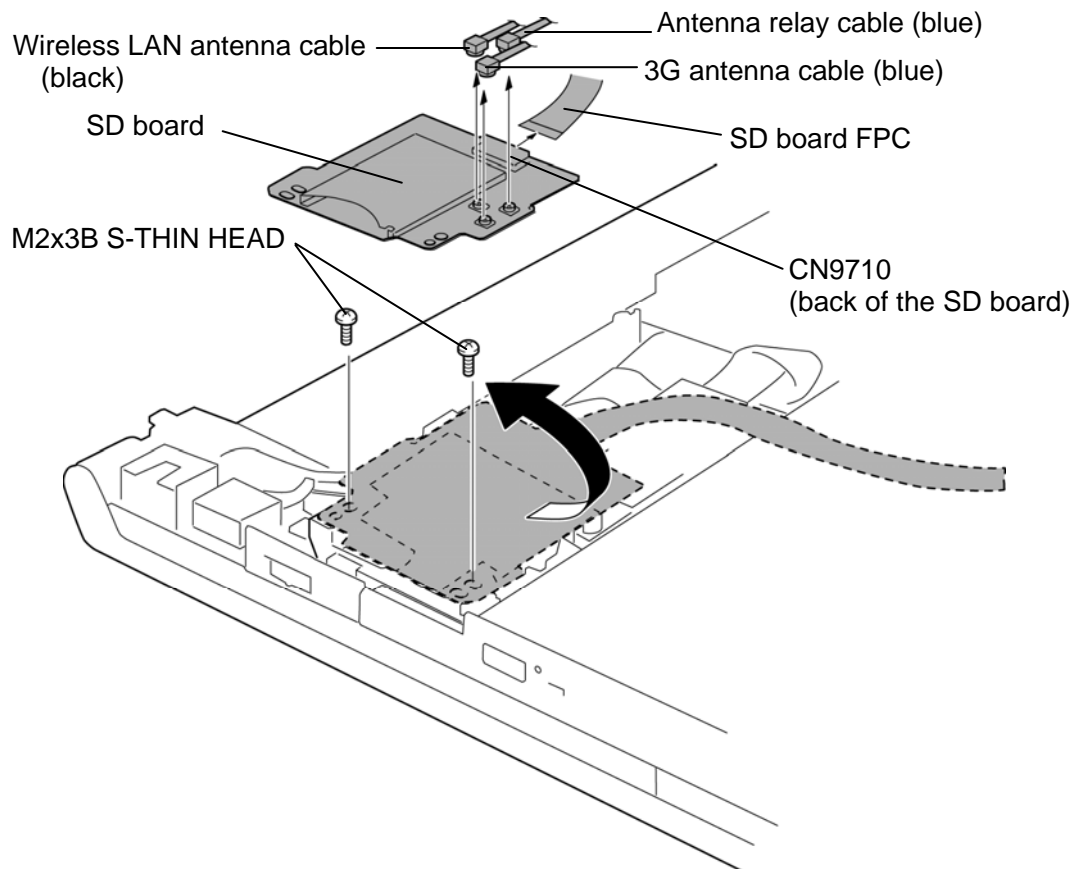


Figure 4-10 Removing the SD board

Installing the SD board

To install the SD board, follow the steps below and refer to Figure 4-10.

1. Connect the **SD board FPC** to the connector **CN9710** on the back of the SD board.
2. Connect the **wireless LAN antenna cable, 3G antenna cable** and **antenna relay cable** to the connectors on the back of the SD board (only for antenna relay model).
3. Set the SD board in place and secure it with the following **screws**.
 - M2×3B S-THIN HEAD ×2

4.11 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-11.

1. Remove the following screw and lift up the **Bluetooth module**.
 - M2×3B S-THIN HEAD ×1
2. Disconnect the **Bluetooth antenna cable** and **Bluetooth FFC** from the connectors on the back of the Bluetooth module.

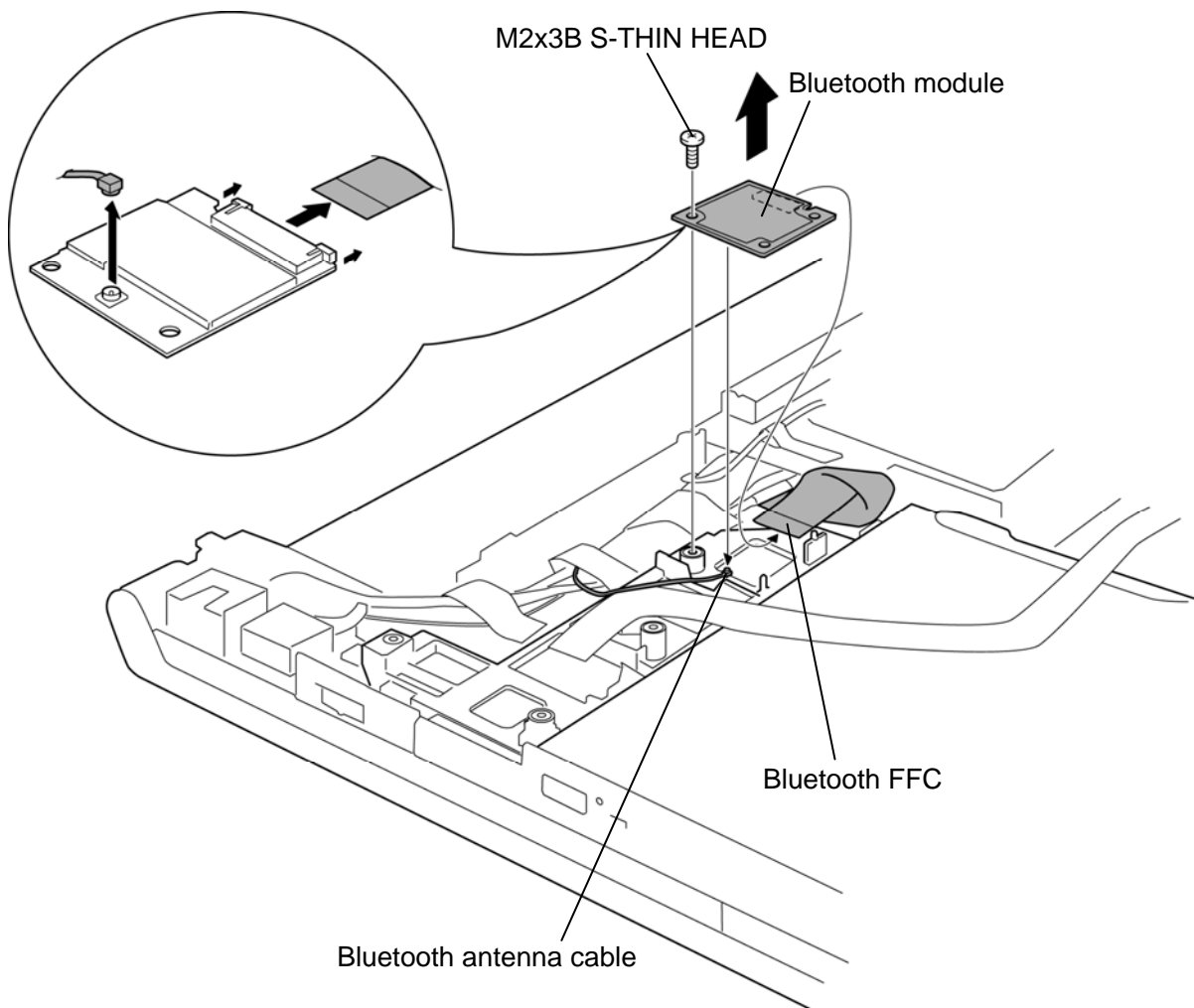


Figure 4-11 Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below and refer to Figure 4-11.

1. Connect the **Bluetooth antenna cable** and **Bluetooth FFC** to the connectors on the back of the Bluetooth module.
2. Set the **Bluetooth module** to the slot and secure it with the following **screw**.
 - M2×3B S-THIN HEAD ×1

4.12 Optical disk drive (DVD-Super Multi drive)/MDC modem

Removing the Optical disk drive/MDC modem

To remove the optical disk drive/MDC modem, follow the steps below and refer to Figure 4-12 to 4-16.

CAUTION: When the optical disk inside the optical disk drive can not be ejected because of some failure, open the disc tray by inserting a slender object (about 15 mm) such as a straightened paper clip into the eject hole near the eject button.

An optical disk drive or MDC modem (dummy ODD) is incorporated exclusively.

1. Disconnect the **ODD FPC** from the connector **CN9400** on the system board.
2. Remove the following screw and **optical disk drive** from the slot.
 - M2×6C BIND ×1

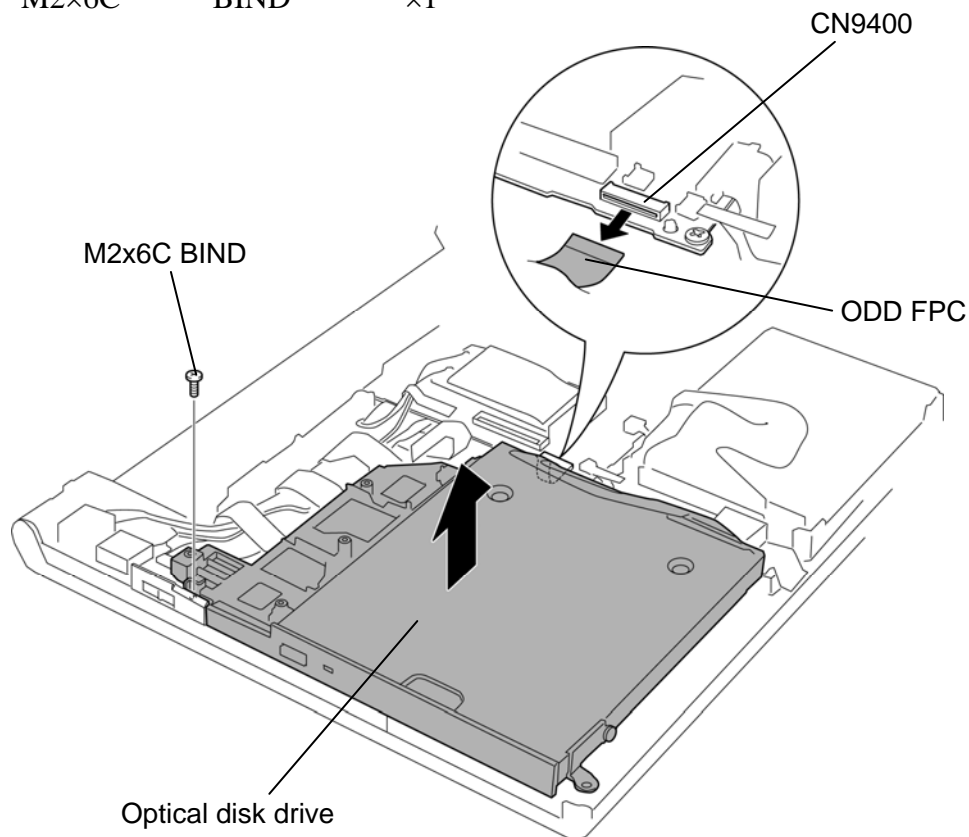


Figure 4-12 Removing the optical disk drive (1)

3. Remove the following **screws** and **SD holder**.

- M2×4C BIND ×2

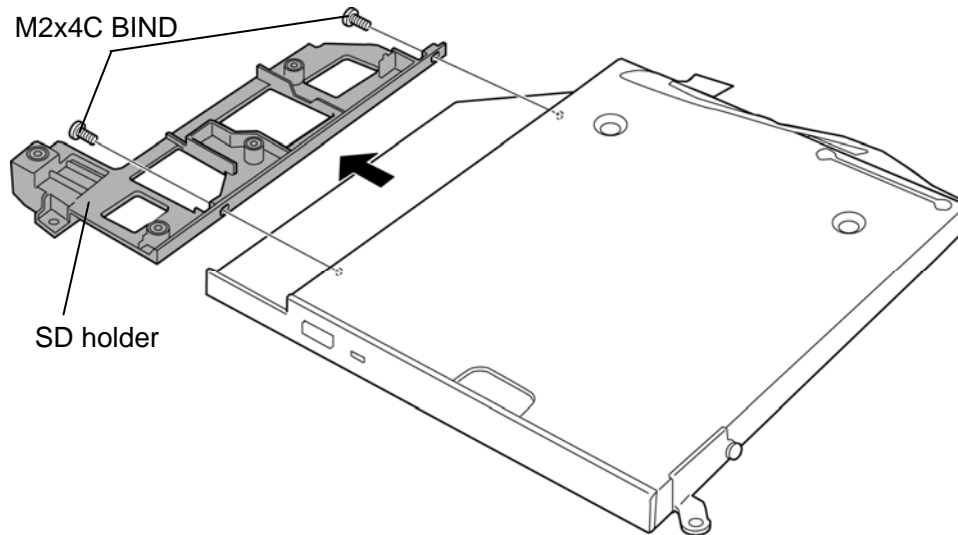


Figure 4-13 Removing the optical disk drive (2)

4. Remove the following **screws**, **ODD FPC**, **ODD rear plate** and **ODD side plate**.

- M2×4C BIND ×2
- M2×3B S-THIN HEAD ×1

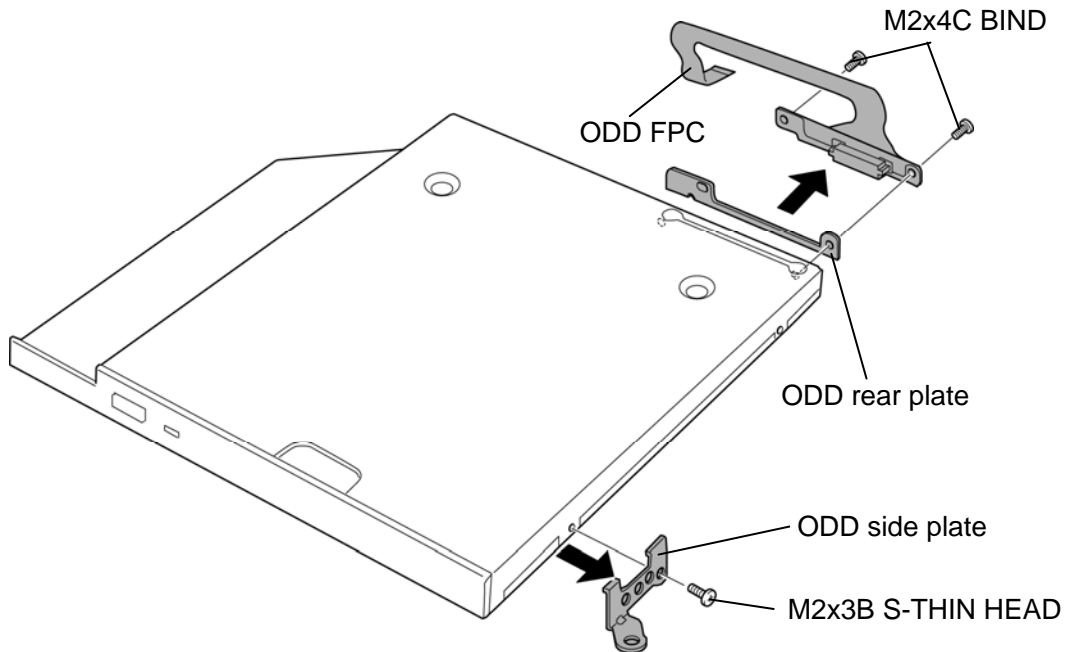


Figure 4-14 Removing the optical disk drive (3)

5. Remove the following **screws** securing the MDC modem.
 - M2×4C BIND ×2
6. Turn up the **insulator** and take out the RJ11 harness from the slot.
7. Disconnect the **MDC modem** from the connector on the MDC FPC.
8. Disconnect the **RJ11 harness** from the connector on the MDC modem.
9. Remove the **dummy ODD**.

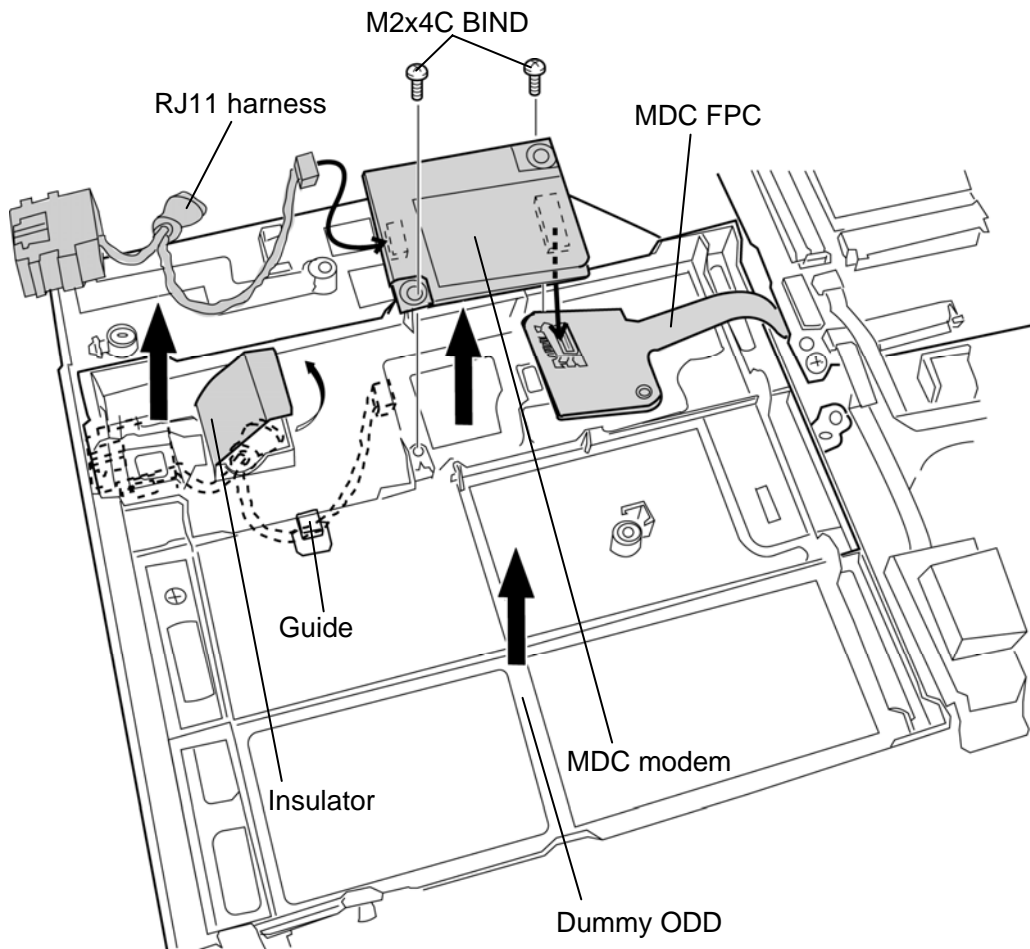


Figure 4-15 Removing the MDC modem

10. Remove the following screws and **ODD upper**.

- M2x4C BIND x2

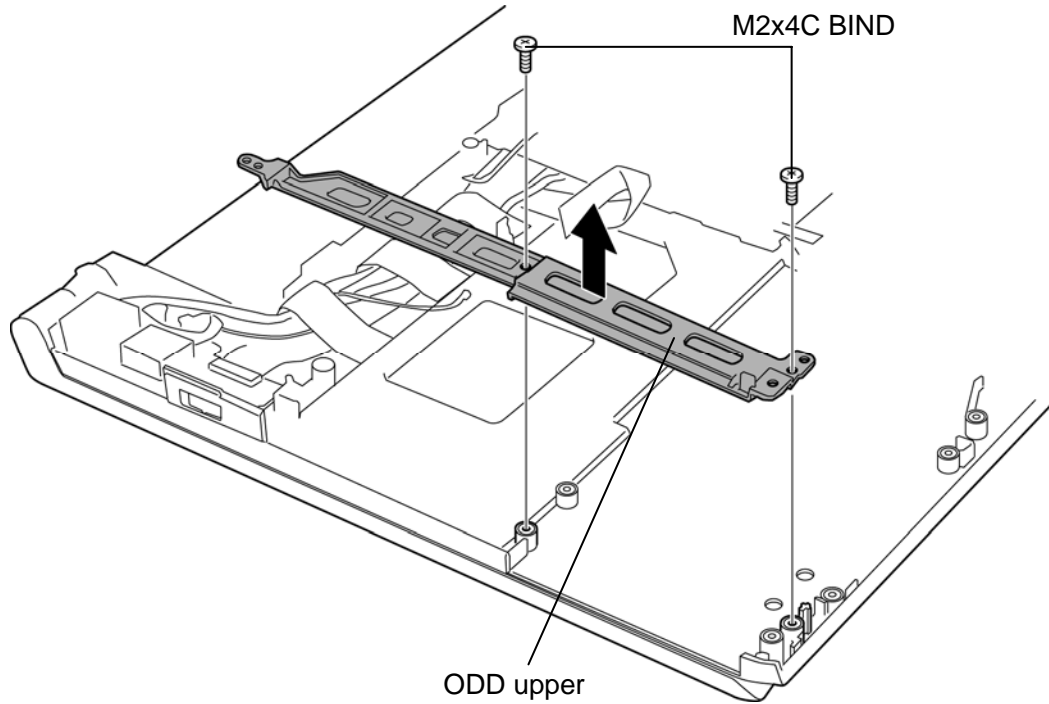


Figure 4-16 Removing the ODD upper

Installing the optical disk drive/MDC modem

To install the optical disk drive/MDC modem, follow the steps below and refer to Figure 4-12 to 4-16.

1. Set the **ODD upper** and secure it with the following **screws**.
 - M2×4C BIND ×2
2. Set the **dummy ODD** in place.
3. Connect the **RJ11 harness** to the connector on the MDC modem.
4. Connect the **MDC modem** to the connector on the MDC FPC and secure them with following **screws**.
 - M2×4C BIND ×2
5. Turn up the **insulator** and set the **RJ11 harness** to the slot while arranging it in place.
6. Set the **ODD FPC**, **ODD rear plate** and **ODD side plate** to the optical disk drive and secure them with the following **screws**.
 - M2×4C BIND ×2
 - M2×3B S-THIN HEAD ×1
7. Set the **SD holder** to the optical disk drive and secure them with the following **screws**.
 - M2×4C BIND ×2
8. Set the optical disk drive to the slot and secure it with the following **screw**.
 - M2×6C BIND ×1
9. Connect the **ODD FPC** to the connector **CN9400** on the system board.

4.13 3G card

Removing the 3G card

To remove the 3G card, follow the steps below and refer to Figure 4-17.

1. Disconnect two **3G antenna cables** from the connectors on the 3G card.
2. Remove the following **screws** and disconnect the **3G card** from the connector on the 3G FPC.
 - M2×3B S-THIN HEAD screw ×2
3. Disconnect the **3G FPC** from the connector **CN2750** on the system board.
4. Remove the following **screws** and **3G FPC**.

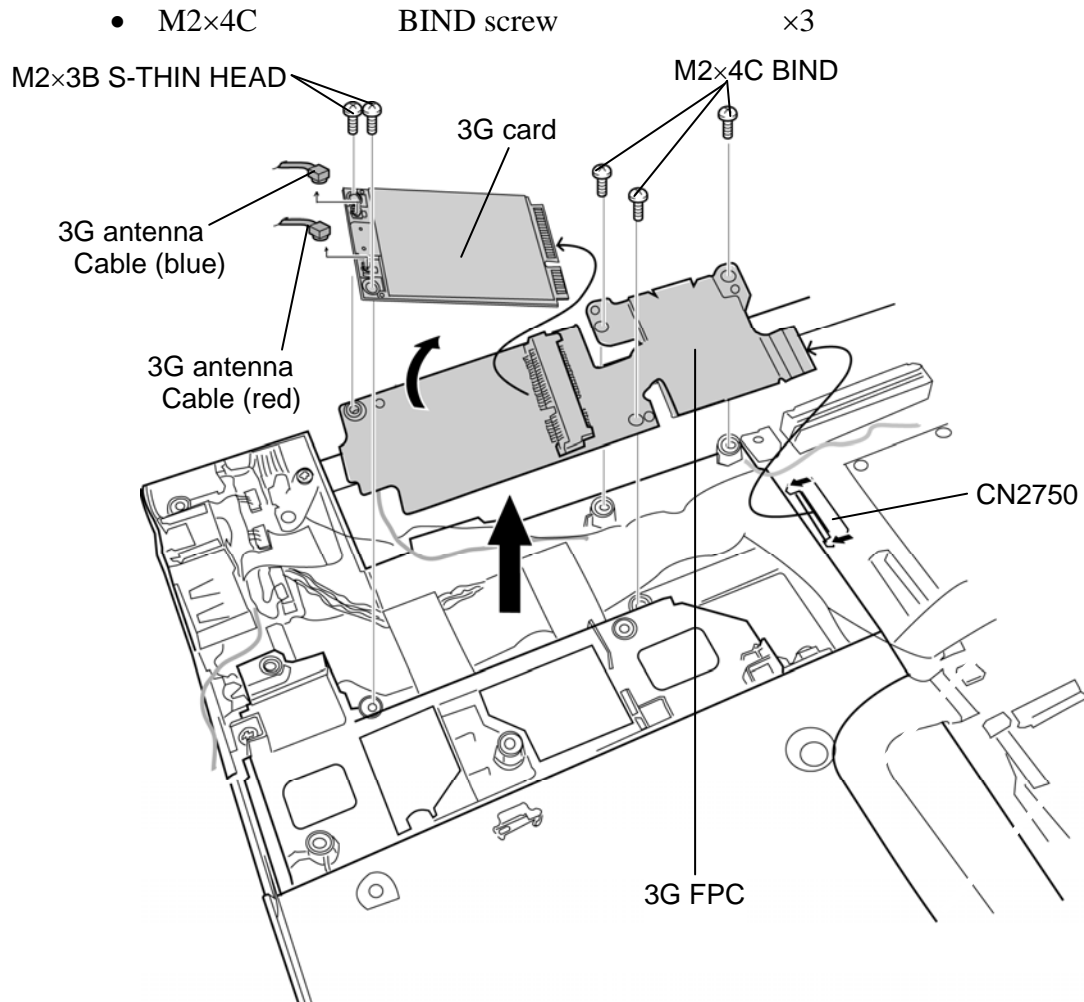


Figure 4-17 Removing the 3G card

Installing the 3G card

To install the 3G card, follow the steps below and refer to Figure 4-17.

1. Connect the **3G FPC** to the connector **CN2750** on the system board and secure it with following **screws**.
 - M2×4C BIND screw ×3
2. Insert the **3G card** to the connector on the 3G FPC slantwise.
3. Press the **3G card** down and secure it with the following **screws**.
 - M2×3B S-THIN HEAD screw ×2
4. Connect the **3G antenna cables** to the connectors on the 3G card.
5. Arrange the **3G antenna cables** in place.

4.14 ExpressCard slot

Removing the ExpressCard slot

To remove the ExpressCard slot, follow the steps below and refer to Figure 4-18.

1. Remove the following **screws** securing the ExpressCard slot.
 - M2×4C BIND screw ×4
2. Disconnect the **ExpressCard FPC** from the connector **CN2520** on the system board and remove the **ExpressCard slot** from the cover assembly.
3. Peel off the **insulator**.

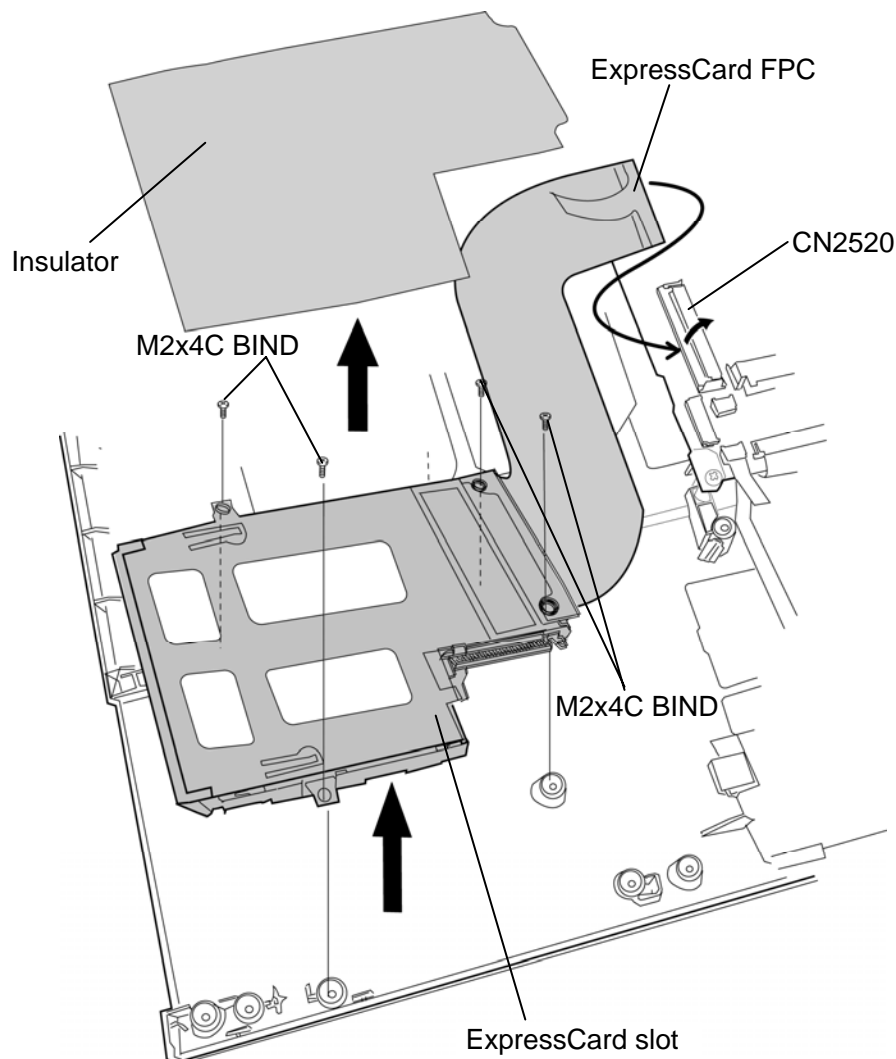


Figure 4-18 Removing the ExpressCard slot

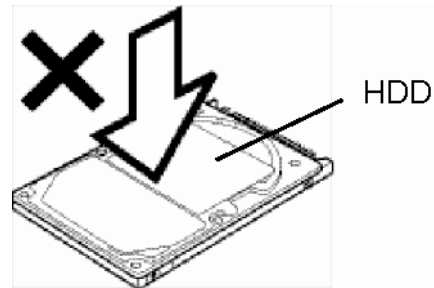
Installing the ExpressCard slot

To install the ExpressCard slot, follow the steps below and refer to Figure 4-18.

1. Stick the **insulator**.
2. Set the **ExpressCard slot** to the cover assembly and secure it with the following **screws**.
 - M2×4C BIND screw ×4
2. Connect the **ExpressCard FPC** to the connector **CN2520** on the system board

4.15 HDD/SSD

CAUTION: Take care not to press on the top or bottom of the HDD or SSD. Pressure may cause data loss or damage to the device.



There is a possibility that the black shield layer of the HDD FPC and SD board FPC is peeled off (different from the usual polyimide cover), if any tape is stuck to the black shield layer. Handle with care of installing/removing.

- (1) Do not use the HDD FPC or SD board FPC which the black shield layer is peeled off.
When the black shield layer of the HDD FPC and SD board FPC is peeled off, orange or gray color will appear on the surface.
- (2) Do not stick any tape (except for the insulator stuck to the connector portion) to the black shield layer of the HDD FPC or SD board FPC.

4.15.1 HDD

Removing the HDD

To remove the HDD, follow the steps below and refer to Figure 4-19.

