

Toshiba Personal Computer
PORTÉGÉ R500
Maintenance Manual

TOSHIBA CORPORATION

File Number 960-634

First Edition

[CONFIDENTIAL]

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Toshiba Personal Computer PORTÉGÉ R500 Maintenance Manual

First edition Jun 2007

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTÉGÉ R500.

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 T PORTÉGÉ R500. 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 R500 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 PORTÉGÉ R500 Personal Computer uses advanced 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 are some models and options according to BTO system. Refer to the Parts List for the configuration of each model and options.

Microprocessor

The PORTÉGÉ R500 computer is equipped with one of the following processors.

Intel® Core™ 2 Duo ULV

1.2GHz (Processor Number : U7600)

1.06GHz (Processor Number : U7500)

Chipset

Equipped with Intel Calistoga GMS as North Bridge, Intel ICH7-M as South Bridge and Texas Instrument PCI8412 as Card Controller.

VGA Controller

An internal Graphics Controller in North Bridge is used.

Memory

One DDR2-667 SDRAM slots. Memory modules can be installed to provide a maximum of 2GB (on board memory 1GB). Memory modules are available in 512MB and 1024MB sizes.

HDD

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

- 60/80/120/160/GB

The computer has a 1.8-inch PATA HDD. The following capacities are available.

- 40/100 GB

 USB FDD

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

 Optical Drive

A 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.

 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)

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

 IEEE 1394 port

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

 External monitor (RGB) port

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

 PC card slot

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

 SD/ SDHC memory card slot

One SD/ SDHC memory card slot. Data can be read and written by inserting each media to the slot.

 Fingerprint sensor

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

Docking interface port

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

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

 Sound system

The sound system is equipped with the following features:

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

Internal modem

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

 Internal LAN

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

 Wireless LAN

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

 Bluetooth

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

 TOSHIBA Assist button

Press this button to launch the program automatically. When power-off, Sleep Mode and Hibernation Mode, press this button to start the computer and launch the program.

 Back light On/Off button

If you turn off the back light outdoors in a good weather, you can use the computer for a longer period.

