

Toshiba Personal Computer

PORTEGE M780 Maintenance Manual

First edition January 2010

TOSHIBA CORPORATION

File Number 960-809

[CONFIDENTIAL]

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Toshiba Personal Computer TECRA A11/S11/P11/Satellite Pro S500 Series Maintenance Manual

First edition **January 2010**

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE M780

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 M780 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 M780 Series 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 M780 Series Personal Computer is equipped with an Intel® Processor.

The PC comes in with one of the following speeds:

Intel® Arrandale Processor

Core Frequency (GHz)	System Bus Frequency (MHz)	L2 Cache Size (Mbytes)
2.66GHz Core i7-620M	1066	4
2.53GHz Core i5-540M	1066	3
2.4GHz Core i5-520M	1066	3

Intel® Arrandale Seam Processor

Core Frequency (GHz)	System Bus Frequency (MHz)	L2 Cache Size (Mbytes)
2.26GHz Core i5 430M	1066	3
2.13GH Core i3 330M	1066	3

Memory

Two DDR3-1066 SDRAM slots. Memory modules can be installed to provide a maximum of 8GB. Memory modules are available in 1024MB, 2048MB and 4096MB sizes.

Chipset

The Toshiba PORTEGE M780 Series Personal Computer is Equipped with Intel Ibex peak QM57 .

VGA Controller

The internal graphics controller in Intel Processor(Core i*) is used..

HDD

The computer has a 2.5-inch SATA HDD. The following capacities are available.
160/250/320 GB

USB FDD

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

Optical Drive

A DVD-ROM drive or DVD Super Multi drive (double layer) can be installed.

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.

Digitizer

A digitizer is installed at the rear of LCD unit. The supplied tablet pen enables pen computing.

Tablet pen / Reserve pen

The Tablet pen / Reserve pen can be used as a mouse by touching the display softly with the pen tip. Tablet button on the side of the pen corresponds to the right click of the mouse. Erase button on the pen tail can be used as an eraser depending on the application.

Touch screen

A touch screen is installed at the front of LCD unit.

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 Universal Serial Bus ports, which comply to the USB 2.0 standard, are provided on the right hand side of the computer.

eSATA/USB combo

One eSATA/USB combo port, which complies to the USB 2.0 standard, is provided on the left hand side of the computer. This port has eSATA (External Serial ATA) function. Some models are equipped with a eSATA/USB combo port. A Charge power supply (When a computer is power-on or sleep) to USB ports on the left side of computer.

External monitor (RGB) port

This port provides 15-pin, analog VGA port. This port allows you to connect an external monitor to the computer.

IEEE 1394 port

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

Bridge Media slot

This slot lets you insert an SD™/SDHC™ memory card, miniSD™/microSD™ Card, Memory Stick® (PRO™/PRO Duo™), xD-Picture Card™ and MultiMediaCard

ExpressCard slot

This slot allows you to install a single ExpressCard device.

Fingerprint sensor(Some models)

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

Docking interface port

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

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

Sound system

The sound system is equipped with the following features:

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

Internal modem

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

Internal LAN

The computer has built-in support for Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) and Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T).

Wireless LAN

Some computers in this series are equipped with a Wireless LAN module that is compatible with other LAN systems based on Direct Sequence Spread Spectrum/Orthogonal Frequency Division Multiplexing radio technology that complies with the IEEE 802.11 Standard.

Bluetooth

Some computers in this series have Bluetooth wireless communication function which eliminates the need for cables between electronic devices such as computers, printers and mobile phones. When it is enabled, Bluetooth provides the wireless personal area network environment which is safe and trustworthy, that is quick and easy.

❑ Switch/Button

The following switches and buttons are equipped.

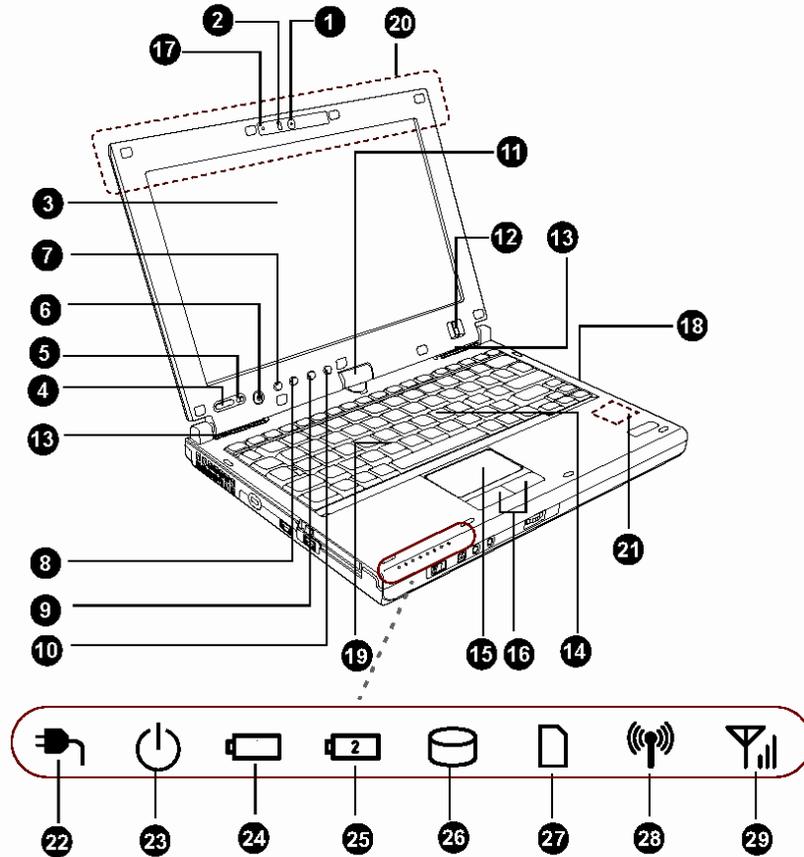
- Power on switch
- Cross Function button
- ESC/Rotation button
- Windows-Security tablet button
- Wireless Assist button
- Wireless Presentation button

❑ 3G(Some models)

The computer is equipped with PCI Express Mini Card type 3G card

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

Front with the display open



- | | |
|-----------------------------------|---|
| 1. Web Camera | 16. Touch Pad control buttons |
| 2. Web Camera LED | 17. Microphone |
| 3. Display screen | 18. LCD Sensor switch (Not shown) |
| 4. Power button | 19. Memory module slot (Not shown) |
| 5. Power button Lock Switch | 20. Wireless LAN antennas and Wireless WAN antennas (Not shown) |
| 6. Cross Function button | 21. Bluetooth antenna (Not shown) |
| 7. ESC/Rotation button | 22. DC IN indicator |
| 8. Windows Security tablet button | 23. Power indicator |
| 9. TOSHIBA Assist button | 24. Battery indicator |
| 10. TOSHIBA Presentation button | 25. 2nd battery indicator |
| 11. Display hinge | 26. Hard Disk Drive indicator |
| 12. Fingerprint Sensor | 27. Bridge media slot indicator |
| 13. Stereo speakers | 28. Wireless communication indicator |
| 14. Keyboard | 29. Wireless WAN indicator |
| 15. Touch Pad | |

Figure 1-1 Front of the computer

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

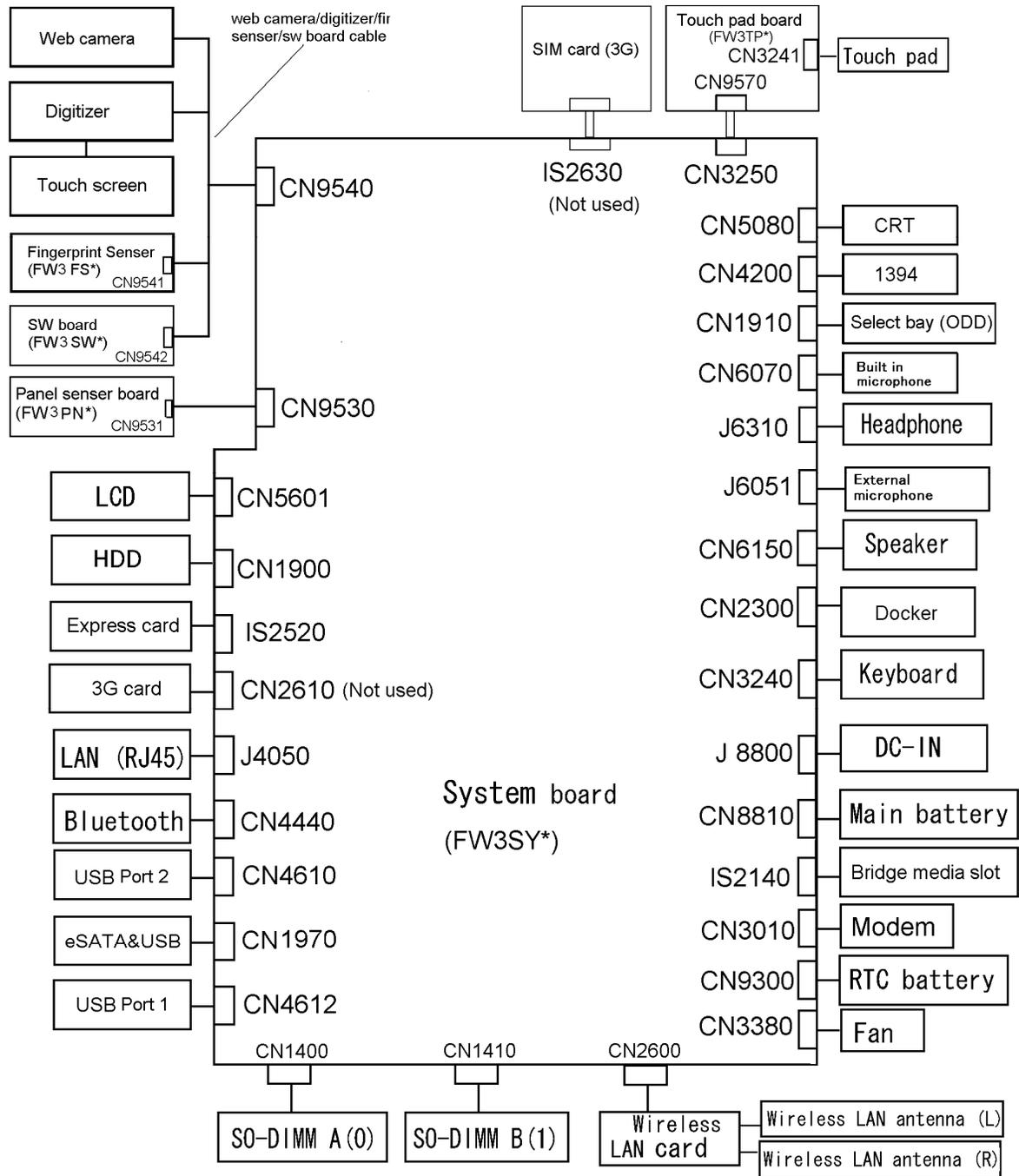


Figure 1-2 System unit configuration

1.2 System Unit Block Diagram

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

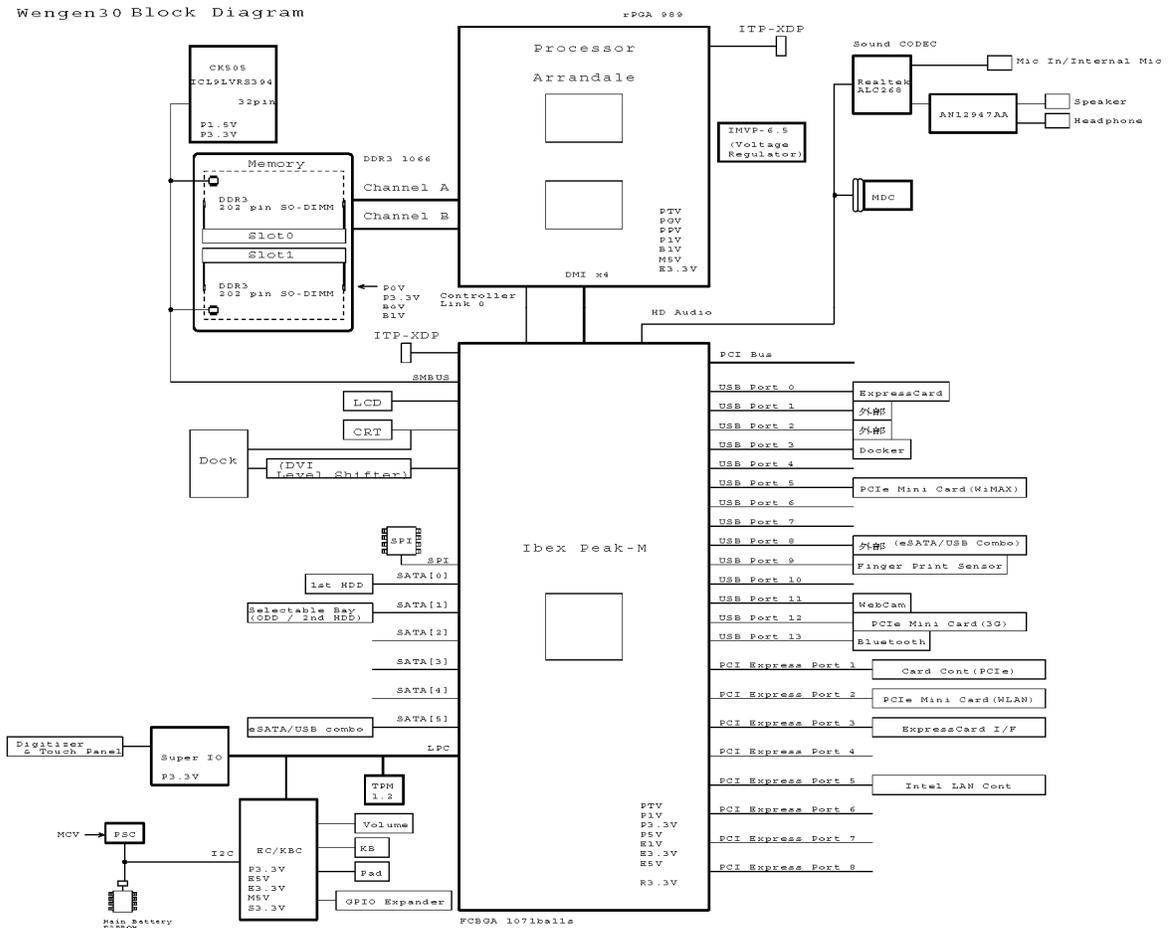


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Microprocessor

The Toshiba PORTEGE M780 Series Personal Computer is equipped with an Intel® Processor.

The PC comes in with one of the following speeds:

Intel® Arrandale Processor

Core Frequency (GHz)	System Bus Frequency (MHz)	L2 Cache Size (Mbytes)
2.66GHz Core i7-620M	1066	4
2.53GHz Core i5-540M	1066	3
2.4GHz Core i5-520M	1066	3

Intel® Arrandale Seam Processor

Core Frequency (GHz)	System Bus Frequency (MHz)	L2 Cache Size (Mbytes)
2.26GHz Core i5 430M	1066	3
2.13GH Core i3 330M	1066	3

❑ Memory

Two DDR3-1066 SDRAM slots. Memory modules can be installed to provide a maximum of 8GB. Memory modules are available in 1024MB, 2048MB and 4096MB sizes.

- 204-pin slot
- DDR3-1066 support

❑ Chipset

The Toshiba PORTEGE M780 Series Personal Computer is Equipped with Intel Ibex peak QM57 .

❑ VGA Controller

The internal graphics controller in Intel Processor(Core i*) is used.

❑ LAN Controller

Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) or Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T) is used.

- Gigabit Ethernet is supported.
- PCI-Express connection
- One RJ45 port
- Supports WOL
- Supports Magic Pocket
- AMT 2.6 is supported.

Sound Controller

- Ibex peak QM57 Built-in HD Audio
- Realtek ALC268
- AMP: AN12947AA
- volume control
- Supports VoIP
- Stereo headphone jack
- External microphone jack
- Built-in microphone

Modem Controller

- One MDC is used.
- One RJ11 port
- V.92 (V.90) 56K Modem/FAX
- Agree made Controller
- Ring Wakeup support

Wireless LAN

- One PCI Express Mini Card slot1

Intel 802.11(a/b/g/n):13ch-Puma Peak 2x2 MOW-HMC
Atheros 802.11(b/g/n)13ch-HB95 MOW-HMC
- Supports Wireless Communication SW

Bluetooth

- V2.1 module
- Antenna built-in

Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.
- LCD Sensor:.
- Acceleration Sensor
- Thermistor (Crestline-GM, memory, ODD, HDD, 3G:not used)
- Fingerprints sensor: Authen Tec maid

3G (Not Used)

- 3G card in the PCI Express Mini card slot

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.

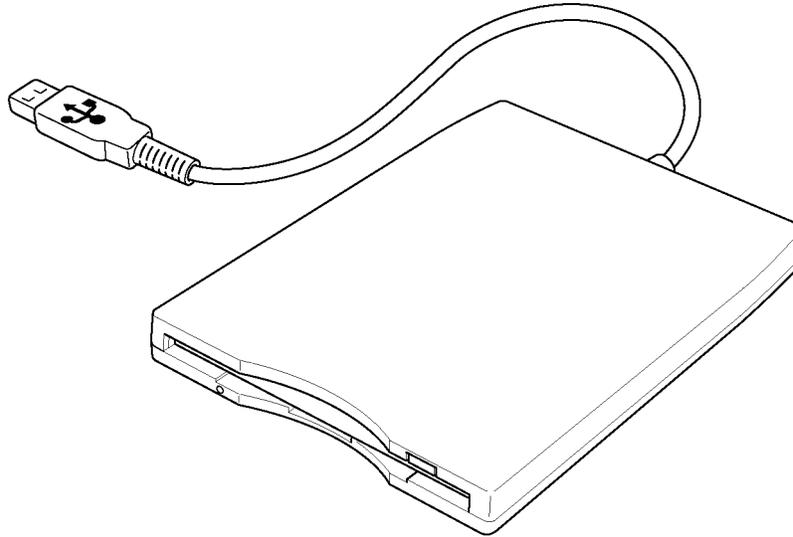


Figure 1-4 3.5-inch FDD (USB External)

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 160GB, 250GB or 320GB.

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

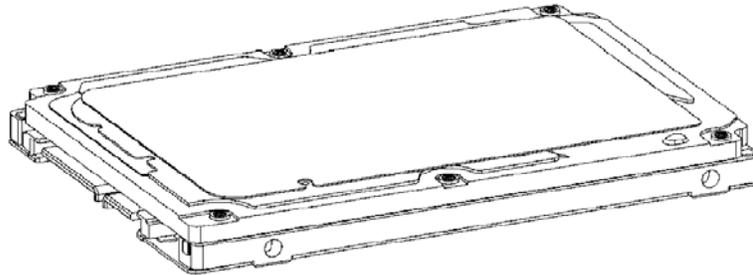


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD specifications

Items		Specifications	
		FUJITSU G8BC00065160	FUJITSU G8BC00065250
Outline Dimensions	Width (mm)	100.0	
	Height (mm)	9.5	
	Depth (mm)	70	
	Weight (g)	96 max	101 max
Storage size (formatted)		160GB	250GB
Speed (RPM)		5,400	
Data transfer speed (Mb/s)			
To/Form Media		116.2 MB/s Max	
To/Form Host		150 MB/s (Genli)	
Data buffer size (MB/s)		8	
Positioning Time(read and seek time)		Read: 12ms	
Motor startup time (s)		4	

Table 1-2 2.5-inch HDD specifications

Items		Specifications	
		HGST G8BC0006U250	HGST G8BC0006U320
Outline Dimensions	Width (mm)	100.2±0.25	
	Height (mm)	9.5±0.2	
	Depth (mm)	69.85±0.25	
	Weight (g)	95 max	115 max
Storage size (formatted)		250GB	320GB
Speed (RPM)		7,200	
Data transfer rate Disk-buffer to/from media(Mbps)		1245	
Buffer-host data transfer (Ggit/sec)		3.0/1.5 max.	
Data buffer size		16384KB	
Positioning Time(read and seek time)		Read: 12ms	
Motor startup time (s)		4.0	

Table 1-3 2.5-inch HDD specifications

Items		Specifications
		TSDC G8BC0006T321
Outline Dimensions	Width (mm)	100.0
	Height (mm)	9.5
	Depth (mm)	69.85
	Weight (g)	97 typ
Storage size (formatted)		320GB
Speed (RPM)		5,400
Internal transfer speed (Mb/s)		464-1148 typ
Host transfer rate (Gbit/sec)		3
Data buffer size(Kbyte)		8192
Positioning Time(read and seek time)		Read: 12ms
Motor startup time (s)		3.5

1.5 Optical Drive (ODD)

1.5.1 DVD-Super Multi Drive

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

The specifications are listed in Table 1-4.

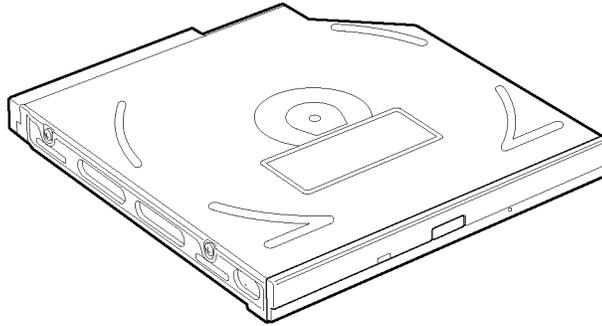


Figure 1-6 DVD Super Multi drive

Table 1-4 DVD Super Multi drive specifications

Item		Specifications
		Panasonic UJ862ABTJ1-M (G8CC0004D127)
I/F		SATA
Outline dimensions	Width (mm)	128 (except protrusion)
	Height (mm)	9.5 (except protrusion)
	Depth (mm)	129 (except protrusion)
	Mass (g)	107±5(With Bezel)
Data transfer speed (Read) DVD-ROM CD-ROM		(Catalog spec) Max. 8x Max. 24x
Data transfer speed (Write) CD-R CD-RW High Spee speed d CD-RW Ultra Speed CD-RW DVD-R DVD-RW DVD-R DL DVD+R DVD+R DL DVD+RW DVD+RW DL DVD-RAM		(Catalog spec) 24 speed 4 speed 10 speed 16 speed 8 speed 6 speed 4 speed 8 speed 6 speed 8 speed 4 speed 5 speed (4.7GB)
SATA Interface		150 Mbyte/s
Data Buffer Capacity		2MB
Access time: Random (ms) CD-ROM DVD-ROM		150msec typ. 180msec typ.
Supported Disks		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD+R, DVD-RW DVD+RW, DVD-RAM
Supported Formats		CD: Sound CD, CD-ROM, CD-R, CD-RW, Multi-session (Photo CD, CD extra) DVD: DVD-ROM, DVD-Video, DVD-R, DVD-R DL, DVD+R, DVD+R DL, DVD-RW, DVD+RW, DVD-RAM

1.6 Keyboard

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

Figure 1-7 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



Figure 1-7 Keyboard

1.7 TFT Color Display

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

1.7.1 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 resolution. The VGA in North Bridge can control internal and external WXGA support displays simultaneously.

Figure 1-8 shows a view of the LCD module and Table 1-5 lists the specifications.

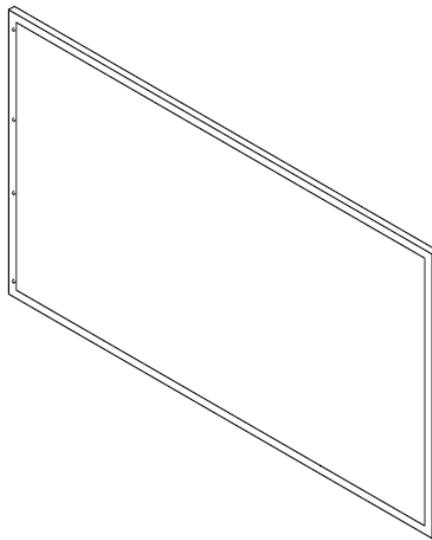


Figure 1- 8 LCD module

Table 1-5 LCD module specifications

Item	Specifications
	12.1-inch WXGA TFT (TMD G33C0005W110)
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)

1.8 Power Supply

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

1. Judges that the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the battery icon, and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.

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

Table 1-6 Power supply output rating

		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
	*	PPV	x	x	x	x	x	x	CPU, Thermal Sensor, ITP-Conn,PCH
	*	IGD-PGV	x	x	x	x	x	x	CPU
	*	LEDBL-PYV	x	x	x	x	x	x	LCD
	5	P5V	x	x	x	x	x	x	Touch Pad, LED, SATA, KB, CRT, Camera, GPIO, Expander, PCH, FAN,
	3.3	P3V	x	x	x	x	x	x	Clock generator, DDR3-SDRAM, PCH, Card Cont, Express Card, TPM, EEPROM, Bluetooth, CRT, Digitizer, Super I/O, LCD, ITP Conn, Volume, DVI, Dock
	1.1	IGD-PGV	x	x	x	x	x	x	CPU,
	1.8	1R8-P1V	x	x	x	x	x	x	CPU, PCH, eSATA
	1.5	1R5-P1V	x	x	x	x	x	x	Clock generator, PCH, PCI-E Mini Card, Express Card
	1.05	1R05-P1V	x	x	x	x	x	x	PCH
0.75	0R75-P0V	x	x	x	x	x	x	DDR3-SDRAM	
B	1.5	1R5-B1V	o	o	o	x	x	x	CPU DDR3-SDRAM
	0.75	MR0R75-B0V	o	o	o	x	x	x	DDR3-SDRAM
ME	1.05	1R05M-E1V	o /x	x	x	x	x	x	(G)MCH, JTAG
	3.3	M-E3V	o	x	x	x	x	x	PCH SPI

1 Hardware Overview

LAN	1.05	LN1R05-E1V	○	○	×	○	×	×	LAN PHY
	3.3	LAN-E3V	○	○	×	○	×	×	LAN, PHY, Dock
E	5	E5V	○	○	○	○	×	×	PCH, USB
	3.3	E3V	○	○	○	○	×	×	LED, MDC, F/T PJ, LCD, Finger Sensor, GPIO Expander, CPU, Thermal Sensor, LAN PHY, PCH, PCH-E Mini card, ITP-Conn, USB CHARGER, TPM, EC/KBC, Dock
	3.3	M-E3V	○	○	○	○	×	×	PCH, SPI
	1.05	1R05-E1V	○	○	○	○	×	×	PCH, ITP-Conn,
	1.05	1R05M-E1V	○	○	○	○	×	×	PCH
	2.5	2RE-E2V	○	○	○	○	×	×	LCD
	M	5	M5V& MCV	○	○	○	○	○	×
S	3.3	S3V	○	○	○	○	○	×	EC/KBC, GPIO Expander, Acceleration sensor, AMP, TPM
R	2.0-3.6	R3V	○	○	○	○	○	○	RTC

1.9 Batteries

The computer has three types of batteries as follows:

- Main battery pack
- RTC battery

The battery specifications are listed in Table 1-7.

Table 1-7 Battery specifications

Battery name		Material	Output voltage	Capacity
Main battery	G71C0007M510 G71C0007ME10 G71C0007MD10 (WW) G71C0007MC10 (JP)	Lithium-Ion	10.8 V	51Wh, 6 cell
Slice Expansion Battery	G71C0006K110 71C0006K710 G71C0006K810 G71C0006K910	Lithium-Ion	10.8 V	44Wh, 6 cell
RTC battery	GDM710000041	NiMH	2.4 V	16 mAh

1.9.1 Main Battery

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

1.9.2 Battery Charging Control

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

Battery Charge

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

Table 1-8 Time required for charges

Battery type	Power on (hours)	Power off (hours)
Battery(51Wh, 6 cell)	about 3.0 to 12.0	About 3.0
Slice Expansion Battery (44Wh, 6 cell)	About 3.0 to 9.5	About 2.5

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

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

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

❑ 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
Sleep Mode	About 4 days Battery(51Wh, 6 cell)
Boot Mode	About 40 days Battery(51Wh, 6 cell)
Sleep Mode	About 3 days (44Wh, 6 cell)
Boot Mode	About 35 days(44Wh, 6 cell)

1.9.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-10 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)	8 hours
Data preservation period (full charge)	30 days

1.10 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	
	G71C000A5210 (2-pin)	G71C000A6210 (3-pin)
Power	75W (Peak 90W)	
Input voltage	100V/240V	
Input frequency	50Hz to 60Hz	
Input current	1.3 A(MAX) (100V-240V)	
B Output voltage	15V	
Output current	5A (Peak 6A)	

Chapter 2

Troubleshooting Procedures

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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. Touch screen |
| 2. System Board | 9. Modem | 16. Sound |
| 3. USB FDD | 10. LAN | 17. Bridge Media slot |
| 4. 2.5” HDD | 11. Wireless LAN | 18. PCI ExpressCard slot |
| 5. Keyboard | 12. Bluetooth | 19. Fingerprint Sensor |
| 6. Touch pad | 13. Web camera | |
| 7. Display | 14. Tablet Pen | |

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.

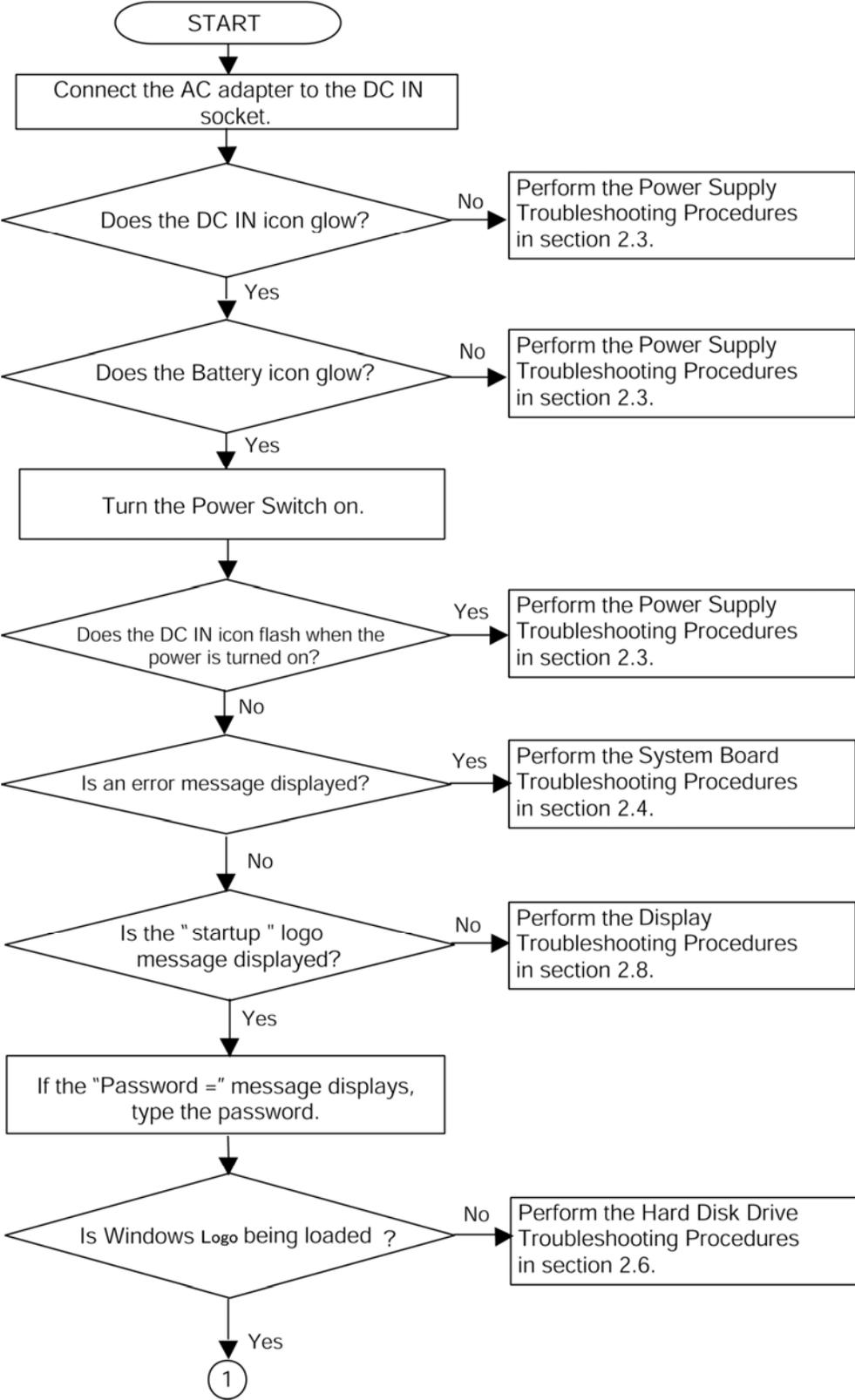


Figure 2-1 Troubleshooting flowchart (1/2)

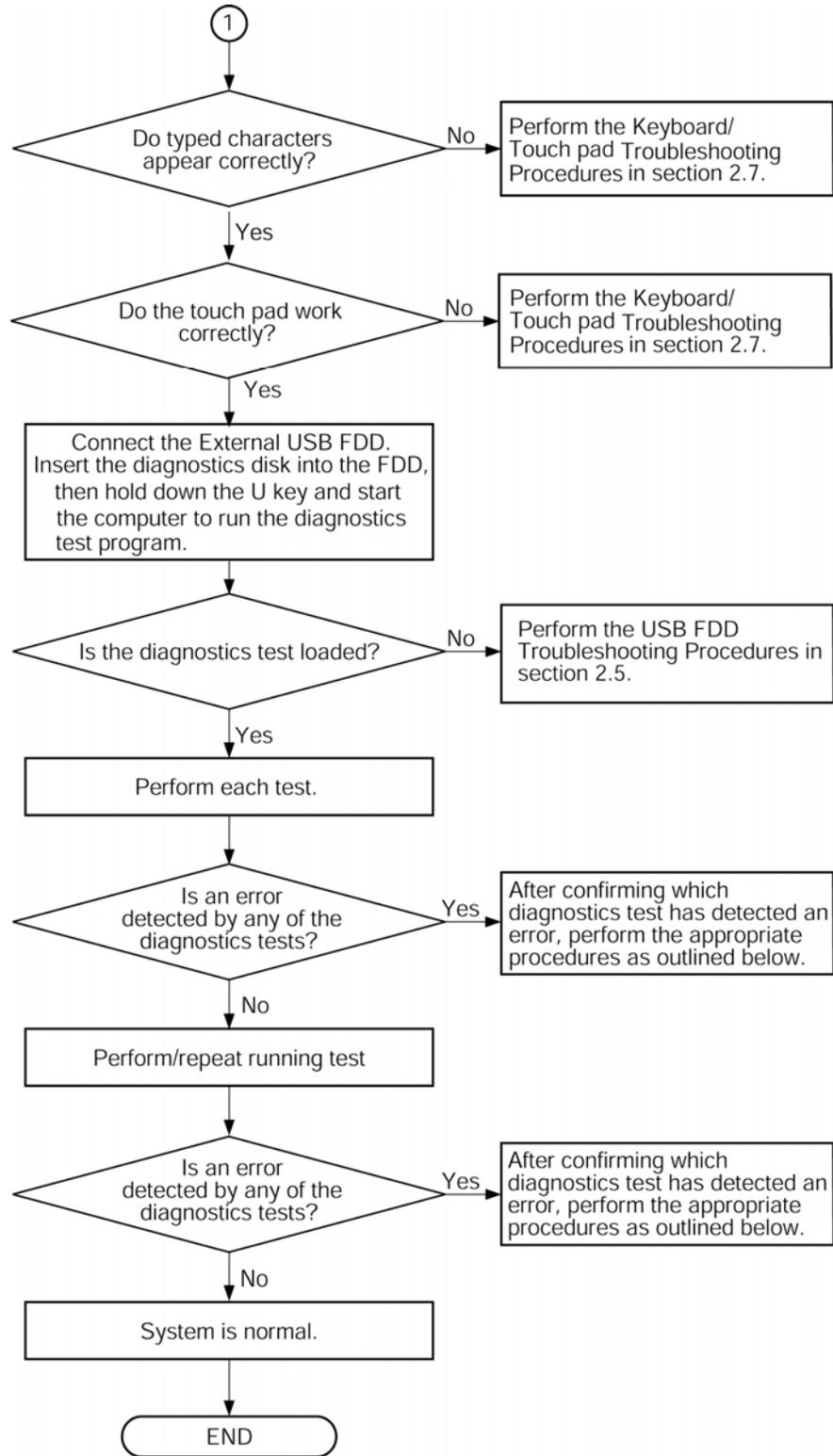


Figure 2-1 Troubleshooting flowchart (2/2)

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 Web camera test, perform the Web camera Troubleshooting Procedures in Section 2.15.
13. If an error is detected on the Tablet Pen test, perform the Tablet Pen Troubleshooting Procedures in Section 2.16.
14. If an error is detected on the Touch screen test, perform the Touch screen Troubleshooting Procedures in Section 2.17.

15. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.18.
16. If an error is detected on the sound test, perform the Bridge Media Troubleshooting Procedures in Section 2.19.
17. If a malfunction is detected on the PCI ExpressCard, perform the PCI ExpressCard Troubleshooting Procedures in Section 2.20.
18. If a malfunction is detected on the fingerprint sensor, perform the Fingerprint Sensor Troubleshooting Procedures in Section 2.21.

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

2.3.1 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.
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 G71C000A5210 (2-pin)/ G71C000A6210 (3-pin).

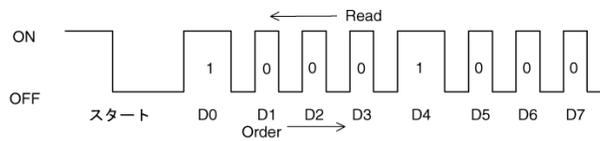
2.3.2 Procedure 2 Error Code Check

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

- Start Off for 2 seconds
- 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	IGD-PGV output
8*h	PPV output
9*h	PPV output
A*h	—
B*h	I1R5-B1V output
C*h	1R05M-E1 output
D*h	PTV 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 4.95A.
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 4.3A.
24h	The compensation value of [0A] is not within the limits from design data ($\pm 400\text{mA}$).
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 2.7A.
34h	The compensation value of [0A] is not within the limits from design data ($\pm 400\text{mA}$).
35h	Second battery charge current is over 0.3A

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 booting up.

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.

IGD-PGV output

Error code	Meaning
70h	IGD-PGV voltage is over 1.80V.
71h	IGD-PGV voltage is under 0V when the computer is powered on.
72h	IGD-PGV voltage is under 0V when the computer is booting up.

PTV output

Error code	Meaning
80h	PTV voltage is over 1.26V.
81h	PTV voltage is under 0.89V when the computer is powered on.
82h	PTV voltage is under 0.89V when the computer is booting up.

PPV output

Error code	Meaning
90h	PPV voltage is over 1.68V.
91h	PPV voltage is under 0.00V when the computer is powered on.
92h	PPV voltage is under 0.55V when the computer is booting up.

With no error surveillance

Error code	Meaning
A0h	voltage is over 5.00V.
A1h	voltage is under 0.00V when the computer is powered on.
A2h	voltage is under 0.00V when the computer is booting up.

1R5-B1V output

Error code	Meaning
B0h	1R5-B1V voltage is over 1.80V.
B1h	1R5-B1V voltage is under 1.28V when the computer is powered on.
B2h	1R5-B1V voltage is under 1.28V when the computer is booting up.
B3h	1R5-B1V power supply showed the normal range at the time of BV power supply stop. (Although the power supply should be Off(ed), power supply voltage was detected) However, it restricts to the time when the "OUTV7 power-supply =BV power supply" was specified.

1R05M-E1V output

Error code	Meaning
C0h	1R05M-E1V voltage is over 1.26V.
C1h	1R05M-E1V voltage is under 0.00V when the computer is powered on.
C2h	1R05M-E1V voltage is under 0.00V when the computer is booting up.

PTV output

Error code	Meaning
D0h	PTV voltage is over 1.26V.
D1h	PTV voltage is under 0.00V when the computer is powered on.
D2h	PTV voltage is under 0.55V when the computer is booting up.

- With no error surveillance

Error code	Meaning
E0h	voltage is over 5.00V.
E1h	voltage is under 0.00V when the computer is powered on.
E2h	voltage is under 0.00V when the computer is booting up.

- 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.

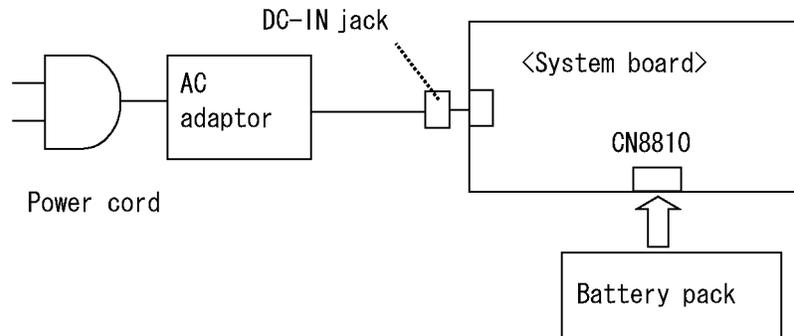
Check 3 In the case of error code 21h:

- Go to Procedure 3.

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

2.3.3 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 adapter 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 adapter 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.

2.3.4 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 adapter 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 adapter. 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.

2.3.5 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

2.4.1 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

2.4.2 Procedure 2 Debugging Port Check

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

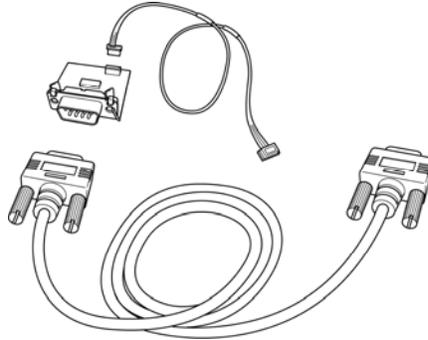
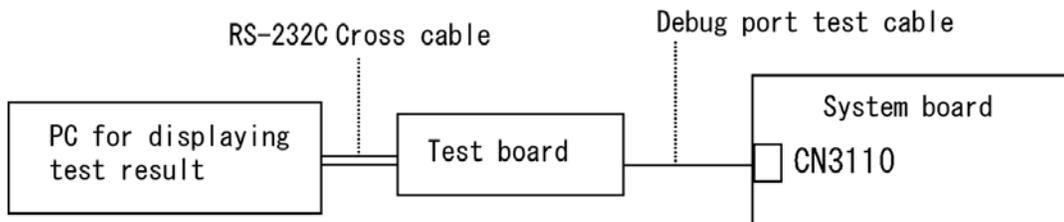


Figure 2-1 A set of tool for debug port test

1. Not a Serial Port model should connect a debug port test cable to connector CN3110 of a system board.(W3270 open)
2. 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\SYSI_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 (1/2) pending

System BIOS Boot block processing			
Debug Code	BIOS processing outline	Target Device	IC No.
	CPU setup	CPU Super I/O	IS1050 (CPU Socket) IC3400 (Super I/O)
	Initialization of PCH ,Super I/O		
F000	Boot Block processing start	BIOSROM	IC3000 (BIOS ROM)
F001	Initialization of PCH	PCH, Ricoh controller	IC1600 (PCH)
	Initialization of Ricoh controller		
F002	Initialization of PCH	PCH	IC1600 (PCH) IC1000 (CLKGEN)
	Graphics distinction	VGA	
	Clock Generator setup	Clock Generator	
F003	PCH initialization end	BIOSROM	IC3000/IC3002 (BIOS ROM)
F004	Memory initialization start	PCH	IC1600 (PCH)
F005	Memory initialization end	PCH	IC3000/IC3002 (BIOS ROM)
F006	Loader start to a system part	BIOSROM	IC3000/IC3002 (BIOS ROM)
F007	Deployment start to a system part	BIOSROM	IC3000/IC3002 (BIOS ROM)
F008	Updating judging of BIOS and EC	BIOSROM	IC3000/IC3002 (BIOS ROM)
F009	Update process start of BIOS and EC	BIOSROM EC USB Memory	IC3000/IC3002 (BIOS ROM) IC3200(EC/KBC)
F00A	BIOS update authority error	—	Check BIOS Password
F00B	updating error of BIOS Bootblock	BIOSROM	IC3000/IC3002 (BIOS ROM)
F00C	Completion of updating of Boot block	BIOSROM	IC3000/IC3002 (BIOS ROM)
F00D	End of Boot Block processing. IRT shift	BIOSROM	IC3000/IC3002 (BIOS ROM)

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

System BIOS IRT processing			
Debug Code	BIOS processing outline	Target Device	IC No.
F100	IRT section start	CPU	IS1050 (CPU Socket)
F101	Creation of SETUP information	BIOSROM RAM	IC3000/IC3002 (BIOS ROM) CN1400, CN1410 (RAM Conn.)
F102	PCI Express initialization	PCH	IC1600 (PCH)
F103	PCH Express initialization	PCH	IC1600 (PCH)
F104	SMRAM Express initialization	PCH RAM	IC1600 (PCH) CN1400, CN1410 (RAM Conn.)
F105	End of SMRAM initialization	PCH RAM	IS1050 (CPU Socket), CN1400, CN1410 (RAM Conn.)
F106	EC Ecart initialization	EC	IC3200 (EC/KBC)
F107	USB Legacy initialization	PCH	IC1600 (PCH)
F108	Device Lock main processing start	RAM	CN1400, CN1410 (RAM Conn.)
F109	Device Lock device processing start	RAM	CN1400, CN1410 (RAM Conn.)
F10A	End of Device Lock main processing	RAM	CN1400, CN1410 (RAM Conn.)
F10B	Thermal control initialization	RAM	CN1400, CN1410 (RAM Conn.)
F10C	Digital thermal sensor initialization	CPU	IS1050 (CPU Socket)
F10D	End for IRT of a module load	RAM	CN1400, CN1410 (RAM Conn.)
F10E	Memory test start	RAM	CN1400, CN1410 (RAM Conn.)
F10F	End of a memory test	RAM	CN1400, CN1410 (RAM Conn.)
F110	VGA initialization start	VGA	IC1050 (VGA)
F111	VGA initialization end		CN1400, CN1410 (RAM Conn.)
F112	Interrupt vector initialization	RAM	CN1400, CN1410 (RAM Conn.)
F113	VGA, LAN initialization	VGA LAN BIOSROM RAM	IC1050 (VGA), IC4000/IC4100 (LAN Controller), IC3000/IC3002 (BIOS ROM), CN1400, CN1410 (RAM Conn.)
F114	end of option ROM execution	RAM	CN1400, CN1410 (RAM Conn.)
F115	Determination of a boot device	RAM	CN1400, CN1410 (RAM Conn.)
F116	SC initialization start	EC	IC3200 (EC/KBC)

F117	end of SC initialization	RAM	CN1400, CN1410 (RAM Conn.)
F118	Processing in front of boot	RAM	CN1400, CN1410 (RAM Conn.)
F119	Device processing in front of boot	PCH	IC1600 (PCH)
F800	S3 shift start	RAM	CN1400, CN1410 (RAM Conn.)
F801	S4 shift start	RAM	CN1400, CN1410 (RAM Conn.)
F802	S5 shift start	RAM	CN1400, CN1410 (RAM Conn.)
F803	USB electric supply setting start	RAM	IC1600 (PCH) IC3200 (EC/KBC)
F804	Completion of a USB electric supply setting	PCH EC	IC1600 (PCH) IC3200 (EC/KBC)
F805	Shutdown processing	RAM	CN1400, CN1410 (RAM Conn.)
F8FF	Completion of Shutdown processing	RAM	CN1400, CN1410 (RAM Conn.)
F180	S3 return service start	BIOSROM RAM	IC3000/IC3002 (BIOS ROM), CN1400, CN1410 (RAM Conn.)
F1FF	End of S3 return processing. Shifts to OS.	RAM	CN1400, CN1410 (RAM Conn.)

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

2.4.3 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
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.

2.4.4 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

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

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

2.5.1 Procedure 1 FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program.

After connecting USB FDD, insert the Diagnostics Disk in the floppy disk drive. Turn on the computer and run the test. And then clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 2.

Detailed operation is given in Chapter 3, *Tests and Diagnostics*.

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

2.5.2 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.

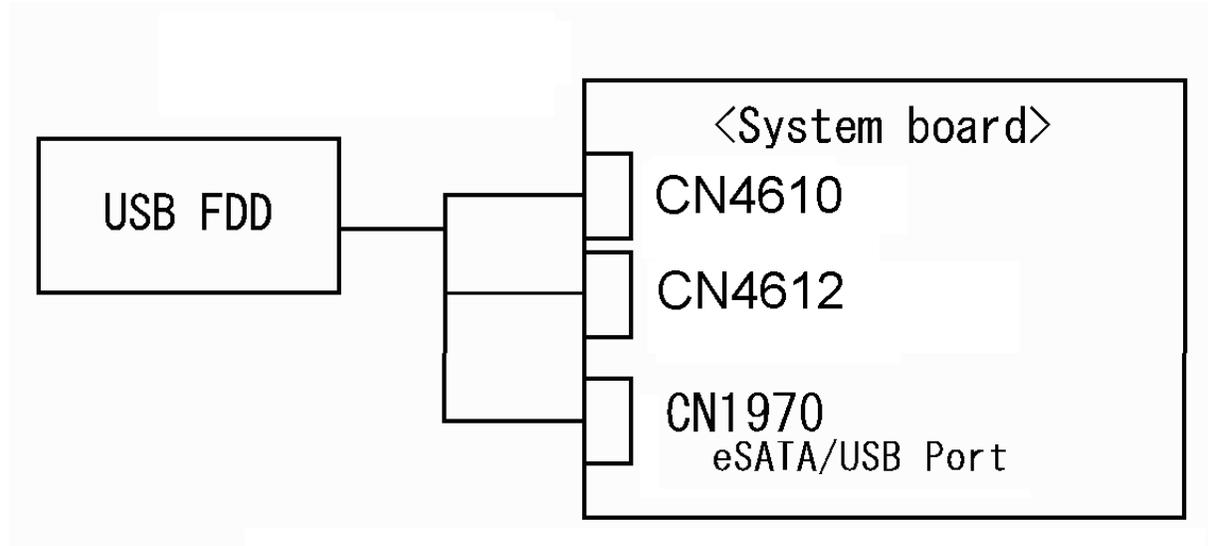
Write protected

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

2.5.3 Procedure 3 Connector Check and Replacement Check

USB FDD is connected to USB port on system board. 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.

USB FDD can be connected to the following 3 ports.



Check 1 Make sure USB FDD is firmly connected to USB port. If the connection is loose, connect firmly and repeat Procedure 2. If the problem still occurs, go to Check 2.

NOTE: When checking the connection, be sure to check it with care for the followings.

1. Cable can not be disconnected from the connector.
2. Cable is connected straight to the connector.
3. Cable is connected all the way seated in the connector.
4. Cable or connector can not be broken.

- Check 2 Connect USB FDD to other USB port and check if it works properly. If it does not work properly, perform Check 3
- Check 3 USB FDD may be faulty. Replace it with a new one. If the problem still occurs, perform Check 4
- Check 4 System board and USB / Sound board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.6 2.5" HDD Troubleshooting

To check if the 2.5" HDD 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 2.5" 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.*

2.6.1 Procedure 1 Partition Check

Insert the Toshiba 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.

2.6.2 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.

2.6.3 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.

2.6.4 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.

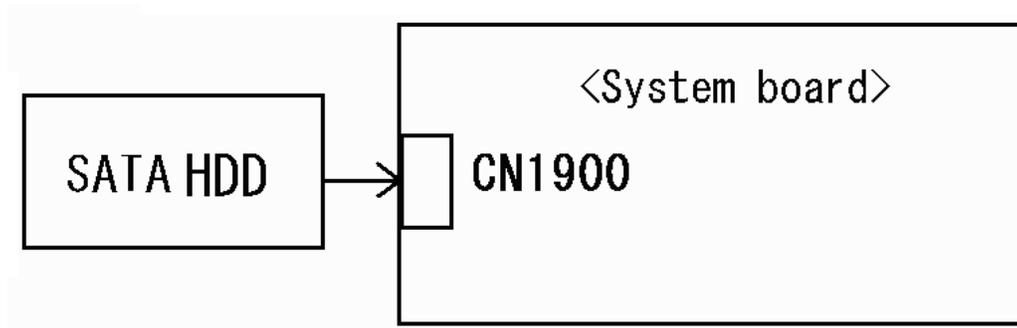
Table 2-6 2.5" Hard disk drive error code and status

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

2.6.5 Procedure 5 Connector Check and Replacement Check

The SATA HDD may be disconnected, or the SATA HDD 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 is firmly connected to CN1900 on the system board.



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

- Check 2 The SATA HDD 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 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*

2.7 Keyboard Troubleshooting

To check if the computer's keyboard 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

2.7.1 Procedure 1 Diagnostic Test Program Execution Check

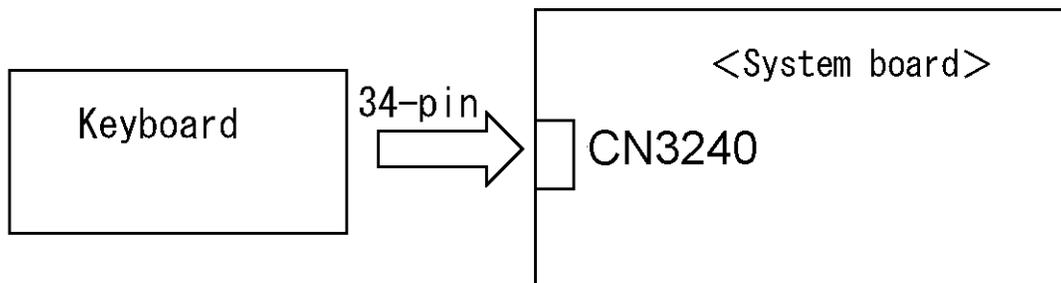
Execute the Keyboard Test (DIAGNOSTIC TEST) and Pressed key display test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

2.7.2 Procedure 2 Connector Check and Replacement Check

The connection of 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 keyboard cable is firmly connected to system board.



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

Check 2 Keyboard 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*.

2.8 Touch pad Troubleshooting

To check if the computer's touch pad 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

2.8.1 Procedure 1 Diagnostic Test Program Execution Check

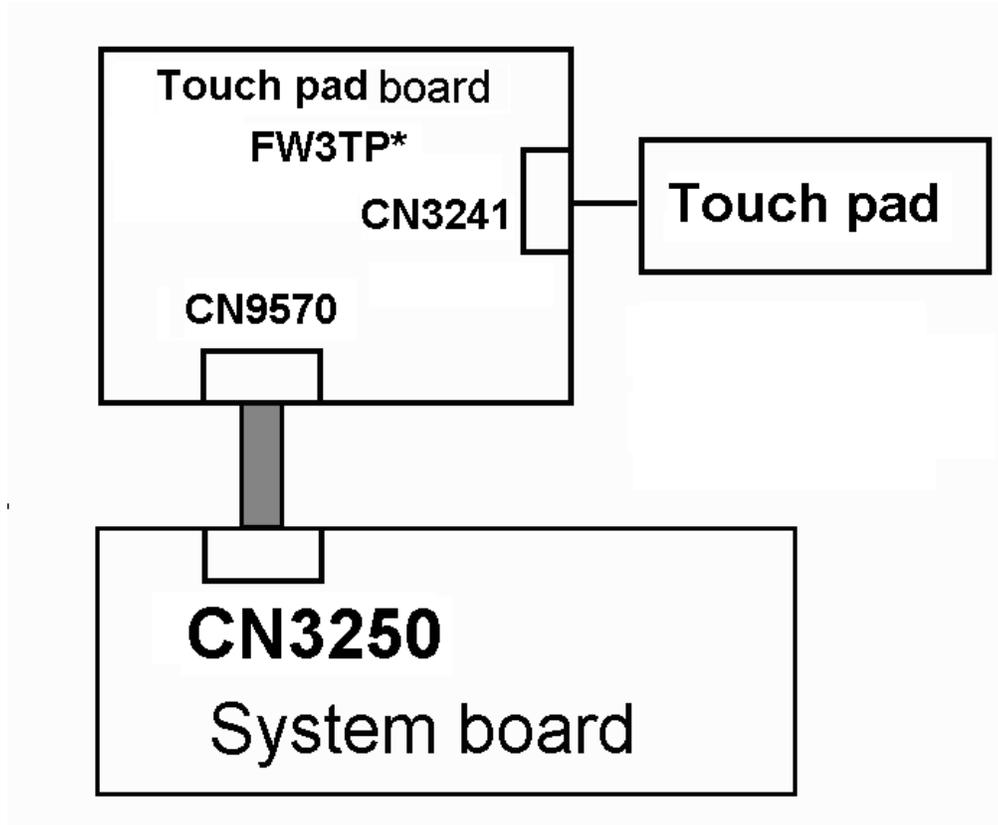
Execute the Touch pad test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

2.8.2 Procedure 2 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 button 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 Touch pad 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 Touch pad 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 4.
- Check 4 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.9 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

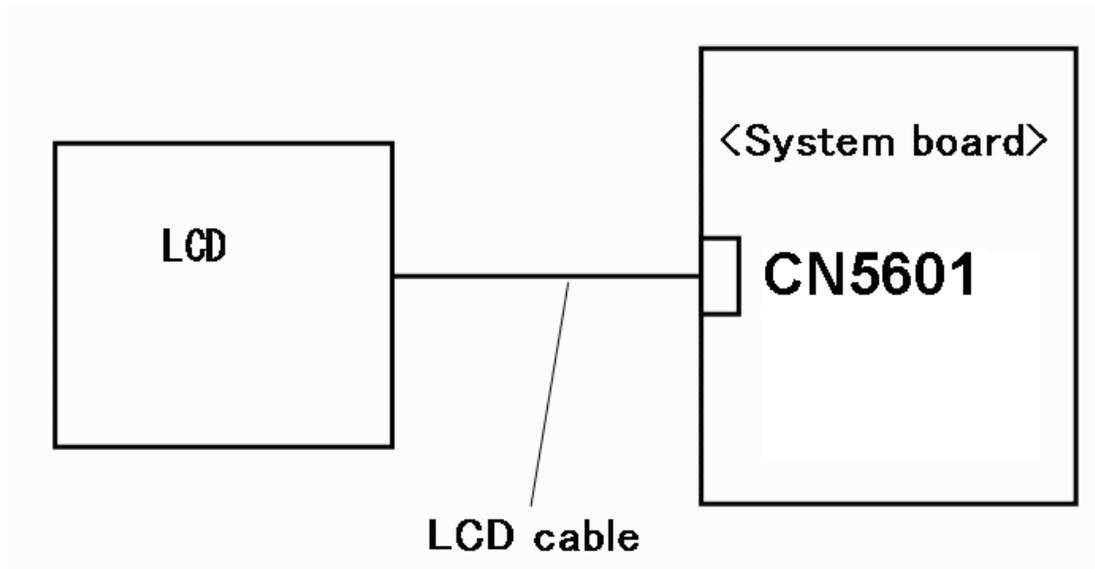
Procedure 3: Replacement Check

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*.

2.10 Optical Disk Drive Troubleshooting

To check if optical disk drive 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

2.10.1 Procedure 1 Diagnostic Test Program Execution Check

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

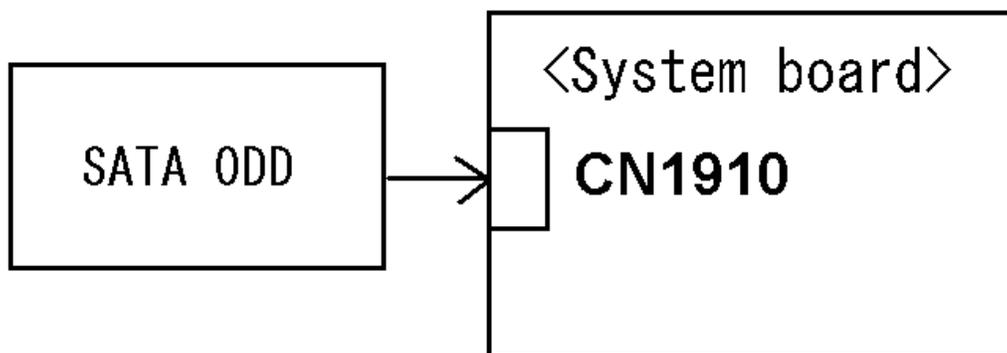
Prepare the tools before the test.

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

2.10.2 Procedure 2 Connector Check and Replacement Check

The SATA ODD may be disconnected, or the SATA ODD 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 ODD is firmly connected to CN1910 on the system board.



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

- Check 2 The SATA ODD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 System board may be faulty. Replace it with new one following the instructions in Chapter 4, *Replacement Procedure*.

2.11 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.

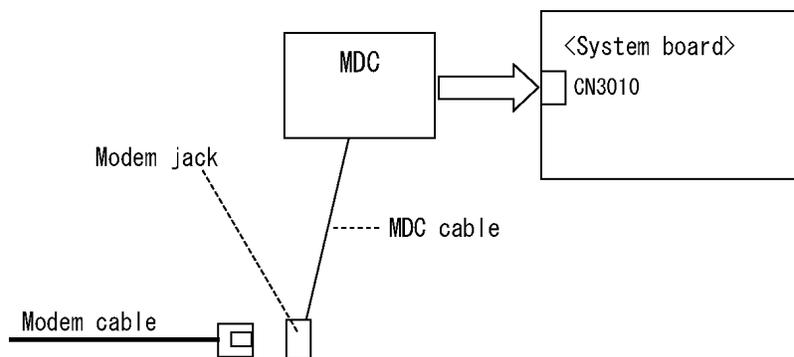
If any error is detected, perform Procedure 2.

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

2.12 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

2.12.1 Procedure 1 Diagnostic Test Program Execution Check

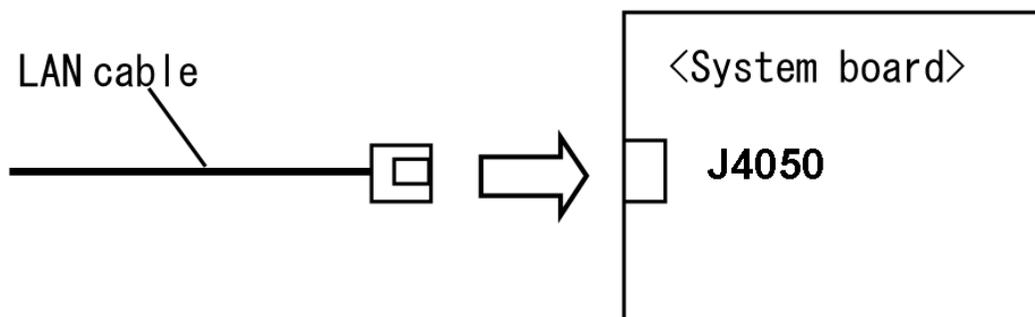
Execute LAN test in the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

2.12.2 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*.

2.13 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

2.13.1 Procedure 1 Transmitting-Receiving Check

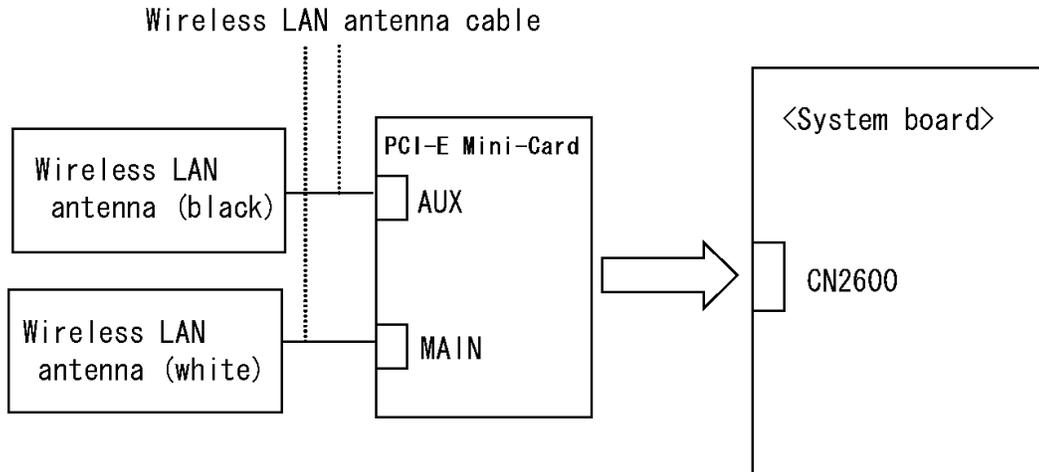
Before starting the test, make sure the wireless communication switch is set in the ON position.

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.

2.13.2 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.

2.13.3 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*.

2.14 Bluetooth Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connection Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

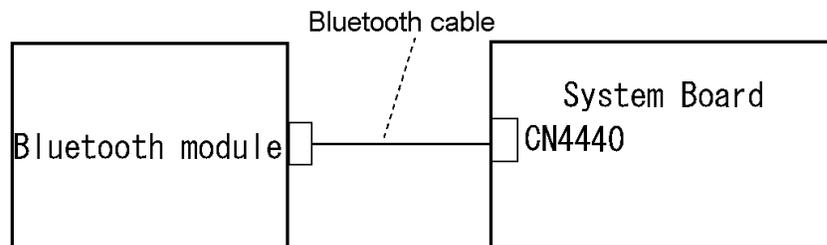
Make sure the wireless switch on the left side of the computer is turned “On”. If it is not, slide the switch toward the back of the computer to turn it on.

- 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 Connector Check and Replacement Check

The Bluetooth may be disconnected, or the Bluetooth module, Bluetooth cable 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 Bluetooth is firmly connected to CN4440 on the system board.



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

- Check 2 The Bluetooth module 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 Bluetooth 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 4.
- Check 4 The system board may be damaged. Replace it with a new one following the

2.15 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

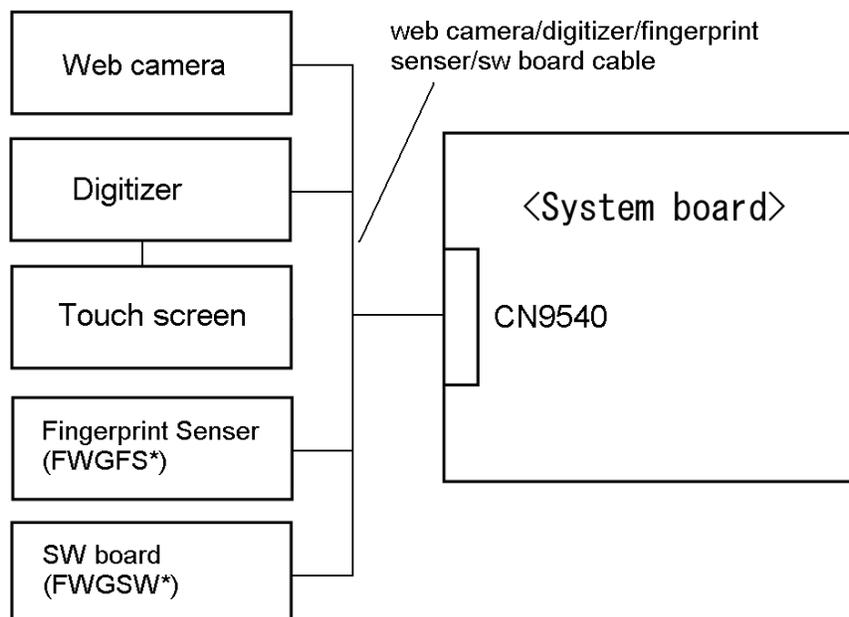
Procedure 1 Check on Windows OS

The web camera checks operating normally using the software of Windows OS attachment. Please perform Procedure 2, when you cannot perform the display of a still picture, and writing/read-out of Video.

Procedure 2 Connector Check and Replacement Check

The connection of cables, web camera 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 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 web camera 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 web camera/digitizer/fingerprint sensor /sw board 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 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.16 Tablet Pen Troubleshooting

To check if the Tablet Pen is defective or not, follow the troubleshooting procedures below as instructed.

CAUTION: Use the Tablet Pen supplied to this model.

Procedure 1: Check on Windows Vista

Procedure 2: Tablet pen replacement Check

Procedure 3: Connector Check and Replacement Check

Procedure 1 Check on Windows Vista

This procedure checks if the tablet pen is working properly by using the function of Windows Vista.

Check 1 Make sure the mouse cursor is following the tablet pen when you move the pen on the display. If it does not work properly, go to Procedure 2.

Check 2 Make sure the “click” function works properly when you tap (touch) the display with the tablet pen. If it does not work properly, go to Procedure 2.

When both the functions work correctly, the tablet pen is not defective.

Procedure 2 Tablet pen replacement Check

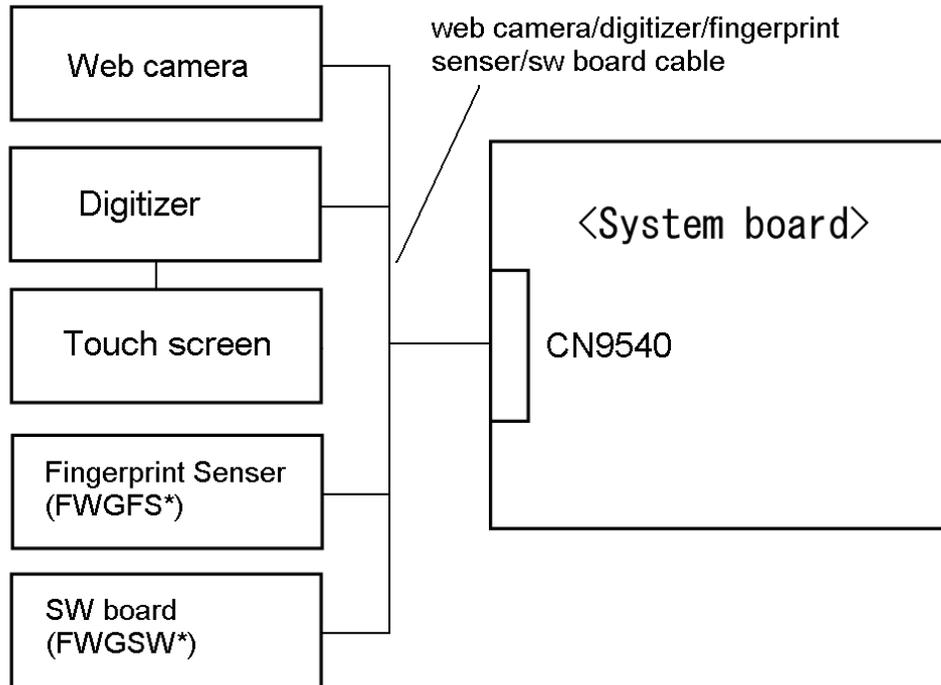
Check 1 The core of the tablet pen might be worn out. Replace the core with a new one following the steps in the User’s manual, and check the tablet pen is working properly. If there is still an error, go to Check 2.

Check 2 The tablet pen might be defective. Replace the tablet pen with a new one and check if the tablet pen is working properly. If there is still an error, execute Procedure 3.

Procedure 3 Connector Check and Replacement Check

The Digitizer is connected to the system board as below.