1. Lift up the **HDD** from the slot.
2. Disconnect the **HDD** from the connector on the **HDD FPC**.

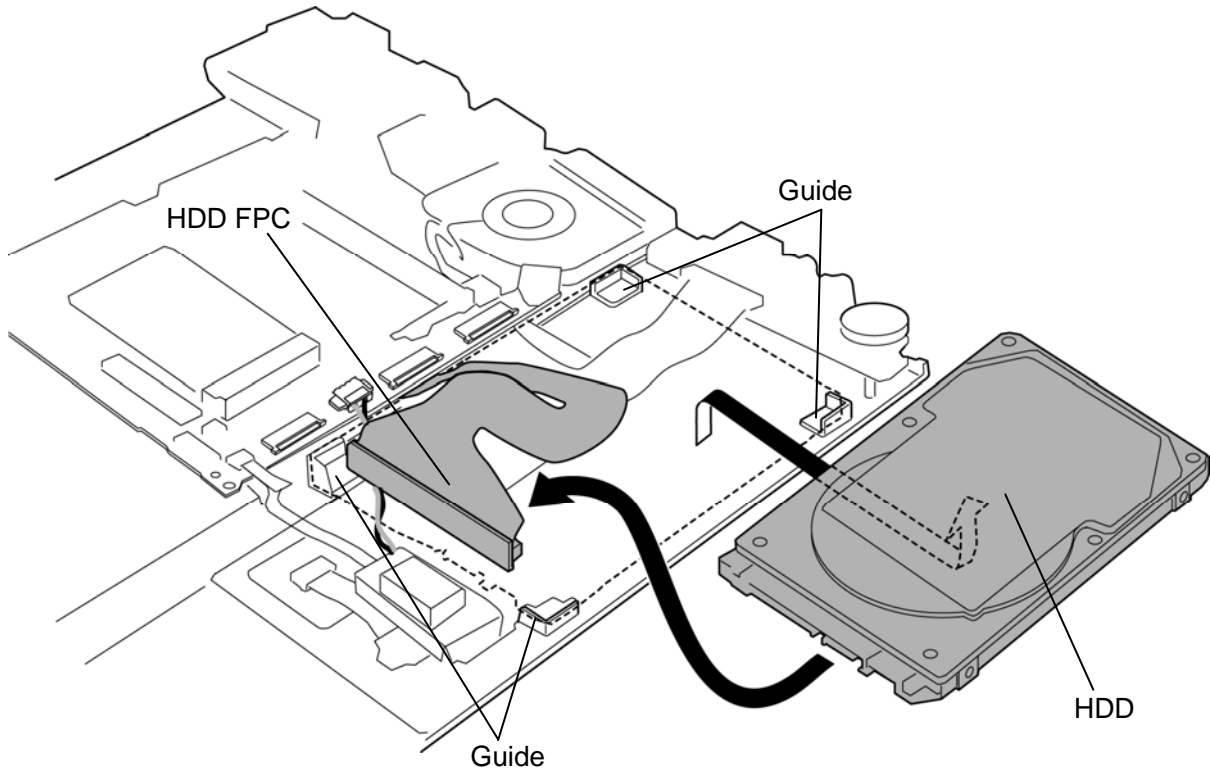


Figure 4-19 Removing the HDD

Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-19.

1. Connect the **HDD** to the connector on the **HDD FPC**.
2. Set the **HDD** into the **guides** of the slot.

4.15.2 SSD

Removing the SSD

To remove the SSD, follow the steps below and refer to Figure 4-20.

1. Remove the following **screws** securing the **SSD**.
 - M1.4x3B S-THIN HEAD ×4
2. Disconnect the **SSD** from the connector on the **SSD FPC**.

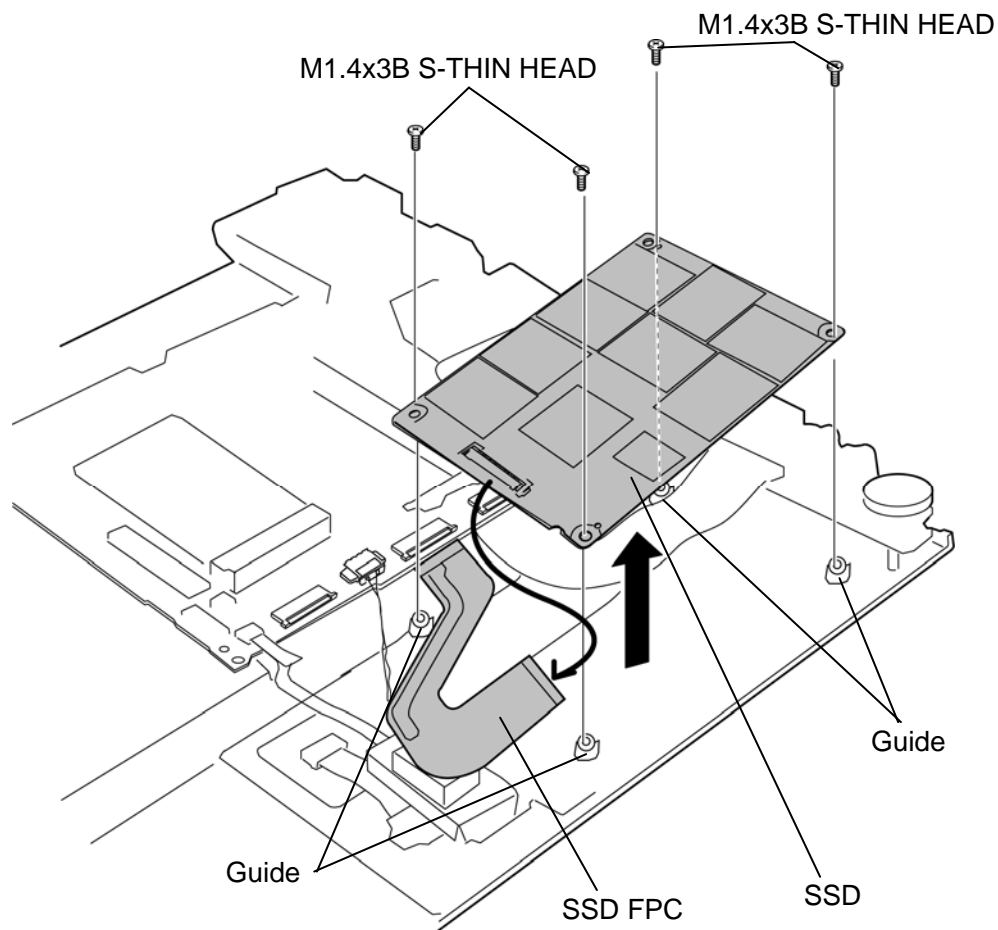


Figure 4-20 Removing the SSD

Installing the SSD

To install the SSD, follow the steps below and refer to Figure 4-20.

1. Connect the **SSD** to the connector on the **SSD FPC**.
2. Set the **SSD** into the **guides** of the slot and secure it with the following **screws**.
 - M1.4×3B S-THIN HEAD ×4

4.16 RTC battery

CAUTION: Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the laws and ordinances of your local authority.

Removing the RTC battery

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

1. Disconnect the **RTC battery harness** from the connector **CN9300** on the system board.
2. Remove the **RTC battery holder** (INSULATOR RTC BATT) fixed to the cover assembly with the **double-sided tape**.

CAUTION: A cushion is fixed to the bottom of the RTC battery holder with a double-sided tape and the cushion is fixed to the cover assembly with a double-sided tape. When removing the RTC battery holder, be careful not to break the cushion of the bottom of the RTC battery holder.

3. Open the **RTC battery holder** (INSULATOR RTC BATT) while peeling adhered portion with the **double-sided tape** and remove the **RTC battery**.

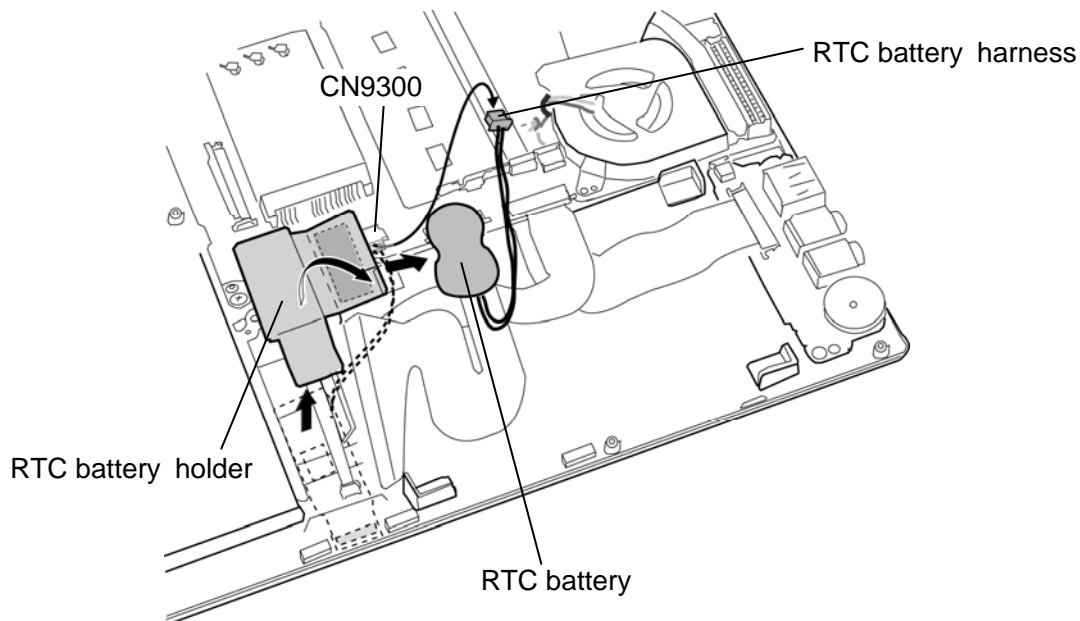


Figure 4-21 Removing the RTC battery

Installing the RTC battery

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

1. Set the **RTC battery** to the RTC battery holder (INSULATOR RTC BATT) and close the **RTC battery holder** while sticking the cover portion with the double-sided tape.

CAUTION: *Use a new RTC battery holder, when the cushion of the RTC battery holder is broken.*

2. Set (stick) the **RTC battery holder** (INSULATOR RTC BATT) in place.
3. Connect the **RTC battery harness** to the connector **CN9300** on the system board.

4.17 Sound board/MIC harness

Removing the Sound board/MIC harness

To remove the sound board/MIC harness, follow the steps below and refer to Figure 4-22 and Figure 4-23.

1. Remove the following **screw** securing the sound board.
 - M2×4C BIND ×1
2. Disconnect the **sound board FPC** and **speaker harness** from the connector **CN9510** and **CN6350** on the sound board and remove the **sound board** from the slot.

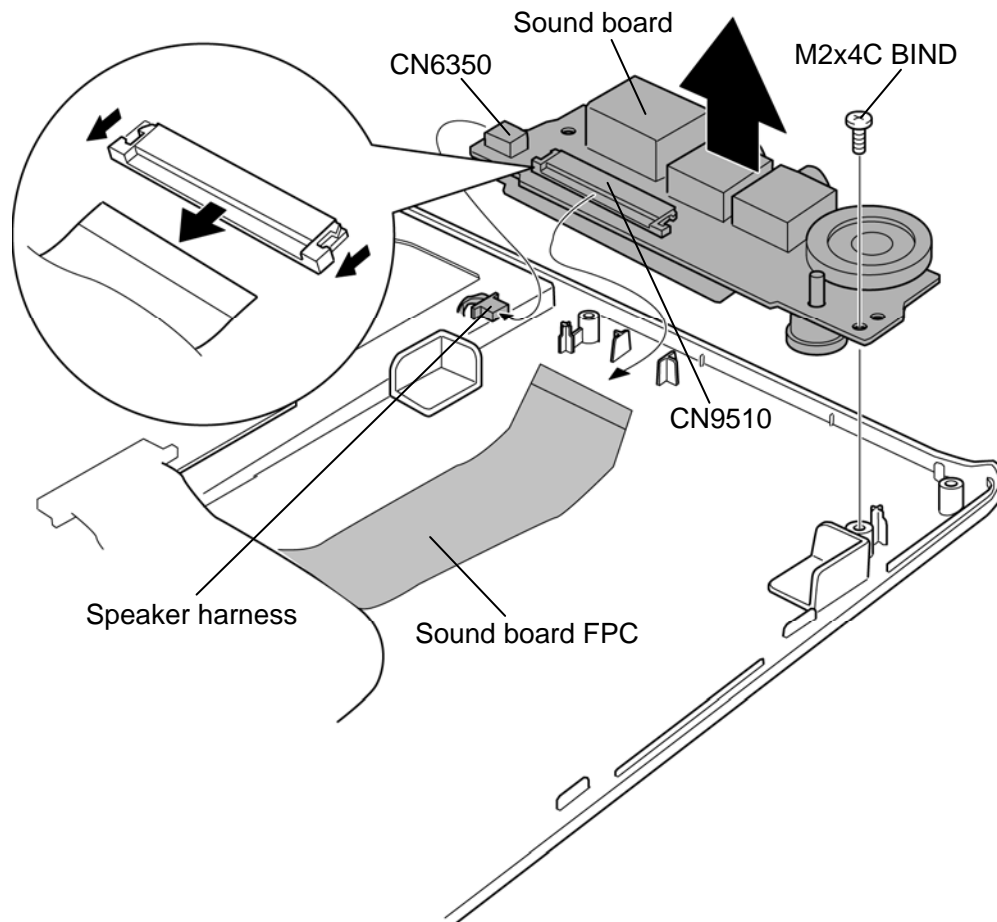


Figure 4-22 Removing the sound board/MIC harness (1)

3. Disconnect the **MIC harness** from the connector **CN6050** on the sound board and remove the **MIC harness** from the sound board.

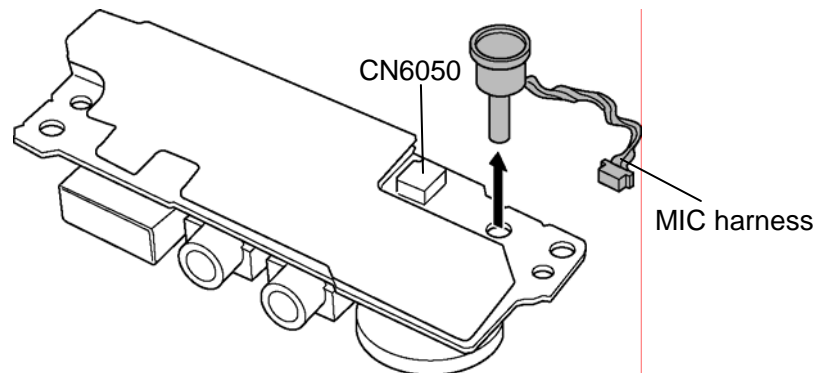


Figure 4-23 Removing the sound board/MIC harness (2)

Installing the Sound board/MIC harness

To install the sound board/MIC harness, follow the steps below and refer to Figure 4-22 and 4-23.

1. Set the **MIC harness** to the slot of the sound board and connect the **MIC harness** to the connector **CN6050** on the sound board.
2. Connect the **sound board FPC** and **speaker harness** to the connector **CN9510** and **CN6350** on the sound board.
3. Set the **sound board** to the slot and secure it with following screw.
 - M2×4C BIND ×1

4.18 Cooling module

Removing the Cooling module

To remove the cooling module, follow the steps below and refer to Figure 4-24.

CAUTION: *The CPU can become very hot during operation. Be sure to let it cool before starting repair work.*

1. Remove the following **screws** securing the cooling module.
 - M2×4C BIND ×2
2. Disconnect the **fan harness** from the connector **CN8771** on the system board.
3. Remove the **cooling module** from the slot.

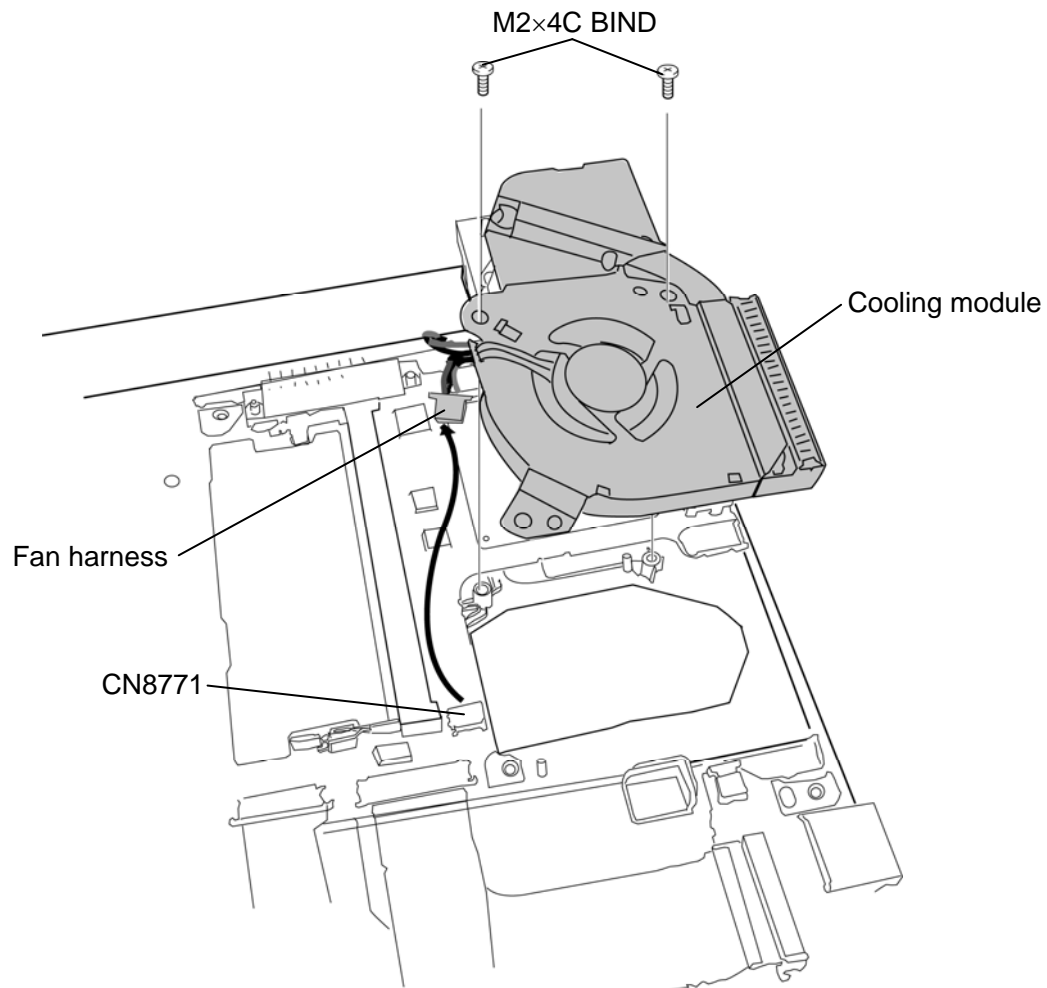


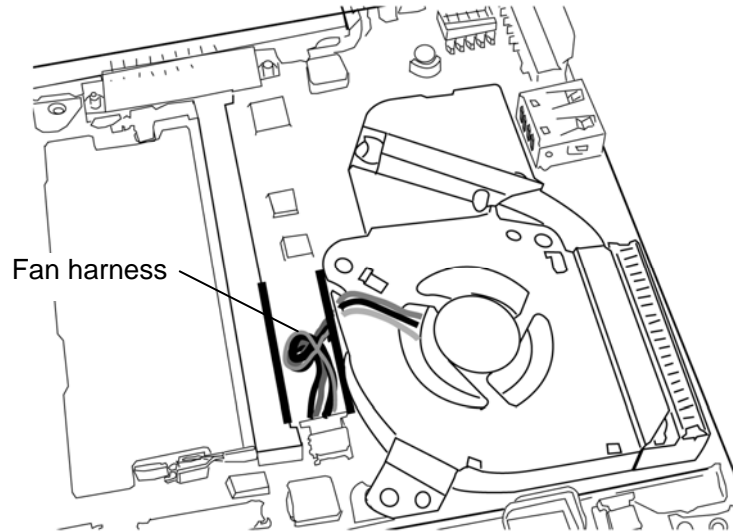
Figure 4-24 Removing the cooling module

Installing the Cooling module

To install the cooling module, follow the steps below and refer to Figure 4-24.

1. Wipe off the grease from the cool sheet.
2. Apply new **grease** on the CPU using a special syringe.
3. Connect the **fan harness** to the connector **CN8771** on the system board.
4. Set the **cooling module** to the slot and secure it with the following **screws**.
 - M2×4C BIND ×2

CAUTION: Arrange the fan harness within the area indicated with the thick line in the figure below.



4.19 DC-IN harness

Removing the DC-IN harness

To remove the DC-IN harness, follow the steps below and refer to Figure 4-25.

1. Disconnect the **DC-IN harness** from the connector **CN8800** on the system board and remove the **DC-IN harness** from the slot.

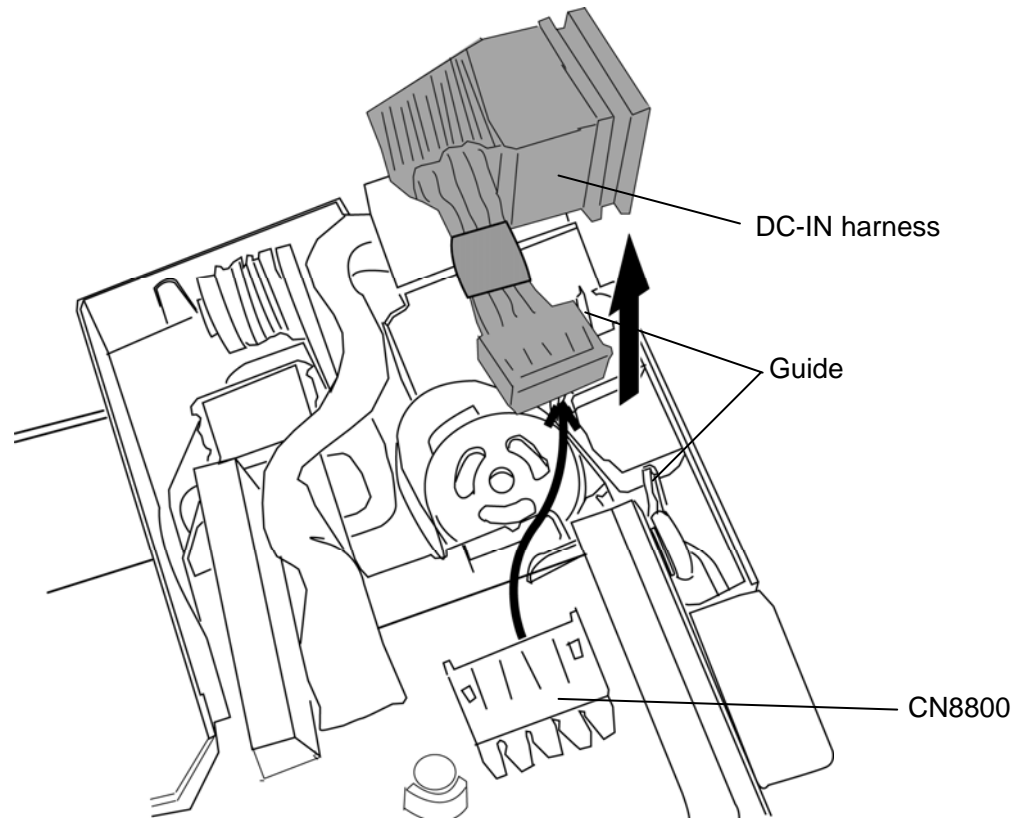


Figure 4-25 Removing the DC-IN harness

Installing the DC-IN harness

To install the DC-IN harness, follow the steps below and refer to Figure 4-25.

1. Set the **DC-IN harness** into the guide of the slot and connect the **DC-IN harness** to the connector **CN8800** on the system board.

4.20 USB board/WL SW holder

Removing the USB board/WL SW holder

To remove the USB board/WL SW holder, follow the steps below and refer to Figure 4-26 to 4-28.

1. Open the **insulators** and release the cables.

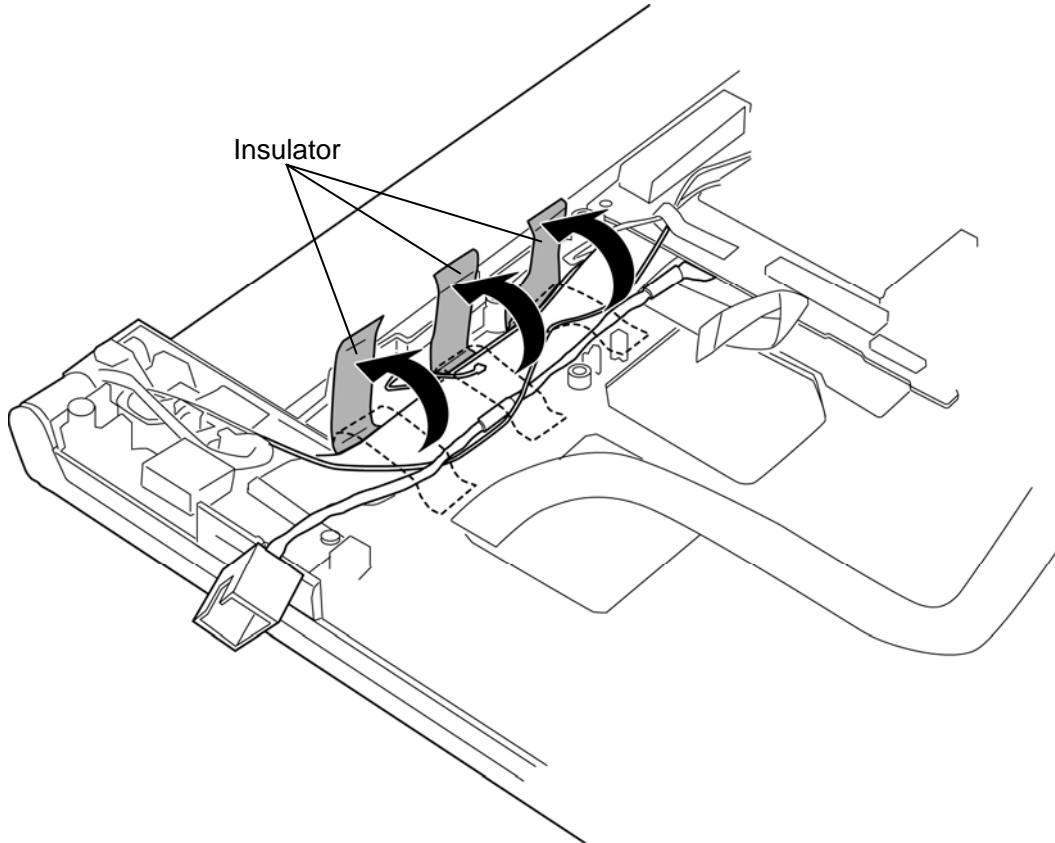


Figure 4-26 Removing the USB board/WL SW holder (1)

2. Open the **insulator** and take out the **RJ45 wire harness** from the slot.
3. Disconnect the **USB board FPC** from the connector **CN9610** on the USB board.
4. Open the **insulator** and disconnect the **sensor harness** from the connector **CN9540** on the USB board and connector **CN9630** on the SW board.
5. Disconnect the **camera harness** from the connector **CN9620** on the USB board.
6. Remove the following **screw** and **USB board**.
 - M2×3B S-THIN HEAD ×1

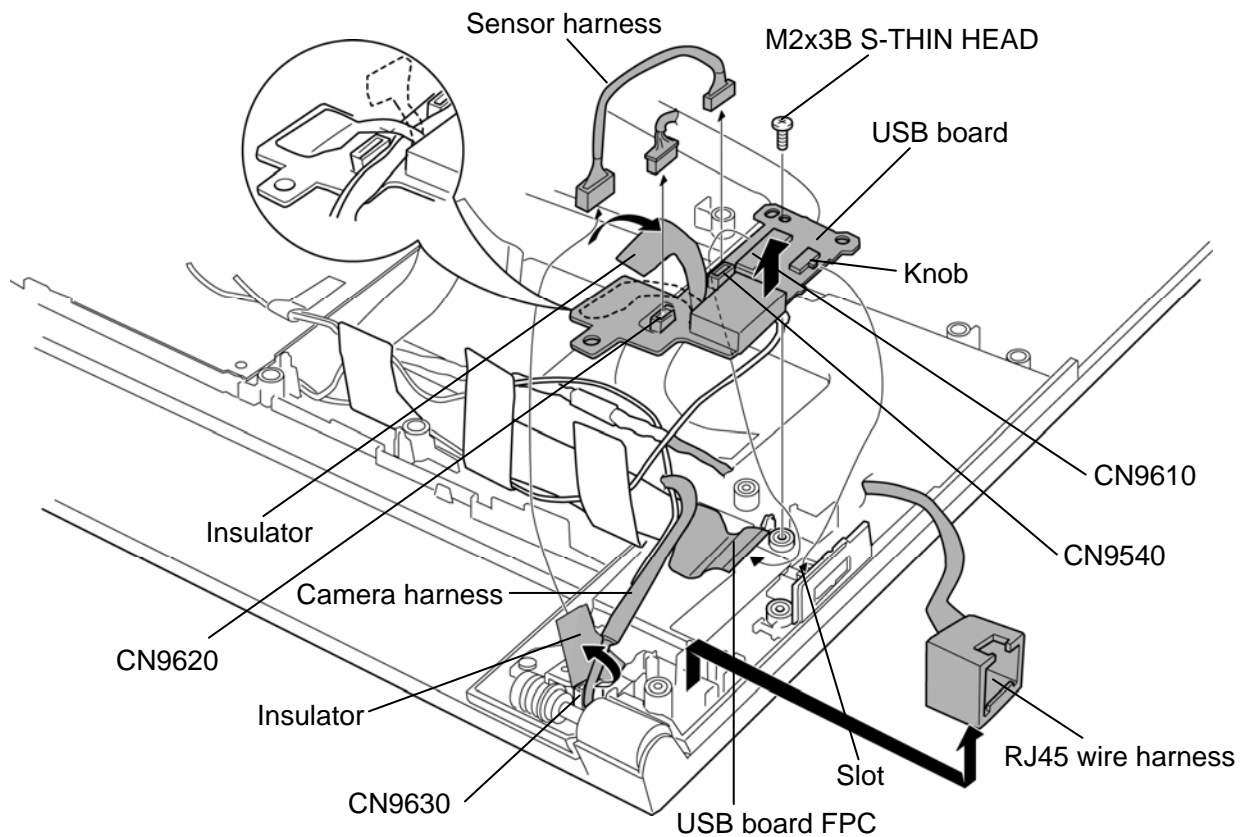


Figure 4-27 Removing the USB board/WL SW holder (2)

7. Remove the **WL SW holder** adhered with the double-sided tape.

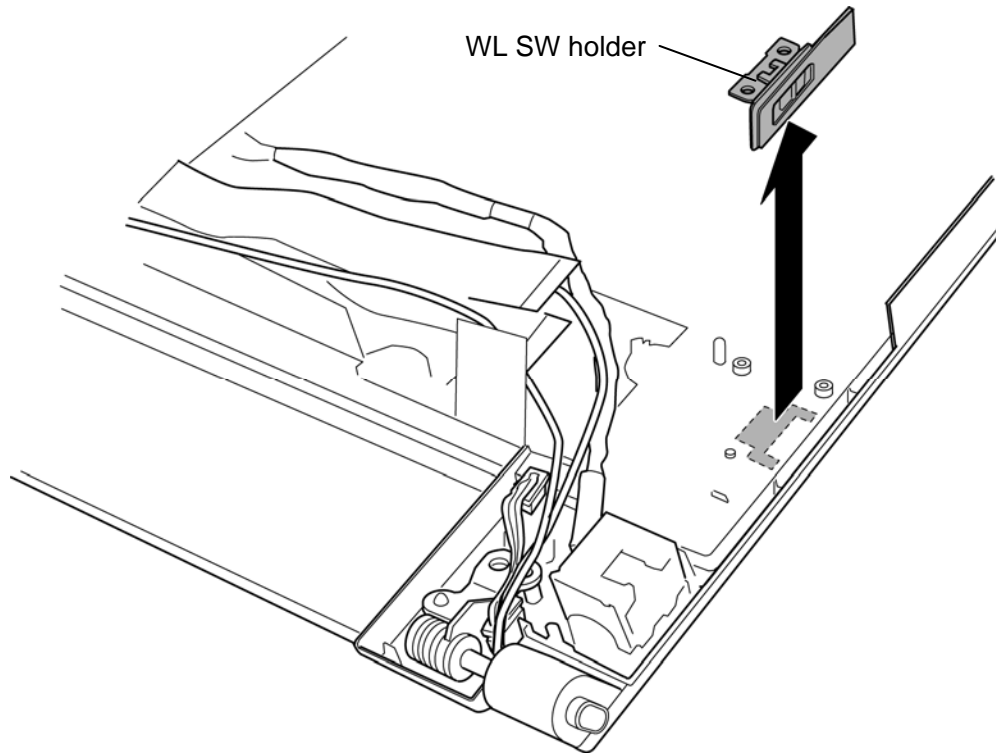


Figure 4-28 Removing the USB board/WL SW holder (3)

Installing the USB board/WL SW holder

To install the USB board/WL SW holder, follow the steps below and refer to Figure 4-26 to 4-28.

1. Set the **WL SW holder** in place and fix it with the double-sided tape.

CAUTION: A double-sided tape is stuck to a new WL SW holder. Wipe off the double-sided tape left on the cover assembly.

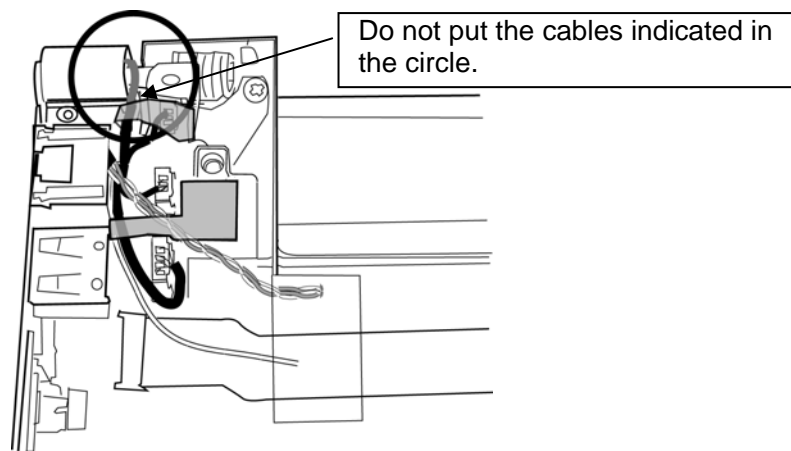
2. Set the **USB board** and secure it with the following **screw**.