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



Figure 1-1 Front of the computer

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

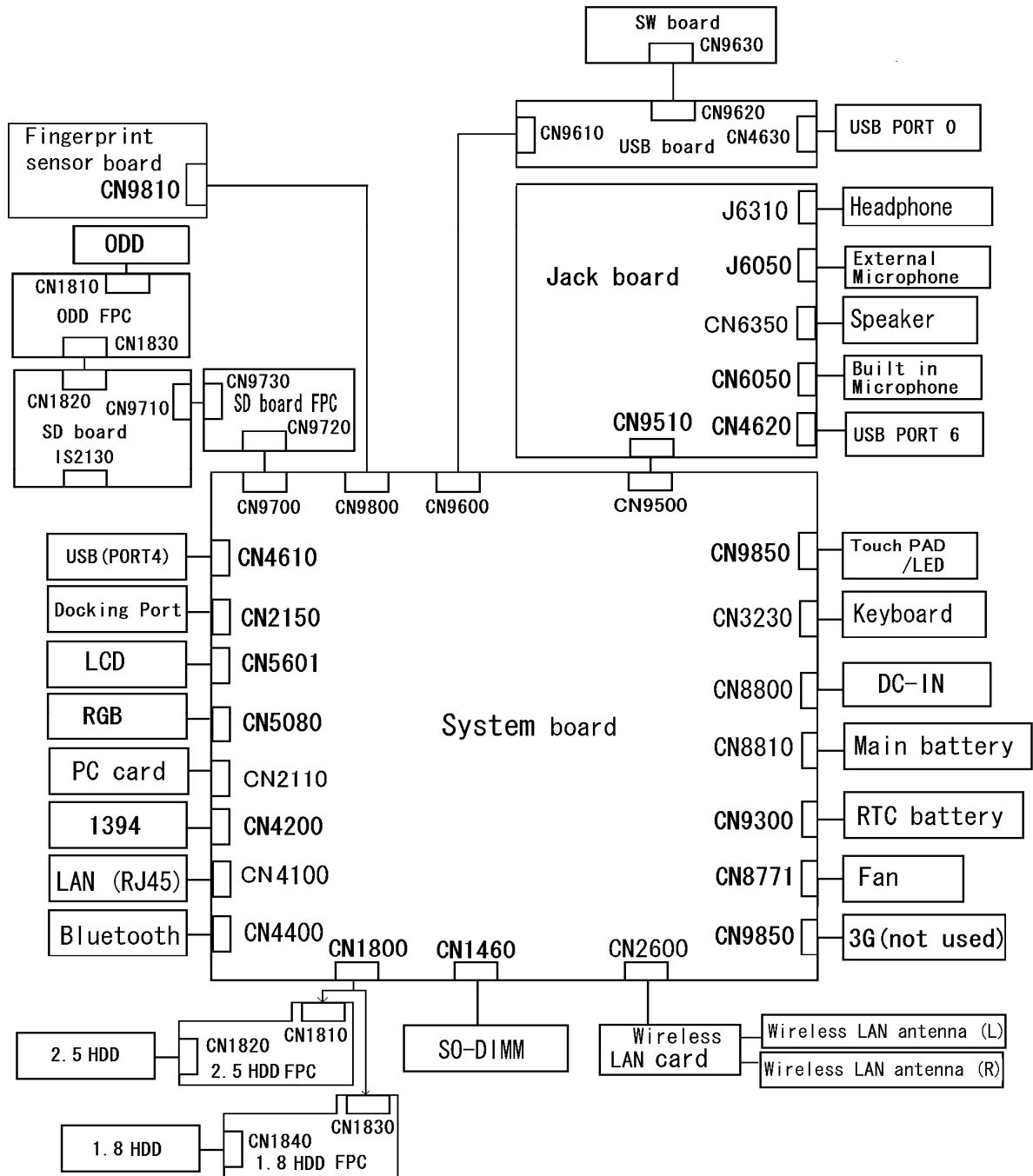


Figure 1-2 System unit configuration

1.2 System Unit Block Diagram

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

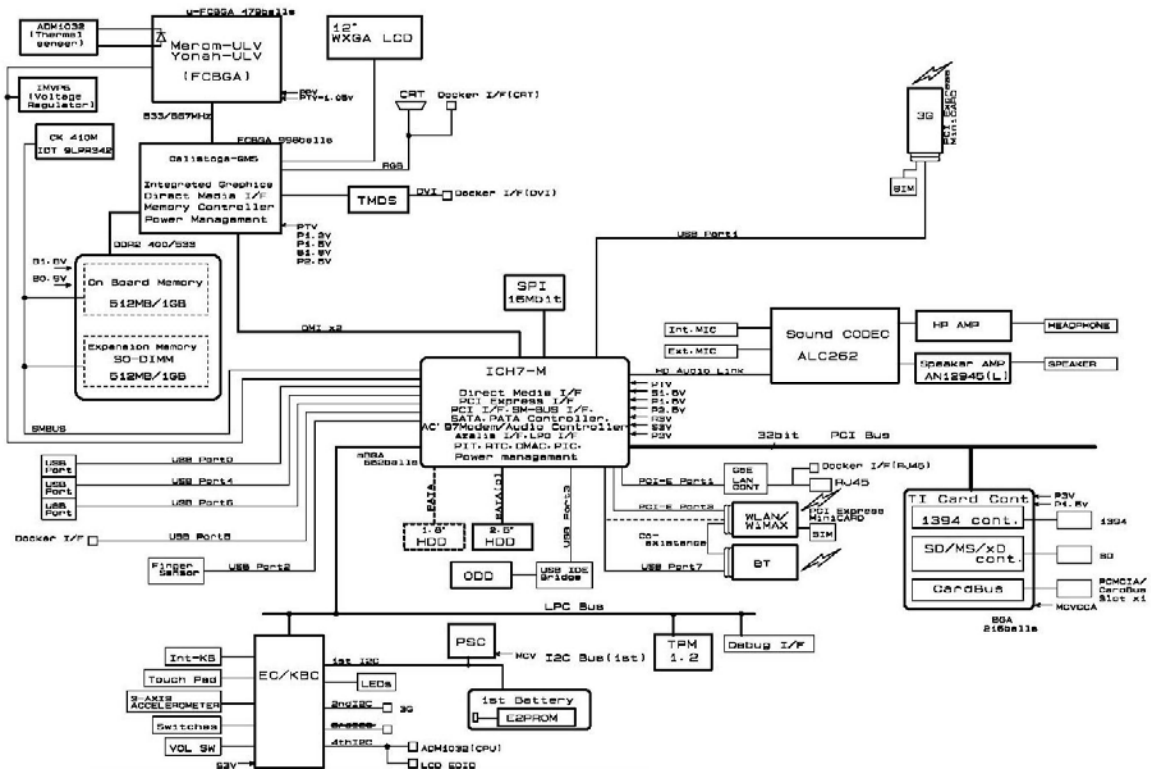


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

Intel® Core™ 2 Duo ULV

- Core speed:
 - Speed 1.2GHz (U7600)/ 1.06GHz (U7500)
 - Integrated L1 cache memory of 64KB (32KB +32KB)
 - Integrated L2 cache memory of 2MB
 - Processor bus speed: 533MHz
 - Core voltage: 1.05
 - 478-pin Micro FC-PGA package
 - (): Processor Number

❑ Memory

One memory slots capable of accepting DDR2-SDRAM 512MB or 1024MB memory modules for a maximum of 2GB (on board 1GB) .