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



- Check 2 The Digitizer 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 web camera/digitizer/fingerprint sensor /sw board 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 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.17 Touch screen Troubleshooting

To check if the touch screen is defective or not, follow the troubleshooting procedures below as instructed.

CAUTION: Use the touch screen supplied to this model.

Procedure 1: Check on Windows Vista

Procedure 2: Touch screen connector Check and Replacement Check

Procedure 1 Check on Windows Vista

This procedure checks if the touch screen is working properly by using the function of Windows Vista.

Check 1 Make sure the mouse cursor is following the touch screen when you move the touch on the display. If it does not work properly, go to Procedure 2.

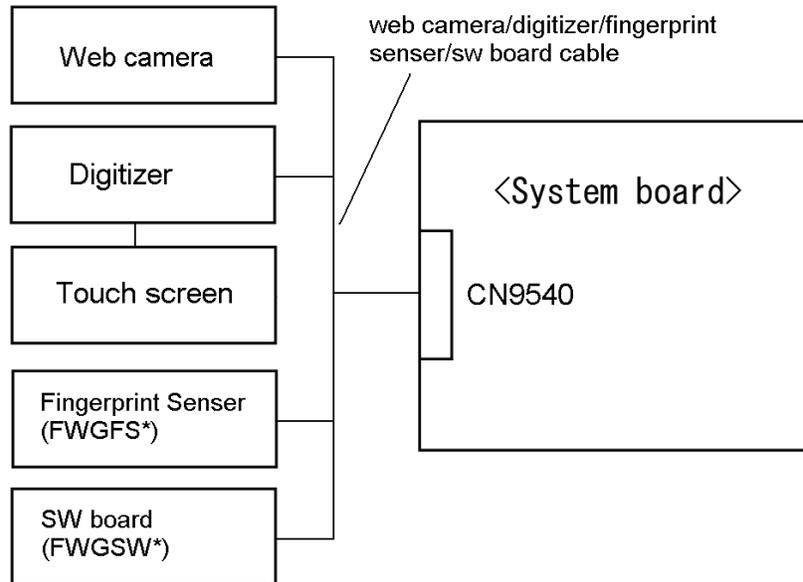
Check 2 Make sure the “click” function works properly when you touch the display with the finger. If it does not work properly, go to Procedure 2.

When both the functions work correctly, the touch screen is not defective.

Procedure 2 Connector Check and Replacement Check

The Digitizer is connected to the system board as below.

- Check 1 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 touch screen 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 web camera/digitizer/fingerprint sensor /sw board 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 4.
- Check 4 The Digitizer may be damaged. Replace it with a new one following the instructions in Touch screen Troubleshooting and Chapter 4, *Replacement Procedures* and check the operation. If the problem still exists, perform Check 3.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.18 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

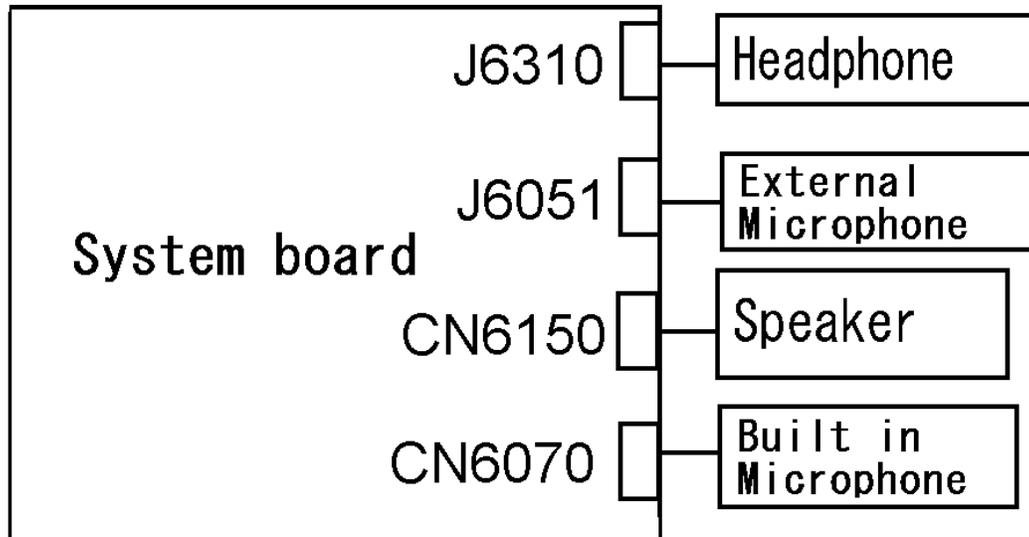
Procedure 1 Diagnostic Test Program Execution Check

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

2.19 Bridge media Slot Troubleshooting

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

Procedure 1: Check on Windows OS

Procedure 2: Connector Check and Replacement Check

2.19.1 Procedure 1 Check on Windows OS

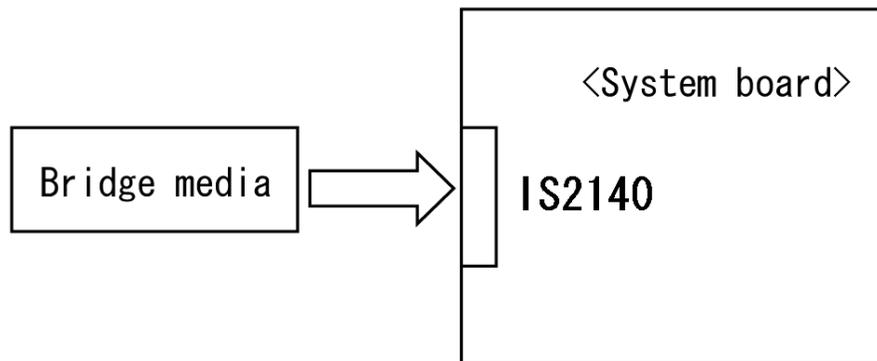
Insert a Bridge media (SD memory card/SDIO card/Memory stick/Memory stick Pro/xD Picture card/Multimedia card) into the slot. Check if the installed Windows recognizes automatically the Bridge media and the data in the Bridge media can be read.

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

2.19.2 Procedure 2 Connector Check and Replacement Check

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

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



Check 1 Bridge media and system board may be disconnected. Make sure the Bridge media is firmly inserted to IS2140 on the system board. If not, insert it firmly. If the Bridge media is still not functioning properly, perform Check 2.

Check 2 Bridge media may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 3.

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

2.20 PCI ExpressCard Slot Troubleshooting

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

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

1. Gigabit Ether ExpressCard

- (1) Insert the Gigabit Ether ExpressCard into the ExpressCard slot.
- (2) On Windows, open System Property → Hardware → Device Manager window.
- (3) Make sure that the following device is recognized on the Device Manager window.

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

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

- (4) After confirmation, take a “Safety Remove” procedure and pull out the Gigabit Ether ExpressCard

2. USB2.0 5in1 ExpressCard

- (1) Insert the USB2.0 5in1 ExpressCard into the ExpressCard slot.
- (2) On Windows, open System Property →Hardware → Device Manager window.
- (3) Make sure that the following device is recognized on the Device Manager window.

`USB 2.0 5in1 ExpressCard USB Device`

- (4) After confirmation, take a “Safety Remove” procedure and pull out the USB2.0 5in1 ExpressCard.

2.21 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

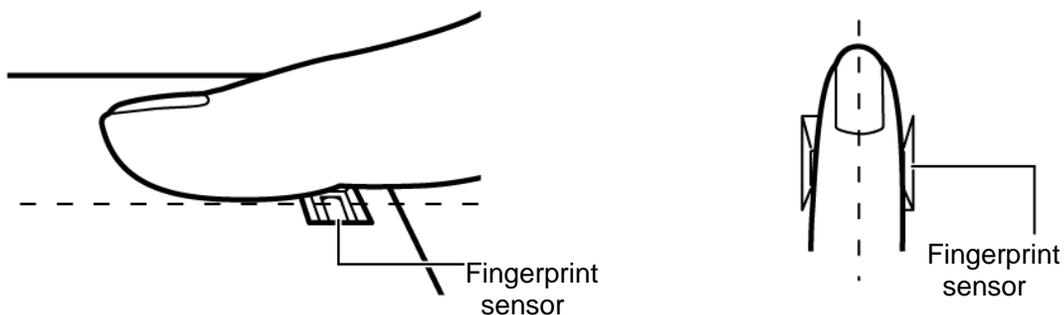
Procedure 3: Authentication of fingerprint

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].

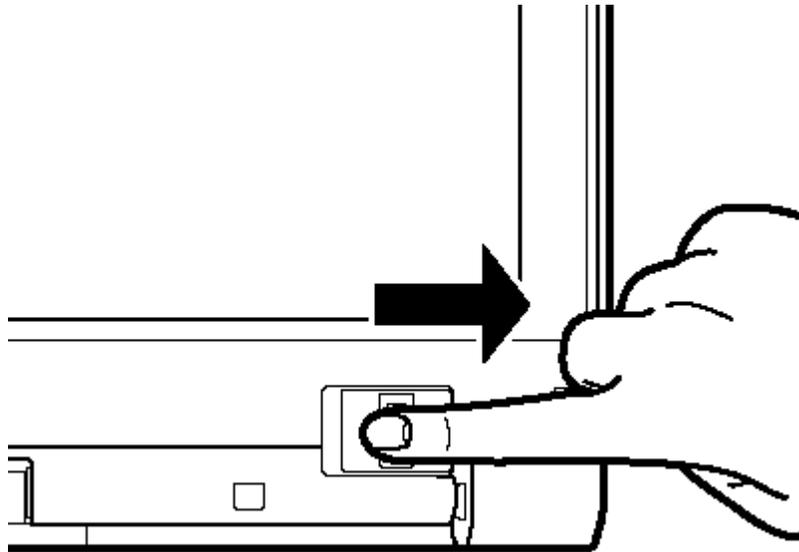
Procedure 2 Registration of fingerprint

1. To run this program, click Start -> All Programs -> TrueSuite Access Manager -> Fingerprint Application.
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.

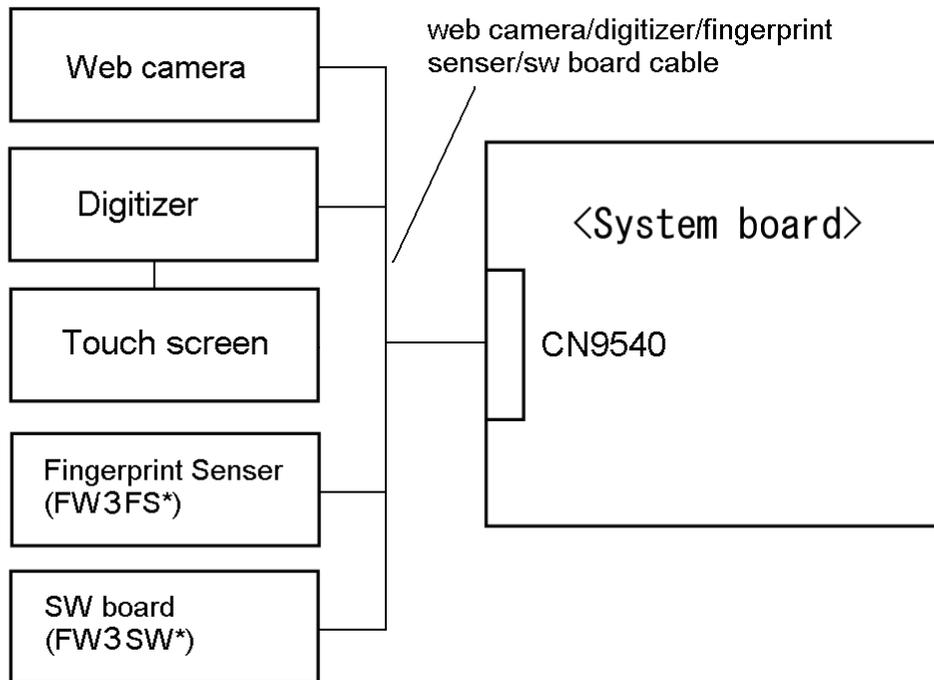
When not authenticated well, warning message appears. If you fail continually ten times or more, you can not use the fingerprint authentication about one minute.

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

Procedure 4 Connector Check and Replacement Check

The Fingerprint sensor is connected to the system board as below.

- Check 1 If any of the connections are loose, reconnect firmly and repeat Procedure 1 to 3 .
If there is still an error, go to Check 2.



- Check 2 The Fingerprint sensor 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 web camera/digitizer/fingerprint sensor /sw board 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 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.22 3G Troubleshooting: Not Used

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 side of the computer is turned. If it is not, slide the switch toward the ON side 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.

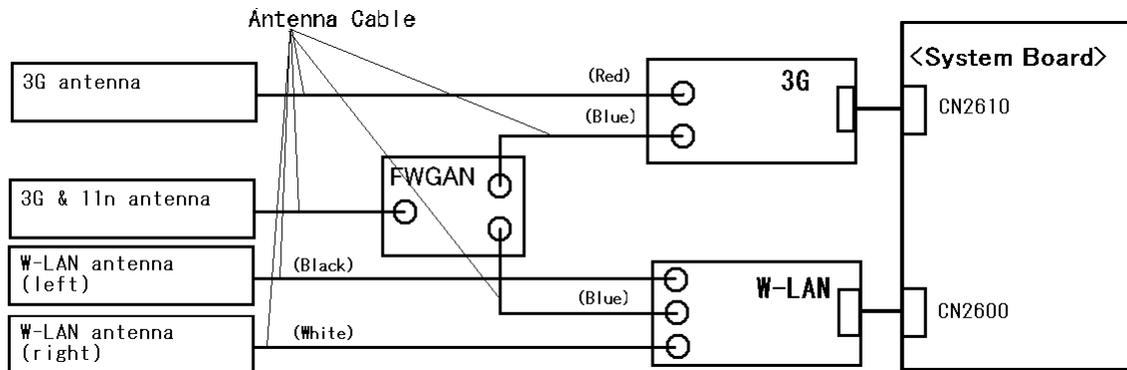
The test program for EU870DT1 should use the WINDOWS version.

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 FWGAN 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 is firmly connected to CN2610 on the system board. If the connector is disconnected, 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 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 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 system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

Chapter 3

Tests and Diagnostics

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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
- 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 - EXIT TO MS-DOS
```

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

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

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

```
DIAGNOSTIC TEST MENU :
```

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

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   xxxxxxxx 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.

```
*****  
                        HEATRUN 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-XXXXX
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

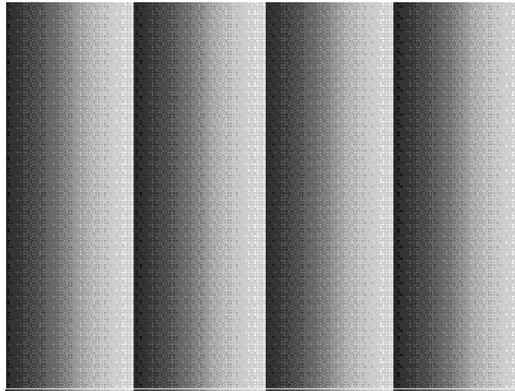
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

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

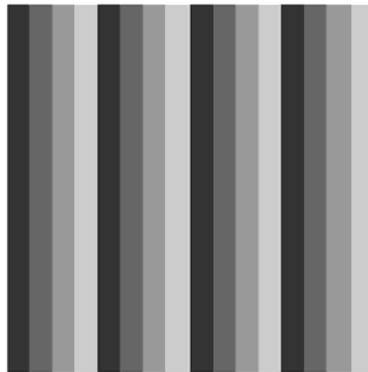
This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

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.



[Mode 12]

(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.

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

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. For the subtest 04, use a CD-RW on the market.

Subtest 01 Sequential read

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

Subtest 02 Read specified address

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

Subtest 03 Random address/data

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

Subtest 04 RW 1point W/R/C

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

3.18 Error Code and Error Status Names

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

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

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

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

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

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

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

3.19 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

Table 3-3 Hard disk controller status register contents

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

Table 3-4 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 TES

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 (XXXXXXXX)          #####
#####
*
* 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/Undock *
* 9 ..... Fan control *
* A ..... E2PROM (MAC/GUID) *
* B ..... Intel AMT *
* C ..... Degitizer utility *
* D ..... Intel Shirley Peak (MAC) *
* E ..... SD Card (R5C847 Writh/Read) *
*
* 99..... Exit to Common Test *
*
*****
.... Press test number [1-9, A-E9, 99] ?
```

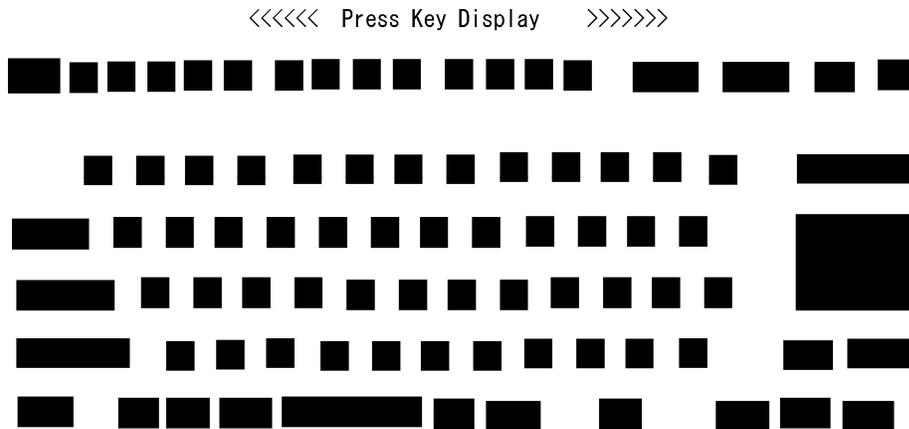
Select the subtest number you want to test and press **Enter**.

To return to the Common Test menu, select **99** and press **Enter**.

Subtest 1 Pressed key display

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

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



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

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

Subtest 2 Touch Pad

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

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

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

```
*** IPS TEST PROGRAM (Vx.xx) ***  
  
<POINTING>                <PARAMETER>  
                            STATUS:0000h  
                            X-RATE:0000h  
                            Y-RATE:0000H  
  
                            <BUTTON>  
                            (1)    (2)  
  
                              
  
<< PRESS BUTTON1+BUTTON2 THEN END >>
```

```
*** IPS TEST PROGRAM (Vx.xx) .***  
  
< POINTING >                <PARAMETER>  
                            STATUS:0018h  
                            X-RATE:OK  
                            Y-RATE:OK  
  
                            <BUTTON>  
                            (1)    (2)  
  
                              
  
<< PRESS BUTTON1+BUTTON2 THEN END >>
```

Subtest 3 Wireless communication switch

This subtest checks if the Wireless communication switch works properly.

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

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

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

Wireless communication switch ON !!

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

Wireless communication switch OFF !!

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

Subtest 4 USB Port Select menu

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

This subtest checks if USB port works properly.

The following menu appears in the display.

```
#####
#####          Port Select menu          #####
#####
*
*  0 ..... Port 0 (Front in the left side) *
*  1 ..... Port 1 (Behind the Left side back) *
*  2 ..... Port 2 (Back side) *
*  9          Exit *
*
*****
.... Press test number[0-2, 9] ?
```

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

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

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

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

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

Subtest 5 LED

This subtest checks if each LED lights properly.

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

[HDD Access LED test]

Press any key and following message appears in the display.

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

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

Confirm corresponding LED lights properly.

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

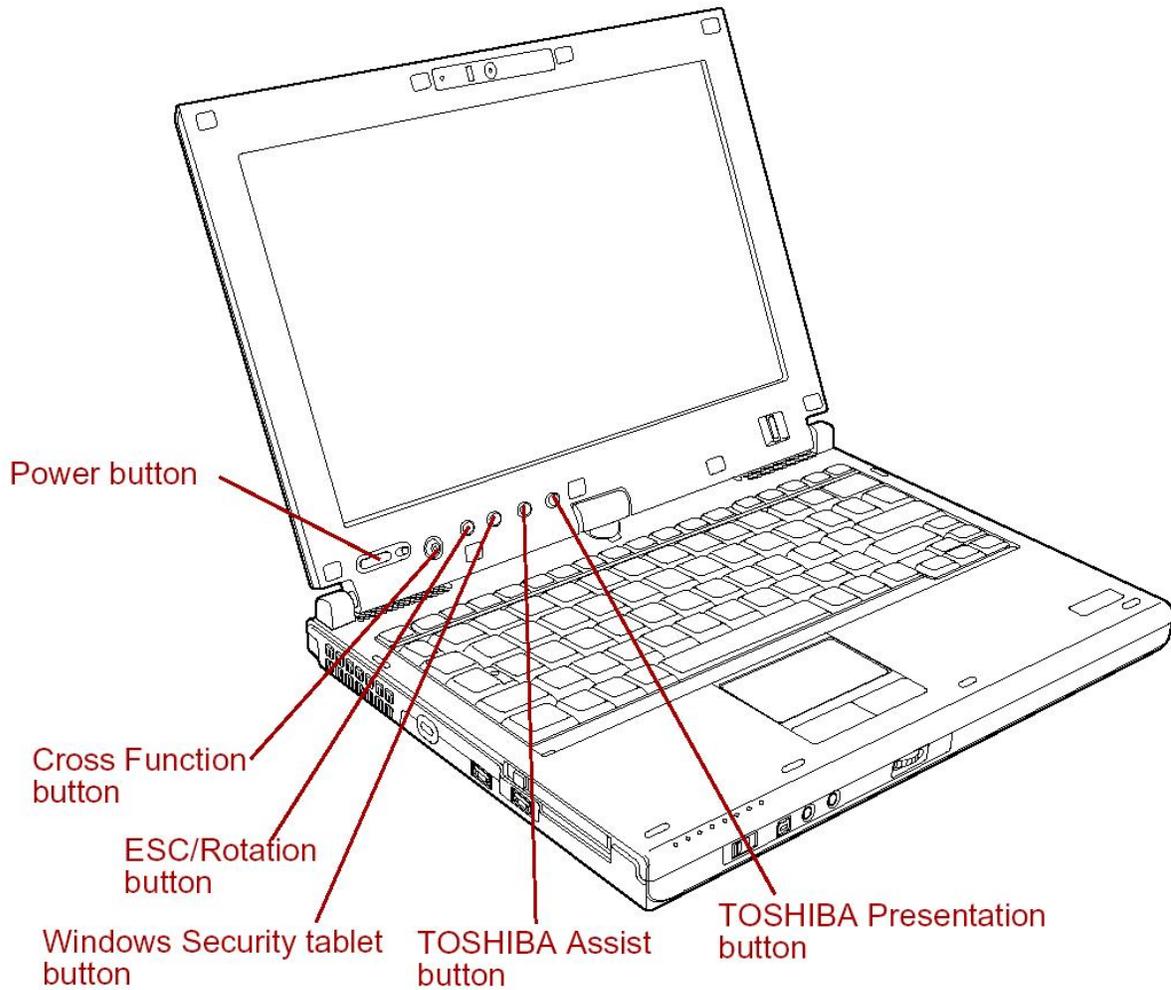
Check [DC-IN]&[Power]&[Main Battery]LED= Green

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

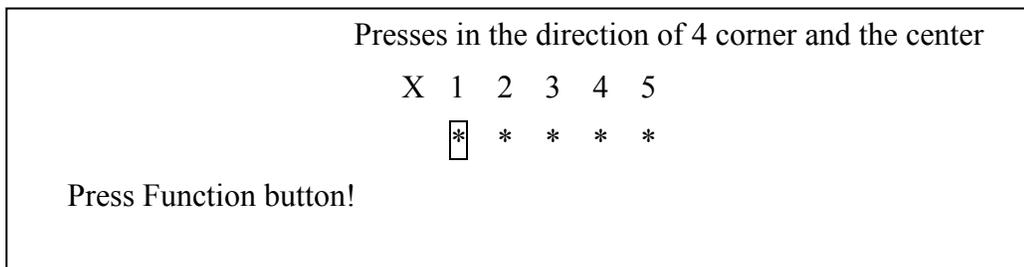
Press **Enter** and return to the ONLY ONE TEST menu.

Subtest 6 Button

This subtest checks if the buttons in the following figure work properly.



The following message appears in the display.



Step 1	X	1	2	3	4	5
	*	<input type="checkbox"/>	*	*	*	*

Cross Function button is pushed in the direction of center, upper, lower, left, and 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.

Step 2	X	1	2	3	4	5
	*	*	<input type="checkbox"/>	*	*	*

Press Escape/Rotation 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.

Step 3	X	1	2	3	4	5
	*	*	*	<input type="checkbox"/>	*	*

Press Windows security tablet 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.

Step 4	X	1	2	3	4	5
	*	*	*	*	*	<input type="checkbox"/>

Press TOSHIBA Presentation button.

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

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

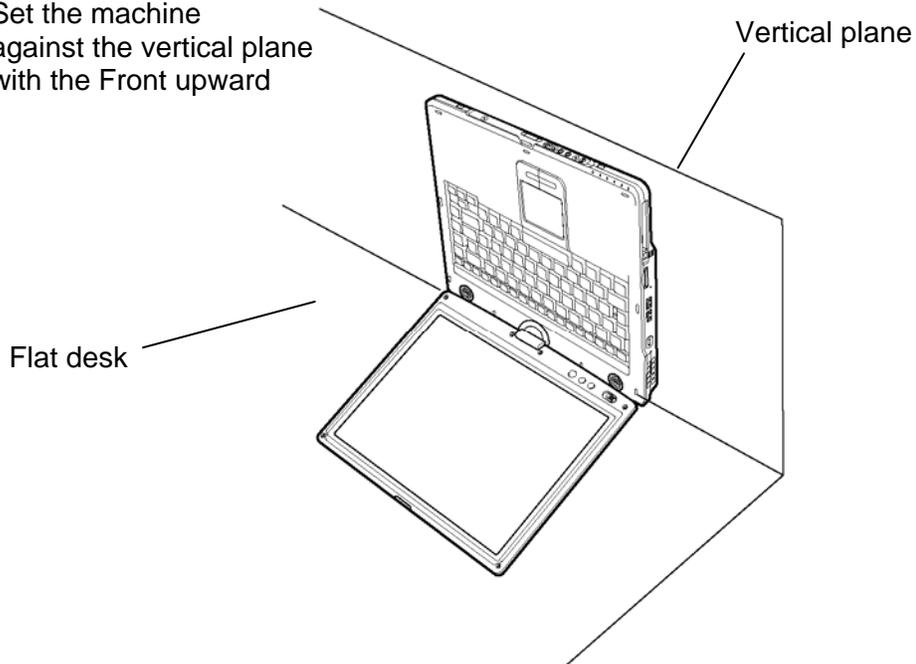
This subtest detects and corrects the each axis (X, Y, Z).

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

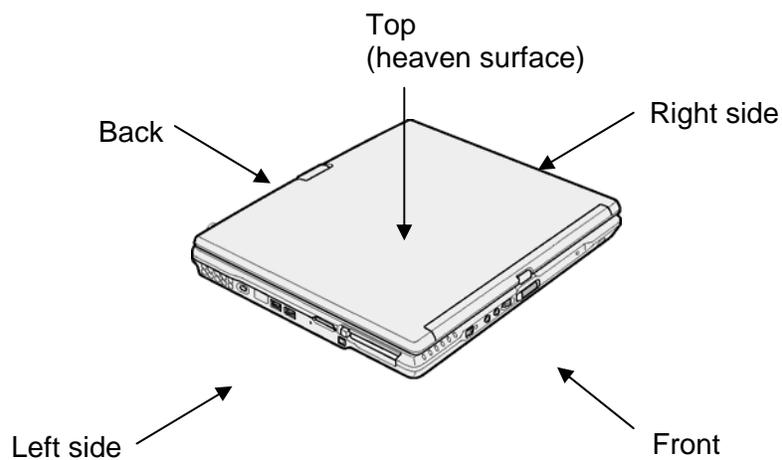
1. Flat desk with vertical plane to get the stability of machine.
2. The vertical wall or plane is necessary.
3. Prevent the machine from shake or shock.

<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 9 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: 5400 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 (Information)

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

Subtest C Digitizer utility

NOTE: 1. To perform this subtest, connect the AC adapter.
 2. While performing this test, don't turn off the power by any means.
 If the power is turned off, there is a possibility that the machine may not start.

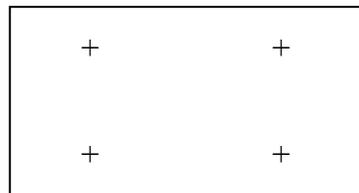
This subtest checks the operation and compensates the position of the digitizer.
 If this subtest is performed, the computer will reboot in order to rewrite the program of the digitizer.

Therefore, it takes time for a while until the test starts.

Don't turn off the power by any means during this operation.

- 1) In the case of the model which carries both the digitizer and the touch panel, perform the following Step1.
- 2) The model which carries only the digitizer (without touch panel) performs only the functional check of the digitizer automatically.

Step 1 For Digitizer and Touch panel model



Since four crosses are displayed on a screen, touch the center of them which indicated in green in order with a tablet pen.

Since the touch-panel compensation data is written in by this test, please touch the center of each cross with a tablet pen carefully.

(If the compensation value is wrong, the touch panel cannot be used during Windows operation.)

In the both cases, when the test ends normally, the computer will reboot in order to rewrite the program of the digitizer again.

Then the test returns to the ONLY ONE TEST menu automatically after a while.

Don't turn off the power by any means until the ONLY ONE TEST menu appears again.

The following error message is displayed when the digitizer is out of order.

“Press any key!”

If any key is pressed, the computer will reboot in order to rewrite the program of the digitizer.

Then the test returns to the ONLY ONE TEST menu automatically after a while.

Don't turn off the power by any means until the ONLY ONE TEST menu appears again

Subtest D Intel Shirley Peak (MAC)

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

Subtest E SSD Card (R5C847 Writh/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.
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) ?

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 = XXXKB)
* - 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.

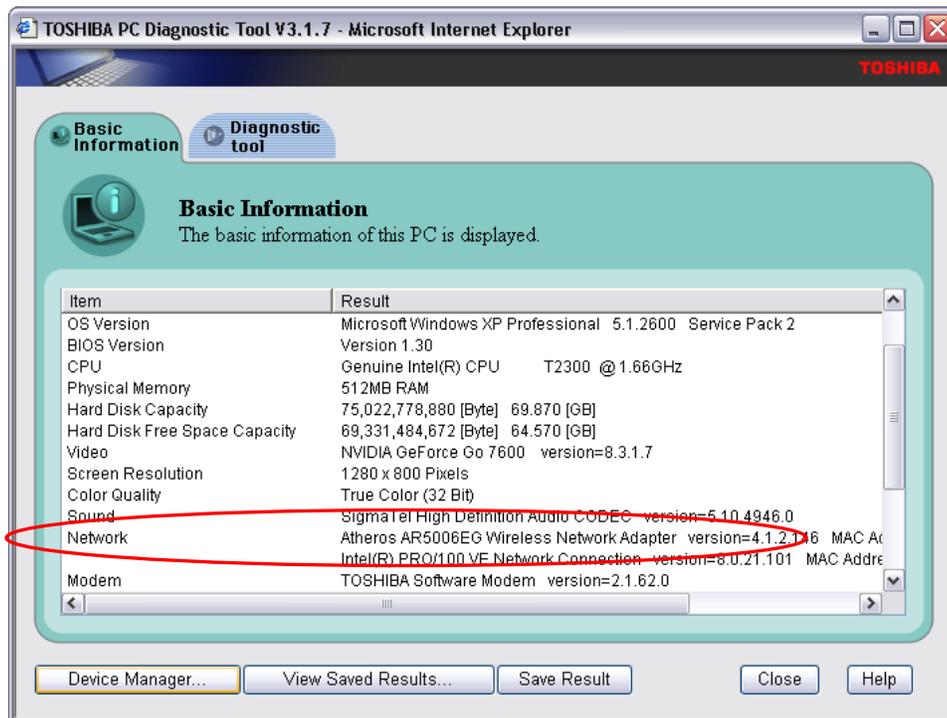
3.26 Wireless LAN Test Program (Atheros)

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.

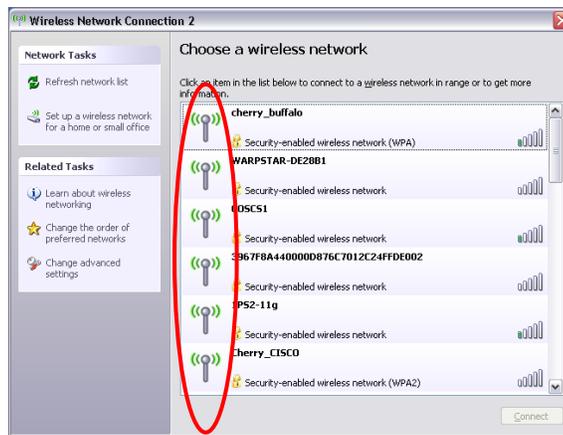


Check of the antenna connection

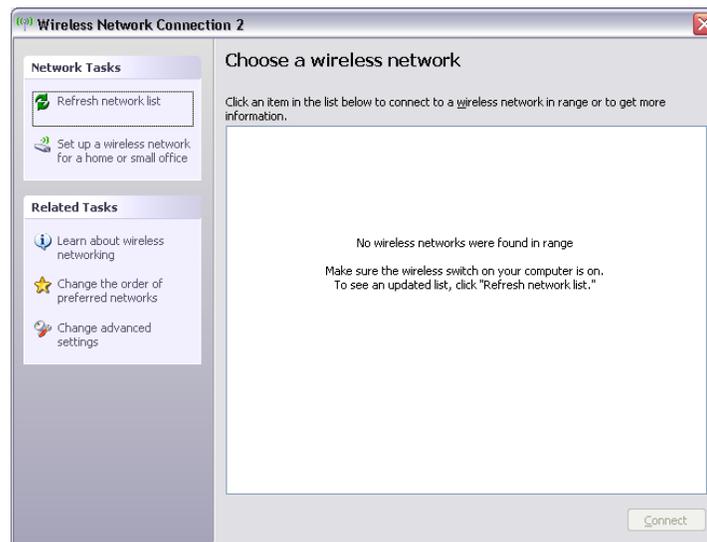
1. Confirm that the icon for wireless LAN appears at the lower right of the screen under the circumstances the wireless LAN communication is available. (It is no problem if a cross is shown on the icon.)



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) (Not Used)

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.)

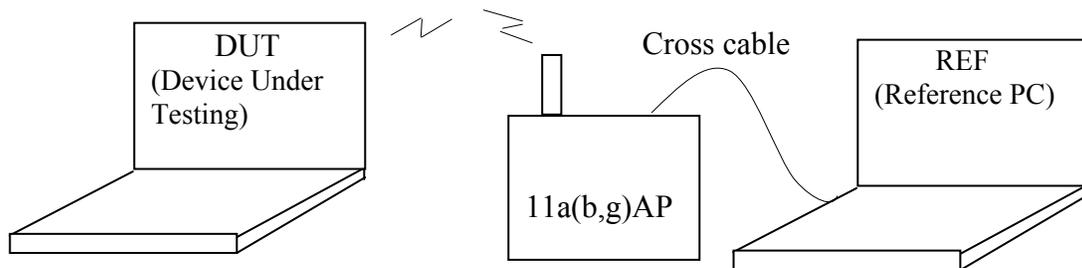
AP for check of 11a : 11aAP

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

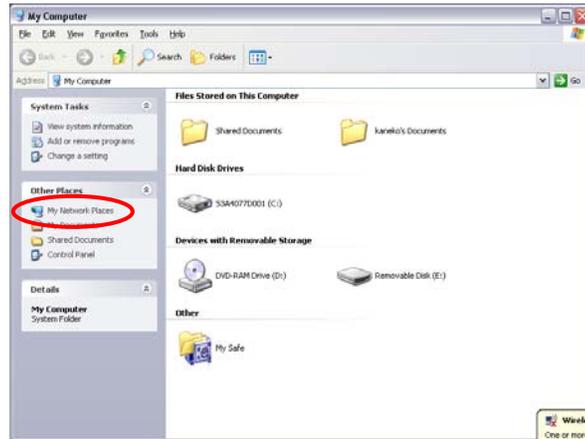
How to setup the REF PC

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

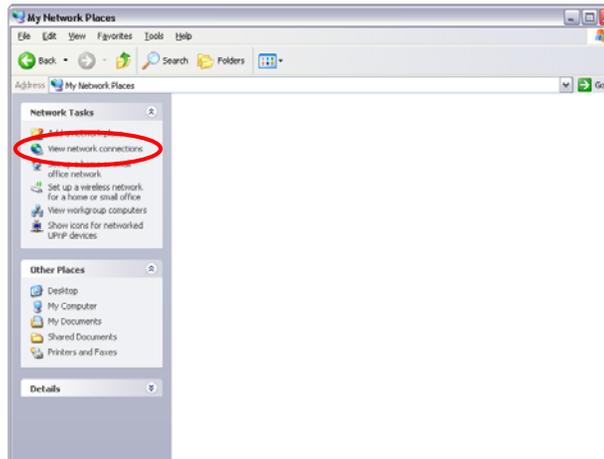
1. Copy the R100VWL5.ZIP (wireless LAN program for maintenance, common to Calxico, Golan and Kedron) to REF PC and unzip it. Then "Clx_Res" folder is created and the following three programs are copied in it.

PACKET.SYS
 PACKET.INF
 WTWINSVR.EXE

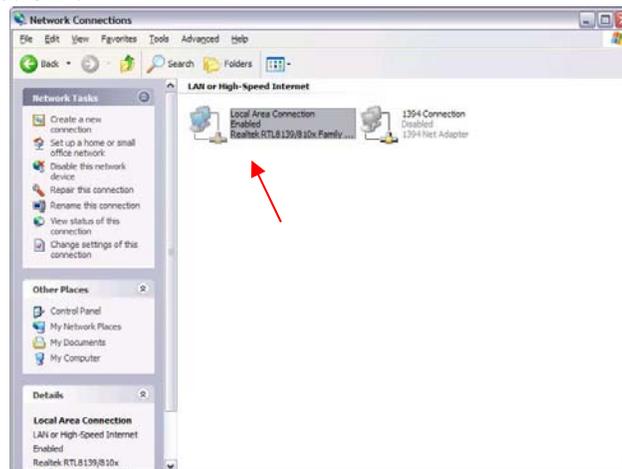
Open “My Computer” window and click “My Network places” on the left column.



Click “View network connections” on the left column.

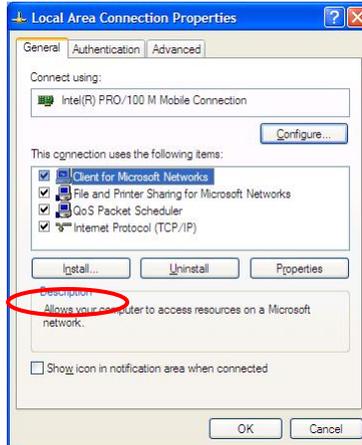


The “Network Connections” window appears. Double-click “Local Area Connection”.



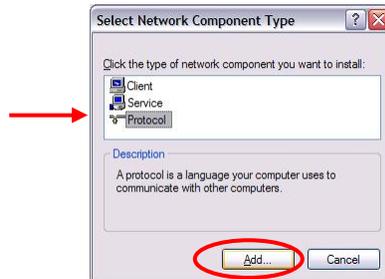
Network Connections window

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.)



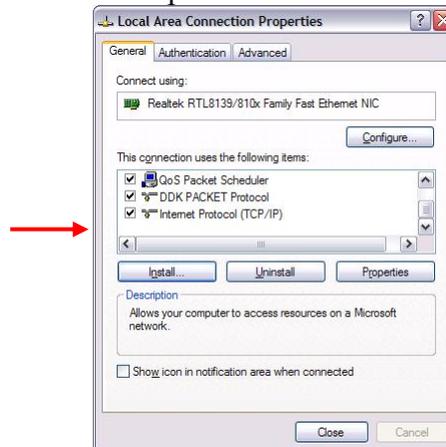
Install From Disk window

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

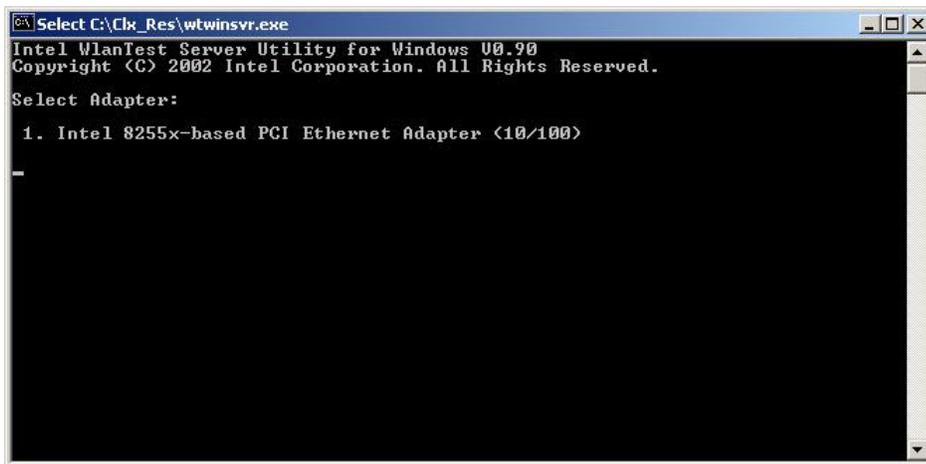
After the completion of REF PC setup, restart the WINDOWS. Then perform the Responder test program for Windows (WTWINSVR.EXE) in the Clx_Res folder.

- WTWINSVR.EXE

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

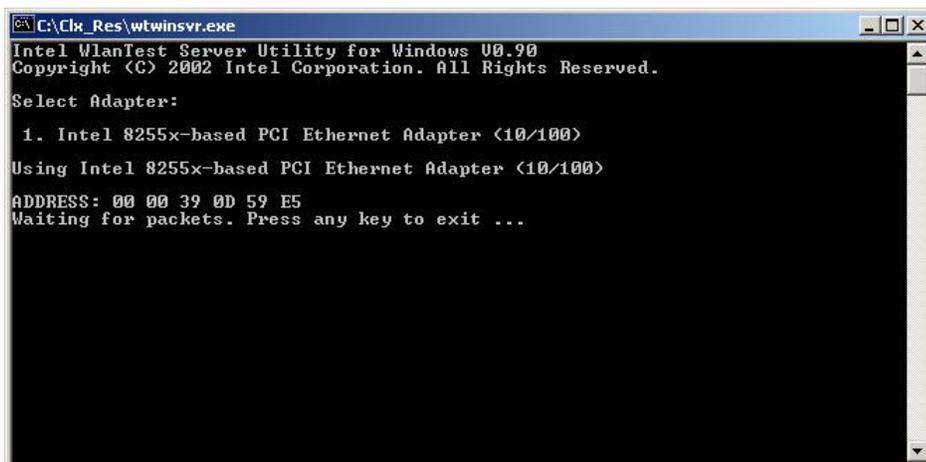
How to start

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.

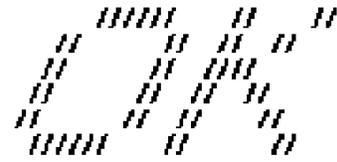
If a defective is found, **NG** message will appear in the display.

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

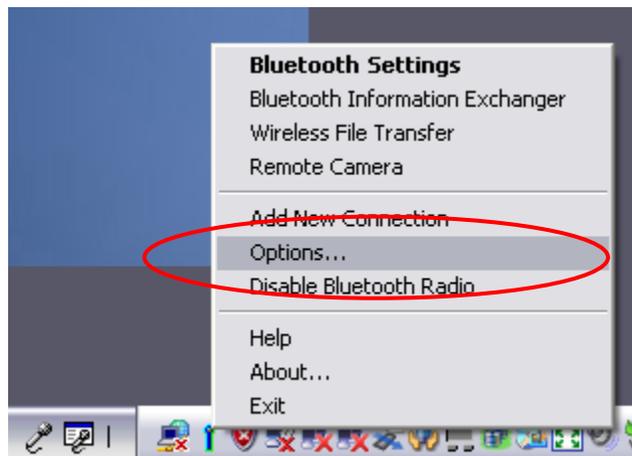
- For the test of Bluetooth function, use the Windows program installed on the target computer (computer to be tested). A responder device (device for transmitting/receiving data) is also needed. (A mobile phone with the Bluetooth function is also available.)
- A Bluetooth card should be installed on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

Test procedure

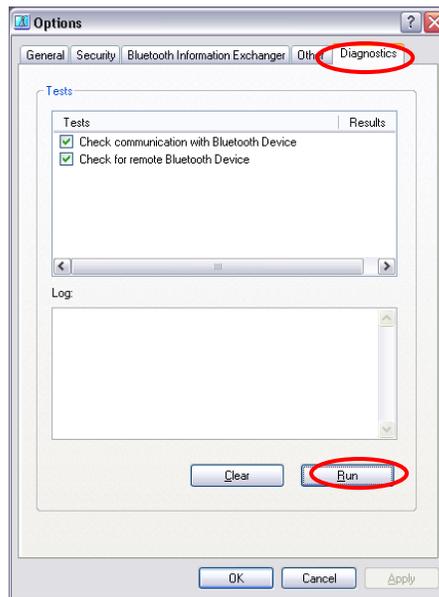
1. Enable the Bluetooth function of the responder device.
2. Make sure the wireless communication switch of the target computer is set to “ON” position.
3. Right-click the Bluetooth icon on the lower right screen of the target computer.



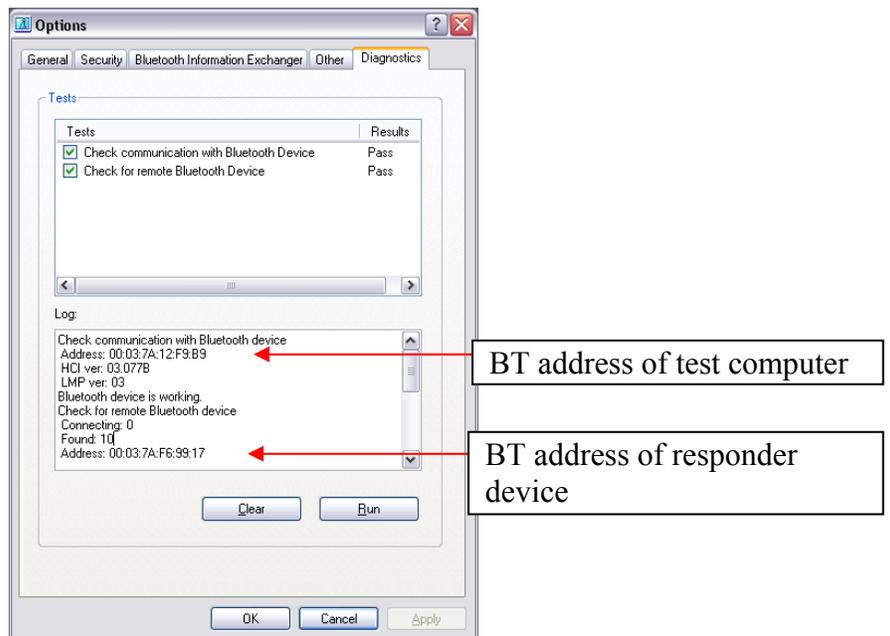
4. Select “Options...”.



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 M780. 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 SETUP

3.31.1 Function Description

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

Main menu

System Time (System time)

System Date (System date)

CPU Type

CPU Speed

HDD1/SSD1

ODD

Total Memory Size

System BIOS Version

EC Version

ATM Setup Prompt

Language

Security menu

User Password

Supervisor Password

HDD1/SDD1 Password Mode

HDD User Password

TPM

Clear TPM Owner

Power Management menu

Wake-up on LAN
Wake-up on LAN on Battery
Wake on Keyboard
Critical Battery Wake-up
Dynamic CPU Frequency Mode
Core Multi-Processing
Intel Turbo boosts
eSATA

SATA Interface setting
BIOS Power Management

Advanced menu

Execute-Disable Bit Capability
Virtualization Technology
Trusted Execution Technology
Beep Sound
USB Sleep and Charge
USB KB/Mouse Legacy Emulation
USB-FDD Legacy Emulation
USB Memory BIOS Support Type
Change Boot Order
System Configuration

Exit menu

- Load Setup Defaults

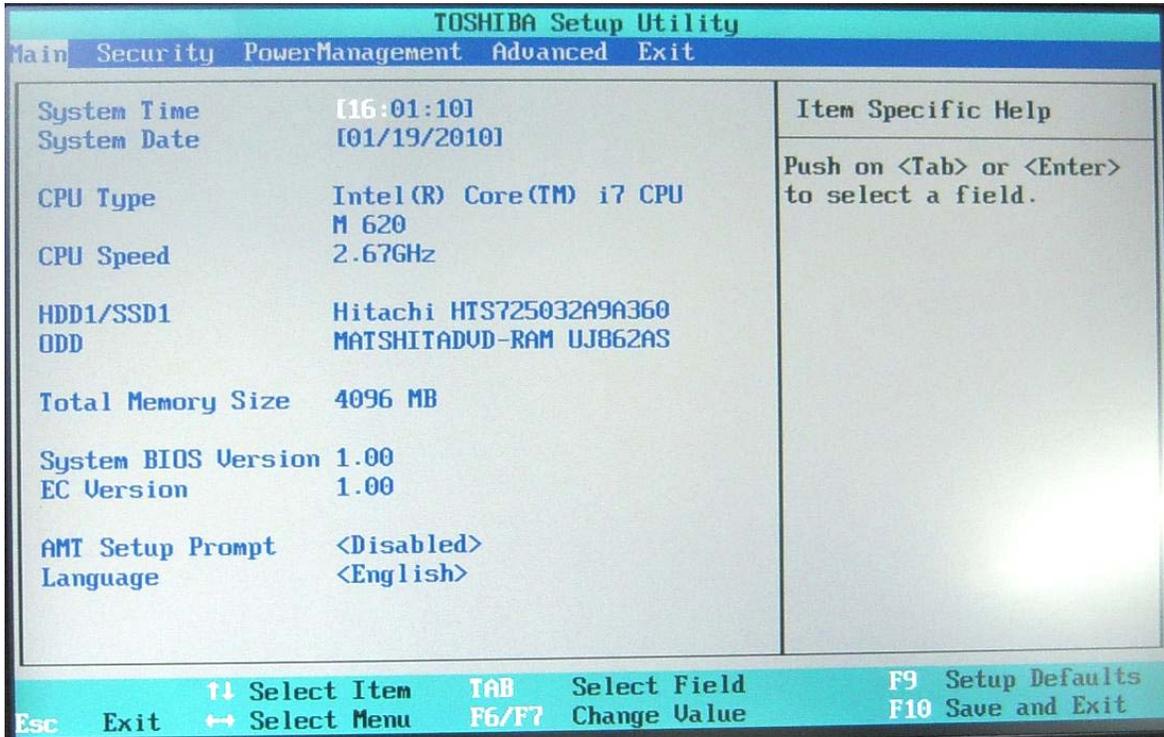
- Discard Changes

- Exit Saving Changes

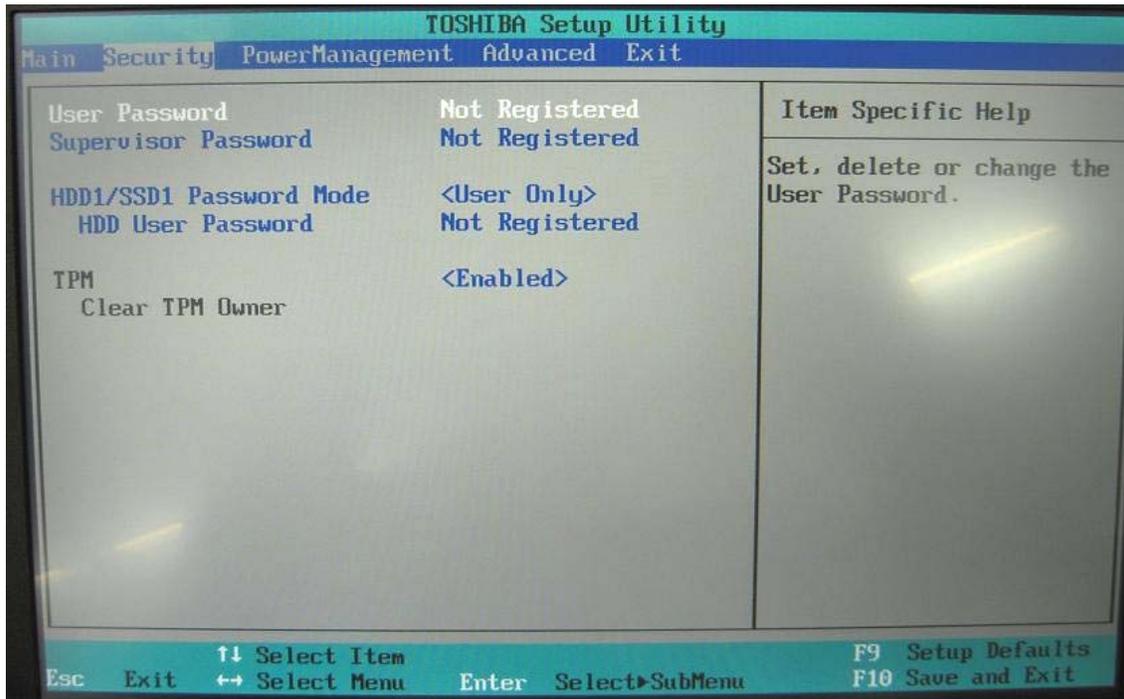
3.31.2 Accessing the SETUP Program

Turn on the power SW.
then press **F2**. The following display appears.

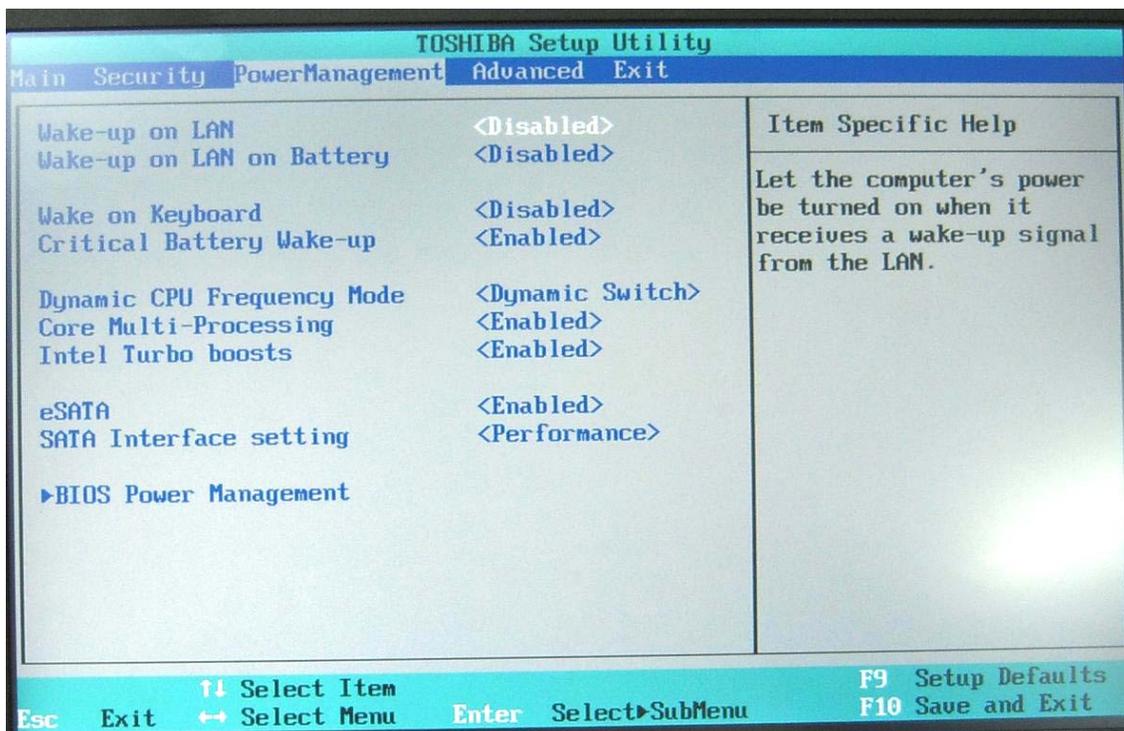
Main menu screen



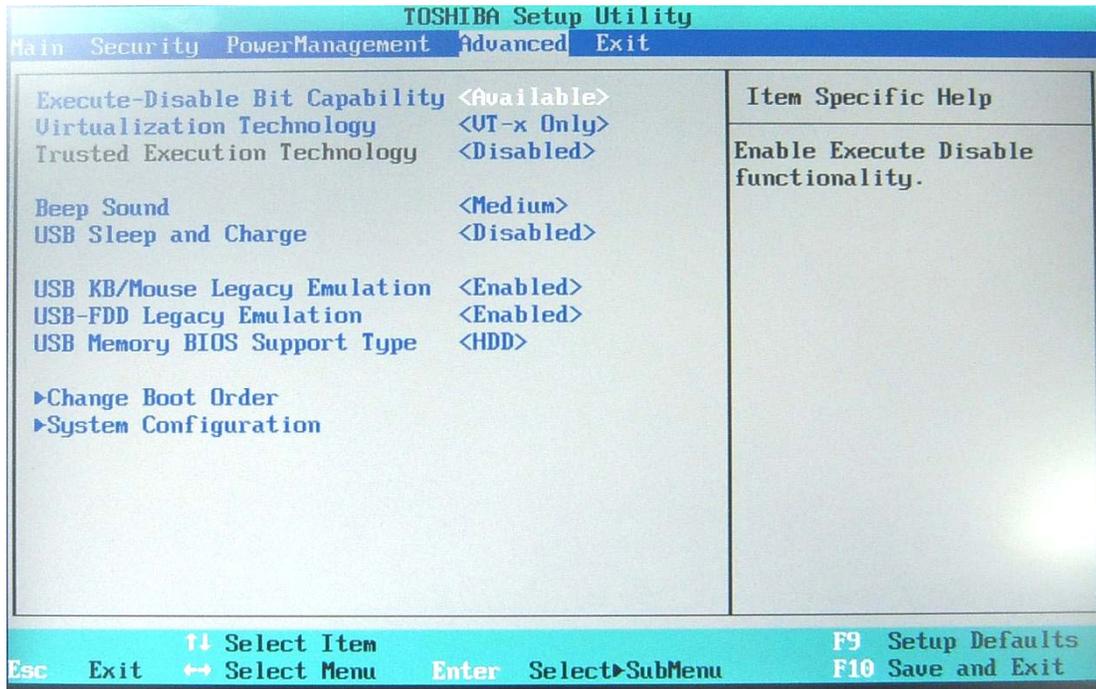
Security menu screen



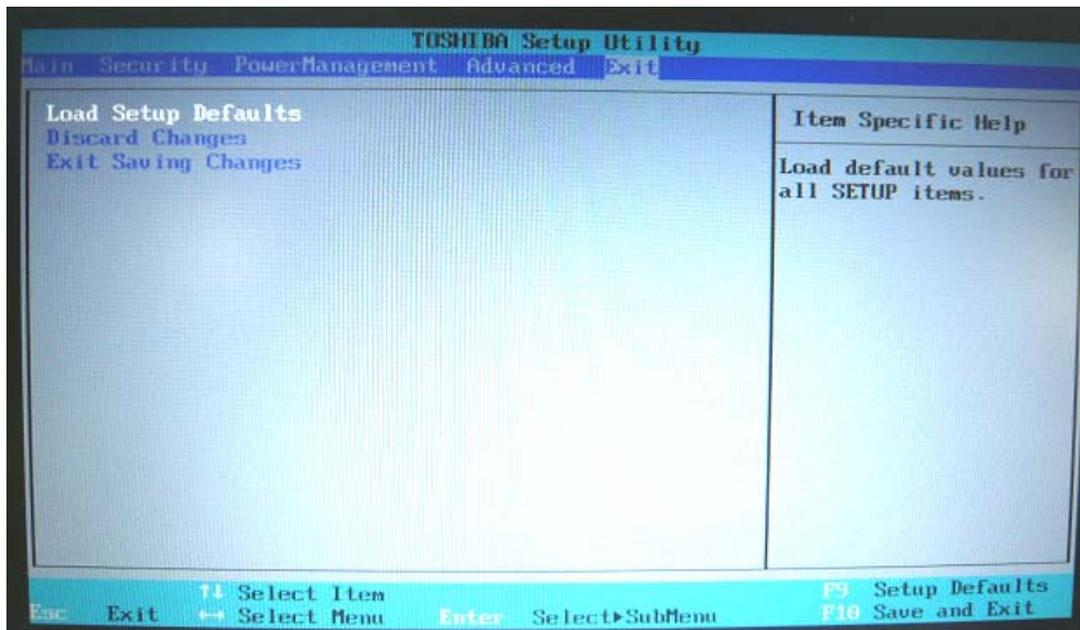
Power Management menu screen



Advanced menu screen



Exit menu screen



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.
2. Press either the **[Enter]Key** to change the value.

Accepting Changes and Exiting the SETUP Window

1. Press **[F10] key** to accept the changes you made.
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 **[F9] key**.
2. To accept the default settings, press **[Y] key**.

How to change setup Options

Since a help is displayed on the right-hand side of each menu screen, it is referred to.

3.32 Maintenance (WinPE&FreeDos) Test Program Operation

3.32.1 . Outline

This document explains how to operate T&D that is released through TOSHIBA Test & Diagnostic CD.

3.32.2 Outline of Specification

The TOSHIBA Test & Diagnostic CD already released includes WindowsPE T&D (hereafter, referred as WinPE T&D) and Freedos T&D (hereafter, referred as Fdos T&D) and either of the T&D programs can be activated by multiboot support.

3.32.2.1 Outline of WindowsPE T&D

WinPE T&D operates on the Windows PE2.1 operating system. If the CD is booted, the operating system WindowsPE is extracted to the RAM disk in the system memory and operates on it. (At this time, the drive is drive X:.)

T&D functionally consists of display of system information, execution of each test and various utilities, whose test items support only tests which can be commonly used on each model. T&D also allows you in some models to use the multitasking functions which execute the stress test and each test never been included in it, as multitasks.

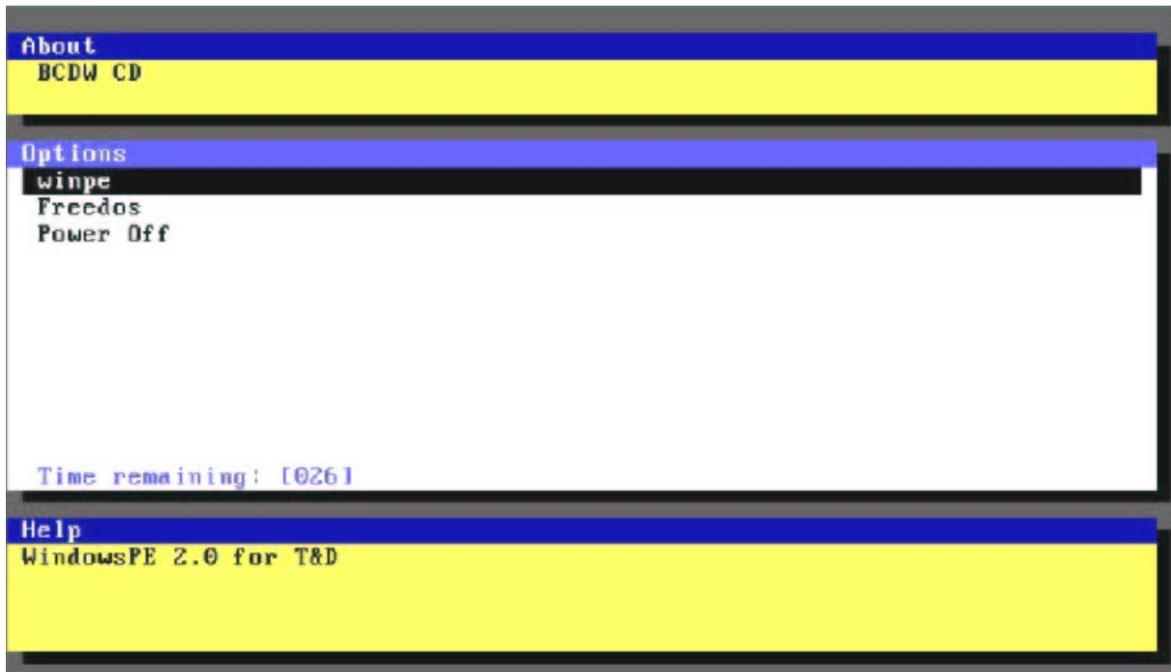
3.32.2.2 Outline of Freedos T&D

Freedos T&D is extracted as image on the CD and operates on the CD drive. Also, if Freedos T&D can conduct a test such as the conventional memory test that cannot be done by WinPE T&D. The test items include only tests that can be commonly used on each model like WinPE T&D.

3.33 . Starting TOSHIBA Test & Diagnostic

3.33.1 Starting from CD

1. Load the TOSHIBA Test & Diagnostic Discs into the optical disc drive and turn off the computer's power.
2. While holding down F12 key on the keyboard, turn on your computer - when the logo screen appears, release the F12 key.
3. Use the left and right cursors key to select the CD-ROM icon from the menu.
4. If T&D starts from the TOSHIBA Test & Diagnostic CD, the following screen is displayed.



Move the cursor to the desired item and press the Enter key.

[winpe]: Displays the following screen. If Enter key is pressed, WindowsPE will start up and then WinPE T&D will start.

[Freedos]: Starts up FreeDOS and then starts FreeDOS T&D.

[Power Off]: Turns the power off.