- M2×3B S-THIN HEAD ×1

CAUTION: When installing the USB board, align the switch knob of the USB board to the slot of the WL SW holder.

3. Connect the **camera harness** to the connector **CN9620** on the USB board.
4. Connect the **sensor harness** to the connector **CN9540** on the USB board and connector **CN9630** on the SW board.
5. Connect the **USB board FPC** to the connector **CN9610** on the USB board.

CAUTION: When arranging the cables, be careful of the following:



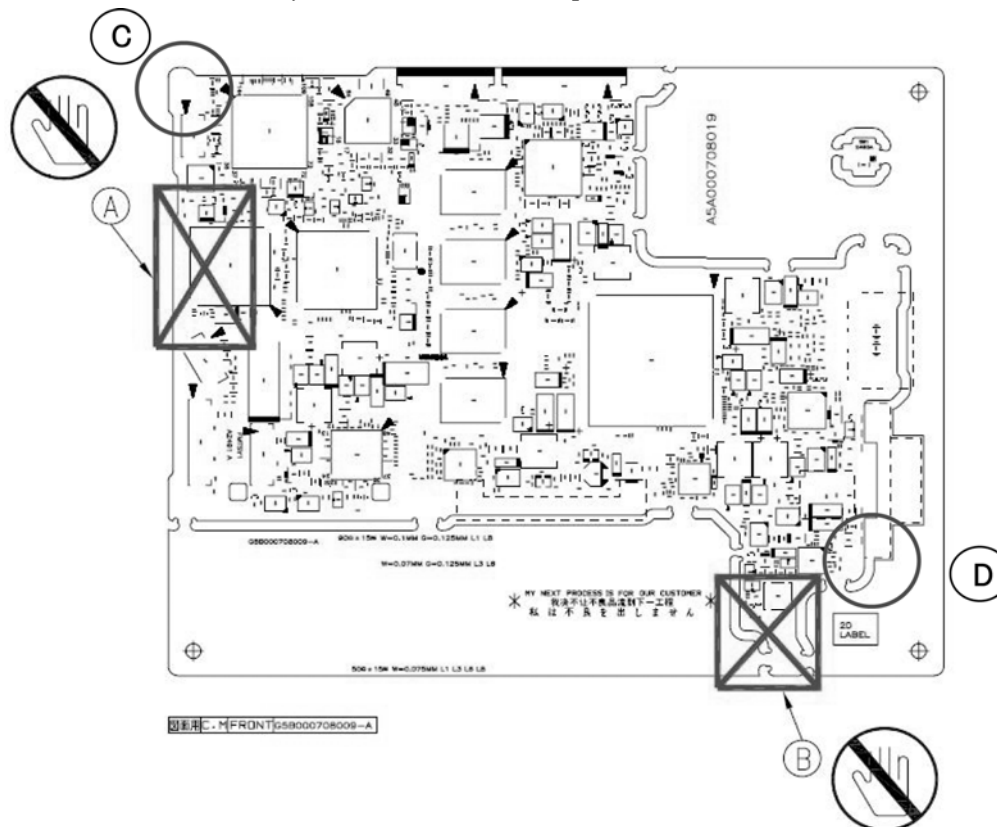
6. Set the **RJ45 wire harness** into the slot.
7. Arrange the **RJ45 wire harness** and fix it with the **insulator**.

4.21 System board

CAUTION: When replacing with a new system board, the following procedures must be executed.

- (1) Before replacing the system board, execute subtest02 “DMI information save” in 3.3 Setting of the hardware configuration of Chapter 3 Test program in order to save the DMI information from system board to floppy disk.
- (2) After replacing the system board, execute the subtest03 “DMI information recovery” and subtest01 “Entry of the DMI information” in order to copy the DMI information and system configuration information.
- (3) Also update the BIOS and EC/KBC with the latest ones according to the steps described in Appendix G and Appendix H.

Handle the system board C and D portions with both hands.



Do not handle the A(IC) portion ⇒ IC portion may be damaged
 Do not handle the B(P-ON SW) portion ⇒ PCB may be damaged

Removing the System board

To remove the system board, follow the steps below and refer to Figure 4-29 and 4-30.

1. Remove the following **screws** securing the system board.
 - M2×4C BIND ×1
 - M3×5C BIND ×2
2. Disconnect the **LCD harness**, **membrane switch FPC**, **keyboard FPC** and **fingerprint sensor board FFC** from the connectors **CN5601**, **CN9850**, **CN3230** and **CN9800** on the system board.
3. Remove the **system board** and disconnect the **SD board FPC** from the connector **CN9700** on the system board.

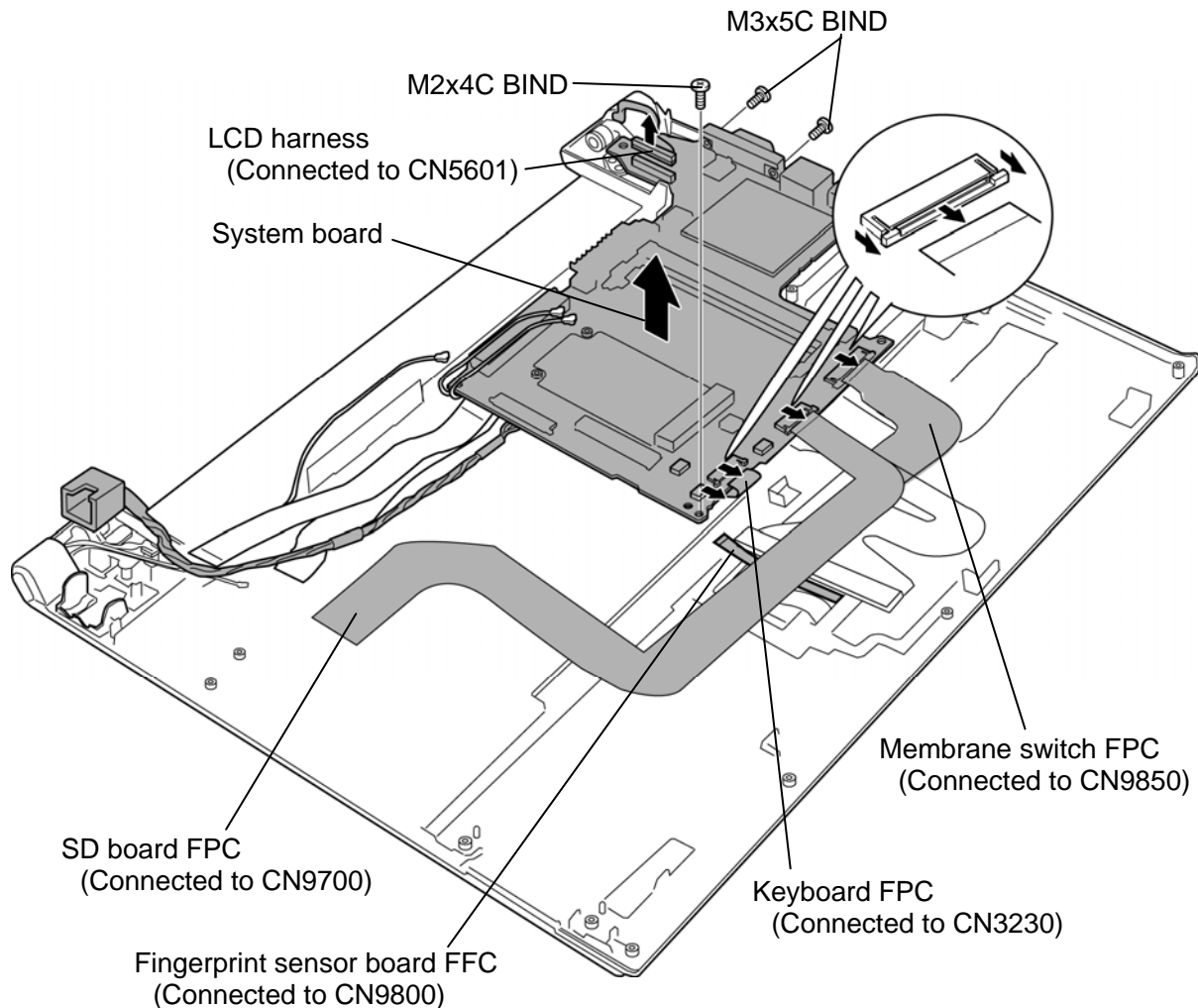


Figure 4-29 Removing the system board (1)

4. Disconnect the **HDD FPC (or SSD FPC)**, **USB board FPC**, **RJ45 wire harness**, **sound board FPC**, **Bluetooth FFC** and **MDC FPC** from the connectors **CN1900**, **CN9600**, **CN4100**, **CN9500**, **CN4400** and **CN3010** on the system board.

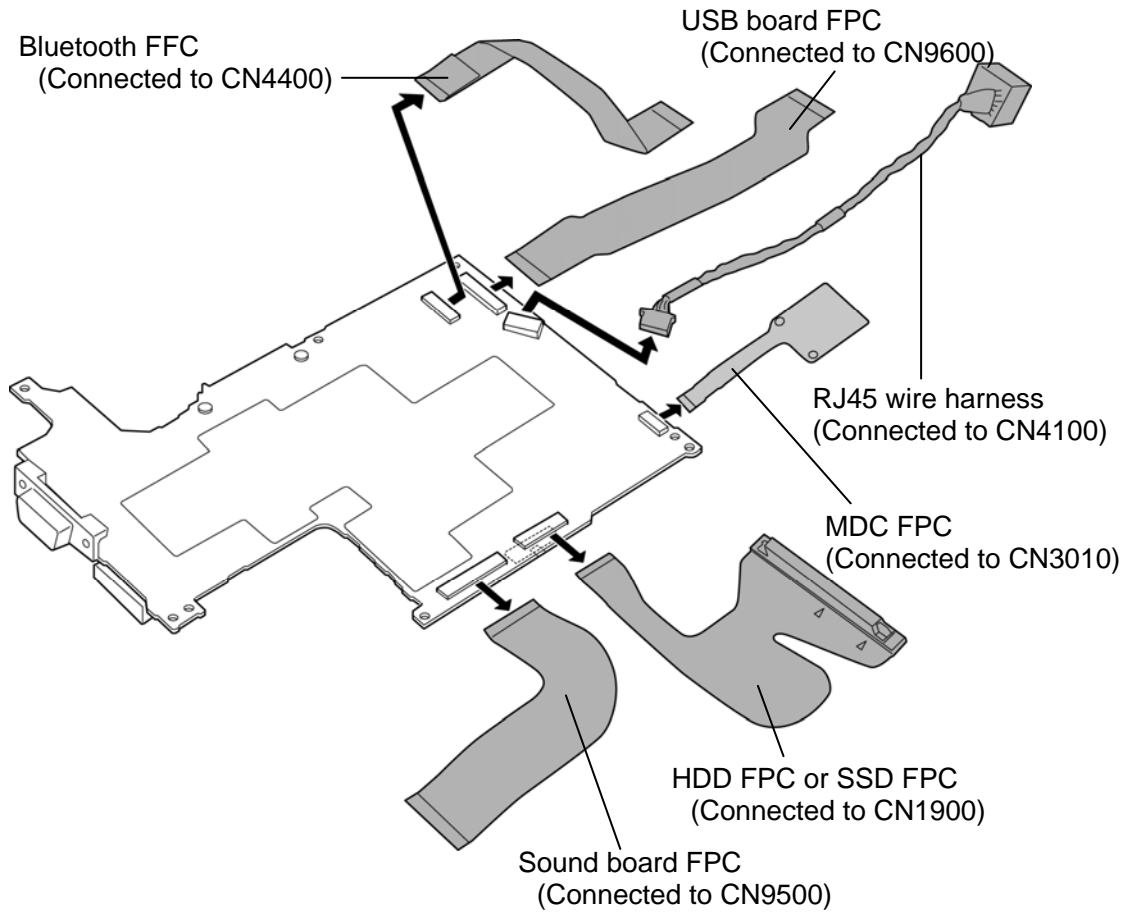


Figure 4-30 Removing the system board (2)

Installing the System board

To install the system board, follow the steps below and refer to Figure 4-29 and 4-30.

1. Connect the **HDD FPC** (or **SSD FPC**), **USB board FPC**, **RJ45 wire harness**, **sound board FPC**, **Bluetooth FFC** and **MDC FPC** to the connectors **CN1900**, **CN9600**, **CN4100**, **CN9500**, **CN4400** and **CN3010** on the system board.
2. Connect the **SD board FPC** to the connector **CN9700** on the system board.
3. Set the **system board** in place and connect the **LCD harness**, **membrane switch FPC**, **keyboard FPC** and **fingerprint sensor board FFC** to the connectors **CN5601**, **CN9850**, **CN3230** and **CN9800** on the system board.
4. Secure the system board with the following **screws**.
 - M2×4C BIND ×1
 - M3×5C BIND ×2

4.22 Speaker

Removing the Speaker

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

1. Take out the **speaker** from the slot.
2. Peel off the **acetate tape**.
3. Open the **insulators** and remove the **speaker harness**.

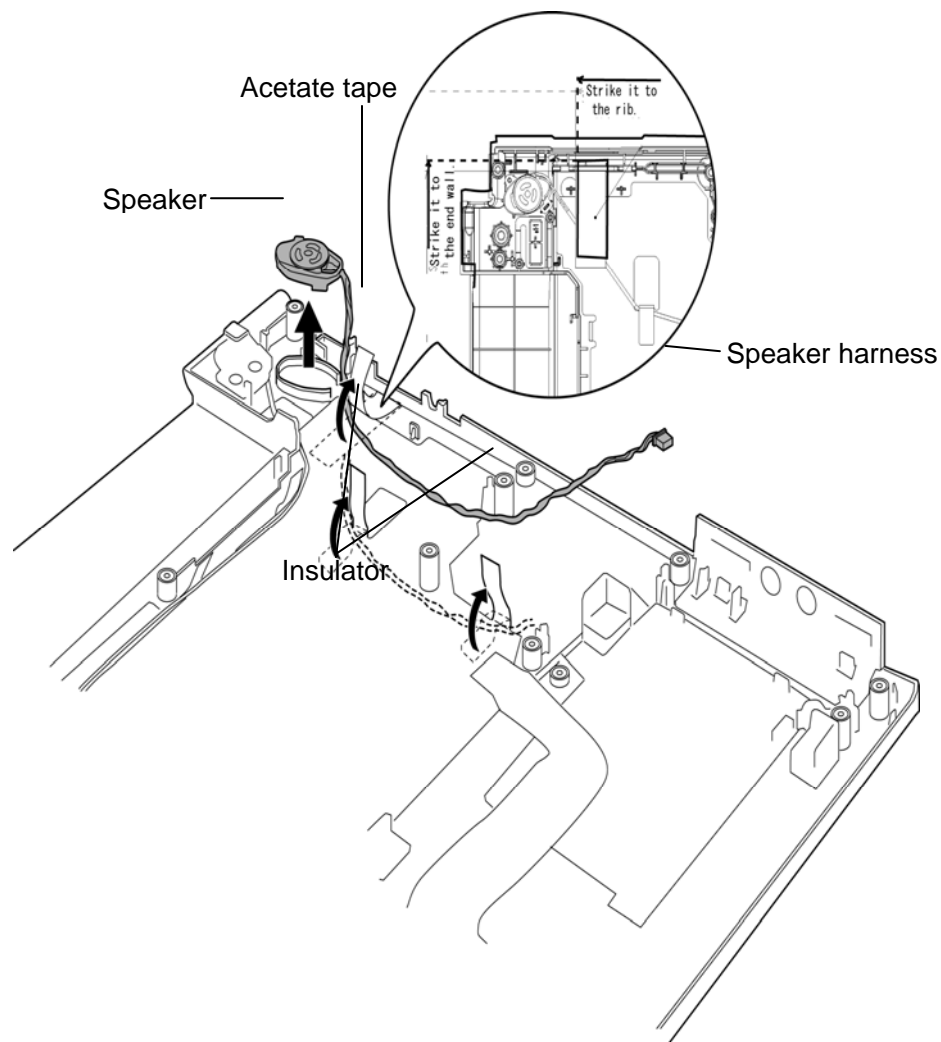


Figure 4-31 Removing the speaker

Installing the Speaker

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

1. Set the **speaker** to the slot.
2. Open the **insulators** and arrange the **speaker harness** in place.
3. Close the **insulators** and stick the **acetate tape** in place.

4.23 Cover assembly/LCD assembly

Removing the Cover assembly/LCD assembly

To remove the cover assembly/LCD assembly, follow the steps below and refer to Figure 4-32 to 4-34.

1. Open the **insulators** and release the antenna cables.

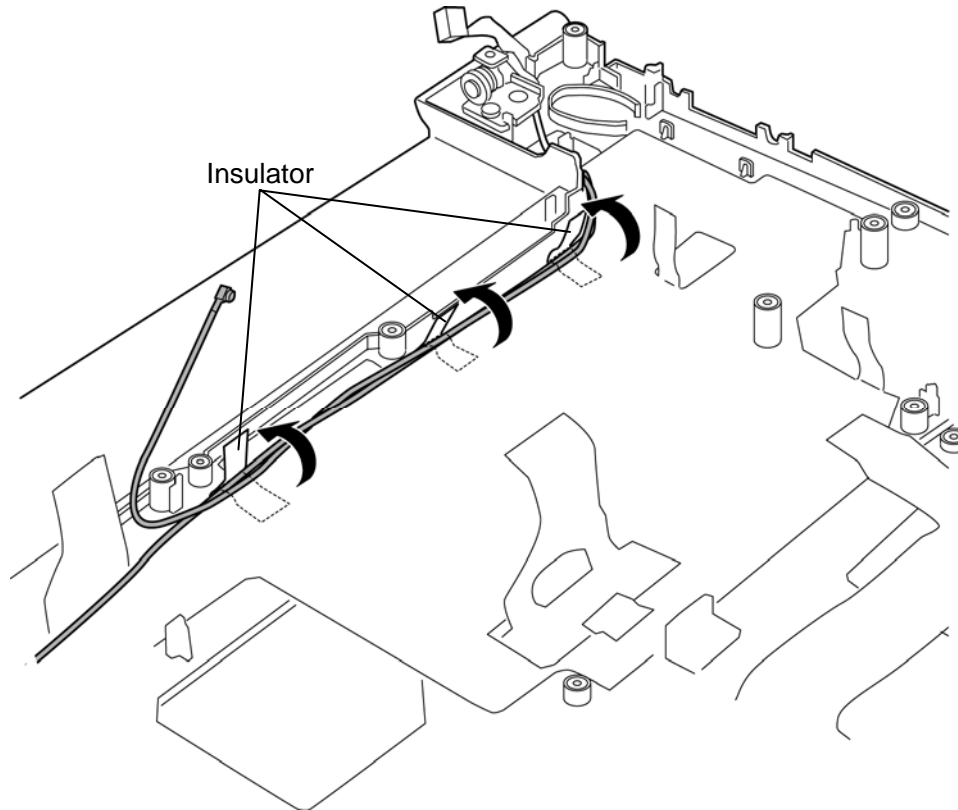


Figure 4-32 Removing the cover assembly/LCD assembly (1)

2. Open the display at the angle of 90 degrees and put the computer on the stand.
3. Remove the following screws and separate the **cover assembly** and **LCD assembly**.
 - M2x4C BIND ×2

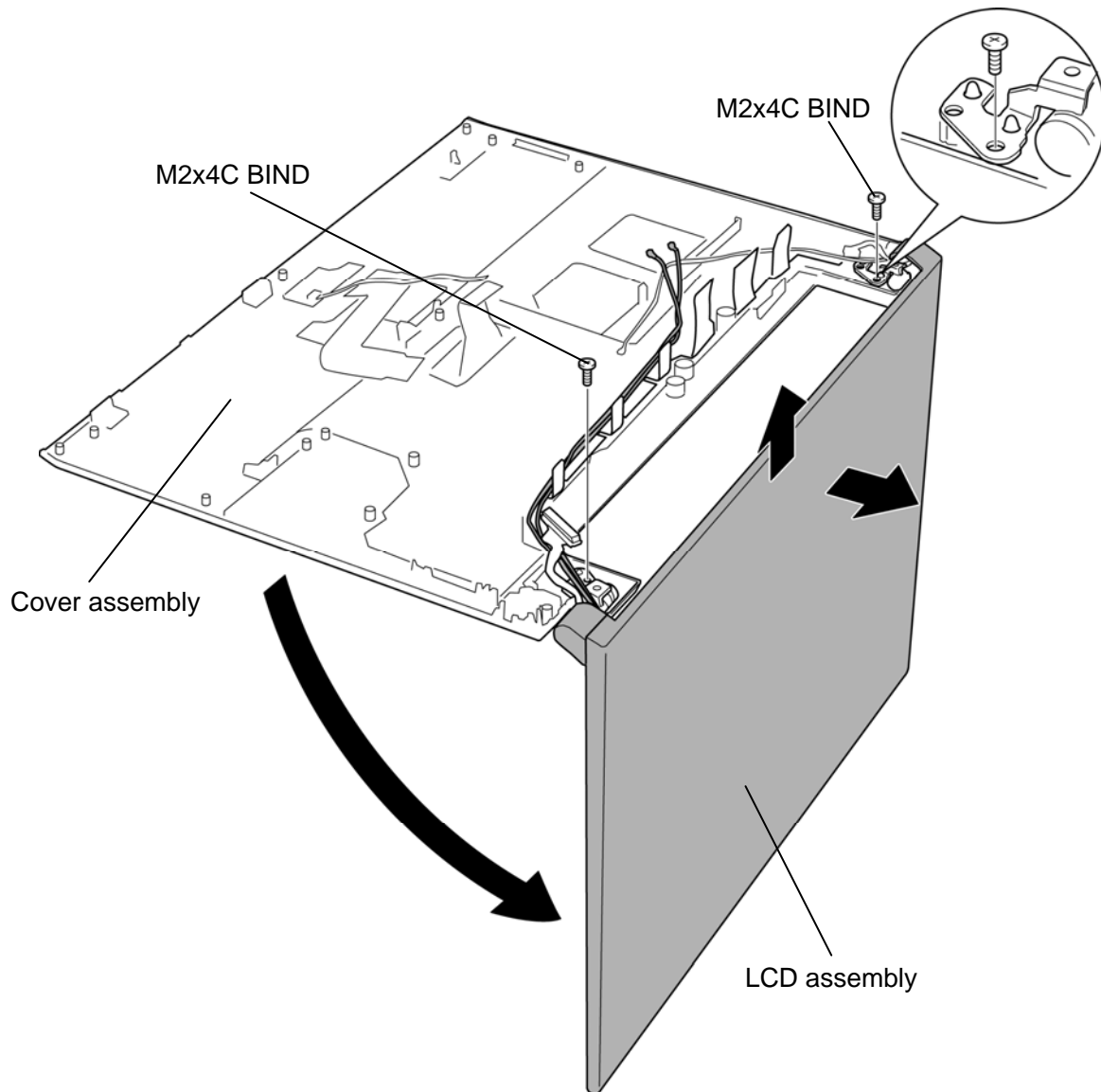


Figure 4-33 Removing the cover assembly/LCD assembly (2)

4. Remove the **SW board** from the cover assembly.

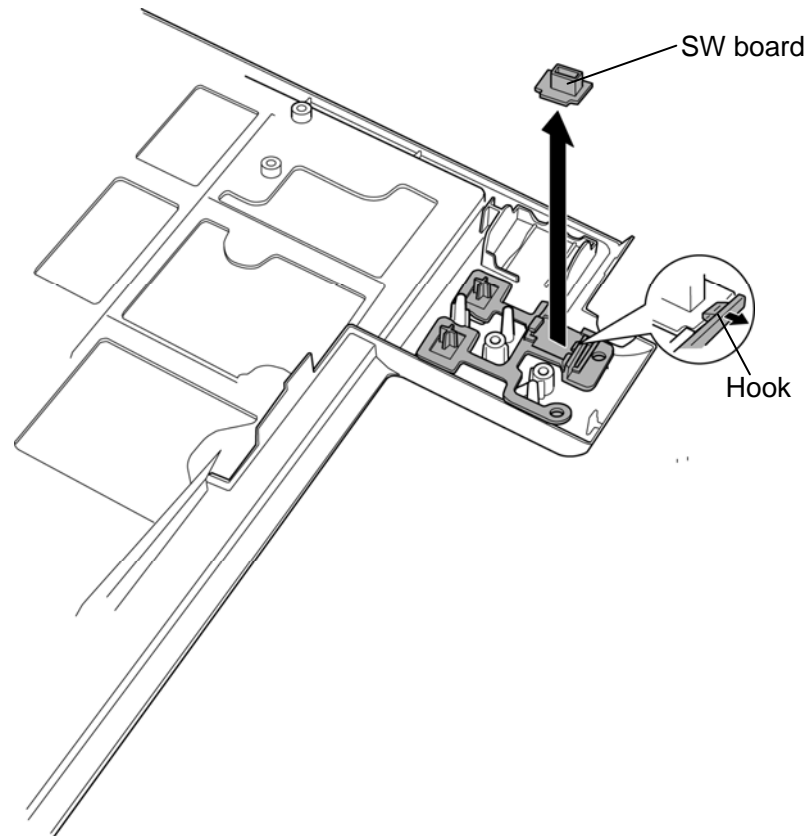


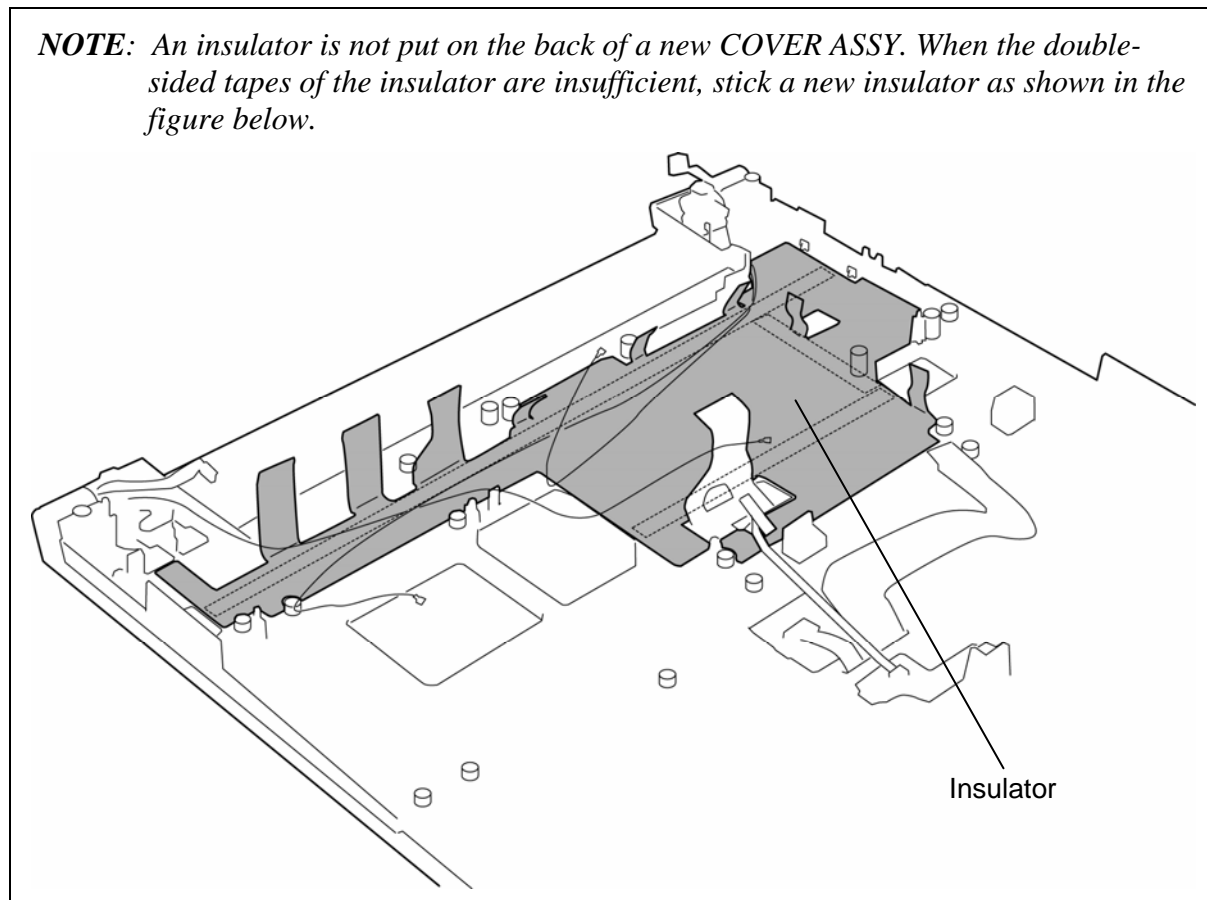
Figure 4-34 Removing the SW board

Installing the Cover assembly/LCD assembly

To install the cover assembly/LCD assembly, follow the steps below and refer to Figure 4-32 to 4-34.

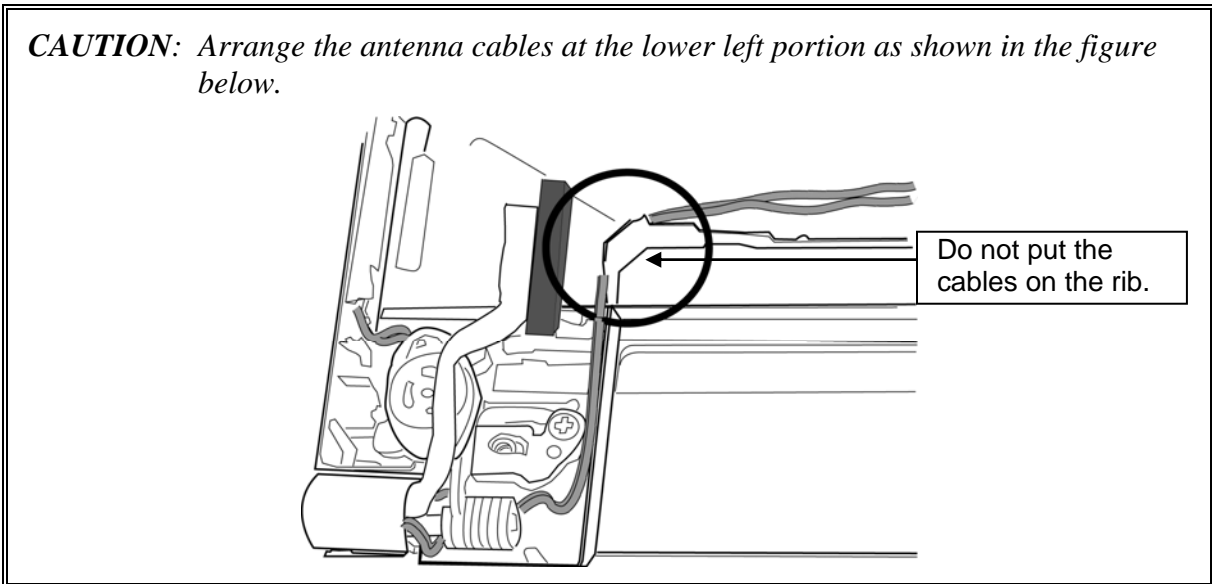
1. Set the **SW board** to the cover assembly.
2. Set the **LCD assembly** to the **cover assembly** and secure them with following **screws**.
 - M2×4C BIND ×2

NOTE: An insulator is not put on the back of a new COVER ASSY. When the double-sided tapes of the insulator are insufficient, stick a new insulator as shown in the figure below.



3. Arrange the **antenna cables** in place and fix them with the **insulators**.

CAUTION: Arrange the antenna cables at the lower left portion as shown in the figure below.



Please prepare required parts in advance, when replacing the following item.

ITEM	Parts List ITEM No	PART NAME	Quantity
COVER ASSY	50	COVER ASSY	1
	20	TOUCH PAD	1
	30	MEMBRANE SWITCH	1
	44	TP BTN COV ASSY	1
	06	PCB ASSY FMTFSx (Fingerprint sensor board)	1
	15	KEYBOARD UNIT	1
	45	INSULATOR KB	1

4.24 Touch pad/Fingerprint sensor board

Removing the Touch pad/Fingerprint sensor board

To remove the touch pad/fingerprint sensor board, follow the steps below and refer to Figure 4-35 and 4-36.

1. Disconnect the **membrane switch FPC** from the connector on the touch pad.
2. Disconnect the **fingerprint sensor board FFC** from the connector **CN9810** on the fingerprint sensor board.
3. Turn the cover assembly face up and remove the **touch pad** adhered with the double-sided tape.
4. Remove the **TPD BTN cover** adhered with the double-sided tape while releasing the **latches**.