- 200-pin Small Outline DIMM
- 1.8V operation
- PC2-4200(DDR2-533)/PC2-5300(DDR2-667) support

❑ North Bridge

- Intel Calistoga GMS(Intel 945GMS)
 - Processor Support: Core 2 Duo ULV (case of PORTEGE R500)
 - Supports System Memory : DDR2-400/DDR2-533/DDR2-667, 2GB(max)
 - Internal Graphics Controller : Inter Generation 3.5 Integrated GFX Core
 - DMI(Direct Media Interface)
 - Supports ICH.
 - 998-ball 27×27mm Bell Pitch 0.8mm FC-BGA package

❑ South Bridge

- Intel ICH7-M: (Intel 82801GBM)
 - DMI(Direct Media Interface)
 - PCI Express I/F (4 ports)
 - PCI Bus I/F Rev2.3 (6 PCI REQ/GNT Pairs)
 - Integrated Serial ATA Host Controller (2 Prots,150MB/S)
 - Integrated IDE Controller (Ultra ATA 100/66/33)
 - AC'97 2.3 codecs
 - Intel High Definition controller (Azalia)
 - USB 1.1/2.0 Controller 8 ports
 - Built-in LAN controller (WfM 2.0 & IEEE 802.3 compliance)
 - Power Management (ACPI 2.0 compliance)
 - SMBus2.0 controller
 - SPI interface (BIOS)
 - Low Pin Count (LPC) interface (EC/KBC, Super I/O)
 - IRQ controller
 - Serial Interrupt Function
 - Suspend/Resume control
 - Built –in RTC
 - GPIO
 - 652-ball 31×31×2.51mm BGA Package

❑ Cardbus controller (TI PCI8412ZHK)

- PCI Interface(PCI Rev.2.2)
- SD IO Controller(Ver.1.1)
- CardBus / Ultra media Controller (Yenta Ver.2.2:1 socket)
- SD/MMC(SDHC Ver. 1.2 revised edition)
- Memory Stick, Memory Stick pro
- xD Picture Card Controller
- 1394 Controller
- BGA Package

VGA

Graphics interface in North Bridge (Intel Calistoga GMS) is used

 Sound Controller

- Azalia Link(Intel ICH7-M built in)
- Real Tec ALC262
- Internal speaker
- volume control
- Supports VoIP
- Stereo headphone jack
- External microphone jack
- Built-in microphone

 Modem Controller

- One MDC is used.
- This controller has the following functions:
 - One RJ11 port
 - Azalia MDC1.5
 - V.92 (V.90) 56K Modem/FAX
 - Ring wake up support

 Internal 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.
 - Supports
 - Gigabit Ethernet: Gigabit Intel Vidaria
 - One RJ45 port(non LED)
 - Supports WOL
 - Supports Magic Pocket

Wireless LAN

- One PCI-Ex MiniCard
- Intel Golan b/g, Golan a/b/g, Intel Kedlon a/b/g/n, Atheros b/g, Atheros a/b/g
- Supports Wireless Communication SW

Bluetooth

- V2.0+EDR

Sensor

- Thermal Sensor: One ADM1032ARMZ chip is used.
- LCD Sensor:.
- Acceleration Sensor

1.3 3.5-inch Floppy Disk Drive (USB External)

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

The FDD is shown in figure 1-4. The specifications for the FDD are listed in Table 1-1.

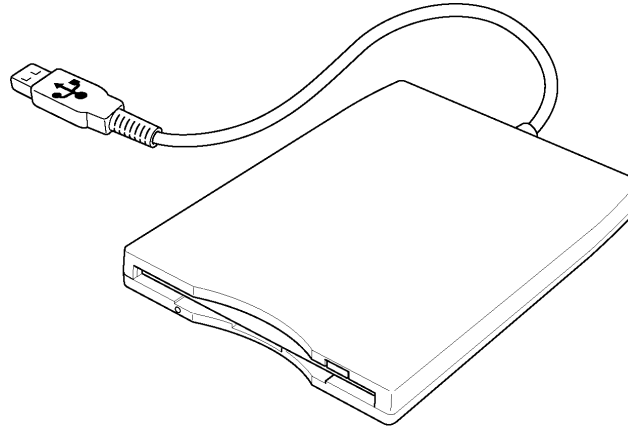


Figure 1-4 3.5-inch FDD (USB External)

Table 1-1 3.5-inch FDD specifications

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

1.4 2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads.