```
Starting CD ... ok.  
Bootable CD Wizard v2.0a1 Copyright (c)2004 by Alex Kopylov  
Press any key to boot from CD or DVD.
```

When the above-mentioned screen is displayed, it is "Enter" again.
Press a key. Next, WindowsPE starts.

***NOTE:** When keys other than "Enter" are pressed, or when pushing nothing, Windows of HDD starts..*

3.34 . Windows PE T&D

3.34.1 Equipment Configuration for Test

The following table indicates equipment configuration necessary for conduction of the tests items shown below using WinPE T&D.

Test Item	Equipment required	Remarks
USB	USB flash memory	Free space : More than 12MB (When you start WinPE T&D from a USB memory, use 512MB or more of USB memory.)
ODD	Media containing test data	The test data is included in a bootable CD. File name: CDDTEST0.DAT
LAN	Wired router, LAN cable	The router has the DHCP server function
FDD	USB connected FDD 2HD Floppy disk	Free space : 384KB
IEEE1394	IEEE1394-compatible external HDD	Free space : More than 12MB

To execute the above test, start the machine after connecting all of the equipment

* In particular, if LAN router is connected after OS is activated, IP address is not assigned to it.

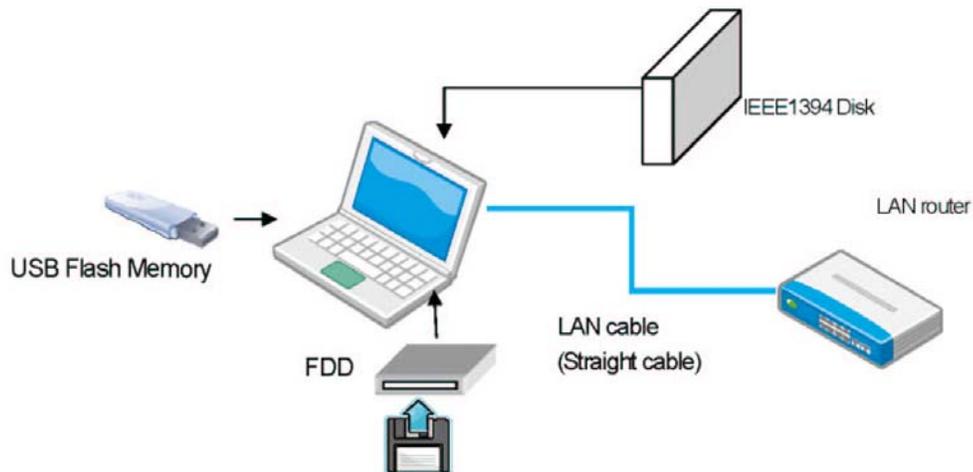


Fig.1 Test Environment Image

3.34.2 Starting T&D

3.34.2.1 Automatic Start

When WindowsPE starts up from the TOSHIBA Test & Diagnostic CD or the USB memory, WinPE T&D starts automatically.

After the startup of the OS, unless CD volume name is WINTDCD or USB volume name is WINTDUSB, WinPE T&D does not start automatically.

Note: If the system starts up from the TOSHIBA Test & Diagnostic CD, WinPE T&D in the USB memory starts when the USB memory created in section 3-5-2 is connected.

3.34.2.2 Manual Start

If the user starts WinPE T&D manually, move to the folder containing WinPETD.exe and run WinPETD.exe.

Example of WinPE T&D to be executed from the command prompt screen

```
D:/WinPETD/>WinPETD [enter]
```

* The actual drive letter varies depending on the PC.

The storage location of WinPETD.exe in each device is as follows:

CD media drive: ¥WinPETD

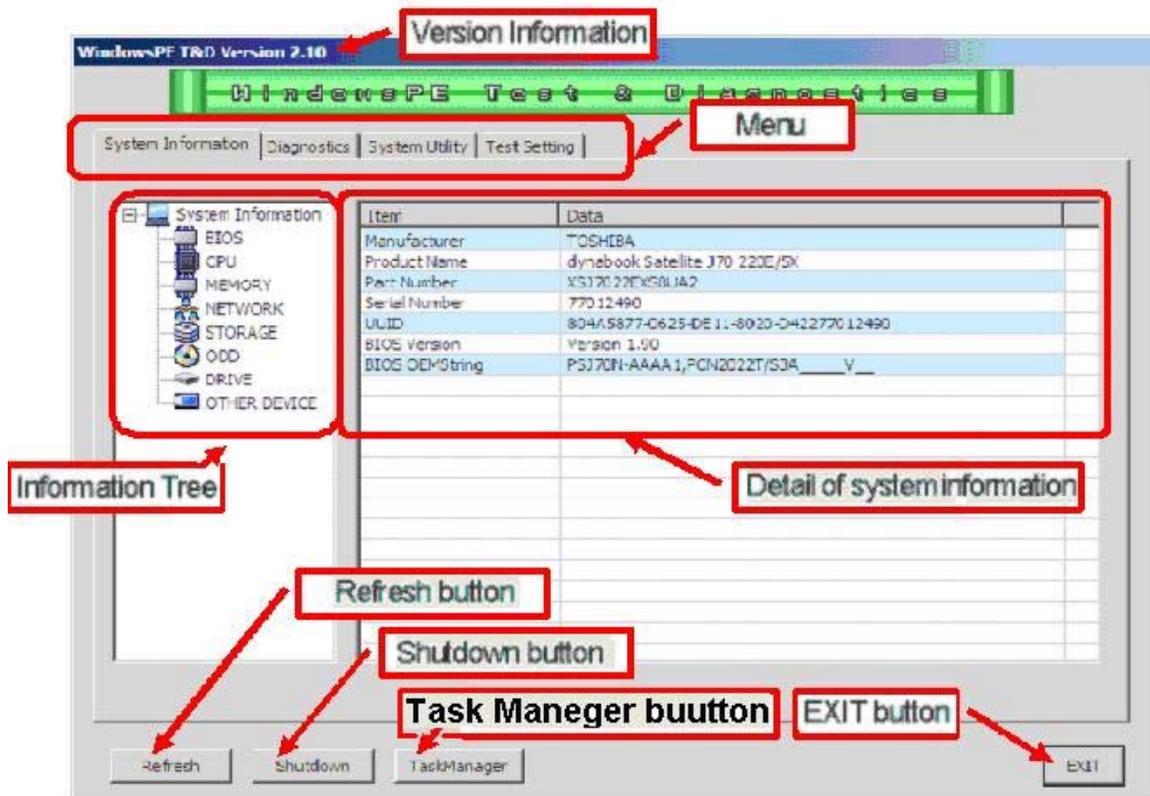
USB memory drive: ¥WinPETD

3.34.3 System Information Menu

If you set the TOSHIBA Test & Diagnostic CD to the ODD drive and run WinPE T&D, the following test selection screen is displayed. (For further details, refer to Chapter 2.)

Hereinafter, System Information will be described in detail.

There are four menus of System Information, Diagnostics, System Utility, and Test Setting as a menu.



3.34.3.1 Explanation of each item

- ▼ [Refresh] button Obtains system information again, redispays it, rejudges the grayed test item(s) of the test menu and displays the test menu.
- ▼ [Shutdown] button Shuts down WindowsPE.
- ▼ [Task Manager] button task manager is started.
- ▼ [EXIT] button Terminates this application.
- ▼ Version information Displays the version of WinPE T&D.
- ▼ Menu Indicates tabs for selecting PC information, Diagnostics to set test items or conduct tests, Tool to extract T&D to USB memory and System Utility to provide SMART information.

- ▼ Information tree Displays detailed information of the item selected from Detail of System Information if you click a desired item of the System Information displayed in Information tree.
- ▼ Detail of system information Displays detailed information of the item selected in Information tree. The detailed information will be given in section 3-3-2.

3.34.3.2 Details of the system information displayed on an information tree

The details of the system information item displayed on each information tree are shown below.

- BIOS

The following items display DMI and BIOS information of the PC.

Item	Description
Manufacturer	Displays Manufacturer of the PC
Product Name	Displays Product Name of the PC
Part Number	Displays Part Number of the PC.
Serial Number	Displays Serial Number of the PC.
UUID	Displays UUID of the PC.
BIOS Version	Displays BIOS Version of the PC.
BIOS OEM String	Displays OEM String of the PC.

- CPU

The following items display CPU information of the PC.

Item	Description
CPU Name0 - 1	Displays the name of the CPU mounted on the PC.
CPU Clock0 - 1	Displays Current Clock (MHz) and Max Clock (MHz) of the CPU.
CPU Socket0 - 1	Displays Socket Name of the CPU.
CPU Description0-1	Displays Processor Name of the CPU and CPUID (Family, Model, Stepping).
L2 Cache0 - 1	Displays the second cache (KB) of the CPU

- MEMORY

The following item displays memory information of the PC.

Item	Description
Physical Memory	Displays the capacity (GB) of the physical memory on the PC

- NETWORK

The following items displays network card information of the PC.

If more than one network card is connected, the information of up to 4 network cards are displayed.

Item	Description
Network0 - 3	Displays the name of the LAN card connected to the PC.
MAC Address0 - 3	Displays MAC address of the LAN card.

- STORAGE

The following items display IDE, IEEE1394-HDD and USB memory storage information of the PC. If more than one HDD is connected, the information of up to 4 HDDs are displayed

Item	Description
IDE HDD0 - 3	Displays the name and the capacity (GB) of IDE HDD connected to the PC.
USB Flash Disk0 - 3	Displays the name and the capacity (GB) of USB Flash Disk connected to the PC.
1394 Disk0 - 3	Displays the name and the capacity (GB) of IEEE1394-HDD connected to the PC.
Other Disk0 - 3	Displays the name and the capacity (GB) of the HDD other than the above three HDD types which is connected to the PC

- ODD

The following item displays ODD information of the PC. If more than one ODD is connected, the information of up to 4 ODDs are displayed.

Item	Description
ODD0 - 3	Displays the name and the media type of the ODD connected to the PC. Media type is information of the media used, such as CD-ROM, DVD-RW and etc.

- Drive

The following item displays Drive information of the PC. If more than one ODD is connected, the information of up to 4 ODDs are displayed.

Item	Description
Drive	The information on the assigned logical drive is displayed. Type, volume name, free disk spaces (free size), and used disk spaces (used size) is displayed.

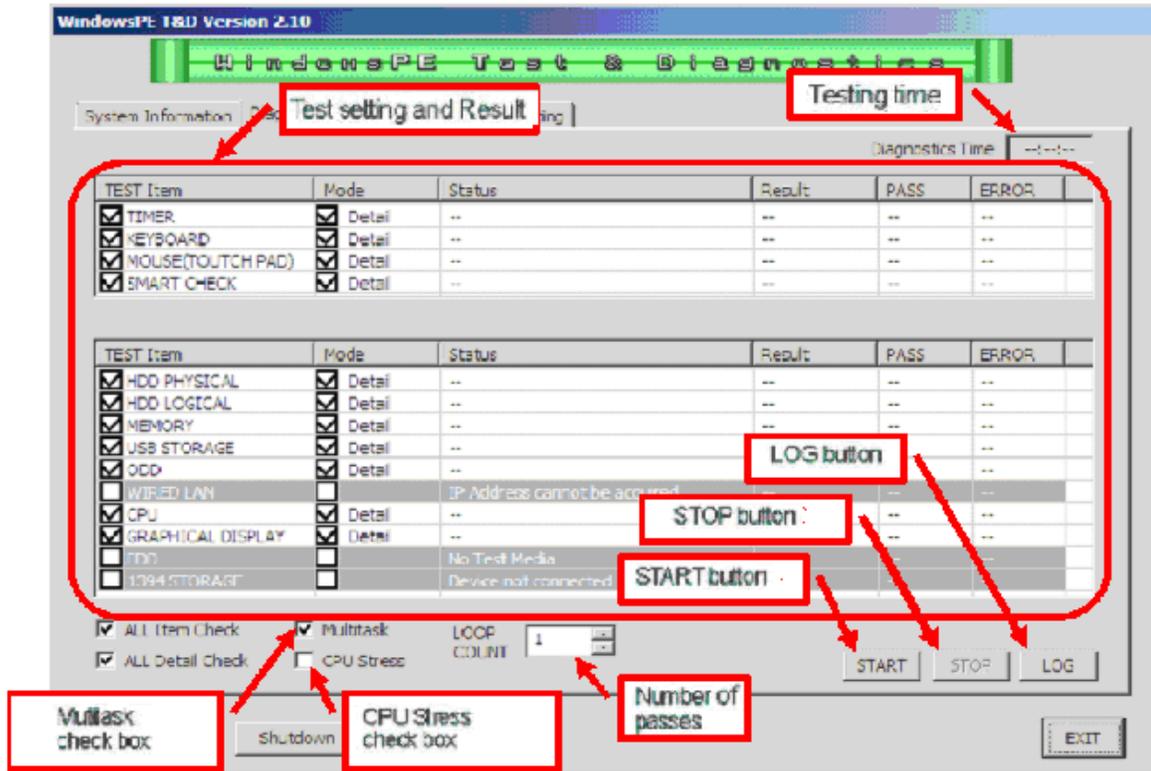
- OTHER DEVICE

The following items display other device information of the PC.

Item	Description
FDD	Displays the name of the FDD connected to the PC.
Key Board0 - 3	Displays the name of the Keyboard connected to the PC. If more than one keyboard is connected, the information of up to 4 keyboards are displayed.
Mouse0 - 3	Displays the name of the mouse connected to the PC. For the touchpad, (Touchpad) follows the mouse name.

3.34.4 Test Menu

This section explains the Diagnostics screen.



3.34.4.1 Explanation of each item

- ▼ [Multitask] check box Checking this box activates each test as multi-task.
- ▼ [CPU Stress] check box Checking this box applies any stress to the CPU during the test.
Restriction: If the test is conducted, uncheck Multitask in the Simple mode before the test because of too much stress to be applied to the CPU. Also, USB and TIMER of TEST Item cannot be supported.
- ▼ [Number of pass] number of passes Sets the number of times of a test, which allows you to specify from 1 to 999.
- ▼ [START] button Starts the test.
- ▼ [LOG] button Displays the test result or the menu to save it. The detailed explanation will be given in section 3-4-5.
- ▼ [STOP] button Stops the test during the execution of it.
- ▼ Testing time Updates the testing time and displays it in real time during the execution of the test.
- ▼ Test setting and Result This will be explained in section 3-4-2.

3.34.4.2 Test setting and Result

TEST Item	Mode	Status	Result	PASS	ERROR
<input checked="" type="checkbox"/> TIMER	<input checked="" type="checkbox"/> Detail	--	PASS	--	--
<input checked="" type="checkbox"/> KEYBOARD	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> MOUSE(TOUCHPAD)	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> SMART CHECK	<input checked="" type="checkbox"/> Detail	--	--	--	--
TEST Item	Mode	Status	Result	PASS	ERROR
<input checked="" type="checkbox"/> HDD PHYSICAL	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> HDD LOGICAL	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> MEMORY	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> USB STORAGE	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> ODD	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> WIRED LAN	<input checked="" type="checkbox"/> Detail	IP Address cannot be acquired	--	--	--
<input checked="" type="checkbox"/> CPU	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input checked="" type="checkbox"/> GRAPHICAL DISPLAY	<input checked="" type="checkbox"/> Detail	--	--	--	--
<input type="checkbox"/> FDD	<input type="checkbox"/> Detail	No Test Media	--	--	--
<input type="checkbox"/> 1394 STORAGE	<input type="checkbox"/> Detail	Device not connected	--	--	--

- ▼ TEST Item Checks the check box of the item to be tested.
- ▼ Mode Sets the test mode for each test item.
- ▼ Status The following table explains status information of each test item (test device).Status Description

Status	Description
--	Ready for the test prior to the start of it.
*****	Gray out. It is indicated when the test environment is not ready. Refer to the following items for details.
TESTING	The test is running.
SKIP	The test was skipped.
DONE	The test finished

Note: The test item grayed out indicates that the test environment is not ready and its explanation is displayed in the Status field.
The following table lists the statuses to be displayed on the screen and explains their meanings.

Status	Description
Device not connected	Peripheral device necessary for the test is not connected. USB flash memory, FDD and others may be connected to the PC.
Device has a problem	Failure occurred in the device driver.
This Device is disabled	The device has been removed.
This Device is currently stopped	The device is in the STOPPED state.
IP Address cannot be acquired	The IP address is not able to be obtained. The LAN cable may not be connected.
No Test Media	Test media is not inserted. Please insert the test media to the ODD or the FDD.
Space Size Error	This device is insufficient of free disk spaces required for a test.
No partition or file	A partition is not in devices, such as HDD, USB, and IEEE1394. Or the file does not exist in HDD.

- ▼ Test result ... The test results to be displayed on the screen are as follows:
- ▼ PASS ... Updates the number of passes of each test in real time during a test and displays it.

Status	Description
--	This is displayed before the start of every test or if the test is skipped.
OK	The test was successful
NG	The test failed

- ▼ ERROR ... Updates the number of error occurrences in each test in real time during a test and displays it.

3.34.4.3 Test Procedure

This section describes operation procedure of WinPE T&D.

1) Select the test item to run from Test Item and check it. (If you put a check mark in the ALL Item Check check box, all test items are checked.)

2) Select the test mode of each test.

(If you put a check mark in the ALL Detail Check check box, all tests are performed in the Detail mode.)

3) Set the number of LOOP CONT, Multitask and CPU Stress.

4) Click on the [START] button and the test starts.

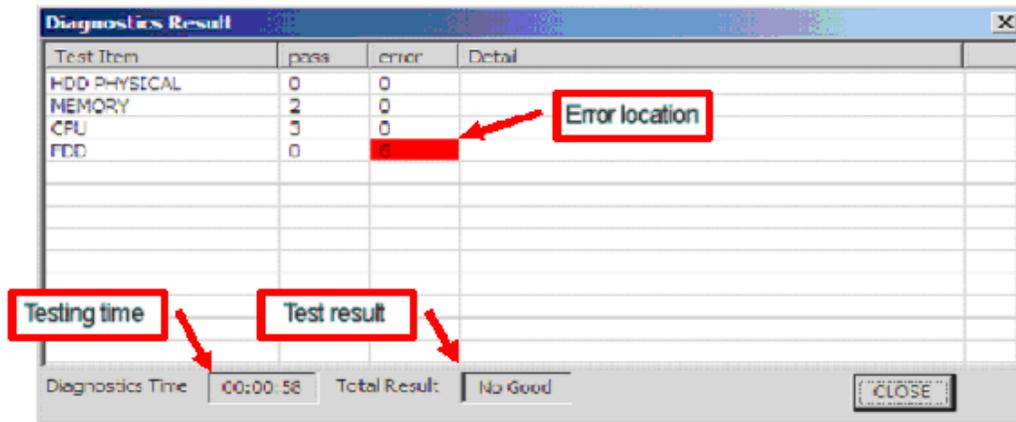
5) When "Multitask" is checked and a test is started, the test of Keyboard and Mouse is done once first. Next, other tests are started.

6) If PASS of each test reaches the value set to [LOOP COUNT] the number of pass times, the test is terminated, or if the [STOP] button is clicked, the test is terminated

<p><i>Note: The test item grayed out indicates that the test is not ready yet and you cannot select it.</i></p>
--

3.34.4.4 Display of Test Result

If the test ends successfully or the [STOP] button is clicked, the following Result screen is displayed.

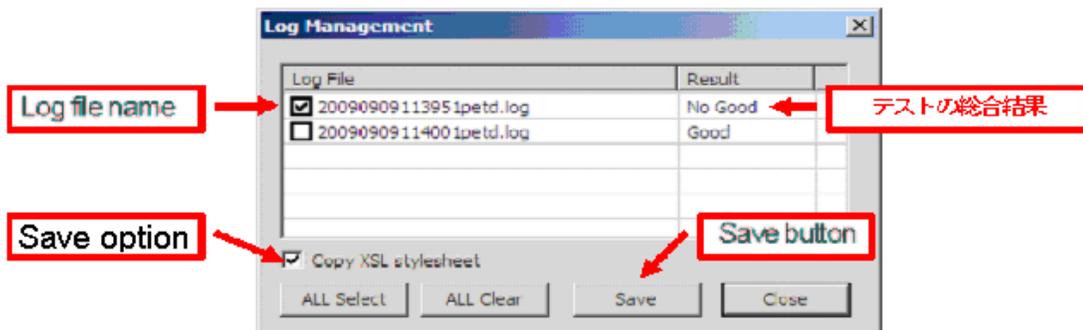


After confirming the result, click the [CLOSE] button to close the screen.
After the display of the test result screen, the test result logs are saved to X drive.

Note: WinPE is extracted on the RAM disk on drive X. Therefore, if the PC is shut down, the log files will be lost. It is recommended that necessary log files should be stored in an external media according to the procedure described in section 3-4-5.

3.34.4.5 Test Log Management Screen

If you press the [LOG] button on the Diagnostics screen, the following log management screen opens. This function saves test log files to the specified storage.



1) Display of log file

If you click on the log file name displayed on the screen, the content of the log file is displayed in the text format.

2) How to save log files

The following is the procedure to save log files to an external media

Test logs in the text format and HTML log files and XSL style sheet file are saved to the external media.

2-1) Click the check box of the log file to save.

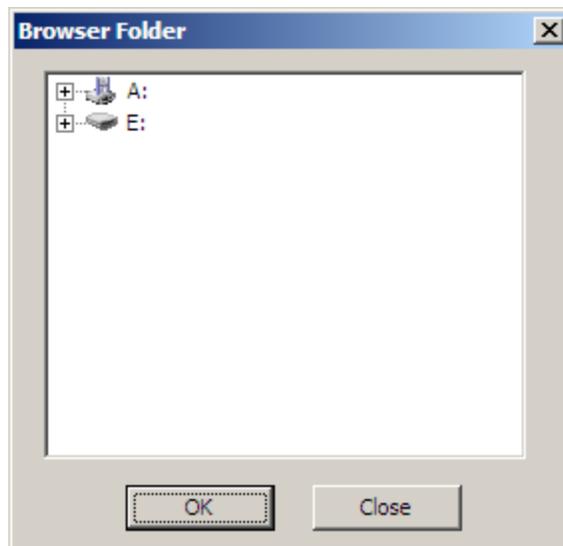
If you click the [ALL Select] button, all the check boxes of the log files are checked.

Also, if you click the [ALL Clear] button, all the checkmarks in the check boxes are cleared.

2-2) Save option is set up.

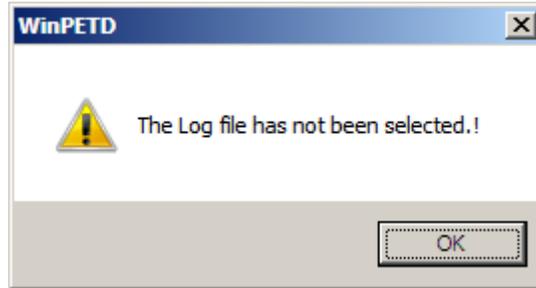
When it does not save an XSL style sheet, Copy XML style sheet is not checked. If an XSL style sheet file is saved to the same folder as XML, An XML log file is similarly displayed as a HTML log file.

2-3) If you click the [Save] button, the destination selection screen is displayed. Select the destination and click the [OK] button.



Warning Message

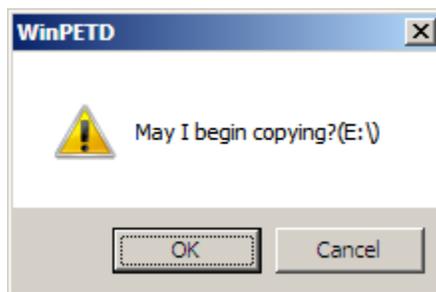
If no log file is selected, the following warning message appears on the screen,



If the [OK] button is clicked without selecting a destination, the following warning message appears on the screen.



2-4) If a destination confirmation message is displayed, click the [OK] button.



2-5) If the log file is successfully saved to the destination, the following confirmation screen is displayed and click the [OK] button.



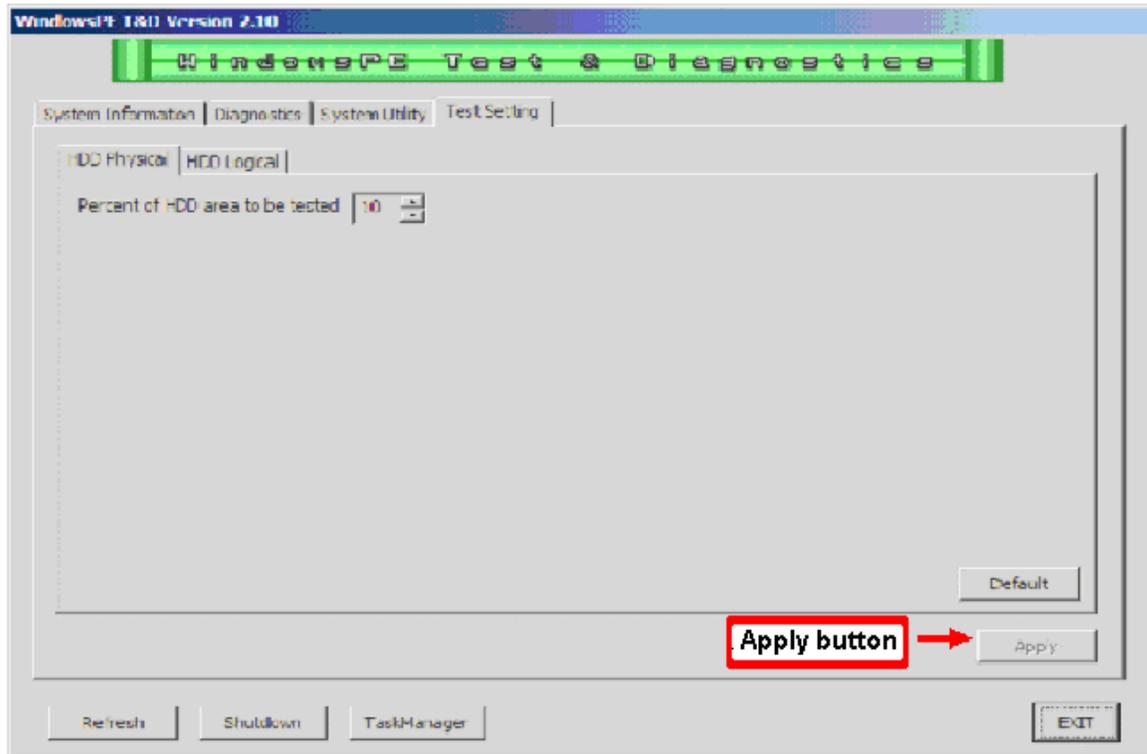
2-6) After saving the log files, click the [Close] button to close the Management screen.

3.34.6 Test setting Menu

This section explains Test setting screen.

3.34.6.1 Explanation of Each Item

The Apply button for validating a setup of each test item is shown in a Test Setting screen. Setup of each test item changes and sets up a test item tab.

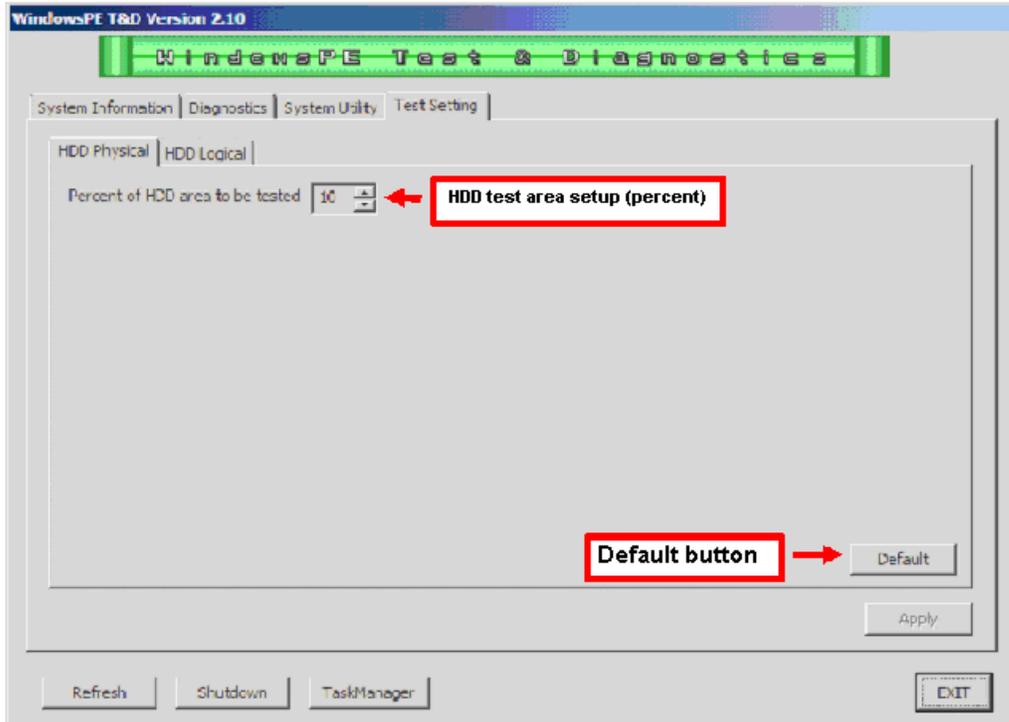


▼ Apply...Each setting item is validated. This button is clicked when a setup is changed.

Note: Each setting item does not become effective unless it clicks the Apply button.

Note: When validating each setting item, a warning message may be displayed if there is a problem.

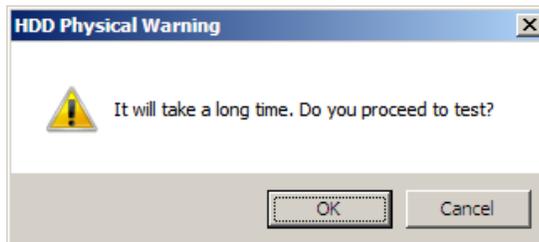
3.34.6.2 Explanation of HDD Physical Each Item



- ▼ Percent of HDD area to be tested...A value is set up with a spin button. Setting ranges are 5-100 in five units. Default value is 10. Value cannot be inputted directly.
- ▼ Default...setup is changed into a default value.

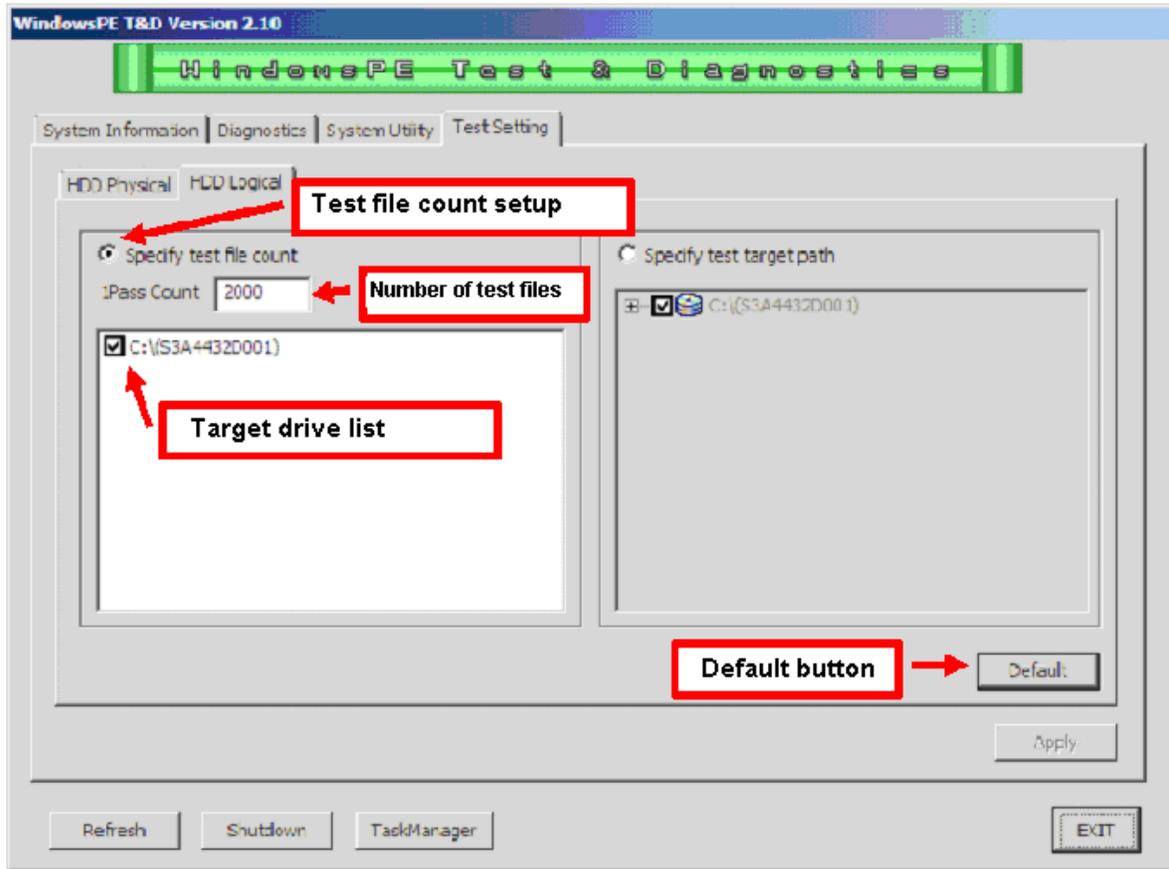
About a message display

When the Apply button is clicked and it is judged that test time exceeds 30 minutes, the following warning messages are displayed.

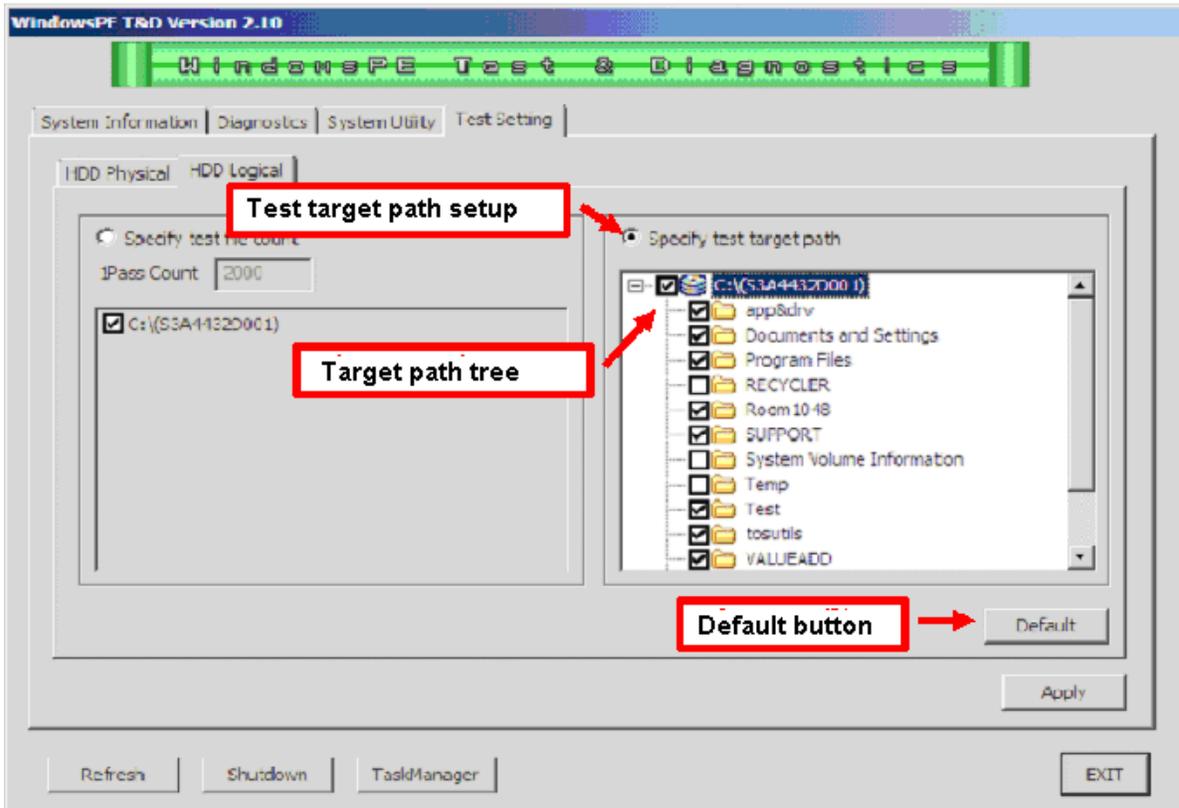


- O.K. : Setup is validated.
- Cancellation : Setup is canceled.

3.34.6.3 Explanation of HDD Logical Each Item



- ▼ Specify test file count... test file count setup is validated. Test target path setup becomes invalid. Default value is effective.
- ▼ 1Pass Count number of test files is set up. When reading inspection of the specified number of test files is completed, it is considered as One pass. setting range is 2000 to 100000. Default value is 2000.
- ▼ Target drive list drive for a test is set up. As for the default value, all the drives are chosen. It is necessary to certainly check one or more drives.
- ▼ Default...setup is changed into a default value.



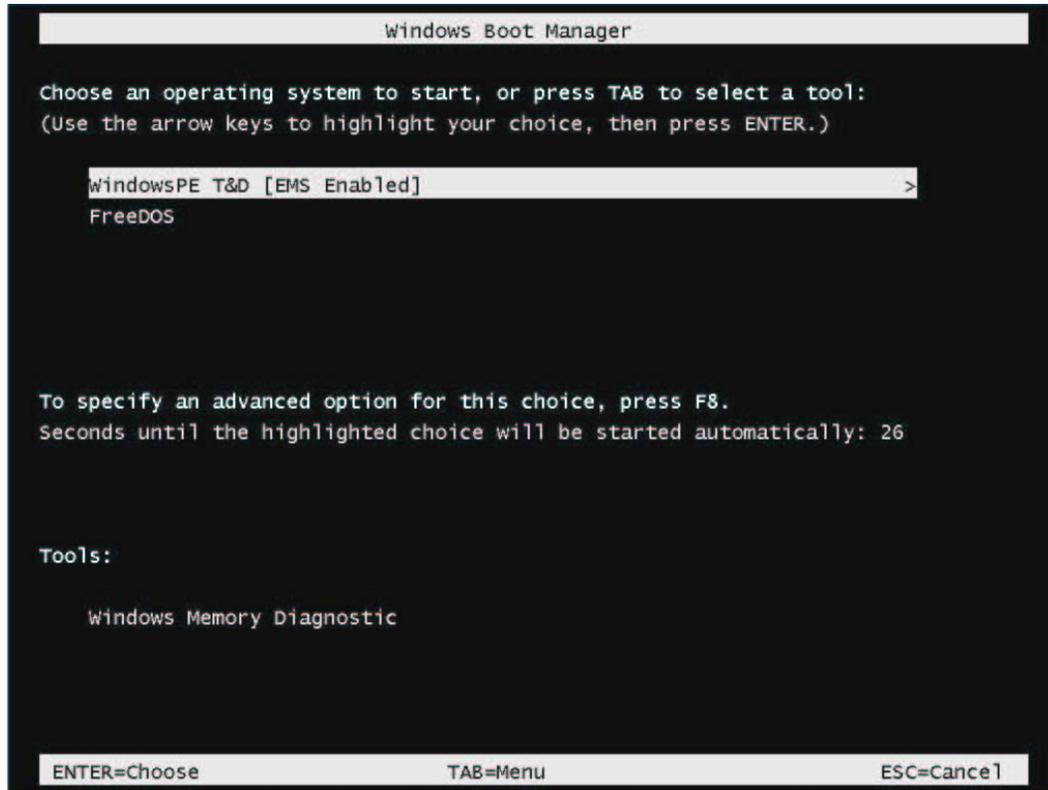
▼ Specify test target path...test target path setup is validated and a test file count setup is repealed. default value is invalid.

▼ Target path tree The path for a test is set. As for the default value, all the path(s) are chosen. It is necessary to certainly check one or more paths.

Note: Please be sure to choose one or more path(s). The Apply button becomes invalid when a setup is an invalid value.

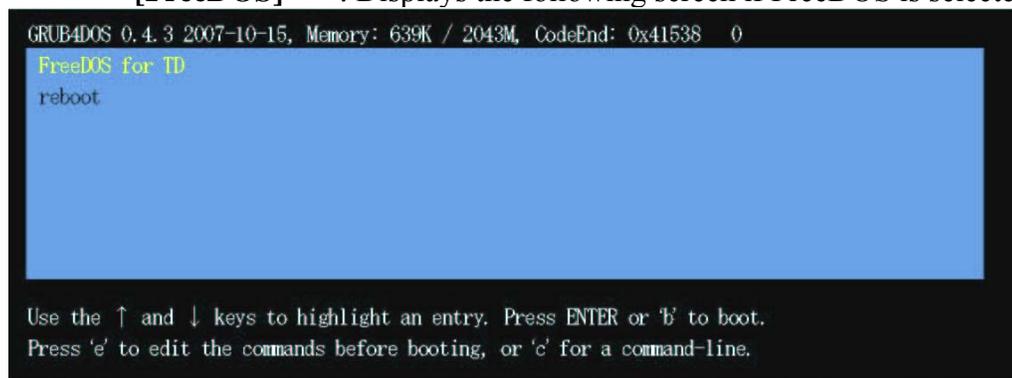
3.34.6.1 USB Memory Creation Tool

If the system is booted using the USB memory created in 3-5-2, the following screen is displayed.



Press the arrow keys to operate on the multi-boot screen.
Move the cursor to the desired item and press the Enter key.

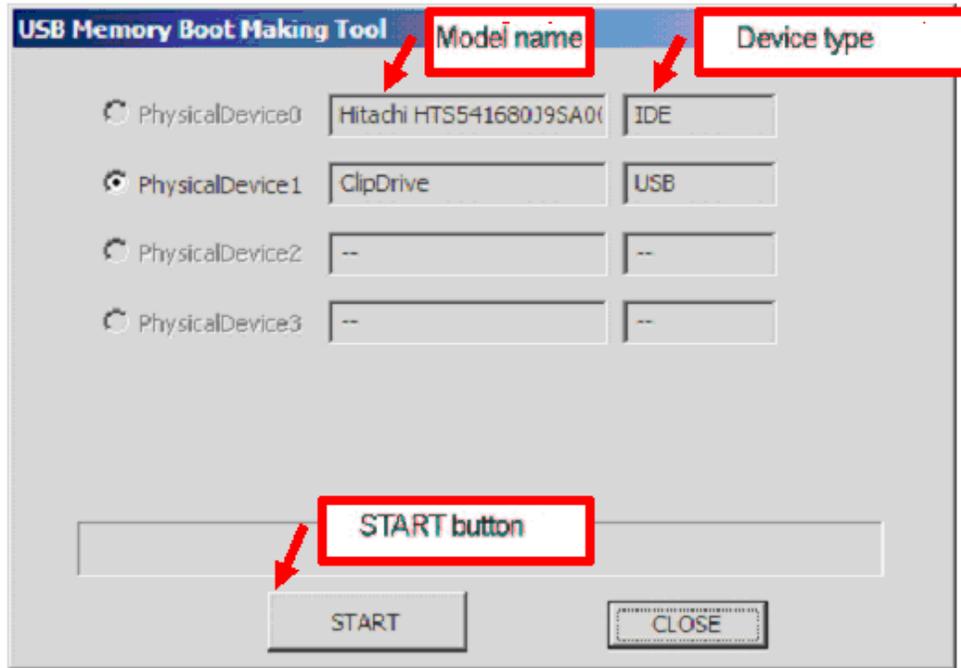
- [WindowsPE T&D]:** Starts up WindowsPE and then starts WinPE T&D.
- [FreeDOS]** : Displays the following screen if FreeDOS is selected.



Use the arrow keys to operate on the screen. Move the cursor to [FreeDOS for TD] and press the Enter key. If [reboot] is selected, the PC is rebooted.

This utility extracts the contents of TOSHIBA Test & Diagnostic to the specified USB memory to provide the environment which allows you to start the test from the USB memory and conduct it. If the utility is executed, the following screen is displayed.

Note: If this tool is run, the content of the USB memory is cleared. Use the USB memory with 512MB or more.



Operational Procedure

- 1) The device type checks the USB device.
- 2) Click the [START] button.
- 3) Creation of the USB memory for TOSHIBA Test & Diagnostic is started.

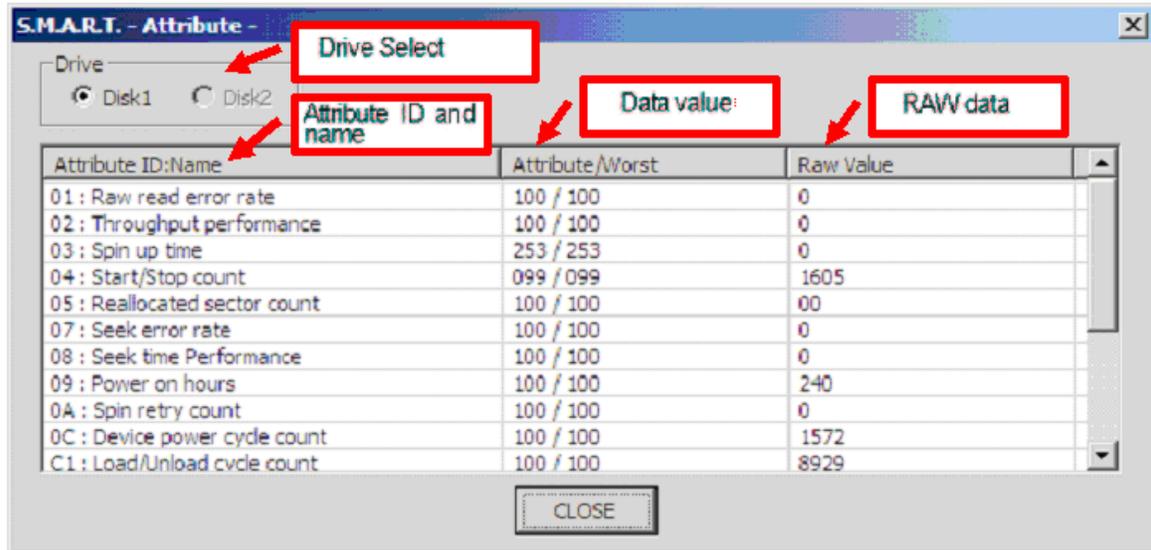
Error Message	Description
There is no WinPE folder.	The folder to be copied does not exist. Reading from the CD may have failed.
DISKPART failed.!	The DISKPART command failed. Check whether the USB memory is normal.
It failed in the copy!	The file copy failed. Check whether the USB memory is normal

3.34.6.2 Display of SMART Information

This utility lists the SMART information on the screen. Attribute and Worst values for each ID are also displayed.

Since some HDDs do not have ID, these information are not displayed in that case.

The following screen displays the SMART information of the first HDD.



When two HDDs are connected and the current checkbox is changed to Disk2, the SMART information of the second HDD is displayed.

- ▼ [Drive Select] ... Checkbox for selecting a HDD
- ▼ Attribute ID and Name ... Displays Attribute ID and the content of the Attribute IDs.
- ▼ Data value ... Displays Attribute value and Worst value.
- ▼ RAW data ... Displays raw data.

Note: The SMART information is only for reference.

Each ID and its details are listed in the following table.

ID	Attribute Name	Description
1h	Raw read error rate	Read error rate Rate of errors which occur when the HDD reads data.
2h	Throughput performance	Throuput performance
3h	Spin up time	Start-up time of spindle mortar Averate time from turning the power on to starting spinning
4h	Start/Stop count	Number of stops of the spindle morotr after the factory setting
5h	Reallocated sector count	Number of defective sectors for which alternative processing was performed.
7h	Seek error rate	Rate of seek errors
8h	Seek time Performance	Processing time of sequential seek and random seek
9h	Power on hours	Power-on hour after the factory setting
Ah	Spin retry count	Number of retires of spinning up within the prescribed rate
Ch	Device power cycle count	Number of power-on/power-off operations of HDD
C1h	Load/Unload cycle count	Number of head loads
C2h	Temperature	Past maximum temperature, past minimum temperature, current temperature
C4h	Reallocation event count	Number of alternative sector events
C5h	Current pending sector count	Number of currently defective sectors
C6h	Off-line scan uncorrectable sector count	Number of sectors that could not be corrected during Off-line scan

C7h	UltraDMA CRC error count	Number of CRC errors occurred during data transference in the UltraDMA mode
DFh	Load/Unload retry count	Number of reloads of more than a certain amount of times

3.34.7 Details of Each Test Function

3.34.7.1 HDD Physical Test

1) Test content

This test handles the HDDs to the PC as physical unit and conducts read test to the target HDD to check whether it works or not.

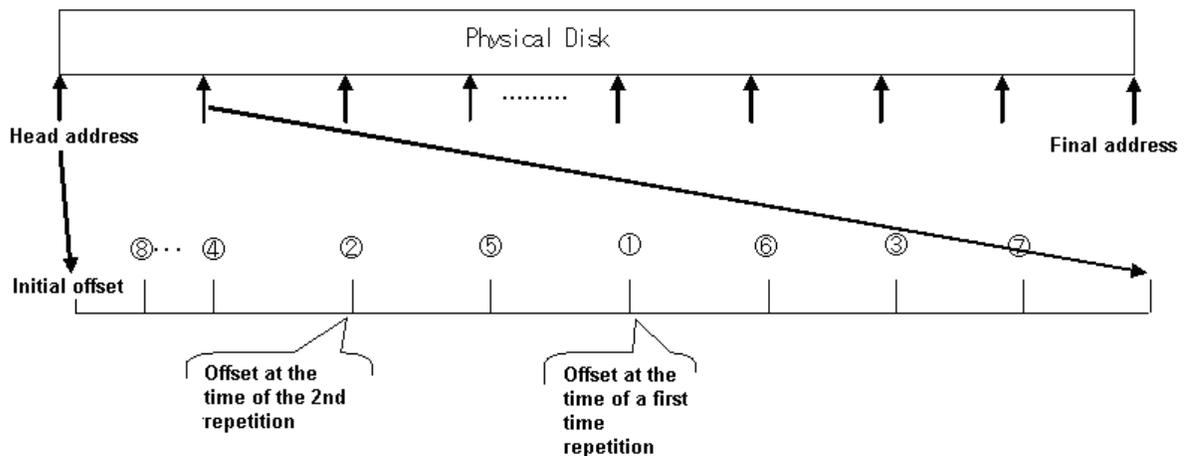
Up to first four HDDs connected to the PC can be the target of the test.

■ Simple Mode

- The amount of 10GB does the reading test of all the sectors by sequential lead in the first half of an HDD test.
- The second half portion of an HDD test divides the remaining domains into 5000, and leads every 64KB of each point.
- When a test carries out a loop, the test which is 10GB of the first half does not perform. 10GB of this test is already completed.
- A test When carrying out a loop, A test start point is offset so that the place which tested by then may not be overlapped.

An offset position is computed in the following formula.

A head address is changed whenever a test carries out a loop. A different domain by that cause can be tested.



The n-th offset is computed in the following formulas. X introduces the total number of sectors of HDD.

$$\left(\frac{1}{2}\right)^{[\log_2 n]+1} \{1 + 2(n - 2^{[\log_2 n]})\} \frac{X}{1000} \quad ([x] \text{ The maximum integer that does not exceed } x)$$

$$\left(\frac{1}{2}\right)^{\log_2 n} \frac{X}{1000} \leq \quad (\text{The number of sectors equivalent to 64k})$$

When it becomes (the completion of an HDD test of all the area), it returns to initial offset after that.

■ Detail Mode

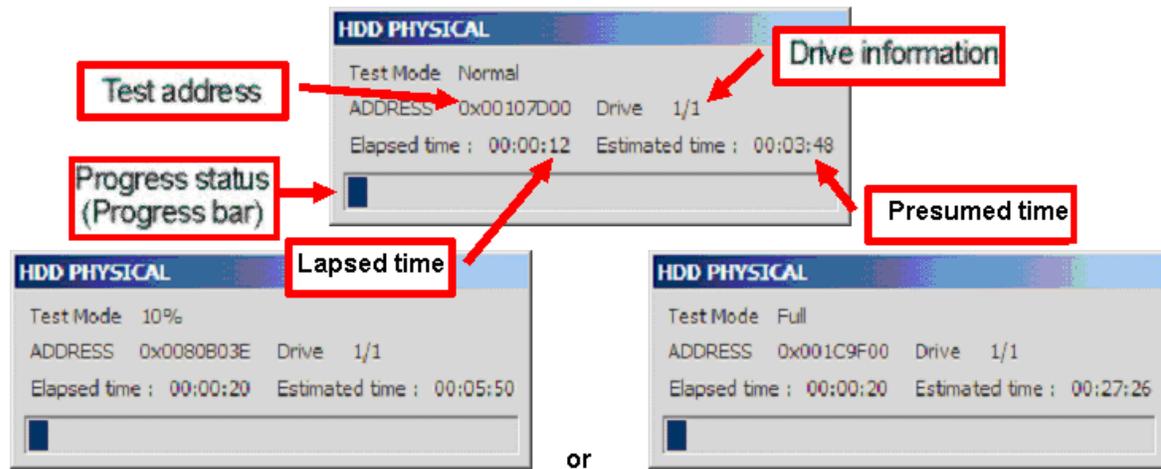
The area (%) which HDD tests are set up. The number of division is determined based on this. When set up to 100%, the Sequential Read test over all the area of HDD is carried out. When set up to 100%, the Sequential Read test over all the area of HDD is carried out.

Subject of examination :

The setting rate of all the HDD area (from a head address to LBA) (%)

1 time of reading size: 64 K bytes

2) Test screen



- ▼ Test address: Displays the address (LBA) of the test currently performed.
- ▼ Drive information: Displays the drive number of the test currently performed.
- ▼ Progress status: Displays the progress status of the test with the progress bar.
- ▼ Lapsed time: Lapsed time is displayed.
- ▼ Presumed time: Presumed time of the end of a test is displayed.

3) Result judgment

This test regards as 1PASS when every read test of all of the HDDs connected to the PC is successful.

If an error occurs even in an HDD, the error count is incremented.

■ In the case of PASS

The Pass Count on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. Move details are as shown below.

Message	Explanation	Remarks
Read Hdd Create File Error.Address=XX	Failed in opening of HDD driver. XX is LAB value.	The HDD driver may not be normal or installed.
Read Hdd Set File Pointer Error.Address=XX	Failed in the HDD file pointer setting command. XX is LAB value.	It indicates that a read error occurred with the specified value
Read Hdd Command Error.Address=XX	Failed in the HDD read command. XX is LAB value.	
Read Hdd Check Size Error Address=XX	The size read by the HDD read command does not correspond to the specified size. XX is LAB value.	

3.34.7.2 HDD Logical Test

1) Test content

This test first verifies that the files which exist on the drive recognized as the built-in HDD are read normally.

During the verification operation, the status update is performed sequentially (display of file names in File Name) and when the verification reaches the last file, it is terminated.

In addition, reading of a file reads 1MB of area from a head. If 1MB of the area reads without a problem and is made, it will be judged as O.K.

■ Simple Mode

This test mode performs the read test to the first 400 files on the drive.

■ Detail Mode

About a setup of 1PASS Count

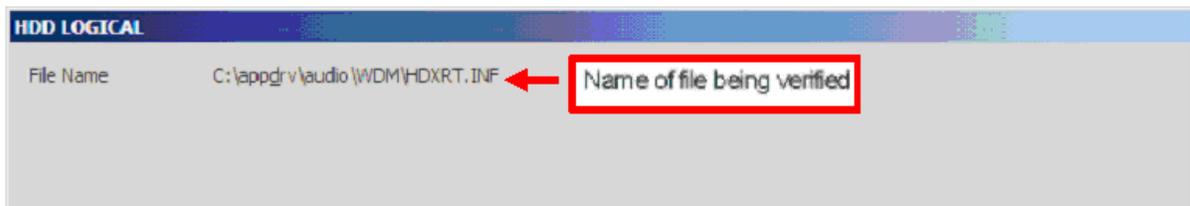
A Detail test mode specifies the number of times of a test by "1 PASS Count" box of a detailed setting screen. When the number of files of HDD is below a default value at this time, and the reading test of all the PATH files of HDD is completed, it judges with 1PASS.

A default preset value tests by reading from a head to 2000 files.

About Folder PASH

Only PATH specified by the folder tree of the Detail setting screen is tested. Only the folder of the root class of each drive can be specified. Moreover, although the file to a root class is not displayed on a folder tree, it tests. Moreover, although the file to a root class is not displayed on a folder tree, it tests. It will be referred to as "1PASS" if the reading test of all the specified PATH files is completed.

2) Test screen



▼ File Name: Displays the name of the file being verified with full path.

3) Result judgment

Both of PASS and FAIL are not displayed anywhere on the HDDL screen.

The result is reflected to the log on the WinPE T&D screen.

■ In the case of PASS

The result is displayed as (OK) in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The result is displayed as (NG) in the Result field on the WinPE T&D screen.

The file name of the file in which an error occurred is printed to the log of WinPE T&D.

(The following example indicates the case where an error was found in file A .)

Name of file being verified

<p>[HDDL] ERROR0000=(2008/09/10, 12:00:00) C:¥file-A</p>
--

3.34.7.3 Memory Test

1) Test content

This test reserves free memory area in the main memory and performs Write, Read and Compare operation to the area to verify data validity. A test using burst transfer is also performed.

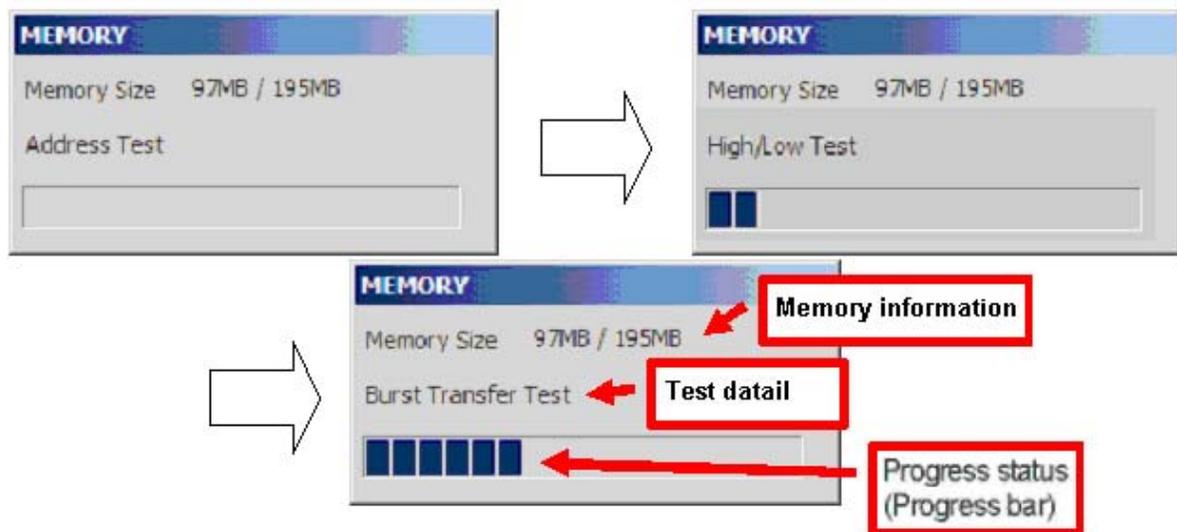
■ Simple Mode

This test mode only executes Address Test and Stack High/Low test.

■ Detail Mode

This test mode also executes Address Test and Stack High/Low test as well as Bust Transfer test.

2) Test screen



- ▼ Memory information: Displays the memory capacity reserved for the test and the total free memory
- ▼ Test detail: Displays the detail of the test being executed in the order of Address Test, Stack High/Low Test and Burst Transfer Test.
- ▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result judgment

■In the case of PASS

The PASS Count on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■In the case of FAIL

The PASS Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
Memory Compar Error (Address Test)	An error occurred during Address Test.	
Memory Compar Error (Stack High/Low Test)	An error occurred during Stack High/Low Test	
Memory Compar Error (Burst Transfer Test)	An error occurred during Burst Transfer Test.	

3.34.7.4 USB Test

1) Test content

This test accesses a file on the disk in the USB device (USB Flash Memory) to verify the file validity.

Create a file with the specified size in the USB device and delete the file after creating it.

■ Simple Mode

This test mode creates a 4 MB file (Write), reads the file and compares it with the original file.

■ Detail Mode

This test mode creates a 12 MB file (Write), reads the file and compares it with the original file.

In the case of the following drive configuration, this test is performed only to the F drive.

Name	Disk Type	Drive Type
3.5 –inch FD (A :)	3.5-inch floppy disk	FDD
Local disk (C :)	Local disk	HDD
DVD drive (D :)	CD drive	CD
Local disk (E :)	Local disk	HDD
Removal disk (F :)	Removal disk	USB
SD storage device (G :)	Removal disk	SD

2) Test screen



▼ Test detail: The drive under test execution is displayed..

▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result judgment

This test is regarded as 1PASS when every access to the files in all of the devices connected to the PC is successful.

If an error occurs even in a device, the error count is incremented.

■ In the case of PASS

The PASS Count on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
File Access Error.xx:	Failed in the file access. xx indicates drive name.	
Space size Error. Code (xx :)	There is no sufficient free space for the file size. xx indicates drive name.	

3.34.7.5 ODD Test

1) Test content

This test reads the test data in the CD inserted on the CD drive (External CD driver is also possible) to verify the data integrity. During the verification operation, update of the read address is performed (displayed on the right side of the Addressing Data) and when the verification reaches the end of the data, it is terminated.

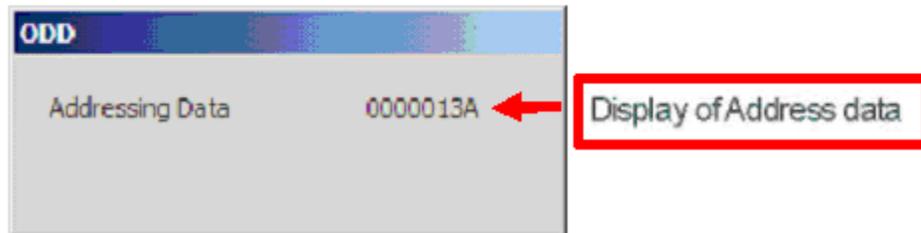
■ Simple Mode

This test mode reads 64MB data and compares it with the original data.

Detail Mode

This test mode reads 192MB data and compares it with the original data.

2) Test screen



▼ Addressing Data display: Displays the memory address of the test data.

The test data is a collection of data blocks separated by 32K bytes and the display ranges from the data address (00000001) to the Simple test mode (000007FF) or the Detail test mode (000017FF) is the address of a data block

3) Result judgment Both of PASS and FAIL are not displayed anywhere on the ODD screen.. The result is reflected to the log on the WinPE T&D screen.

■ In the case of PASS

The PASS Count on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The Addressing data of the data in which an error occurred is printed to the log of WinPE T&D. (When an error occurs at 000007FF)

[ODD]

ERROR0000=(2008/09/10, 12:00:00)000007FF

3.34.7.6 WIRED LAN Test

1) Test content

This test checks that normal communication can be performed with the built-in LAN card. To execute the test, it is necessary that Mac address for the LAN card should have been set and IP address should have been given to the machine.

■ Simple Mode

transmit 32 packet sizes data via the LAN line and confirm that a response can be received normally.

■ Detail Mode

transmit 198 packet sizes data via the LAN line and confirm that a response can be received normally.

2) Test Screen



- ▼ LAN Card information: Displays the name of LAN card, MAC address and IP address.
- ▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result Decision

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
An IP address does not understand one.	IP address cannot be obtained.	This error occurs when IP is not assigned or the test is conducted with a LAN card.
WSAStartup failed: xx	In-use API error xx indicates error code.	This is a message caused by an error of Windows Socket API used in the test.
failed to set recv timeout: xx	In-use API error xx indicates error code.	
failed to set send timeout: xx	In-use API error xx indicates error code.	
Invalid in-address: xx	In-use API error xx indicates IP address	
send to failed: xx	In-use API error xx indicates error code.	
Wrote xx bytes	Communication data size unmatched xx indicates reception size	
recvfrom failed: xx	In-use API error xx indicates error code.	
timed out.	Time out occurred.	

3.34.7.7 CPU Test

1) Test content

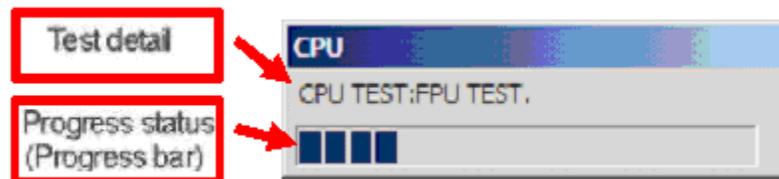
This test performs arithmetic operation test to the CPU to verify the CPU operation. The test processes ALU and FPU operations and allows you to check that the results are correct.

■ Simple Mode / Detail Mode

Conduct the same test in both Simple mode and Detail mode.

The test content is to process the ALU and FPU operations and check that the results are correct.

2) Test screen



- ▼ Test detail: The test details under execution are displayed. It displays in order of ALU TEST and FPU TEST.
- ▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result judgment

Check whether the calculation result is the same as expected one.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
The ALU test made an error.	An error occurred during processing of ALU.	
The FPU test made an error.	An error occurred during processing of FPU.	

3.34.7.8 VIDEO Test

1) Test content

This test displays red, green, blue, white and black colors, circles, line gradation, ASCII characters and H pattern full screen.

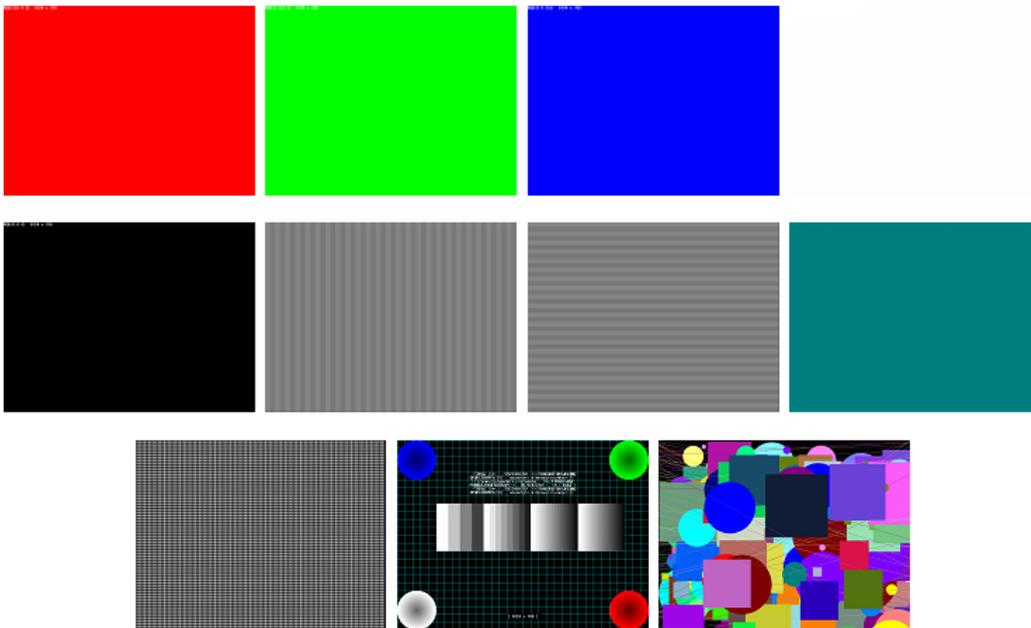
■ Simple Mode

This test mode displays red, green, blue, white and black colors, circles, line gradation, ASCII characters and H pattern full screen.

■ Detail Mode

This test mode performs display of test items in the Simple mode as well as random drawing of circles, squares and lines.

2) Test screen



Example of a test screen

3) Result judgment

The operator judges PASS or FAILE by visual check. However, unless program error occurs, OK is displayed in the Result field on the WinPE T&D screen.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

This test only performs gradation display by visual check and does not execute error judgment.

3.34.7.9 FDD Test

1) Test content

This test accesses a file on a floppy disk and verifies that the access can be made correctly. Create a file with the specified size on a floppy disk and delete the file after creating it. Perform the test after inserting a floppy disk to the drive.

■ Simple Mode

This test mode creates a 128 KB file (Write), reads the file and compares it with the original file.

■ Detail Mode

This test mode creates a 384 KB file (Write), reads the file and compares it with the original file.

2) Test screen



▼ Test detail: The drive under test execution is displayed..

▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result judgment

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
Space Size Error. Code(xx)	There is no sufficient free space for the file with the specified size. xx indicates error code.	This message also appears when no floppy disk is in the floppy disk drive.
Open File Error. Code(xx)	Failed in opening the file. zx indicates file code.	
Write File Error. Code(xx).	Failed in writing to the file. zx indicates file code	

Note: The test causes error if the floppy disk is write-protected. Make sure that the floppy disk is not write-protected.

3.34.7.10 IEEE1394 Test

1) Test content

This test accesses a file in the IEEE1394 device and verifies that the access can be made correctly.

Create a file with the specified size in the IEEE1394 device and delete the file after creating it

■ Simple Mode

This test mode creates a 4 MB file (Write), reads the file and compares it with the original file.

■ Detail Mode

This test mode creates a 12 MB file (Write), reads the file and compares it with the original file.

2) Test screen



▼ Test detail: The drive under test execution is displayed..

▼ Progress status: Displays the progress status of the test with the progress bar.

3) Result judgment

This test is regarded as 1PASS when every access to the files in all of the devices connected to the PC is successful.

If an error occurs even in a device, the error count is incremented.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on

the WinPE T&D screen.

The detail of the error is printed to the log of WinPE T&D. More details are as shown below.

Message	Explanation	Remarks
File Access Error.xx:	Failed the file access xx indicates drive name.	
Space size Error.Code(xx:)	There is no sufficient free space for the file with the specified size. xx indicates drive name.	

3.34.7.11 TIMER Test

1) Test content

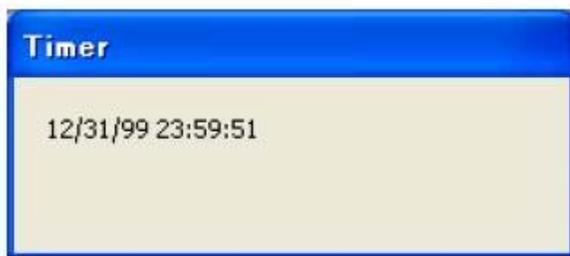
Execute the test after adjusting the internal time and verify the accuracy of the timer after it passes the year 2000. It tests only once not by an auto execution category but by a manual execution category from a version 2.10.

■ Simple Mode / Detail Mode

Simple Mode tests at intervals of order 5 seconds. Detail Mode tests at intervals of order 10 seconds.

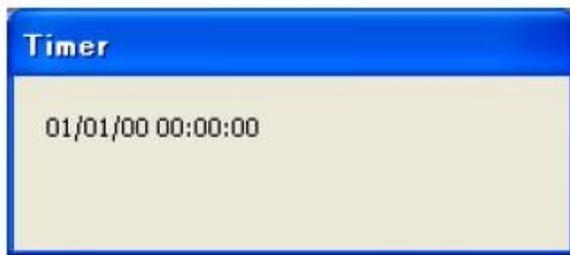
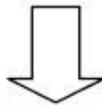
The test content is to verify that there is no difference between the calculated estimated time and really taken time.

2) Test screen

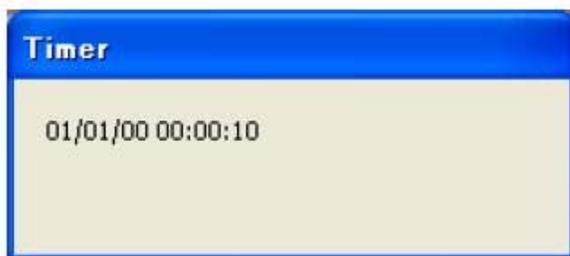
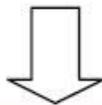


A clock will be set 10 seconds ago in 2000, and inspection will be started.

The time is displayed every one second on the screen.



All the displays are updated at once as the time reaches the year 2000.



Moreover, 10 seconds later, the validity of the setting is checked Internally and the result is judged.

3) Result judgment

Both of PASS and FAIL are not displayed anywhere on the TIMER screen.

The result is reflected to the log on the WinPE T&D screen.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

The information of the time at which an error occurred is printed to the log of WinPE T&D. More details are as shown below.

(The following example indicates that a time difference of 2 seconds has occurred in the timer setting.)

[TIMER]

ERROR0000=(2008/09/10, 13:11:20) (TIME-1)00:00:05 (TIME-2)00:00:07

3.34.7.12 KEYBOARD Test

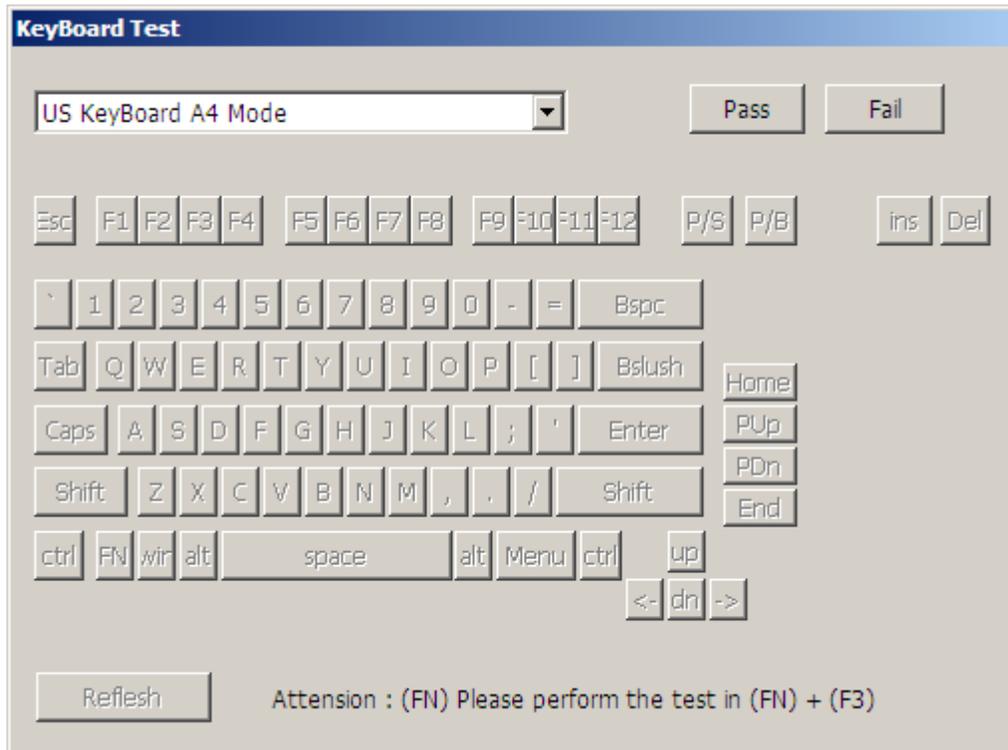
1) Test content

The keyboard of PC is a test which judges whether it operates normally.

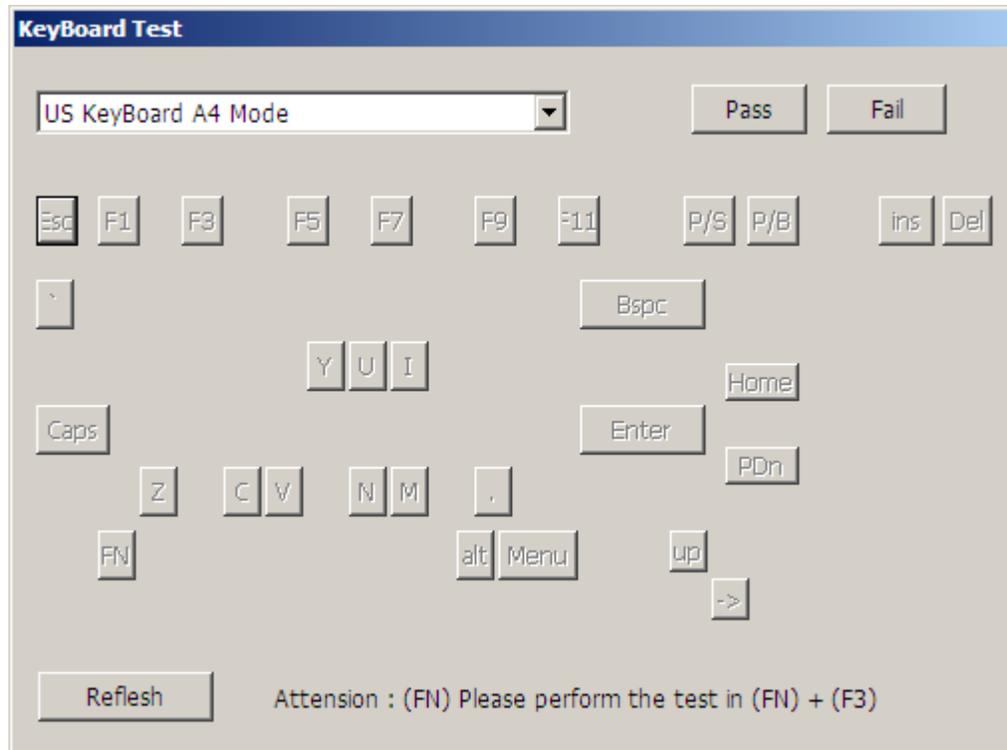
■ Simple Mode / Detail Mode

The same operation is carried out whichever it chooses.

2) Test screen

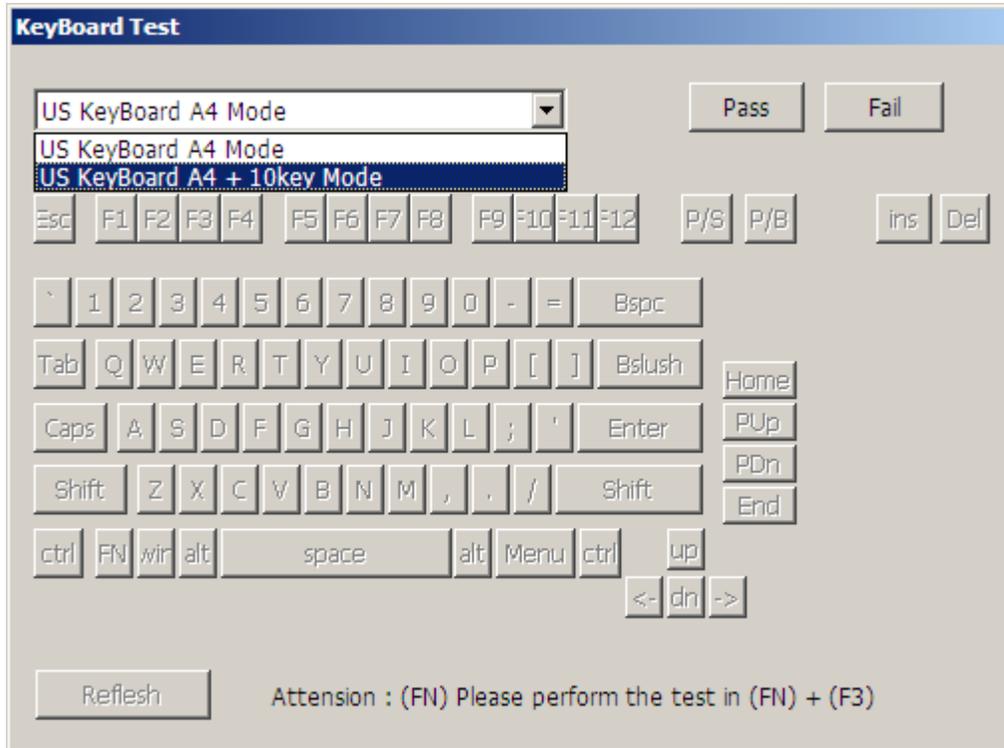


The arrangement of a keyboard is displayed on the display of PC.



- 1) If the press of a key is recognized correctly, the object key on a display will be eliminated.
- 2) When redoing a keyboard test, the "Refresh" button arranged at the screen lower left is pressed. Next, it returns to the state immediately after starting.

Note: The check of the "FN" key should press "FN" and "F3" simultaneously. It does not react, even if it presses only the "FN" key.



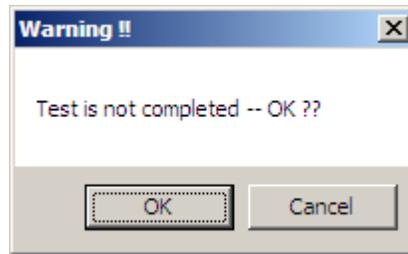
The keyboard which can be tested is two kinds, "US Keyboard A4 Mode" and "US Keyboard A4 Mode+10Key Mode."

When you test a keyboard with a ten key, choose "US Keyboard A4 Mode+10Key Mode" by the combo box of the keyboard layout upper left stage.

3) Result judgment

It is normal, if a keyboard test is done and all the keyboard layouts are eliminated. Press the "Pass" button with the judgment button at the upper right of a keyboard layout. Press the "Fail" button, when abnormal.

In addition, a warning message will be displayed, if the "Pass" key is pressed before all the keys are pressed. The thing in which the operator made the mistake is told.



OK: Although the keyboard test is not ended, it is considered as success.

Cancel: It returns to a keyboard test screen.

If all the keys are eliminated, it becomes impossible in addition, to choose the "Fail" button.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

3.34.7.13 Mouse Test

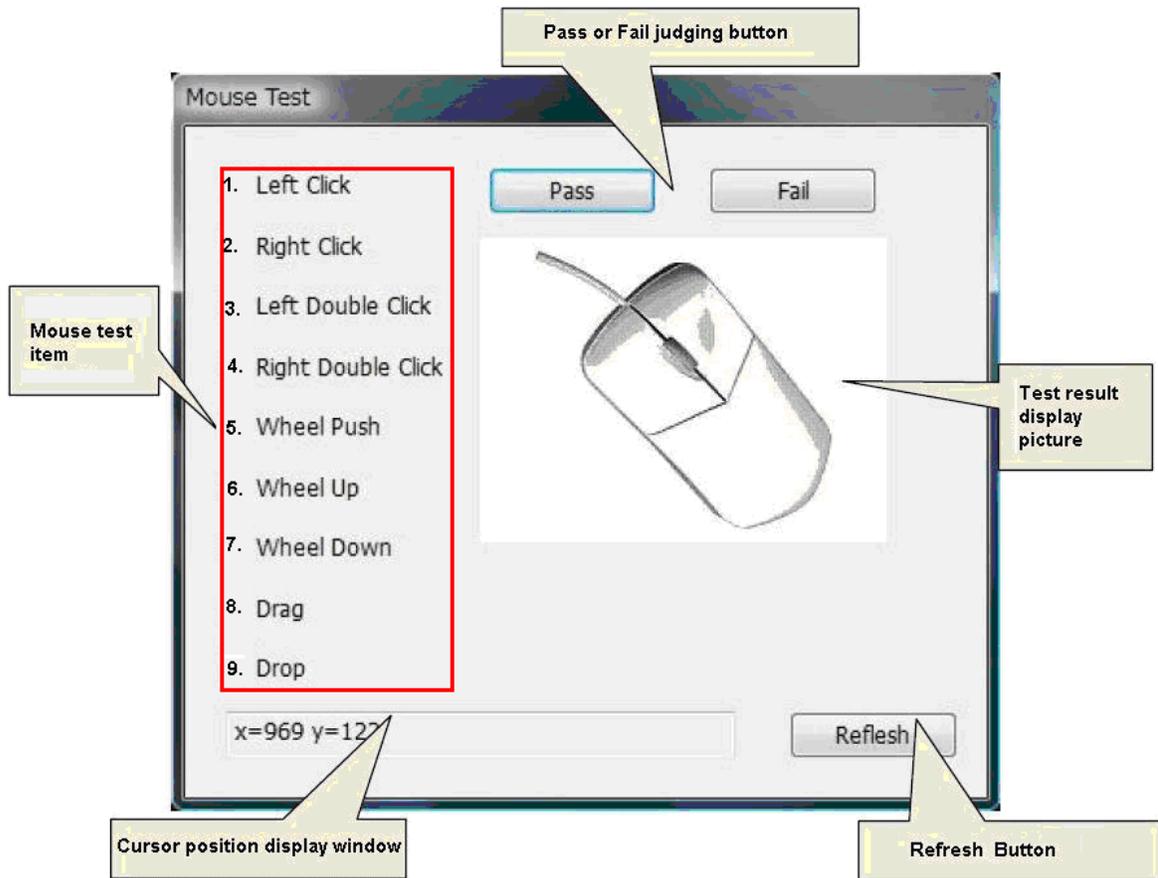
1) Test content

The Mouse of PC is a test which judges whether it operates normally.

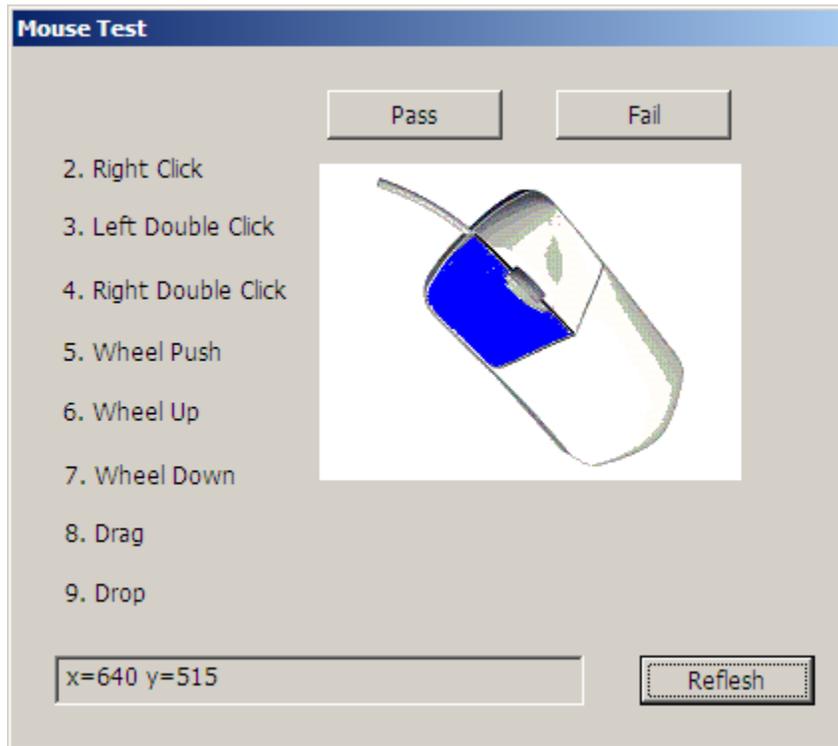
■ Simple Mode / Detail Mode

The same operation is carried out whichever it chooses.

2) Test screen



If a mouse test start is carried out, the above-mentioned screen will be displayed.



- 1) There is a test item to 1-9 of a mouse test screen. If applicable mouse operation is performed, a test item will disappear. Moreover, it is simultaneously displayed on the corresponding section of a right-hand side mouse illustration by coloring.
- 2) Press the "Refresh" button at the lower left of a screen to redo a mouse test. It returns to the initial screen of a test.
- 3) The cursor position is expressed in the lower part of a screen as X coordinates and Y coordinates.
- 4) Test items other than the cursor position become effective only on this screen.

3) Result judgment

When all the test items of a mouse test disappear and it is normal, Please push the "Pass" button of a mouse test screen. Press the "Fail" button, when abnormal.

A warning message is displayed, when the "Pass" button is pressed before the mouse test items were all completed. The thing in which the operator made the mistake is told.

OK: Although the keyboard test is not ended, it is considered as success.

Cancel: It returns to a keyboard test screen.

When the item to the mouse tests is eliminated, it becomes impossible moreover, to choose the "Fail" button.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

3.34.7.14 SMART CHECK Test

1) Test content

the judgment of the problem existence of HDD is performed using "HDD SMART information."

The check of the number of alternative sectors

The "Raw Value" value of "Reallocated Sector Count" of "SMART ID#5" in the data acquired by "SMART READ ATTRIBUTE DATA" is checked.

If the value becomes 100 or more, it will be considered as an error.

The check of an upper controller log

the latest log reported to the upper controller is checked. and "Error Register" If there is a value, it will judge with an effective log. Next, it tests by reading to LBA by which logging is carried out. "Command=C 8h (Read DMA)" or "25h (Read DMA Ext)" are then used.

When a media error is detected by a reading test, it is considered as an error.

■ Simple Mode / Detail Mode

The same operation is carried out whichever it chooses.

2) Test screen

a test screen is not displayed.

■ In the case of PASS

The PASS Count display on the test screen is zoomed in and (OK) is displayed in the Result field on the WinPE T&D screen.

■ In the case of FAIL

The Error Count on the test screen is zoomed in and (NG) is displayed in the Result field on the WinPE T&D screen.

3.35 DOS T&D

3.35.1 Configuration of Test Equipment

The configuration of test equipment required for executing FreeDOS T&D is as follows:

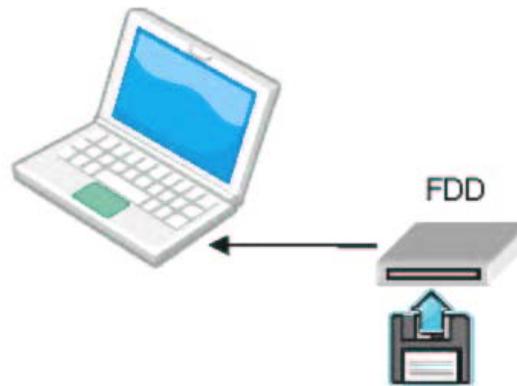
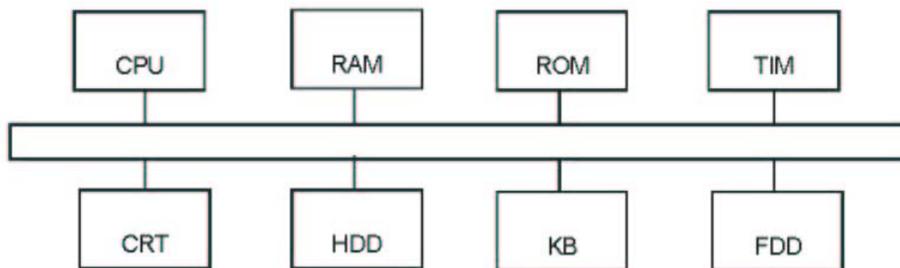


Figure: Test Environment Image

Note: Start the machine after connecting the FDD. If the FDD is connected to the machine after FreeDOS T&D started, it does not recognize the FDD.

3.35.1.1 Test device configuration



Devices to be tested and Test devices (Abbreviated names)

CPU : Central Processing Unit

RAM : Random access memory

ROM : Read only memory

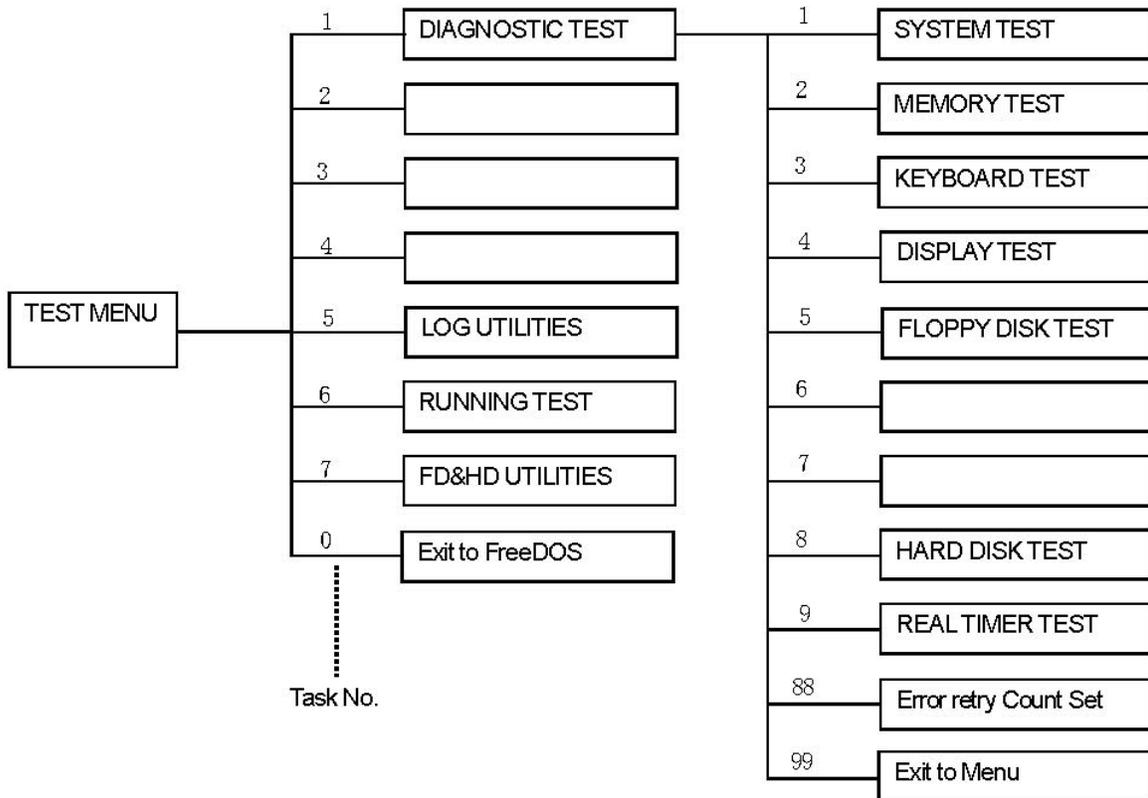
TIM : Real Timer、 Backup memory(128bytes)

CRT : Display unit

HDD : Hard disk drive
 KB : Keyboard
 FDD : Floppy disk drive

3.35.1.2 Test program configuration

This test program is configured as below:



3.35.1.3 Test program list

The following table lists test items included in each test.

Test name	Test No.	Sub No.	Test item
SYSTEM	1	01	DMI read
MEMORY	2	01 02 03 04	Conventional memory Protected mode Cache memory(on/off) Stress test
KEYBOARD	3	01	Pressed key code display
DISPLAY	4	01 02 03 04 05	VRAM read/write for VGA Gradation for VGA Gradation for LCD Gradation & Mode test for VGA All dot on / off for LCD
FDD	5	01 02 03 04 05	Sequential read Sequential read/write Random address/data Write specified address Read specified address
---	6	---	---
---	7	---	---
HDD	8	01 02 03 04 05 06 07 08 09	Sequential read Address uniqueness Random address/data Cross talk & peak shift Partial Read Write specified address Read specified address Sequential write W-R-C specified address
REAL TIMER	9	01 02 03	Real time Backup memory Real time carry

3.35.2 How to start T&D

3.35.2.1 Diagnostics main menu

Set the TOSHIBA Test & Diagnostic CD to the ODD drive and turn the power of the system on.

If you select FreedOS on the BOOT selection screen then the test program is loaded and the following test selection screen is displayed. (Refer to section 4.2.2 for details.)