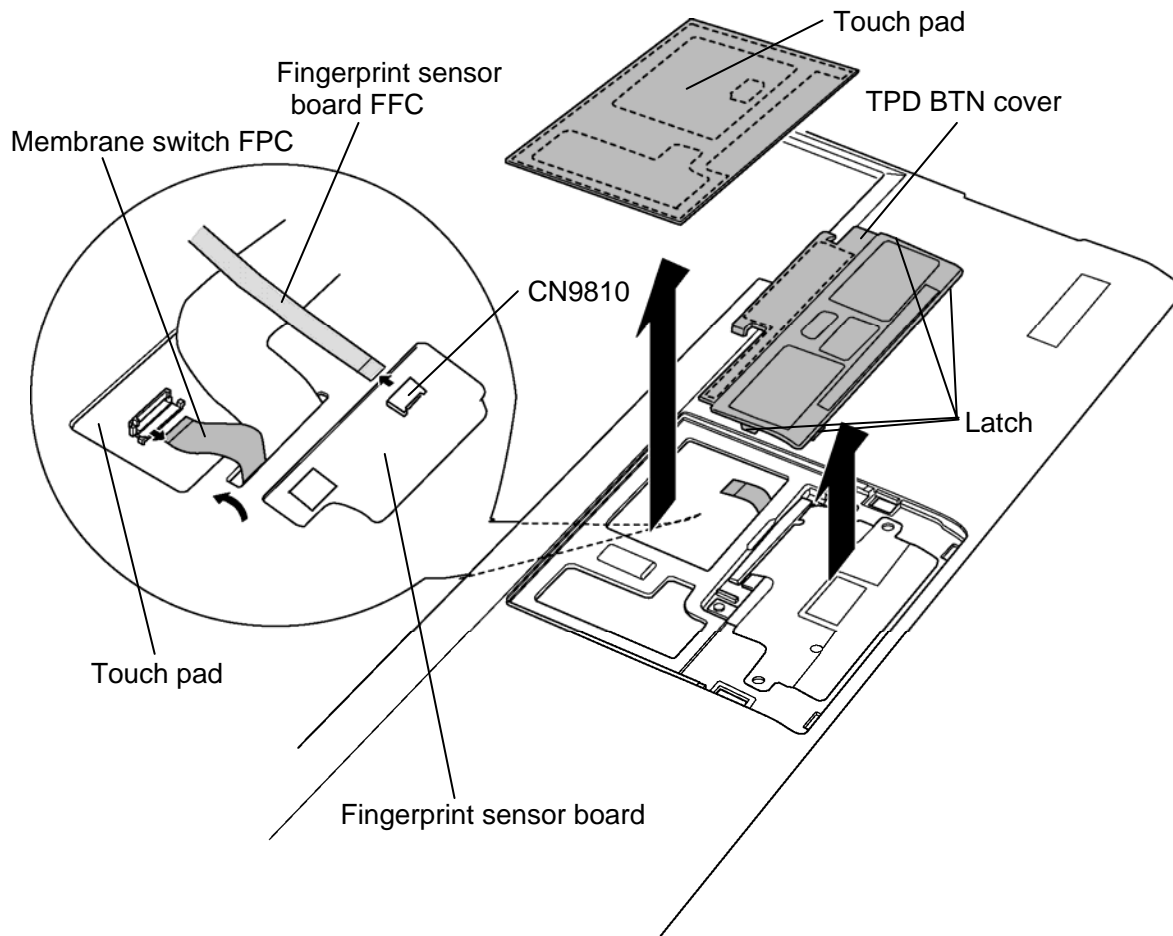


Figure 4-35 Removing the touch pad/fingerprint sensor board (1)

5. Peel off the **membrane switch** adhered with the double-sided tape and remove the tip point of the FPC (connector terminal side) from the hole.
6. Remove the following **screw** and **fingerprint sensor board** adhered with the double-sided tape.
 - M2×3B S-THIN HEAD ×1

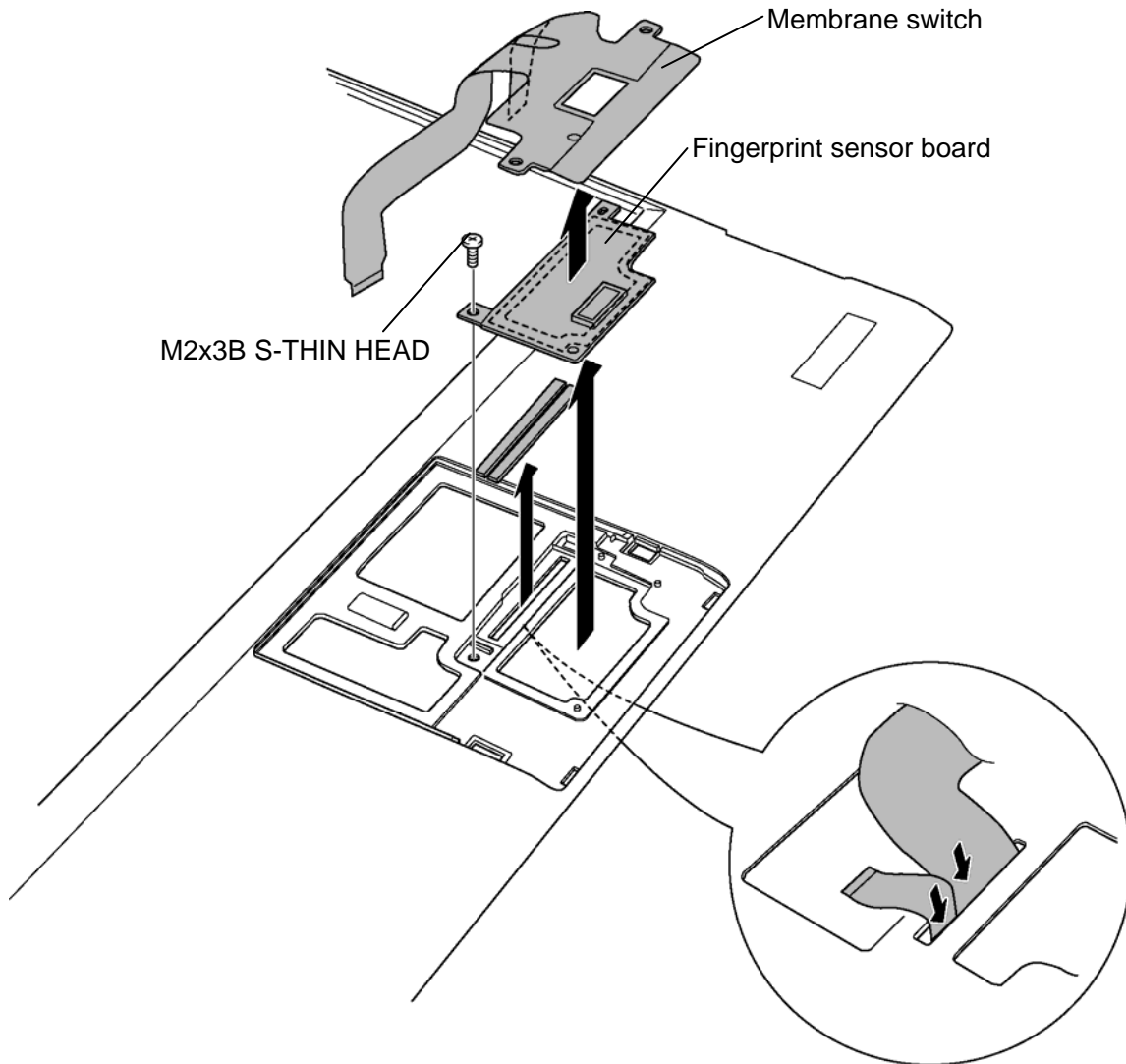


Figure 4-36 Removing the touch pad/fingerprint sensor board (2)

Installing the Touch pad/Fingerprint sensor board

To install the touch pad/fingerprint sensor board, follow the steps below and refer to Figure 4-35 and 4-36.

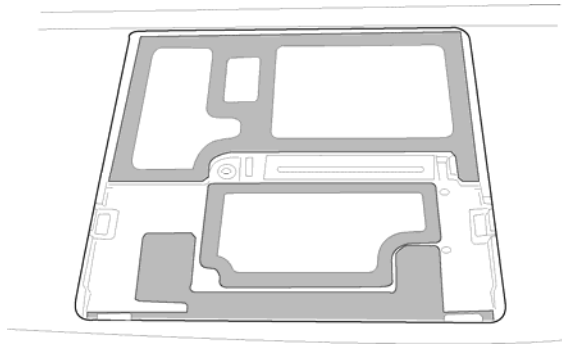
1. Wipe off the double-sided tapes on the cover assembly and TPD BTN cover and stick a new double-sided tape on them.
2. Stick the **fingerprint sensor board** and secure it with the following **screw**.
 - M2×3B S-THIN HEAD ×1
3. Pass the tip point of the **membrane switch** (connector terminal side) through the hole and stick the membrane switch in place.
4. Stick the **TPD BTN cover** in place and engage the **latches**.
5. Stick the **touch pad** in place.
6. Turn over the cover assembly and connect the **membrane switch FPC** to the connector on the touch pad.
7. Connect the **fingerprint sensor board FFC** to the connector **CN9810** on the fingerprint sensor board.

CAUTION: Do not reuse the removed touch pad, membrane switch, TPD BTN cover and fingerprint sensor board.

When removing (peeling) the touch pad, membrane switch, TPD BTN cover and fingerprint sensor board, wipe off the double-sided tape on the cover assembly and TPD BTN cover. Stick new double-sided tapes on the cover assembly and TPD BTN cover.

A new double-sided tape is stuck to a new COVER ASSY and TPD BTN cover for adhering a touch pad, membrane switch and fingerprint sensor board.

The double-side tapes on the COVER ASSY are shown in the figure below.



4.25 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-37.

1. Remove the **aluminum tape** from the back of the cover assembly.
2. Turn the cover assembly face up and peel off the **keyboard** adhered to the insulator.
3. Peel off the **insulator** (INSULATOR KB) from the cover assembly.

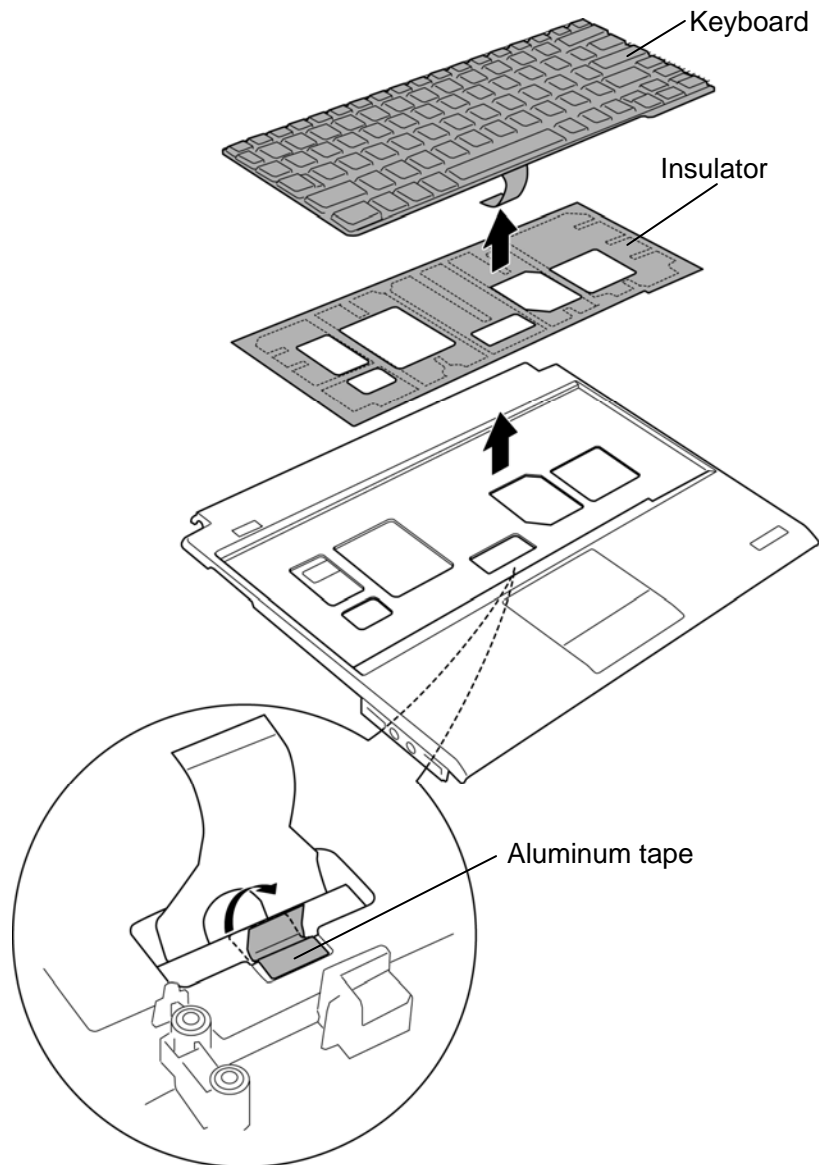


Figure 4-37 Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figure 4-37.

NOTE: *Do not reuse the removed keyboard and insulator. Use new keyboard and insulator (INSULATOR KB).
Wipe off the double-sided tapes left on the cover assembly and stick new double-sided tapes.*

1. Wipe off the double-sided tapes left on the cover assembly.
2. Stick a new **insulator** (INSULATOR KB) on the cover assembly.
3. Stick a new **keyboard** on the insulator.
4. Stick the **aluminum tape** in place.

4.26 LCD

Removing the LCD

To remove the LCD, follow the steps below and refer to Figure 4-38 and 4-39.

1. Peel off three **LCD cushions** and one **LCD mask seal** from the LCD mask.
2. Remove the following **screws** and **LCD mask**.

- M2×3.2B FLAT HEAD screw ×4

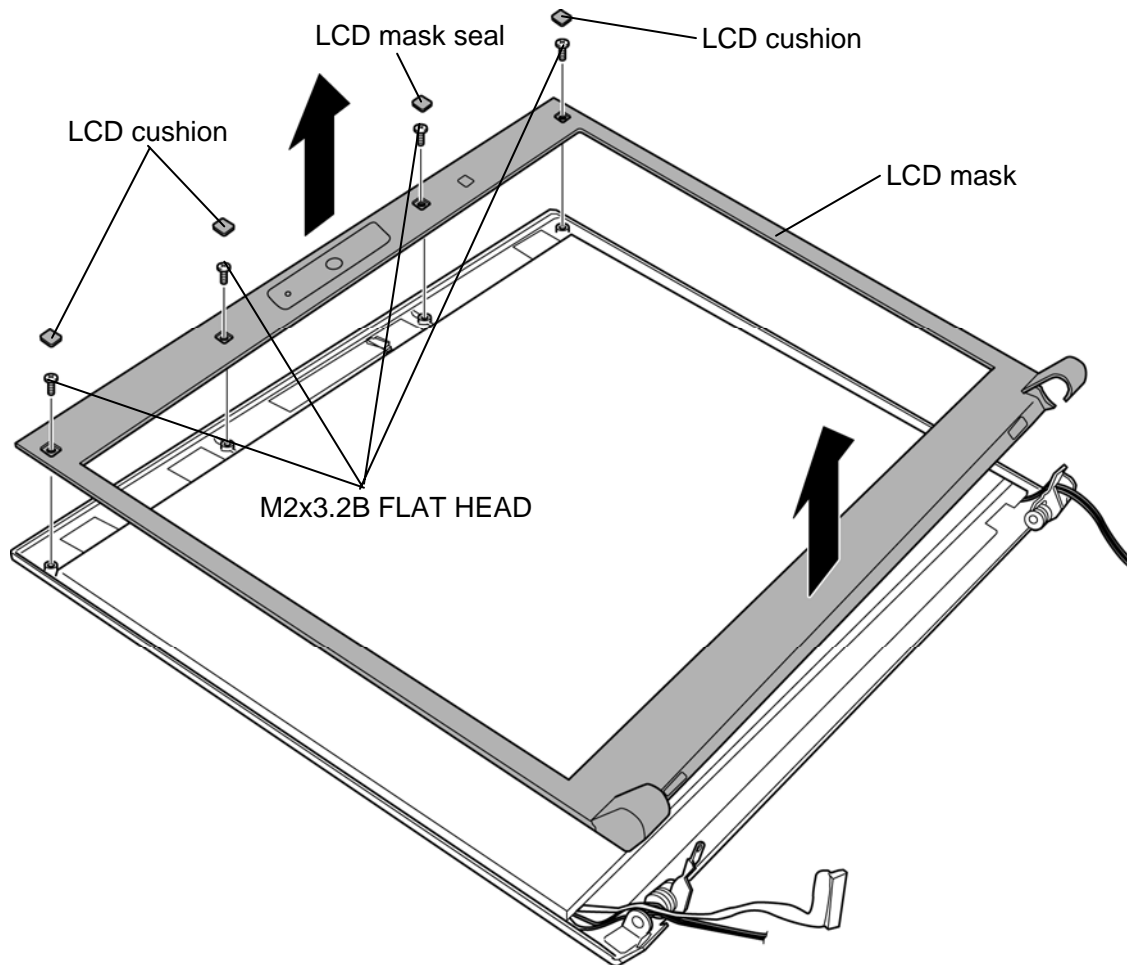


Figure 4-38 Removing the LCD mask

3. Turn up the **insulator** and remove the **LCD** from the LCD cover.
4. Peel the **insulator** (HNS CONN INSULATOR) and disconnect the **LCD harness** from the connector on the LCD.

CAUTION: When disconnecting the LCD harness from the LCD unit, peel off the adhered portion of the LCD harness very carefully. Otherwise, the connector of the LCD harness or LCD may be broken.

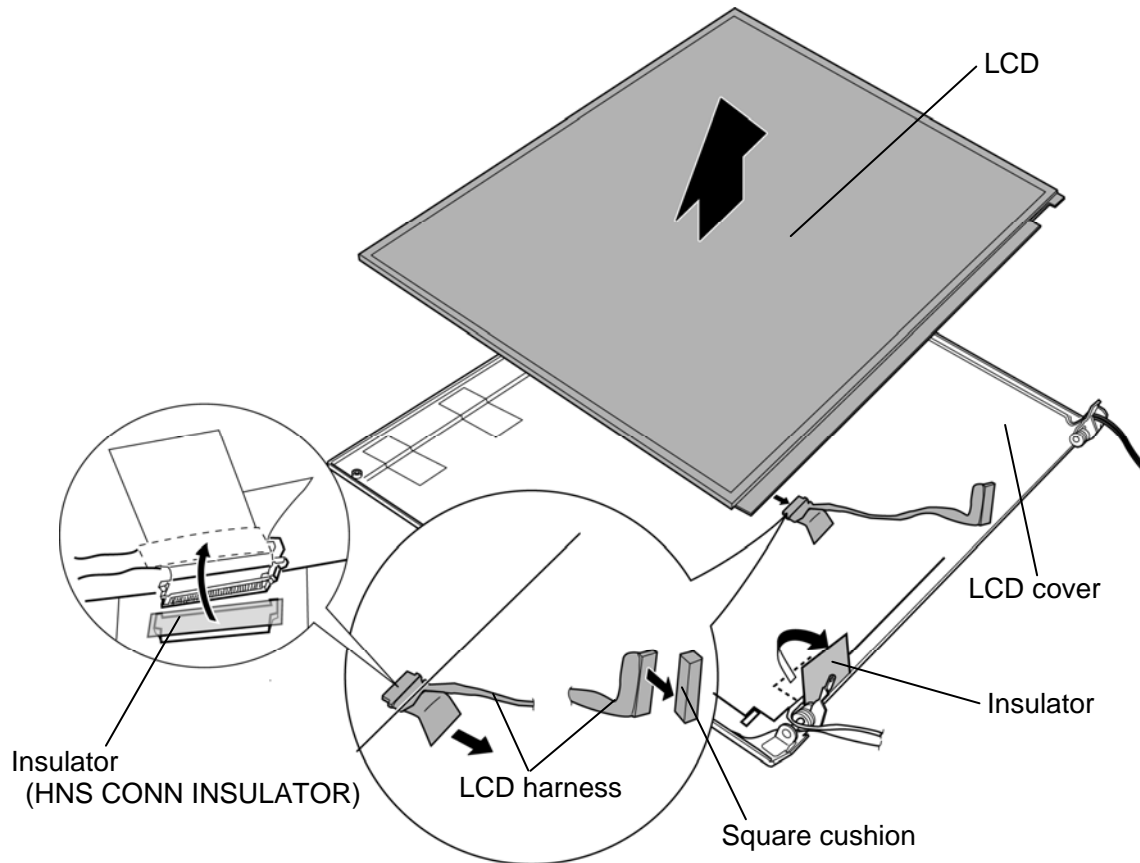


Figure 4-39 Removing the LCD

Installing the LCD

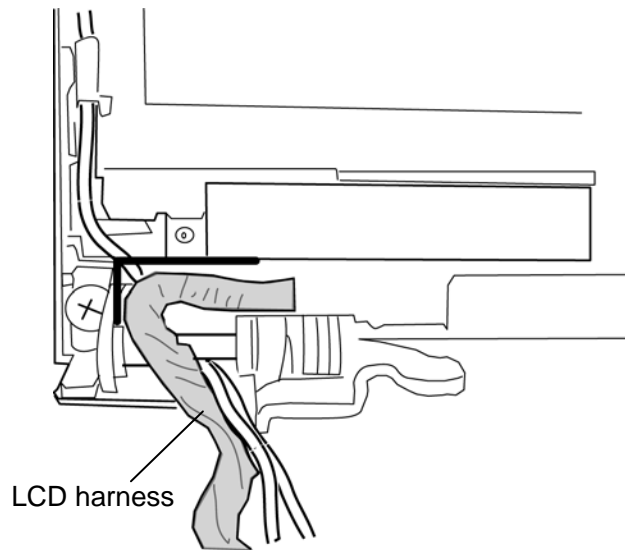
To install the LCD, follow the steps below and refer to Figure 4-38 and 4-39.

NOTE: When installing a new LCD harness, stick a new square cushion to the LCD harness.

When installing a new LCD harness or LCD, stick a new insulator (HNS CONN INSULATOR) to the LCD harness.

1. Connect the **LCD harness** to the connector on the LCD and stick the **insulator** (HNS CONN INSULATOR) on them.
2. Set the **LCD** to the **LCD cover** and arrange the **LCD harness** in place.
3. Fix the **LCD** and **LCD harness** with the **insulator**.

CAUTION: Do not put the LCD harness on the LCD.



4. Place the **LCD mask** to the LCD cover and secure them with the following **screws**.
 - M2×3.2B FLAT HEAD screw ×4
5. Stick three **LCD cushions** and one **LCD mask seal** in place.

4.27 Camera module

Removing the Camera module

To remove the camera module, follow the steps below and refer to Figure 4-40.

1. Take out the **camera module** from the slot and disconnect the **camera harness** from the connector on the camera module.

NOTE: Do not reuse the removed camera module. Be sure to use a new camera module.

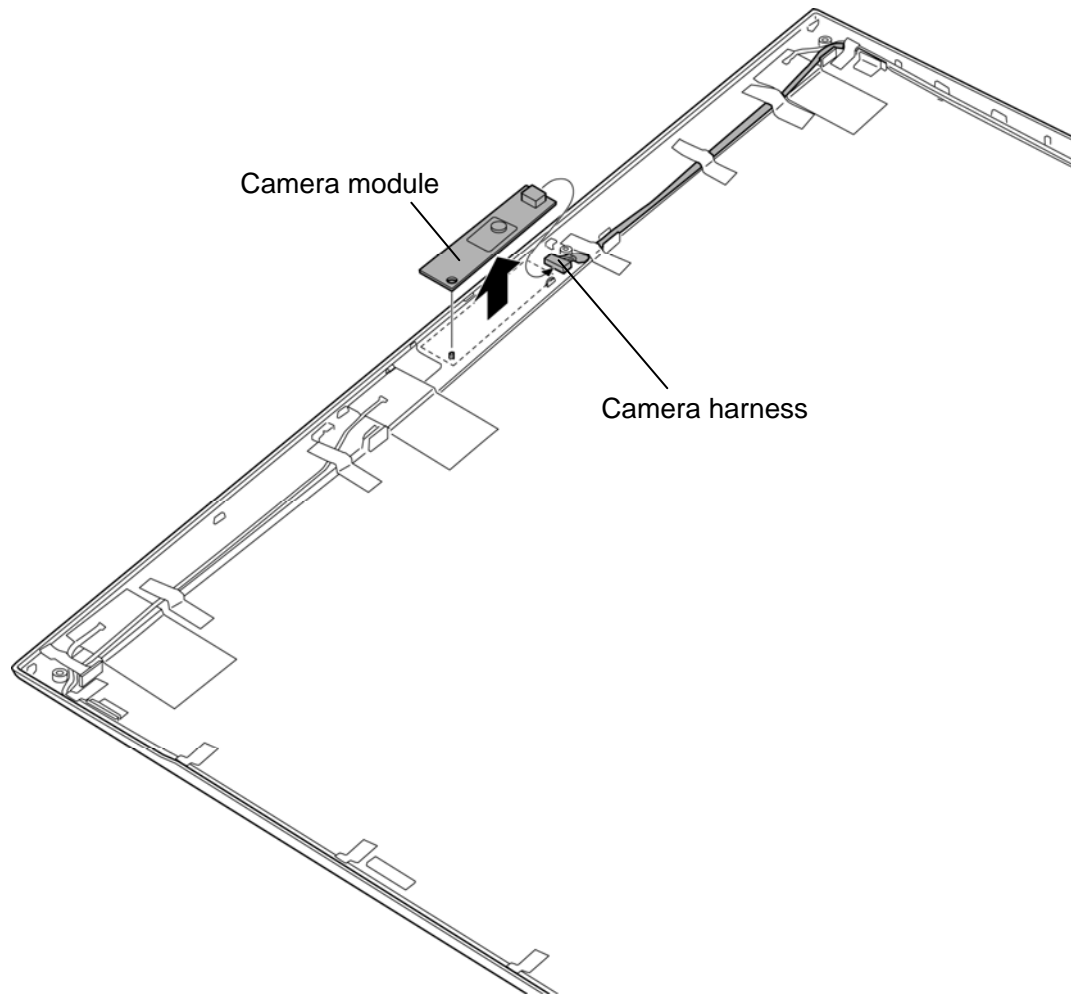


Figure 4-40 Removing the camera module

Installing the Camera module

To install the camera module, follow the steps below and refer to Figure 4-40.

1. Connect the **camera harness** to the connector on a new camera module and stick the **camera module** in place.

4.28 Wireless LAN antenna/Bluetooth antenna/3G antenna

Removing the Wireless LAN antenna/Bluetooth antenna/3G antenna

To remove the wireless LAN antenna/Bluetooth antenna/3G antenna, follow the steps below and refer to Figure 4-41.

1. Turn up the **insulators** fixing the wireless LAN antenna, Bluetooth antenna, 3G antenna and camera harness.
2. Remove the **camera harness** from the LCD cover.
3. Peel off the **wireless LAN antenna/Bluetooth antenna/3G antenna** from the LCD cover.

NOTE: Do not reuse the removed wireless LAN antennas, Bluetooth antenna and 3G antenna. Be sure to use new wireless LAN antennas, Bluetooth antenna and 3G antenna.

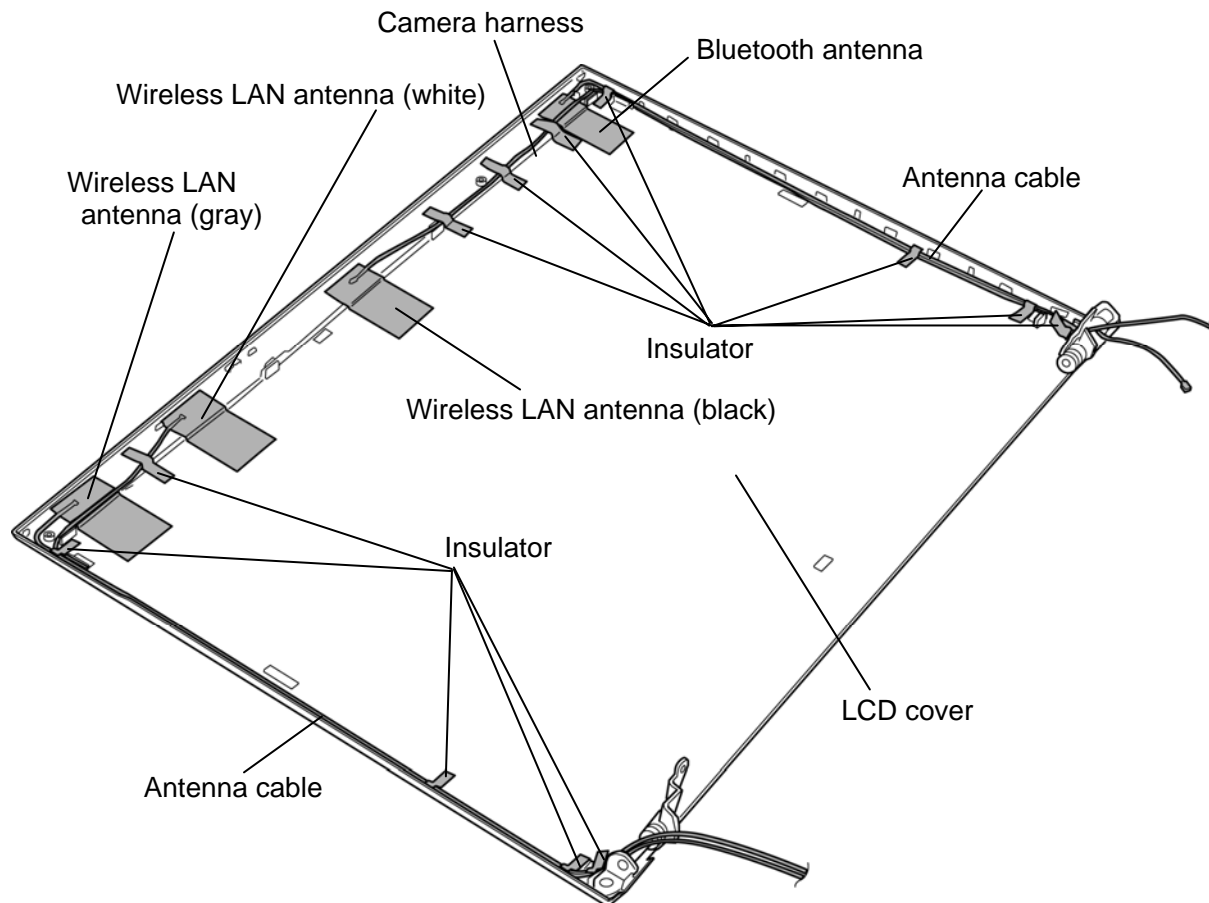


Figure 4-41 Removing the wireless LAN antenna/Bluetooth antenna/3G antenna

Please prepare required parts in advance, when replacing the following items.