The computer supports a 60GB, 80GB, 120GB or 160GB.

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

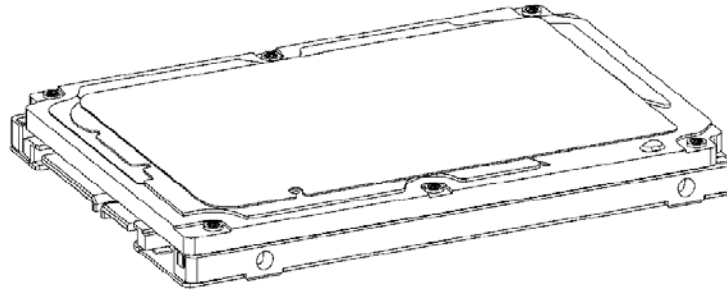


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD specifications

Items		Specifications			
		TOSHIBA HDD2D63BZL01	TOSHIBA HDD2D61BZL01	TOSHIBA HDD2D62BZL01	TOSHIBA HDD2D60BZL01
Outline Dimensions	Width (mm)	100.0			
	Height (mm)	9.5			
	Depth (mm)	69.85			
	Weight (g)	98 max		102 max	
Storage size (formatted)		60GB	80GB	120GB	160GB
Speed (RPM)		5,400			
Data transfer speed		335-613(Mbits/s)			
Internal Transfer rate		300 (Mbytes/s)			
Host Transfer rate					
Data buffer size		8,192Kbyte			
Motor startup time (s)		3.5 typical 9.5 max			

1.5 1.8-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 1.8-inch magnetic disk and mini-Winchester type magnetic heads.

The computer supports a 40GB or 100GB.

The HDD is shown in figure 1-6. Specifications are listed in Table 1-3.

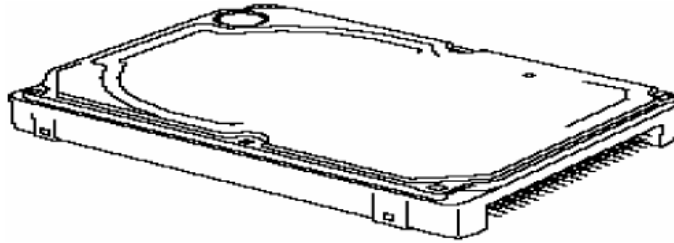


Figure 1-6 1.8-inch HDD

Table 1-3 1.8-inch HDD specifications)

1.8-inch HDD Specifications

Items		Specifications	
		TOSHIBA HDD1682BZM01	TOSHIBA HDD1789BZM01
Outline Dimensions	Width (mm)	54.0±0.2	
	Height (mm)	5.0±0.35	8.0±0.35
	Depth (mm)	71.0±0.3	
	Weight (g)	48 max	59 max
Storage size (formatted)		40GB	100GB
Speed (RPM)		4,200	
Internal Transfer rate(Mbits /s)		165.0-356.8	176.90-382.9
Host interface transfer rate (Mbytes/s)		100(Ultra DMA mode) 16.6(PIO mode)	
Data buffer size (MB/s)		8	
Motor startup time (s)		3.5 typical 20 max	

1.6 DVD-Super Multi Drive Optical Drive (ODD)

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

The specifications are listed in Table 1-4.

Table 1-4 DVD Super Multi drive specifications

Item		Specifications
		MATSUSHITA G8CC0003K220
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	7.0 (excluding projections)
	Depth (mm)	127.0 (excluding projections)
	Mass (g)	87±5(bezel included)
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW DVD-R DVD-RW DVD+R DVD+RW DVD-RAM		Max. 16x ZCLV Max. 10x CLV (Ultra speed) Max. 8x ZCLV Max. 4x ZCLV Max. 8x ZCLV Max. 4x ZCLV Max. 3x ZCLV (4.7GB)
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Data Buffer Capacity		2MB
Access time (ms) CD-ROM DVD-ROM		220msec typ. 220msec typ.
Supported Disks		CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+RW, DVD-R DL(Read only), DVD+R, DVD+R DL(Read only)
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, CD-Extra(CD+), CD-text, Video CD DVD: DVD-R, DVD-RW (Ver. 1.1, 1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM, DVD-ROM DVD-R DL(Read only, DVD+R DL(Read only)

1.7 Keyboard

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

Figure 1-7 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



Figure 1-7 Keyboard

1.8 TFT Color Display

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

1.8.1 LCD Module

The LCD module used for the TFT color display uses a white LED backlight as the light source and can display a maximum of 16M colors with 1,200 x 800 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.