```
TOSHIBA Personal Computer XXXXXX DIAGNOSTICS
Version 1.00 (C) Copyright TOSHIBA Corp. XXXX

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 -
3 -
4 -
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FD&HD UTILITIES
0 - Exit to FreeDOS

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

Use the Up or Down cursor key to select your desired item and press the [Enter] key. If you select [1] on the above screen, the test menu for selecting each test is displayed. In addition, items

[5] - [7] indicate the tasks to be supported by this T&D.

Note: Pressing the [Esc] key or selecting [0] on the screen terminates this test program and the FreeDOS command prompt appears.

3.35.2.2 Diagnostics test menu

If you select [1] in the main menu, the following test screen is displayed.

```
TOSHIBA Personal Computer XXXXXXXX DIAGNOSTICS
Version 1.00 (C) Copyright TOSHIBA Corp. XXXX

DIAGNOSTICS TEST MENU :

  1 - SYSTEM TEST
  2 - MEMORY TEST
  3 - KEYBOARD TEST
  4 - DISPLAY TEST
  5 - FLOPPY DISK TEST
  6 -
  7 -
  8 - HARD DISK TEST
  9 - REAL TIMER TEST
 88 - ERROR RETRY COUNT SET [ FDD & HDD ]
 99 - EXIT TO DIAGNOSTICS MENU

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

Use the Up or Down cursor key to select your desired test item and press the [Enter] key.

[1] - [9]: Select the subtest menu described in section 4-2-3.

[88] : Specifies the number of error retries. {0 - 255}

[99]: Redisplays the main menu screen in section 4-2-1 (Pressing [Esc] is also considered valid.)

If either test item of [5 - FLOPPY DISK TEST] or [8 - HARD DISK TEST] is executed from the test menu, the following requirements have to be set.

1) FLLPPY DISK TEST

The following message will appear

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

Select the media mode and start track to be tested, then press Enter.

2) HARD DISK TEST

The following message will appear.

```
Test drive number select (1:HD#1, 2:HD#2, 3:HD#3, 4:HD#4, 0:HDD1-4)
```

Select the Hard Disk DRIVE to be tested, then press Enter.

- [1] : Drive 1
- [2] : Drive 2
- [3] : Drive 3
- [4] : Drive 4
- [0] : Drives 1 to 4

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

This message is used to select the error dump operation when a data compare error is detected. Select 1 or 2.

[1]: The dumped data is not displayed on the screen even if a data compare error occurs.(Only pressing the [Enter] key is also considered valid.)

[2]: The dumped data is displayed on the screen when a data compare error occurs.

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

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.

[1]: The detail status is not displayed. (Only pressing the [Enter] key is also considered valid.)

[2]: The detail status is displayed.

3.35.2.3 Sub test menu

If you select any test item from “DIAGNOSTICS TEST MENU”, the following sub menu is displayed.

```
TEST NAME                XXXXXXXX
SUB TEST      : XX
PASS COUNT   : XXXXX  ERROR COUNT : XXXXX
WRITE DATA  : XX     READ DATA   : XX
ADDRESS      : XXXXX  STATUS       : XXX
                Error status name

SUB-TEST MENU :

XX - XXXXXXXXXXXXX
  |
  |
  |
99 - EXIT TO DIAGNOSTICS TEST MENU

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

Use the Up or Down cursor key to select your desired item and press the [Enter] key. When you select any subtest item, you are taken to the test mode described in the detail of each test function in section 4-6.

Pressing the [Esc] key or selecting [99] returns to the test selection screen described in section 3-31-4-2-2T

3.35.3 Test Operating Procedure

If you select any test item from the subtest menu and execute it, you are required to set the test mode.

Set the test mode according to the following procedure. Use the Up and Down cursor keys to select an option for TEST LOOP and ERROR SOPT.

Specify the following as the test program execution mode for when the test finishes or an error occurs

1) TEST LOOP

Move the cursor under Yes/No with the Right and Left keys to select either of Yes/No and press [Enter].

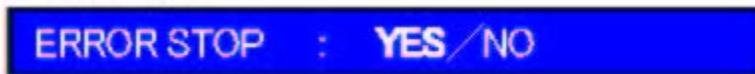
Pressing the [Esc] key returns to the subtest selection screen described in section 4.2.3.



[YES]: When the current test cycle is finished, the pass counter is incremented by 1 and the next test cycle stops.

[NO]: When the current test cycle is finished, the test is terminated and the subtest selection screen is redisplayed.

2) ERROR STOP



[YES]: When an error occurs, the error status is displayed and the execution stops.(The error status name is displayed in the 8th column.)
At this time, the following operation guide is displayed on the right side of the screen.

[NO]: When an error occurs, the error status is displayed. The error counter is incremented by 1 and you are taken to the next test step.

[[HALT OPERATION]]

1 : Test end ...The test ended. Select a subtest.

2 : Continue ...The next step will be executed.

3 : Retry ...The error step will be retried.

3) Discontinuing a test

If you press the [Ctrl] + [Alt] + [Break] keys during a test, the test is discontinued and the screen returns to the subtest menu described in section 3-31-4.2.3.

3.35.4 Error Code Status

If an error occurs during any test, one of the following error codes is displayed.

Device Name	Code	Status
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
FDD	01 02 03	FDD - BAD COMMAND ERROR FDD - ADDRESS MARK NOT FOUND 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
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
	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

3.35.5.2 Running Test (Task #6)

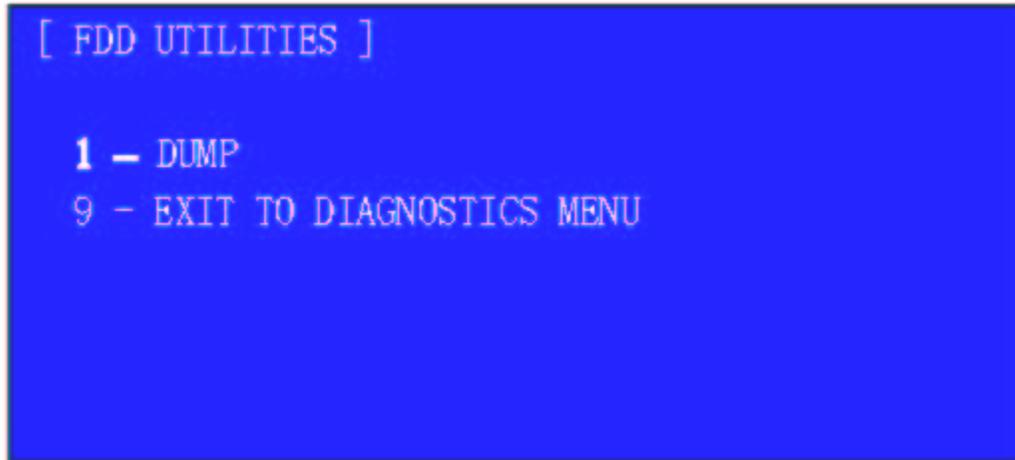
This test is a continuous test to be applied to the devices capable of unattended operation. The name of test device and the number of subtest being tested are displayed on the screen during a test.

The following table indicates the test items.

Test Name	Sub test No.
Memory	01 (Conventional Memory)
-	02 (Protected Mode)
- -	04 (Stress Test)
Display	01 (VRAM read / write for VGA)
Real Timer	02 (Backup memory)
HDD	01 (Sequential read)

3.35.5.3 FD & HD Utilities (Task #7)

Run the utility on the floppy disk. If you select task No. [7], the following FDD utility selection menu is displayed.



Use the Up and Down cursor keys to select your desired item and press the [Enter] key. If you press the [Esc] key or select [9], the screen returns to the main menu described in section 4.2.1.

1) DUMP

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

3.35.6 Detail of Each Test Function

3.35.6.1 System Test

1) DMI data read

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

Model Name :	XXXXXXXX
Version Number :	XXXXXXXX
Serial Number :	XXXXXXXX
Model Number :	XXXXXXXX
PCN/BND Number :	XXXXXXXX
UUID Number :	XXXXXXXXXXXXXXXXXX

3.35.6.2 Memory test

1) Conventional memory test

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.

With regard to the test memory content, save the data to the test memory before the test and restore it after the test.

Details of Test:

1-1) This subtest performs a test data write/read/compare operation to the work memory (640KB from 0000:0000 to 9000:FFFF) in the real mode. The test procedure is as follows:

Step 1: Byte Enable Test

Write double words of the data to the initial address of the data in 64KB units and the initial address + 4, then read the written data byte by byte and compare the result with the original data.

Test data = CCAA5533H, 8000000H

Step 2: Byte Enable Test

Write the data byte by byte to the initial address of the data in 64KB units and the initial data + 4, then read double words of the written data and compare the result with the original data.

Test data = CCAA5533H, 8000000H

Step 3: Data Bus Test

Write double words of the data to the initial address of the data in 64KB units and the initial address + 4, then read double words of the written data and compare the result with the original data

Test data = 1H, 2H, 4H, 8H, 10H, 8000000H, 0

Step 4: Constant Data Test

Write double words of the data to the whole of the data in 64KB units, then read double words of the written data and compare the result with the original data.

Test data = FFFFFFFFh, 00000000h, 80018001h

Step 5: Address Pattern Test

Write double words of the data to the address pattern data, read double words of the written data and compare the result with the original data

Test data = 0000H, 0004H, 0008H, 000CH
.. 8000H, 8004H ...FFECH

If a compare error occurs, the write data, read data and test address are displayed on the test screen.

1-2) The test information (Test address) during a test is displayed by 4 KB. Test step number is also displayed.

2) Protected Mode

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.

With regard to the test memory content, save the data to the test memory before the test and restore it to the former address after the test. (Coincidence assurance of the memory content)

Details of Test

Step 1: Sequential Write (Fixed pattern 1 MMX version 00005555AAAAFFFFh)

: Sequential Read and Compare

Step 3: Sequential Write (Fixed pattern 2 MMX version FFFFAAAA55550000h)

: Sequential Read and Compare

Step 5: JMP + Write (Address pattern 1) 0, 1/2 increment 1/4, 3/4 decrement

: JMP + Read and Compare

Step 7: JMP + Write (Address pattern 2) 1/4. 3/4 increment 0, 1/2 decrement

: JMP + Read and Compare

3) Cache memory (On / off)

This subtest writes constant data to constant address 70000h in the protected mode, then reads the written data and compares the result with the original data.

With regard to the test memory content, save the data to the test memory before the test and restore it to the former address after the test. (Coincidence assurance of the memory content)

Details of Test:

This subtest displays the number of memory accesses within the same time in both of Cache ON and Cache OFF by the counter. Check that the benchmark speed is high when the cache is used

4) Stress

This subtest writes or reads constant data and address data from 1MB to the maximum MB in the protected mode and compare the results with the original data.

For the content of the test memory, save the data to the test target memory before the test and restore it to the former address after the test.

Details of Test:

This subtest is performed once from step 1 to step 3 and repeated 20 times from step 5 to step 8 and then it displays the total number of the test performances as Sub Step Number.

Step 1: Sequential Write (Fixed pattern 1 MMX version 00005555AAAAFFFFh)

: Sequential Read and Compare

Step 3: Sequential Write (Fixed pattern 2 MMX version FFFFAAAA55550000h)

: Sequential Read and Compare

Step 5: JMP + Write (Address pattern 1) 0, 1/2 increment 1/4, 3/4 decrement

: JMP + Read and Compare
Step 7: JMP + Write (Address pattern 2) 1/4. 3/4 increment 0, 1/2 decrement
: JMP + Read and Compare
Step 11: Dword Transfer (Data is an 32-bit shift data)
: Step 11 bit-reversed pattern

3.35.6.3 Keyboard Test

1) 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 88 key (compatible with the 106 key) is not tested because this key operating in overseas mode uses the different character code table (Not for Japan model).

```
Scan code      = SS
Character code  = C
Key top        = NNNNNN

Ins Lock  Caps Lock  Num Lock  Scroll Lock
Alt       Ctrl       Left Shift  Right Shift
```

3.35.6.4 Display test

Move the highlight bar to the subtest you want to execute and press **Enter**.

1) 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.

2) 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.

3) 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.

4) Gradation & Mode test for VGA

This subtest displays gradations for following modes. To change the mode, press **Enter**. It automatically judges vesa mode supported by each mode and displays gray levels for as many modes as possible.

Resolution	Screen Mode
1024 X 800	12, 13, 3, 111, 112, 114, 115, 117, 118, 165

5) 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.

3.35.6.5 Floppy Disk Test

This subtest tests floppy disks.

1) 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.

2) 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.

The number of passes is written to the first tow bytes of the data to check write missing.

Number of passes (First sector only)	A D B 5 A D A D B 5 A D A D B 5 A D A D (Repeated data after the second sector 2)
---	--

3) 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. (20 times/pass, Test sector = 1)

4) Write specified address

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

TEST DATA ??
TRACK NO ??
HEAD NO ?

5) Read specified address

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

TRACK NO ??

HEAD NO ?

Note: The test data should be created as much as the maximum number of sectors (18 sectors in 3 mode) to test. It is because when FDD#1 becomes greater than FDD#2 in the 2FDD test, a correct data cannot be created because of insufficient test data amount. (the test data is created with the #1 sector size.)

[FDC Status]

 0 1 2 3 4 5 6
FDC Status = XX XX XX XX XX XX

- 0 : Result Status 0
- 1 : Result Status 1
- 2 : Result Status 2
- 3 : Cylinder Address
- 4 : Head Address
- 5 : Sector Address
- 6 : Number of Bytes / Sector

[Result Status 0]

7	6	5	4	3	2	1	0
IC1	IC0	SE	EC	NR	HD	US1	US0

IC1 / IC0 : Interrupt Code bits

00 = normal , 01 = abnormal , 10 = invalid CMD

11 = abnormal (FDD ready)

SE : Seek end

EC : Equipment check (track 0 is detected)

NR : Not ready

HD : Head address

US1 / US0 : Unit select

[Result Status 1]

7	6	5	4	3	2	1	0
EN		DE	OR		ND	NW	MR

- EN : End of Cylinder
- DE : Data error
- OR : Over run (DMAC)
- ND : No data
- NW : Not writable
- MA : Missing address mark

[Result Status 2]

7	6	5	4	3	2	1	0
	CM	DD	NC	SH	SN	BC	MD

- CM : Control mark
- DD : Data error (data field)
- NC : No cylinder
- SH : Scan equal hit
- SN : Scan not satisfied
- BC : Bad cylinder
- MD : Missing address mark (data field)

3.35.6.6 Hard Disk Test

1) Sequential read

This subtest performs a forward read operation (0 to Maximum) by 63 sectors.

2) Address uniqueness

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

- ▼ Forward sequential
- ▼ Reverse sequential
- ▼ Random

3) 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.

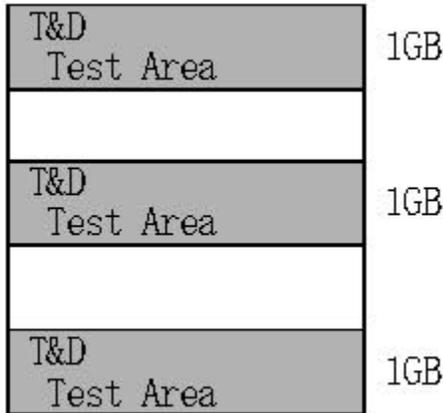
4) Cross talk & peak shift

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
‘ 149249 ‘	3 cylinder
‘ 63B63B ‘	4 cylinder
‘ 9C49C4 ‘	5 cylinder
‘ 2DB6DB ‘	6 cylinder
‘ D24924 ‘	7 cylinder

5) Partial read

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



6) Write specified address

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

7) Read specified address

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

8) Sequential write

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

9) 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.

[HDC Status]

An error occurs during the HDD test, the following message is displayed.

Note: For the serial ATA, this message is not displayed correctly.

HDC status = X X X X	HDC error register (P – 1f7h) HDC status register (P – 1f1h)
----------------------	---

[HDC Status] : P – 1F7h

Bit	Name	Function
7	BSY (busy)	0: HDC is ready. 1: HDC is busy.
6	DRY (drive ready)	0: HDD does not accept the command. 1: HDD is ready.
5	DWF (write fault)	0: Write is successful 1: Write error
4	DSC (seek complete)	0: Seek error 1: Seek normal termination
3	DRQ (data request)	0: No data transfer request 1: Data transfer being requested.
2	COR (corrected data)	0: Not used 1: Data error occurrence
1	IDX (index)	0: Not used 1: Index detection
0	ERR (error)	0: Normal termination 1: End with error

[Error register] P – 1F1h

Bit	Name	Function
7	BBK (BadBlockMark)	0: Not used 1: Defective block mark detection.
6	UNC (uncorrectable)	0: No uncorrectable data error 1: Uncorrectable data occurrence
5	---	
4	IDN (identification)	0: Not used 1: No ID field
3	---	
2	ABT (about)	0: Not used 1: Illegal command or command abort
1	TK0 (track zero)	0: Track 0 detection 1: Track 0 not detection (When recalibrated)
0	0---	

3.35.6.7 Real timer test

1) Real time

This subtest sets and displays the calendar or clock function.

2) Backup memory

This subtest writes the data for 1bit ON (01, 02, 04...80h) and 1bit OFF (FE, FB, FB...7Fh) and AAh, 55h to 114 bytes of addresses from 0E to 7Fh, reads the written data and compares the result with the original data.

3) Real time carry

Set the constant value as below and check carry of the timer.

Month	Date	Year	Hour	Min.	Sec.
12	- 31	- 2008	23	: 59	: 58

3.36 Maintenance (WinPE&FreeDos) Test Program Supplementary Information

3.36.1 Details of HTML Log File

This section provides details of the HTML log file stored in the storage.

3.36.1.1 System Information

The following table lists system information of the PC that

Item Name	Description
Manufacturer	Manufacturer of PC
Product Name	Product name of PC
Part Number	Part number of PC
Serial Number	Serial number of PC
BIOS Version	BIOS version of PC
CPU Name0	Name of the first CPU mounted in PC
CPU Clock0	Current Clock of CPU, Max Clock
CPU Socket0	Name of CPU socket
CPU Description0	Name of CPU processor, CPUID(Family, Model, Stepping)
L2 Cache0	Second cache of CPU
CPU Name1	Name of the second CPU mounted in PC
CPU Clock1	Current Clock of CPU, Max Clock
CPU Socket1	Name of CPU socket
CPU Description1	Name of CPU processor, CPUID(Family, Model, Stepping)
L2 Cache1	Second cache of CPU

Physical Memory	Capacity (MB) of memory which is installed in PC
NetWork0	Name of LAN card. Only the first LAN card is displayed on the screen.
MAC address	Mac address of LAN card
IDE HDD	Name of the first IDE HDD and its capacity (GB)
IDE HDD	Name of the second IDE HDD and its capacity (GB)
1394 Disk	Name of HDD connected to IEEE1394 and its capacity (GB)
USB Flash Disk	Name of USB flash disk and its capacity (GB)
ODD0	Name of ODD and media type
FDD	Name of FDD
Key Board	Name of keyboard
Mouse	Name of mouse
Other Disk	Name of HDD other than IDE, IEEE1394 and USB and its capacity

3.36.1.2 Test conditions

The following table lists the test statuses.

Item Name	Description
T&D Version	Version of WindowsPE T&D
Test mode	Indicates the test mode. When a test is performed in Multitask, Multitask is displayed. When performed in Sequential, Sequential is displayed.
CPU Stress	If CPU stress is applied, Yes is displayed. If not applied, No is displayed.
Limit pass count	The number of passes of a test specified.

3.36.1.3 Test Result

The following table lists the test results. If an error occurs during a test, the line of the test on the screen is displayed in red color.

Item Name	Description
Test Name	Name of test
Test Information	Brief explanation of each test
Pass Count	Number of passes of a test
Error Count	Number of errors of a test
Simple Mode	Displays the result of the test performed in the Simple mode ● indicates that the test is OK. ▲ indicates that there is any problem in the test.
Detail Mode	Displays the result of the test performed in the Detail mode. ● indicates that the test is OK. ▲ indicates that there is any problem in the test.
Heart Run	Displays the result of heat run test. * The current version does not support it.
Comment	Displays the comment on the test result. * The current version does not support it.
Over-all judgment	Displays the results of all of the tests. ● indicates that the test is OK. ▲ indicates that there is any problem in the test.

3.35.1.4 List of the error logs recorded on a log file

The list of error logs is shown below.

Section name	Log	Explanation
[HDD PHYSICAL]	Read Hdd Create File Error.Address=???	It is recorded when a error occurs in "drive opening."
	Read Hdd Set File Pointer Error.Address=???	It is recorded when an error occurs in setting processing of a reading position.
	Read Hdd Command Error.Address=???	It is recorded when an error occurs by a reading command.
	Read Hdd Check Size Error Address=???	It is recorded when it differs from the reading size as which the read size was specified.
[HDD LOGICAL]	HDD TEST:Read Hdd Create File Error.Address= ???	It is recorded when an error occurs in "file opening." However, the case of an AccessDenied error is excluded.
	HDDL Error : Access to ??? was denied.	It is recorded when an AccessDenied error occurs in "file opening." Not an error but the test was skipped. This log, A key becomes "SKIP#####" instead of "ERROR####."
	HDDL FileException:	It is recorded when an exception occurs during a file operation.
[MEMORY]	Memory Compar Error (Address Test)	It is recorded when an error occurs in Address Test.
	Memory Compar Error (Stack High/Low Test)	It is recorded when an error occurs in Stack High/Low Test.
	Memory Compar Error (Burst	It is recorded when an error occurs in

	Transfer Test)	Burst Transfer Test.
[USB STORAGE]	USB is not connected.	It is recorded, when it tests without having equipped with USB.
	File Access Error. (???).	It is recorded when an error occurs during a file operation. ??? is a drive letter.
	Space Size Error.(???).	It is recorded when the capacity for writing in a file is insufficient. ??? is a drive letter.
[ODD]	Odd Error-1	Test CD does not exist in a drive or, in the case of inaccurate test data, is recorded.
	Odd Error-2	It is recorded when the value read from test CD is not in agreement with a default.
[WIRED LAN]	An IP address does not understand one.	It is recorded when an IP address is not able to be acquired.
	WSAStartup failed: ???	It is recorded when WSAStartup goes wrong.
	WSASocket() failed: ???	It is recorded when WSASocket goes wrong.
	failed to set send timeout: ???	It is recorded when a setup of a timeout goes wrong.
	Invalid in-address: ???	It is recorded when an IP address is an unjust value.
	HeapAlloc failed: ???	It is recorded when acquisition of a memory goes wrong.
	sendto failed: ???	It is recorded when sendto goes wrong.
	Wrote ??? bytes	It is recorded when the written-in size is not in agreement.
	recvfrom failed: ???	It is recorded when recvfrom goes

		wrong.
	timed out.	It is recorded when a timeout occurs.
[CPU]	The ALU test made an error.	It is recorded when an error occurs during an ALU test.
	The FPU test made an error.	It is recorded when an error occurs during an FPU test.
[FDD]	Space Size Error.Code(0x???)	It records, when not equipped with FDD, or when file write-in capacity is insufficient.
	Memory Alloc Error.Code(0x???)	It is recorded when acquisition of a memory goes wrong.
	Open File Error.Code(0x???)	It is recorded when an error occurs in file opening.
	Write File Error.Code(0x???)	It is recorded when the write error of a file occurs.
[1394 STORAGE]	1394 is not connected.	It records, when it tests without equipping with an IEEE1394 device.
	File Access Error. (???:).	It is recorded when an error occurs during a file operation. ??? is a drive letter.
	Space Size Error.(???:).	It is recorded when the capacity for writing in a file is insufficient. ??? is a drive letter.
[TIMER]	Timer error.	It records, when gap of 1 seconds or more has arisen by the test.
[KEYBOARD]	Keyboard Error.Code(0x???)	It records, when the Fail button is clicked by a keyboard test.
[MOUSE]	Mouse Error.Code(0x???)	It records, when the Fail button is clicked by a Mouse test.

3.37 Maintenance (WinPE&FreeDos) Test Program Supplementary Information

3.37.1 Outline

Describes notices and restrictions on using this program

3.37.2 Notices and Restrictions (Win PE T&D)

1) CPU Stress

When the CPU stress checkbox is checked, it is recommended that this test be conducted in the Simple mode.

If CPU stress is applied in the TIMER Test and the USB Test in the test items, an error occurs.

2) External ODD Boot

If you run this maintenance tool from the CD, boot the system from the built-in ODD. For the models in which ODD is not built, boot the system from the USB memory.

3) VIDEO Test

If the VIDIO test and other test are executed simultaneously (Multitasking), the test status cannot be shown on the WinPE T&D main screen due to the VIDIO test.

4) LAN Test

To conduct the LAN test, be sure to connect the LAN router with DHCP to the PC. Do not connect the LAN router to the external Network for safety reason. In addition, if the router without DHCP or Hub is connected to the PC, the test fails with an error.

5) ODD、 USB Test

Do not remove the CD containing this T&D test program or the USB memory during the test. This CD or this USB memory include an operational program for the test, if it is removed, the test cannot be continued and ends in an error.

6) Boot Media

If the system is booted from the CD when both the CD and the USB memory that contain WinPE T&D are connected to the PC, T&D in the USB memory starts up.

Also, when a bootable CD is not inserted in the CD drive when the system is booted from the USB memory, the ODD test fails with an error because the ODD test file is only contained in this CD. However, this error should be solved by inserting the bootable CD.

7) Timer Test

If the Timer test and other test are executed simultaneously (Multitasking), the error time displayed in the test log is not displayed correctly.

8) CD Boot

After Winpe is selected on the Multiboot selection screen when the system is booted from the CD, the "Press any Key to boot from CD or DVD..." message is displayed but only the [ENTER] key is valid.

3.37.3 Notices and Restrictions (Freedos)

1) USB Boot

If you boot the system from the USB memory, the FDD test cannot be executed. Use CD Boot.

2) FDD Test

If the USB FDD drive or the floppy disk on the disk drive is removed during an FDD test, a time-out error occurs and then the program hangs up. Do not remove the FDD drive or the floppy disk during the FDD test.

Chapter 4

Replacement Procedures

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4.1 Overview

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

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

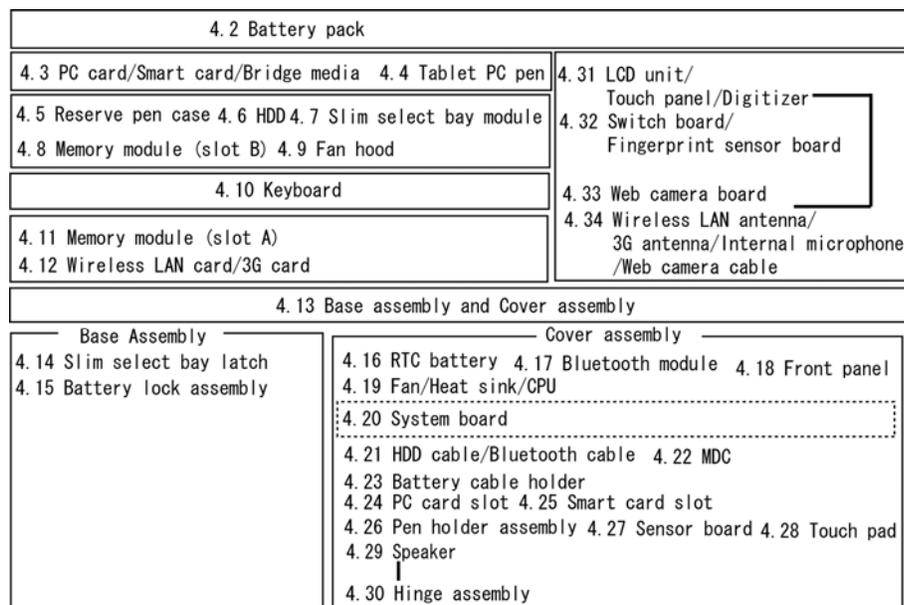
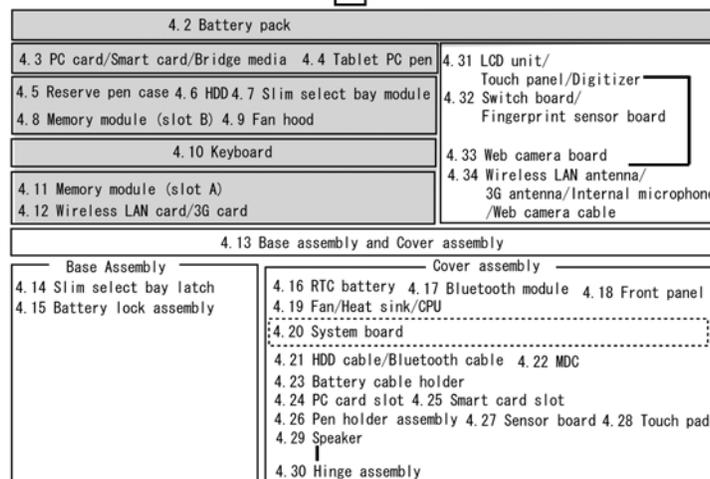


Chart Notation

The chart shows the case for the following example:

- Removing the Base assembly and cover assembly

All FRUs down to the “4.2 Battery pack” to “4.12 Wireless LAN card/Robson card” above a 4.13 Base assembly and cover assembly must be removed.



Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

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

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

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

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

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

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

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

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

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

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

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

Before You Begin

Take note of the following points before starting work. **Always remove the AC adapter and battery pack before commencing any of the procedures.** The procedure for removing the battery pack is described in section “4.2. Battery Pack”.

Do not disassemble the computer unless it is operating abnormally.

Use the designated tools.

Ensure that the environment for working on and storing parts does not contain any of the following.

- Dust or dirt
- Static electricity
- Extremely hot, cold, or humid conditions

Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.

Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly procedures in this manual.

Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.

Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.

When re-assembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.

As all parts have sharp edges and corners, take care not to cut yourself.

After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedure

Four main types of cable connector are used.

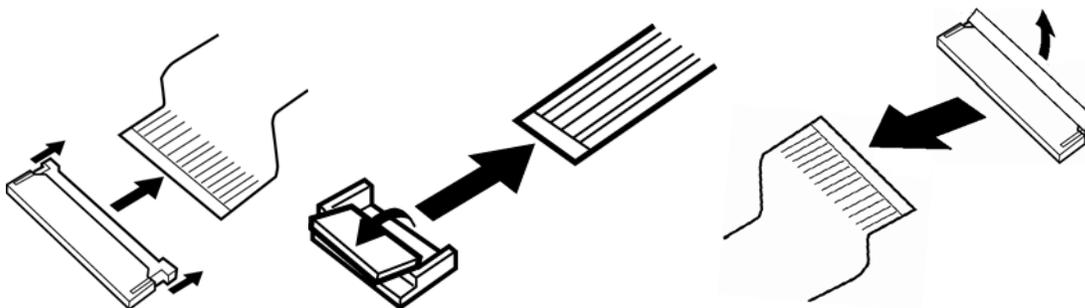
- Pressure plate connector
- Spring connector
- Back flip connector
- Normal pin connector

When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector. Press down on both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you lift the pressure plate high enough to insert fully the cable.

For spring connectors, lifting up the stopper frees the cable and allows 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.

For back flip connectors, lifting up the flip plate frees the cable and allows 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.

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 Procedure

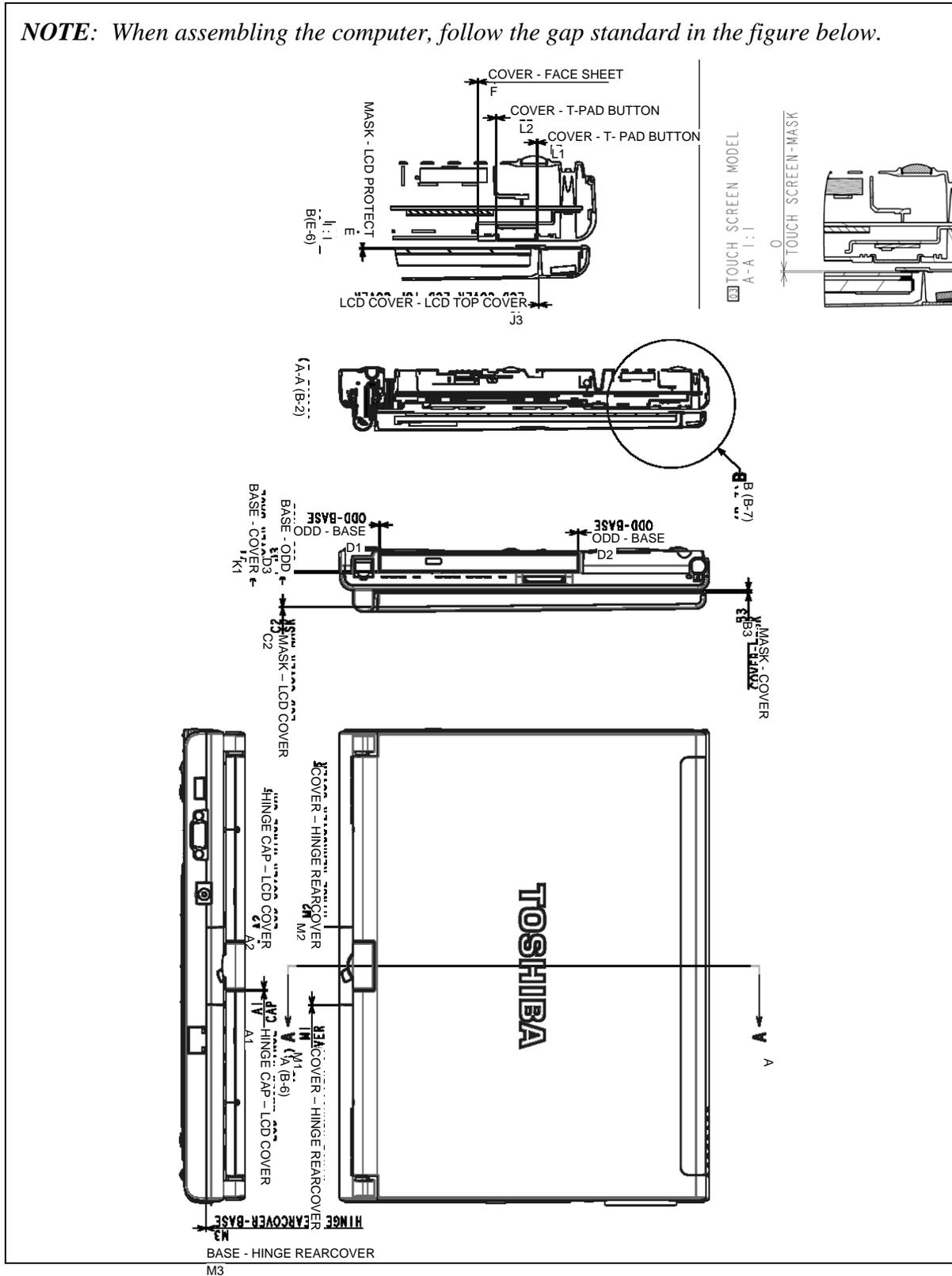
After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

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.

NOTE: When assembling the computer, follow the gap standard in the figure below.



Mark	Gap standard	Mark	Gap standard	Mark	Gap standard
A1	$0.85^{+1}_{-0.85}$	D1	0.7 ± 0.5	J1	$0.2^{+0.1}_{-0.2}$
A2	$0.85^{+1}_{-0.85}$	D2	0.7 ± 0.5	J2	$0.2^{+0.1}_{-0.2}$
B1	1.5 ± 1	D3	0.8 ± 0.5	J3	$0.2^{+0.1}_{-0.2}$
B2	1.5 ± 1	E	0.15 ± 0.15	K1	0.3 ± 0.3
B3	$1.5^{+0.9}_{-1.5}$	F	$0.2^{+0.3}_{-0.2}$	K2	0.3 ± 0.3
C1	$0.3^{+0.4}_{-0.3}$	G1	$0.35^{+0.65}_{-0.2}$	K3	0.3 ± 0.3
C2	$0.3^{+0.4}_{-0.3}$	G2	$0.3^{+0.7}_{-0.2}$	L1	0.3 ± 0.3
C3	$0.3^{+0.4}_{-0.3}$	H	$0.2^{+0.5}_{-0.2}$	L2	0.3 ± 0.3
		I	$0.3^{+0.5}_{-0.2}$	M1	$0.25^{+0.5}_{-0.25}$
				M2	$0.25^{+0.5}_{-0.25}$
				M3	$0.1^{+0.5}_{-0.1}$
				N	$0.15^{+0.35}_{-0.15}$
				O	$0.6^{+0.9}_{-0.5}$

Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

- One Philips screwdriver with type 0 bit (for 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 and heel grounder
- Anti-static carpet or flooring
- A pair of needle-nose pliers
- Air-ionizers in highly static sensitive areas
- Antenna coaxial cable disconnecter

Screw Tightening Torque

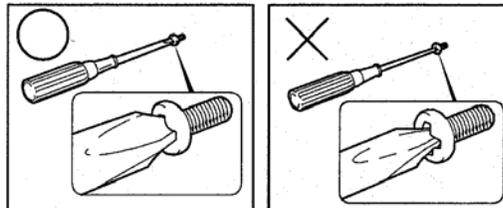
Use the following torque when tightening screws.

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.

- M2 (2mm) 0.167 N•m (1.7 kgf•cm)
- M2.5 (2.5mm) 0.294 N•m(3.0 kgf•cm)
- M3 (3mm) 0.549 N•m(5.6 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.

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

“Special length screw” means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.6 mm and so on.



Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Format:

Screw type + Screw length (mm)

Screw type

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

Example: **B6** ... 6mm Bind screw

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

The following describes the procedure for removing the battery pack. (See Figure 4-1.)

CAUTION: Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Turn the computer upside down.
4. Release the **battery lock**.
5. Pull out the **battery pack** while sliding the **battery release latch** toward the arrow pointing.

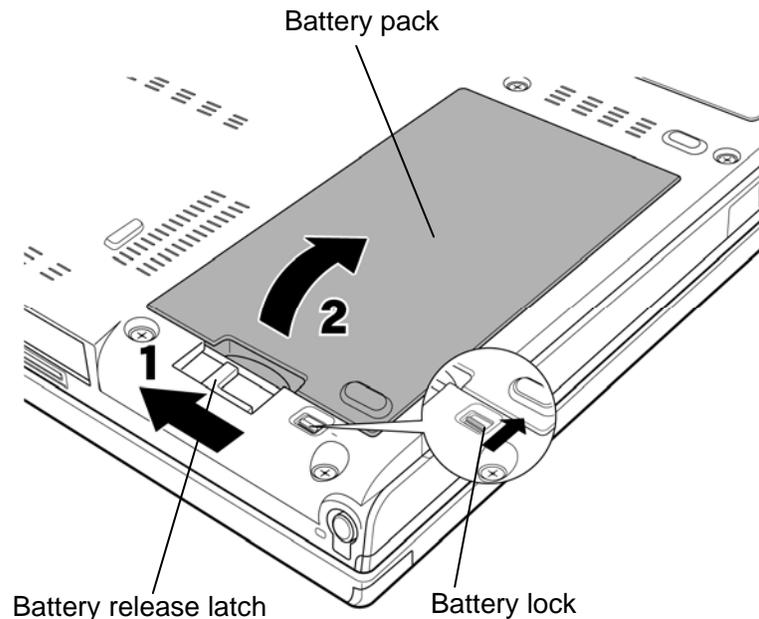


Figure 4-1 Removing the battery pack

NOTE: Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.

Installing the battery pack

The following describes the procedure for installing the battery pack. (See Figure 4-1.)

CAUTION: *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used batteries pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

NOTE: *Check visually the battery terminals and clean off any dirt 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. Insert the connector of the battery pack to the connector of the computer. Press the **battery pack** until the battery is locked.
4. Slide the **battery lock** into the lock position.

4.3 ExpressCard /Bridge media

4.3.1 ExpressCard

Removing the ExpressCard

The following describes the procedure for removing the ExpressCard . (See Figure 4-2.)

CAUTION: *Insert or remove the ExpressCard in accordance with any instructions in the ExpressCard manual or the manuals of the computer system you are using.*

1. Turn the computer face up and open the display.
2. Push the ExpressCard . It will pop out. It will pop out partly when you release, so pull out the card.

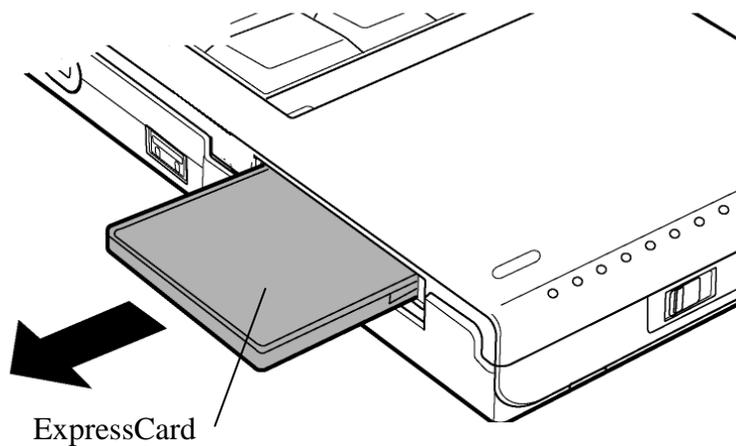


Figure 4-2 Removing the ExpressCard

Installing the ExpressCard

The following describes the procedure for installing the ExpressCard . (See Figure 4-2.)

1. Insert the **ExpressCard** carefully and make sure a firm connection.

4.3.2 Bridge media

Removing the Bridge media (SD Card/Memory Stick/xD Picture Card/MultiMediaCard)

The following describes the procedure for removing the Bridge media. (See Figure 4-3.)

CAUTION: Insert or remove the Bridge media in accordance with any instructions in the Bridge media manual or the manuals of the computer system you are using.

1. Push the **Bridge media**. It will pop out partly, so pull out the card. (For an instance, SD card is described in the figure 4-3.)

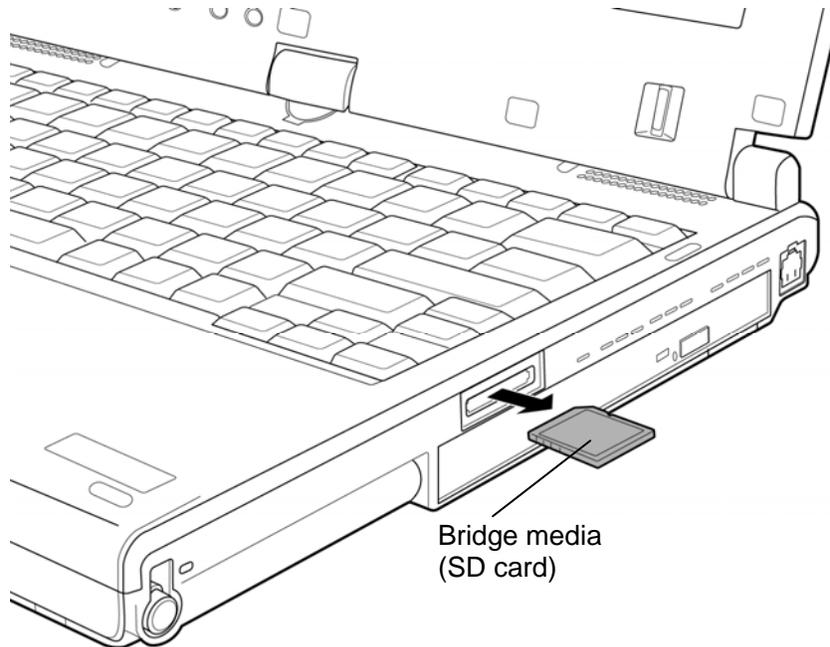


Figure 4-3 Removing the Bridge media

Installing the Bridge media (SD Card/Memory Stick/xD Picture Card/MultiMediaCard)

The following describes the procedure for installing the Bridge media. (See Figure 4-3.)

1. Insert the **Bridge media** and press it until it securely connected.

4.4 Tablet PC pen

Removing the Tablet PC pen

The following describes the procedure for removing the tablet PC pen. (See Figure 4-4.)

1. Push the tablet PC pen in the tablet PC pen slot, so that it protrudes slightly.
2. Pull the **tablet PC pen** to remove it.

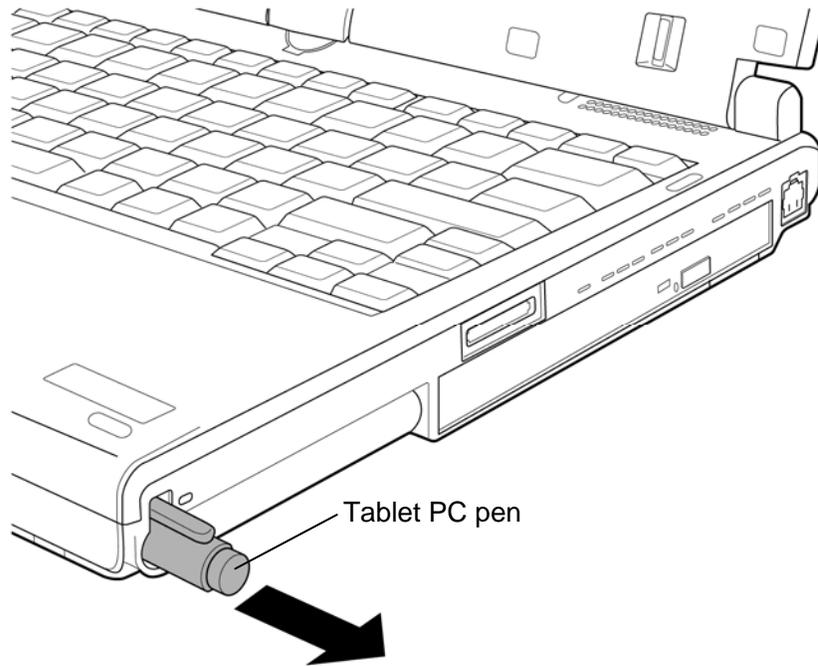


Figure 4-4 Removing the tablet PC pen

Installing the Tablet PC pen

The following describes the procedure for installing the tablet PC pen. (See Figure 4-4.)

1. Insert the **tablet PC pen** into the slot until it locks.

4.5 Reserve pen case

Removing the Reserve pen case

The following describes the procedure for removing the reserve pen case. (See Figure 4-5.)

1. Close the display and turn over the computer
2. Push slightly the point shown by the arrow using an **object** with a thin tip.
3. Slide the **reserve pen case** as shown in the following figure and remove it.

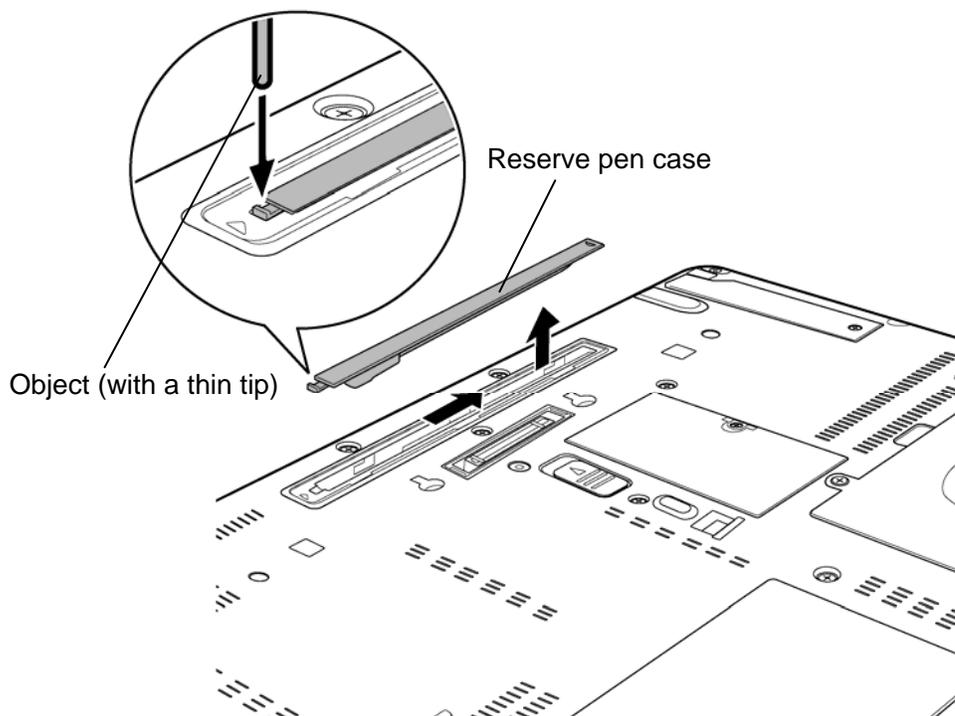


Figure 4-5 Removing the reserve pen case

Installing the Reserve pen case

The following describes the procedure for installing the reserve pen case. (See Figure 4-5.)

1. Seat the **reserve pen case** to the slot and slide it until it locks.

4.6 HDD

Removing the HDD

The following describes the procedure for removing the HDD. (See Figure 4-6 to 4-8.)

CAUTION: Take care not to press on the top and bottom of the HDD. Pressure may cause data loss or damage to the device.

1. Loosen two **screws** fixing the HDD slot cover and remove the **HDD slot cover**.

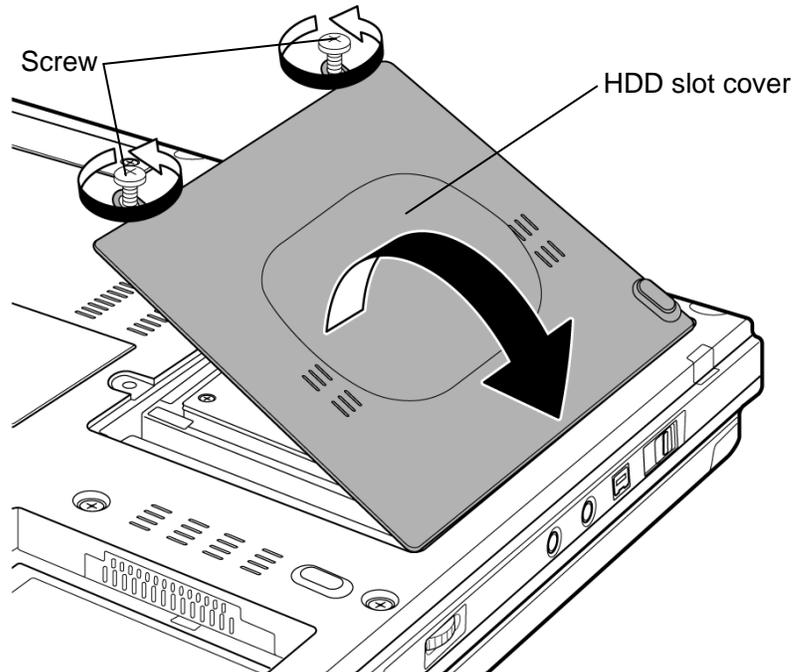


Figure 4-6 Removing the HDD slot cover

2. Hold the **tab** to raise the HDD assembly straight and pull out the **HDD assembly** from the connector of the **HDD cable**.

NOTE: When removing the HDD assembly, be careful not to tear the tab. If the tab is torn, replace the HDD holder with a new one.

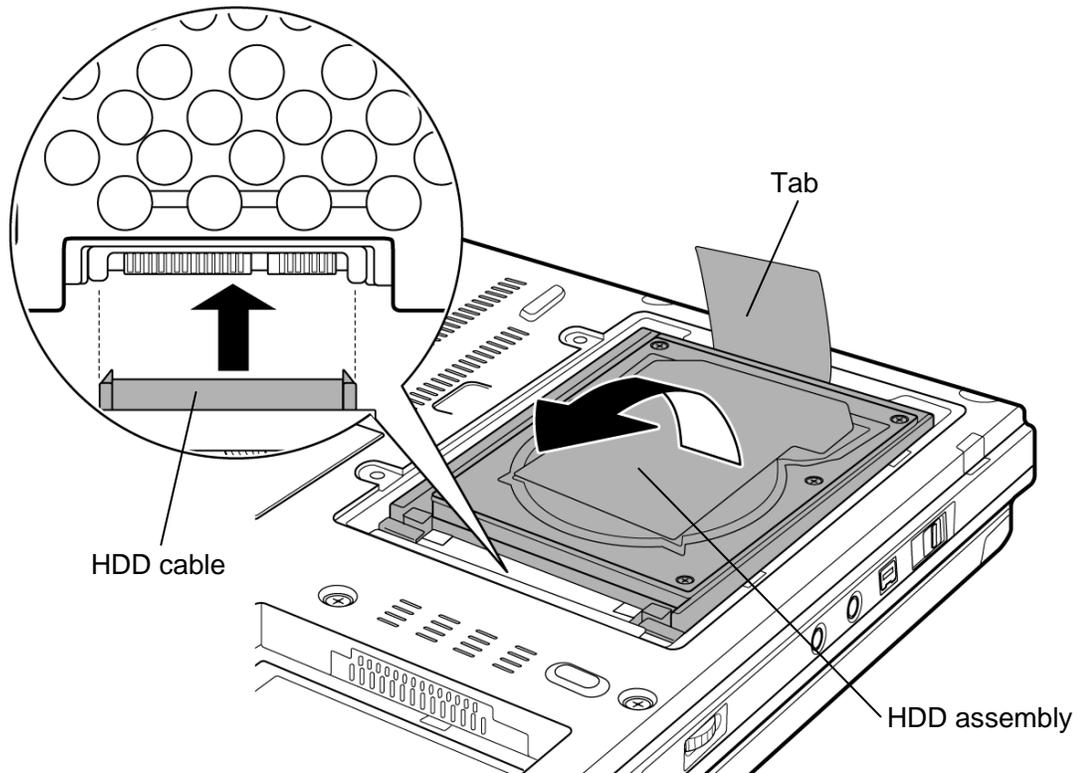


Figure 4-7 Removing the HDD assembly

- Place the HDD assembly on a flat surface and remove the following **screws** fixing the HDD holder.