ITEM	Parts List ITEM No	PART NAME	Quantity
LCD COVER ASSY	51	LCD COVER ASSY	1
	42	CAMERA MODULE	1
	72, 73	ANTENNA 2.4/5.2GHZ (Wireless LAN antenna)	1
		ANTENNA 2.4/5.2GHZ (3G antenna)	1
	36	ANTENNA 2.4GHZ (Bluetooth antenna)	1

Installing the Wireless LAN antenna/Bluetooth antenna/3G antenna

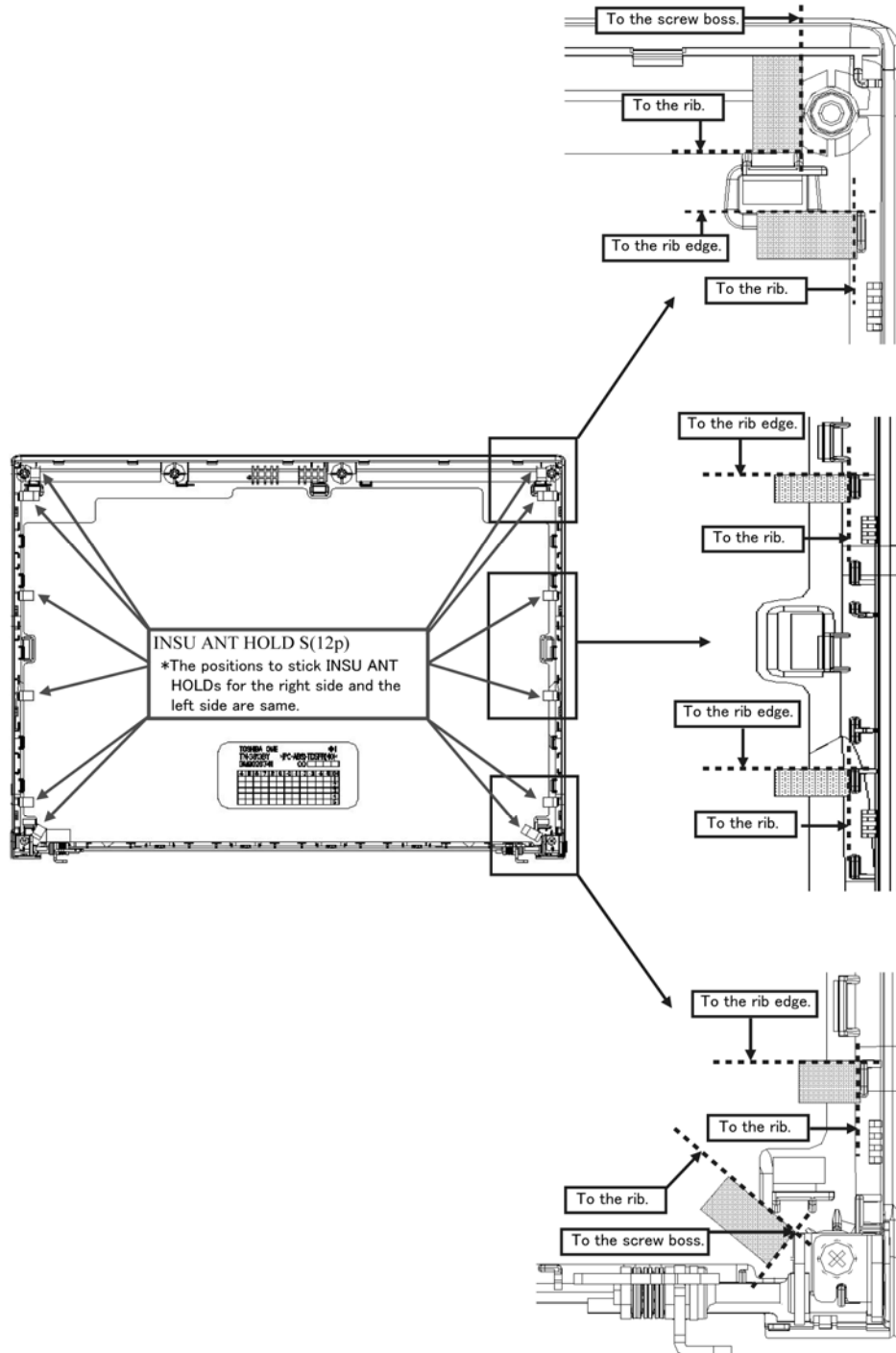
To install the wireless LAN antenna/Bluetooth antenna/3G antenna, follow the steps below and refer to Figure 4-41.

1. Stick the **wireless LAN antenna/Bluetooth antenna/3G antenna** on the LCD cover in place.
2. Arrange the **camera harness** on the LCD cover.
3. Fix the wireless LAN antenna, Bluetooth antenna, 3G antenna and camera harness with the **insulators**.

CAUTION: Replacing the antennas with care of the followings:

[Sticking the **INSULATOR ANT HOLD S**]

1. Peel off the separators of the **INSULATOR ANT HOLD S** (12pt) and stick the **INSULATOR ANT HOLD S** (12pt) to the LCD cover.



[Sticking the **antennas** Non 3G MODEL]

<WL-LAN MODEL>

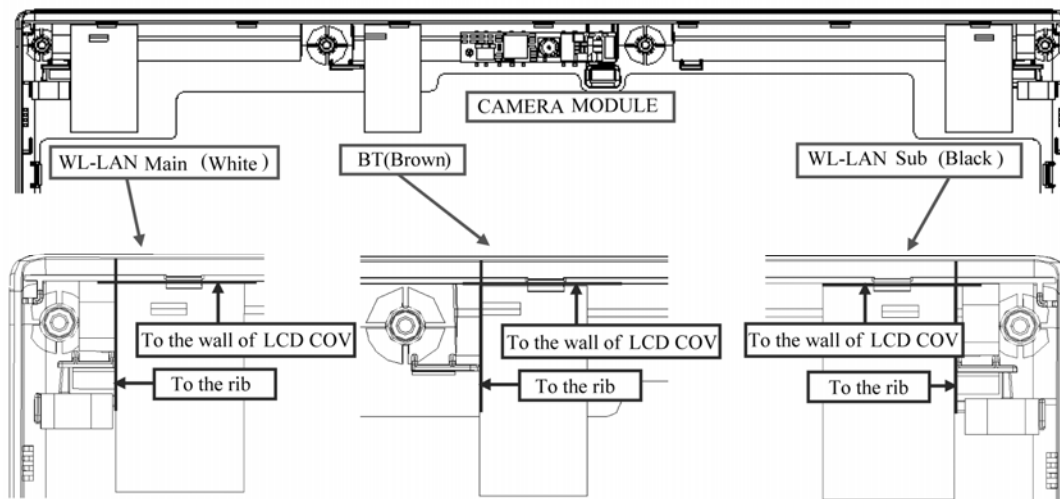
1. Stick the WL-LAN antenna Main (white) to the LCD cover.
2. Stick the WL-LAN antenna Sub (black) to the LCD cover.

<BT MODEL>

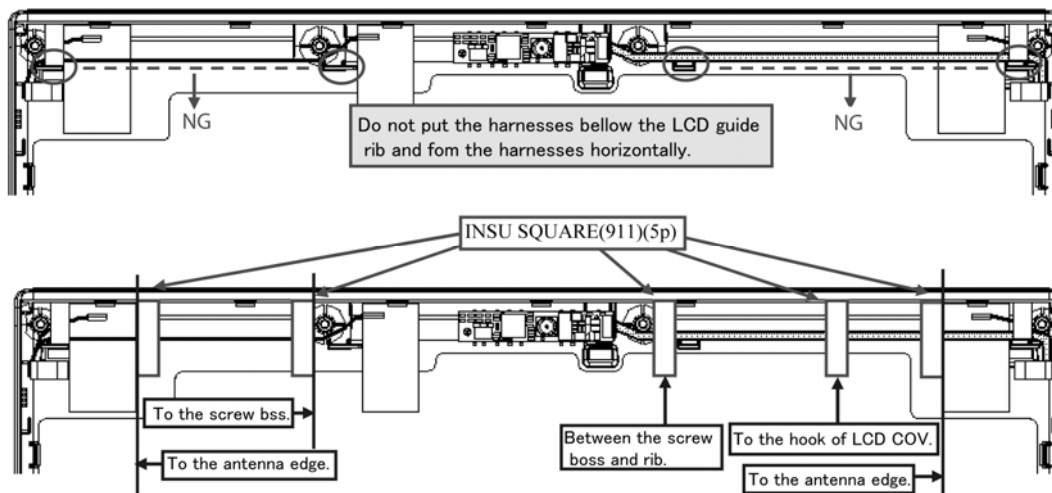
3. Stick the BT antenna (brown) to the LCD cover.

<CAMERA MODEL>

4. Connect the CAMERA HARENESS to the CAMERA MODULE.
5. Stick the CAMERA MODULE to the LCD cover.



6. Stick the **SQUARE INSULATOR (911) (5p)** to the LCD cover to fix the antennas.



[Sticking the **antennas 3G (EU) & WL-LAN (Intel) MODEL**]

<WL-LAN MODEL>

1. Stick the WL-LAN antenna Main (white) to the LCD cover.

<BT MODEL>

2. Stick the BT antenna (brown) to the LCD cover.

<3G MODEL>

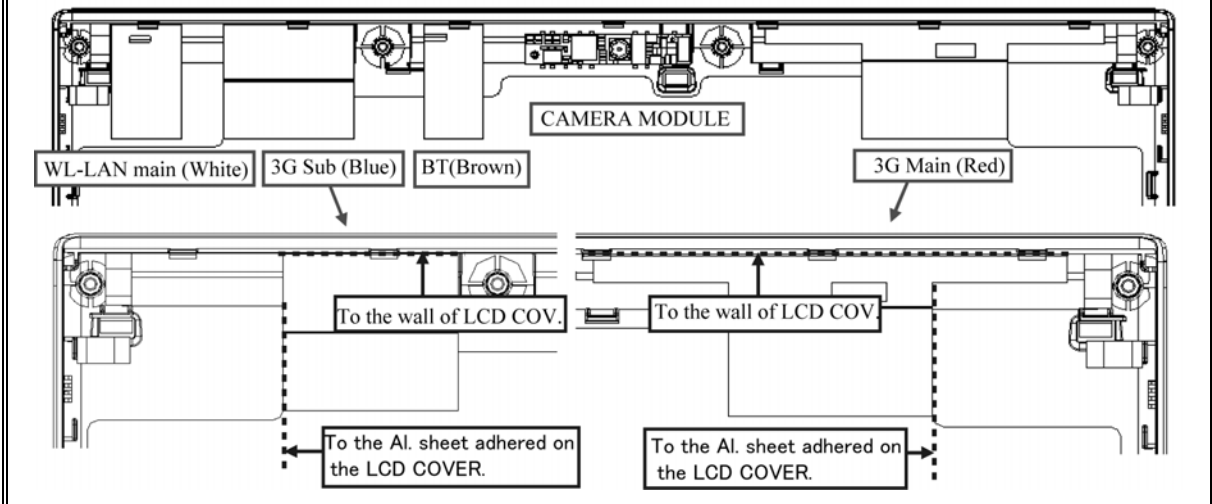
3. Stick the 3G antenna Main (red) to the LCD cover.

4. Stick the 3G antenna Sub (blue) to the LCD cover.

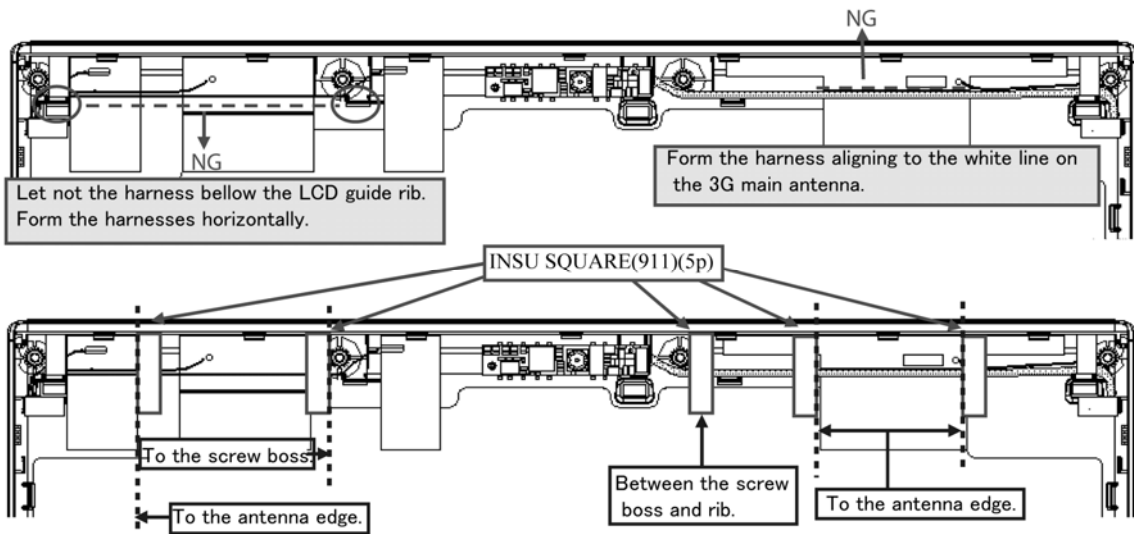
<CAMERA MODEL>

5. Connect the CAMERA HARENESS to the CAMERA MODULE.

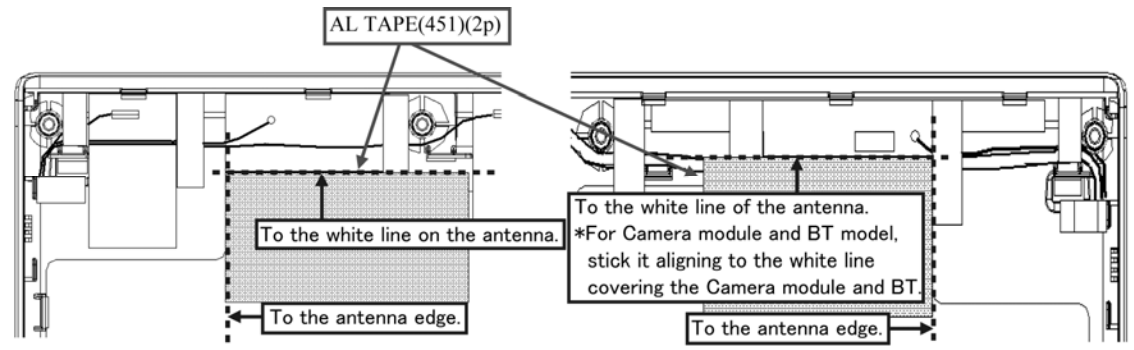
6. Stick the CAMERA MODULE to the LCD cover.



7. Stick the SQUARE INSULATOR (911) (5p) to the LCD cover to fix the antennas.



8. Stick the AL TAPE (451) (2p) on the 3G antennas.



[Sticking the **antennas 3G (EU) & WL-LAN (Atheros) MODEL**]

<WL-LAN MODEL>

1. Stick the WL-LAN antenna Main (white) to the LCD cover.
2. Stick the WL-LAN antenna Sub (black) to the LCD cover.

<3G MODEL>

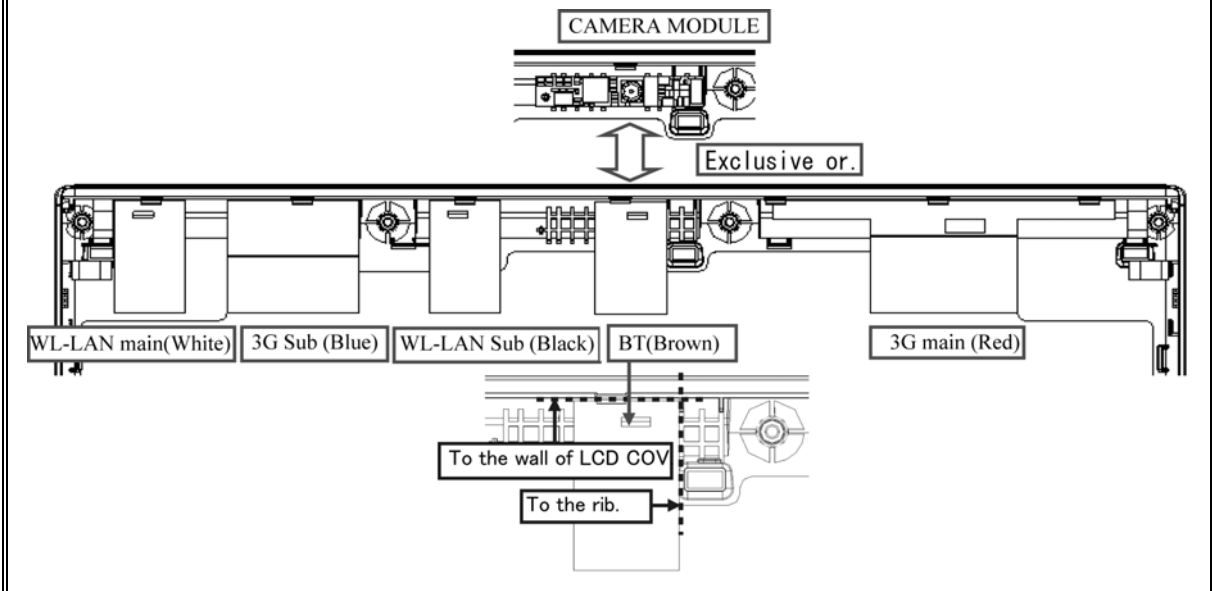
3. Stick the 3G antenna Main (red) to the LCD cover.
4. Stick the 3G antenna Sub (blue) to the LCD cover.

<CAMERA MODEL or BT MODEL >

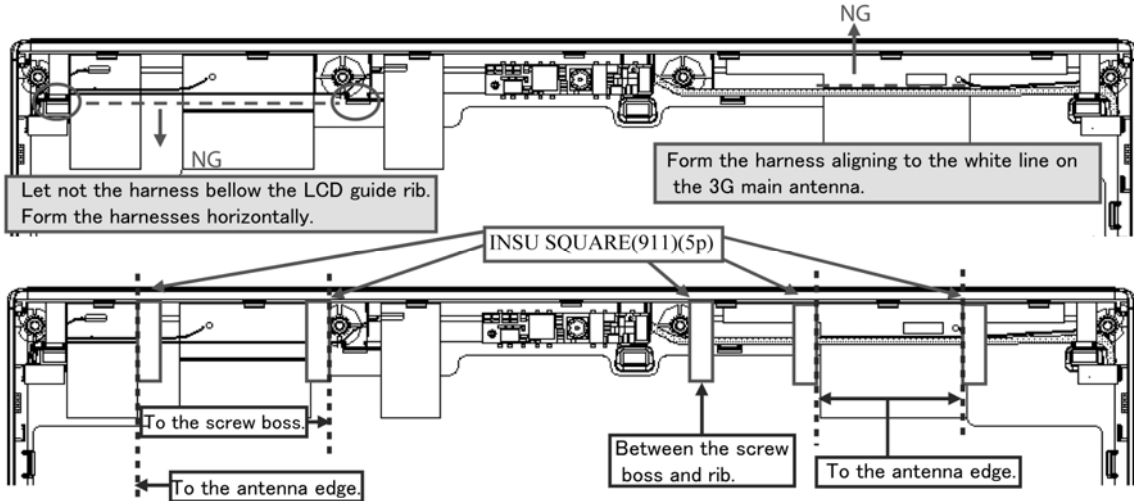
5. Connect the CAMERA HARENESS to the CAMERA MODULE.
6. Stick the CAMERA MODULE to the LCD cover.

Or

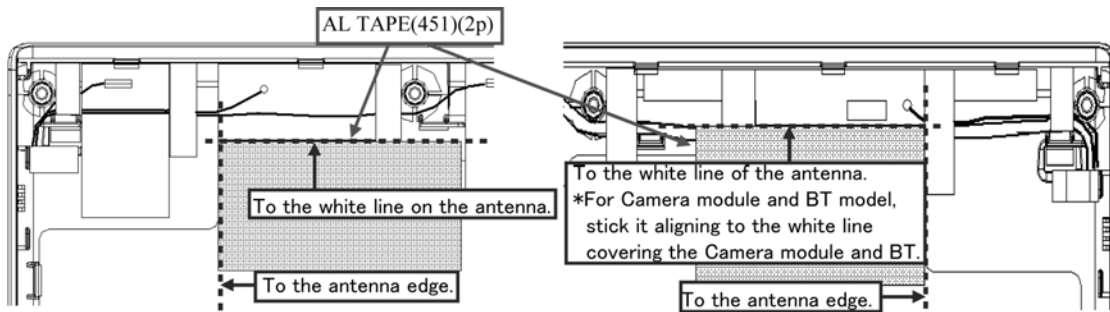
5. Stick the BT antenna (brown) to the LCD cover.



7. Stick the **SQUARE INSULATOR (911) (5p)** to the LCD cover to fix the antennas.

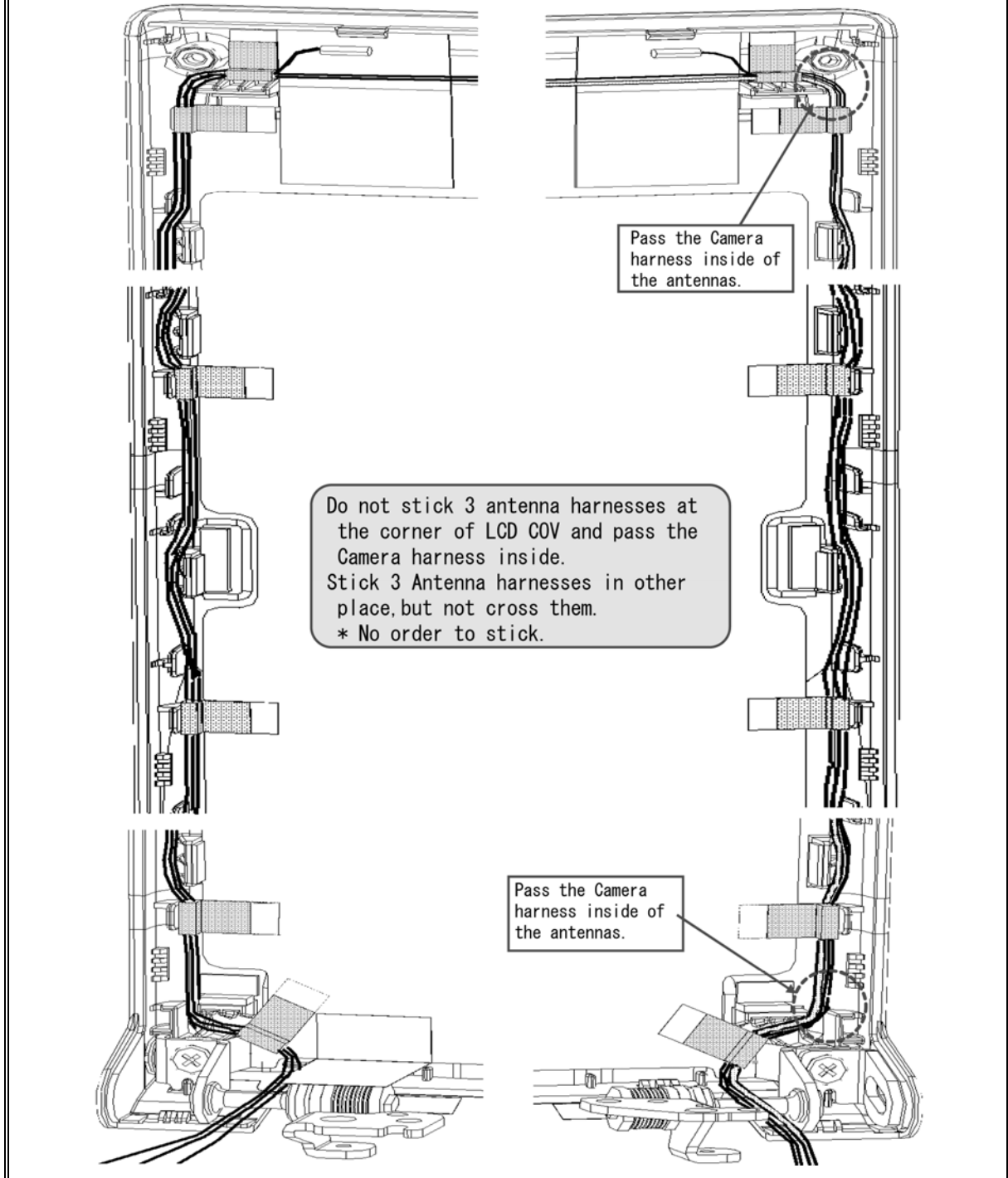


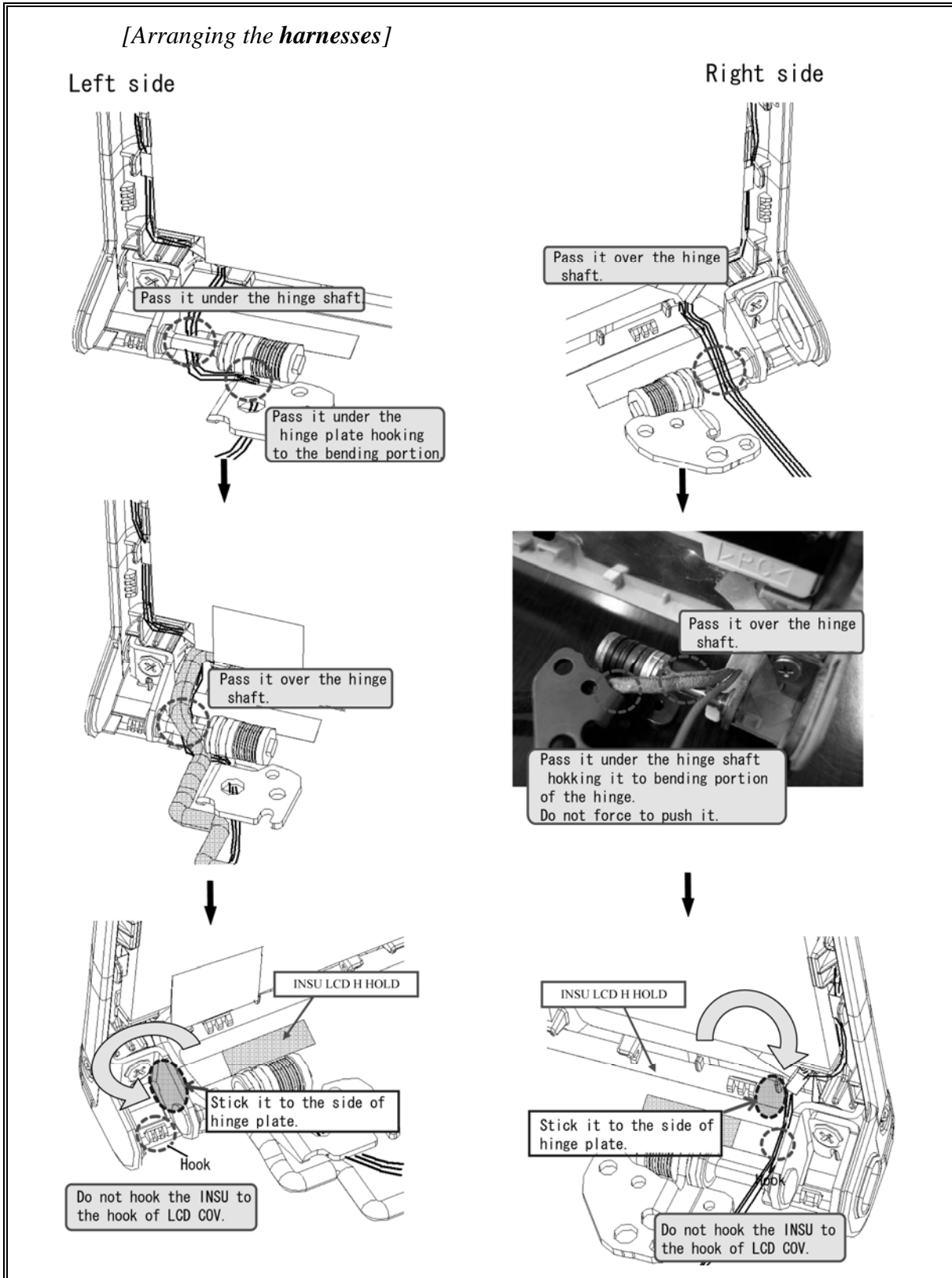
8. Stick the **AL TAPE (451) (2p)** on the 3G antennas.



[Arranging the **harnesses WL-LAN MODEL**]

1. Arrange the harnesses and fix them with the **INSULATOR ANT HOLD S (12pt)**.





4.29 Hinge

Removing the Hinge

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

1. Remove the following **screws** securing the hinges.
 - M2×6C S-THIN HEAD ×2
 - M2×2.4C S-THIN HEAD ×2
2. Remove the **hinges** (right and left) and **key plate** from the LCD cover.

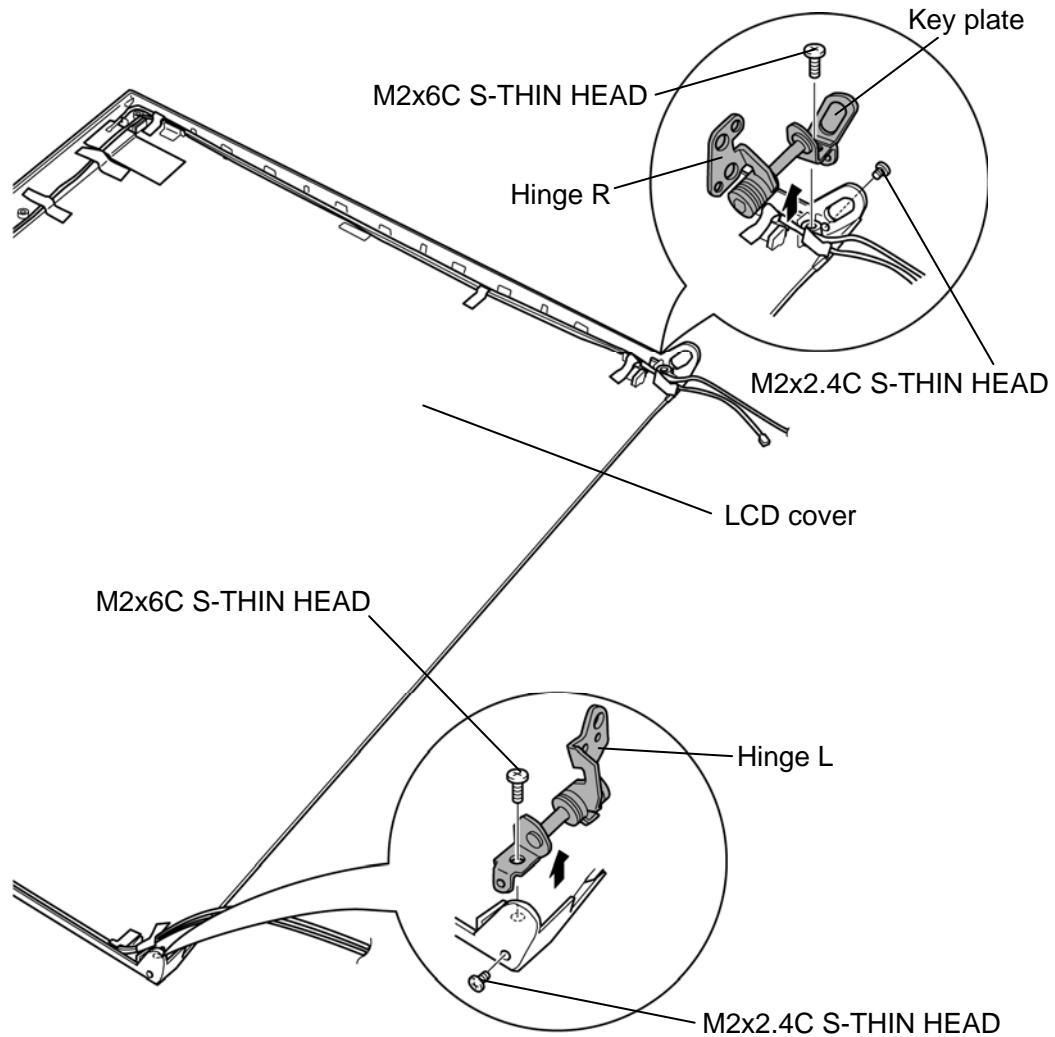


Figure 4-42 Removing the hinge

Installing the Hinge

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

1. Set the **key plate** and **hinges** (right and left) to the LCD cover, and secure them with the following **screws**.

- M2×6C S-THIN HEAD ×2
- M2×2.4C S-THIN HEAD ×2

NOTE: When install the hinges, apply *LOCTITE 648* to the screws.