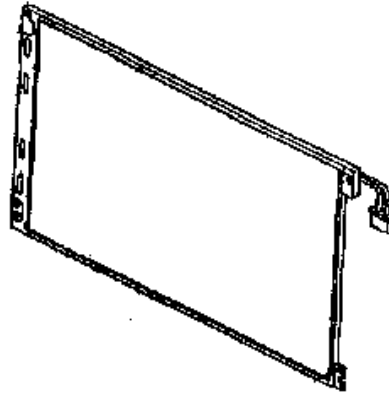


Figure 1-8 LCD module

Table 1-5 LCD module specifications

Item	Specifications
	12.1-inch WXGA TFT (TMD G33C00047110/210)
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)

1.9 Power Supply

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

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

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

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

Name	Power supply (Yes/No)				
	Voltage [V]	Power OFF(Suspend mode)	Power OFF (Hibernation mode)	No Battery	Object
0R9-P0V	0.9	NO	NO	NO	DDR2-SDRAM
1R5-E1V	1.5				
1R5-P1V	1.5	NO	NO	NO	CPU, GMCH, ICH7-M, PCIe Mini Card
1R8-B1V	1.8	Yes	NO	NO	GMCH, DDR2-SDRAM
2R5-E2V	2.5				
2R5-P2V	2.5	NO	NO	NO	GMCH, ICH7-M, LCD
A4R7-P4V	4.7	NO	NO	NO	ALC262
AT-E3V	3.3	Yes/NO	Yes/NO	NO	Finger Sensor
BT-P3V	3.3	NO	NO	NO	Bluetooth
DDC-P5V	5	NO	NO	NO	CRT
D-E3V	3.3	Yes	Yes/NO	NO	Dock
D-E5V	5	Yes	Yes/NO	NO	Dock
E3V	3.3	Yes	Yes/NO	NO	ICH7-M, PCI-e Mini Card(WLAN, 3G), Finger Sensor
E5V	5	Yes	Yes/NO	NO	ICH7-M, USB Power
FS-E3V	3.3	Yes/NO	Yes/NO	NO	Finger Sensor
LAN1R2-E1V	1.2	Yes	Yes/NO	NO	LAN
LAN2R5-E2V	2.5	Yes	Yes/NO	NO	LAN
LAN-E3V	3.3	Yes	Yes/NO	NO	LAN
LEDBL-PYV	15~20	NO	NO	NO	LCD(LED Backlight)
M5V	5	Yes	Yes	NO	LED
MCV	5	Yes	Yes	NO	PSC
MCVCCA-PYV	5/3.3	NO	NO	NO	PC Card Slot
MCVPPA-PYV	5/3.3	NO	NO	NO	PC Card Slot
MR0R9-B0V	0.9	Yes	NO	NO	GMCH, DDR2-SDRAM
MRVREF-B0V	0.9	Yes	NO	NO	DDR2-SDRAM
ODD2R5-P2V	2.5	NO	NO	NO	USB-IDE Bridge
ODD-P3V	3.3	NO	NO	NO	USB-IDE Bridge
ODD-P5V	5	NO	NO	NO	ODD
OVCVDA-E3V	3.3	Yes/NO	Yes/NO	NO	Finger Sensor

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

Name	Power supply (Yes/No)				
	Voltage [V]	Power OFF(Suspend mode)	Power OFF (Hibernation mode)	No Battery	Object
P3V	3.3	NO	NO	NO	Clock Generator, Thermal Sensor, GMCH, SDRAM(SPD), ICH7-M, HDD(1.8"), PC-Card Cont. , PC-Card Power, TPM, LCD, ALC262, AN12945A, SPI Flash
P5V	5	NO	NO	NO	ICH7-M, ODD, HDD(SATA), PC-Card Power, LED, KB, PAD, CRT, FAN, LED Backlight, AN12945A
PNL-P2V	2.5	NO	NO	NO	LCD
PPV	1.500 - 0.300	NO	NO	NO	CPU
PTV	1.05	NO	NO	NO	Clock Generator, CPU, GMCH, ICH7-M
R3V	2.0 - 3.5	Yes	Yes	Yes	ICH7-M(RTC)
S3V	3.3	Yes	Yes	NO	EC/KBC
SD-P3V	3.3	NO	NO	NO	SD Slot
UIMPWR-E3V	3.3	Yes	Yes/NO	NO	SIM Slot(3G)
VDDA-E3V	3.3	Yes/NO	Yes/NO	NO	Finger Sensor
WFLN-E3V	3.3	Yes	Yes/NO	NO	WLAN
WIMPWR-E3V	3.3	Yes	Yes/NO	NO	SIM Slot(WiMax)
WLAN-E3V	3.3	Yes	Yes/NO	NO	WLAN
WLAN-P1V	1.5	NO	NO	NO	WLAN
VDDA-E3V	3.3	Yes/NO	Yes/NO	NO	Finger Sensor

1.10 Batteries

The computer has three types of batteries as follows:

- Main battery pack
- RTC battery

The battery specifications are listed in Table 1-7.