- M3.0x4.0C FLAT HEAD screw ×4

- Separate the **HDD holder** and **HDD**.

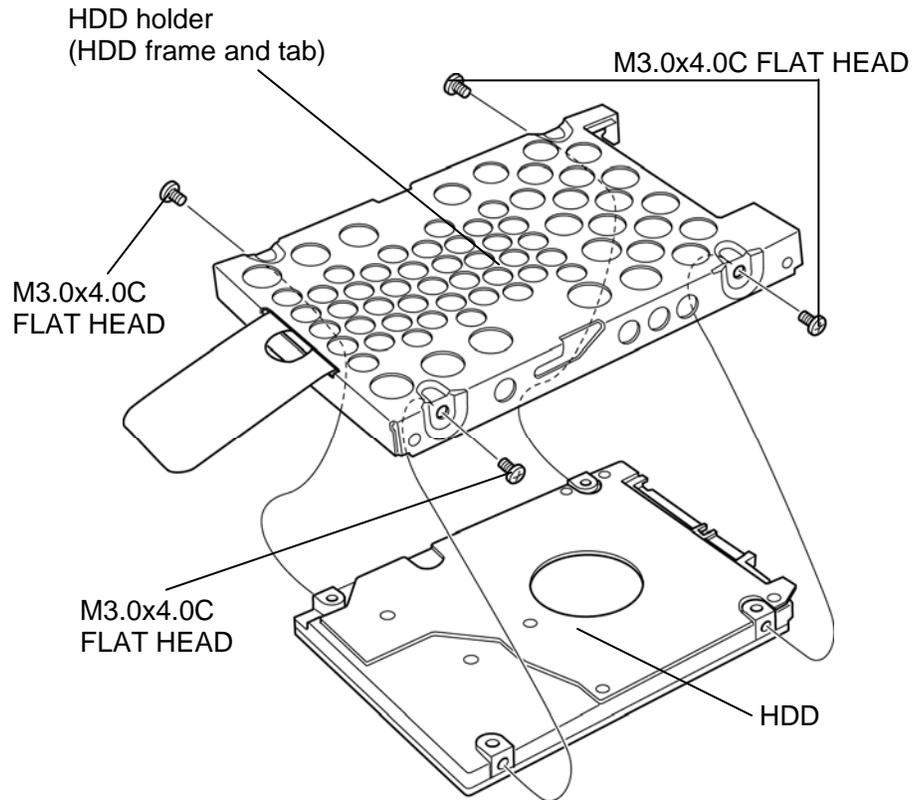


Figure 4-8 Removing the HDD

Installing the HDD

The following describes the procedure for installing the HDD. (See Figure 4-6 to 4-8.)

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

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

- M3.0×4.0C FLAT HEAD screw ×4

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

2. Set the connector of the **HDD cable** upward and connect the **HDD assembly** to the connector. Press the HDD assembly to ensure a firm connection.
3. Set the **HDD assembly** into the slot.
4. Seat the **HDD slot cover** and secure it with two **screws**.

4.7 Slim select bay module

Removing the slim select bay module

The following describes the procedure for removing the slim select bay module. (See Figure 4-9 and 4-10.)

The explanation and figure shown below indicate the optical drive removing/installing.

CAUTION: Do not put fingers in the slim select bay slot. It may cause injury.

1. Remove the following **screw** securing the **latch**.
 - M2.5×4.0B FLAT HEAD screw ×1
2. Set the removed screw into the **screw hole**. (The slim select bay is unlocked.)
3. While sliding the **latch** toward the arrow direction in the Figure 4-10, push the **hook** of the slim select bay module and pull out the **slim select bay module** to disconnect it from the system board.

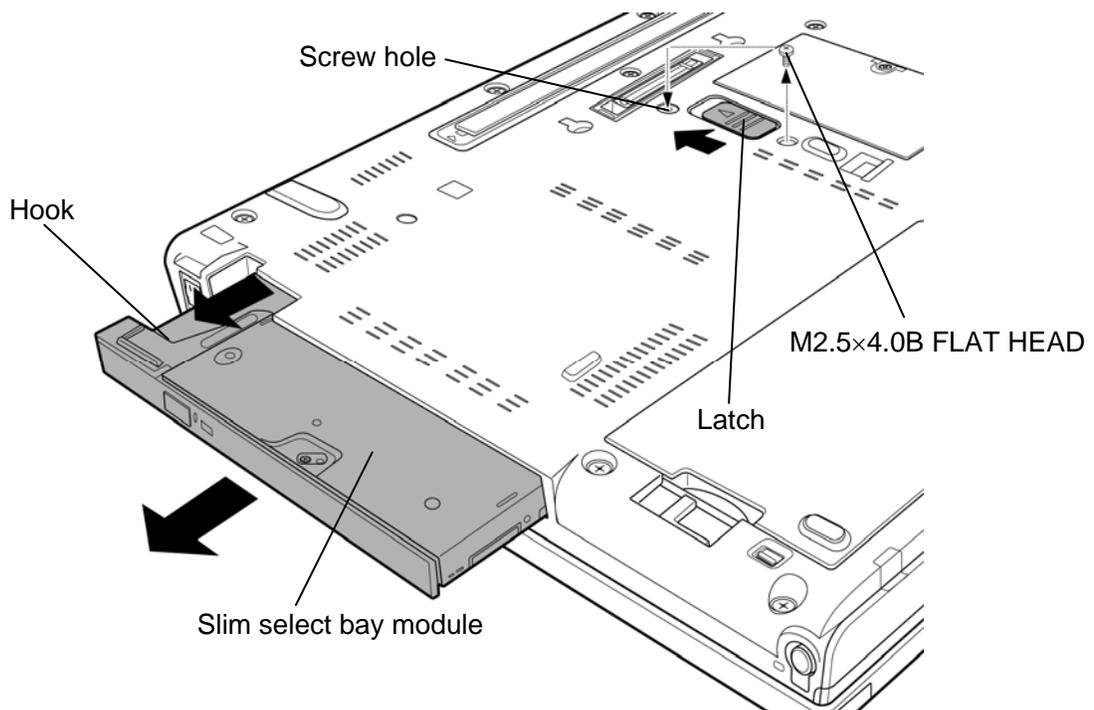


Figure 4-9 Removing the slim select bay module

4. Remove the following **screw** and **connector base** from the optical drive assembly.

- M2.0×3.0C S-THIN HEAD screw ×2

5. Remove the following **screws** and **ODD side assembly** from the optical drive assembly

- M2.0×3.0C S-THIN HEAD screw ×1
- M2.0×22.0C BIND screw ×1

Rev D

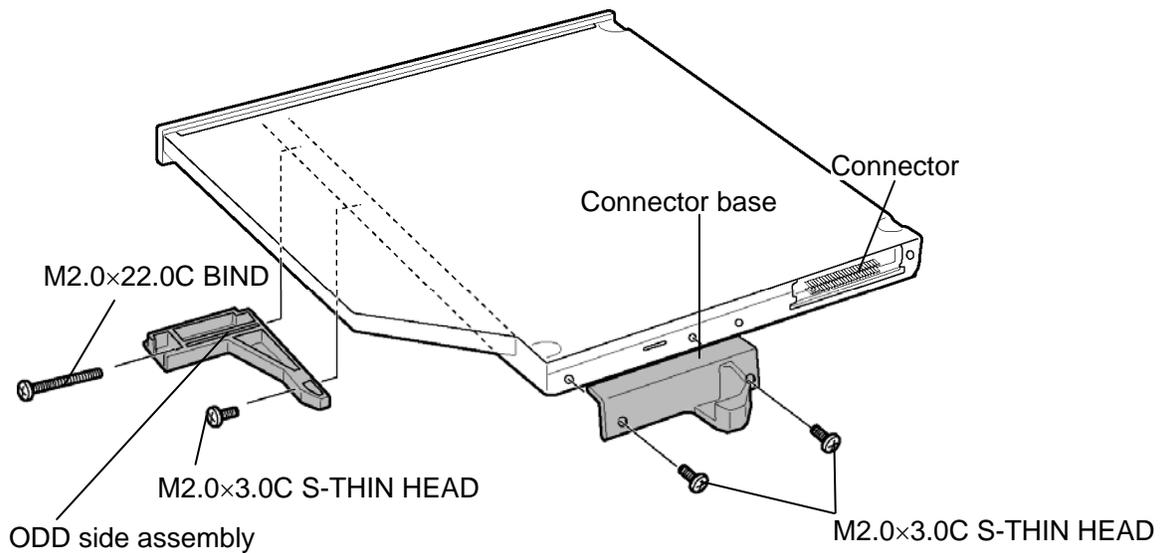


Figure 4-10 Detaching the optical drive assembly

Installing the slim select bay module

The following describes the procedure for installing the slim select bay module. (See Figure 4-9 and 4-10.)

1. Install the **ODD side assembly** to the optical drive assembly and secure it with the following **screws**.

- M2.0×3.0C S-THIN HEAD screw ×1
- M2.0×22.0C BIND screw ×1

2. Install the **connector base** to the optical drive assembly and secure it with the following **screw**.

- M2.0×3.0C S-THIN HEAD screw ×2

3. Insert the **slim select bay module** into the slot to connect it to the connector on the system board. Press to ensure a firm connection.
4. Remove the following **screw** from the screw hole. Then secure the **latch** with the **removed screw**. (The slim select bay is locked.)

- M2.5×4.0B FLAT HEAD screw ×1

4.8 Memory module (slot B)

CAUTION: *The power must be turned off when you remove the memory module. Removing the memory module with the power on risks damaging the module or the computer itself.*

Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.

Never press hard or bend the memory module.

Removing the memory module

To remove the memory module, make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-11 and 4-12.)

1. Loosen the **screw** securing the memory slot cover and remove the **memory slot cover**.

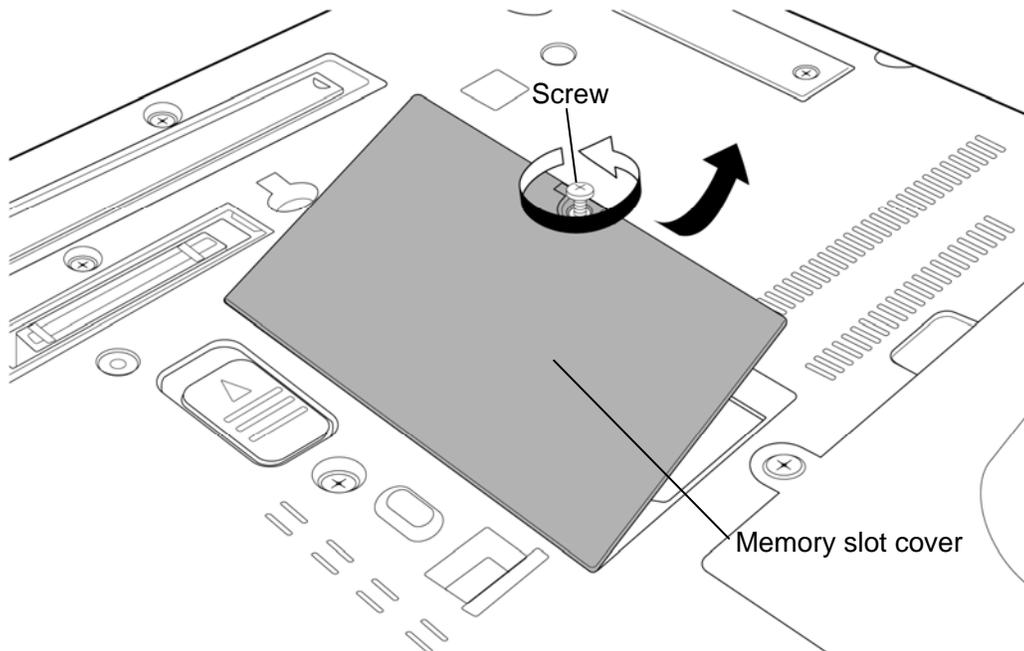


Figure 4-11 Removing the memory slot cover (slot B)

2. Open the left and right **latches** and remove the **memory module**.

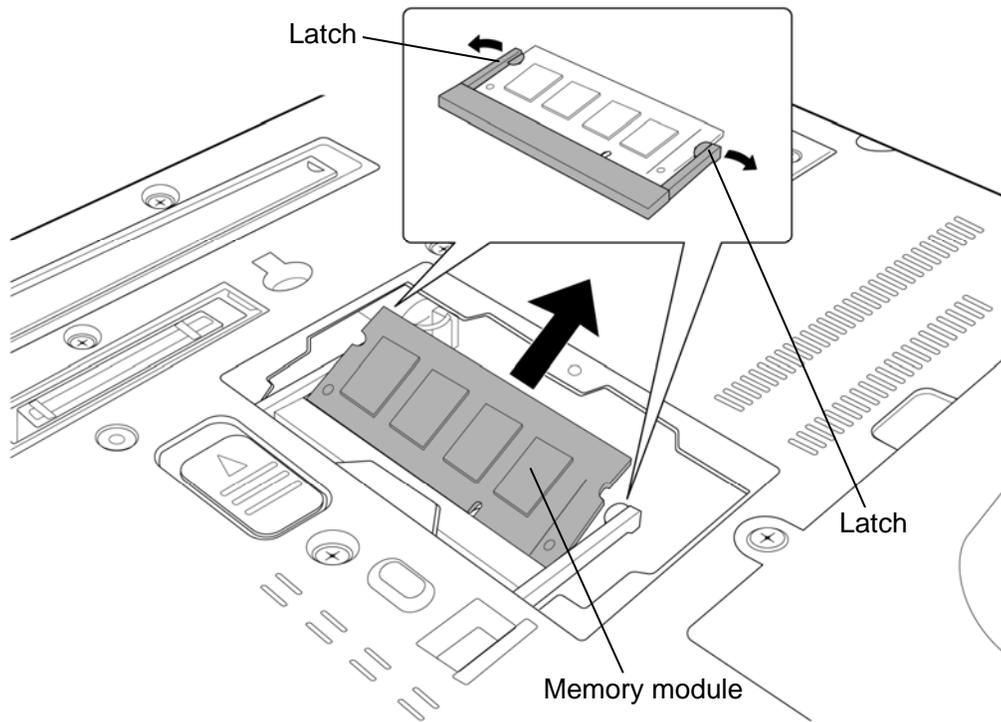


Figure 4-12 Removing the memory module (slot B)

Installing the memory module

To install the memory module, make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-11 and 4-12.)

1. Insert the **memory module** into the connector slantwise (terminal side first) and press it to connect firmly.

CAUTION: *The power must be turned off when you insert the memory module. Inserting the memory module with the power on risks damaging the module or the computer itself.*

*Do not install a memory module only in the **slot B**. Use the **slot A** prior to the **slot B**. Otherwise, the computer or the memory may be damaged.*

Never press hard or bend the memory module.

After installing the memory module, confirm that the memory module is fixed with the left and right latches.

2. Install the **memory slot cover** and secure it with the **screw**.

4.9 Fan hood

NOTE: When repairing the PC, clean the fan hood and heat sink with a vacuum cleaner and cotton sticks, and remove dusts with tweezers.

Removing the Fan hood

The following describes the procedure for removing the fan hood. (See Figure 4-13.)

1. Remove the following **screw** and **fan hood cover**.

- M2.0×4.0B BIND screw ×1

2. Remove the **fan hood** from the slot.

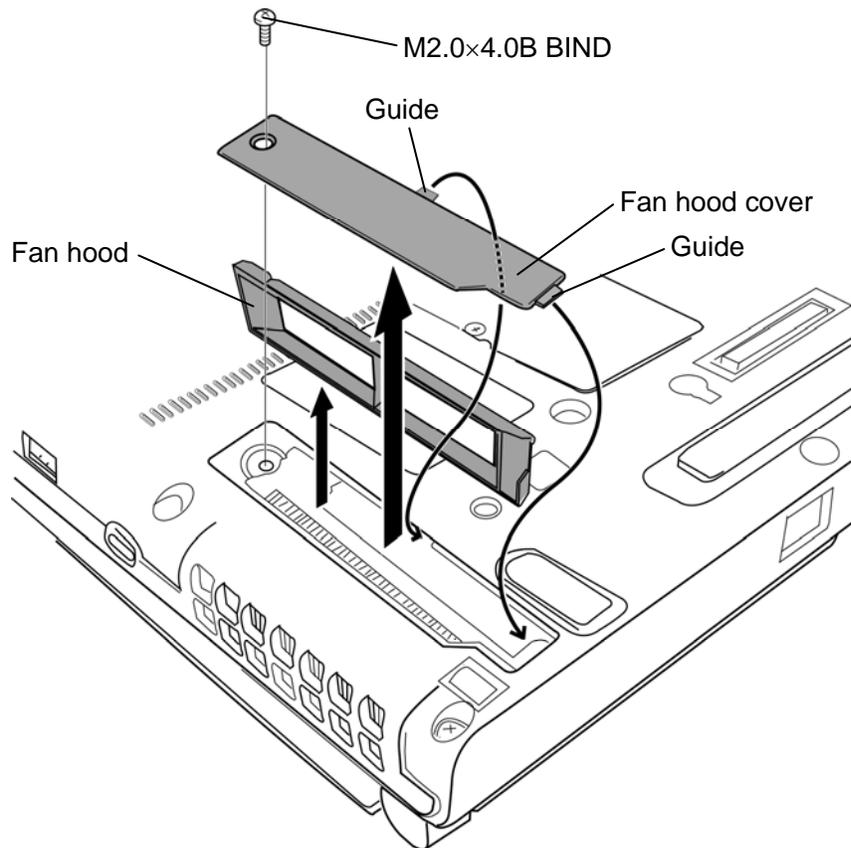


Figure 4-13 Removing the fan hood

Installing the Fan hood

The following describes the procedure for installing the fan hood. (See Figure 4-13.)

1. Install the **fan hood** into the slot.
2. Set the **fan hood cover** with the guide under the base and secure it with the following **screw**.

- M2.0×4.0B BIND screw ×1

4.10 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard. (See Figure 4-14 to 4-17.)

1. Turn the computer face up.
2. Open the display and make it flat.
3. Insert your finger into the **slit** and lift up the **keyboard holder** to remove.
4. Remove the following **screws** securing the keyboard.

- M2.0x3.0C S-THIN HEAD screw ×2

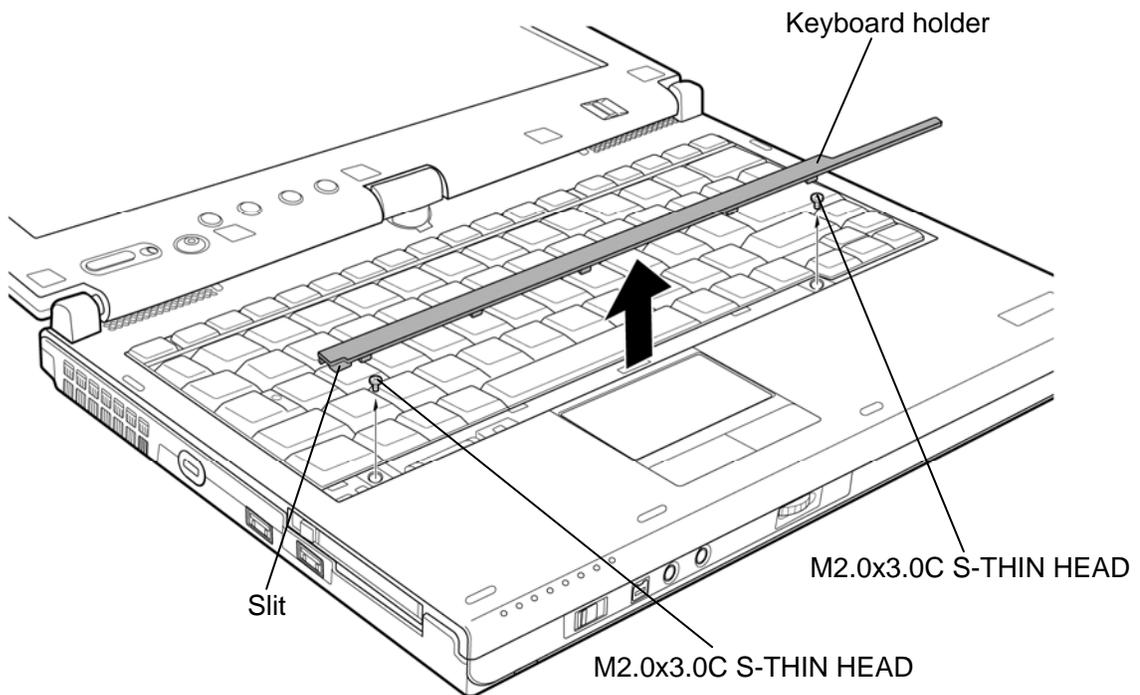


Figure 4-14 Removing the keyboard holder

5. Lift the top edge of the **keyboard** while releasing **latch** and turn it face down on the palm rest while releasing the **guides** from the **slits**.

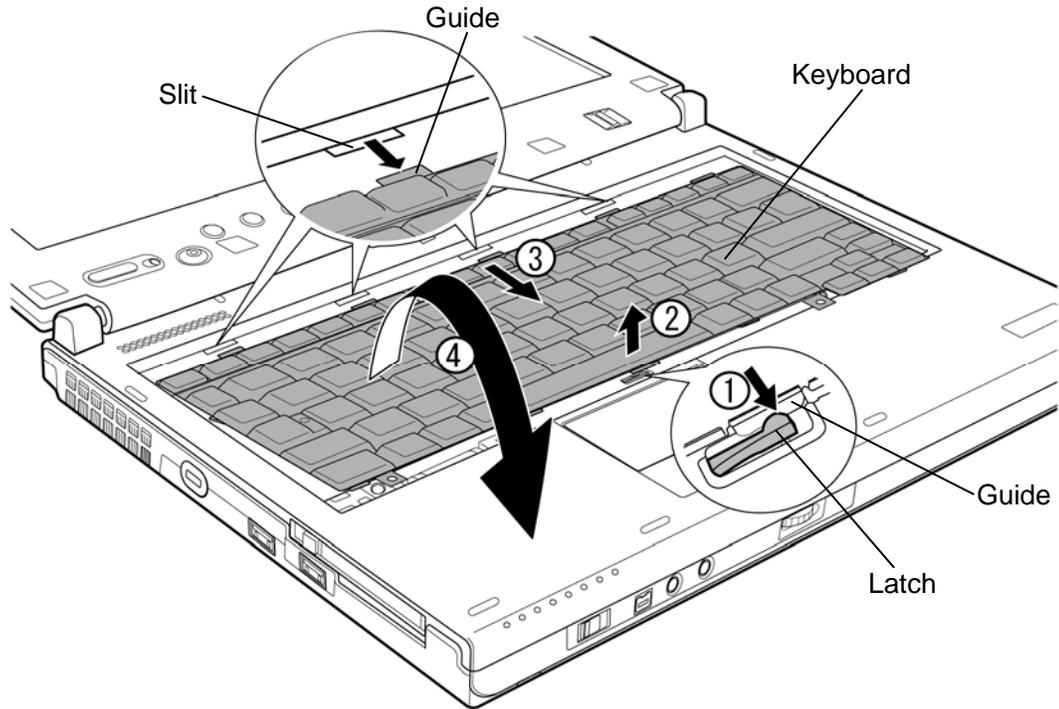


Figure 4-15 Removing the screw

6. Remove the following **screw** and **keyboard cover**.

- M2.5x3.0C S-THIN HEAD screw ×1

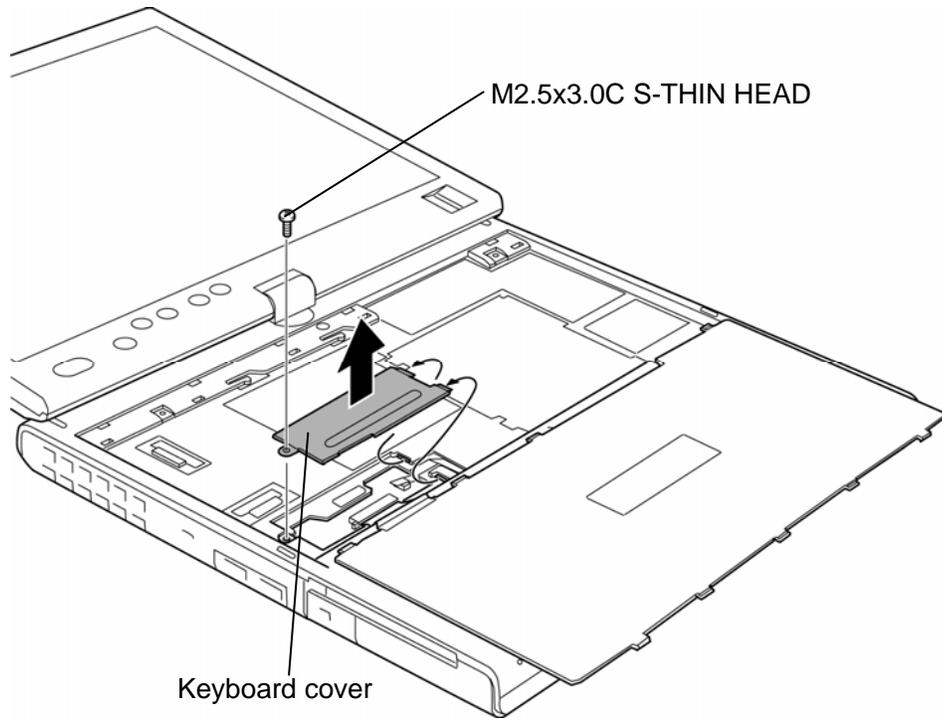


Figure 4-16 Removing the keyboard cover

7. Disconnect the **keyboard cable** from the connector **CN3240** on the system board and remove the **keyboard**.

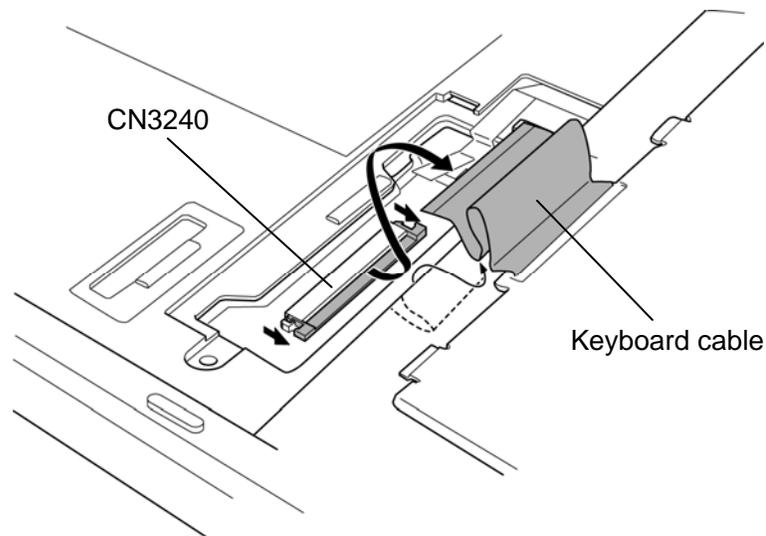


Figure 4-17 Removing the keyboard

Installing the keyboard

The following describes the procedure for installing the keyboard. (See Figure 4-14 to 4-17.)

1. Place the keyboard face down on the palm rest.
2. Connect the **keyboard cable** to the connector **CN3240** on the system board.

CAUTION: *Extra portion of the keyboard cable must be put under the palm rest.*

3. Install the **keyboard cover** and secure it with the following **screw**. (Insert the guide of the keyboard cover first)
 - M2.5×3.0C S-THIN HEAD screw ×1
4. Turn the **keyboard** face up and insert the four guides of the keyboard into the four slits. Set the keyboard while pushing the latch. Make sure the guide of the keyboard is under the latch.
5. Secure the **keyboard** with the following **screws**.
 - M2.0×3.0C S-THIN HEAD screw ×2
6. Install the **keyboard holder** while engaging the latches.

4.11 Memory module (slot A)

CAUTION: *The power must be turned off when you remove the memory module. Removing the memory module with the power on risks damaging the module or the computer itself.*

Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.

Never press hard or bend the memory module.

Removing the memory module

To remove the memory module, make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-18 and 4-19.)

1. Remove the following screws and **memory slot cover**.

- M2.5×3.0C S-THIN HEAD screw ×2

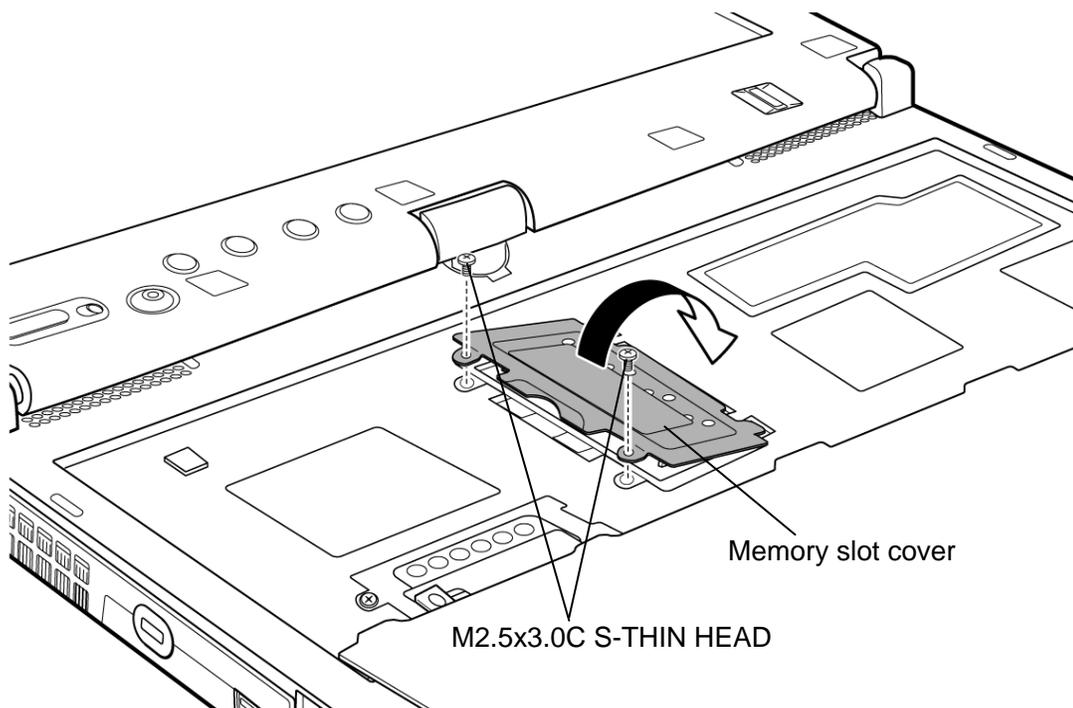


Figure 4-18 Removing the memory slot cover (slot A)

2. Open the left and right **latches** and remove the **memory module**.

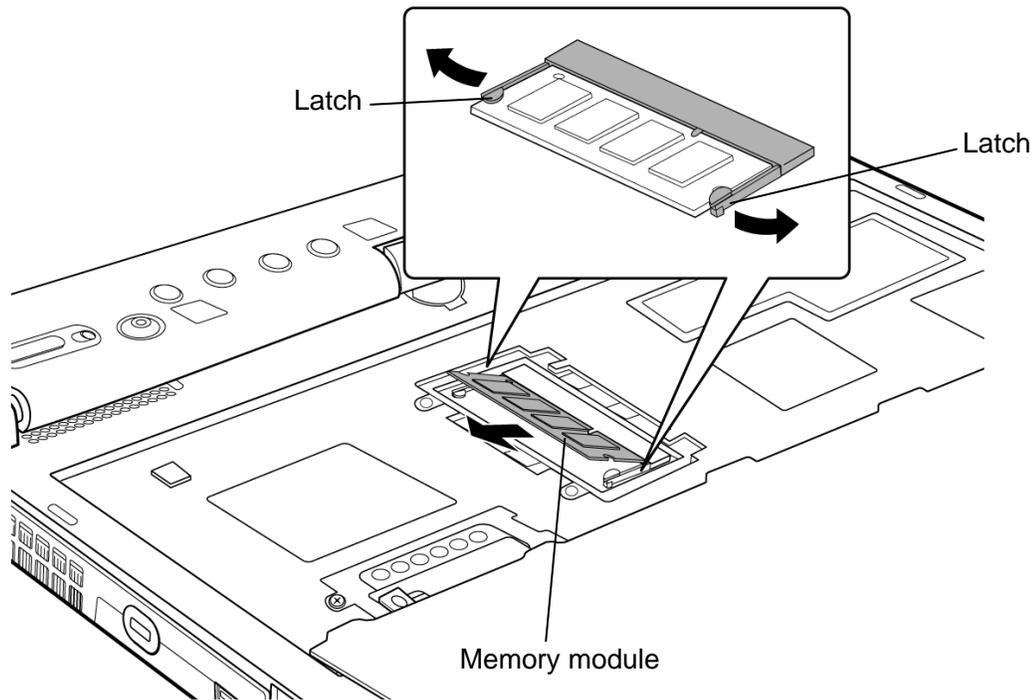


Figure 4-19 Removing the memory module (slot A)

Installing the memory module

To install the memory module, make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-18 and 4-19.)

1. Insert the **memory module** into the connector slantwise (terminal side first) and press it to connect firmly.

CAUTION: *The power must be turned off when you insert the memory module. Inserting the memory module with the power on risks damaging the module or the computer itself.*

*Do not install a memory module only in the **slot B**. Use the **slot A** prior to the **slot B**. Otherwise, the computer or the memory may be damaged.*

Never press hard or bend the memory module.

After installing the memory module, confirm that the memory module is fixed with the left and right latches.

2. Install the **memory slot cover** and secure it with the following **screws**.

- M2.5×3.0C S-THIN HEAD screw ×2

4.12 Wireless LAN card/Robson card

Removing the Wireless LAN card/Robson card

To remove the wireless LAN card/Robson card, follow the steps below. (See Figure 4-20 to 4-22.)

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

1. Peel off the **insulator**.

CAUTION: Do not reuse the removed insulator.

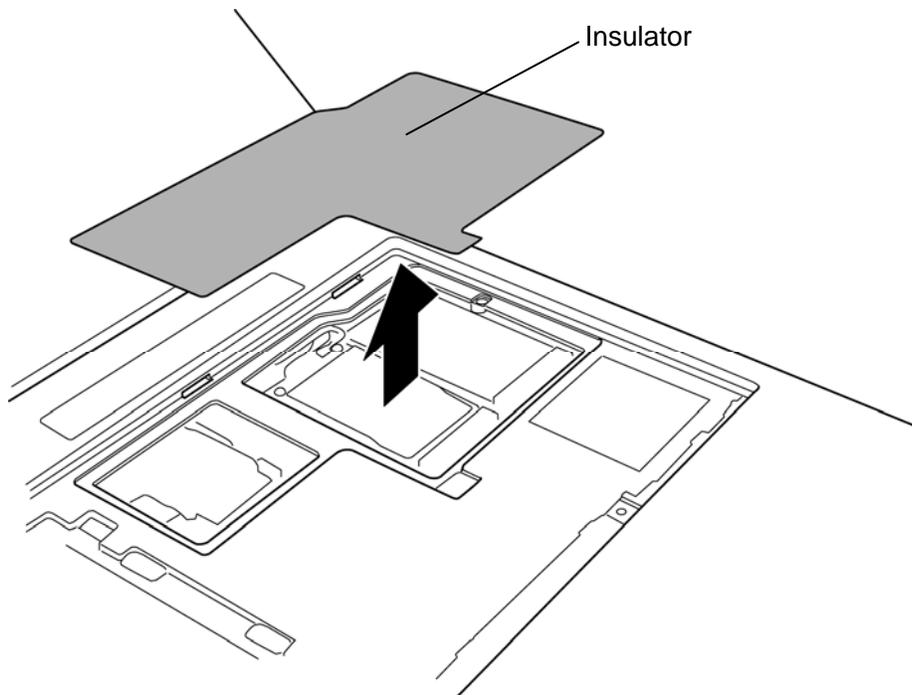


Figure 4-20 Removing the insulator

2. Remove the following **screws** and disconnect the **Robson card** from the connector on the system board.

- M2.0×4.0B S-THIN HEAD screw ×2

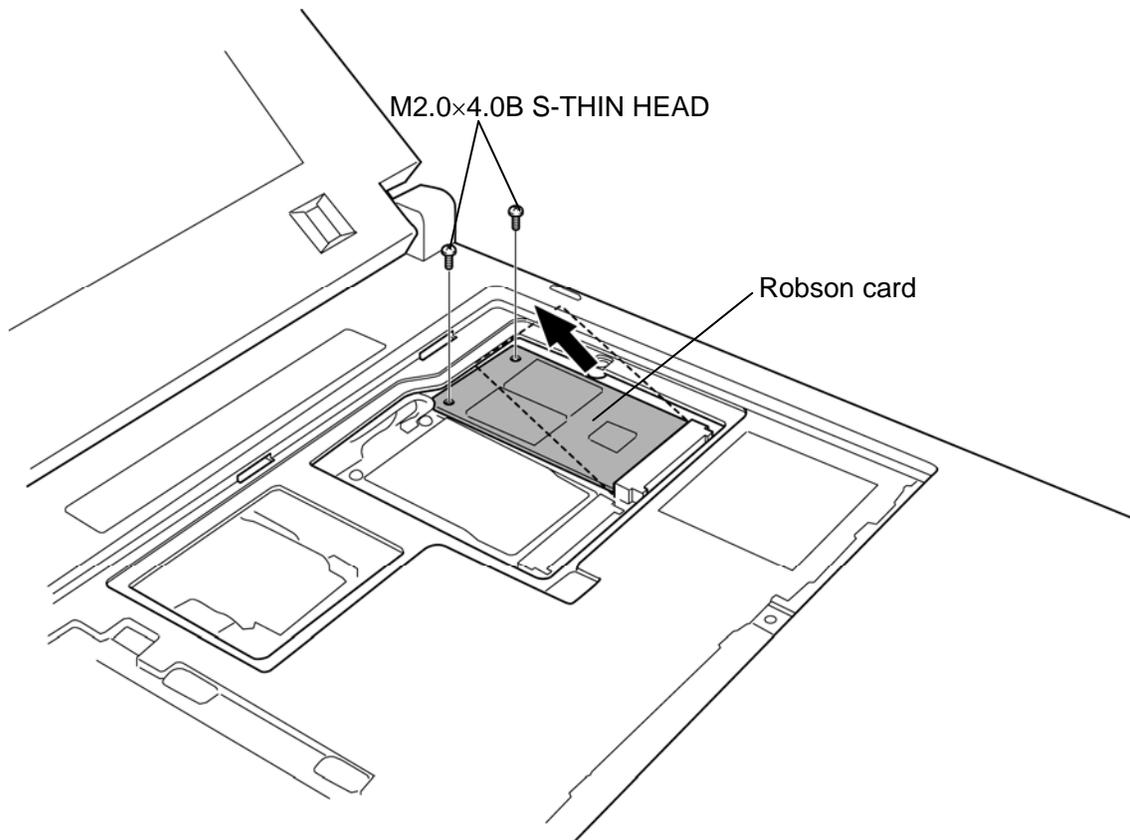


Figure 4-21 Removing the Robson card

3. Disconnect the **wireless LAN antenna cables** (black, white) from the wireless LAN card using an antenna coaxial cable disconnecter.
4. Remove the following **screws** and disconnect the **wireless LAN card** from the connector on the system board.

- M2.0×4.0B S-THIN HEAD screw ×2

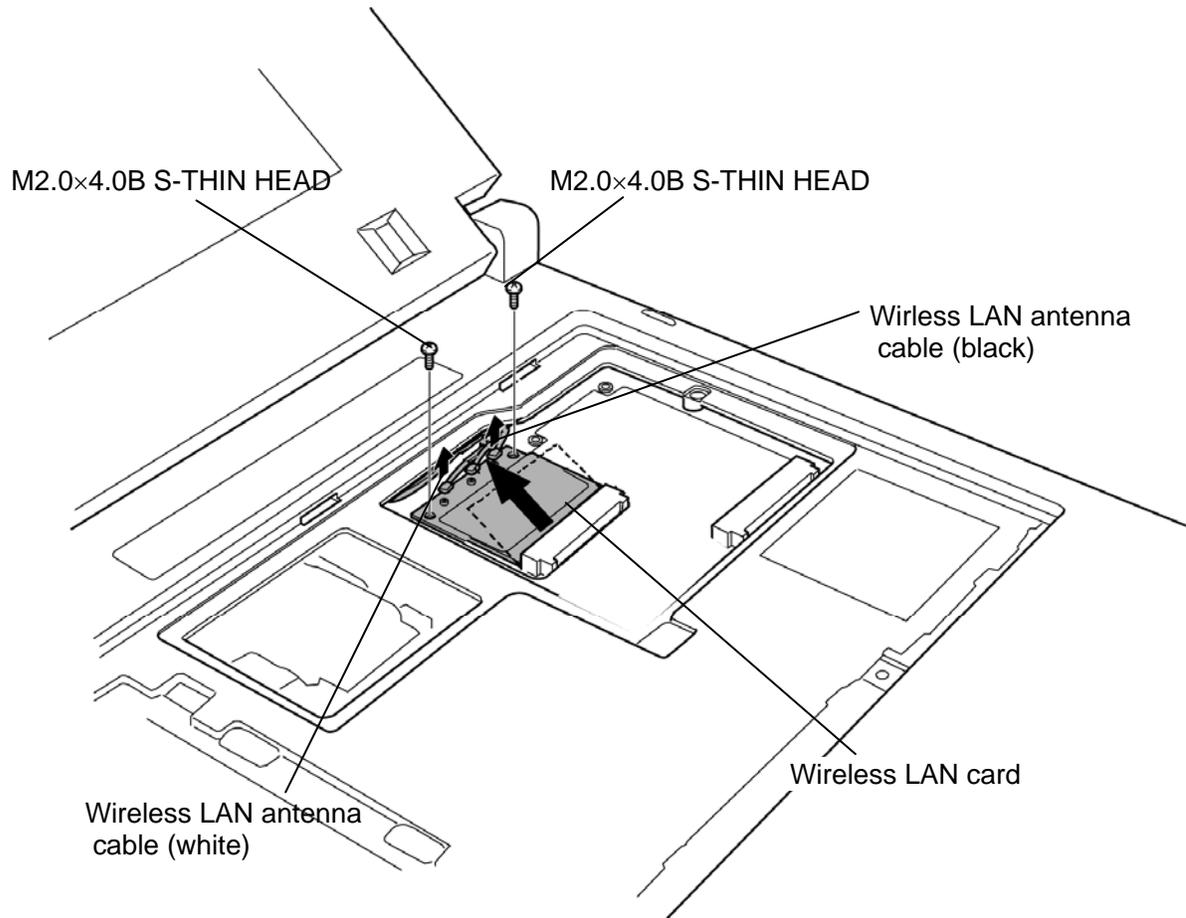


Figure 4-22 Removing the Wireless LAN card

Installing the Wireless LAN card/Robson card

To install the wireless LAN card/Robson card, follow the steps below. (See Figure 4-20 to 4-22.)

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

1. Insert 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**.
 - M2.0×4.0B S-THIN HEAD screw ×2
3. Connect the **wireless LAN antenna cables** (white: 1, black: 2) to the connectors on the wireless LAN card.

NOTE: *For models without wireless LAN, fix the antenna cables to the place where the wireless LAN card is mounted (for wireless LAN model) with the glass tape.*

4. Insert the **Robson card** to the connector on the system board slantwise and press it to connect firmly and secure it with the following **screws**.
 - M2.0×4.0B S-THIN HEAD screw ×2
5. Stick a new **insulator** in place.

4.13 3G card (3G model only)

Removing the 3G card

To remove the 3G card, follow the steps below. (See Figure 4-23.)

CAUTION: Do not try to remove the 3G card with the computer turned on. The computer or the 3G card can be damaged. Do not touch the connectors on the 3G card. Debris on the connectors may cause the 3G card access problems.

1. Disconnect the **3G card antenna cables** (blue and red) from the 3G card using an antenna coaxial cable disconnecter.
2. Remove the following **screws** and disconnect the **3G card** from the connector on the system board.

- M2.0×4.0B S-THIN HEAD screw ×2

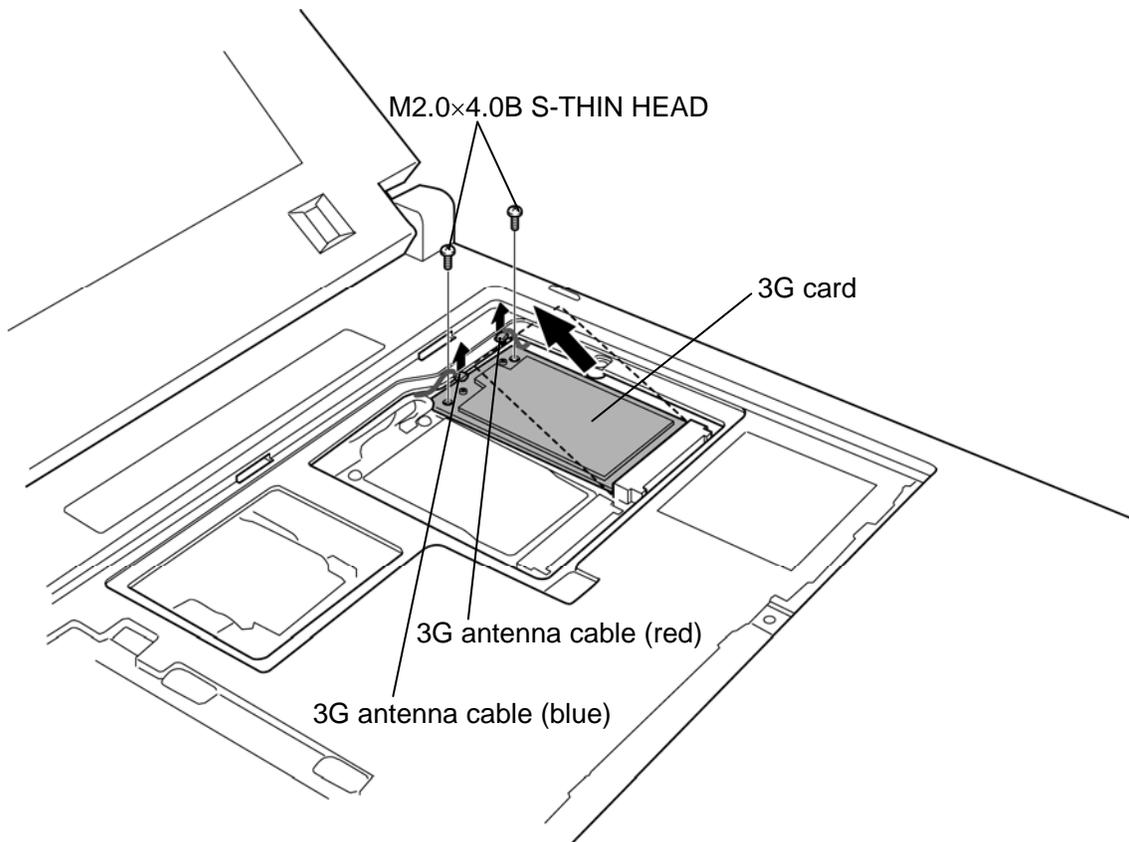


Figure 4-23 Removing the 3G card

Installing the 3G card

To install the 3G card, follow the steps below. (See Figure 4-23)

CAUTION: *Be sure to switch the computer off before installing the 3G card. Otherwise, the computer or the 3G card may be damaged.*

1. Insert the **3G card** to the connector on the system board slantwise and press it to connect firmly.
2. Secure the 3G card with the following **screws**.
 - M2.0×4.0B S-THIN HEAD screw ×2
3. Connect the **3G antenna cables** (blue and red) to the connectors on the 3G card.

4.14 Base assembly and Cover assembly

Removing the base assembly and cover assembly

The following describes the procedure for removing the base assembly and cover assembly. (See Figure 4-24 to 4-26.)

1. Remove the following screw.
 - M2.0×4.0B BIND screw ×1
2. Disconnect the **touch pad cable**, **LCD cable** and **digitizer cable** from the connector **CN3250**, **CN5601**, and **CN9540** on the system board.

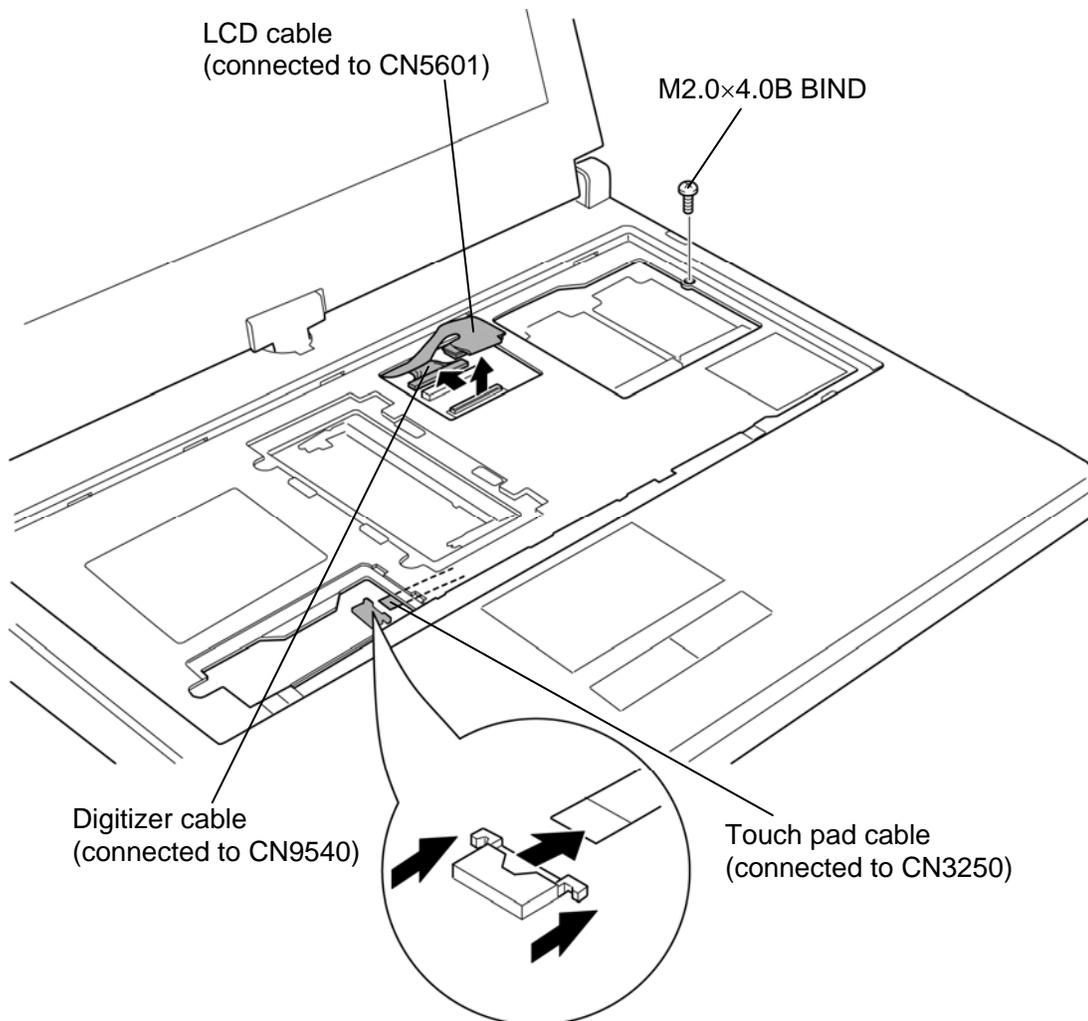


Figure 4-24 Removing the base assembly and cover assembly (1)

3. Stand the display 90 degrees.
4. Turn the display clockwise 90 degrees and remove the following screws.
 - M2.5×10.0B FLAT HEAD screw ×2
5. Remove the **hinge rear cover**.

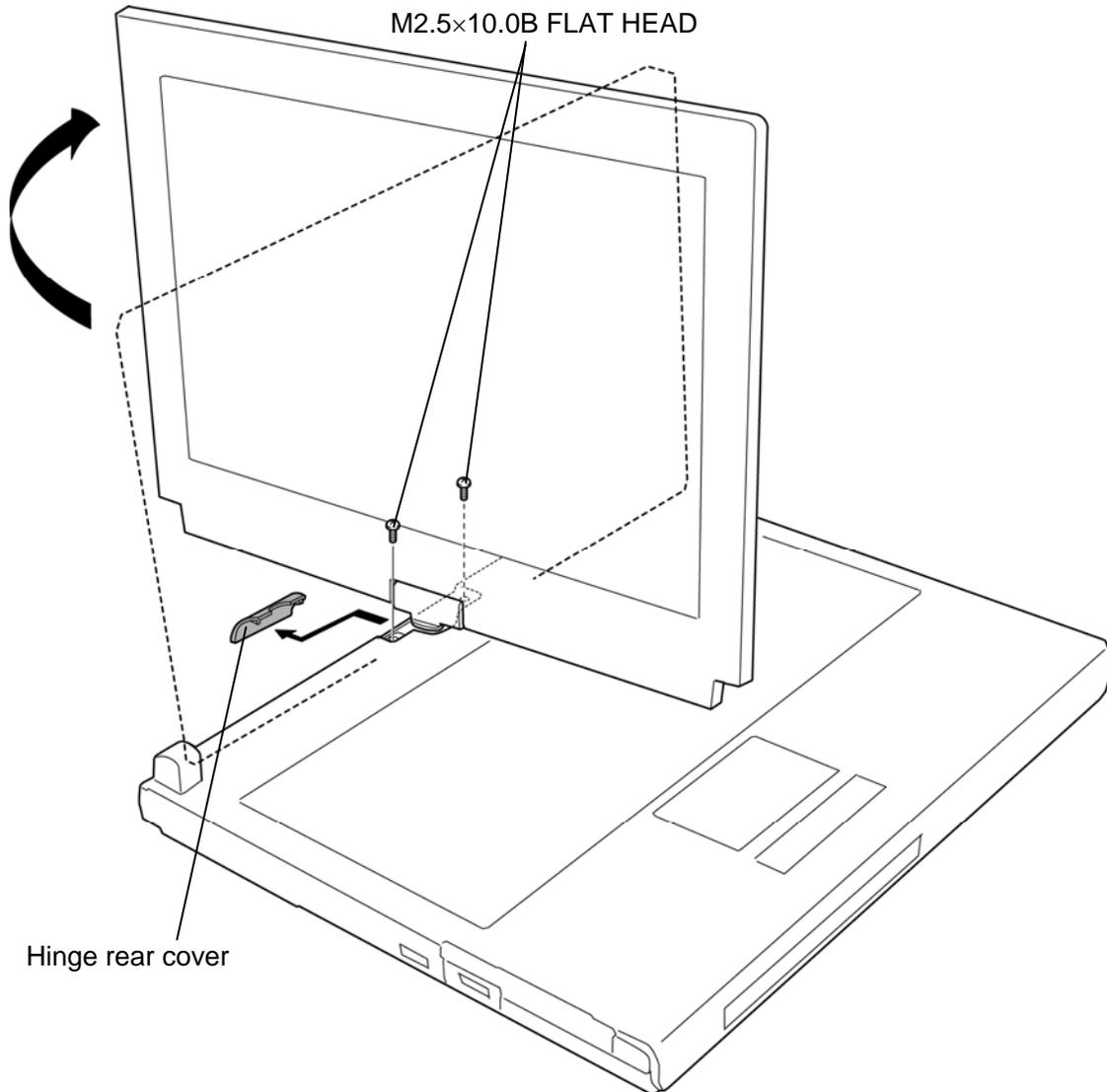


Figure 4-25 Removing the base assembly and cover assembly (2)

6. Return the display counterclockwise in the original position, close the display and turn over the computer.
7. Remove the following screws.
 - M2.5×16.0B FLAT HEAD screw ×3 (“16” in the figure below)
 - M2.5×6.0B FLAT HEAD screw ×10 (“6” in the figure below)
8. Separate the **base assembly** and **cover assembly**.

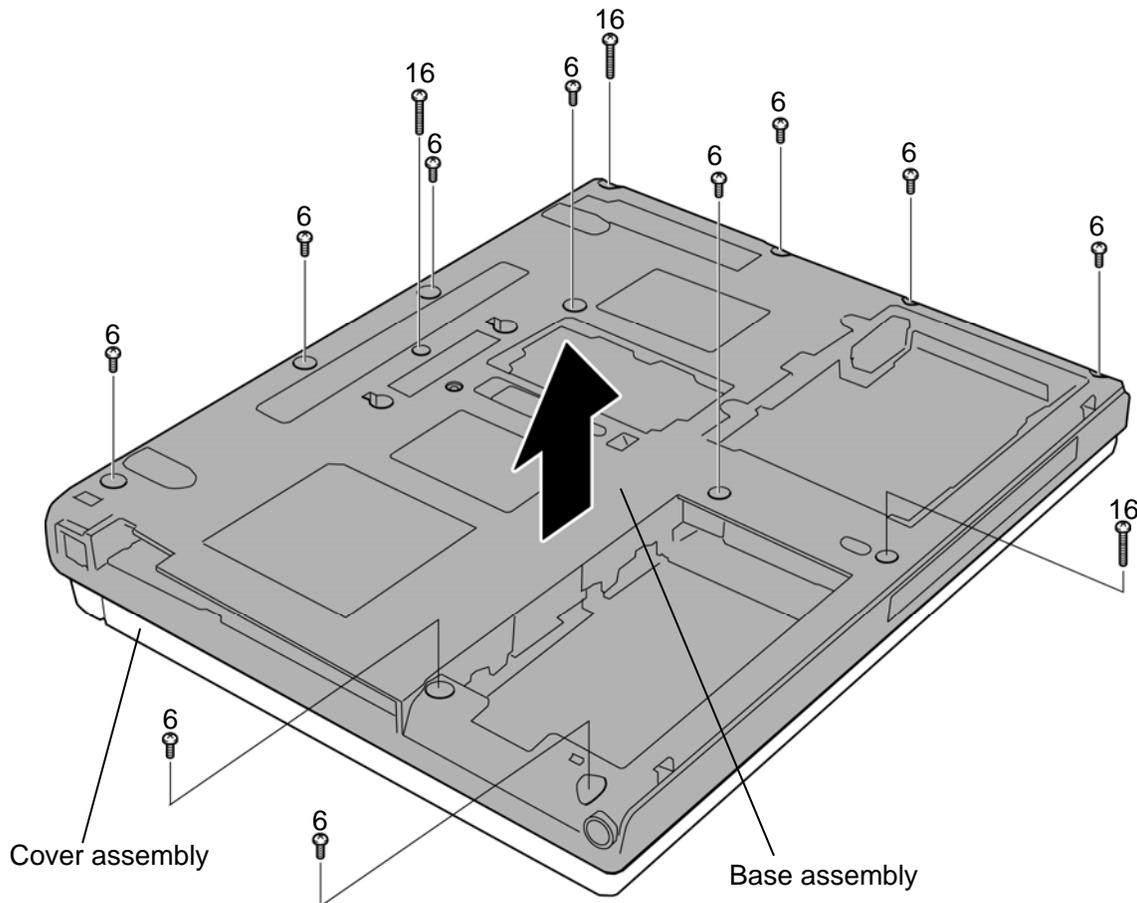


Figure 4-26 Removing the base assembly and cover assembly (3)

Installing the base assembly and cover assembly

The following describes the procedure for installing the base assembly and cover assembly. (See Figure 4-24 and 4-26.)

1. Place the **base assembly** onto the **cover assembly** and secure them with the following **screws**.
 - M2.5×16.0B FLAT HEAD screw ×3 (“16” in the figure 4-26)
 - M2.5×6.0B FLAT HEAD screw ×10 (“6” in the figure 4-26)
2. Turn the computer face up and stand the display 90 degrees.
3. Turn the display clockwise 90 degrees.
4. Secure the following **screws**.
 - M2.5×10.0B FLAT HEAD screw ×2
5. Turn the display counter clockwise 90 degrees. (The display is returned to the former position.)
6. Set the **hinge rear cover**.
7. Connect the **touch pad cable**, **LCD cable** and **digitizer cable** to the connector **CN3250**, **CN5601**, and **CN9540** on the system board.
8. Secure the base assembly and cover assembly with the following **screw**.
 - M2.0×4.0B BIND screw ×1

4.15 Slim select bay latch

Removing the Slim select bay latch

The following describes the procedure for removing the slim select bay latch. (See Figure 4-26.)

1. Remove the **slim select bay cap** on the bottom while pushing two **latches** inside to release them.
2. Remove the **slim select bay latch** in the direction in the figure below. Be careful not lose the **spring**.

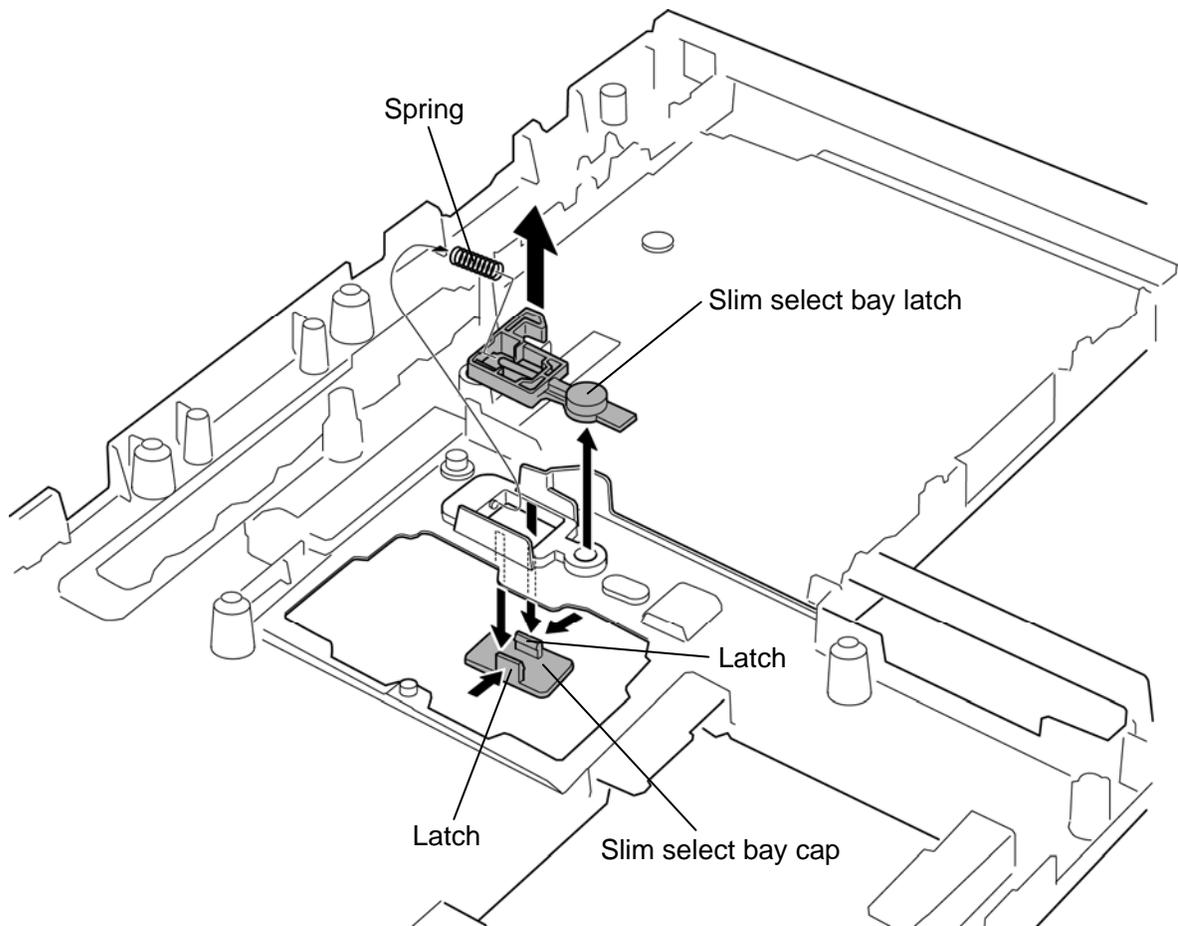


Figure 4-26 Removing the slim select bay latch

Installing the Slim select bay latch

The following describes the procedure for installing the slim select bay latch (See Figure 4-26).

1. Set the spring to the **slim select bay latch**.
2. Set the **slim select bay latch** to the slot.
3. Push the **slim select bay cap** from the bottom.

4.16 Battery lock assembly

Removing the Battery lock assembly

The following describes the procedure for removing the battery lock assembly. (See Figure 4-27.)

1. Remove the **battery lock assembly** from the slot while pushing it in the direction in the figure below.

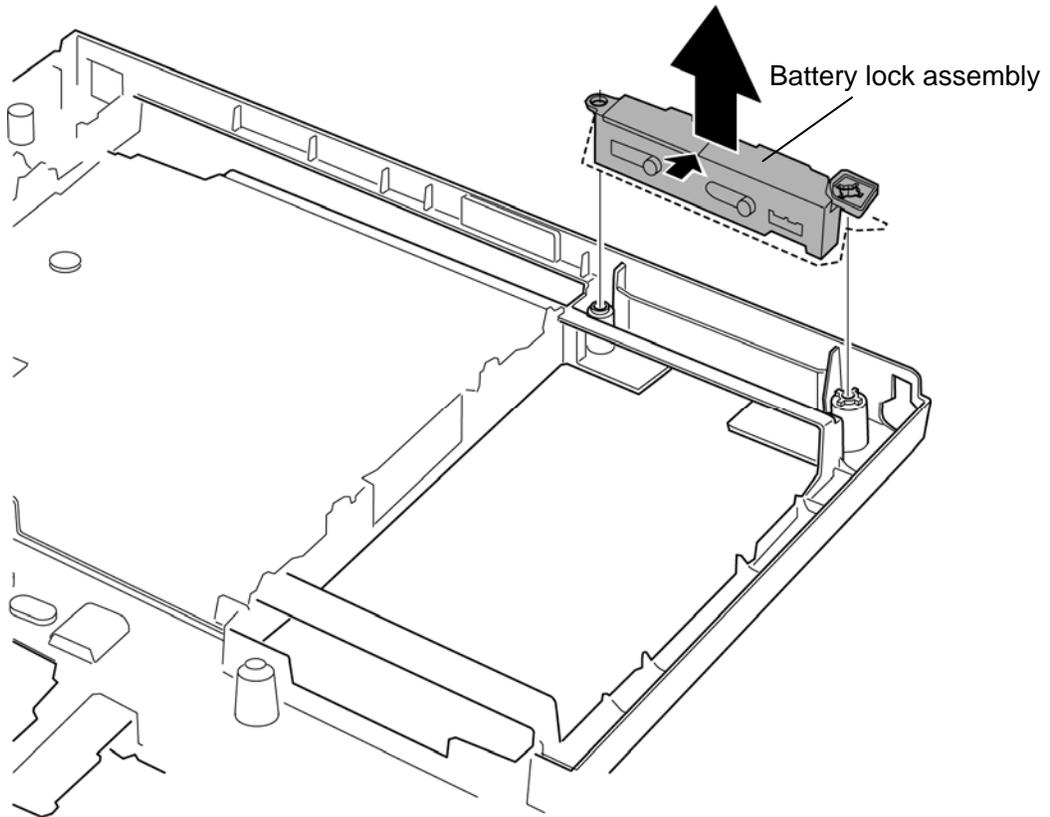


Figure 4-27 Removing the battery lock assembly

Installing the Battery lock assembly

The following describes the procedure for installing the battery lock assembly (See Figure 4-27).

1. Set the **battery lock assembly** into the slot.

4.17 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

The following describes the procedure for removing the RTC battery. (See Figure 4-28.)

1. Disconnect the **RTC battery cable** from the connector **CN9300** on the system board.
2. Peel off the **insulator** and remove the **RTC battery** from the slot.

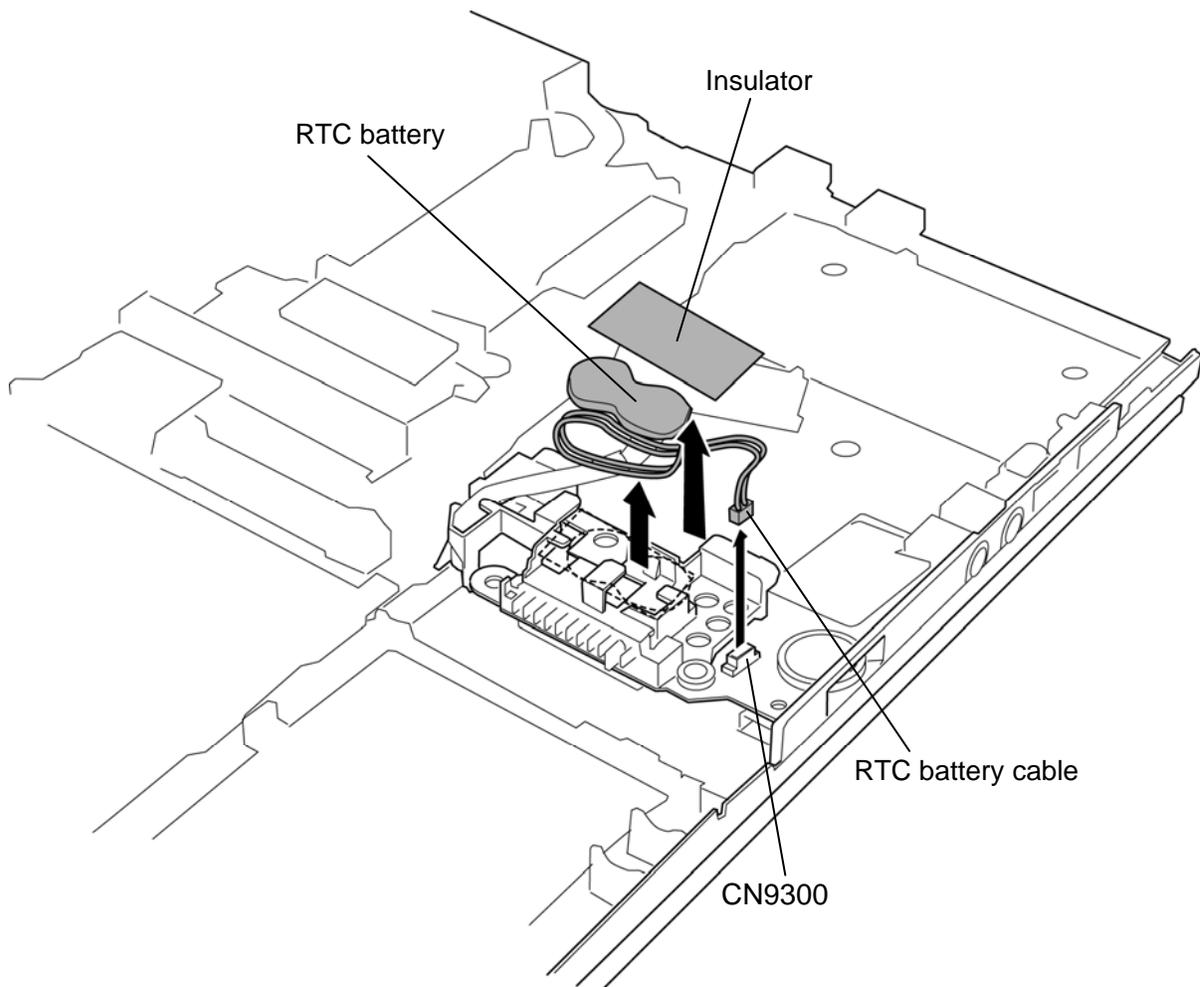


Figure 4-28 Removing the RTC battery

Installing the RTC battery

The following describes the procedure for installing the RTC battery. (See Figure 4-28.)