Appendices

[CONFIDENTIAL]

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Finger Sensor board (FMTFS*)

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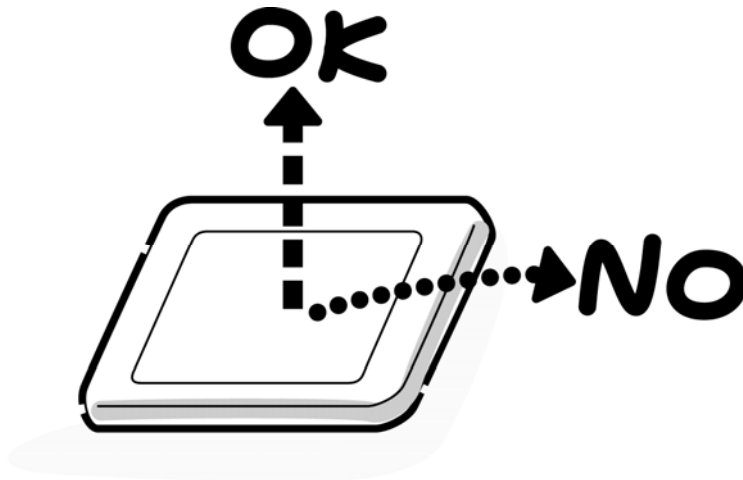
Table I-1 MTBF I-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

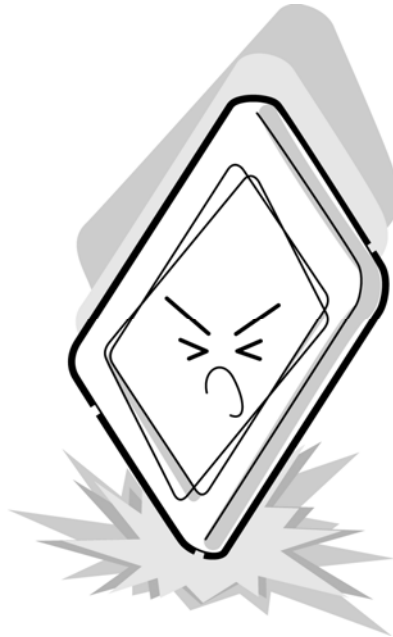
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



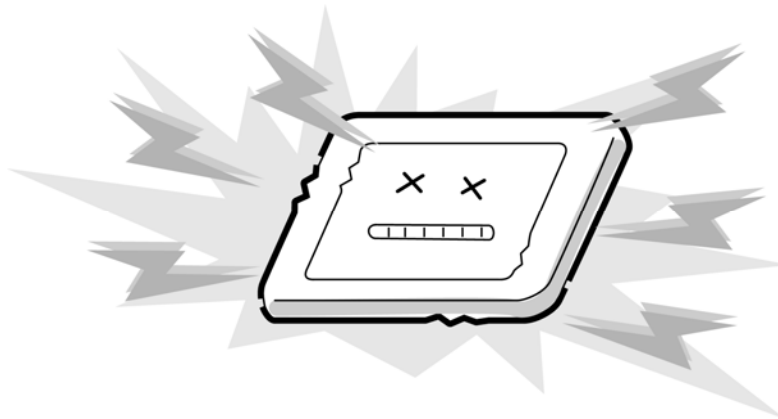
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



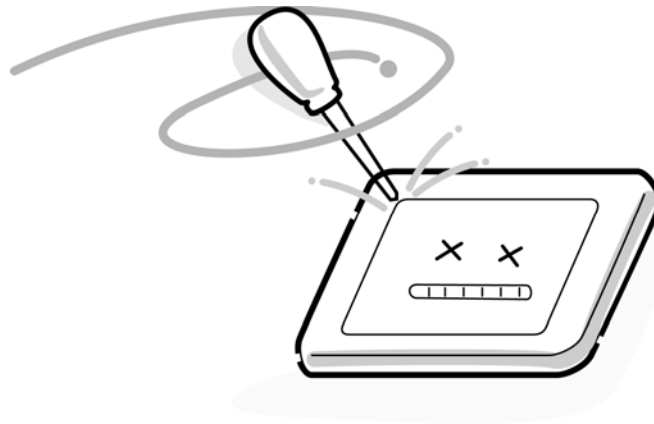
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



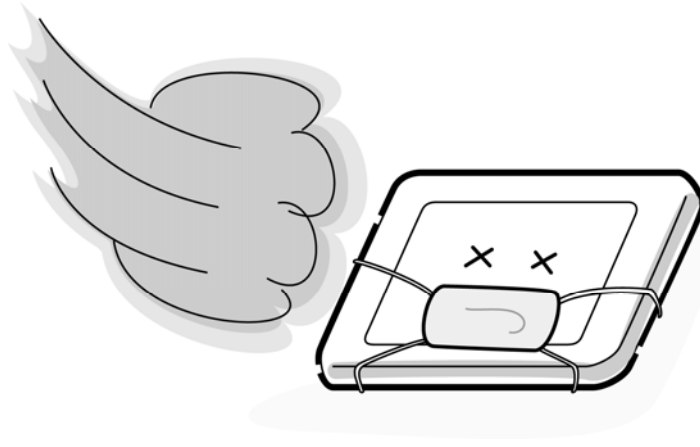
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System board (FMTXS*) Front View

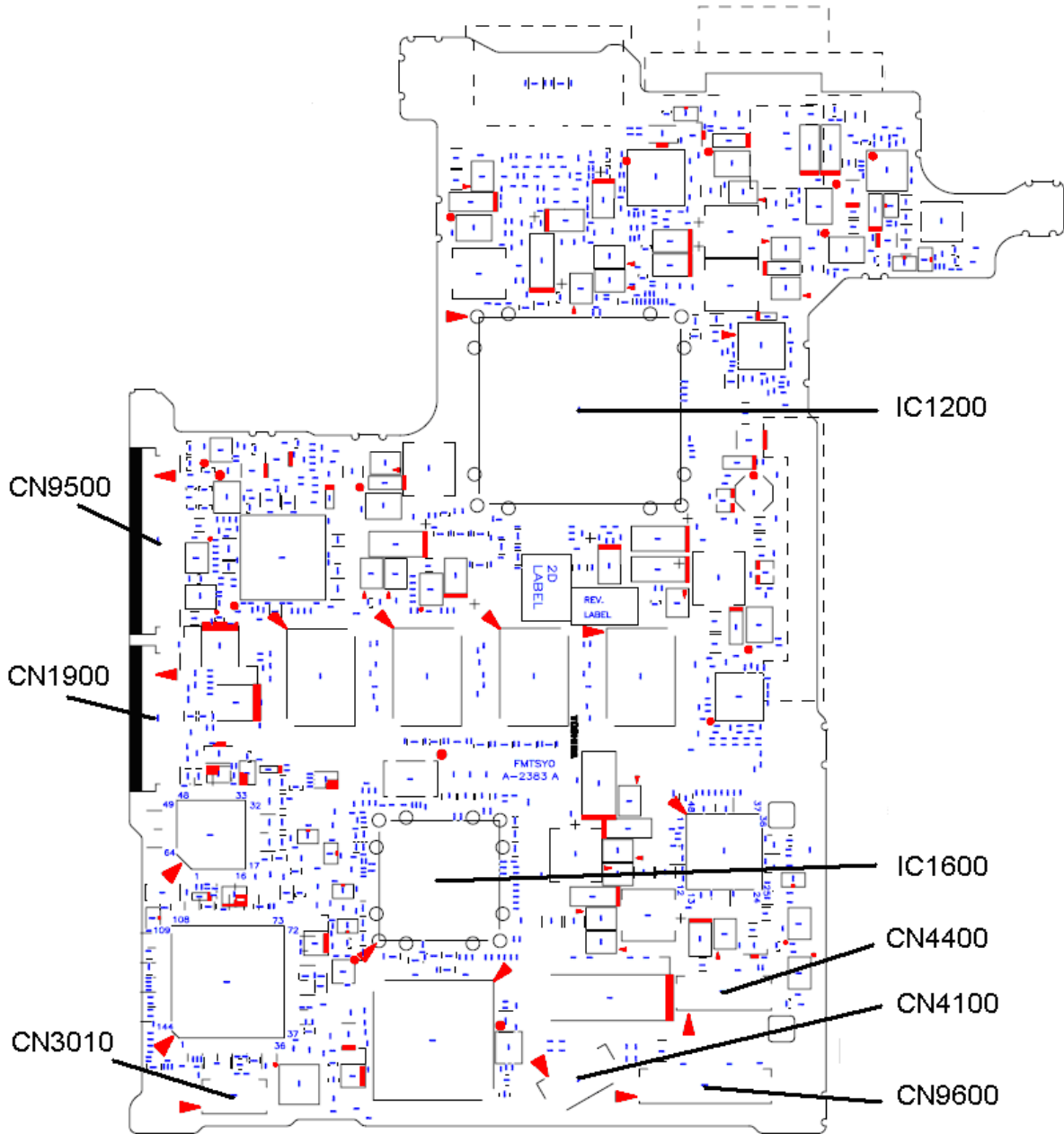


Figure B-1 System board(FMTXS*) layout (front)

Table B-1 System board(FMTXS*) connectors (front)

Number	Name
CN1900	HDD/SSD I/F connector
CN3010	MDC I/F connector
CN4100	LAN I/F connector
CN4400	Bluetooth I/F connector
CN9500	FMTJA* board I/F connector
CN9600	FMTUS* board I/F connector
IC1200	North Bridge Cantiga-GS
IC1600	South Bridge ICH9M

B.2 System board (FMTXS*) Back View

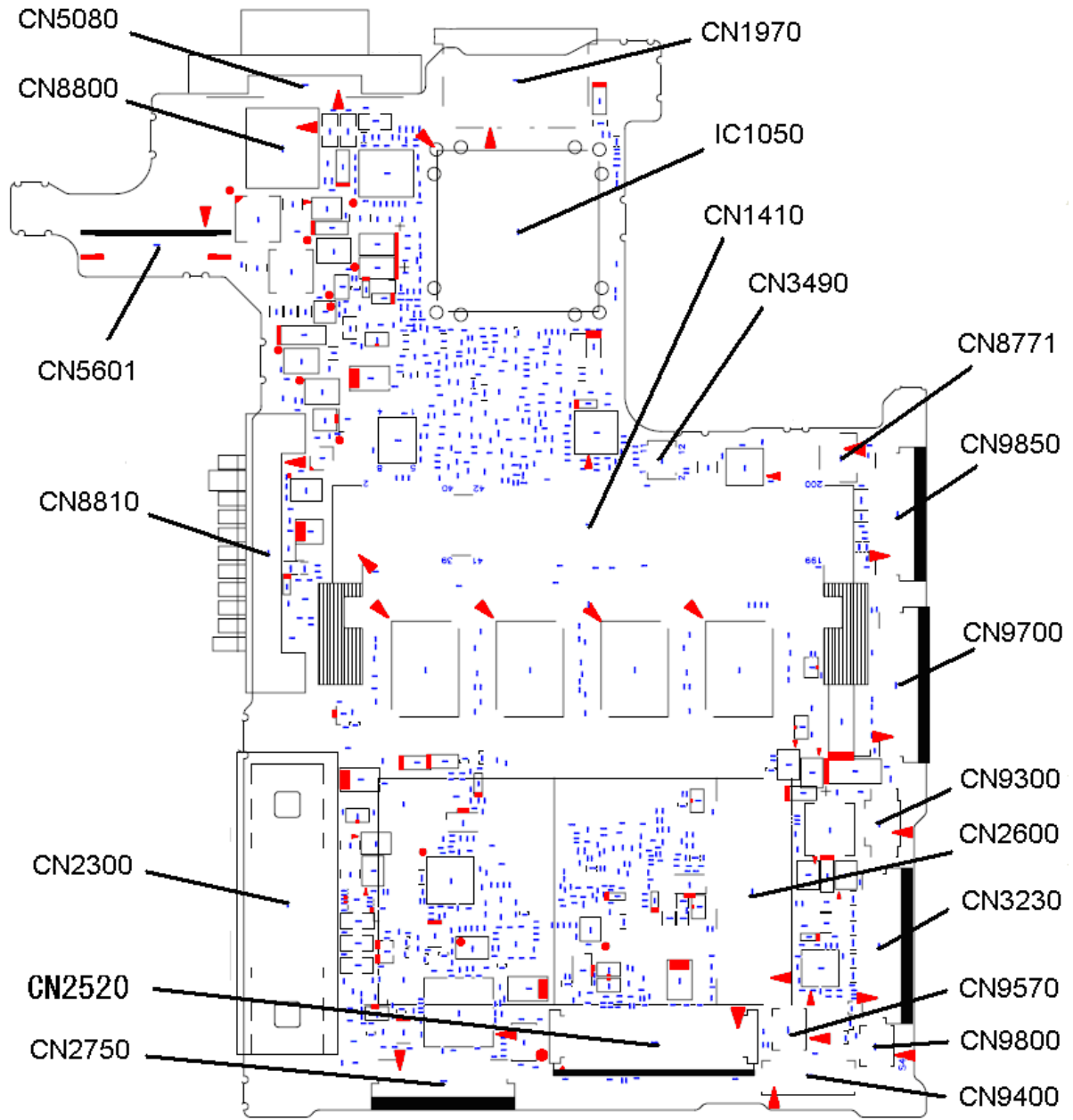
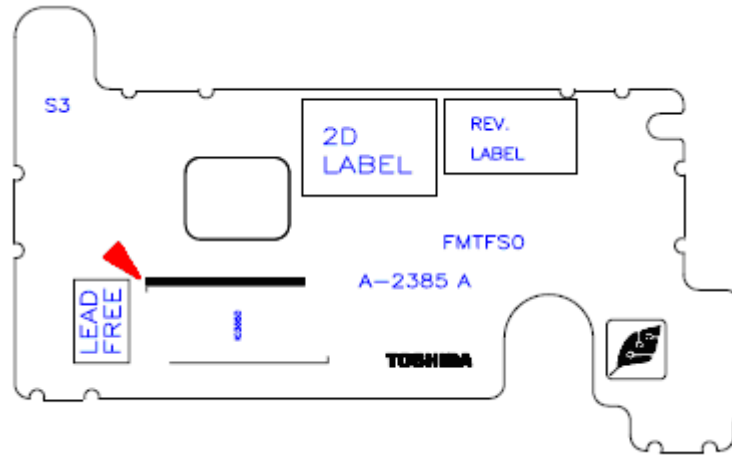


Figure B-2 System board(FMTXS*) layout (back)

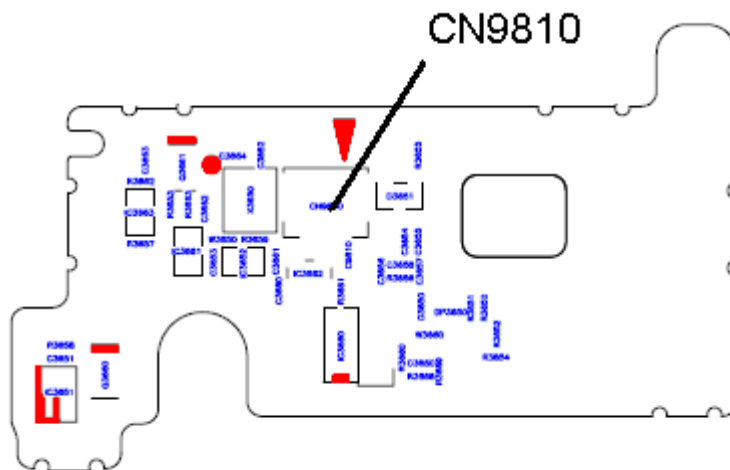
Table B-2 System board (FMTXS*) connectors and ICs (back)

Number	Name
CN1410	Memory connector 2
CN1970	eSATA&USB I/F connector
CN2520	Express card I/F connector
CN2300	Docking I/F connector
CN2600	Mini PCI Express I/F connector
CN2750	FSI3G* board I/F connector
CN3230	Keyboard I/F connector
CN3490	It is debugging port for development only
CN5080	CRT I/F connector
CN5601	LCD I/F connector
CN8771	FAN I/F connector
CN8800	DC-IN connector
CN8810	Battery connector
CN9300	RTC battery connector
CN9400	SATA ODD I/F connector
CN9570	FELICA I/F connector (Japanese model Only)
CN9700	FMTSD*/FSISD* board I/F connector
CN9800	FMTFS* board I/F connector
CN9850	Membrane I/F connector
IC1050	CPU

B.3 Finger Sensor board (FMTFS*) View



(front)



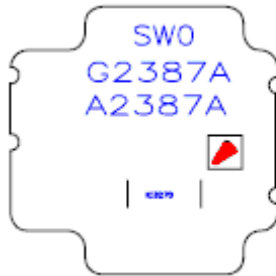
(back)

Figure B-3 Finger Sensor board (FMTFS*) layout (front/back)

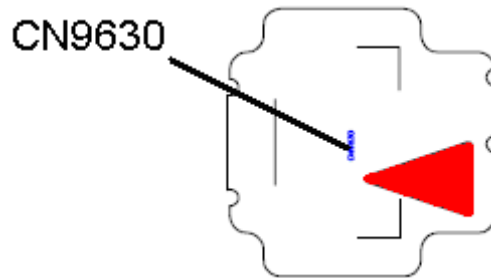
Table B-3 Finger Sensor board (FMTFS*) connector (back)

Number	Name
CN9810	System board I/F connector

B.4 SW board (FMTSW*) View



(front)



(back)

Figure B-4 SW board (FMTSW*) layout (front/back)

Table B-4 SW board (FMTSW*) connector (back)

Number	Name
CN9630	FMTUS* board I/F connector

B.5 Jack board (FMTJA*) View

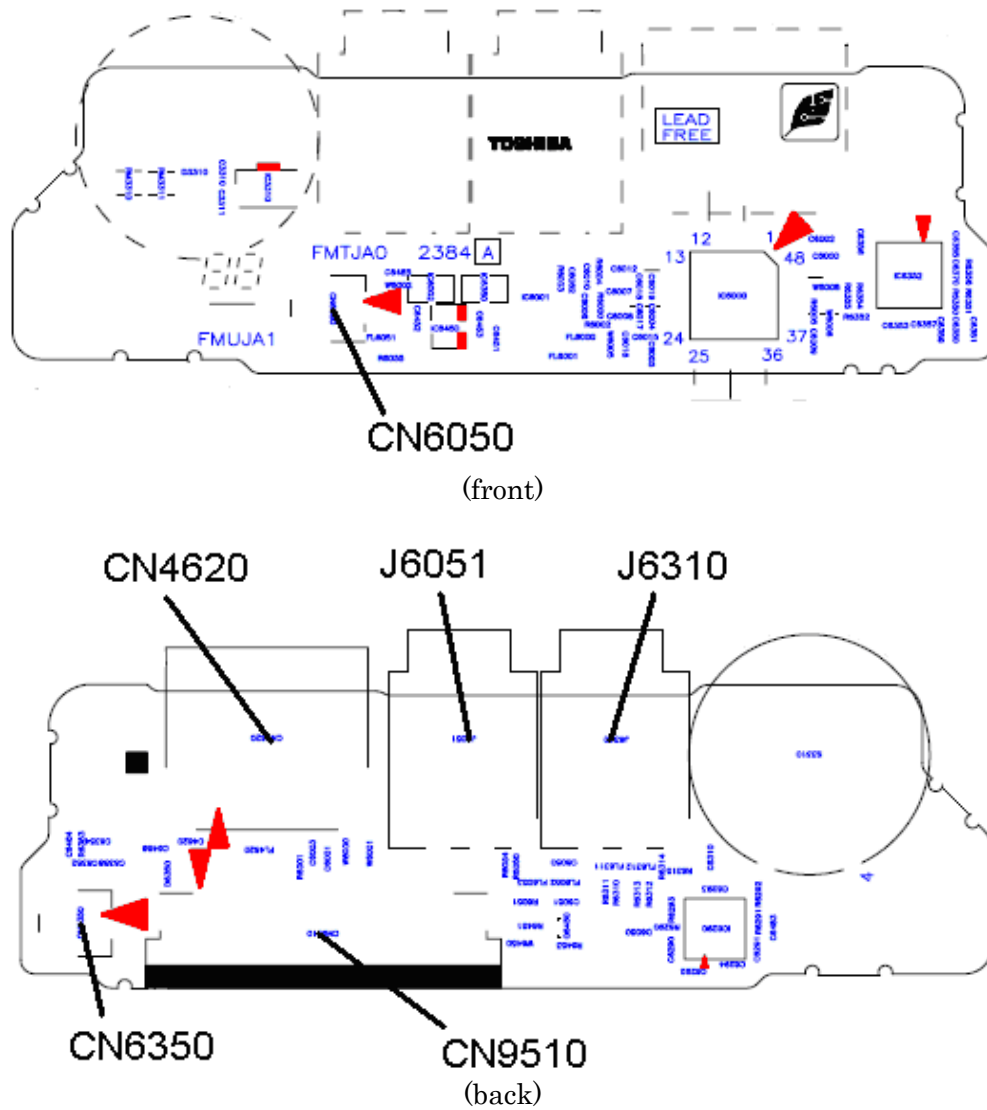


Figure B-5 Jack board (FMTJA*) layout (front/back)

Table B-5 Jack board (FMTJA*)connector (front/back)

Number	Name
CN4620	USB(port6) I/F connector
CN6050	Int-Microphone I/F connector
CN6350	Speaker I/F connector
CN9510	System board I/F connector
J6051	Microphone I/F connector
J6310	Headphone I/F connector

B.6 USB board (FMTUS*) View

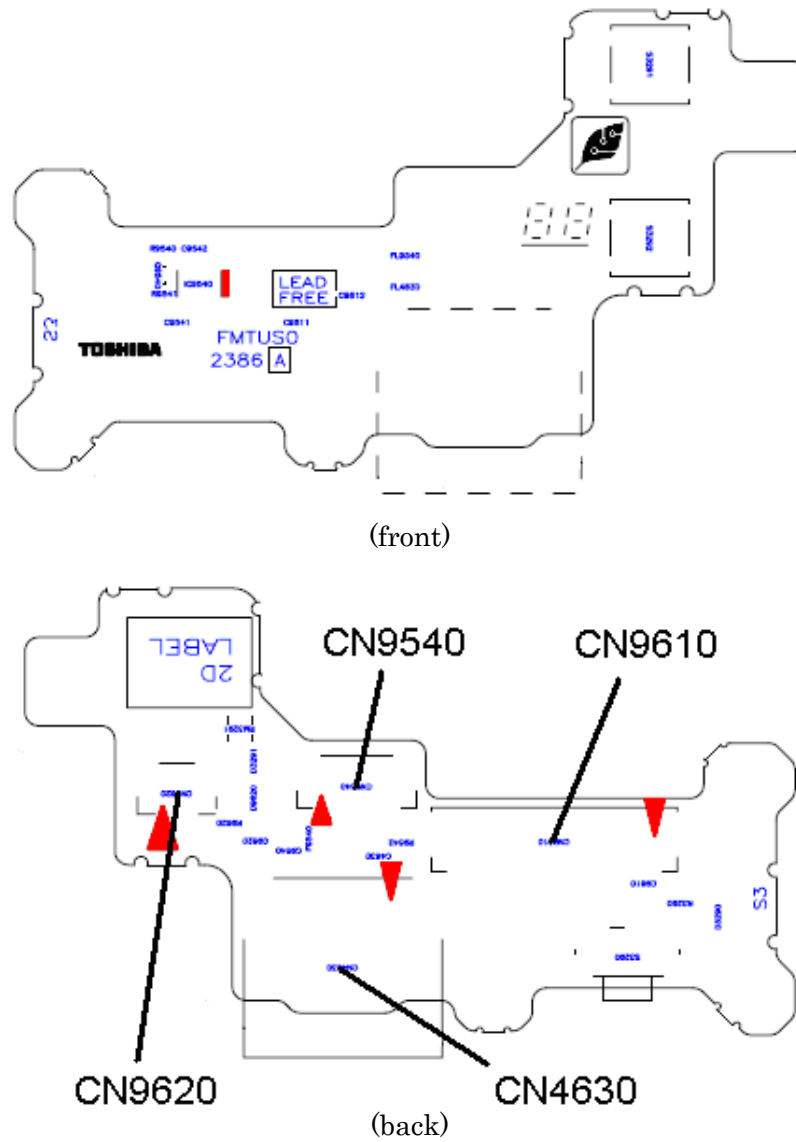


Figure B-6 USB board (FMTUS*) layout (front/back)

Table B-6 USB board (FMTUS*) connector (back)

Number	Name
CN4630	USB(Port0) I/F connector
CN9540	WebCam I/F connector
CN9610	System board I/F connector
CN9620	FMTSW* board I/F connector

B.7 SD board (FSISD*) View for PORTEGE A600

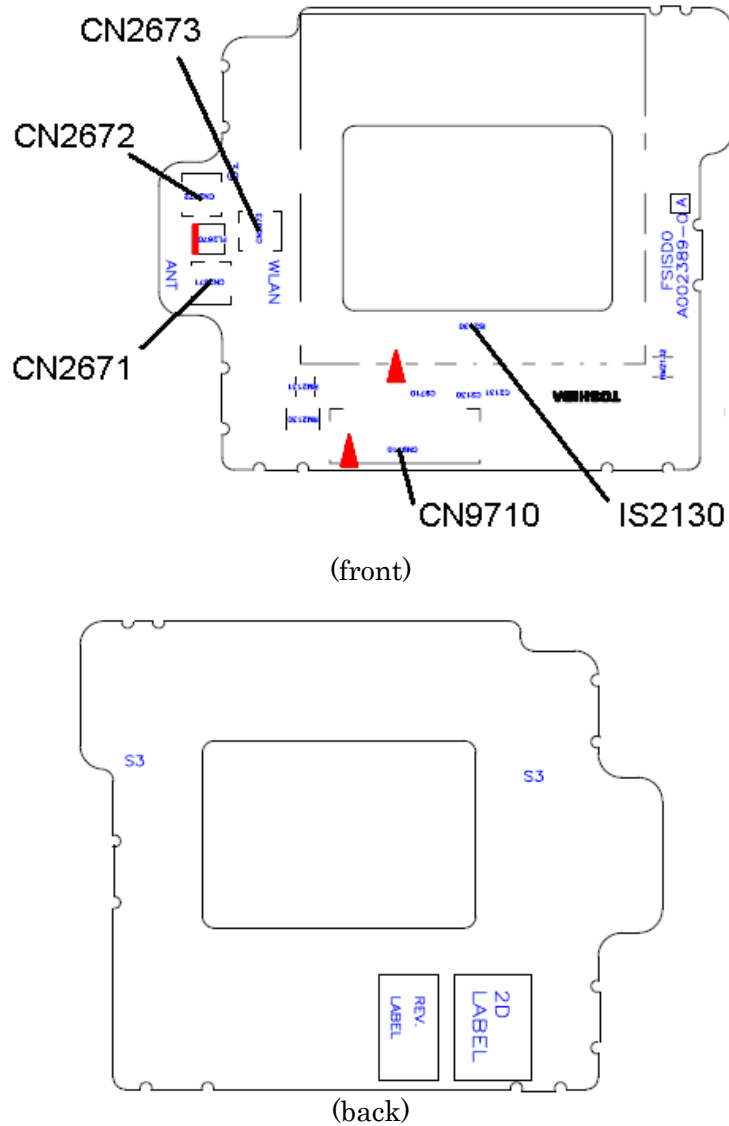


Figure B-7 SD board (FSISD*) layout (front/back)

Table B-7 SD board (FSISD*) connector (front/back)

Number	Name
CN2671	Antenna I/F connector
CN2672	3G I/F connector
CN2673	WLAN I/F connector
CN9710	System board I/F connector
IS2130	SD Card I/F connector

B.8 SD board (FMTSD*) View for PORTEGE R600 (Not used)

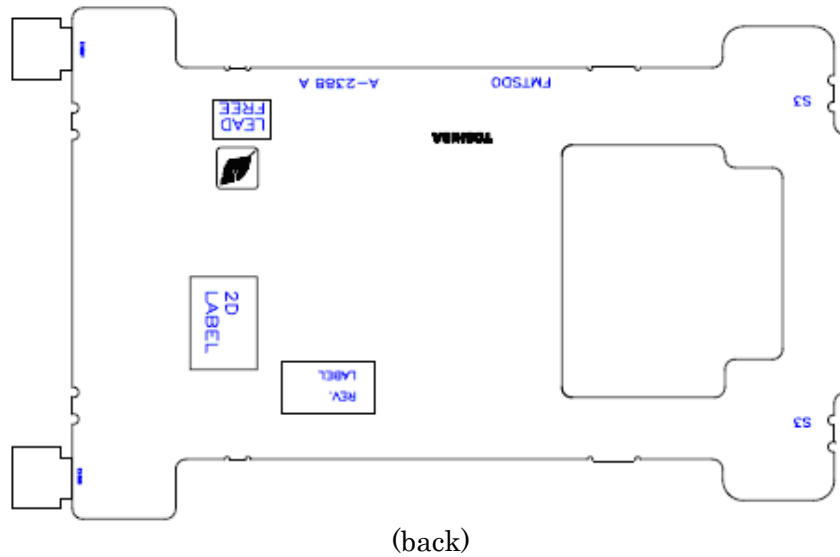
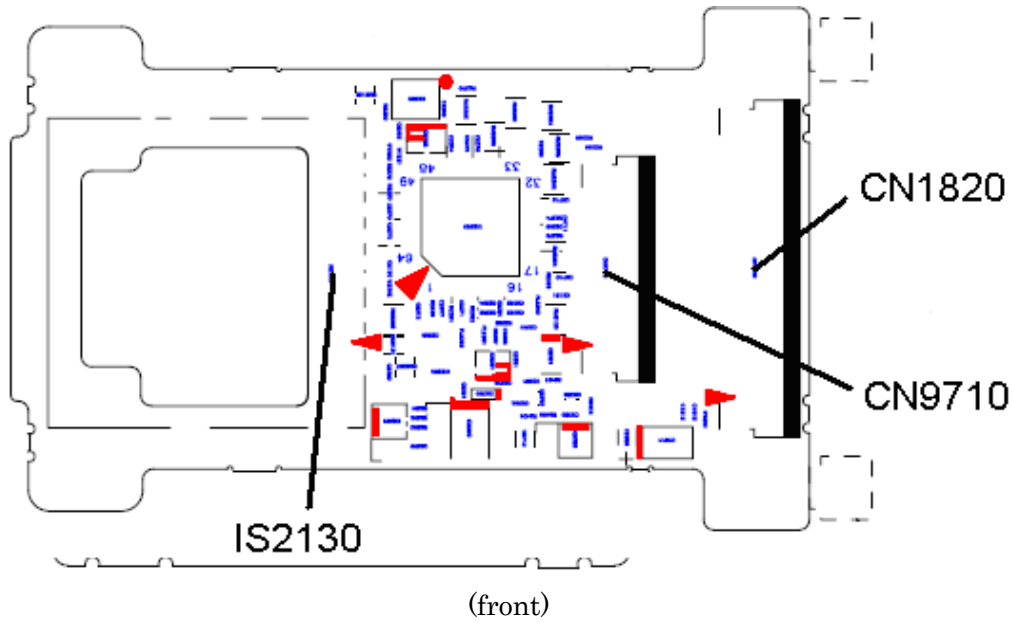


Figure B-8 SD board (FMTSD*) layout (front/back)

Table B-8 SD board (FMTSD*) connector (front/back)

Number	Name
CN1820	FMTPO* board I/F connector
CN9710	System board I/F connector
IS2130	SD Card I/F connector

B.9 Antenna board (FMTAT*) View for PORTEGE R600 (Not used)

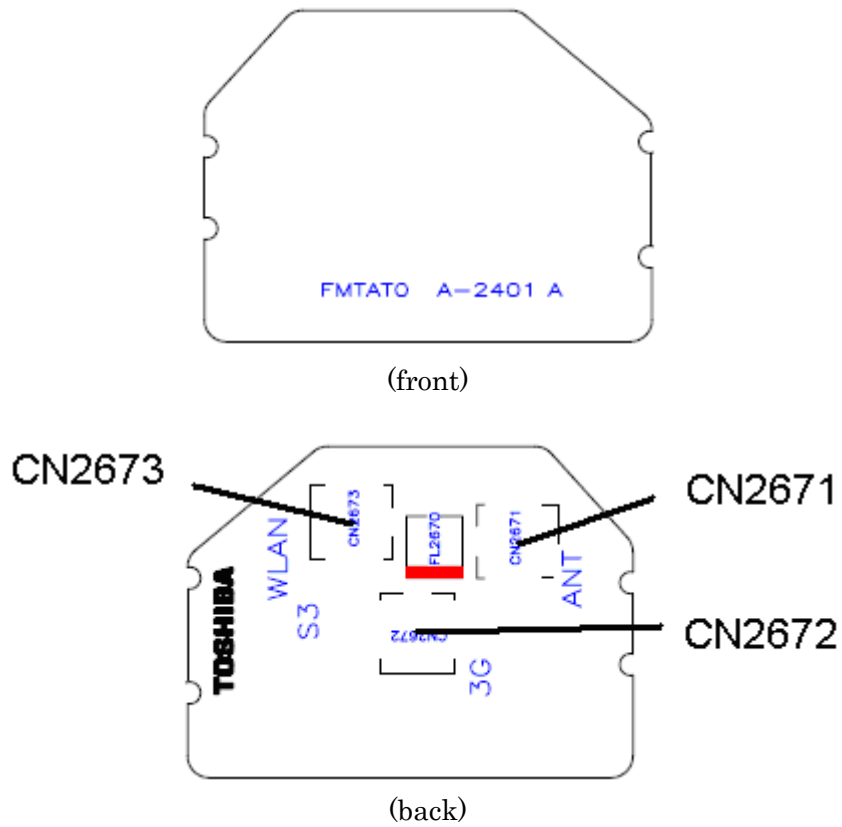
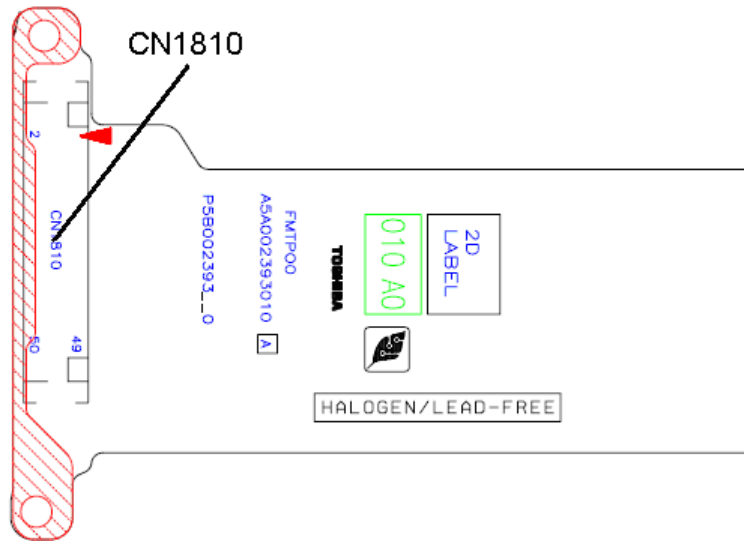


Figure B-9 Antenna board (FMTAT*) layout (front/back)