Table 1-7 Battery specifications

Battery name		Material	Output voltage	Capacity
Main battery	G71C00085110/210	Lithium-Ion	10.8 V	2,900 mAh
	G71C00086110/210	Lithium-Ion	10.8 V	5,800 mAh
RTC battery	GDM710000041	NiMH	2.4 V	15mAh

1.10.1 Main Battery

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

1.10.2 Battery Charging Control

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

Battery Charge

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

Table 1-8 Time required for charges

Battery type	Power on (hours)	Power off (hours)
Battery(2,900 mAh)	About 5.0 to 7.5	About 5.0
Battery(5,800 mAh)	About 6.5 to 15.0	About 5.0

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

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

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

Detection of full charge

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

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

1.10.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-9 lists the charging time and data preservation period of the RTC battery.

Table 1-9 RTC battery charging/data preservation time

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

1.11 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-10 lists the AC adapter specifications.

Table 1-10 AC adapter specifications

Parameter	Specification
	G71C0004A510(3-pin) / G71C00062210(2-pin)
Power	60W (Peak 75W)
Input voltage	100V/240V
Input frequency	50Hz to 60Hz
Input current	1.5A or less (100V-240V 4Aload)
Output voltage	15V
Output current	0A to 4A (At constant voltage mode)

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

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

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

The Diagnostics Disk operations are described in Chapter 3. Detailed Replacement Procedures are given in Chapter 4, *Replacement Procedures*.

The following tools are necessary for implementing the troubleshooting procedures:

The following tools are necessary for implementing the Diagnostics procedures:

For tools required for executing the Test Program, refer to the Chapter3. For tools required for disassembling/assembling, refer to the Chapter 4.

1. A set of tools for debugging port test (test cable, test board, RS-232C cross cable, display, D port FD)
2. A PC with a serial port (for displaying debug port test result)
3. DOS system FD
4. An external CRT display(for Display trouble shooting)
5. A SD card(for SD card slot trouble shooting)
6. An external microphone(for Sound trouble shooting)
7. Headphone(for Sound trouble shooting)

2.2 Troubleshooting Flowchart

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

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Make sure that Toshiba Windows is installed on the hard disk. Non-Toshiba operating systems can cause the computer malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the USB FDD and optical drive are empty.