1. Connect the **RTC battery cable** to the connector **CN9300** on the system board.
2. Set the **RTC battery** to the slot and stick the **insulator** in place.

4.18 Bluetooth module

Removing the Bluetooth module

The following describes the procedure for removing the Bluetooth module. (See Figure 4-29.)

CAUTION: Do not try to remove the Bluetooth module with the computer turned on. You can damage the computer or Bluetooth module. Do not touch the connectors on the Bluetooth module on the computer. Debris on the connectors may cause Bluetooth access problems.

1. Turn up the **black sheet**.
2. Remove the **Bluetooth module** from the slot while pushing the **holder** outside and disconnect the **Bluetooth cable** from the connector on the Bluetooth module.

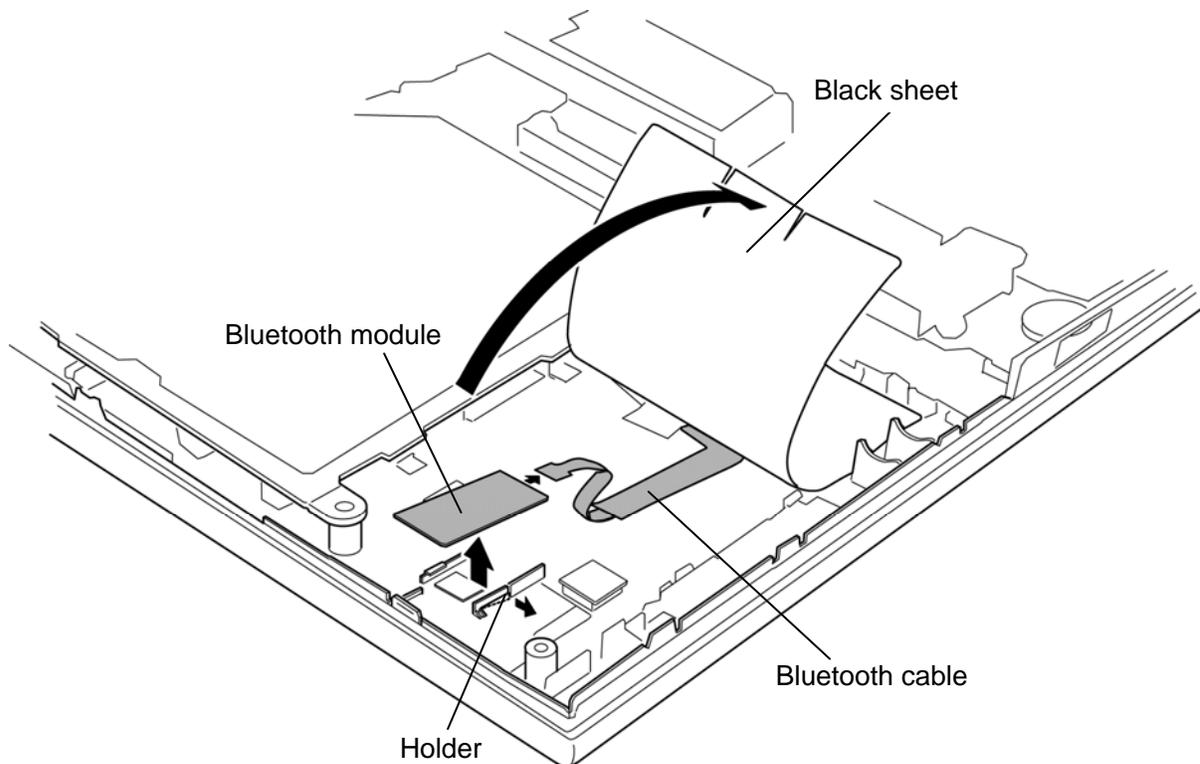


Figure 4-29 Removing the Bluetooth module

Installing the Bluetooth module

The following describes the procedure for installing the Bluetooth module. (See Figure 4-29.)

1. Turn up the **black sheet**.
2. Connect the **Bluetooth cable** to the connector on the Bluetooth module.
3. Set the **Bluetooth module** to the slot.

4.19 Front panel

Removing the Front panel

The following describes the procedure for removing the front panel. (See Figure 4-30.)

1. Remove the **front panel** from the base assembly while lifting the system board up slightly.

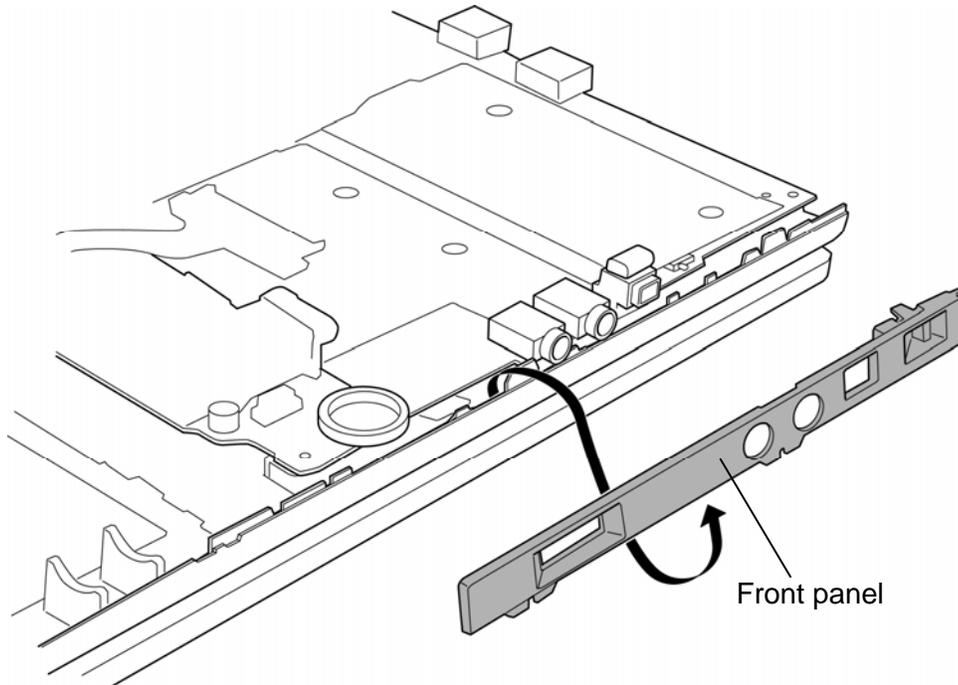


Figure 4-30 Removing the front panel

Installing the Front panel

The following describes the procedure for installing the front panel. (See Figure 4-30.)

1. Set the **front panel** to the system board in place while lifting the system board up slightly.

NOTE: After setting the front panel, make sure that the wireless communication switch moves properly.

4.20 Fan/Heat sink/CPU

Removing the Fan/Heat sink/CPU

The following describes the procedure for removing the fan/heat sink/CPU. (See Figure 4-31 to 4-35.)

1. Disconnect the **fan cable** from the connector **CN3380** on the system board.
2. Remove the following **screws and heat sink**.
 - M2.0x4.0B BIND screw ×4
3. Remove the **fan hood**.

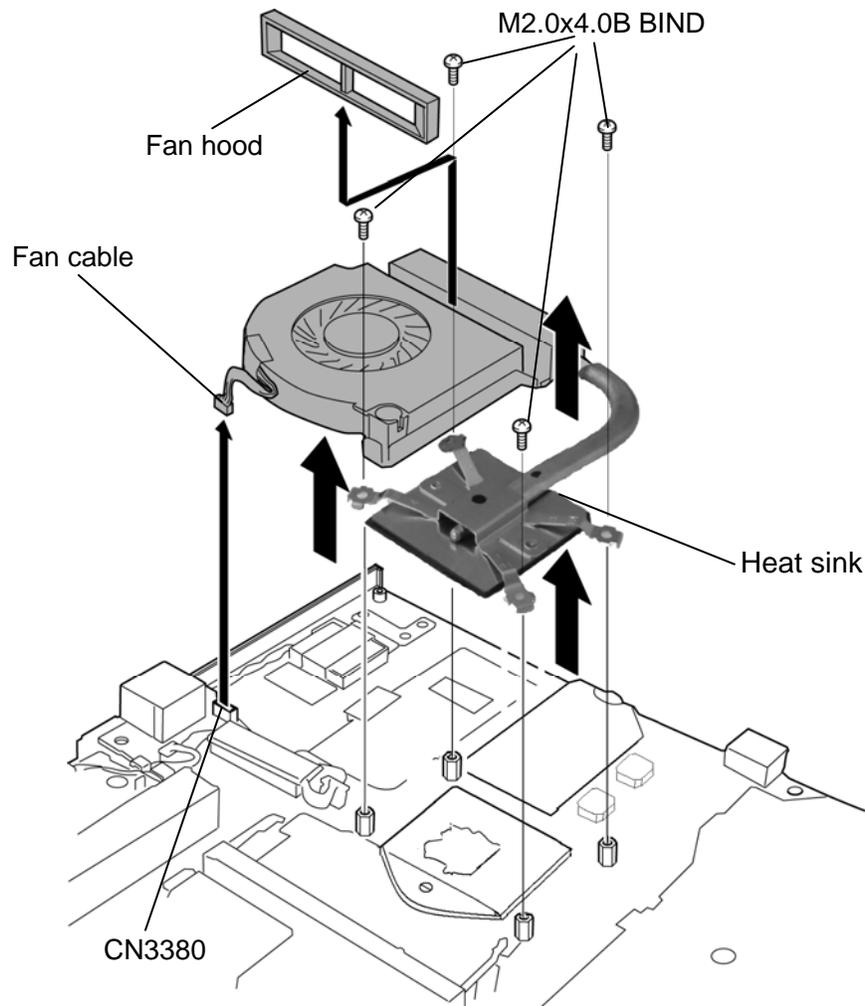


Figure 4-31 Removing the heat sink (with fan)

4. Set the **flat plate** under the fan so that stress is not given to the assembly while disassembling and assembling.
5. Remove the following **screws** and separate the **fan** and **heat sink**.

- M2.5×4.0B FLAT HEAD screw ×2

NOTE: Remove/Install the fan on the flat plate.

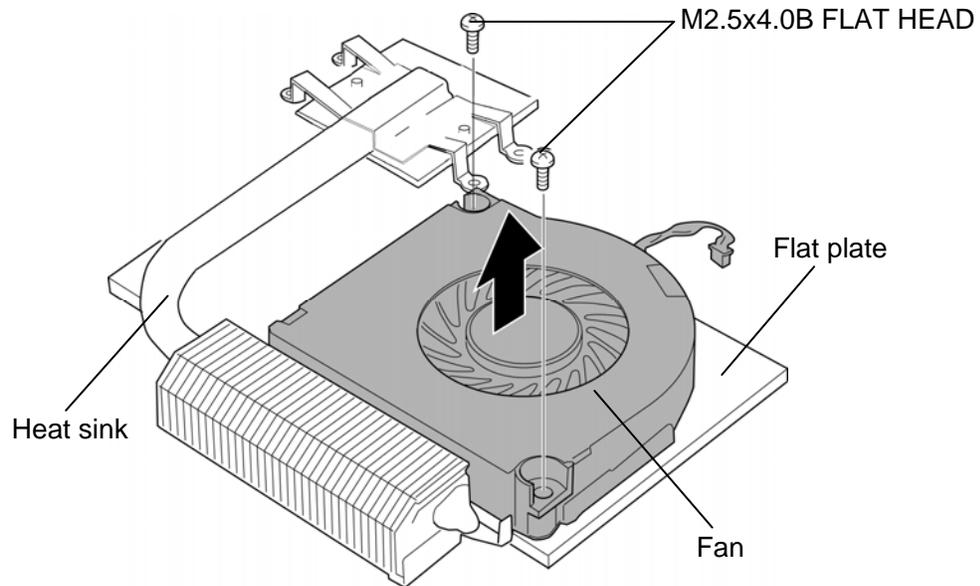


Figure 4-32 Removing the fan

6. Unlock the **CPU** by turning the **cam** counterclockwise on the CPU socket by 180 degrees with a flat-blade screwdriver.
7. Remove the **CPU**.

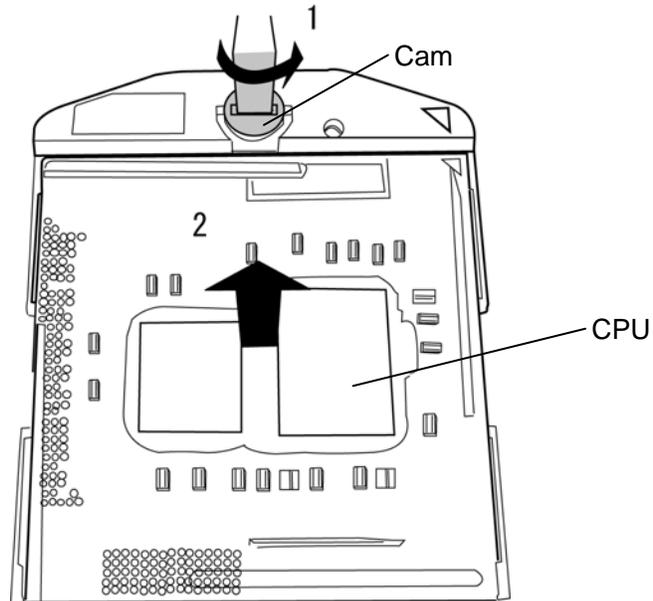


Figure 4-33 Removing the CPU

CAUTION: When removing the CPU, lift it up right above. Otherwise, pins of the CPU may be damaged.

Installing the CPU/fan/DC fan

To install the CPU/fan/DC fan, follow the steps below and refer to Figure 4-31 to 4-35.

1. Make sure that the **cam** of the CPU socket is in the unlock (OPEN) position.
2. Set the **CPU** to the correct position in the **CPU socket**. Make sure the position of the CPU (**triangle mark**) is correct to avoid damaging pins on the CPU.

NOTE: When replacing the CPU with a new one, stick the insulator (SQUARE INSULATOR) to the CPU in place.

3. Lock the CPU by rotating clockwise the **cam** on the CPU socket by 180 degrees with a flat-blade driver.

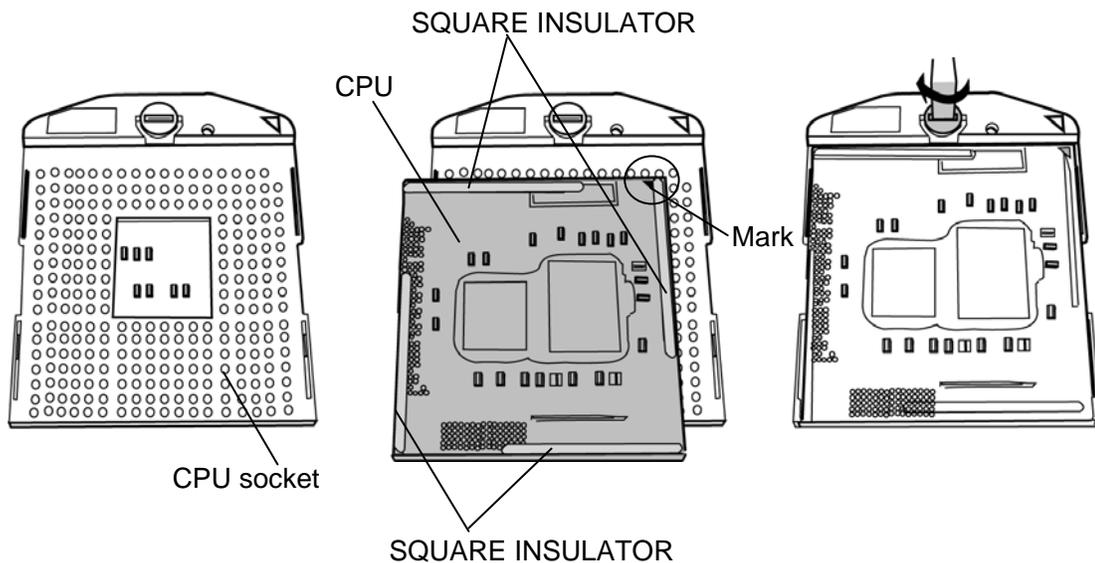


Figure 4-34 Installing the CPU

4. When silicon grease is already applied to the CPU or fin, wipe them off with a cloth in advance.
5. Apply new **grease** (Shin-Etsu Chemical Co. X-23-7921-5) on the CPU using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip.

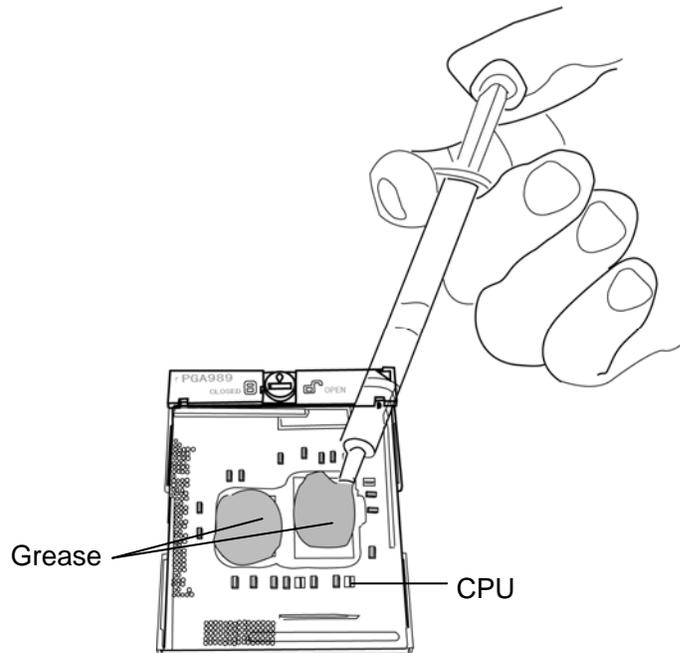


Figure 4-35 Applying new grease

6. Place the **fan** on the heat sink and secure them with the following **screws**.
 - M2.5×4.0B FLAT HEAD screw ×2
7. Set the **fan hood** in place.

CAUTION: Do not apply silicon grease on the North bridge.

8. Place the **heat sink** on the CPU and secure it with the following **screws**.
 - M2.0×4.0B BIND screw ×4
9. Connect the **fan cable** to the connector **CN3380** on the system board.

CAUTION: Do not put the fan cable on the fan.

Tighten the screws in the order of the number marked on the CPU hold plate.

4.21 System board

Removing the System board

The following describes the procedure for removing the system board. (See Figure 4-36 and 4-37.)

1. Turn up the **insulator** and disconnect the **speaker cable** and **microphone cable** from the connector **CN6150** and **CN6070** on the system board.
2. Remove the following **screws** securing the system board.

- M2.5×4.0B FLAT HEAD screw ×2

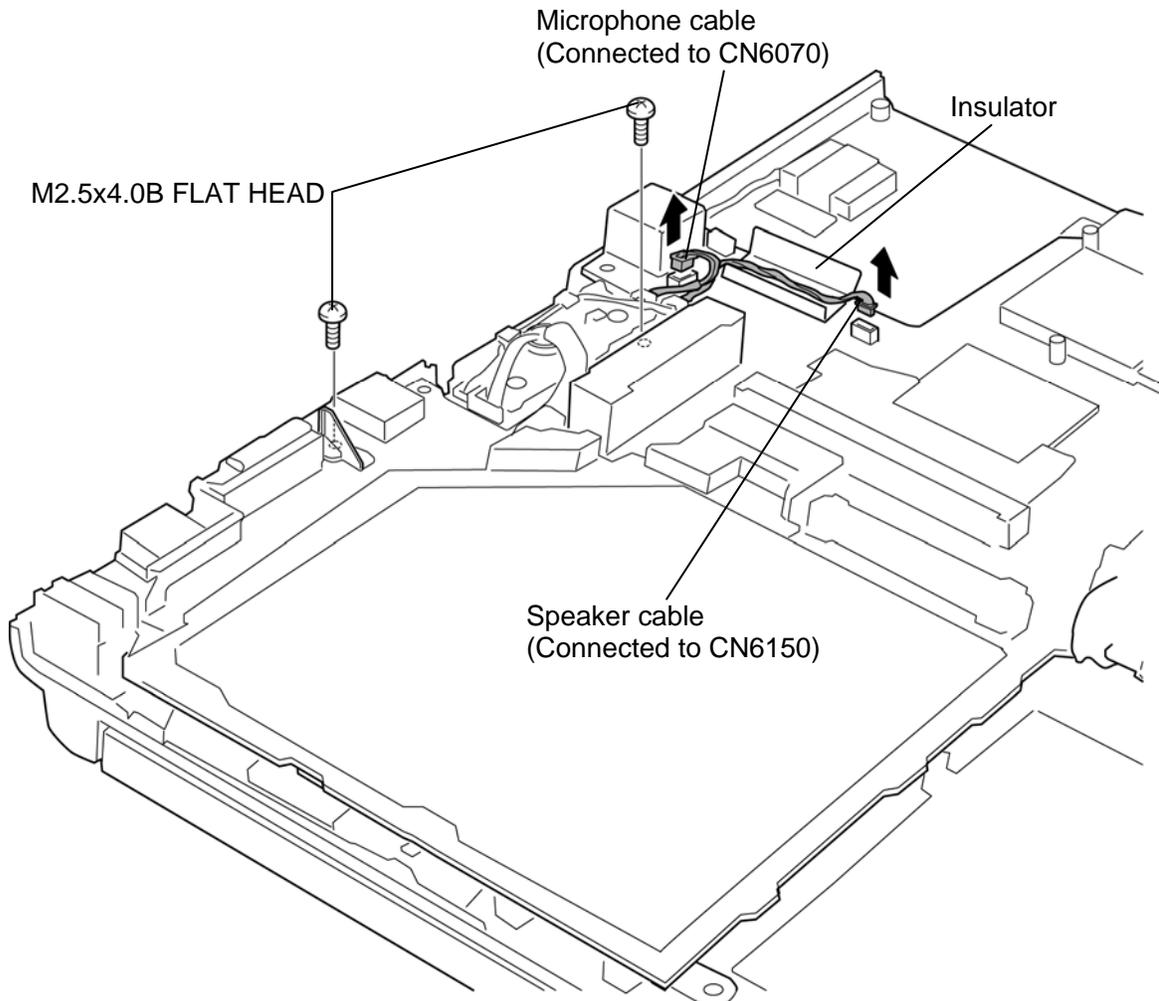


Figure 4-36 Removing the system board (1)

3. Turn up the **black sheet** and peel off the **acetate tape**.
4. Lift up the **system board** and disconnect the **sensor cable** from the connector **CN9530** on the system board.

NOTE: Do not try to remove the system board with the sensor cable being connected.

5. Peel off the **acetate tape** and remove the **modem jack** from the slot.
6. Remove the **system board** from the cover assembly.

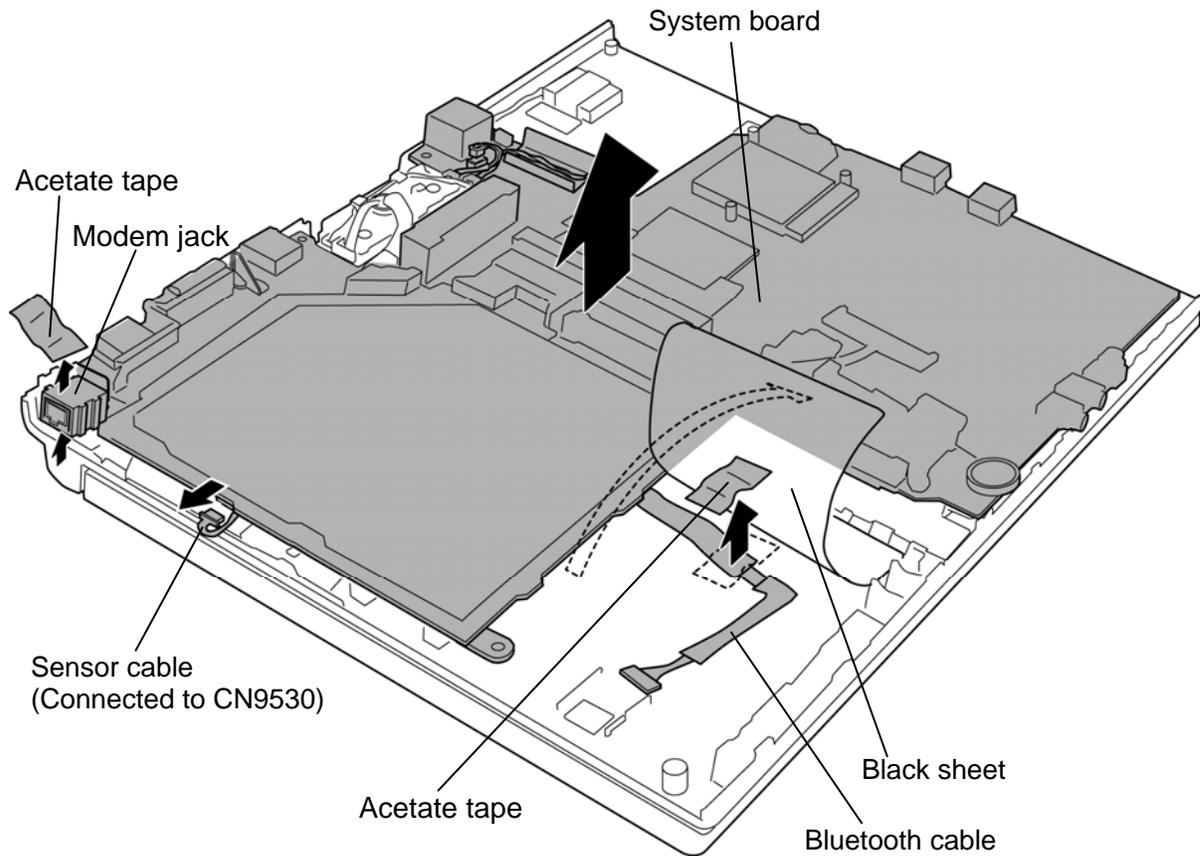


Figure 4-37 Removing the system board (2)

Installing the system board

The following describes the procedure for installing the system board. (See Figure 4-36 and 4-37.)

1. Set the **system board** to the cover assembly.
2. Lift up the system board and connect the **sensor cable** to the connector **CN9530** on the system board.
3. Turn up the **black sheet** and arrange the **Bluetooth cable** in place.
4. Stick the **acetate tape** in place.

CAUTION: *Be careful not to pinch the Bluetooth cable between the system board and cover assembly.*

5. Set the core of the MDC cable to the slot.
6. Set the **modem jack** to the slot and stick the **acetate tape** in place.
7. Secure the system board with the following **screws**.

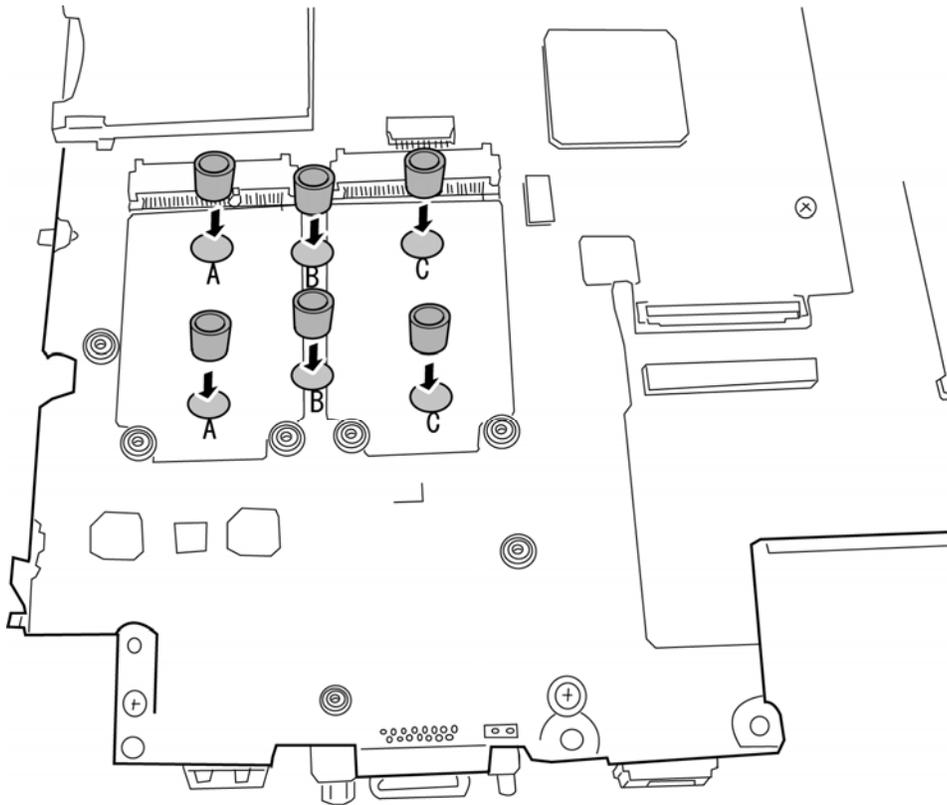
- M2.5×4.0B FLAT HEAD screw ×2

CAUTION: *Make sure the system board is not lifted up by the cables.*

8. Turn up the **insulator** and connect the **speaker cable** and **microphone cable** to the connector **CN6150** and **CN6070** on the system board.

NOTE: When installing a new system board, stick new keyboard supports on the system board according to the model. Refer to the below table for the model and corresponding key support, and figure for the place.

Model	Keyboard support
Without Robson (3G) and Wireless LAN card	A C
Without wireless LAN card	B C
Without Robson (3G) card	A
With Robson (3G) and Wireless LAN card	B



4.22 HDD cable/Bluetooth cable

Removing the HDD cable/Bluetooth cable

The following describes the procedure for removing the HDD cable/Bluetooth cable. (See Figure 4-38.)

1. Peel off the **insulator** and disconnect the **HDD cable** from the connector **CN1900** on the system board.
2. Disconnect the **Bluetooth cable** from the connector **CN4440** on the system board.

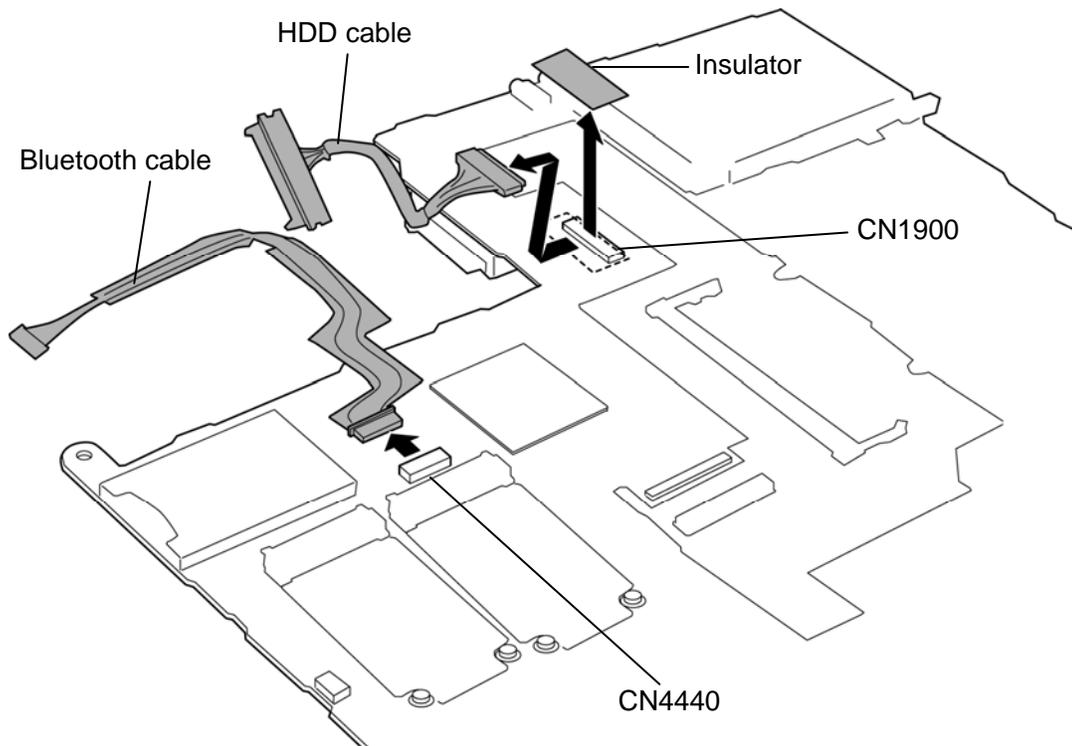


Figure 4-38 Removing the HDD cable/Bluetooth cable

Installing the HDD cable/Bluetooth cable

The following describes the procedure for installing the HDD cable/Bluetooth cable. (See Figure 4-38.)

1. Connect the **Bluetooth cable** to the connector **CN4440** on the system board.
2. Connect the **HDD cable** to the connector **CN1900** on the system board and stick the **insulator**.

4.23 MDC

Removing the MDC

The following describes the procedure for removing the MDC. (See Figure 4-39.)

1. Remove the following **screws** securing the MDC.
 - M2.0x4.0B BIND screw ×2
2. Turn up the **insulator**.
3. Disconnect the **MDC** from the connector **CN3010** on the system board.
4. Disconnect the **MDC cable** from the connector on the MDC.

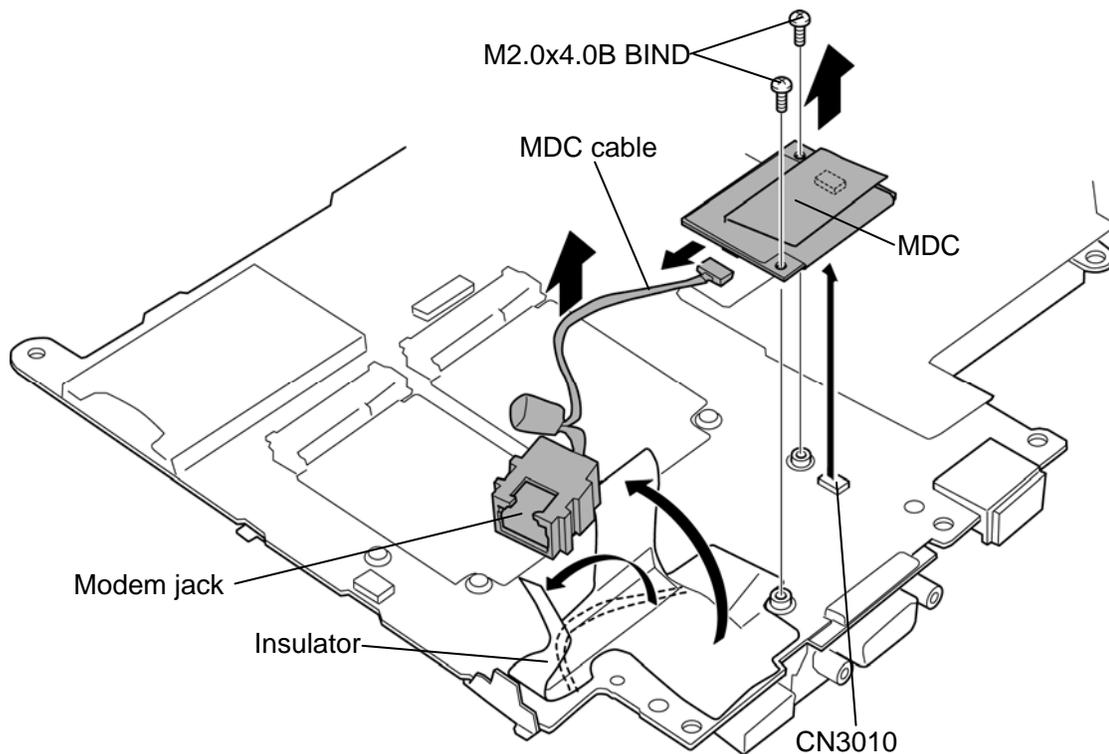


Figure 4-39 Removing the MDC

Installing the MDC

The following describes the procedure for installing the MDC. (See Figure 4-39.)

1. Connect the **MDC cable** to the connector on the MDC.
2. Connect the **MDC** to the connector **CN3010** on the system board.
3. Arrange the MDC cable in place and wrap it with the **insulator**.
4. Secure the MDC with the following **screws**.

- M2.0×4.0B BIND screw ×2

4.24 ExpressCard

Removing the ExpressCard

The following describes the procedure for removing the PC card slot. (See Figure 4-40 .)

1. Remove the following **screws** securing the ExpressCard slot.
 - M2.0×3.0C S-THIN HEAD screw ×2
 - M2.0×6.0C S-THIN HEAD screw ×2
2. Remove the **ExpressCard4 slot** .

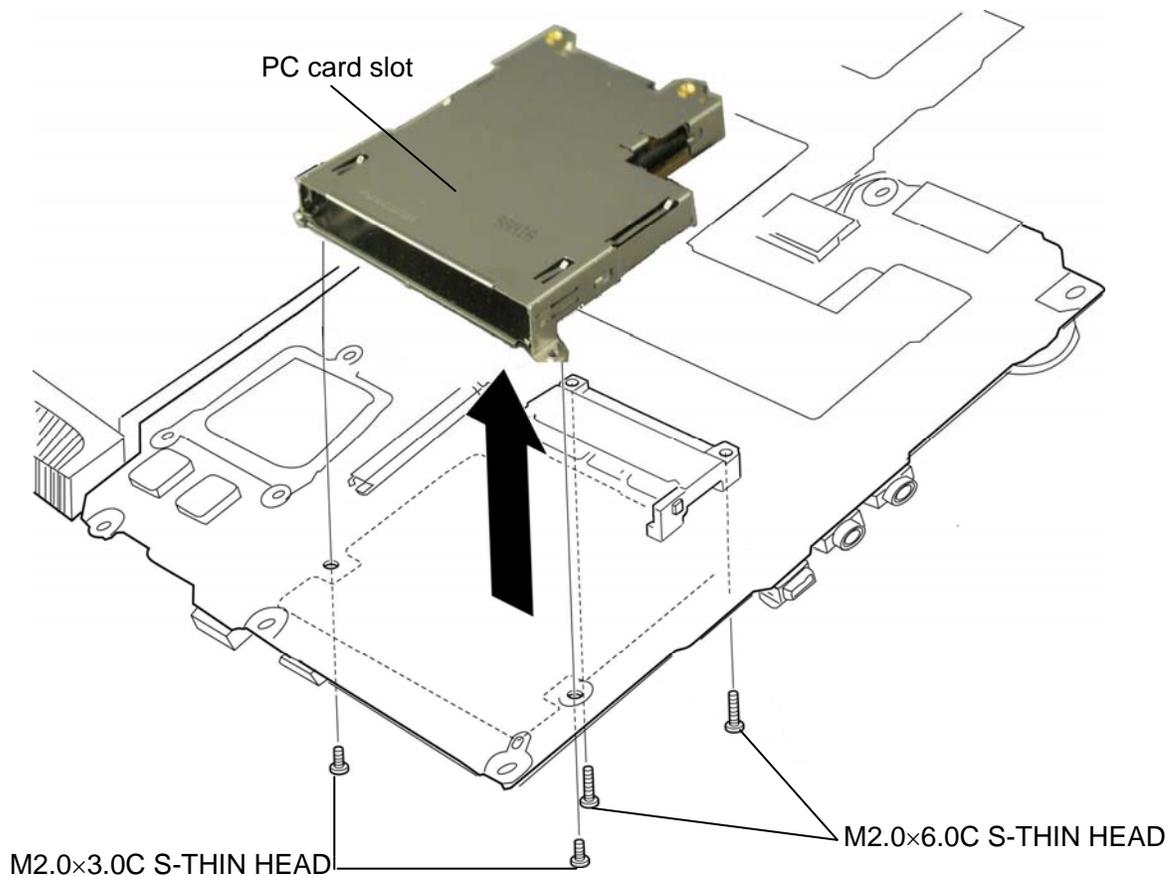


Figure 4-40 Removing the ExpressCard slot

Installing the ExpressCard slot

The following describes the procedure for installing the ExpressCard slot. (See Figure 4-40.)

1. Set the **ExpressCard slot** and secure it with the following **screws**.

- M2.0×3.0C S-THIN HEAD screw ×2
- M2.0×6.0C S-THIN HEAD screw ×2

4.25 Battery cable holder

Removing the Battery cable holder

The following describes the procedure for removing the battery cable holder. (See Figure 4-41.)

2. Remove the following **screw** and **battery cable holder** from the slot.

- M2.0×6.0C S-THIN HEAD screw ×1

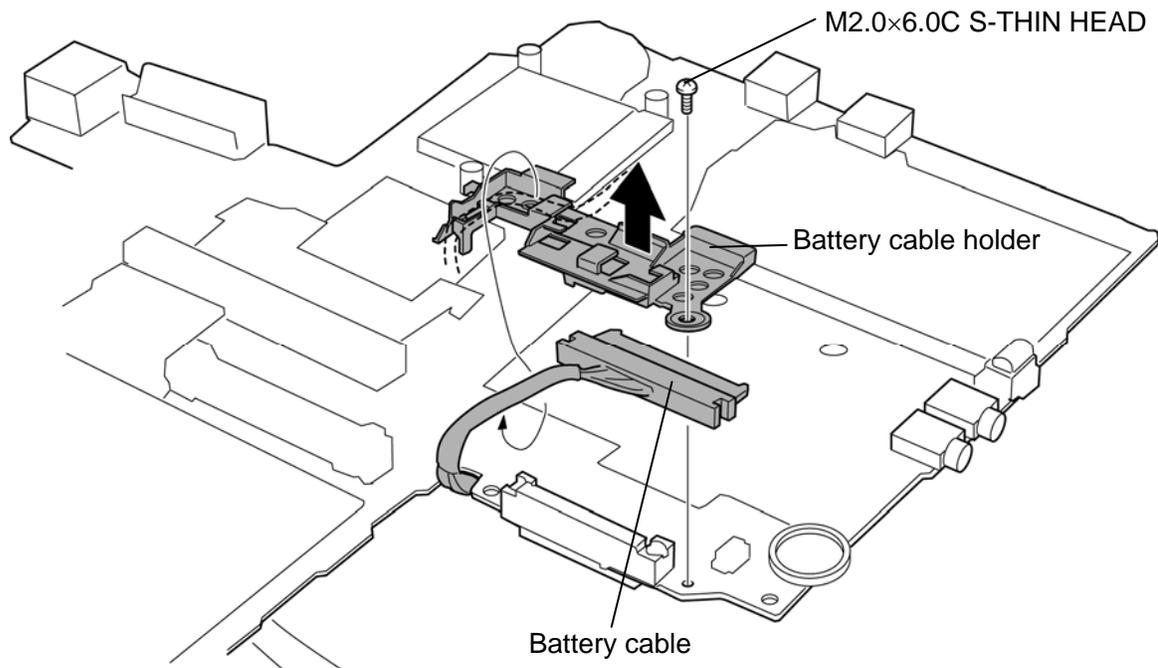


Figure 4-41 Removing the battery cable holder

Installing the Battery cable holder

The following describes the procedure for installing the battery cable holder (See Figure 4-41).

1. Set the **battery cable holder** to the slot and secure it with the following **screw**.

- M2.0×6.0C S-THIN HEAD screw ×1

2. Arrange the **battery cable** on the battery cable holder.

4.26 Pen holder assembly

Removing the Pen holder assembly

The following describes the procedure for removing the pen holder assembly. (See Figure 4-42.)

1. Remove the **pen holder assembly** from the slot.

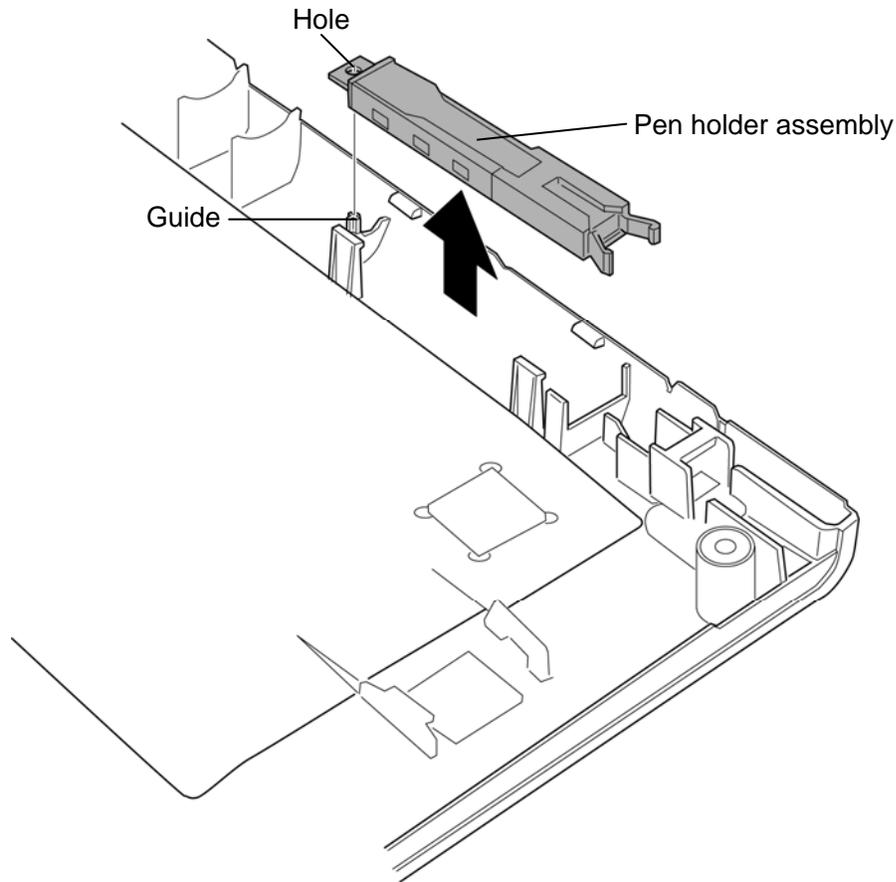


Figure 4-42 Removing the pen holder assembly

Installing the Pen holder assembly

The following describes the procedure for installing the pen holder assembly (See Figure 4-42).

1. Install the **pen holder assembly** to the slot while inserting the **hole** into the **guide**.

4.27 Sensor board

Removing the Sensor board

The following describes the procedure for removing the sensor board. (See Figure 4-43.)

1. Remove the **sensor board** from the slot.
2. Disconnect the **sensor cable** from the connector on the sensor board.

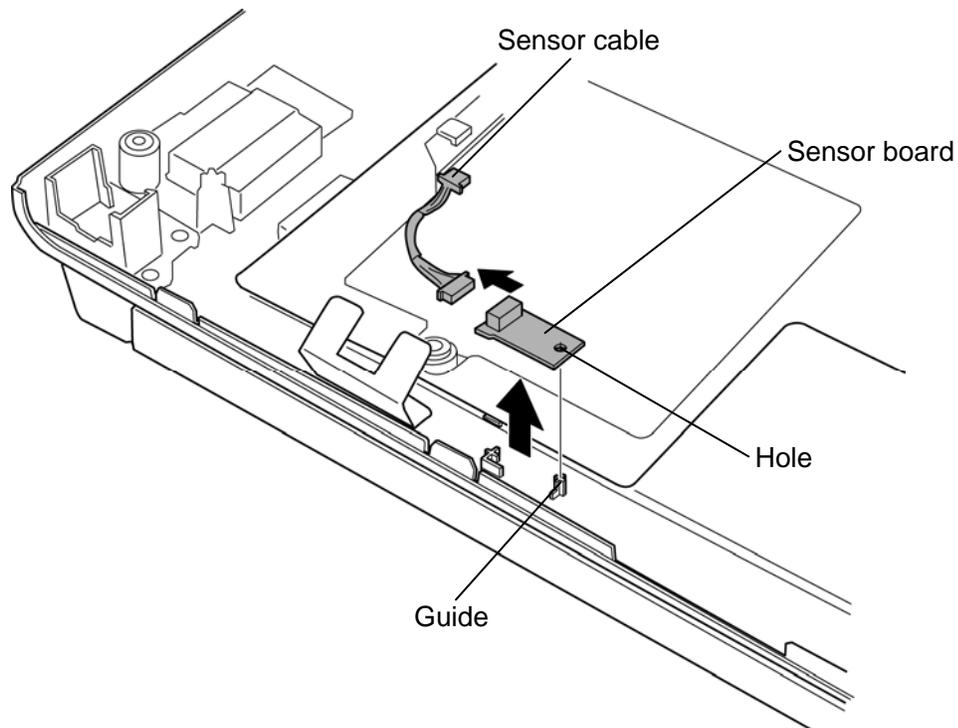


Figure 4-43 Removing the sensor board

Installing the Sensor board

The following describes the procedure for installing the sensor board. (See Figure 4-43.)

1. Connect the **sensor cable** to the connector on the sensor board.

CAUTION: Connect the connector on which the acetate tape is not wrapped to the sensor board. The connector on which the acetate tape is wrapped is connected to the system board. Be careful not to connect the connectors oppositely.

2. Install the **sensor board** to the slot while inserting the **hole** into the **guide**.

4.28 Touch pad

Removing the Touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-44 to 4-46.)

1. Peel off the **glass tapes**.
2. Disconnect the **relay cable** from the **connector** on the touch pad.
3. Remove the following **screw** and **touch pad assembly**.

- M2.5×4.0B FLAT HEAD screw ×1

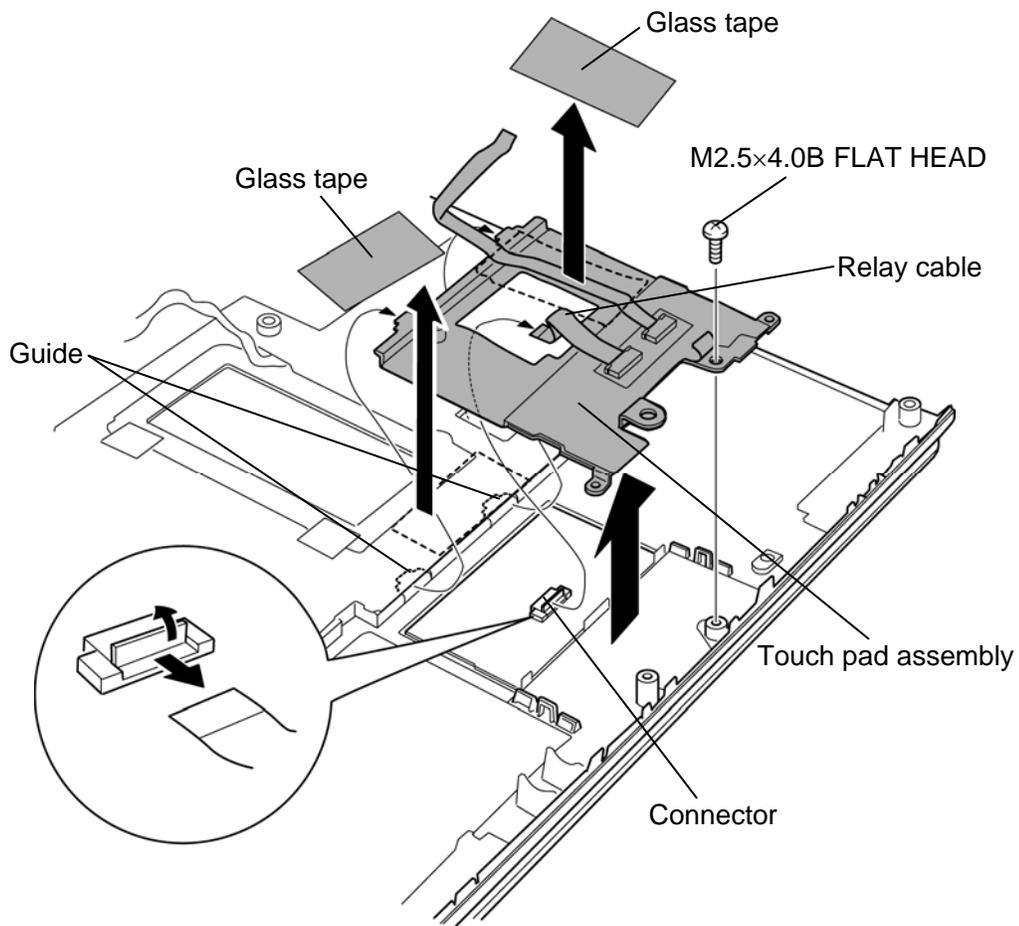


Figure 4-44 Removing the touch pad (1)

4. Disconnect the **touch pad cable** and **relay cable** from the **connector** on the button board.
5. Turn over the touch pad assembly and peel off the **button board**.

CAUTION: Do not reuse the removed button board.

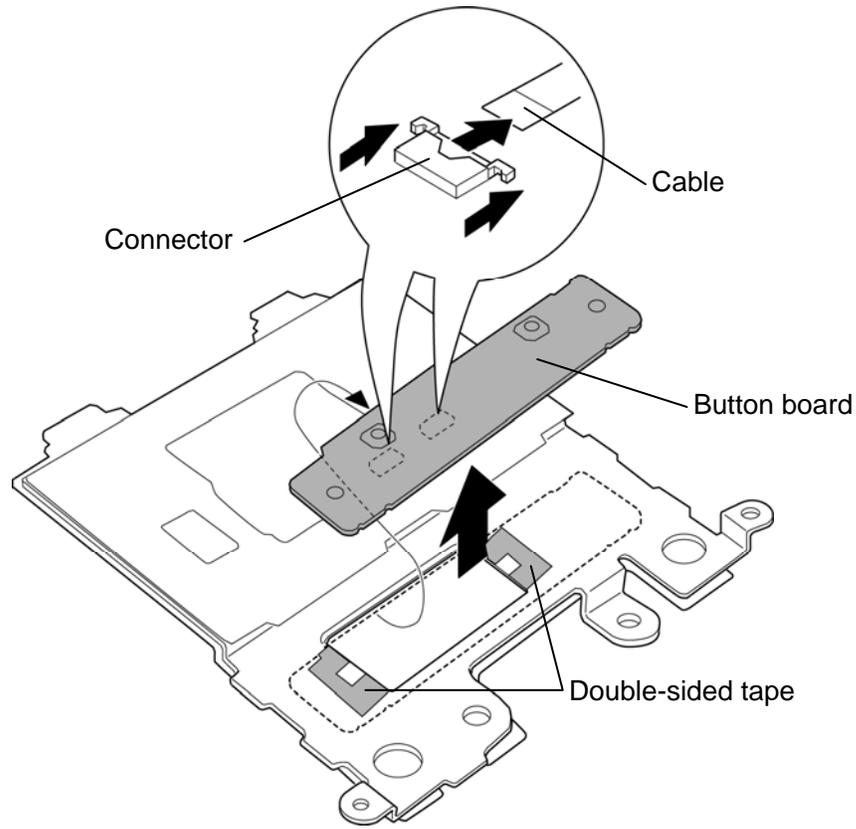


Figure 4-45 Removing the touch pad (2)

6. Peel off the **touch pad**.

CAUTION: Do not reuse the removed touch pad.

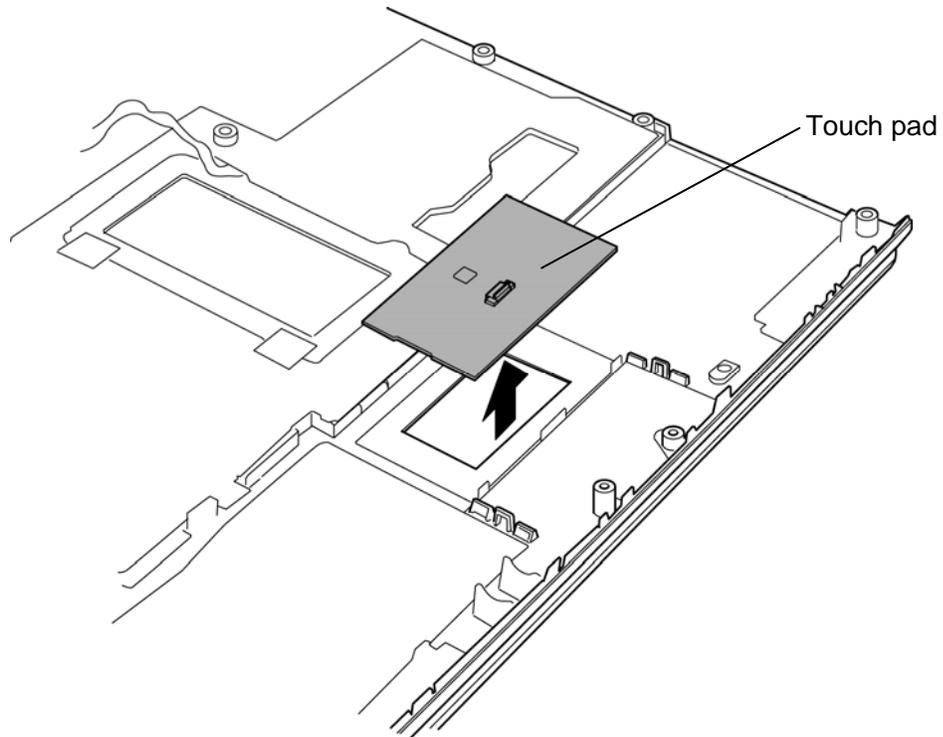


Figure 4-46 Removing the touch pad (3)

Installing the Touch pad

The following describes the procedure for installing the touch pad. (See Figure 4-44 to 4-46.)

1. Stick a new **touch pad** on the palm rest cover in place.

CAUTION: *When installing a new touch pad, follow the steps below.*

1. *Remove the separator from the top surface of the GlidePoint.*
2. *Temporary fixing to designated place on the plastic part.
One edge should contact with the surface first. Then the other side touches down.*
3. *Press down to adhere firmly.
Press down motion: from center to perimeter
Do not touch the electrical components on the GlidePoint.*
4. *Rub the operating surface of plastic part.
Rubbing motion: from center to perimeter
The bottom of GlidePoint should be supported.*

2. Stick a new **button board** on the touch pad assembly in place with the **double-sided tape**.
3. Connect the **touch pad cable** and **relay cable** to the **connector** on the button board.
4. Set the **touch pad assembly** to the **guides** and secure it with the following **screw**.
 - M2.5×4.0B FLAT HEAD screw ×1
5. Connect the **relay cable** to the **connector** on the touch pad.
6. Stick the **glass tapes** in place.

4.29 Speaker

Removing the speaker

The following describes the procedure for removing the speaker. (See Figure 4-47.)

1. Remove the **speaker covers** while releasing **latches**.
2. Peel off the **acetate tapes** and take the **speakers** out from the speaker slots.

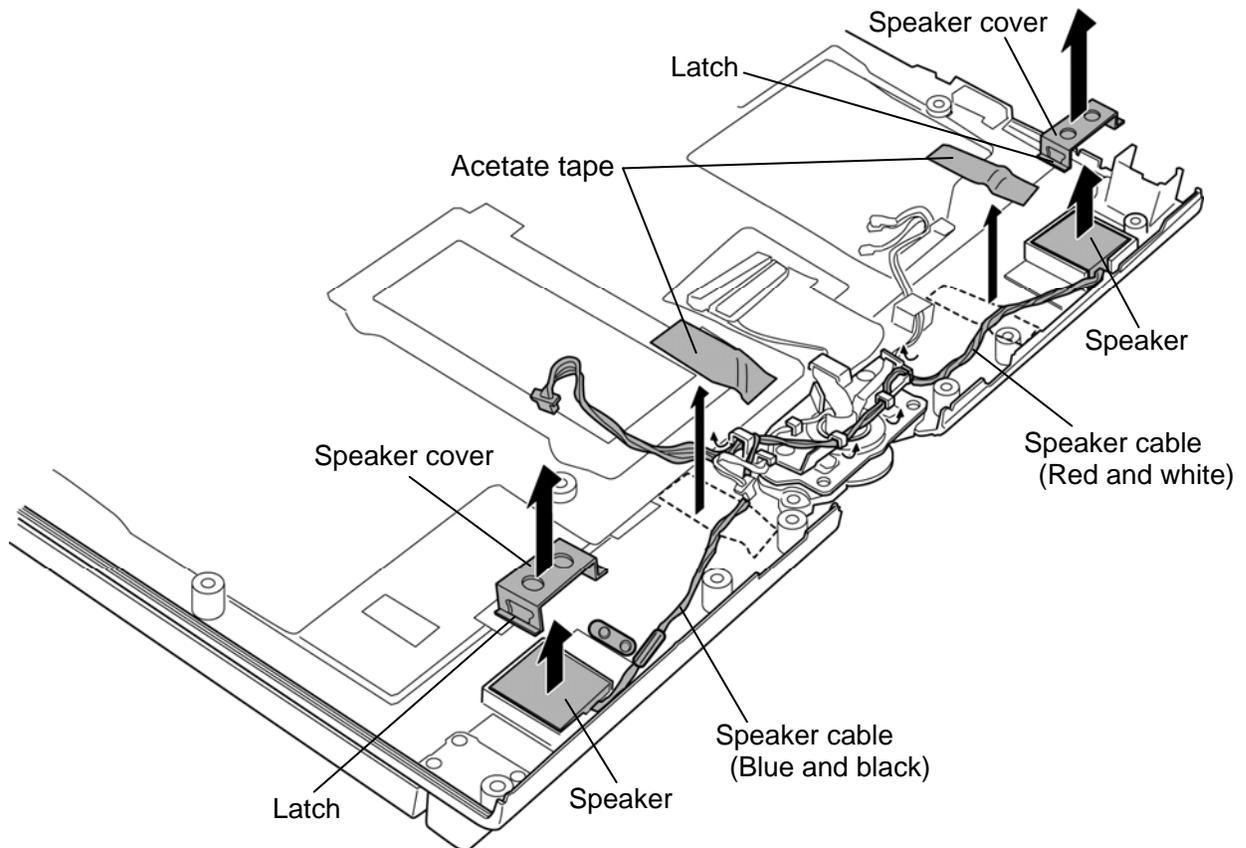


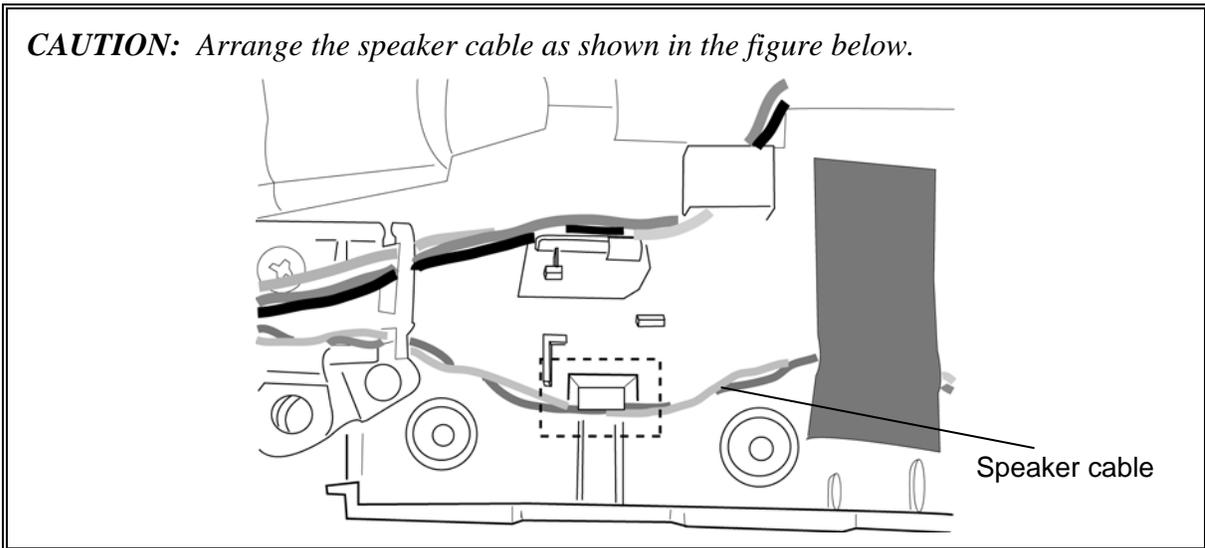
Figure 4-47 Removing the speaker

Installing the speaker

The following describes the procedure for installing the speaker. (See Figure 4-47.)

1. Place the **speakers** to the slots on both sides.
2. Install the **speaker covers** to the slots on both sides while hooking the latches.
3. Arrange the **speaker cables** carefully as shown in the Figure 4-47 in place.
4. Stick the **acetate tapes** in place.

CAUTION: Arrange the speaker cable as shown in the figure below.



4.30 Hinge assembly

Removing the Hinge assembly

The following describes the procedure for removing the hinge assembly. (See Figure 4-48 and 4-50.)

1. Release the **cables** from the guides of the cable holder.

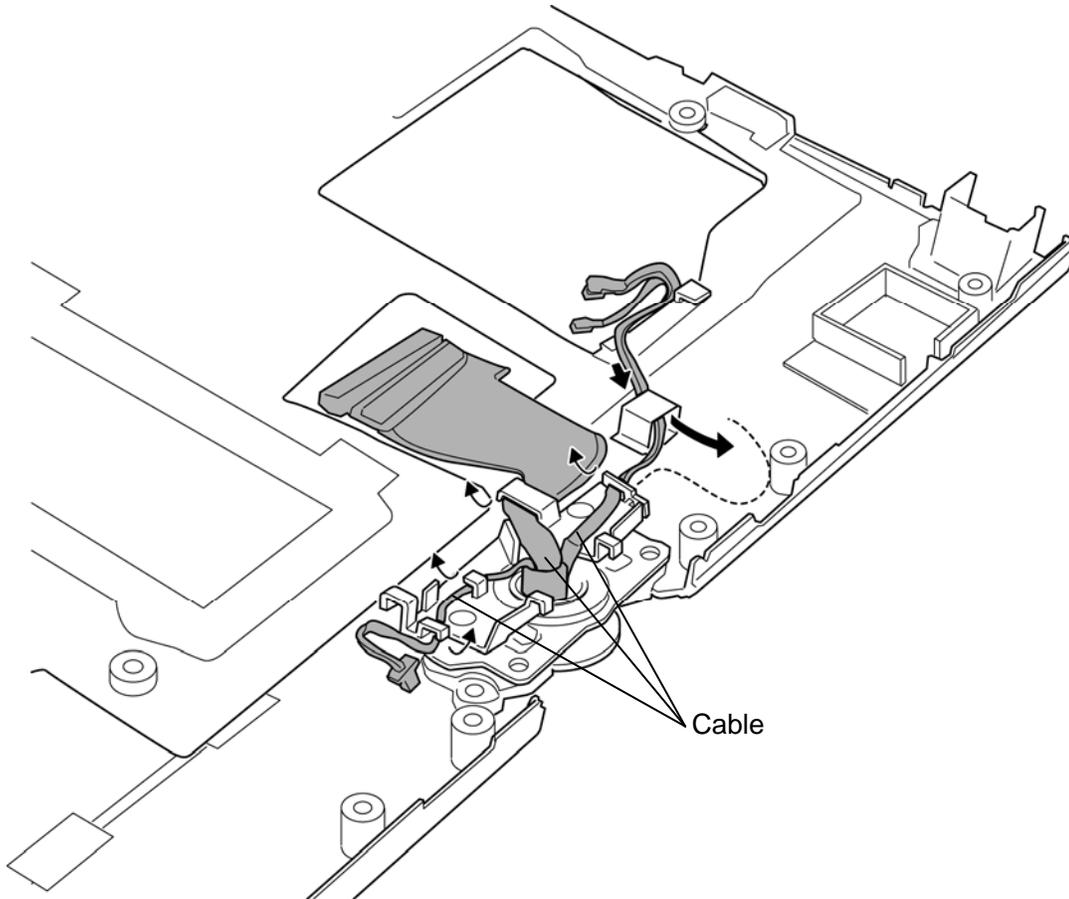


Figure 4-48 Removing the hinge assembly (1)

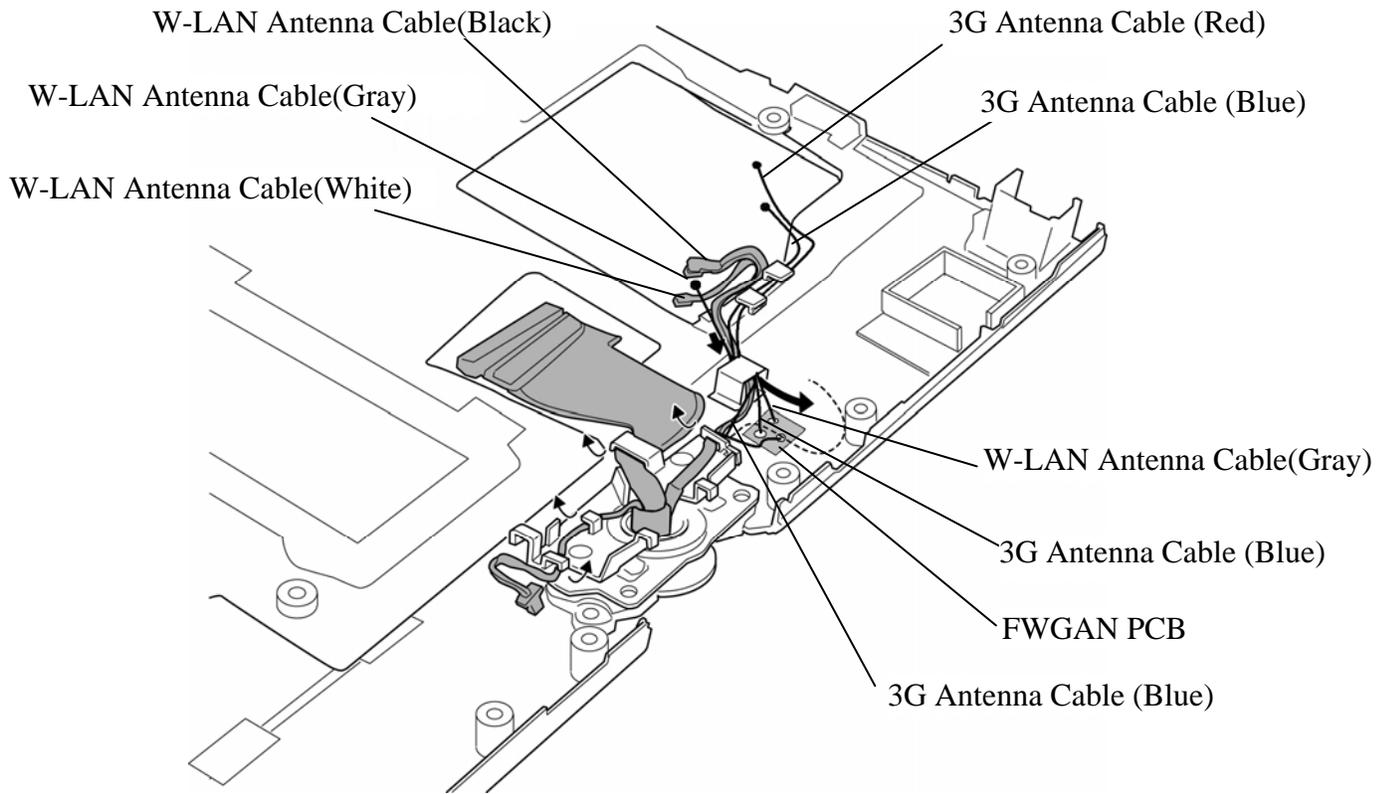
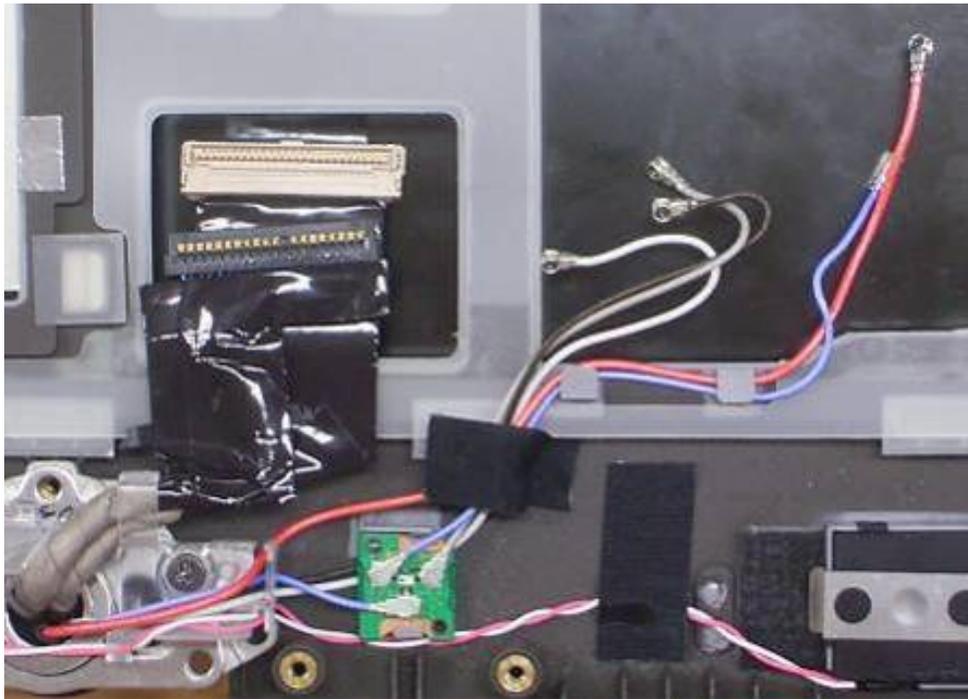


Figure 4-49 Removing the hinge assembly (1) (3G model only)



2. Remove the following **screws** and **cable holder**.
 - M2.5×10.0B FLAT HEAD screw ×2
3. Open the display at the right angle to the palm rest covers and turn the display clockwise 90 degrees and remove the **hinge assembly**.
4. Remove the **hinge spacer**.