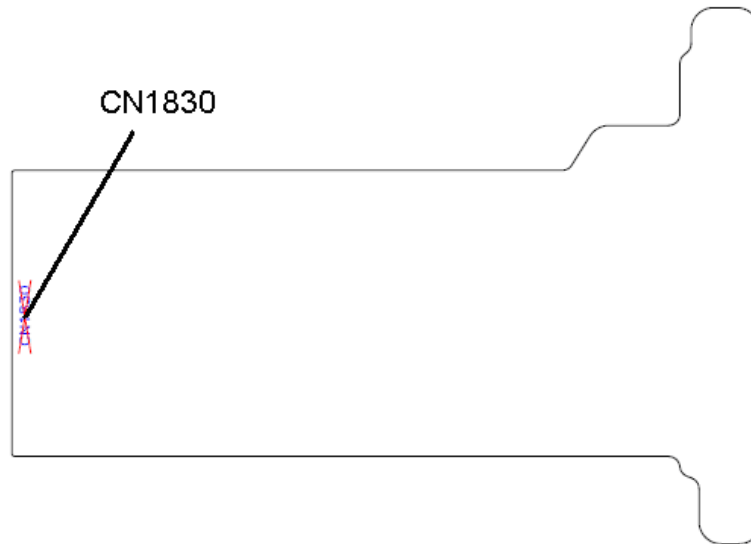
Table B-9 Antenna board (FMTAT*) connector (front/back)

Number	Name
CN2671	Antenna I/F connector
CN2672	3G I/F connector
CN2673	WLAN I/F connector

B.10 PATA ODD FPC (FMTPO*) View for PORTEGE R600 (Not used)



(front)



(back)

Figure B-8 PATA ODD FPC (FMTPO*) layout (front)

Table B-8 PATA ODD FPC (FMTPO*) connector (front)

Number	Name
CN1810	PATA ODD I/F connector
CN1830	FMTSD* board I/F connector

B.11 SATA ODD FPC (FSISO*) View for PORTEGE A600

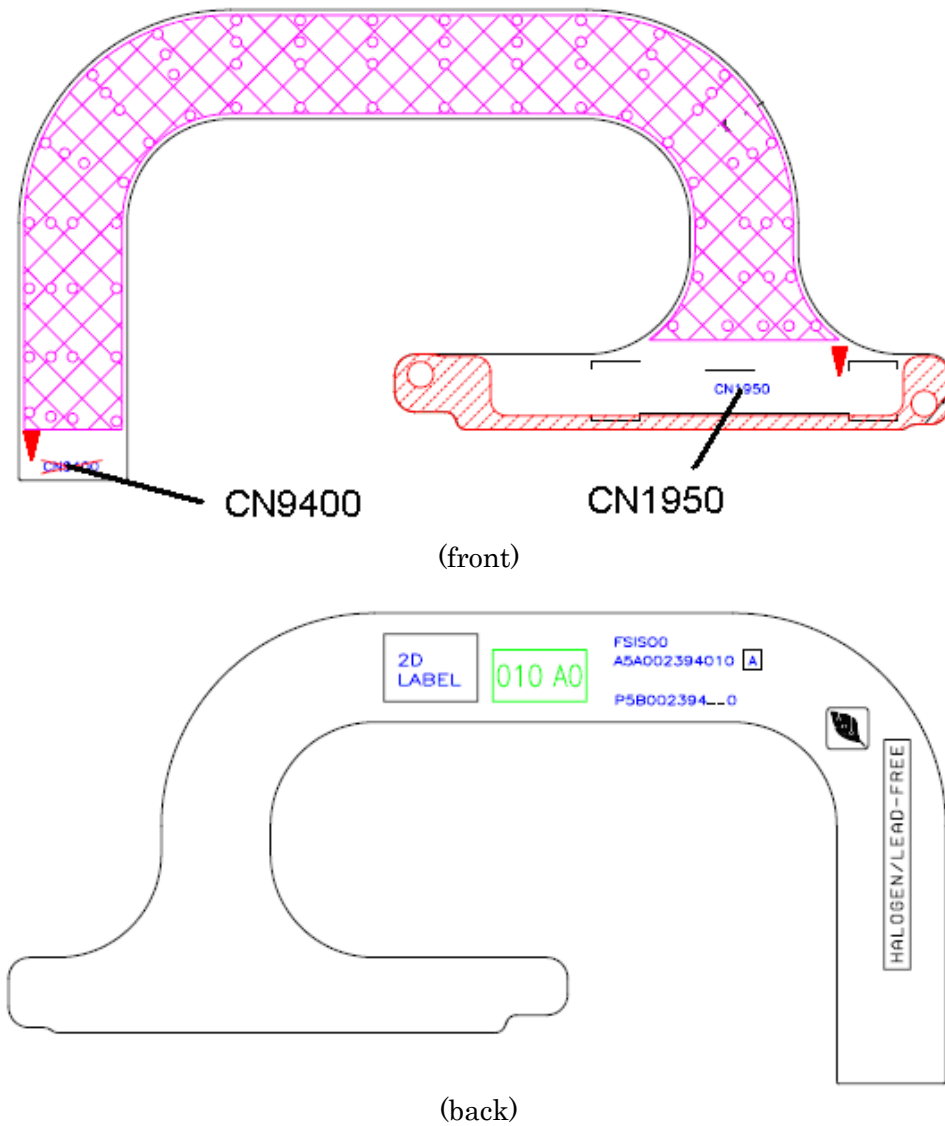


Figure B-11 SATA ODD FPC (FSISO*) layout (front/back)

Table B-11 SATA ODD FPC (FSISO*) connector (front)

Number	Name
CN1950	SATA ODD I/F connector
CN9400	System board I/F connector

B.12 SATA HDD FPC (FMTSH*) View

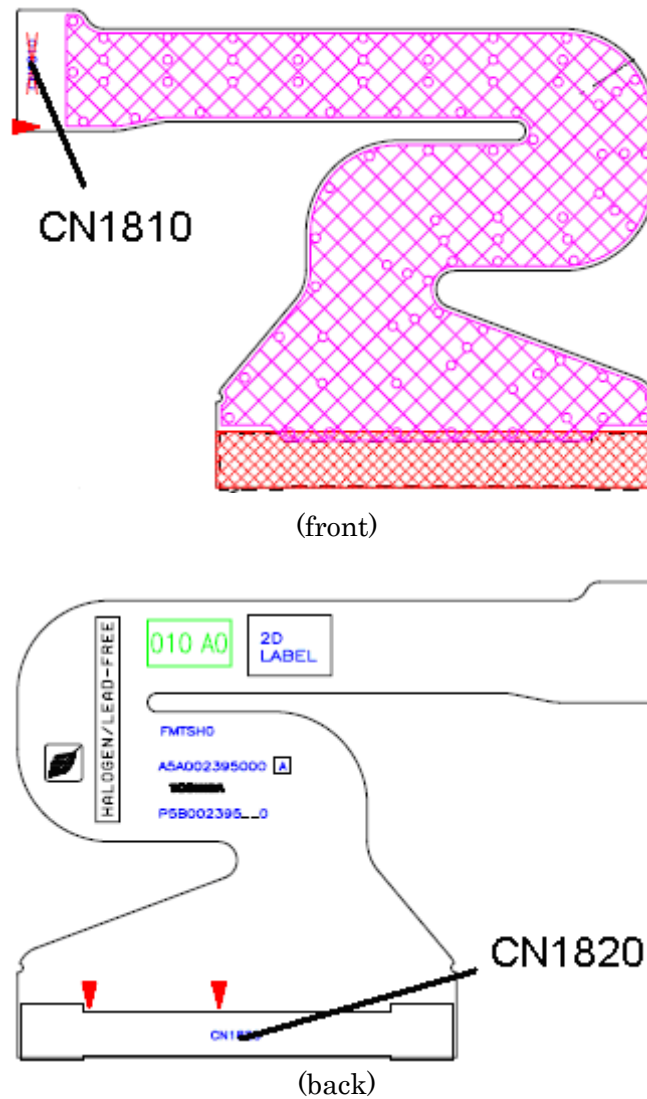


Figure B-12 SATA HDD FPC (FMTSH*) layout (front/back)

Table B-12 SATA HDD FPC (FMTSH*) connector (front/back)

Number	Name
CN1810	System board I/F connector
CN1820	SATA HDD I/F connector

B.13 MDC interface FPC (FSIMD*) View for PORTEGE A600

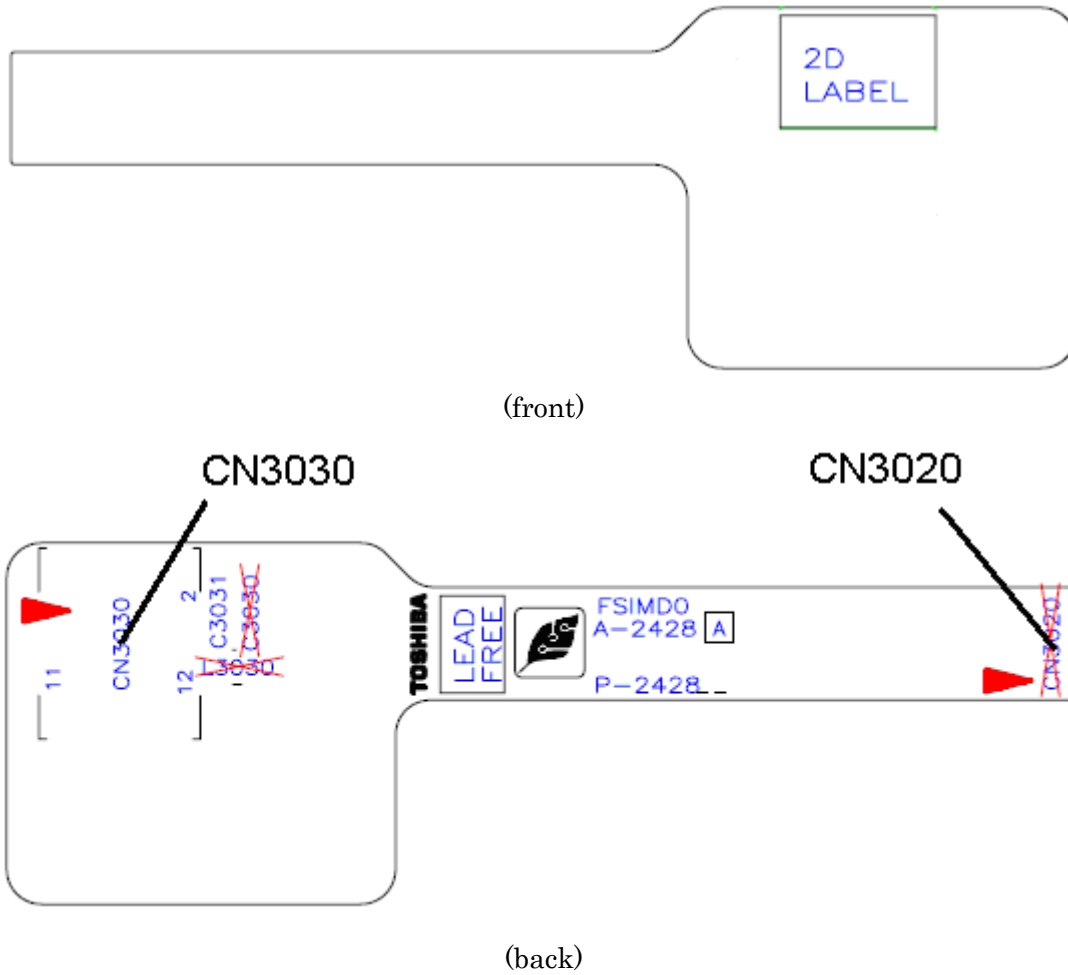


Figure B-13 MDC interface FPC (FSIMD*) layout (front/back)

Table B-13 MDC interface FPC (FSIMD*) connector (back)

Number	Name
CN3020	System board I/F connector
CN3030	MDC I/F connector

B.14 PCIe MiniCard FPC (FMT3G*) View for PORTEGE R600 (Not used)

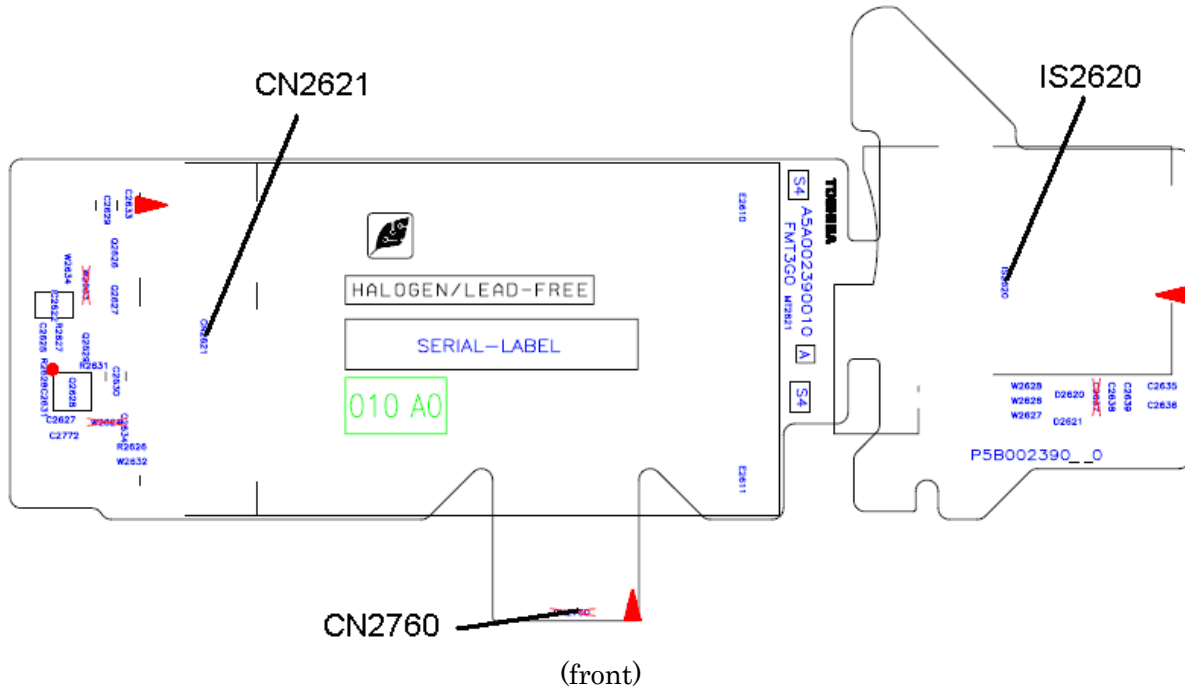


Figure B-14 PCIe MiniCard FPC (FMT3G*) layout (front)

Table B-14 PCIe MiniCard FPC (FMT3G*) connector (front)

Number	Name
CN2621	Mini Card Slot2 I/F connector
CN2760	System board I/F connector
IS2620	SIM Card I/F connector

B.15 PCIe MiniCard FPC (FSI3G*) View for PORTEGE A600

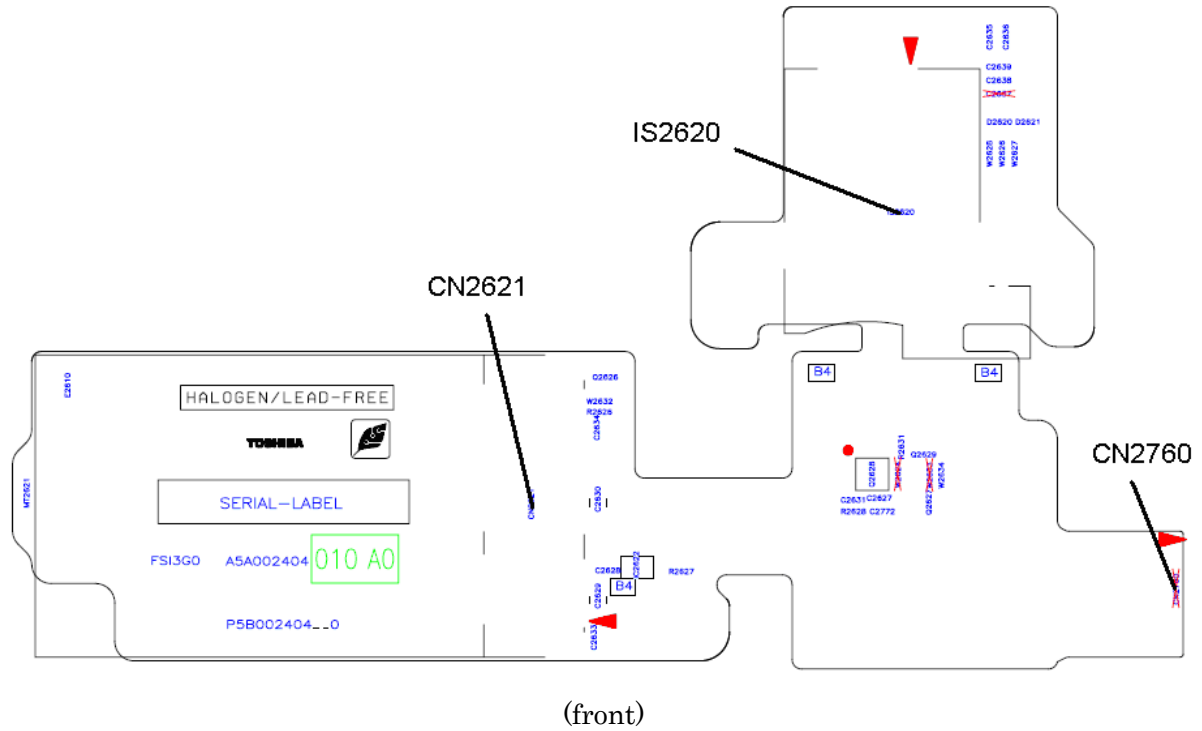


Figure B-15 PCIe MiniCard FPC (FSI3G*) layout (front)

Table B-15 PCIe MiniCard FPC (FSI3G*) connector (front)

Number	Name
CN2621	Mini Card Slot2 I/F connector
CN2760	FMTXS* board I/F connector
IS2620	SIM Card I/F connector

Appendix C Pin Assignments

System board (FMTXS*)

C.1 CN1410 Memory connector 2 (200-pin)

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

Pin No.	Signal Name	Pin No.	Signal Name
1	MRVREF-B0V	2	GND
3	GND	4	BDQ02-B1P
5	BDQ04-B1P	6	BDQ00-B1P
7	BDQ01-B1P	8	GND
9	GND	10	BDM0-B1P
11	BDQS0-B1N	12	GND
13	BDQS0-B1P	14	BDQ05-B1P
15	GND	16	BDQ03-B1P
17	BDQ06-B1P	18	GND
19	BDQ07-B1P	20	BDQ09-B1P
21	GND	22	BDQ13-B1P
23	BDQ12-B1P	24	GND
25	BDQ08-B1P	26	BDM1-B1P
27	GND	28	GND
29	BDQS1-B1N	30	XMCK3-B1P
31	BDQS1-B1P	32	XMCK3-B1N
33	GND	34	GND
35	BDQ11-B1P	36	BDQ10-B1P
37	BDQ15-B1P	38	BDQ14-B1P
39	GND	40	GND
41	GND	42	GND
43	BDQ28-B1P	44	BDQ27-B1P
45	BDQ24-B1P	46	BDQ25-B1P
47	GND	48	GND
49	BDQS3-B1N	50	TSDIMB-P3N
51	BDQS3-B1P	52	BDM3-B1P
53	GND	54	GND
55	BDQ29-B1P	56	BDQ31-B1P
57	BDQ26-B1P	58	BDQ30-B1P
59	GND	60	GND

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

Pin No.	Signal Name	Pin No.	Signal Name
61	BDQ16-B1P	62	BDQ22-B1P
63	BDQ20-B1P	64	BDQ23-B1P
65	GND	66	GND
67	BDM2-B1P	68	BDQS2-B1N
69	NC	70	BDQS2-B1P
71	GND	72	GND
73	BDQ17-B1P	74	BDQ18-B1P
75	BDQ19-B1P	76	BDQ21-B1P
77	GND	78	GND
79	MCKE3-B1P	80	MCKE4-B1P
81	1R8-B1V	82	1R8-B1V
83	NC	84	NC
85	BBS2-B1P	86	BMA14-B1P
87	1R8-B1V	88	1R8-B1V
89	BMA12-B1P	90	BMA11-B1P
91	BMA09-B1P	92	BMA07-B1P
93	BMA08-B1P	94	BMA06-B1P
95	1R8-B1V	96	1R8-B1V
97	BMA05-B1P	98	BMA04-B1P
99	BMA03-B1P	100	BMA02-B1P
101	BMA01-B1P	102	BMA00-B1P
103	1R8-B1V	104	1R8-B1V
105	BMA10-B1P	106	BBS1-B1P
107	BBS0-B1P	108	BRAS-B1N
109	BWE-B1N	110	MCS2-B1N
111	1R8-B1V	112	1R8-B1V
113	BCAS-B1N	114	MODT2-B1P
115	MCS3-B1N	116	BMA13-B1P
117	1R8-B1V	118	1R8-B1V
119	MODT3-B1P	120	NC
121	GND	122	GND
123	BDQ37-B1P	124	BDQ36-B1P
125	BDQ33-B1P	126	BDQ32-B1P
127	GND	128	GND
129	BDQS4-B1N	130	BDM4-B1P
131	BDQS4-B1P	132	GND

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

Pin No.	Signal Name	Pin No.	Signal Name
133	GND	134	BDQ39-B1P
135	BDQ35-B1P	136	BDQ38-B1P
137	BDQ34-B1P	138	GND
139	GND	140	BDQ44-B1P
141	BDQ41-B1P	142	BDQ45-B1P
143	BDQ40-B1P	144	GND
145	GND	146	BDQS5-B1N
147	BDM5-B1P	148	BDQS5-B1P
149	GND	150	GND
151	BDQ43-B1P	152	BDQ47-B1P
153	BDQ42-B1P	154	BDQ46-B1P
155	GND	156	GND
157	BDQ48-B1P	158	BDQ54-B1P
159	BDQ53-B1P	160	BDQ50-B1P
161	GND	162	GND
163	NC	164	XMCK4-B1P
165	GND	166	XMCK4-B1N
167	BDQS6-B1N	168	GND
169	BDQS6-B1P	170	BDM6-B1P
171	GND	172	GND
173	BDQ51-B1P	174	BDQ49-B1P
175	BDQ52-B1P	176	BDQ55-B1P
177	GND	178	GND
179	BDQ61-B1P	180	BDQ57-B1P
181	BDQ56-B1P	182	BDQ58-B1P
183	GND	184	GND
185	BDM7-B1P	186	BDQS7-B1N
187	GND	188	BDQS7-B1P
189	BDQ60-B1P	190	GND
191	BDQ63-B1P	192	BDQ62-B1P
193	GND	194	BDQ59-B1P
195	SMBDT1-E3P	196	GND
197	SMBCK1-E3P	198	GND
199	P3V	200	M-E3V
1T	GND	2T	GND

C.2 CN1900 HDD/SSD interface connector (25-pin)

Table C-2 HDD/SSD interface connector (25-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZSTTHD-P1P
3	ZSTTHD-P1N	4	GND
5	GND	6	ZSTRHD-P1N
7	ZSTRHD-P1P	8	GND
9	GND	10	GND
11	GND	12	GND
13	GND	14	NC
15	P3V	16	P3V
17	P3V	18	P3V
19	P3V	20	NC
21	P5V	22	P5V
23	P5V	24	P5V
25	P5V		
1T	GND	2T	GND

C.3 CN1970 eSATA&USB interface connector (11-pin)*Table C-3 eSATA&USB interface connector (11-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
P1	USB1PS-E5V	P2	ZUSBES-E3N
P3	ZUSBES-E3P	P4	GND
P5	GND	P6	ZSTTES-P1P
P7	ZSTTES-P1N	P8	GND
P9	ZSTRES-P1N	P10	ZSTRES-P1P
P11	GND		
1T	GND	2T	GND
3T	GND	4T	GND

C.4 CN2520 Expresscard interface connector (40-pin)

Table C-4 Expresscard interface connector (40-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	GND	4	GND
5	ZETCRD-P1P	6	ZETCRD-P1N
7	GND	8	GND
9	GND	10	GND
11	ZERCRD-P1P	12	ZERCRD-P1N
13	GND	14	GND
15	GND	16	GND
17	XPECRD-P0P	18	XPECRD-P0N
19	NC	20	CPPE-E3N
21	CRDCRQ-E3N	22	CRD-P3V
23	CRD-P3V	24	CRD-P3V
25	CRDRST-E3N	26	CRD-E3V
27	PEWAKE-E3N	28	CRD1R5-P1V
29	CRD1R5-P1V	30	CRD-E3V
31	CRD-E3V	32	NC
33	NC	34	CPUSB-E3N
35	ZUSBEX-E3P	36	ZUSBEX-E3N
37	GND	38	GND
39	GND	40	GND
1T	GND	2T	GND

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C.5 CN2300 Docking interface connector (64-pin)

Table C-5 Docking interface connector (64-pin)

Pin No.	Signal Name	Pin No.	Signal Name
P1	DSKDC	P2	GND
P3	D-E5V	P4	GND
S1	DOCDT2-S3N	S2	DOCTYP-E3N
S3	EJCTRQ-S3N	S4	DOCVON-S3P
S5	GND	S6	DVIDET-P3N
S7	GND	S8	XDVCLK-P3P
S9	XDCCLK-P3N	S10	GND
S11	ZDVTX1-P3P	S12	ZDVTX1-P3N
S13	GND	S14	IDSCL-P3P
S15	IDSDA-P3P	S16	GND
S17	DRED-PXP	S18	DGREEN-PXP
S19	DBLUE-PXP	S20	DHSYNC-P3P
S21	GND	S22	LINK-E3N
S23	ACT-E3N	S24	NC
S25	NC	S26	NC
S27	ZBIDAP-EXP	S28	ZBIDAN-EXN
S29	ZBIDCP-EXP	S30	ZBIDCN-EXN
S31	D-E3V	S32	D-E3V
S33	PWRSW-S3N	S34	GND
S35	ZUSBDC-E3P	S36	ZUSBDC-E3N
S37	GND	S38	DVISDA-P5P
S39	DVISCL-P5P	S40	GND
S41	ZDVTX2-P3P	S42	ZDVTX2-P3N
S43	GND	S44	ZDVTX0-P3P
S45	ZDVTX0-P3N	S46	GND
S47	GND	S48	GND
S49	GND	S50	DVSYNC-P3P
S51	GND	S52	LAN-E3V
S53	DOCDT1-S3N	S54	NC
S55	NC	S56	NC
S57	ZBIDBP-EXP	S58	ZBIDBN-EXN
S59	ZBIDDP-EXP	S60	ZBIDDN-EXN
1T	GND	2T	GND
3T	GND	4T	GND

C.6 CN2600 Mini PCI Express interface connector (52-pin)*Table C-6 Mini PCI Express interface connector (52-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	PEWAKE-E3N	2	WLAN-E3V
3	NC	4	GND
5	NC	6	1R5-P1V
7	WLNXRQ-P3N	8	NC
9	GND	10	NC
11	XPEWLN-P0N	12	NC
13	XPEWLN-P0P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	WLRFON-S3N
21	GND	22	IC2601-4pin
23	ZERWL-P1N	24	WLAN-E3V
25	ZERWL-P1P	26	WLWMDT-P3N
27	GND	28	1R5-P1V
29	GND	30	NC
31	ZETWL-P1N	32	NC
33	ZETWL-P1P	34	GND
35	GND	36	ZUSBWM-E3N
37	GND	38	ZUSBWM-E3P
39	WLAN-E3V	40	GND
41	WLAN-E3V	42	WLAN-E3V
43	GND	44	NC
45	XCLK1-E1P	46	NC
47	CLDAT1-E1P	48	1R5-P1V
49	CLRST1-E3N	50	GND
51	NC	52	WLAN-E3V
1T	GND	2T	GND

C.7 CN2750 FSI3G* board interface connector (25-pin)

Table C-7 FSI3G* board interface connector (25-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	TMP3G-GND	2	TMP3G-SXP
3	GND	4	3GWAKE-S3N
5	GND	6	PLTRS1-E3N
7	GND	8	3GRST-S3N
9	3GRFON-S3N	10	GND
11	GND	12	ZUSB3G-E3N
13	ZUSB3G-E3P	14	GND
15	GND	16	3GGPDT-P3N
17	3GLED-E3P	18	GND
19	3GON-S3N	20	E3V
21	E3V	22	E3V
23	E3V	24	E3V
25	E3V		
1T	GND	2T	GND

C.8 CN3010 MDC interface connector (12-pin)

Table C-8 MDC interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	E3V	2	E3V
3	AZSDO1-P3P	4	GND
5	AZSYC1-P3P	6	GND
7	AZSDI1-E3P	8	GND
9	AZRST1-E3N	10	GND
11	XAZBC1-P3P	12	GND
1T	GND	2T	GND

C.9 CN3230 Keyboard interface connector (30-pin)*Table C-9 keyboard interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NUMLED-P5N	2	ARWLED-P5N
3	CAPLED-P5N	4	P5V
5	NC	6	KBRT06-S3N
7	KBRT02-S3N	8	KBRT03-S3N
9	KBRT05-S3N	10	KBRT01-S3N
11	KBRT04-S3N	12	KBRT07-S3N
13	KBRT00-S3N	14	NC
15	KBSC00-S3N	16	KBSC09-S3N
17	KBSC03-S3N	18	KBSC02-S3N
19	KBSC05-S3N	20	KBSC04-S3N
21	KBSC06-S3N	22	KBSC08-S3N
23	KBSC10-S3N	24	KBSC01-S3N
25	KBSC11-S3N	26	KBSC07-S3N
27	KBSC15-S3N	28	KBSC12-S3N
29	KBSC13-S3N	30	KBSC14-S3N
1T	GND	2T	GND

C.10 CN4100 LAN interface connector (8-pin)*Table C-10 LAN interface connector (8-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ZBIDDN-EXN	2	ZBIDDP-EXP
3	ZBIDAP-EXP	4	ZBIDAN-EXN
5	ZBIDBP-EXP	6	ZBIDBN-EXN
7	ZBIDCN-EXN	8	ZBIDCP-EXP

C.11 CN4400 Bluetooth interface connector (20-pin)*Table C-11 Bluetooth interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	NC
3	BTMDL-P3N	4	NC
5	NC	6	NC
7	NC	8	BTRST-S3N
9	NC	10	NC
11	GND	12	NC
13	GND	14	NC
15	NC	16	ZUSBBT-E3P
17	ZUSBBT-E3N	18	NC
19	NC	20	BT-P3V
1T	GND	2T	GND

C.12 CN5080 CRT interface connector (15-pin)*Table C-12 CRT interface connector (15-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	MRED-PXP	2	MGREEN-PXP
3	MBLUE-PXP	4	NC
5	GND	6	GND
7	GND	8	GND
9	P5V	10	GND
11	NC	12	MCRTSD-P5P
13	MHSYNC-P3P	14	MVSYNC-P3P
15	MCRTSC-P5P		
1T	GND	2T	GND

C.13 CN5601 LCD interface connector (35-pin)*Table C-13 LCD interface connector (35-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	LEDBL5-GND
3	LEDBL4-GND	4	LEDBL3-GND
5	LEDBL2-GND	6	LEDBL1-GND
7	LEDBL0-GND	8	NC
9	LEDBL-PYV	10	NC
11	PNL-P2V	12	PNL-P2V
13	PNL-P2V	14	PNL-P2V
15	GND	16	GND
17	GND	18	(IC5310-4)
19	NC	20	NC
21	NC	22	FSDA-P3P
23	FSCL-P3P	24	P3V
25	NC	26	GND
27	XITXCA-PYP	28	XITXCA-PYN
29	ZITDA2-PYP	30	ZITDA2-PYN
31	ZITDA1-PYP	32	ZITDA1-PYN
33	ZITDA0-PYP	34	ZITDA0-PYN
35	GND		
1T	GND	2T	GND

C.14 CN8771 FAN interface connector (4-pin)*Table C-14 FAN interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	E5V	2	FANGO-P3P
3	GND	4	(IC8773-4)

C.15 CN8800 DC-IN connector (4-pin)*Table C-15 DC-IN connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	PVL	2	PVL
3	GND	4	GND

C.16 CN8810 Battery connector (10-pin)*Table C-16 Battery connector (10-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(Q8811-1)	2	BTMP1
3	(Q8811-4)	4	M5V
5	PSCL-M5P	6	PSDA-M5P
7	GND	8	DBT10V-S5N
9	GND	10	GND

C.17 CN9300 RTC battery connector (3-pin)*Table C-17 RTC battery connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ZS_PWCHKF	2	NC
3	GND		
1T	GND	2T	GND

C.18 CN9400 SATA ODD interface connector (20-pin)*Table C-18 SATA ODD interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZSTTOD-P1P
3	ZSTTOD-P1N	4	GND
5	ZSTROD-P1N	6	ZSTROD-P1P
7	GND	8	NC
9	NC	10	SODD-P5V
11	SODD-P5V	12	SODD-P5V
13	SODD-P5V	14	SODD-P5V
15	NC	16	GND
17	GND	18	GND
19	GND	20	GND
1T	GND	2T	GND