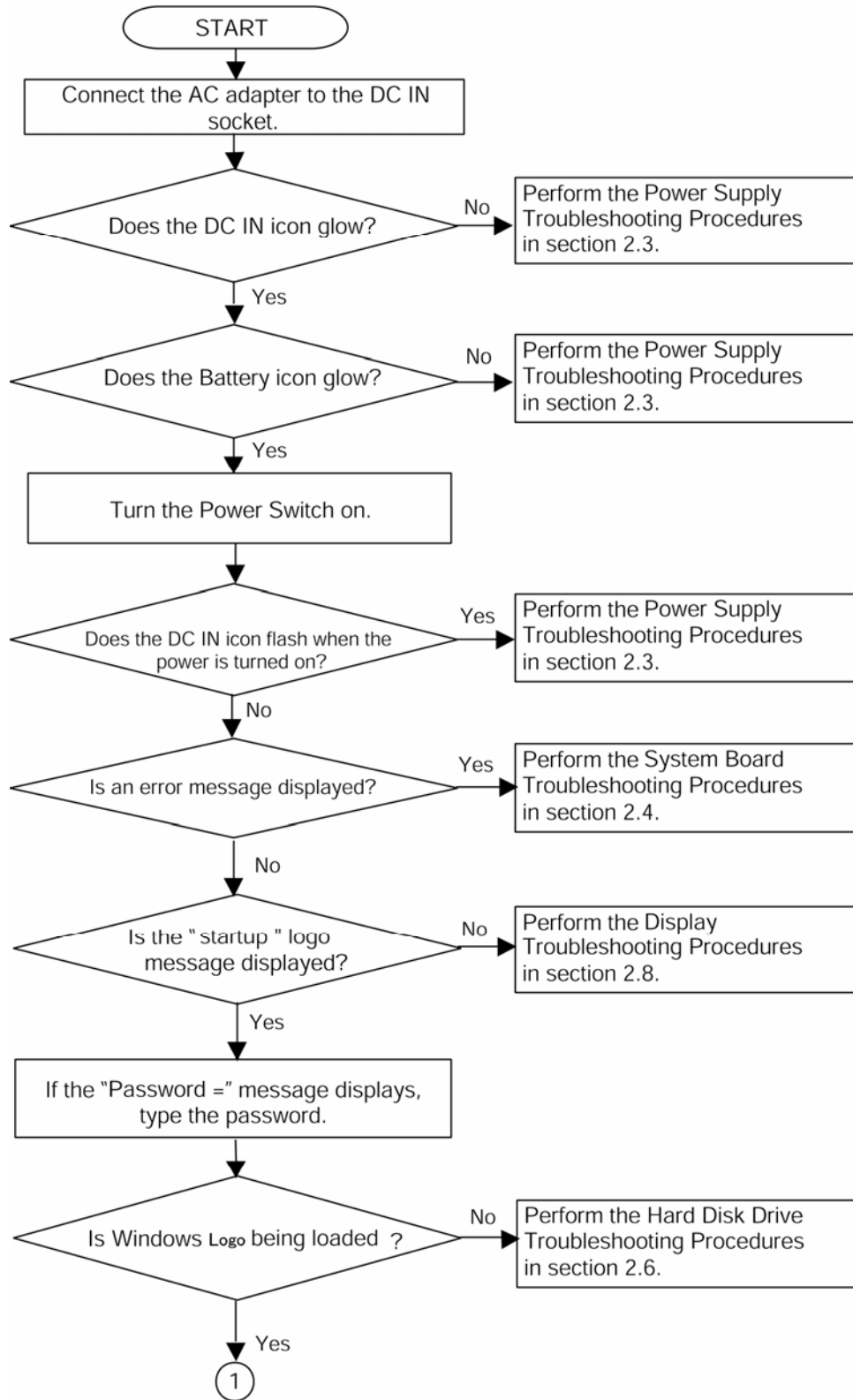


Figure 2-1 Troubleshooting flowchart (1/2)