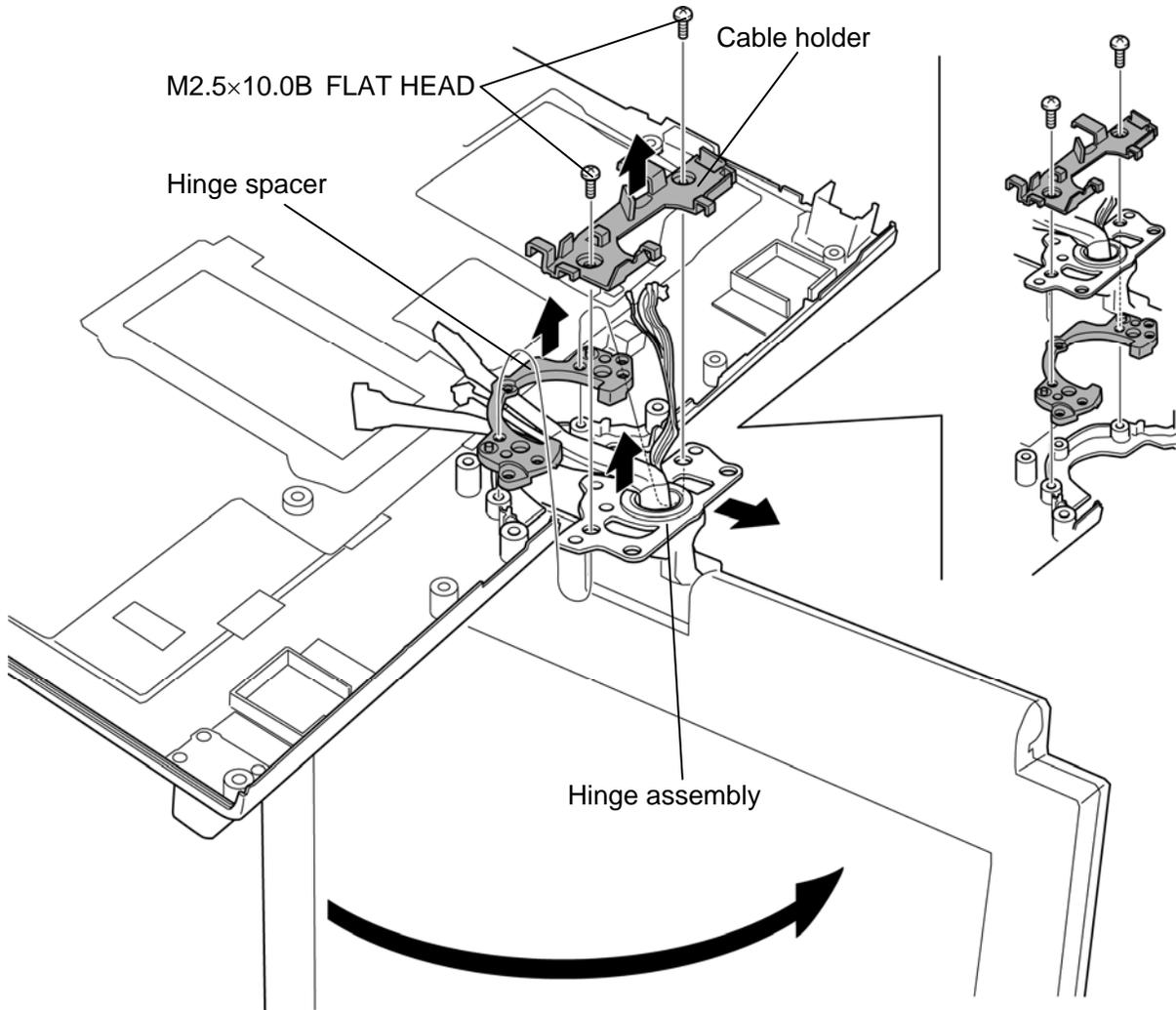


Figure 4-50 Removing the hinge assembly (2)

Installing the Hinge assembly

The following describes the procedure for installing the hinge assembly. (See Figure 4-48 and 4-50.)

1. Set the **hinge spacer**, **hinge assembly** and **cable holder** in place and secure them with the following **screws**.
 - M2.5×10.0B FLAT HEAD screw ×2
2. Return the display counterclockwise in the original position and close the display.
3. Arrange the **cables** carefully as shown in the Figure 4-48 to the guides of the cable holder.

4.31 LCD unit/Touch panel/Digitizer

Removing the LCD unit/Touch panel/Digitizer

The following describes the procedure for removing the LCD unit/touch panel/digitizer. (See Figure 4-51 to 4-55.)

1. Turn the display clockwise 180 degrees and close the display on the palm rest cover.
2. Peel off the **mask seals** (9 points) from the LCD mask and remove the following **screws** securing the LCD mask.
 - M2.5x6.0B FLAT HEAD screw ×9
3. Insert your fingers into the **slits** on both sides and remove the **LCD mask** while releasing the latches.

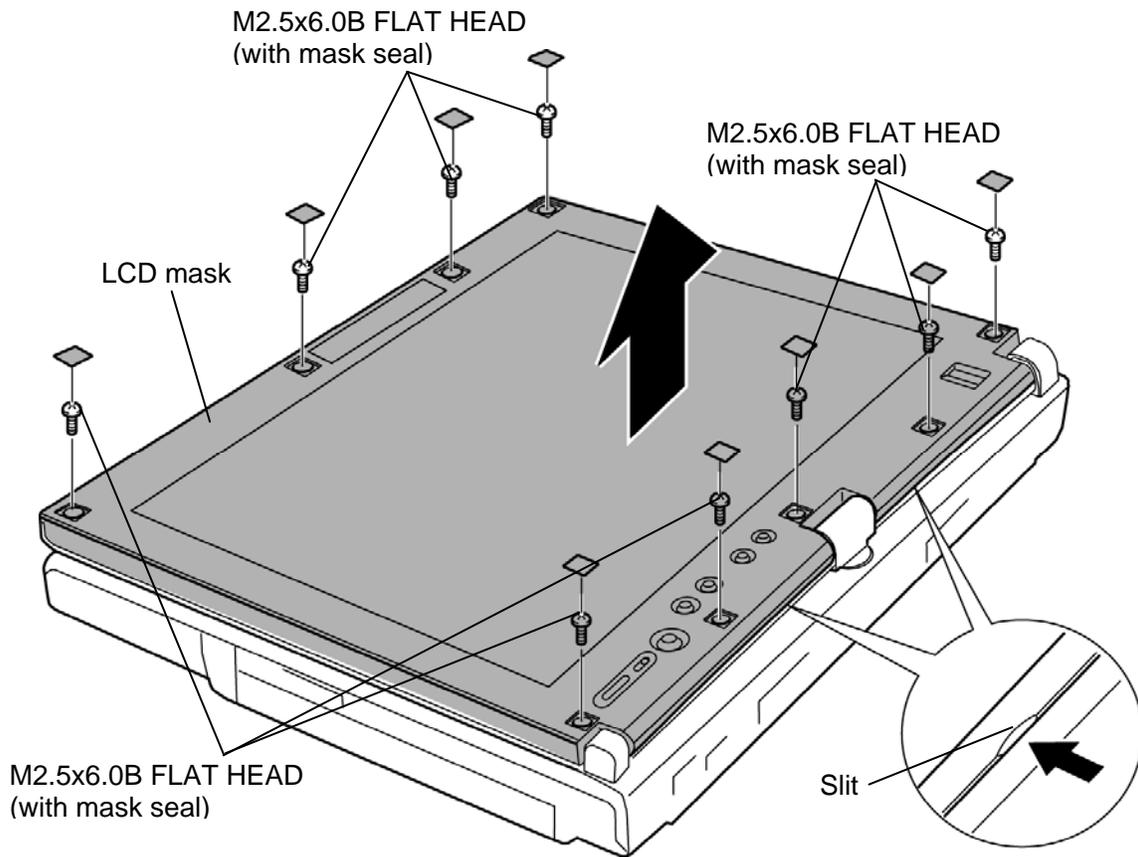


Figure 4-51 Removing the LCD mask

4. Remove the following **screws** securing the LCD assembly.
 - M2.0x4.0B S-THIN HEAD screw ×4
5. Raise the top edge of the **LCD assembly** on the display cover.

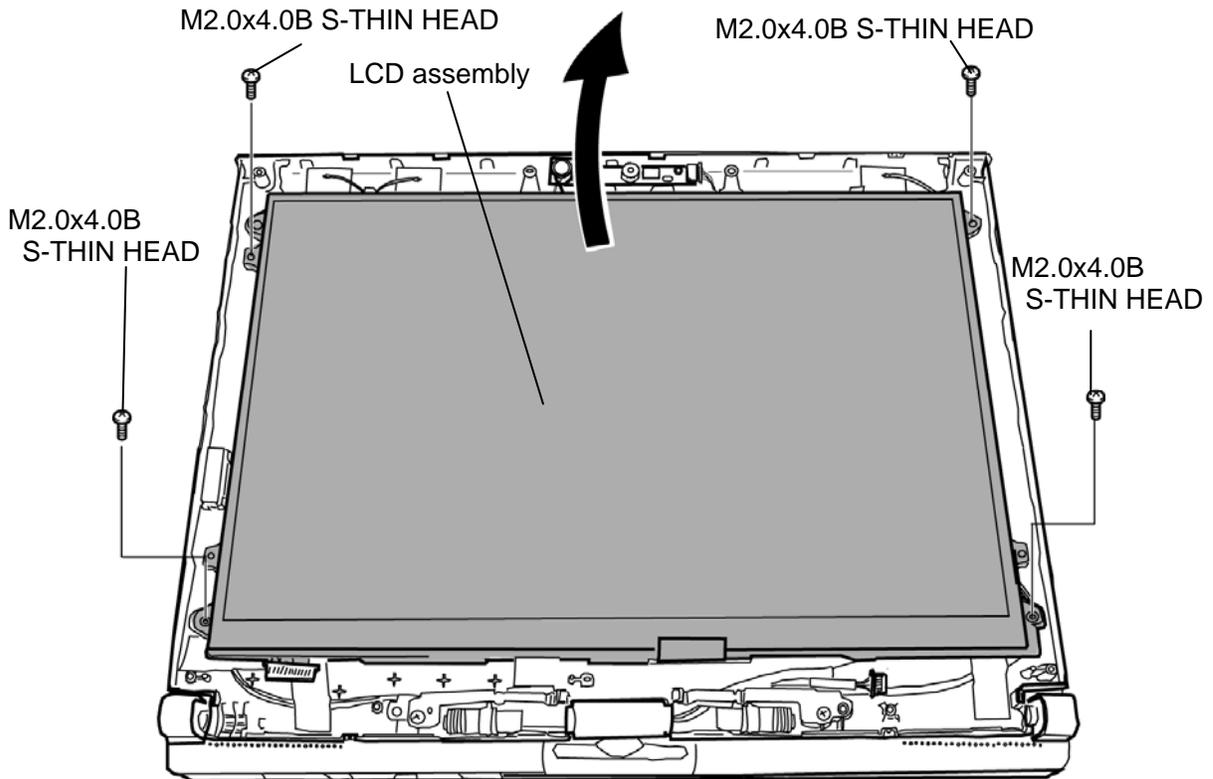


Figure 4-52 Removing the LCD assembly (1)

6. Turn up the **insulator** and peel off the **glass tapes**.
7. Disconnect the **LCD cable** and **digitizer cable** from the connectors on the back of the LCD unit.

CAUTION: When removing the cables, be careful not to damage the connectors.

8. Remove the **LCD assembly** from the display cover.

CAUTION: When putting the LCD assembly on the display cover, lay a mat or something under the LCD assembly to protect the computer and the LCD from a scratch or breakage.

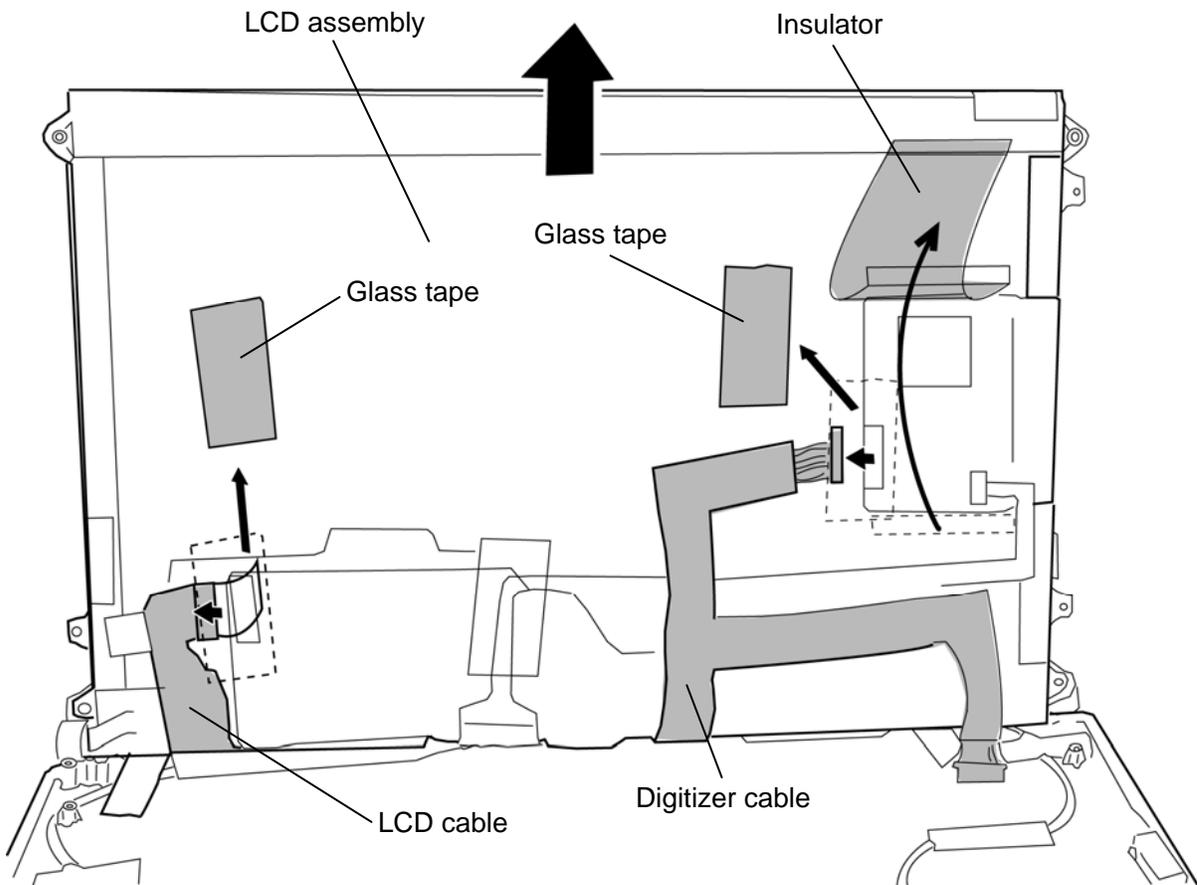


Figure 4-53 Removing the LCD assembly (2)

CAUTION: Read the following instructions before handling the touch panel.

Touch panels are made of glass having sharp edges and corners; workers must wear gloves not to cut their fingers or skin when handling.

Touch panels are made of glass; do not apply stress or hit with hard object.

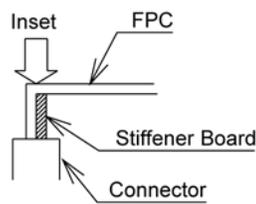
Do not put any stress on the surface film e.g. moving a product with a vacuum stick on the film.

Use soft cloth lightly moistened with mild detergent or with ethanol when cleaning. Do not use any organic solvent, acid or alkaline solution.

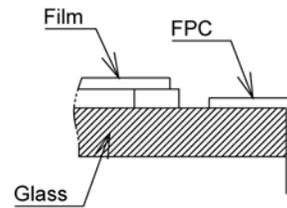
Do not pile touch panels. Do not put heavy objects on a touch panel.

FPC cable of touch panel is fragile. Do not pull the FPC cable strongly.

Do not bend the FPC cable of touch panel strongly; it will damage the conductor pattern. Bad examples are shown below.



at stiffener end



Bent at glass edge

The LCD mask must not touch any part of the transparent area; it will cause unexpected input.

Inside edge of the LCD mask must be between the transparent area and the operation guaranteed active area. The LCD mask must not touch film in the transparent area.

We recommend the part that secures the touch panel to be an elastic material.

Do not glue or adhere the film surface onto the display frame e.g. in a manner film may be peeled or sheared off if stressed by expanding/shrinking due to temperature change.

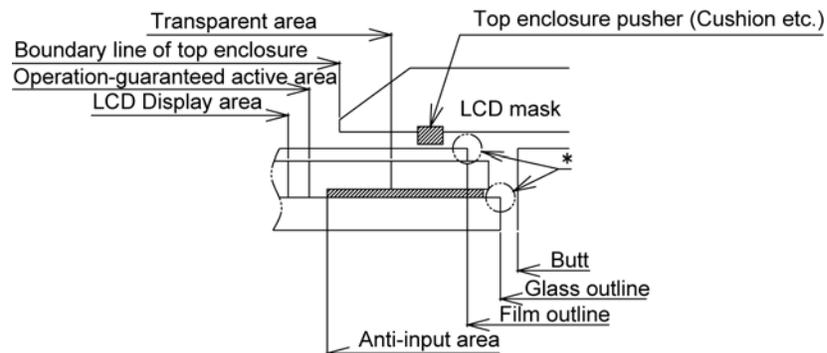
NEVER do so especially where the conductive-connection part of film and glass; electrical connection between FPC and touch panel will be deteriorated.

When aligning touch panel, do so by the glass outline, not by the film outline. Aligning by the film will cause Newton ring to appear, unexpected input to occur and electrical connection between FPC and touch panel will be deteriorated.

The end part of glass and film (marked as "*" in the following figure 'Installation Example') have naked conductors.

Be sure to design the construction not to touch any conductive material on the parts marked with "*".

Installation Example



9. Peel off the **glass tape** and disconnect the **touch panel cable** from the **connector** on the LCD assembly.

CAUTION: When removing the cable, be careful not to damage the connectors.

10. Peel off the **acetate tapes** and separate the **touch panel** and **LCD unit/digitizer**.

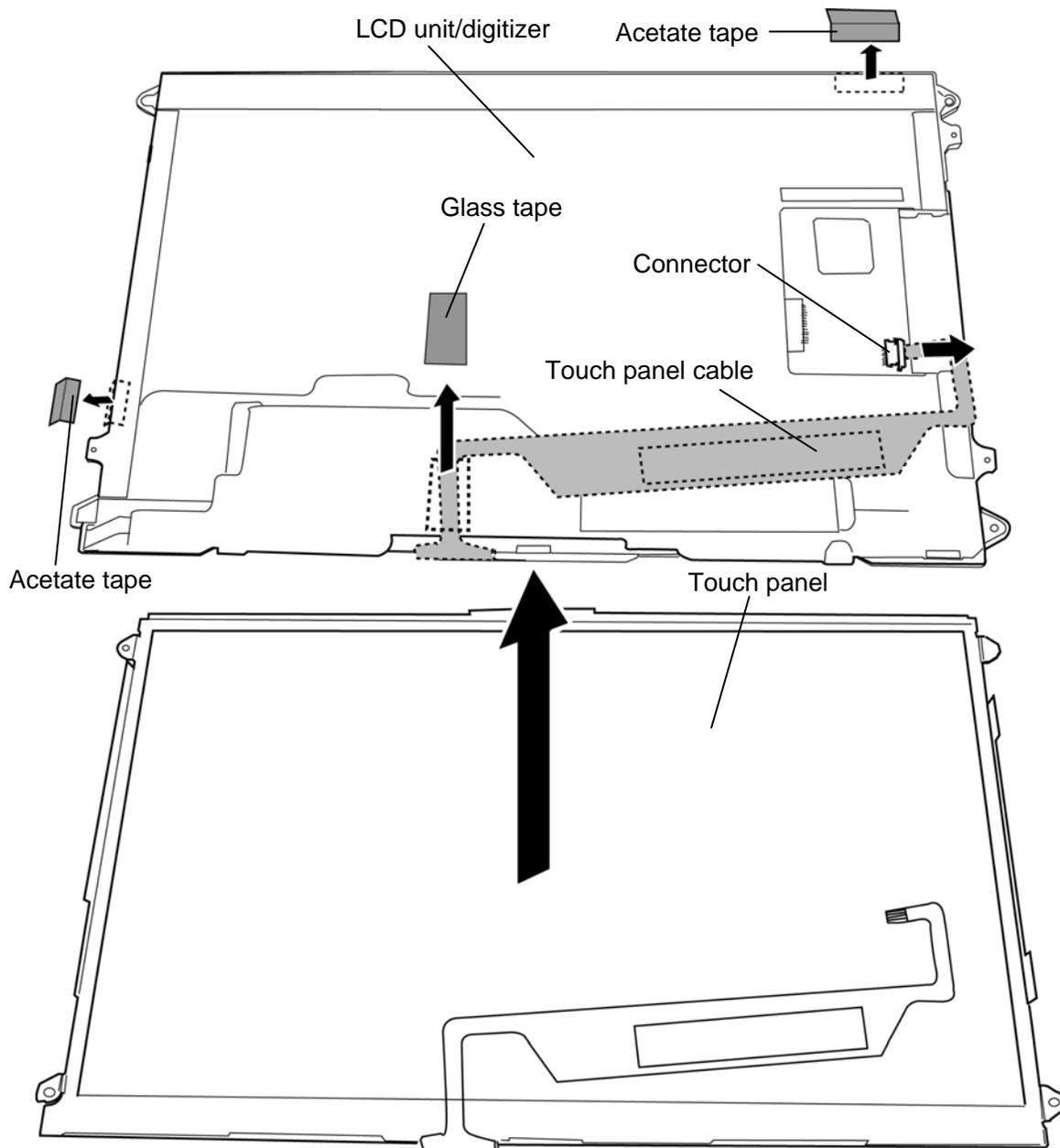


Figure 4-54 Removing the touch panel

CAUTION: Read the following instructions before handling the Digitizer.

Do not disassemble or modify the digitizer sensor unit; it may damage sensitive parts inside the digitizer sensor unit, and dusts or scratches may mar the device.

Be careful of sharp edges of the sensor board; it may cause injury on fingers or skin.

Do not exceed the absolute maximum rating values under the worst probable conditions caused by the variations in supply voltage, input voltage, parts constants, ambient temperature, etc.; it may damage the digitizer sensor unit.

Appropriate protection circuit shall be applied to each systems design.

Turn off the power before connecting or disconnecting the digitizer sensor unit.

Scratching with sharp object may cause open circuit of the sensor board.

Do not use any water or chemicals except alcohols to clean the product.

The digitizer sensor unit shall be installed to the system tight by using the single-coated or double-coated adhesive tape.

Be sure to design the enclosure for the digitizer sensor unit so that pushing/bending/twisting forces are not applied to the digitizer sensor unit during and after the installation into the system.

Power supply lines shall be designed as follows. Power supplies shall always be turned on before the input signals are supplied to the digitizer sensor unit, and the input signals shall be disconnected before power supplies are turned off. If the sequence does not satisfy the specified conditions, it may cause the digitizer sensor unit to mis-operate.

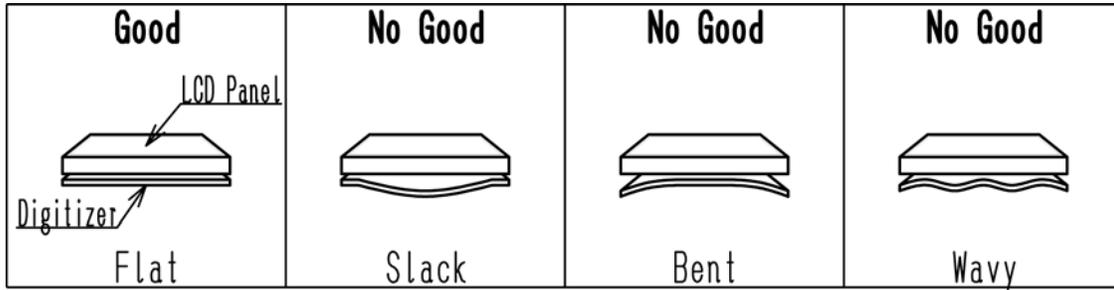
Give some slack to the interface cable so that the connector will not permanently pulled after assembly.

Do not let any bare conductive metal such as LCD metal bezel contact digitizer sensor unit PCB directly. This may cause the digitizer sensor unit to malfunction.

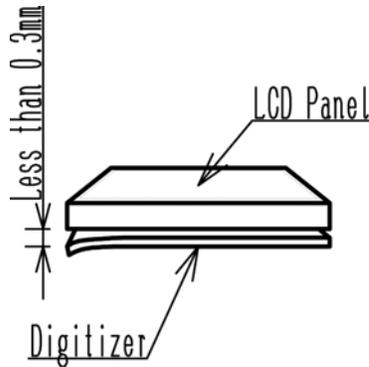
Do not locate any object that emits magnetic flux such as a speaker magnet near the digitizer sensor unit, it may cause the digitizer sensor unit not to operate properly.

To attain maximum performance, abide by the following precautions.

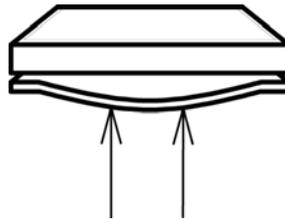
a. Attach the digitizer sensor unit flat on the bottom surface of LCD panel.



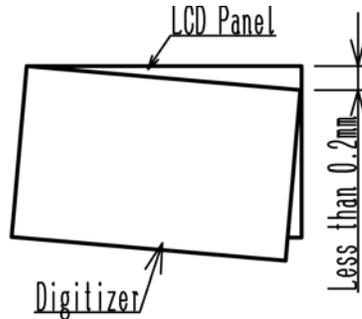
b. Affix three sides of the digitizer sensor unit to corners securely using single-coated or double-coated adhesive tape. No slack on corner is allowed.



c. If a slack in center signifies, design the system mechanical to take up the slack.



d. Attach the digitizer sensor unit to LCD panel parallel with LCD panel edge.



The CMOS LSIs used in the digitizer sensor unit are very sensitive to ESD (Electro-Static Discharge).

Person handling the digitizer sensor unit shall be grounded with wristband. Tools such as a soldering iron, screwdriver and working benches shall be grounded.

Do not apply excessive mechanical forces to install the digitizer sensor unit; it will damage the sensor board or electrical parts of digitizer sensor unit.

Refrain from strong mechanical shocks such as dropping to a working bench or hitting against hard and heavy objects.

Do not pull, extend, warp, bend, twist and press the digitizer sensor unit even momentarily when the digitizer sensor unit is installed in the enclosure of the system; it may damage the digitizer sensor unit.

Keep the minimum of the curvature radius 120mm if you need to bend the digitizer sensor unit. Be sure to install the digitizer sensor unit so that pushing/bending/twisting forces are not applied to the digitizer sensor unit after the installation into the system.

When holding the digitizer sensor unit, do not even locally deform the sensor board; it will leave a permanent dent or embossment which degrades the product quality.

When connecting or disconnecting to the digitizer sensor unit, do not slant the connector; it may damage pins of the connector of the digitizer sensor unit.

Power supplies shall always be turned off during assembly process.

Do not connect or disconnect the connector with force applied to the digitizer sensor unit. This may damage the digitizer sensor unit circuit.

To protect shielding metal from progressive aerugo and protect assembly worker's fingers from minor cuts, gloves must be worn when handling the digitizer sensor unit.

Do not let any bare conductive metal such as LCD metal bezel contact digitizer sensor unit PCB directly. This may cause the digitizer sensor unit to malfunction.

Use extra caution to the part of connection between the controller and the sensor board so that the connection pads will not be peeled off or damaged.

Do not pull the baby board or let it be caught by other object.

Do not store the digitizer sensor units in high temperature, especially in high humidity for a long period of time (approximately more than one month).

It is recommended to store the digitizer sensor units where the temperature is in the range of 15 to 35 degrees in Celsius and the relative humidity is lower than 70%.

Store the digitizer sensor units without exposing to direct sunlight or fluorescent lamps in order to protect the digitizer sensor units from strong ultraviolet rays.

Avoid condensation of water on the digitizer sensor units otherwise it may cause mis-operation or defects.

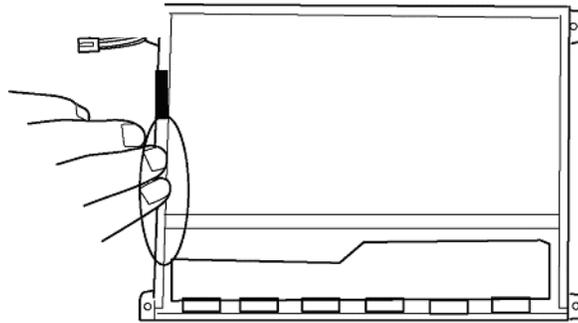
Keep the digitizer sensor units away from over-saturated humidity.

To transport or store the digitizer sensor units after initially opening the original carton box, it is recommended to re-pack the digitizer sensor units into the original box by the same method especially with desiccant in it.

Be careful to use the bezel guide.

There is a portion where the bezel is sticking out because of the digitizer guide. Do not press and rub the portion with bare hands or it may result cut your finger.

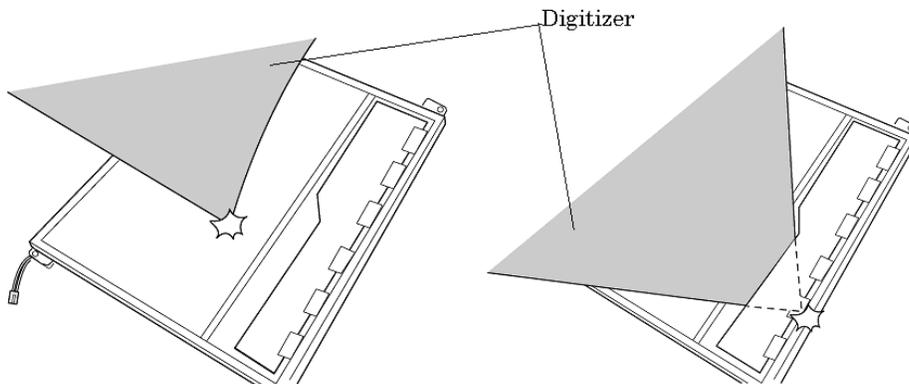
NO



Be careful to use the bezel guide.

Do not make any scratches on the B/L and TAB by the edge of the digitizer when installing the digitizer because it may result to break the TAB or make scratches on the B/L and cause display function failure.

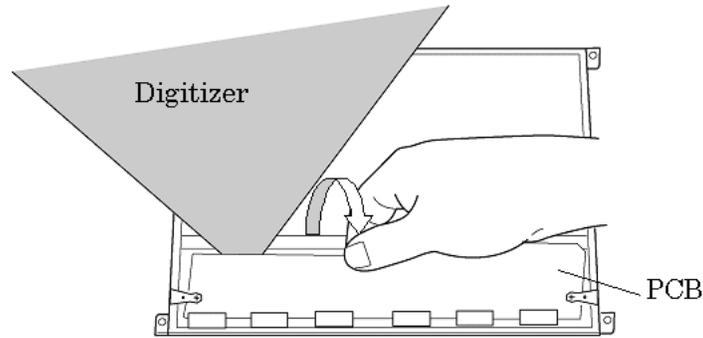
NO



Do not hit the corner of the digitizer

Do not pull up the PCB hardly when installing the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.

NO



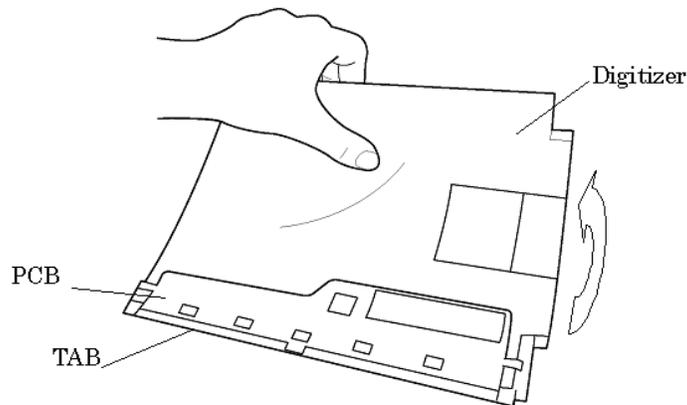
Do not pull up the PCB.

Make sure that three latches fit the digitizer securely.

If the latches are not locked securely, it may result to move the digitizer and give stress on the TAB or PCB and cause the display function failure.

Do not turn up the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.

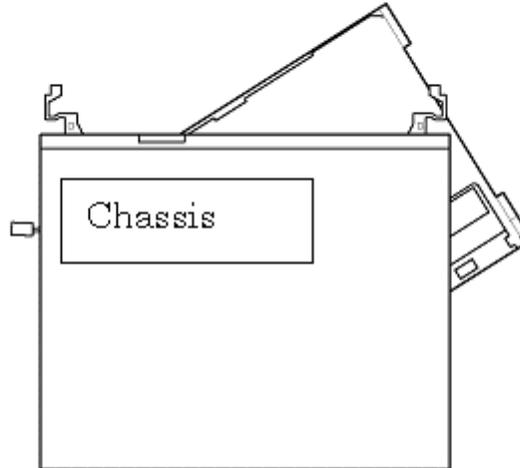
NO



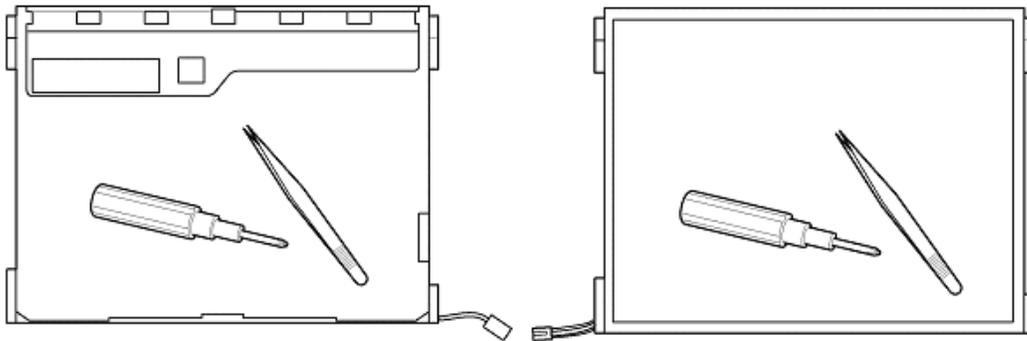
Do not turn up the digitizer to avoid the warp of the PCB.

Do not put any instrument on the LCD module because it may result to make scratch on the cell, polarization sheet or B/L and break the TAB and may cause the display function failure.

NO



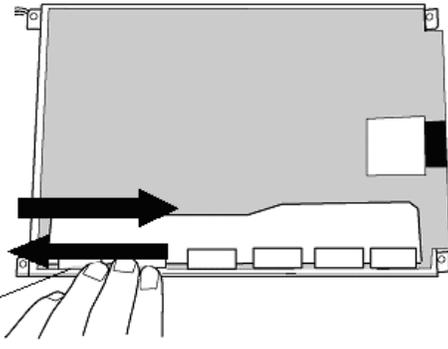
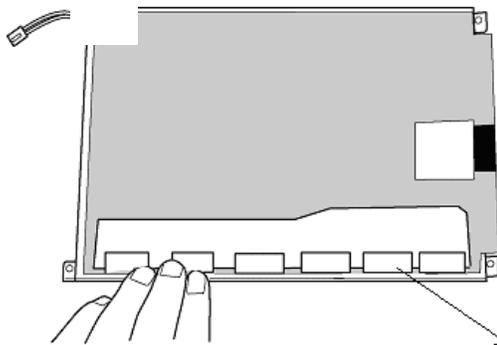
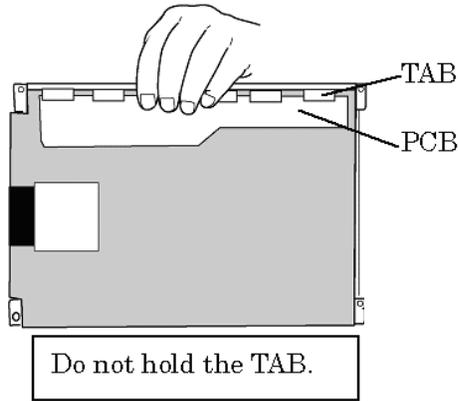
Do not put the chassis on the LCD.



Do not put the instrument on the LCD.

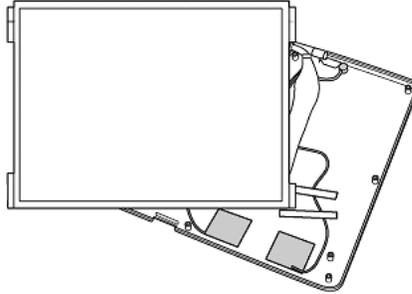
Do not hold, press and rub the TAB because it may result to break the TAB and cause the display function failure.

NO



Make sure to put the LCD module on the flat place. If the LCD module is put on the uneven place, it may result to break the TAB, make scratch on the B/L or polarization sheet and cause the display function failure.

NO



Do not put the LCD on the chassis when the LCD is not installed to the computer.

- Slide out the **digitizer** toward the arrow pointing while peeling off the digitizer of the LCD unit. (The digitizer is stuck on the LCD unit with double-sided tapes.)

CAUTION: Do not reuse the removed digitizer.

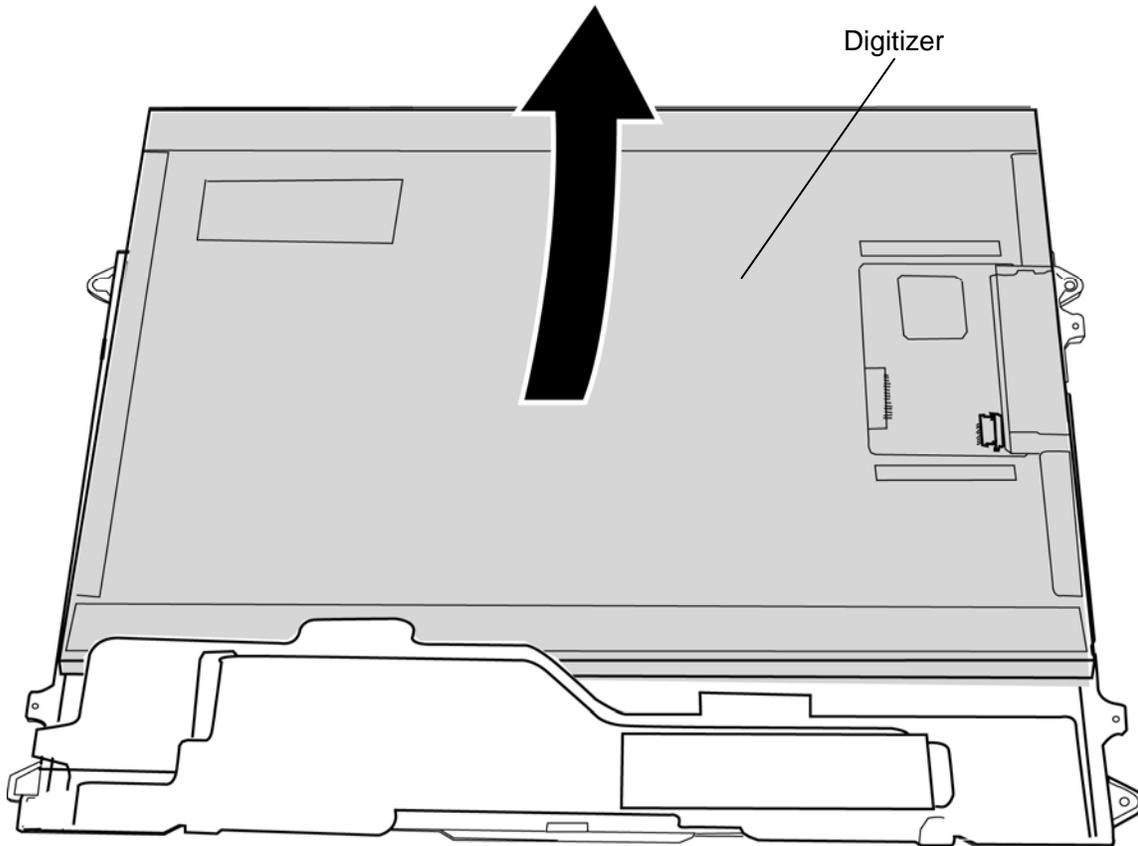


Figure 4-55 Removing the digitizer

Installing the LCD unit/Touch panel/Digitizer

The following describes the procedure for installing the LCD unit/touch panel/digitizer. (See Figure 4-51 to 4-55.)

CAUTION: When installing the LCD unit/touch panel/digitizer, be careful of the followings.

Standards of dirt of the digitizer and dirt between the digitizer and LCD are followings.

	Standard	Criteria
Point alien substance	$D \leq 0.2\text{mm}$	Good
	$0.2\text{mm} < D \leq 0.3\text{mm}$	The number of faults is less than 5
	$0.3\text{mm} < D$	Bad
Line alien substance	$L \leq 3.0\text{mm}$ and $W \leq 0.08\text{mm}$	The number of faults is less than 5
Flaw	$W \leq 0.03\text{mm}$	Good
	$0.03\text{mm} < W \leq 0.05\text{mm}$ and $L \leq 5\text{mm}$	Good
	$0.03\text{mm} < W \leq 0.05\text{mm}$ and $5\text{mm} < L \leq 15\text{mm}$	It is a good item if the distance of the flaw is 20mm or more, when the flaw is two or more pieces.
	$0.05\text{mm} < W$	Follows point alien substance standard

※D=Diameter, L=Length, W=Width

Standards of dirt of the touch panel and dirt between the touch panel and LCD are followings.

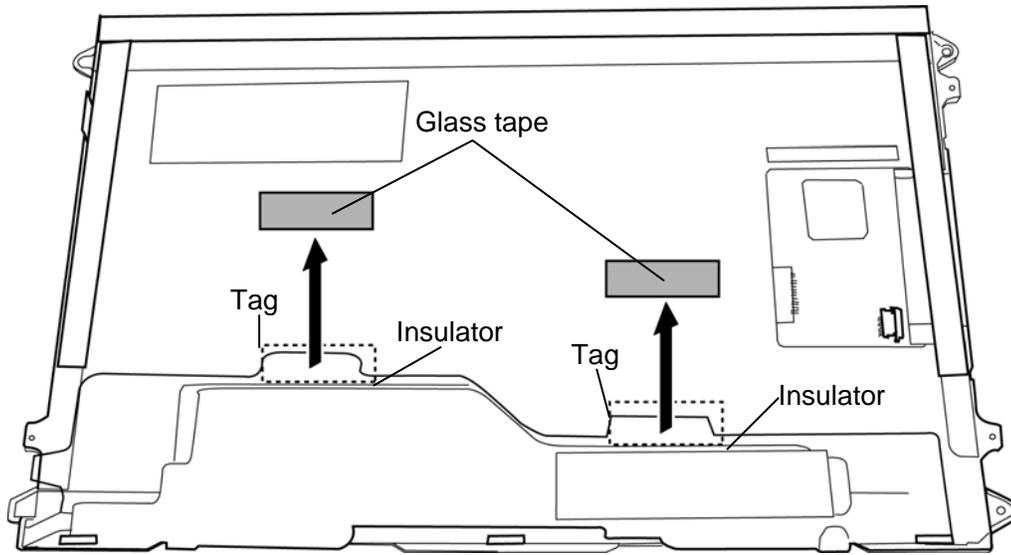
	Standard	Criteria
Point alien substance	$D \leq 0.2\text{mm}$	Good
	$0.2\text{mm} < D \leq 0.4\text{mm}$	The number of faults is less than 5
	$0.4\text{mm} < D$	Bad
Line alien substance	$W \leq 0.03\text{mm}$	Good
	$L \leq 10\text{mm}$ and $W < 0.1\text{mm}$	The number of faults is less than 5
	$0.1\text{mm} \leq W$	Bad
Flaw	$W \leq 0.03\text{mm}$ or $D \leq 0.1\text{mm}$	Good
	$0.03\text{mm} < W \leq 0.05\text{mm}$ and $L \leq 5\text{mm}$	Good
	$0.03\text{mm} < W \leq 0.1\text{mm}$ and $L \leq 20\text{mm}$	The number of faults is less than 5
	$0.03\text{mm} < W \leq 0.1\text{mm}$ and $20\text{mm} < L \leq 40\text{mm}$	The number of faults is less than 1
	$0.1\text{mm} \leq W$	Bad

※D=Diameter L=Length, W=Width

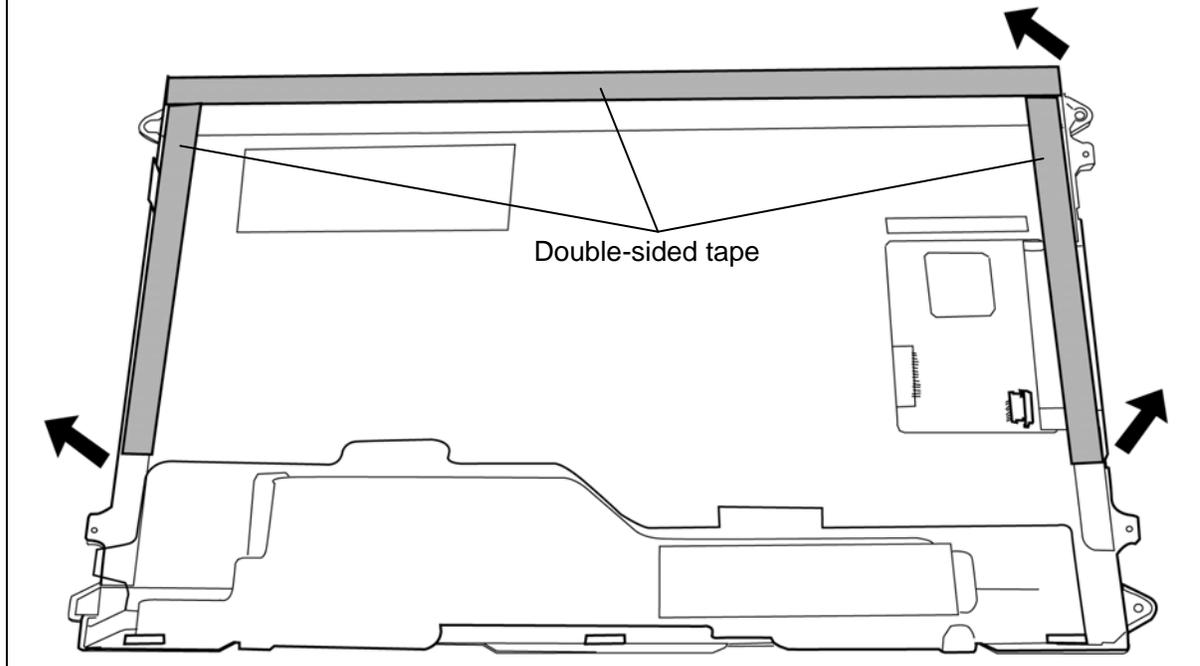
1. Peel off separators of double-sided tapes on the back of a new digitizer.
2. Slide a new **digitizer** into the back pocket of the LCD and fix it with the double-sided tape.

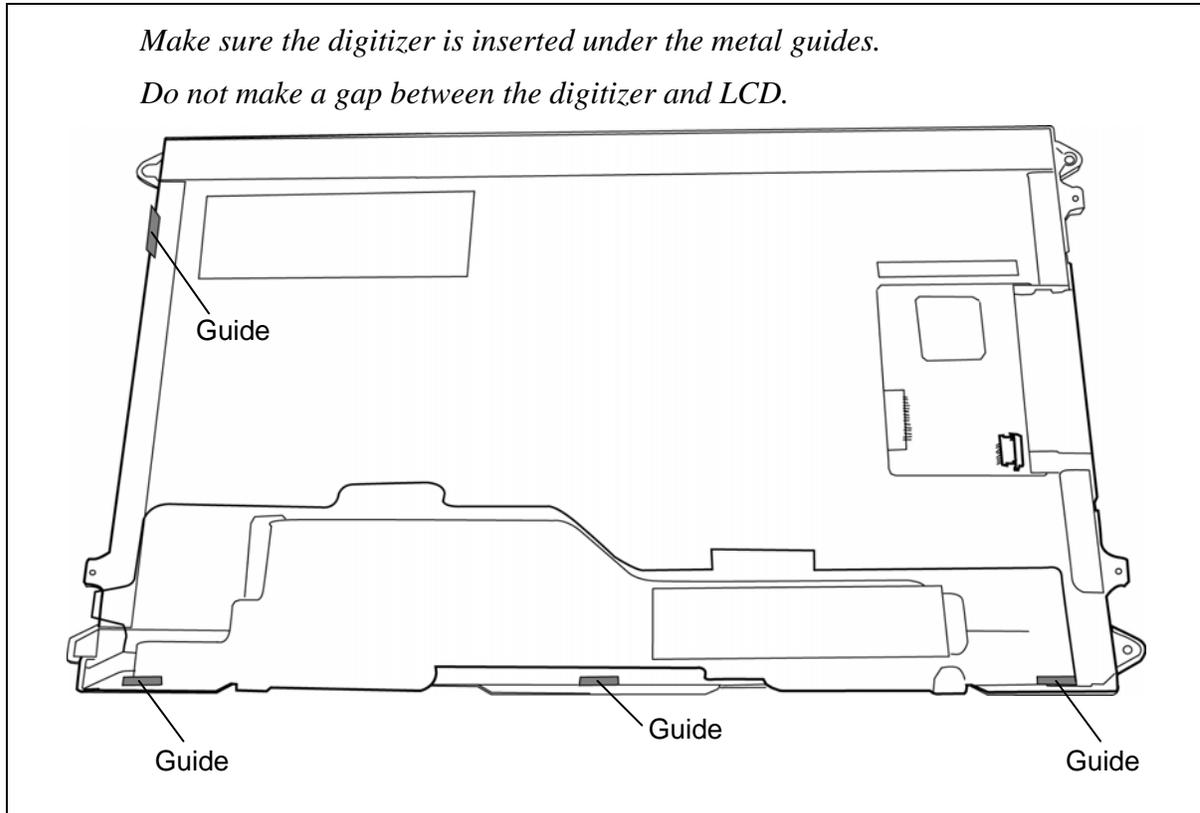
NOTE: When installing a new digitizer, follow the instructions below.

Stick the glass tape in place to fix the LCD assembly.



Peel off the separators of the three double-sided tapes toward the arrow pointing.





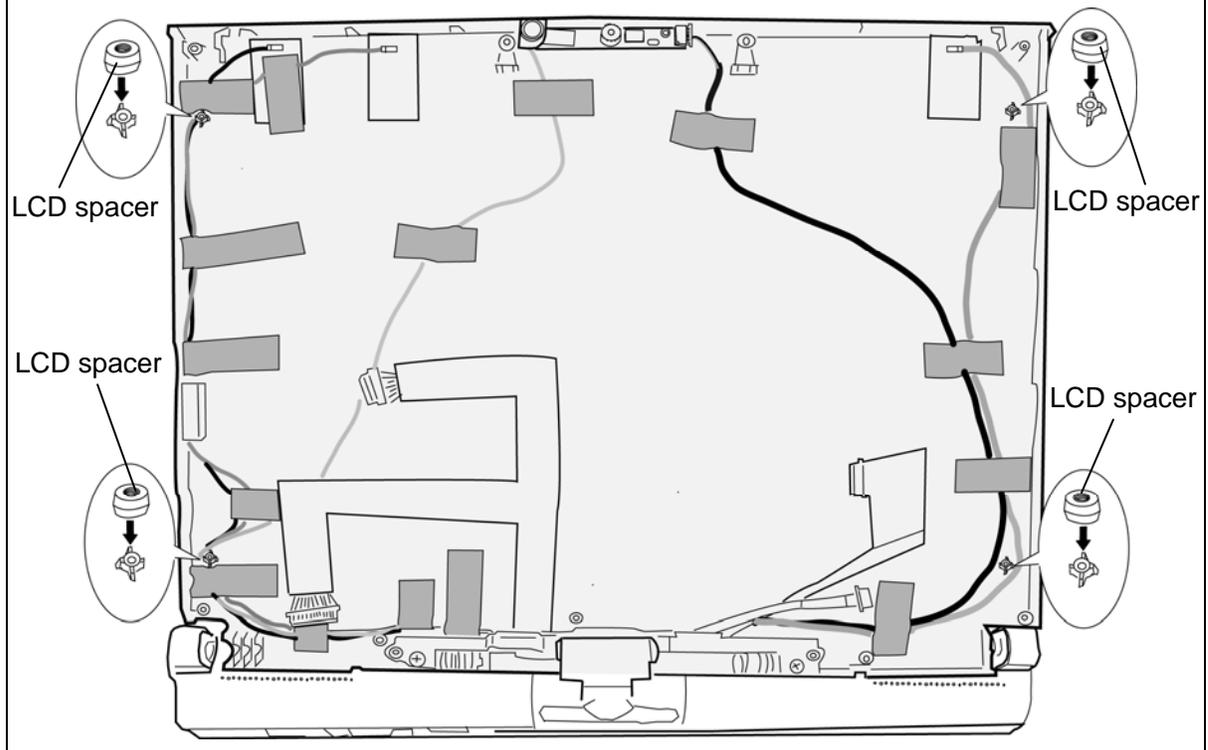
3. Set the **LCD unit/digitizer** on the **touch panel** and stick the **acetate tapes** in place.
4. Connect the **touch panel cable** to the connector on the LCD assembly and stick the **glass tape** in place.
5. Stand the LCD assembly on the display cover and connect the **digitizer cable** and **LCD cable** on the back of the LCD assembly.
6. Turn up the **insulator** and stick two **glass tapes** on each connector.

7. Place the **LCD assembly** to the display cover and secure it with the following **screws**.

- M2.0×4.0B S-THIN HEAD screw ×4

NOTE: For models with a digitizer and touch panel, be careful not to put the LCD cable under the metal plate of the touch panel.

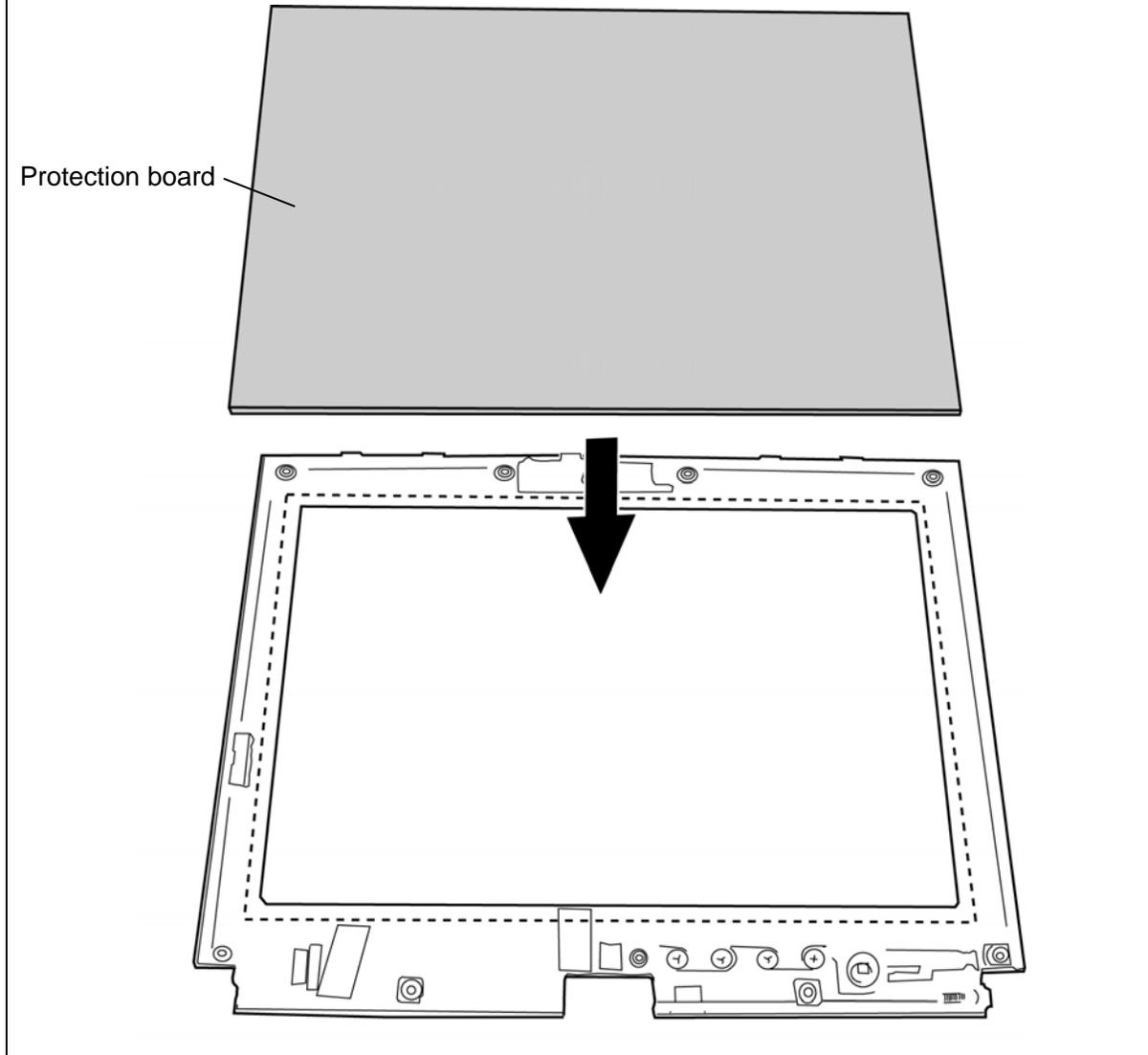
NOTE: For models with a LCD (only), set the LCD spacer on the display cover in place as shown bellow.



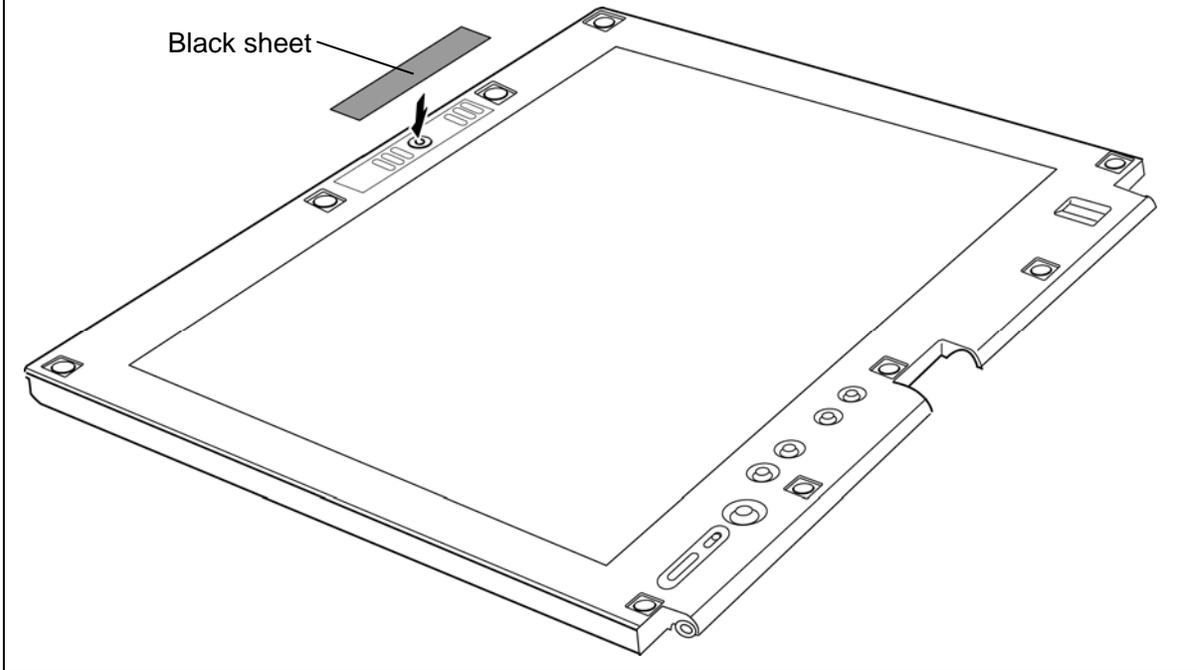
8. Set the **LCD mask** to the display cover while securing the latches.

NOTE: When setting the LCD mask, wipe the LCD with a soft cloth and make the back of the LCD mask clean with an ionizer.

NOTE: For models with a LCD/digitizer (without touch panel), set the protection board to the LCD mask and secure them with the double-sided tape.



NOTE: When replacing the LCD mask with a new one, stick a new black sheet in place. There are two types of black sheet, one type (for web camera model) masks the web camera portion, and the other (for no web camera model) does not mask the web camera portion.



9. Secure the LCD mask with the following **screws** and stick the **mask seals** (9 points).

- M2.5×6.0B FLAT HEAD screw ×9

4.32 Switch board/Fingerprint sensor board

Removing the Switch board/Fingerprint sensor board

The following describes the procedure for removing the switch board/fingerprint sensor board. (See Figure 4-56.)

1. Remove the following **screw** securing the switch board and pull up the **switch board**.
 - M2.5×4.0B FLAT HEAD screw ×1
2. Disconnect the **switch cable** from the connector on the back of the switch board.
3. Remove the following **screw** securing the fingerprint sensor board and pull up the **fingerprint sensor board**.
 - M2.5×4.0B FLAT HEAD screw ×1
4. Disconnect the **fingerprint sensor cable** from the connector on the back of the fingerprint sensor board.

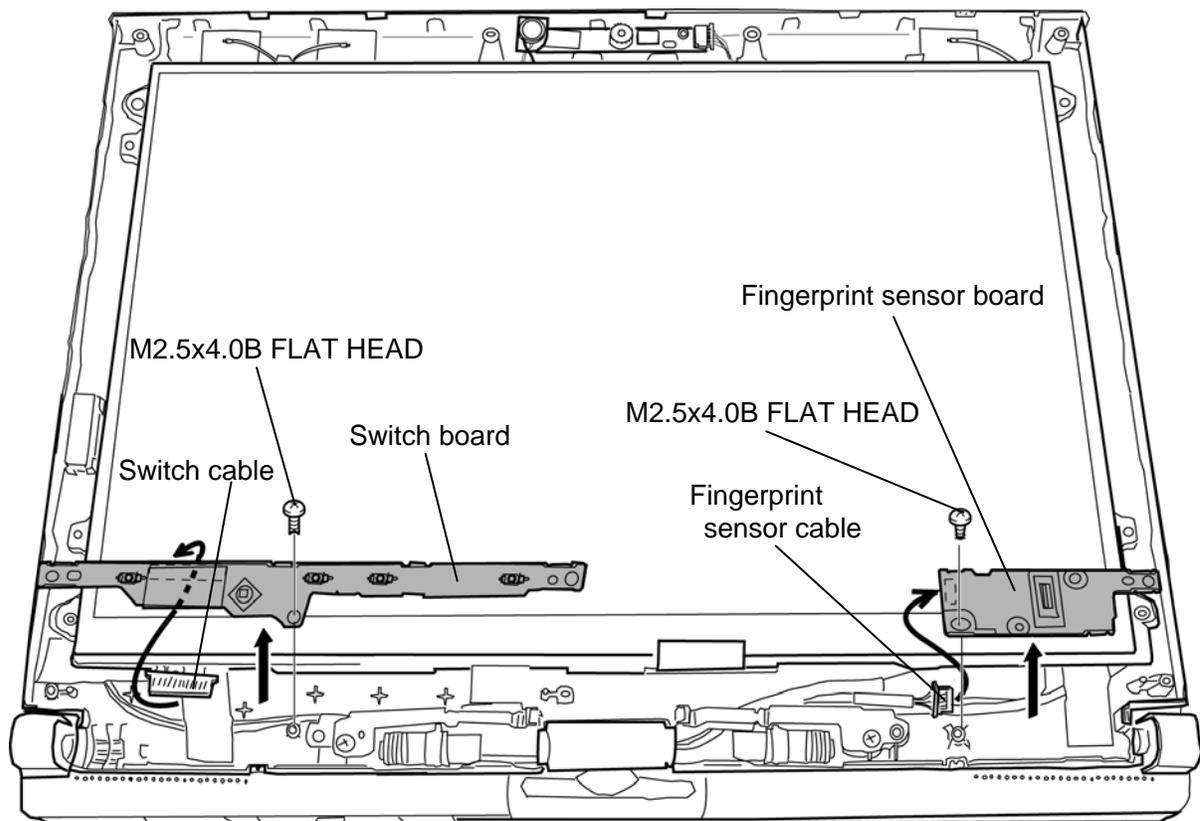


Figure 4-56 Removing the switch board/fingerprint sensor board

Installing the Switch board/Fingerprint sensor board

The following describes the procedure for installing the switch board/fingerprint sensor board. (See Figure 4-56.)

1. Connect the **fingerprint sensor cable** to the connector on the back of the fingerprint sensor board.
2. Set the **fingerprint sensor board** in place and secure it with the following **screw**.
 - M2.5×4.0B FLAT HEAD screw ×1
3. Connect the **switch cable** to the connector on the back of the switch board.
4. Set the **switch board** in place and secure it with the following **screw**.
 - M2.5×4.0B FLAT HEAD screw ×1

4.33 Web camera board

Removing the Web camera board

The following describes the procedure for removing the web camera board. (See Figure 4-57.)

1. Disconnect the **web camera cable** from the connector on the web camera board and remove the **web camera board**.

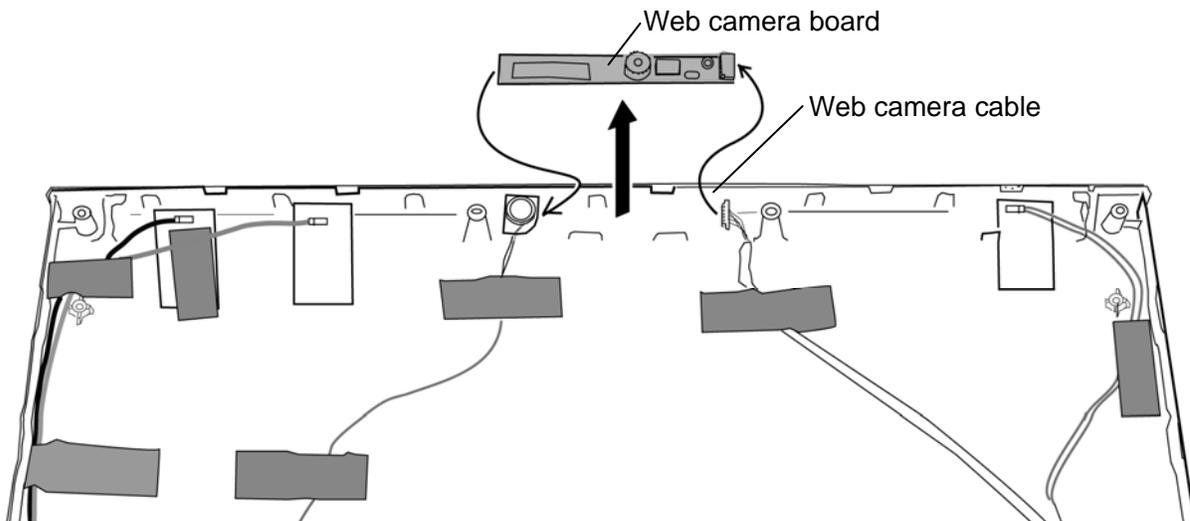


Figure 4-57 Removing the web camera board

Installing the Web camera board

The following describes the procedure for installing the web camera board. (See Figure 4-57.)