C.19 CN9500 FMTJA* board interface connector (36-pin)*Table C-19 FMTJA* board interface connector (36-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	USB2PS-E5V
3	USB2PS-E5V	4	USB2PS-E5V
5	USB2PS-E5V	6	NC
7	GND	8	ZUSBP6-E3N
9	ZUSBP6-E3P	10	GND
11	GND	12	XAZBC0-P3P
13	GND	14	AZSYC0-P3P
15	GND	16	AZSDI0-P3P
17	AZSDO0-P3P	18	AZRST0-E3N
19	GND	20	SNDMUT-S3N
21	P3V	22	AMPSD-S3N
23	1R5-P1V	24	PCBEEP-P3P
25	ATBEEP-P3P	26	P5V
27	P5V	28	PVON-R3N
29	SND-GND	30	SND-GND
31	ROTEA-P3N	32	ROTEB-P3N
33	GND	34	GND
35	GND	36	GND
1T	GND	2T	GND

C.20 CN9570 FELICA interface connector (6-pin) (Japanese model Only)*Table C-20 FELICA interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(Q9570-1	2	ZUSBFE-E3N
3	ZUSBFE-E3P	4	GND
5	NC	6	GND
1T	GND	2T	GND

C.21 CN9600 FMTUS* board interface connector (30-pin)*Table C-21 FMTUS* board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	RESWON-S3N
3	USB0PS-E5V	4	USB0PS-E5V
5	USB0PS-E5V	6	USB0PS-E5V
7	USB0PS-E5V	8	WCAMEN-E3N
9	GND	10	GND
11	ZUSBP0-E3N	12	ZUSBP0-E3P
13	GND	14	GND
15	GND	16	GND
17	GND	18	GPBTNA-S3N
19	GND	20	GPBTNB-S3N
21	S3V	22	PNLOFF-S3N
23	GND	24	ZUSBCM-E3N
25	ZUSBCM-E3P	26	GND
27	GND	28	CAMDET-P3N
29	P5V	30	P5V
1T	GND	2T	GND

C.22 CN9700 FMTSD*/FSISD* board interface connector (30-pin)

Table C-22 FMTSD/FSISD* board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	ZUSBOD-E3N
17	ZUSBOD-E3P	18	GND
19	GND	20	GND
21	GND	22	MBVON-E5N
23	P3V	24	P3V
25	PODDET-P3N	26	P5V
27	P5V	28	P5V
29	P5V	30	P5V
1T	GND	2T	GND

C.23 CN9800 FMTFS* board interface connector (6-pin)*Table C-23 FMTFS* board interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZUSBFS-E3P
3	ZUSBFS-E3N	4	GND
5	FGSPON-S3N	6	E3V
1T	GND	2T	GND

C.24 CN9850 Membrane interface connector (24-pin)*Table C-24 Membrane interface connector (24-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	P5V	2	P5V
3	IPDDAT-P5P	4	IPDCLK-P5P
5	GND	6	GND
7	NC	8	M5V
9	WANLED-M5N	10	M5V
11	RFLED-M5N	12	P5V
13	SDLED-P5N	14	P5V
15	SATLED-P5N	16	M5V
17	BAT1GR-M5N	18	BAT1OR-M5N
19	M5V	20	PWLEGR-M5N
21	PWLEOR-M5N	22	M5V
23	DCINGR-M5N	24	DCINOR-M5N
1T	GND	2T	GND

Finger Sensor board (FMTFS*)**C.25 CN9810 System board interface connector (6-pin)***Table C-25 System board interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	E3V	2	FGSPON-S3N
3	GND	4	ZUSBFS-E3N
5	ZUSBFS-E3P	6	GND
1T	GND	2T	GND

SW board (FMTSW*)**C.26 CN9630 FMTUS* board interface connector (3-pin)***Table C-26 FMTUS* board interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	S3V	2	PNLOFF-S3N
3	GND		

JACK board (FMTJA*)

C.27 CN4620 USB (PORT6) interface connector (4-pin)

Table C-27 USB(PORT6) interface connector (4-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	ZUSBP6-E3N
3	ZUSBP6-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.28 CN6050 Int-Microphone interface connector (2-pin)

Table C-28 Int-Microphone interface connector (2-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	IMICIN-PXP	2	GND

C.29 CN6350 Speaker interface connector (2-pin)

Table C-29 Speaker interface connector (2-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	SP_OUT_+	2	SP_OUT_-

C.30 CN9510 System board interface connector (36-pin)*Table C-30 System board interface connector (36-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	USB2PS-E5V
3	USB2PS-E5V	4	USB2PS-E5V
5	USB2PS-E5V	6	NC
7	GND	8	ZUSBP6-E3N
9	ZUSBP6-E3P	10	GND
11	GND	12	XAZBC0-P3P
13	GND	14	AZSYCO-P3P
15	GND	16	AZSDIO-P3P
17	AZSDO0-P3P	18	AZRST0-E3N
19	GND	20	SNDMUT-S3N
21	P3V	22	AMPSD-S3N
23	1R5-P1V	24	PCBEEP-P3P
25	ATBEEP-P3P	26	P5V
27	P5V	28	PVON-R3N
29	SND-GND	30	SND-GND
31	ROTENA-P3N	32	ROTENB-P3N
33	GND	34	GND
35	GND	36	GND
1T	GND	2T	GND

C.31 J6050 Microphone interface connector (6-pin)*Table C-31 Microphone interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	EMICIN-PXP
3	EMICB-P2V	4	GND
5	DETCTA-P4N	6	EMICB-P2V

C.32 J6310 Headphone interface connector (6-pin)*Table C-32 Headphone interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	HEADL-PXP
3	HEADR-PXP	4	GND
5	DETCTA-P4N	6	NC

USB board (FMTUS*)**C.33 CN4630 USB (PORT0) interface connector (4-pin)***Table C-33 USB(PORT0) interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB0PS-E5V	2	ZUSBP0-E3N
3	ZUSBP0-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.34 CN9540 WebCam interface connector (6-pin)*Table C-34 WebCam interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	CAM-P5V	2	ZUSBCM-E3N
3	ZUSBCM-E3P	4	GND
5	GND	6	CAMDET-P3N

C.35 CN9610 System board interface connector (20-pin)*Table C-35 System board interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	RFSWON-S3N
3	USB0PS-E5V	4	USB0PS-E5V
5	USB0PS-E5V	6	USB0PS-E5V
7	USB0PS-E5V	8	WCAMEN-E3N
9	GND	10	GND
11	ZUSBP0-E3N	12	ZUSBP0-E3P
13	GND	14	GND
15	GND	16	GND
17	GND	18	GPBTNA-S3N
19	GND	20	GPBTNB-S3N
21	S3V	22	PNLOFF-S3N
23	GND	24	ZUSBCM-E3N
25	ZUSBCM-E3P	26	GND
27	GND	28	CAMDET-P3N
29	P5V	30	P5V
1T	GND	2T	GND

C.36 CN9620 FMTSW* board interface connector (3-pin)*Table C-36 FMTSW* board interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	S3V	2	PNLOFF-S3N
3	GND		

SD board (FSISD*) for PORTEGE A600**C.37 CN2671 Antenna interface connector (3-pin)***Table C-37 Antenna interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-2)	2	GND
3	GND		

C.38 CN2672 3G interface connector (3-pin)*Table C-38 3G interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-6)	2	GND
3	GND		

C.39 CN2673 WLAN interface connector (3-pin)*Table C-39 WLAN interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-4)	2	GND
3	GND		

C.40 CN9710 System board interface connector (20-pin)

Table C-40 System board interface connector (20-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	GND
17	GND	18	GND
19	GND	20	GND
1T	GND	2T	GND

C.41 IS2130 SD Card interface connector (12-pin)

Table C-41 SD Card interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	SDAT3-P3P	2	SDCMD-P3P
3	GND	4	SD-P3V
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	SDCD-P3N
11	SDWP-P3P	12	GND
1T	GND	2T	GND
3T	GND	4T	GND

SD board (FMTSD*) for PORTEGE R600 (Not used)**C.42 CN1820 FMTPO* board interface connector (50-pin)***Table C-42 FMTPO* board interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ODD-P5V	2	ODD-P5V
3	ODD-P5V	4	ODD-P5V
5	ODD-P5V	6	ODD-P5V
7	ODD-P5V	8	NC
9	PODDDET-P3N	10	GND
11	UDCS3-P3N	12	UDCS1-P3N
13	GND	14	UDA2-P3P
15	UDA0-P3P	16	UDA1-P3P
17	GND	18	IDEINT-P5P
19	UDDACK-P3N	20	GND
21	UIORDY-P3P	22	GND
23	UDIOW-P3N	24	GND
25	UDIOR-P3N	26	GND
27	UDDREQ-P3P	28	GND
29	UDD15-P3P	30	UDD14-P3P
31	UDD13-P3P	32	UDD12-P3P
33	GND	34	UDD00-P3P
35	UDD01-P3P	36	UDD02-P3P
37	UDD03-P3P	38	GND
39	UDD04-P3P	40	UDD05-P3P
41	UDD06-P3P	42	UDD07-P3P
43	GND	44	UDD08-P3P
45	UDD09-P3P	46	UDD10-P3P
47	UDD11-P3P	48	GND
49	UIDRST-P3N	50	GND
1T	GND	2T	GND

C.43 CN9710 System board interface connector (30-pin)

Table C-43 System board interface connector (30-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	ZUSBOD-E3N
17	ZUSBOD-E3P	18	GND
19	GND	20	GND
21	GND	22	MBVON-E5N
23	P3V	24	P3V
25	PODDET-P3N	26	P5V
27	P5V	28	P5V
29	P5V	30	P5V
1T	GND	2T	GND

C.44 IS2130 SD Card interface connector (12-pin)

Table C-41 SD Card interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	SDAT3-P3P	2	SDCMD-P3P
3	GND	4	SD-P3V
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	SDCD-P3N
11	SDWP-P3P	12	GND
1T	GND	2T	GND
3T	GND	4T	GND

Antenna board (FMTAT*) for PORTEGE R600 (Not used)**C.45 CN2671 Antenna interface connector (3-pin)***Table C-42 Antenna interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-2)	2	GND
3	GND		

C.46 CN2672 3G interface connector (3-pin)*Table C-43 3G interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-6)	2	GND
3	GND		

C.47 CN2673 WLAN interface connector (3-pin)*Table C-44 WLAN interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-4)	2	GND
3	GND		

PATA ODD FPC (FMTPO*) for PORTEGE R600 (Not used)**C.48 CN1810 PATA ODD interface connector (50-pin)***Table C-45 PATA ODD interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	NC
3	GND	4	NC
5	UIDRST-P3N	6	UDD08-P3P
7	UDD07-P3P	8	UDD09-P3P
9	UDD06-P3P	10	UDD10-P3P
11	UDD05-P3P	12	UDD11-P3P
13	UDD04-P3P	14	UDD12-P3P
15	UDD03-P3P	16	UDD13-P3P
17	UDD02-P3P	18	UDD14-P3P
19	UDD01-P3P	20	UDD15-P3P
21	UDD00-P3P	22	UDDREQ-P3P
23	GND	24	UDIOR-P3N
25	UDIOW-P3N	26	GND
27	UIORDY-P3P	28	UDDACK-P3N
29	IDEINT-P5P	30	NC
31	UDA1-P3P	32	NC
33	UDA0-P3P	34	UDA2-P3P
35	UDCS1-P3N	36	UDCS3-P3N
37	NC	38	ODD-P5V
39	ODD-P5V	40	ODD-P5V
41	ODD-P5V	42	ODD-P5V
43	GND	44	GND
45	GND	46	GND
47	NC	48	GND
49	NC	50	NC
1T	GND	2T	GND

C.49 CN1830 FMTSD* board interface connector (50-pin)*Table C-46 FMTSD* board interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ODD-P5V	2	ODD-P5V
3	ODD-P5V	4	ODD-P5V
5	ODD-P5V	6	ODD-P5V
7	ODD-P5V	8	NC
9	GND	10	GND
11	UDCS3-P3N	12	UDCS1-P3N
13	GND	14	UDA2-P3P
15	UDA0-P3P	16	UDA1-P3P
17	GND	18	IDEINT-P5P
19	UDDACK-P3N	20	GND
21	UIORDY-P3P	22	GND
23	UDIOW-P3N	24	GND
25	UIDIOR-P3N	26	GND
27	UDDREQ-P3P	28	GND
29	UDD15-P3P	30	UDD14-P3P
31	UDD13-P3P	32	UDD12-P3P
33	GND	34	UDD00-P3P
35	UDD01-P3P	36	UDD02-P3P
37	UDD03-P3P	38	GND
39	UDD04-P3P	40	UDD05-P3P
41	UDD06-P3P	42	UDD07-P3P
43	GND	44	UDD08-P3P
45	UDD09-P3P	46	UDD10-P3P
47	UDD11-P3P	48	GND
49	UIDRST-P3N	50	GND

SATA ODD FPC (FSISO*) for PORTEGE A600**C.50 CN1950 SATA ODD interface connector (13-pin)***Table C-47 SATA ODD interface connector (13-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
S1	GND	S2	ZSTTOD-P1P
S3	ZSTTOD-P1N	S4	GND
S5	ZSTROD-P1N	S6	ZSTROD-P1P
S7	GND		
P1	SODDET-P3N	P2	SODD-P5V
P3	SODD-P5V	P4	NC
P5	GND	P6	GND
1T	GND	2T	GND

C.51 CN9400 System board interface connector (20-pin)*Table C-48 System board interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZSTTOD-P1P
3	ZSTTOD-P1N	4	GND
5	ZSTROD-P1N	6	ZSTROD-P1P
7	GND	8	SODDET-P3N
9	NC	10	SODD-P5V
11	SODD-P5V	12	SODD-P5V
13	SODD-P5V	14	SODD-P5V
15	NC	16	GND
17	GND	18	GND
19	GND	20	GND

SATA HDD FPC (FMTSH*)**C.52 CN1810 System board interface connector (25-pin)***Table C-49 System board interface connector (25-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	P5V	2	P5V
3	P5V	4	P5V
5	P5V	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	GND	14	GND
15	GND	16	GND
17	GND	18	GND
19	ZSTRHD-P1P	20	ZSTRHD-P1N
21	GND	22	GND
23	ZSTTHD-P1N	24	ZSTTHD-P1P
25	GND		

C.53 CN1820 SATA HDD interface connector (22-pin)*Table C-50 SATA HDD interface connector (22-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
S1	GND	S2	ZSTTHD-P1P
S3	ZSTTHD-P1N	S4	GND
S5	ZSTRHD-P1N	S6	ZSTRHD-P1P
S7	GND		
P1	NC	P2	NC
P3	NC	P4	GND
P5	GND	P6	GND
P7	P5V	P8	P5V
P9	P5V	P10	GND
P11	GND	P12	GND
P13	NC	P14	NC
P15	NC		
1T	GND	2T	GND

MDC interface FPC (FSIMD*) for PORTEGE A600

C.54 CN3020 System board interface connector (12-pin)

Table C-51 System board interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	E3V	2	E3V
3	AZSDO1-P3P	4	GND
5	AZSYC1-P3P	6	GND
7	MDSDI1-E3P	8	GND
9	AZRST1-E3N	10	GND
11	XAZBC1-P3P	12	GND

C.55 CN3030 MDC interface connector (12-pin)

Table C-52 MDC interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	NC
3	AZSDO1-P3P	4	NC
5	GND	6	E3V
7	AZSYC1-P3P	8	GND
9	MDSDI1-E3P	10	GND
11	AZRST1-E3N	12	XAZBC1-P3P
1T	GND	2T	GND
3T	GND	4T	GND
5T	GND	6T	GND

PCIe MiniCard FPC (FMT3G*) for PORTEGE R600 (Not used)**C.56 CN2621 Mini Card Slot2 interface connector (50-pin)***Table C-53 Mini Card Slot2 interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	E3V
3	NC	4	GND
5	NC	6	NC
7	NC	8	UIMPWR-E3V
9	GND	10	UIMDAT-E3P
11	NC	12	UIMCLK-E3P
13	NC	14	UIMRST-E3P
15	GND	16	NC
17	NC	18	GND
19	NC	20	3GRFON-S3N
21	GND	22	PLTRS1-E3N
23	NC	24	E3V
25	NC	26	GND
27	GND	28	NC
29	GND	30	NC
31	NC	32	NC
33	NC	34	GND
35	GND	36	ZUSB3G-E3N
37	NC	38	ZUSB3G-E3P
39	E3V	40	3GGPDT-P3N
41	E3V	42	3GLED-E3P
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	3GWAKE-S3N	50	GND
1T	GND	2T	GND

C.57 CN2760 System board interface connector (25-pin)*Table C-54 System board interface connector (25-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	TMP3G-GND	2	TMP3G-SXP
3	GND	4	3GWAKE-S3N
5	GND	6	PLTRS1-E3N
7	GND	8	3GRST-S3N
9	3GRFON-S3N	10	GND
11	GND	12	ZUSB3G-E3N
13	ZUSB3G-E3P	14	GND
15	GND	16	3GGPDT-P3N
17	3GLED-E3P	18	GND
19	3GON-S3N	20	E3V
21	E3V	22	E3V
23	E3V	24	E3V
25	E3V		

C.58 IS2620 SIM Card interface connector (12-pin)*Table C-55 SIM Card interface connector (12-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	UIMPWR-E3V	2	UIMRST-E3P
3	UIMCLK-E3P	4	NC
5	GND	6	NC
7	UIMDAT-E3P	8	NC
9	NC	10	NC
11	NC	12	GND
1T	GND	2T	GND

PCIe MiniCard FPC (FSI3G*) for PORTEGE A600

C.59 CN2621 Mini Card Slot2 interface connector (50-pin)

Table C-56 Mini Card Slot2 interface connector (50-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	E3V
3	NC	4	GND
5	NC	6	NC
7	NC	8	UIMPWR-E3V
9	GND	10	UIMDAT-E3P
11	NC	12	UIMCLK-E3P
13	NC	14	UIMRST-E3P
15	GND	16	NC
17	NC	18	GND
19	NC	20	3GRFON-S3N
21	GND	22	PLTRS1-E3N
23	NC	24	E3V
25	NC	26	GND
27	GND	28	NC
29	GND	30	NC
31	NC	32	NC
33	NC	34	GND
35	GND	36	ZUSB3G-E3N
37	NC	38	ZUSB3G-E3P
39	E3V	40	3GGPDT-P3N
41	E3V	42	3GLED-E3P
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	3GWAKE-S3N	50	GND
1T	GND	2T	GND

C.60 CN2760 System board interface connector (25-pin)*Table C-57 System board interface connector (25-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	TMP3G-GND	2	TMP3G-SXP
3	GND	4	3GWAKE-S3N
5	GND	6	PLTRS1-E3N
7	GND	8	3GRST-S3N
9	3GRFON-S3N	10	GND
11	GND	12	ZUSB3G-E3N
13	ZUSB3G-E3P	14	GND
15	GND	16	3GGPDT-P3N
17	3GLED-E3P	18	GND
19	3GON-S3N	20	E3V
21	E3V	22	E3V
23	E3V	24	E3V
25	E3V		

C.61 IS2620 SIM Card interface connector (12-pin)*Table C-58 SIM Card interface connector (12-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	UIMPWR-E3V	2	UIMRST-E3P
3	UIMCLK-E3P	4	NC
5	GND	6	NC
7	UIMDAT-E3P	8	NC
9	NC	10	NC
11	NC	12	GND
1T	GND	2T	GND

Appendix D Keyboard Scan/Character Codes

D.1 Scan Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
29	\	2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*2
38	K	25	A5	42	F0	42	*2
39	L	26	A6	4B	F0	4B	*2
40	; :	27	A7	4C	F0	4C	*2
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*2
53	, <	33	B3	41	F0	41	*2
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1				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	*1
76	Del	E0	53	E0	D3	E0	71	E0	F0	71	*1
79	←	E0	4B	E0	CB	E0	6B	E0	F0	6B	*1
80	Home	E0	47	E0	C7	E0	6C	E0	F0	6C	*1
81	End	E0	4F	E0	CF	E0	69	E0	F0	69	*1
83	↑	E0	48	E0	C8	E0	75	E0	F0	75	*1
84	↓	E0	50	E0	D0	E0	72	E0	F0	72	*1
85	PgUp	E0	49	E0	C9	E0	7D	E0	F0	7D	*1
86	PgDn	E0	51	E0	D1	E0	7A	E0	F0	7A	*1
89	→	E0	4D	E0	CD	E0	74	E0	F0	74	*1
110	Esc	01		81		76		F0	76		
112	F1	3B		BB		05		F0	05		
113	F2	3C		BC		06		F0	06		
114	F3	3D		BD		04		F0	04		
115	F4	3E		BE		0C		F0	0C		
116	F5	3F		BF		03		F0	03		
117	F6	40		C0		0B		F0	0B		
118	F7	41		C1		83		F0	83		
119	F8	42		C2		0A		F0	0A		
120	F9	43		C3		01		F0	01		
121	F10	44		C4		09		F0	09	*3	

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57	D7	78	F0	78			*3	
123	F12	58	D8	07	F0	07			*3	
124	PrintSc	*6	*6	*6	*6				*6	
126	Pause	*7	*7	*7	*7				*7	
202	Fn	—	—	—	—				*4	
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combined with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12				
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12				
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12				
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12				
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12				
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12				
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12				
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12				
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12				
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12				
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12				
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12				
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12				

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A	E0 52	E0 D2	E0 AA	E0 12	E0 70	E0 F0	70 E0 F0 12
76	DEL	E0 2A	E0 53	E0 D3	E0 AA	E0 12	E0 71	E0 F0	71 E0 F0 12
79	←	E0 2A	E0 4B	E0 CB	E0 AA	E0 12	E0 6B	E0 F0	6B E0 F0 12
80	Home	E0 2A	E0 47	E0 C7	E0 AA	E0 12	E0 6C	E0 F0	6C E0 F0 12
81	End	E0 2A	E0 4F	E0 CF	E0 AA	E0 12	E0 69	E0 F0	69 E0 F0 12
83	↑	E0 2A	E0 48	E0 C8	E0 AA	E0 12	E0 75	E0 F0	75 E0 F0 12
84	↓	E0 2A	E0 50	E0 D0	E0 AA	E0 12	E0 72	E0 F0	72 E0 F0 12
85	PgUp	E0 2A	E0 49	E0 C9	E0 AA	E0 12	E0 7D	E0 F0	7D E0 F0 12
86	PgDn	E0 2A	E0 51	E0 D1	E0 AA	E0 12	E0 7A	E0 F0	7A E0 F0 12
89	→	E0 2A	E0 4D	E0 CD	E0 AA	E0 12	E0 74	E0 F0	74 E0 F0 12
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
09	8	(8)	48		C8			75	F0	75
10	9	(9)	49		C9			7D	F0	7D
11	0	(*)	37		B7			7C	F0	7C
23	U	(4)	4B		CB			6B	F0	6B
24	I	(5)	4C		CC			73	F0	73
25	O	(6)	4D		CD			74	F0	74
26	P	(-)	4A		CA			7B	F0	7B
37	J	(1)	4F		CF			69	F0	69
38	K	(2)	50		D0			72	F0	72
39	L	(3)	51		D1			7A	F0	7A
40	;	(+)	4E		CE			79	F0	79
52	M	(0)	52		D2			70	F0	70
54	.	(.)	53		D3			71	F0	71
55	/	(/)	E0 35		E0 B5			40 4A	E0 F0	4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0	7C E0 F0 12
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Shift +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Alt +		54	D4		84		F0	B4

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

*: This key generates only make codes.

Appendix E Key Layout

E.1 United Kingdom (UK) Keyboard

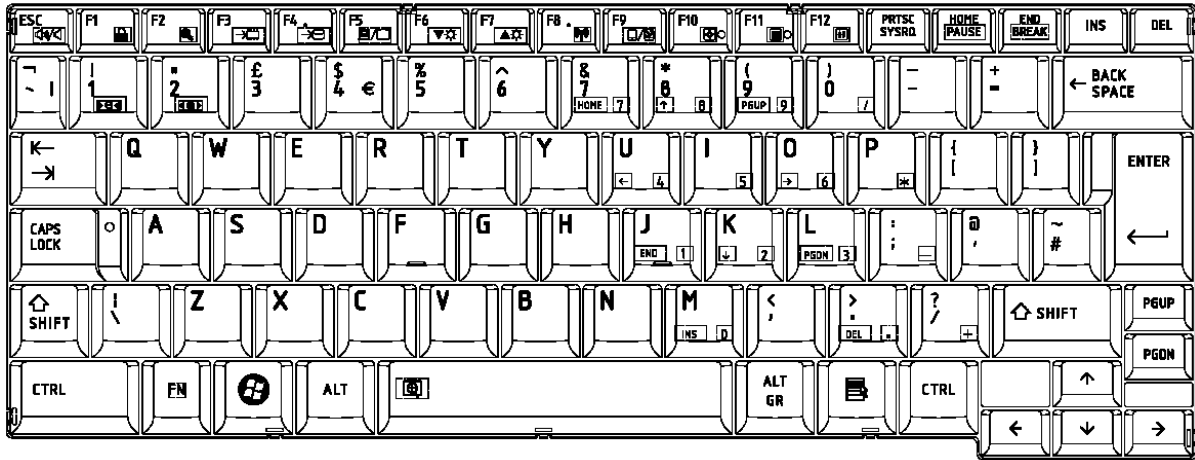


Figure E-1 UK keyboard

E.2 United States (US) Keyboard

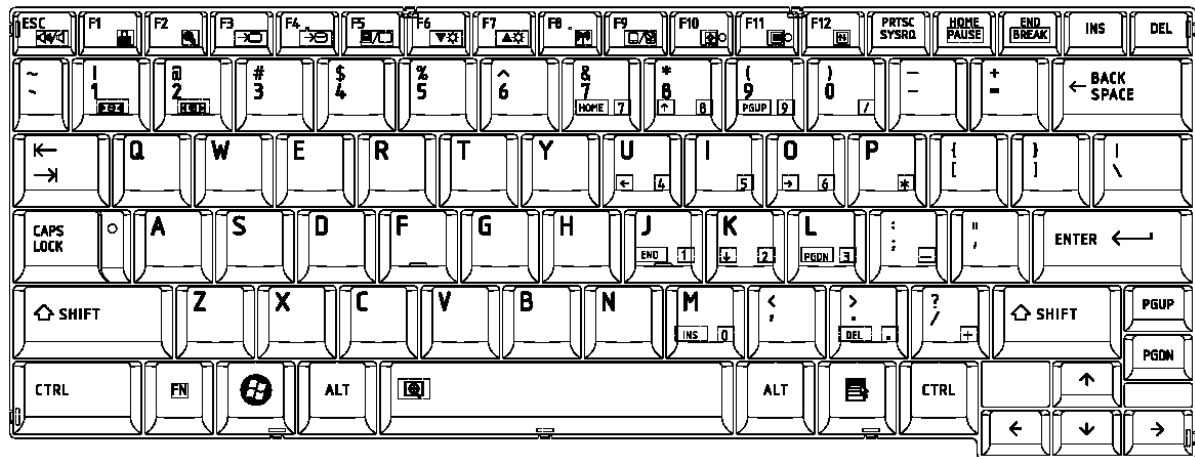


Figure E-2 US keyboard

E.3 Thai Keyboard

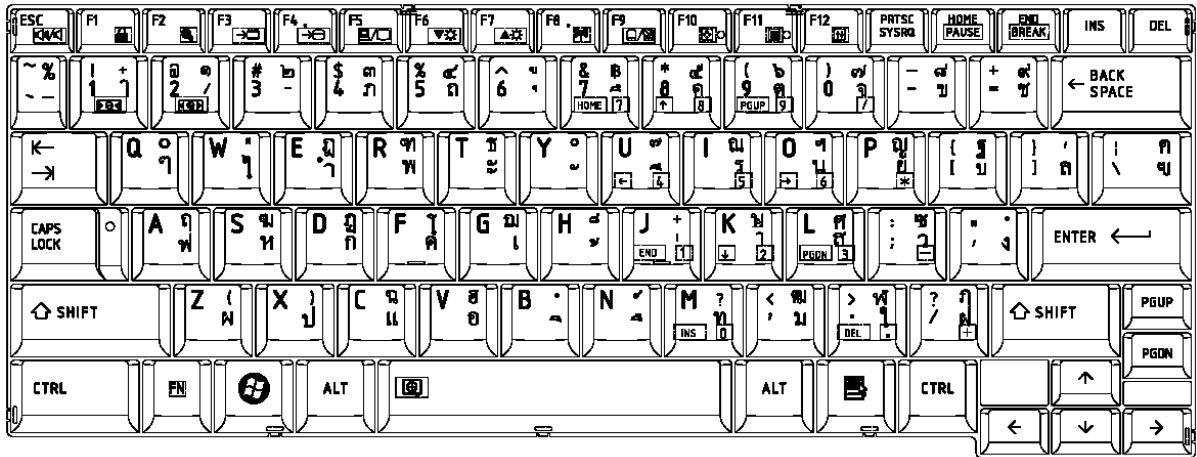


Figure E-3 Thai keyboard

E.4 Canadian French Keyboard

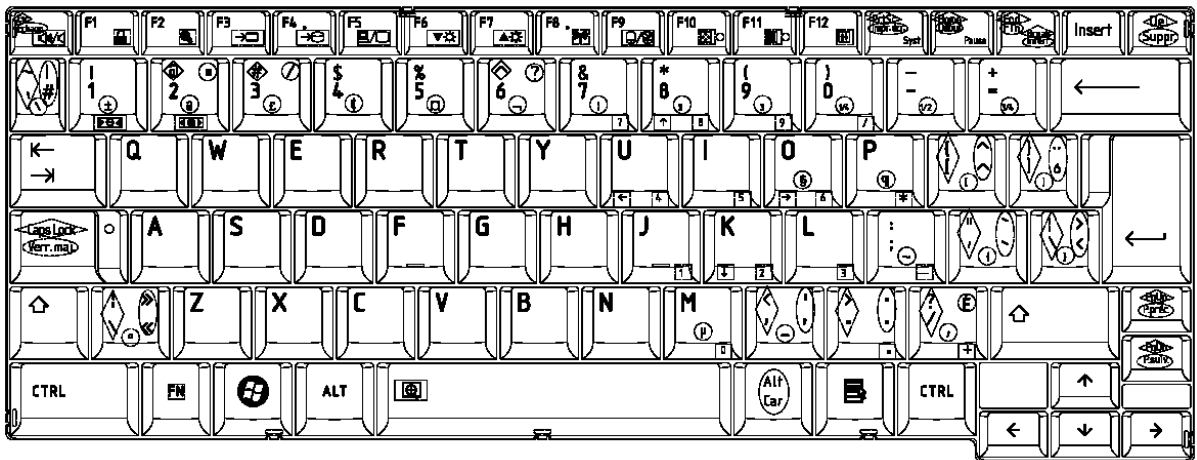


Figure E-4 Canadian French keyboard

Appendix F Wiring diagrams

F.1 RGB Monitor Loopback Connector

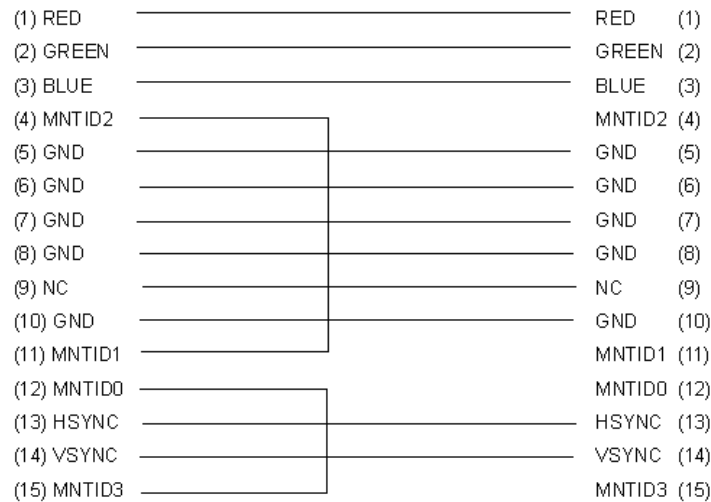


Figure F-1 RGB Monitor Loopback Connector

F.2 LAN Loopback Connector

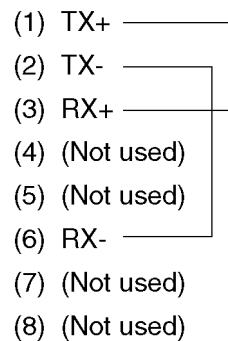


Figure F-2 LAN Loopback Connector

Appendix G BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

- ❑ BIOS/EC/KBC rewriting disk

Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cables and cards.
4. Connect an external FDD and insert the BIOS rewriting disk into the external FDD.
5. Turn on the power while holding down the tilde character key until a beep sounds.

For example



(US Keyboard)



(UK Keyboard)

(Keep holding down the key.)

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.

It is necessary to rewrite the EC/KBC system program when the following changes are made.

1. Replacing of system board
2. Replacing of LCD

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 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 cables and cards.
4. Connect an external FDD and insert the EC/KBC rewriting disk into the external 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) in maximum configuration.

Table I-1 MTBF

Time (hours)
5,703.6 h

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