1. Connect the **web camera cable** to the connector on the web camera board and set the **web camera board** in place.

4.34 Wireless LAN antenna/Internal microphone/Web camera cable

Removing the Wireless LAN antenna/Internal microphone/Web camera cable

Wireless LAN antennas/internal microphone/web camera cable are included in a LCD cover assembly (hinge assembly is also included). When the wireless LAN antennas or internal microphone or web camera cable are/is defective, replace with a new LCD cover assembly.

However, when replacing only the LCD cover assembly or hinge assembly, arrange the antennas and cables, following the procedures below.

The following describes the procedure for removing the LCD cover assembly. (See Figure 4-58 and 4-59.)

1. Remove the following screws and separate the **LCD cover assembly** and **hinge assembly**.

- M2.5×6.0B FLAT HEAD screw ×2

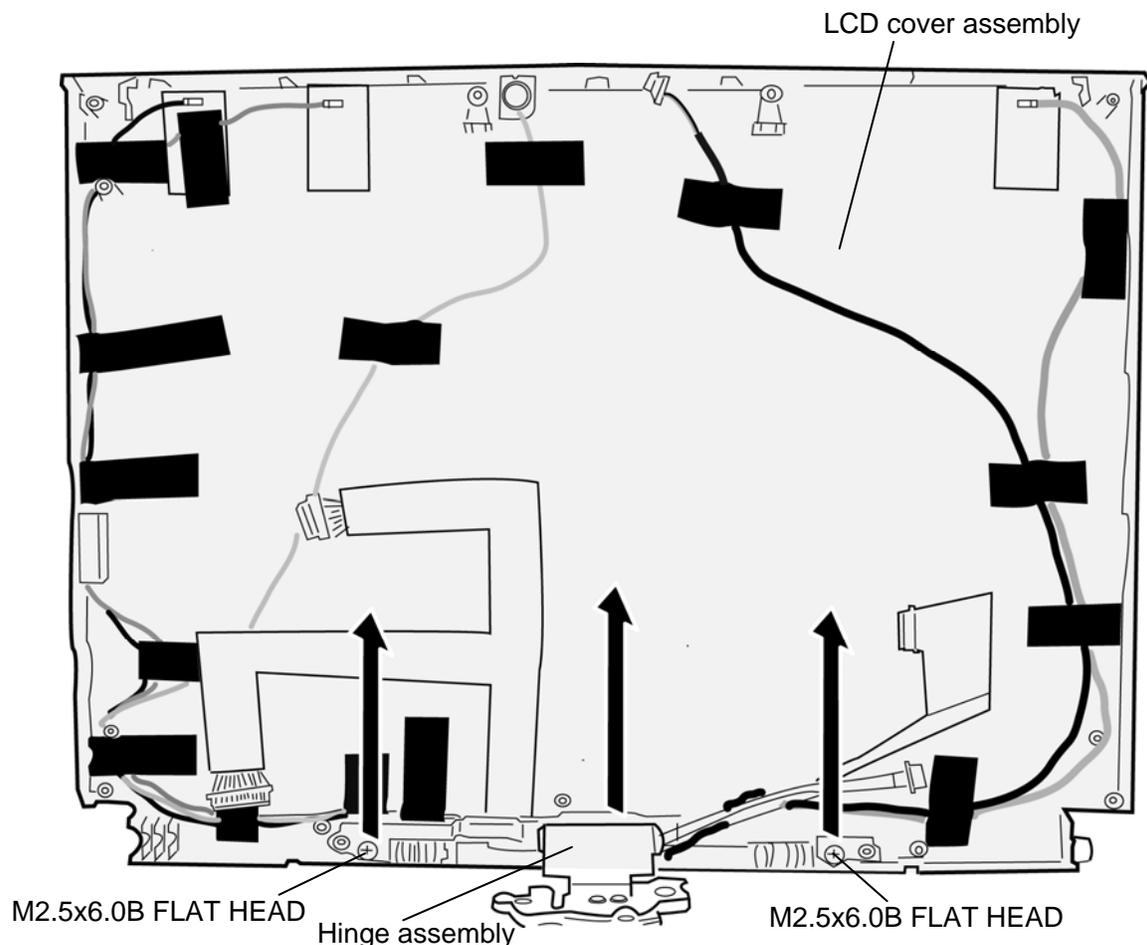


Figure 4-58 Removing the wireless LAN antenna/Internal microphone/web camera cable

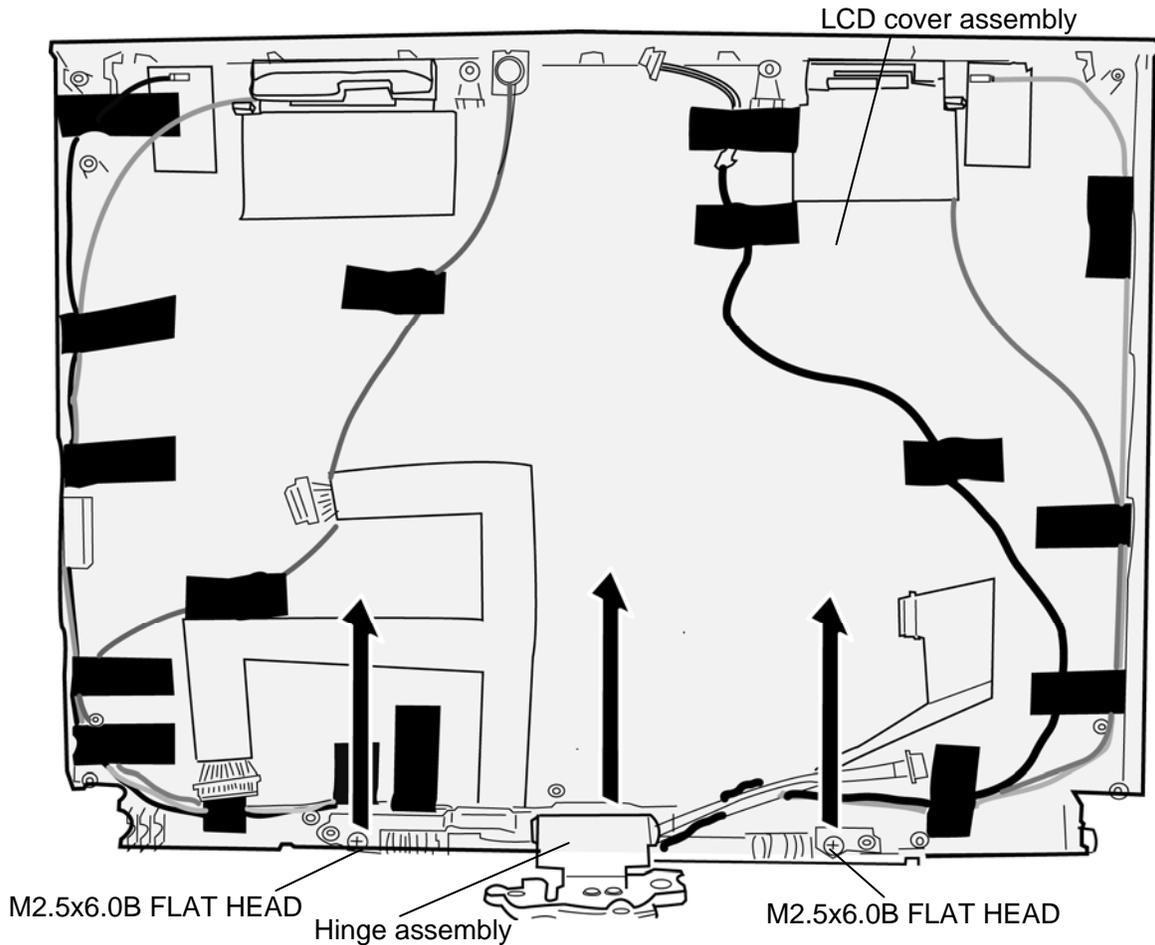


Figure 4-59 Removing the wireless LAN antenna/3G antenna/Internal microphone/webcamera cable(3G model only)

Installing the Wireless LAN antenna/Internal microphone/Web camera cable

The following describes the procedure for installing the LCD cover assembly. (See Figure 4-58 and 4-59.)

1. Set the **hinge assembly** onto the **LCD cover assembly** and secure them with the following screws.
 - M2.5×6.0B FLAT HEAD screw ×2
2. Set the antennas and cables in place.

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SW board (FW3SW*)

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Finger Sensor board (FW3FP*)

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Touch Pad board (FWGTP*)

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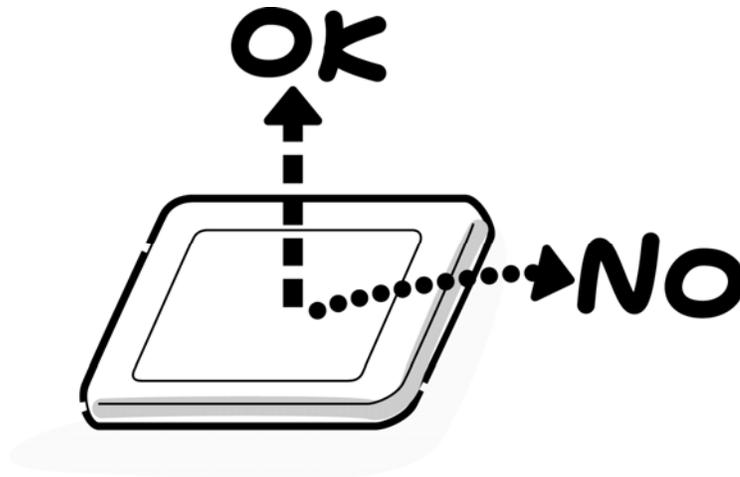
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Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. 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.

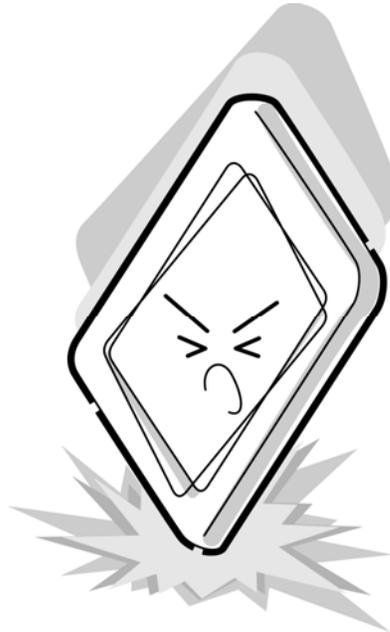
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



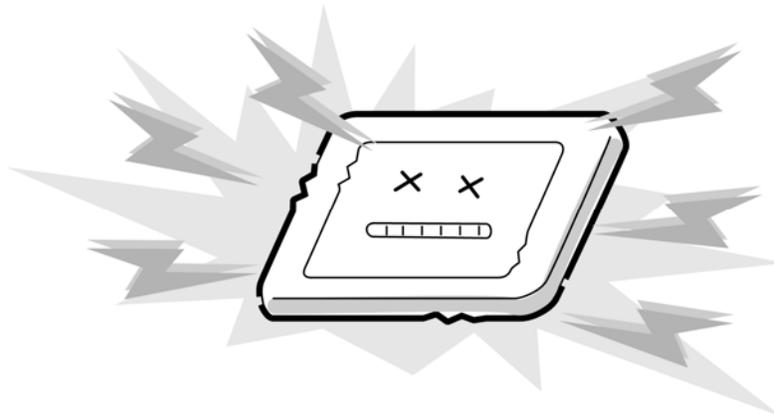
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



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.



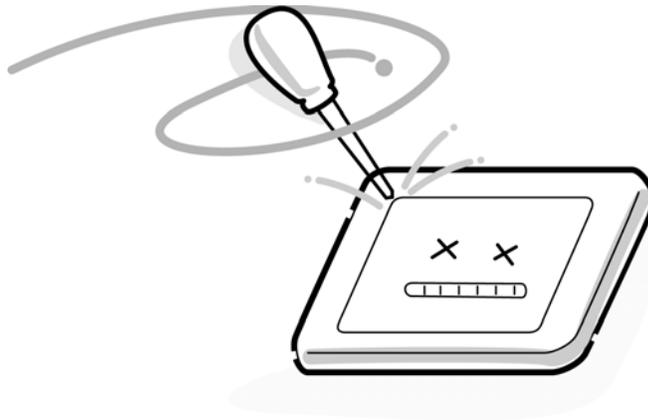
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



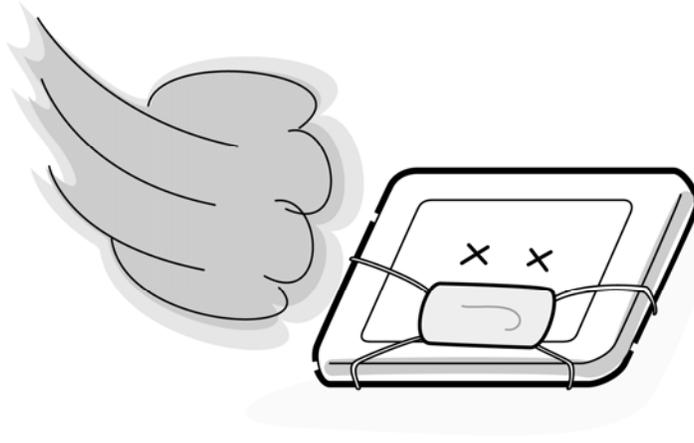
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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 PORTÉGÉ M780 System board (FW3SY*) Front View

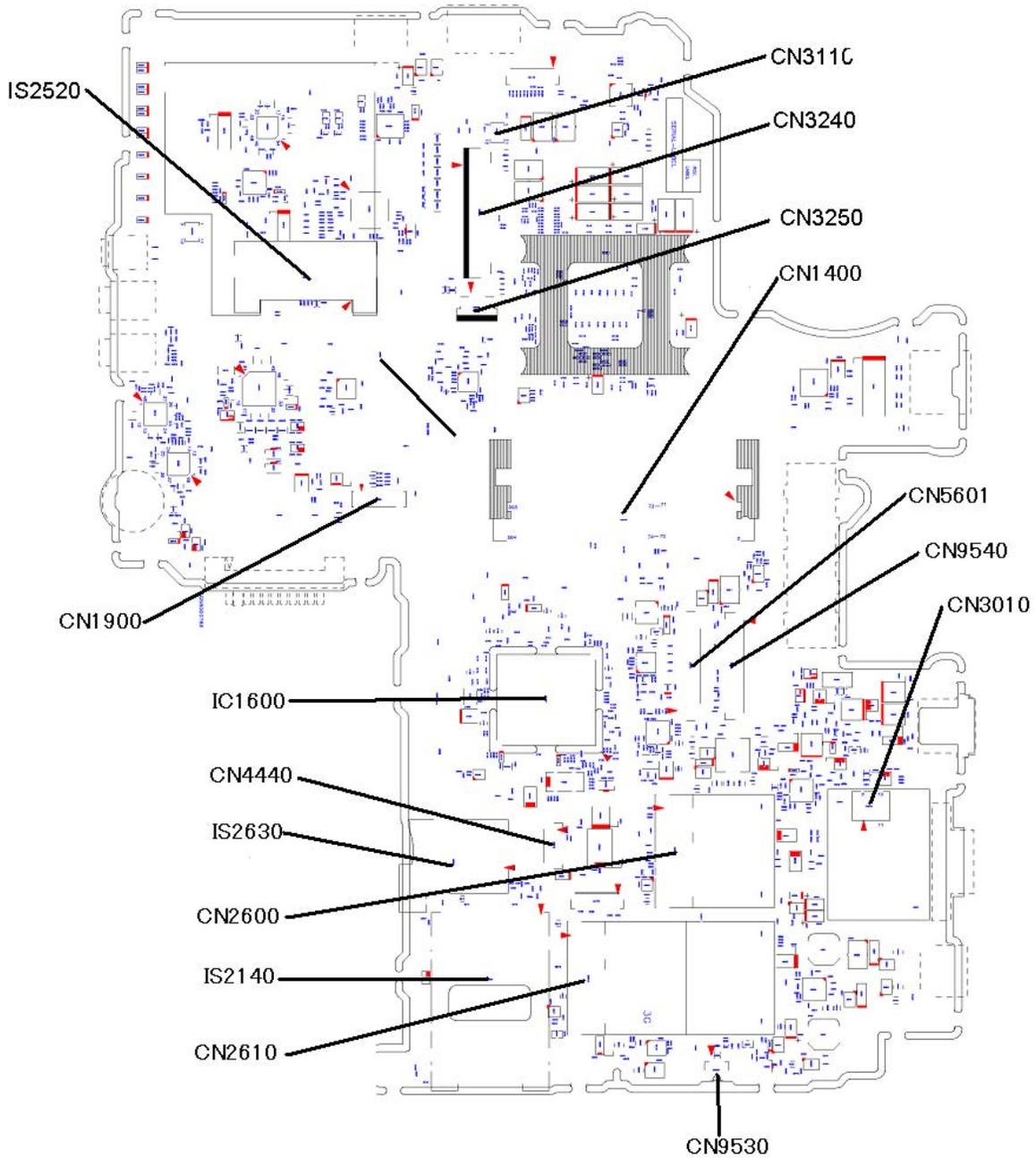


Figure B-1 System board(FW3SY*) layout (front)

Table B-1 PORTÉGÉ M780 System board(FW3SY*) connectors and ICs (front)

Number	Name
CN1400	Memory connector
CN1900	HDD I/F connector
IS2520	Express CARD I/F connector
CN2600	Mini PCI Express I/F connector (WLAN)
CN2610	Mini PCI Express I/F connector (3G): <u>Not used</u>
CN3010	MDC I/F connector
CN3240	Keyboard I/F connector
CN3250	FW3TP* board I/F connector
CN4440	Bluetooth I/F connector
CN5601	LCD I/F connector
CN9530	FW3PN* board I/F connector
CN9540	FW3FS* / FW3SW* board I/F connector
CN3110	Debug port
W3400	It is made to short-circuit when Debugging Port Check. It is indicated to Chaptor2 for details.
IS2140	Media Bridge I/F connector
IS2630	SIMM CARD SLOT: <u>Not used</u>
IC1600	Ibex Peak-M (chip set)

B.2 PORTÉGÉ M780 System board (FWGSY*) Back View

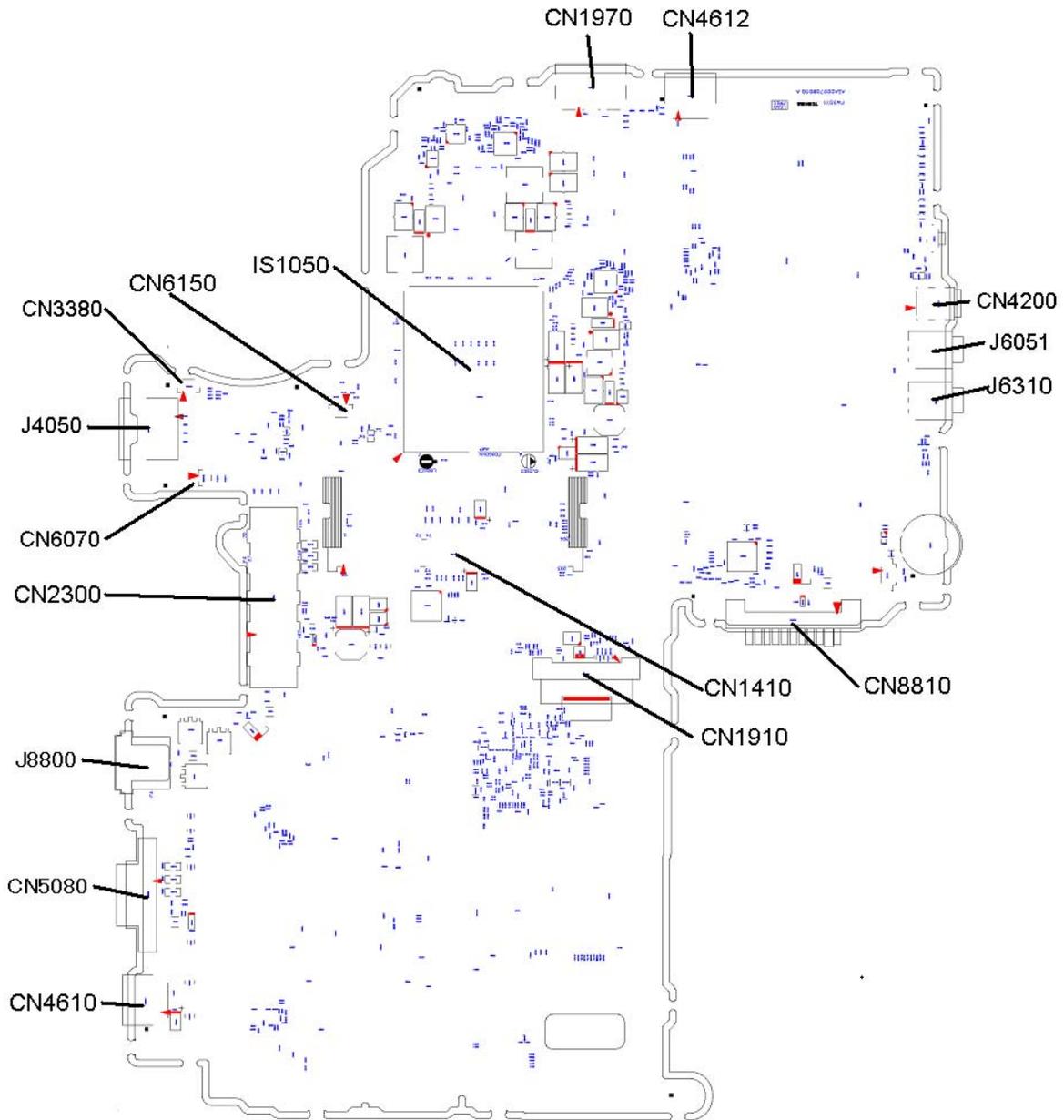


Figure B-2 System board(FW3SY*) layout (back)

Table B-2 PORTÉGÉ M780 System board (F#3SY*) connectors and ICs (back)

Number	Name
CN1410	Memory connector
CN1910	SELECT BAY I/F connector
CN2300	Docking I/F connector
CN4200	1394 I/F connector
CN4610	USB (Port2) I/F connector
CN1970	eSATA/USB interface connector
CN4612	USB (Port1) I/F connector
CN5080	CRT I/F connector
CN6070	Int MIC connector
CN6150	Speaker connector
CN3380	FAN I/F connector
CN8810	Battery connector
CN9300	RTC battery connector
J4050	LAN I/F connector
J6051	Ext MIC connector
J6310	HP JACK
J8800	DC-IN connector
IS1050	CPU

B.3 SW board (FWGSW*,FWGNW*) View

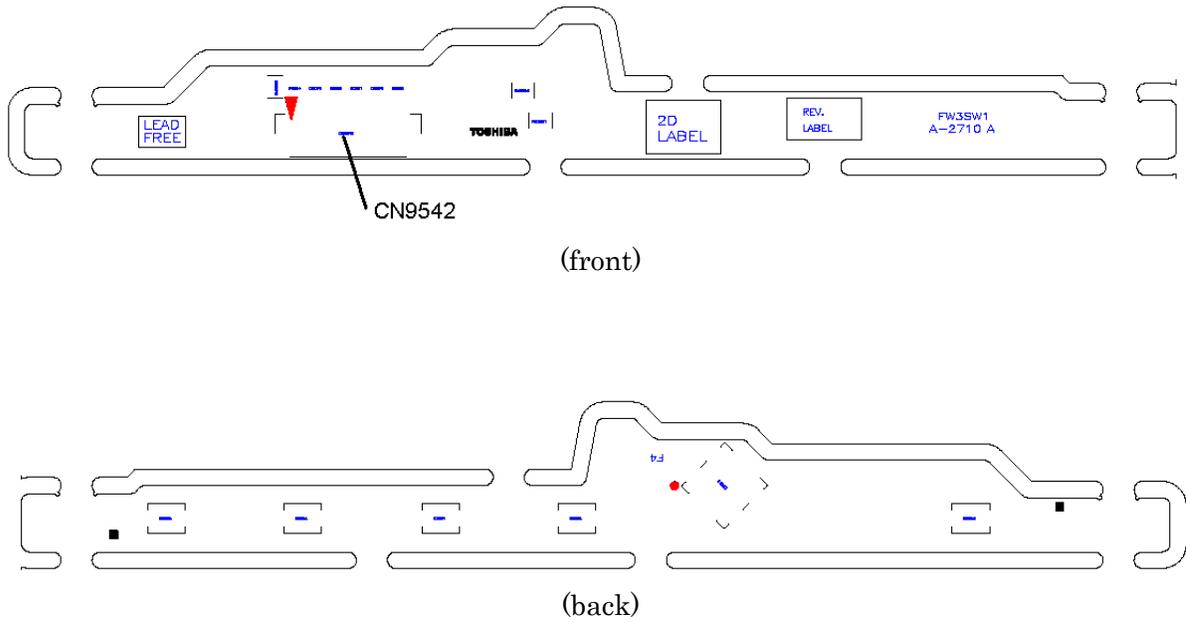


Figure B-3 SW board (FW3SW*) layout (front/back)

Table B-3 SW board (FW3SW*) connector (front)

Number	Name
CN9542	System board I/F connector

B.4 Finger Sensor board (FWGFS*,FWGNF*) View

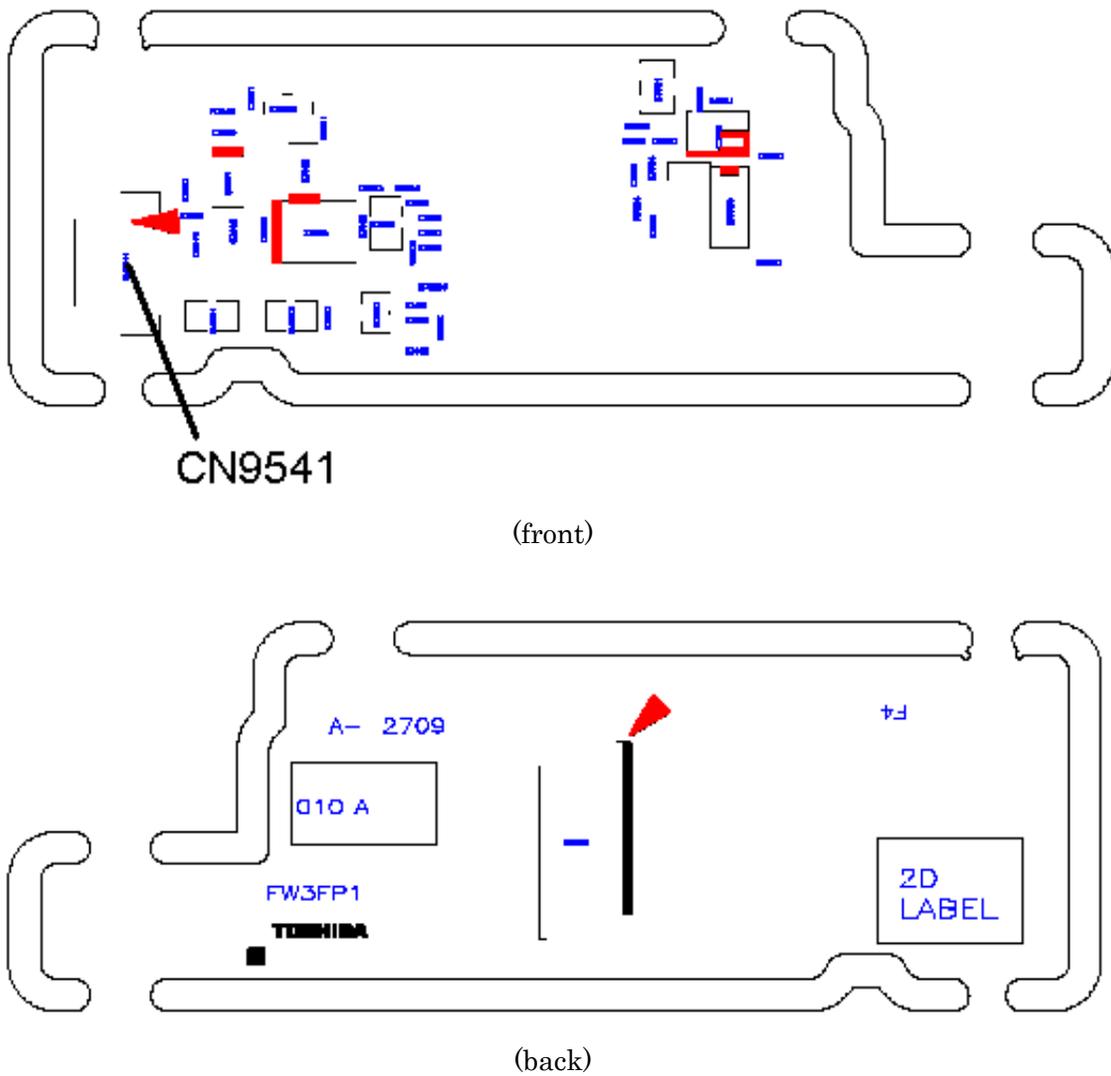


Figure B-4 Finger Sensor board (FW3FS*) layout (front/back)

Table B-4 Finger Sensor board (FW3FS*) connector (Front)

Number	Name
CN9541	System board I/F connector

B.5 Touch Pad board (FWGTP*,FWGNT*) View

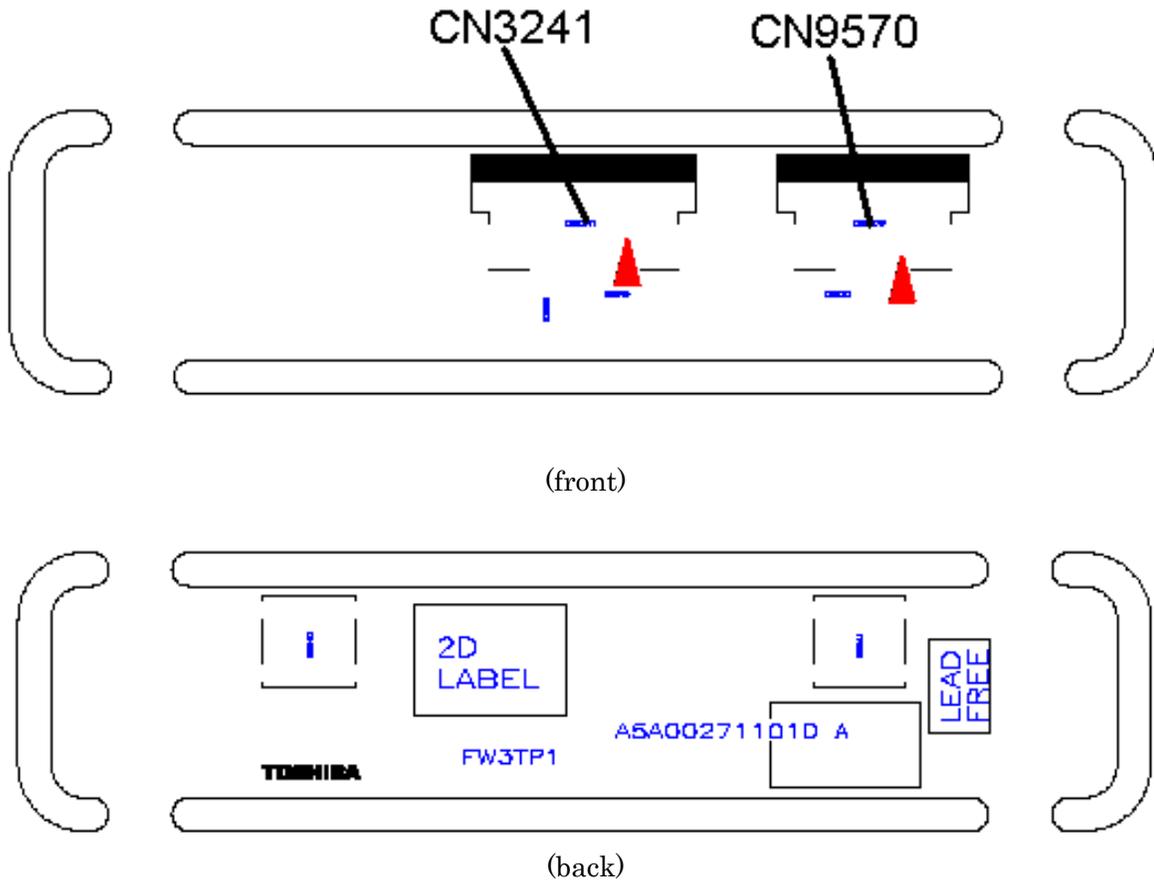
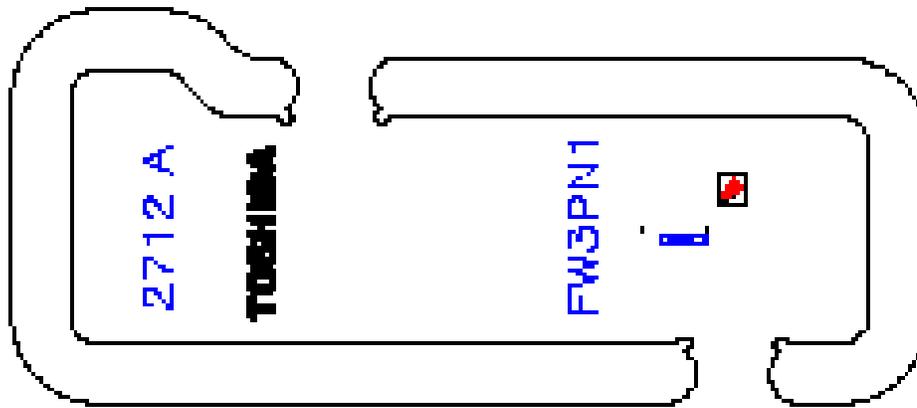


Figure B-5 Touch Pad board (FW3TP*) layout (front/back)

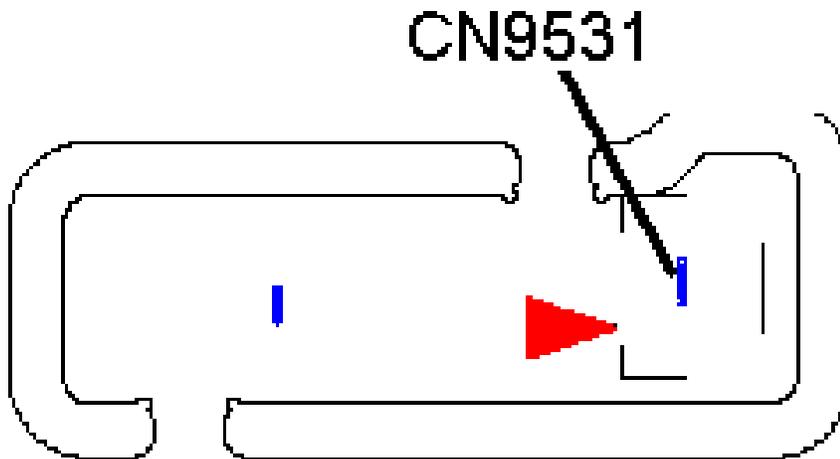
Table B-5 Touch Pad board (FW3TP*)connector (front)

Number	Name
CN3241	Touch PAD I/F connector
CN9570	System board I/F connector

B.6 Panel Sensor board (FWGPN*,FWGNP*) View



(front)



(back)

Figure B-6 Panel Sensor board(FW3PN) layout (front/back)*

Table B-6 Panel Sensor board(FW3PN) connector (back)*

Number	Name
CN9531	System board I/F connector

Appendix C Pin Assignments

System board (FW3SY*)

C.1 CN1400 Memory A connector(200-pin)

Table C- 1 Memory A connector (200-pin) (1/3)

Pin No.	Signal Name	Pin No.	Signal Name
1	MR0R75-B0V	2	GND
3	GND	4	ADQ00-B1P
5	ADQ05-B1P	6	ADQ01-B1P
7	ADQ04-B1P	8	GND
9	GND	10	ADQS0-B1N
11	ADM0-B1P	12	ADQS0-B1P
13	GND	14	GND
15	ADQ07-B1P	16	ADQ02-B1P
17	ADQ06-B1P	18	ADQ03-B1P
19	GND	20	GND
21	ADQ13-B1P	22	ADQ09-B1P
23	ADQ12-B1P	24	ADQ08-B1P
25	GND	26	GND
27	ADQS1-B1N	28	ADM1-B1P
29	ADQS1-B1P	30	ASMRST-B1
31	GND	32	GND
33	ADQ14-B1P	34	ADQ11-B1P
35	ADQ15-B1P	36	ADQ10-B1P
37	GND	38	GND
39	ADQ21-B1P	40	ADQ16-B1P
41	ADQ20-B1P	42	ADQ17-B1P
43	GND	44	GND
45	ADQS2-B1N	46	ADM2-B1P
47	ADQS2-B1P	48	GND
49	GND	50	ADQ19-B1P
51	ADQ23-B1P	52	ADQ18-B1P
53	ADQ22-B1P	54	GND
55	GND	56	ADQ25-B1P
57	ADQ29-B1P	58	ADQ24-B1P
59	ADQ28-B1P	60	GND

Table C-1 Memory A connector (200-pin) (2/3)

Pin No.	Signal Name	Pin No.	Signal Name
61	GND	62	ADQS3-B1N
63	ADM3-B1P	64	ADQS3-B1P
65	GND	66	GND
67	ADQ26-B1P	68	ADQ31-B1P
69	ADQ27-B1P	70	ADQ30-B1P
71	GND	72	GND
73	ACKE0-B1P	74	ACKE1-B1P
75	1R5-B1V	76	1R5-B1V
77	NC	78	AMA15-B1P
79	ABS2-B1P	80	AMA14-B1P
81	1R5-B1V	82	1R5-B1V
83	AMA12-B1P	84	AMA11-B1P
85	AMA09-B1P	86	AMA07-B1P
87	1R5-B1V	88	1R5-B1V
89	AMA08-B1P	90	AMA06-B1P
91	AMA05-B1P	92	AMA04-B1P
93	1R5-B1V	94	1R5-B1V
95	AMA03-B1P	96	AMA02-B1P
97	AMA01-B1P	98	AMA00-B1P
99	1R5-B1V	100	1R5-B1V
101	XACK0-B1P	102	XACK1-B1P
103	XACK0-B1N	104	XACK1-B1N
105	1R5-B1V	106	1R5-B1V
107	AMA10-B1P	108	ABS1-B1P
109	ABS0-B1P	110	ARAS-B1N
111	1R5-B1V	112	1R5-B1V
113	AWE-B1N	114	ACS0-B1N
115	ACAS-B1N	116	AODT0-B1P
117	1R5-B1V	118	1R5-B1V
119	AMA13-B1P	120	AODT1-B1P
121	ACS1-B1N	122	NC
123	1R5-B1V	124	1R5-B1V
125	NC (TEST)	126	MRVREF – B0V
127	GND	128	GND
129	ADQ36-B1P	130	ADQ37-B1P
131	ADQ32-B1P	132	ADQ33-B1P

Table C-1 Memory A connector (200-pin) (3/3)

Pin No.	Signal Name	Pin No.	Signal Name
133	GND	134	GND
135	ADQS4-B1N	136	ADM4-B1P
137	ADQS4-B1P	138	GND
139	GND	140	ADQ34-B1P
141	ADQ35-B1P	142	ADQ38-B1P
143	ADQ39-B1P	144	GND
145	GND	146	ADQ45-B1P
147	ADQ41-B1P	148	ADQ40-B1P
149	ADQ44-B1P	150	GND
151	GND	152	ADQS5-B1N
153	ADM5-B1P	154	ADQS5-B1P
155	GND	156	GND
157	ADQ46-B1P	158	ADQ47-B1P
159	ADQ43-B1P	160	ADQ42-B1P
161	GND	162	GND
163	ADQ53-B1P	164	ADQ52-B1P
165	ADQ48-B1P	166	ADQ49-B1P
167	GND	168	GND
169	ADQS6-B1N	170	ADM6-B1P
171	ADQS6-B1P	172	GND
173	GND	174	ADQ55-B1P
175	ADQ50-B1P	176	ADQ54-B1P
177	ADQ51-B1P	178	GND
179	GND	180	ADQ61-B1P
181	ADQ57-B1P	182	ADQ56-B1P
183	ADQ60-B1P	184	GND
185	GND	186	ADQS7-B1N
187	ADM7-B1P	188	ADQS7-B1P
189	GND	190	GND
191	ADQ59-B1P	192	ADQ63-B1P
193	ADQ58-B1P	194	ADQ62-B1P
195	GND	196	GND
197	GND	198	TSDIM-P3N
199	P3V	200	SMBDT1-P3P
201	GND	202	SMBCK1-P3P
203	0R75-P0V	204	0R75-P0V
1T	GND	2T	GND

C.2 CN1410 Memory B connector (200-pin)*Table C- 2 Memory B connector (200-pin) (1/3)*

Pin No.	Signal Name	Pin No.	Signal Name
1	MRVREF-B0V	2	GND
3	GND	4	BDQ04-B1P
5	BDQ00-B1P	6	BDQ05-B1P
7	BDQ01-B1P	8	GND
9	GND	10	BDQS0-B1N
11	BDM0-B1P	12	BDQS0-B1P
13	GND	14	GND
15	BDQ06-B1P	16	BDQ03-B1P
17	BDQ07-B1P	18	BDQ02-B1P
19	GND	20	GND
21	BDQ13-B1P	22	BDQ09-B1P
23	BDQ12-B1P	24	BDQ08-B1P
25	GND	26	GND
27	BDQS1-B1N	28	BDM1-B1P
29	BDQS1-B1P	30	BSMRST-B1
31	GND	32	GND
33	BDQ11-B1P	34	BDQ14-B1P
35	BDQ10-B1P	36	BDQ15-B1P
37	GND	38	GND
39	BDQ21-B1P	40	BDQ16-B1P
41	BDQ20-B1P	42	BDQ17-B1P
43	GND	44	GND
45	BDQS2-B1N	46	BDM2-B1P
47	BDQS2-B1P	48	GND
49	GND	50	BDQ23-B1P
51	BDQ19-B1P	52	BDQ22-B1P
53	BDQ18-B1P	54	GND
55	GND	56	BDQ29-B1P
57	BDQ25-B1P	58	BDQ28-B1P
59	BDQ24-B1P	60	GND

Table C-2 Memory B connector (200-pin) (2/3)

Pin No.	Signal Name	Pin No.	Signal Name
61	GND	62	BDQS3-B1N
63	BDM3-B1P	64	BDQS3-B1P
65	GND	66	GND
67	BDQ27-B1P	68	BDQ30-B1P
69	BDQ26-B1P	70	BDQ31-B1P
71	GND	72	GND
73	BCKE0-B1P	74	BCKE1-B1P
75	1R5-B1V	76	1R5-B1V
77	NC	78	BMA15-B1P
79	BBS2-B1P	80	BMA14-B1P
81	1R5-B1V	82	1R5-B1V
83	BMA12-B1P	84	BMA11-B1P
85	BMA09-B1P	86	BMA07-B1P
87	1R5-B1V	88	1R5-B1V
89	BMA08-B1P	90	BMA06-B1P
91	BMA05-B1P	92	BMA04-B1P
93	1R5-B1V	94	1R5-B1V
95	BMA03-B1P	96	BMA02-B1P
97	BMA01-B1P	98	BMA00-B1P
99	1R5-B1V	100	1R5-B1V
101	XBCK0-B1P	102	XBCK1-B1P
103	XBCK0-B1N	104	XBCK1-B1N
105	1R5-B1V	106	1R5-B1V
107	BMA10-B1P	108	BBS1-B1P
109	BBS0-B1P	110	BRAS-B1N
111	1R5-B1V	112	1R5-B1V
113	BWE-B1N	114	BCS0-B1N
115	BCAS-B1N	116	BODT0-B1P
117	1R5-B1V	118	1R5-B1V
119	BMA13-B1P	120	BODT1-B1P
121	BCS1-B1N	122	NC
123	1R5-B1V	124	1R5-B1V
125	NC (TEST)	126	MRVREF – B0V
127	GND	128	GND
129	BDQ37-B1P	130	BDQ32-B1P
131	BDQ36-B1P	132	BDQ33-B1P

Table C-2 Memory B connector (200-pin) (3/3)

Pin No.	Signal Name	Pin No.	Signal Name
133	GND	134	GND
135	BDQS4-B1N	136	BDM4-B1P
137	BDQS4-B1P	138	GND
139	GND	140	BDQ38-B1P
141	BDQ34-B1P	142	BDQ39-B1P
143	BDQ35-B1P	144	GND
145	GND	146	BDQ40-B1P
147	BDQ45-B1P	148	BDQ41-B1P
149	BDQ44-B1P	150	GND
151	GND	152	BDQS5-B1N
153	BDM5-B1P	154	BDQS5-B1P
155	GND	156	GND
157	BDQ43-B1P	158	BDQ46-B1P
159	BDQ42-B1P	160	BDQ47-B1P
161	GND	162	GND
163	BDQ53-B1P	164	BDQ48-B1P
165	BDQ52-B1P	166	BDQ49-B1P
167	GND	168	GND
169	BDQS6-B1N	170	BDM6-B1P
171	BDQS6-B1P	172	GND
173	GND	174	BDQ50-B1P
175	BDQ54-B1P	176	BDQ51-B1P
177	BDQ55-B1P	178	GND
179	GND	180	BDQ57-B1P
181	BDQ61-B1P	182	BDQ56-B1P
183	BDQ60-B1P	184	GND
185	GND	186	BDQS7-B1N
187	BDM7-B1P	188	BDQS7-B1P
189	GND	190	GND
191	BDQ58-B1P	192	BDQ62-B1P
193	BDQ59-B1P	194	BDQ63-B1P
195	GND	196	GND
197	GND	198	TSDIM-P3N
199	P3V	200	SMBDT1-P3P
201	P3V	202	SMBCK1-P3P
203	0R75-P0V	204	0R75-P0V
1T	GND	2T	GND

C.3 CN1910 SELECT BAY(SATA ODD) interface connector (13-pin)

Table C- 3 SELECT BAY(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	SBSTS-S3N	P2	P5V
P3	P5V	P4	NC
P5	GND	P6	GND

C.4 C CN1900 SATA HDD interface connector (20-pin)

Table C- 4 SATA HDD interface connector (20-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZSTTHD-P1P
3	ZSTTHD-P1N	4	GND
5	ZSTRHD-P1N	6	ZSTRHD-P1P
7	GND	8	GND
9	GND	10	GND
11	P5V	12	P5V
13	P5V	14	GND
15	GND	16	GND
17	GND	18	GND
19	GND	20	GND
1T	GND	2T	GND
3T	GND		

C.5 IS2520 EXPRESS CARD interface connector (40-pin)

Table C- 5 EXPRESS CARD interface connector (26-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZUSBEX-E3N
3	ZUSBEX-E3P	4	CPUSB-E3N
5	NC	6	NC
7	CRD-E3V	8	CRD-E3V
9	CRD1R5-P1V	10	CRD1R5-P1V
11	PEWAKE-E3N	12	CRD-E3V
13	CRDRST-E3N	14	CRD-P3V
15	CRD-P3V	16	CRDCRQ-E3N
17	CPPE-E3N	18	XPECRD-P0N
19	XPECRD-P0P	20	GND
21	ZERCRD-P1N	22	ZERCRD-P1P
23	GND	24	ZETCRD-P1N
25	ZETCRD-P1P	26	GND
1T	GND	2T	GND

C.6 CN2300 Docking interface connector (133-pin)*Table C-6 Docking interface connector (133-pin) (1/3)*

Pin No.	Signal Name	Pin No.	Signal Name
1	DCOUT	2	DCOUT
3	DOCDT1-S3N	4	GND
5	BT2VD	6	BT2VD
7	PSCL-S5P	8	PSDA-S5P
9	GND	10	ZUSBDC-E3P
11	ZUSBDC-E3N	12	GND
13	GND	14	NC
15	NC	16	GND
17	NC	18	NC
19	GND	20	GND
21	GND	22	ZDVTX2-P3P
23	ZDVTX2-P3N	24	GND
25	ZDVTX1-P3P	26	ZDVTX1-P3N
27	GND	28	DVIDET-P3N
29	NC	30	NC
31	NC	32	NC
33	NC	34	NC
35	NC	36	DCOUT
37	DCOUT	38	NC
39	NC	40	DBT20V-S5N
41	BTMP2	42	GND
43	CDCHG2-S5P	44	GND
45	DOPCONF-S5P	46	GND
47	GND	48	XDVCLK-P3N
49	XDVCLK-P3P	50	GND
51	NC	52	NC
53	GND	54	ZDVTX0-P3P
55	ZDVTX0-P3N	56	GND
57	GND	58	GND
59	GND	60	DVISCL-P5P
61	DVISDA-P5P	62	P3V
63	LINK-E3N	64	NC
65	NC	66	NC
67	ZBIDDP-EXP	68	ZBIDDN-EXN

Table C-6 Docking interface connector (133-pin) (2/3)

Pin No.	Signal Name	Pin No.	Signal Name
69	ZBIDCN-EXN	70	ZBIDCP-EXP
71	DCOUT	72	DCOUT
73	PWRSW-S3N	74	DDCON-P5P
75	NC	76	NC
77	GND	78	GND
79	DILSON-S3P	80	NC
81	GND	82	GND
83	GND	84	GND
85	NC	86	GND
87	NC	88	GND
89	GND	90	GND
91	GND	92	GND
93	GND	94	GND
95	IDSDA-P3P	96	IDSCL-P3P
97	GND	98	ACT-E3N
99	NC	100	NC
101	NC	102	ZBIDBN-EXN
103	ZBIDBP-EXP	104	ZBIDAN-EXN
105	ZBIDAP-EXP	106	DCOUT
107	DCOUT	108	EJCTRQ-S3N
109	M5V	110	NC
111	NC	112	GND
113	DHSYNC-P3P	114	DVSYNC-P3P
115	GND	116	GND
117	ZDTPA-P3P	118	ZDTPA-P3N
119	GND	120	GND
121	GND	122	ZDTPB-P3N
123	ZDTPB-P3P	124	GND
125	GND	126	DGREEN-PXP
127	GND	128	GND
129	GND	130	PSCL-S5P
131	PSDA-S5P	132	GND
133	DOCDT2-S3N		

Table C-6 Docking interface connector (133-pin) (3/3)

Pin No.	Signal Name	Pin No.	Signal Name
1T	GND	2T	GND
3T	GND	4T	GND
5T	GND	6T	GND
7T	GND	8T	GND
9T	GND	10T	GND
11T	GND	12T	GND
13T	GND	14T	GND
15T	GND	16T	GND
17T	GND	18T	GND
A1	GND	A2	GND
A3	DSKDC	A4	PVBAT2

C.7 CN2600 PCI-E Mini CARD interface connector (52-pin)

Table C- 7 PCI-E Mini CARD interface connector (52-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	PEWAKE-E3N	2	WLAN-E3V
3	WCHDAT-P3P	4	GND
5	WCHCLK-P3P	6	1R5-P1V
7	WLXRQ-E3N	8	NC
9	GND	10	NC
11	XPEWL-P0N	12	NC
13	XPEWL-P0P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	WLRFON-S3N
21	GND	22	PLTRS4-E3N
23	ZERWL-P1N	24	WLAN-E3V
25	ZERWL-P1P	26	WLDET-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	WMLED-E3P
43	GND	44	NC
45	XCLCK1-E1P	46	NC
47	CLDAT1-E1P	48	1R5-P1V
49	CLRST1-E3N	50	GND
51	NC	52	WLAN-E3V
1T	GND	2T	GND

C.8 CN2610 PCI-E Mini(3G) CARD interface connector (52-pin)* :Not used

Table C- 8 PCI-E Mini(3G) CARD interface connector (52-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	E3V
3	NC	4	GND
5	NC	6	P1V
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	PLTRS4-E3N
23	NC	24	E3V
25	NC	26	MINDET-P3N
27	GND	28	NC
29	GND	30	NC
31	NC	32	NC
33	NC	34	GND
35	GND	36	ZUSB3G-E3N
37	GND	38	ZUSB3G-E3P
39	NC	40	GND
41	NC	42	3GLED-E3P
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	E3V
1T	GND	2T	GND

C.9 CN3010 MDC module interface connector (12-pin)

Table C- 9 MDC interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	NC
3	AZSDO1-E3P	4	NC
5	GND	6	E3V
7	AZSYC1-E3P	8	GND
9	IC3010-1	10	GND
11	AZRST1-E3N	12	XAZBC1-E3P
1T	GND	2T	GND
3T	GND	4T	GND
5T	GND	6T	GND

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C.10 CN3240 Keyboard interface connector (34-pin)*Table C- 10 keyboard interface connector (34-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	KBSC15-S3N	8	KBSC14-S3N
9	KBRT07-S3N	10	KBRT06-S3N
11	KBSC13-S3N	12	KBSC12-S3N
13	KBRT05-S3N	14	KBRT04-S3N
15	KBSC11-S3N	16	KBSC10-S3N
17	KBRT03-S3N	18	KBRT02-S3N
19	KBRT01-S3N	20	KBSC09-S3N
21	KBSC08-S3N	22	KBSC07-S3N
23	KBRT00-S3N	24	KBSC06-S3N
25	KBSC05-S3N	26	KBSC04-S3N
27	KBSC03-S3N	28	KBSC02-S3N
29	KBSC01-S3N	30	KBSC00-S3N
31	P5V	32	CAPLED-P5N
33	ARWLED-P5N	34	NUMLED-P5N
1T	GND	2T	GND

C.11 CN3250 FW3TP* board interface connector (8-pin)*Table C-11 FW3TP* board interface connector (8-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	P5V	2	P5V
3	IPDDAT-P5P	4	GND
5	GND	6	IPDCLK-P5P
7	GND	8	GND
1T	GND	2T	GND

C.12 CN4200 1394 interface connector (4-pin)*Table C-12 1394 interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ZTPBN-P3N	2	ZTPBP-P3P
3	ZTPAN-P3N	4	ZTPAP-P3P
1T	GND	2T	GND
3T	GND	4T	GND

C.13 CN4440 Bluetooth interface connector (10-pin)*Table C-13 Bluetooth interface connector (10-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	P3V	4	WCHDA-P3P
5	BTRST-S3N	6	BTMDL-P3N
7	WCHCLK-P3P	8	ZUSBBT-E3N
9	ZUSBBT-E3P	10	GND

C.14 CN4610 USB (Port2) interface connector (4-pin)*Table C-14 USB (Port6) interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	ZUSBP2-E3N
3	ZUSBP2-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.15 CN4612 USB (Port1) interface connector (4-pin)*Table C-15 USB (Port0) interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB1PS-E5V	2	ZUSBP1-E3N
3	ZUSBP1-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.16 CN1970 eSATA/USB interface connector (20-pin)*Table C- 16 eSATA/USB interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
P1	USB1PS-E5V	P2	ZUSBCA-E3N
P3	ZUSBCA-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.17 CN5080 CRT interface connector (15-pin)*Table C-17 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	CRTSDA-P5P
13	MHSYNC-P3P	14	MVSYNC-P3P
15	CRTSCL-P5P		
1T	GND	2T	GND

C.18 CN5601 LCD interface connector (34-pin)*Table C-18 LCD interface connector (34-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	GND	4	GND
5	NC	6	PNL-P2V
7	PNL-P2V	8	PNL-P2V
9	PNL-P2V	10	NC
11	P3V	12	TSCL-P3P
13	TSDA-P3P	14	GND
15	ZTXDA0-PYN	16	ZTXDA0-PYP
17	GND	18	ZTXDA1-PYN
19	ZTXDA1-PYP	20	GND
21	ZTXDA2-PYN	22	ZTXDA2-PYP
23	GND	24	ZTXCKA-PYN
25	ZTXCKA-PYP	26	GND
27	NC	28	LEDBL0-GND
29	LEDBL1-GND	30	LEDBL2-GND
31	LEDBL3-GND	32	LEDBL4-GND
33	LEDBL5-GND	34	NC
35	LEDBL-PYV	36	LEDBL-PYV
37	LEDBL-PYV	38	LEDBL-PYV
39	LEDBL-PYV	40	LEDBL-PYV
1T	GND	2T	GND
3T	GND	4T	GND
5T	GND	6T	GND

C.19 CN6070 Int MIC connector (2-pin)*Table C-19 Int MIC connector (2-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	IMICIN-PXP	2	GND

C.20 CN6150 Speaker connector (4-pin)*Table C-20 Speaker connector (4-pin)*

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

C.21 CN8771 FAN interface connector (4-pin)*Table C-21 FAN interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	P5V	2	FANG0-P3P
3	GND	4	FPWM0-S3P

C.22 CN8810 Battery connector (10-pin)*Table C-22 Battery connector (10-pin)*

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

C.23 CN9300 RTC battery connector (3-pin)*Table C-23 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.24 CN9530 FW3GPN* board interface connector (4-pin)*Table C-24 FWGPN* board interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	S3V	2	PNLOFR-S3N
3	TPLOFR-S3N	4	GND

C.25 CN9540 FW3FP*/FW3SW* board interface connector (41-pin)

Table C-25 FWGFS board interface connector (41-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	E3V	4	FGSPON-S3N
5	GND	6	ZUSBFS-E3N
7	GND	8	ZUSBFS-E3P
9	GND	10	GND
11	GND	12	GPBTNA-S3N
13	GPBTNB-S3N	14	PWRSW-S3N
15	KBRT00-S3N	16	KBRT01-S3N
17	KBRT02-S3N	18	KBRT03-S3N
19	KBRT04-S3N	20	KBRT05-S3N
21	KBRT06-S3N	22	KBSC16-S3N
23	GND	24	GND
25	TPNLDT-P3N	26	GND
27	DGDTR-P3N	28	DGRTS-P3N
29	RXD-P3P	30	TXD-P3P
31	DGSLP-P3P	32	IC9540-4
33	P3V	34	GND
35	ZUSBCM-E3P	36	GND
37	ZUSBCM-E3N	38	GND
39	P5V	40	GND
41	GND		
1T	GND	2T	GND

C.26 J4050 LAN interface connector (12-pin)

Table C-26 LAN interface connector (12-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	ZBIDAP-EXP	2	ZBIDAN-EXN
3	ZBIDBP-EXP	4	ZBIDCP-EXP
5	ZBIDCN-EXN	6	ZBIDBN-EXN
7	ZBIDDP-EXP	8	ZBIDDN-EXN
9	LAN-E3V	10	LINK-E3N
11	LAN-E3V	12	ACT-E3N
1T	GND	2T	GND

C.27 J6051 Ext MIC connector (5-pin)*Table C-27 EXT MIC connector (5-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	EMICIN-PXP
3	EMICB-P2V	4	GND
5	DETCTA-P4N		

C.28 J6310 HP JACK (6-pin)*Table C-28 HP JACK (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

C.29 J8800 DC-IN connector (4-pin)*Table C-29 DC-IN connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ADPDC	2	GND
3	ADPDC	4	GND

C.30 IS2140 Media Bridge interface connector (42-pin)

Table C- 30 MEDIA BRIDGE interface connector (45-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	FMC11-P3P	2	FMC10-P3P
3	FMC08-P3P	4	GND
5	GND	6	FMC-P3V
7	FMMSCK-P3P	8	FMC10-P3P
9	FMC01-P3P	10	FMC08-P3P
11	FMC05-P3P	12	FMC02-P3P
13	FMCD0-P3N	14	GND
15	FMC-P3V	16	FMC05-P3P
17	GND	18	FMC02-P3P
19	FMC01-P3P	20	FMC-P3V
21	FMCD0-P3N	22	FMCD1-P3N
23	FMC02-P3P	24	FMC03-P3P
25	FMC04-P3P	26	FMC05-P3P
27	FMC06-P3P	28	FMC07-P3P
29	GND	30	FMC08-P3P
31	FMC09-P3P	32	FMC10-P3P
33	FMC11-P3P	34	FMC12-P3P
35	FMC13-P3P	36	FMMSCK-P3P
37	D2140-C1	38	GND
39	GND	40	FMC00-P3P
41	GND	42	FMC00-P3P
1T	GND	2T	GND
3T	GND	4T	GND

C.31 IS2630 SIMM CARD SLOT (12-pin) :Not used*Table C-31 SIMM CARD SLOT (12-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	UIPWRL-E3V	2	UIRSTL-E3P
3	UICLKL-E3P	4	NC
5	GND	6	NC
7	UIDATL-E3P	8	NC
9	NC	10	NC
11	NC	12	GND
1T	GND	2T	GND

SW board (FW3SW*)**C.32 CN9542 System board interface connector (15-pin)***Table C-32 System board interface connector (15-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GPBTNA-S3N
3	GPBTNB-S3N	4	PWRW-S3N
5	GND	6	KBRT00-S3N
7	KBRT01-S3N	8	KBRT02-S3N
9	KBRT03-S3N	10	KBRT04-S3N
11	KBRT05-S3N	12	KBRT06-S3N
13	GND	14	KBSC16-S3N
15	GND		

Finger Sensor board (FW3FP*)**C.33 CN9541 System board interface connector (6-pin)***Table C-33 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

Touch Pad board (FWGTP*)

C.34 CN3241 Touch PAD interface connector (12-pin)

Table C-34 Touch PAD interface connector (12-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	NC
9	NC	10	SWL
11	SWR	12	NC
1T	GND	2T	GND

C.35 CN9570 System board interface connector (8-pin)

Table C-35 System board interface connector (8-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	IPDCLK-P5P	4	GND
5	GND	6	IPDDAT-P5P
7	P5V	8	P5V
1T	GND	2T	GND

Panel Sensor board (FW3PN*)**C.36 CN9531 System board interface connector (4-pin)***Table C-36 System board interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	TPLOFR-S3N
3	PNLOFR-S3N	4	S3V

Antenna board (FW3AN*): (3G model only) : Not Used**C.37 CN2661 ANT interface connector (3-pin)***Table C-37 ANT interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2660-2)	2	GND
3	GND		

C.38 CN2662 3G interface connector (3-pin)*Table C-38 3G interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2660-6)	2	GND
3	GND		

C.39 CN2663 WLAN interface connector (3-pin)*Table C-39 WLAN interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2660-4)	2	GND
3	GND		

Appendix D

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

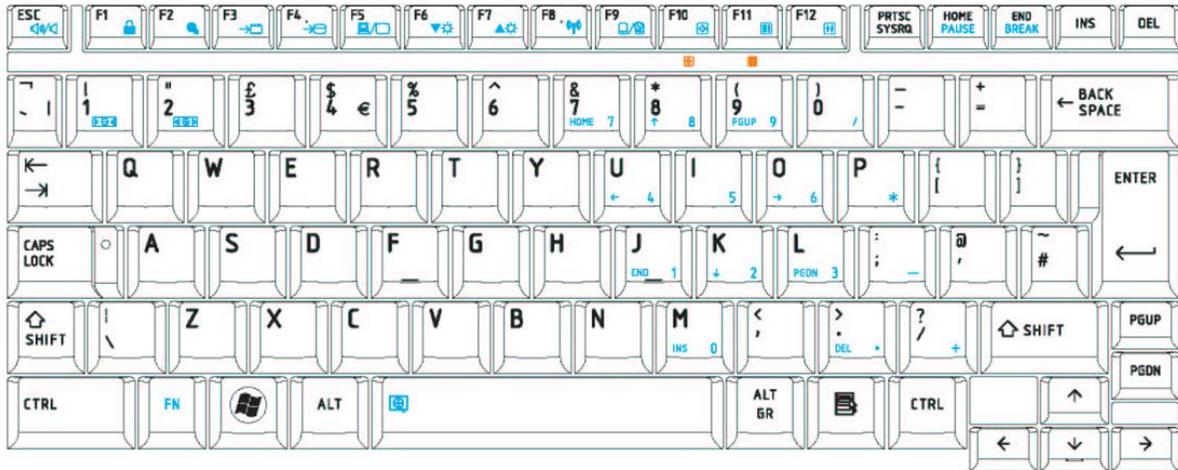


Figure E-1 UK keyboard

E.2 United States (US) Keyboard

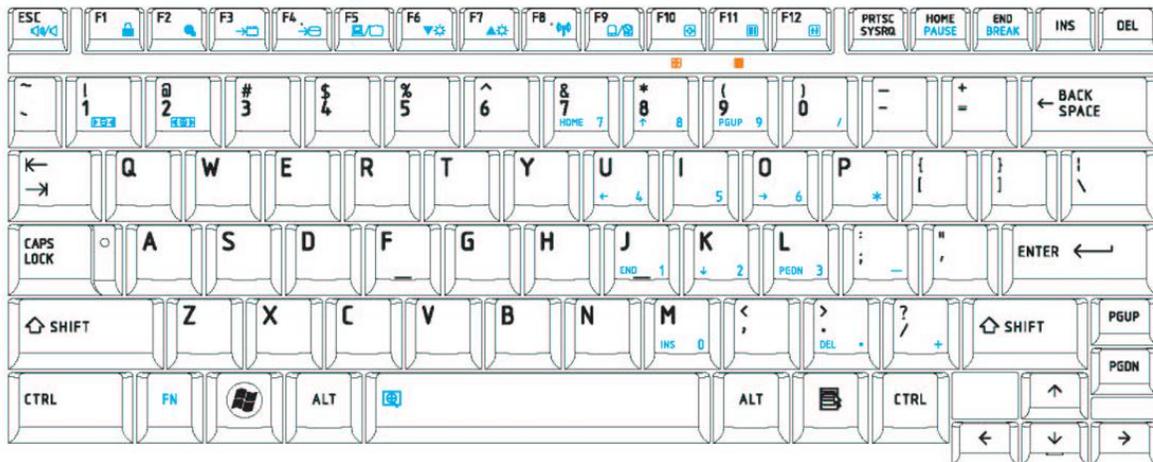


Figure E-2 US keyboard

E.3 Canadian French Keyboard

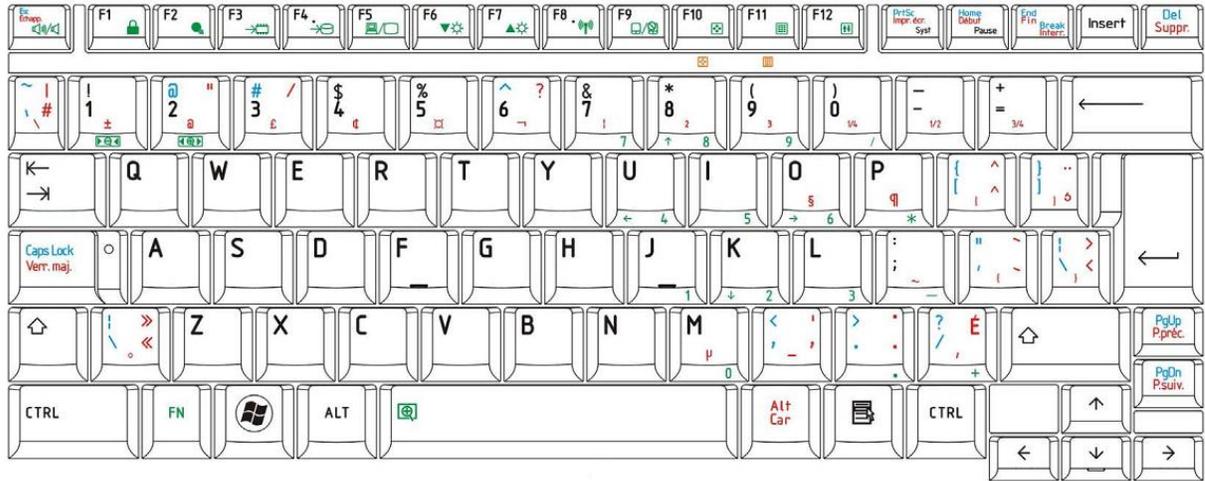


Figure E-3 Canadian French keyboard

Appendix F Wiring diagrams

F.1 RGB Monitor Loopback Connector

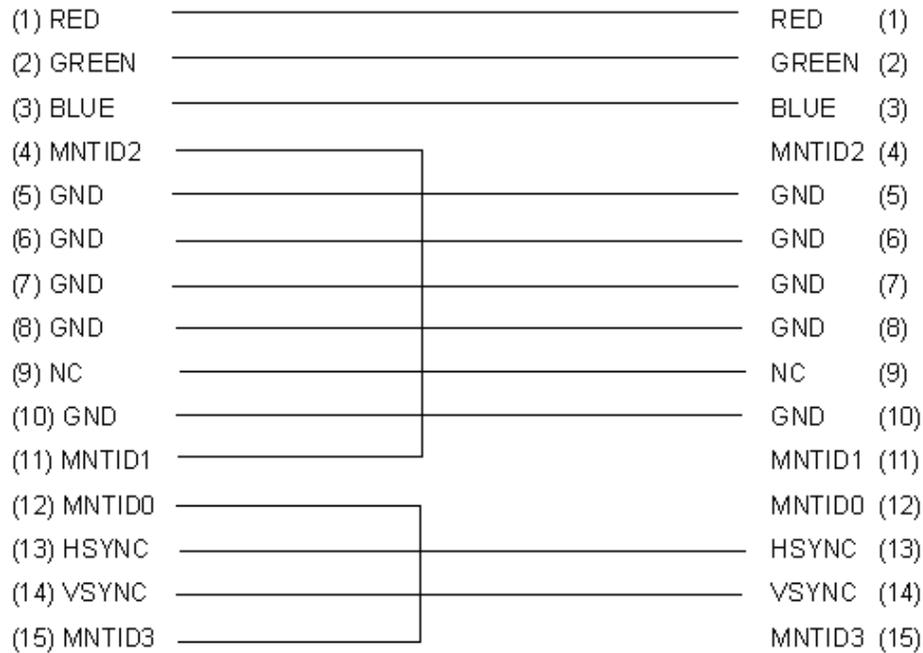


Figure F-1 RGB Monitor Loopback Connector

F.2 LAN Loopback Connector

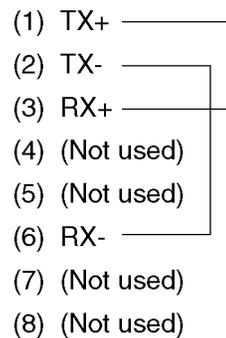


Figure F-2 LAN Loopback Connector

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. Set the USB Flash Memory containing BIOS rewriting data..
5. Turn on the power while holding down the tilde character key Until LED blinks

For example



(US Keyboard)



(UK Keyboard)

(Keep holding down the key.)

6. The BIOS rewriting starts.
7. When the process is completed, it the system automatically reboots.

NOTE:

1. *Connect the AC adapter and the charged battery 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. Set the USB Flash Memory containing EC/KBC rewriting data..
5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a beep sounds.) The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures).

Table I-1 MTBF

	Time (hours)
MTBF	5272.3 h*

* In the case of the model corresponding to AMT