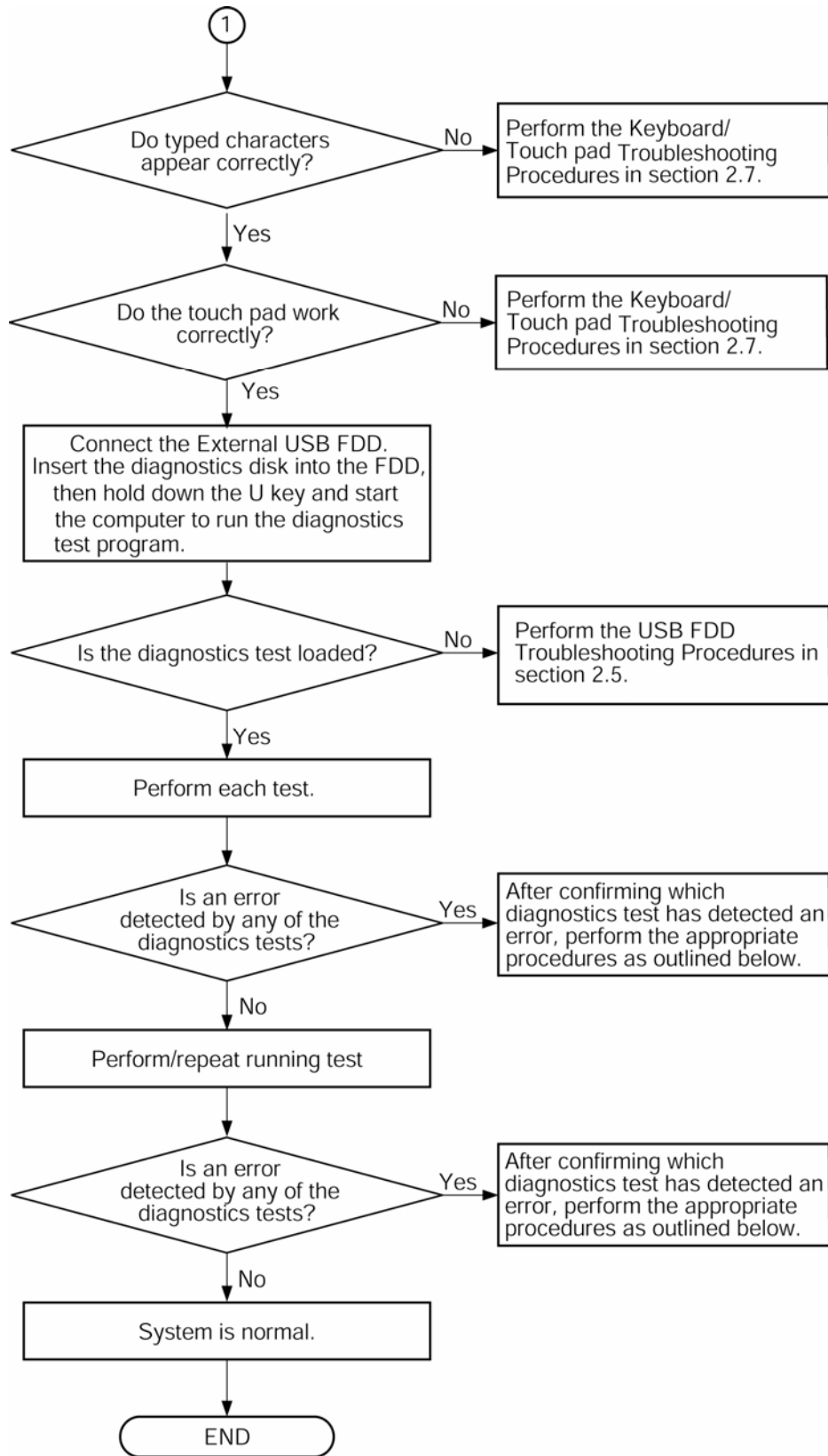


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, real timer test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the keyboard test, perform the Keyboard and Dual point Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the Bluetooth test, perform the Bluetooth Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.14.
12. If an error is detected on SD card, perform the SD Card Slot Troubleshooting Procedures in Section 2.15.
13. If an error is detected on Fingerprint sensor, perform the Fingerprint sensor Troubleshooting Procedures in Section 2.16.

2.3 Power Supply Troubleshooting

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

- Procedure 1: Icons in the LCD Check
- Procedure 2: Error Code Check
- Procedure 3: Connection Check
- Procedure 4: Charge Check
- Procedure 5: Replacement Check

Procedure 1 Icons in the LCD Check

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

- Battery icon
- DC IN icon

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

Table 2-1 Battery icon

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

Table 2-2 DC IN icon

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

Procedure 2 Error Code Check

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

The error code begins with the least significant digit.

Table 2-3 Error code

Error code	Where Error occurs
1*h	AC Adaptor
2*h	1st Battery
3*h	2nd Battery
4*h	S3V output
5*h	E5V output
6*h	E3V output
7*h	1R5-E1V output
8*h	1R8-B1V output
9*h	PPV output
A*h	PTV output
B*h	1R5-E1V output
C*h	1R8-B1V output
D*h	PPV output
E*h	PTV output
F*h	-

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

AC Adaptor

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	Express Port Replicator voltage is over 16.5V.
12h	Current from the DC power supply is over 6.60A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	The compensation value of [0A] is not within the limits from design data (+/- 481mA).

1st Battery

Error code	Meaning
22h	1st battery discharge current over 0.5A when there is no load.
23h	1st battery charge current is over 3.5A in charging.
24h	The compensation value of [0A] is not within the limits from design data (+/- 400mA).
25h	1st battery charge current is over 0.3A in not charging.

2nd Battery

Error code	Meaning
32h	2nd battery discharge current is over 0.5A when there is no load.
33h	2nd battery charge current is over 2.7A in charging.
34h	The compensation value of [0A] is not within the limits from design data (+/- 400mA).
35h	2nd battery charge current is over 0.3A in not charging.

S3V output

Error code	Meaning
40h	S3V voltage is over 3.47V when the computer is powered on/off.
45h	S3V voltage is under 3.14V in normal conditions.
46h	S3V voltage is under 3.14V when the computer is booting up.

❑ E5V output

Error code	Meaning
50h	E5V voltage is over 6.00V when the computer is powered on/off.
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 and OUTV1=EV is designated.

❑ E3V output

Error code	Meaning
60h	E3V voltage is over 3.96V when the computer is powered on/off.
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 2.81 V when EV power is maintained.

❑ 1R5-E1V output

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

❑ 1R8-B1V output

Error code	Meaning
80h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
81h	1R8-B1V voltage is under 1.53V when the computer is powered on.
82h	1R8-B1V voltage is under 1.53V when the computer is booting up.
84h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV 4 =BV is designated.

PPV output

Error code	Meaning
90h	PPV voltage is over 1.80V when the computer is powered on/off.
91h	PPV voltage is under 0.32V when the computer is powered on.
92h	PPV voltage is under 0.32V when the computer is booting up.

PTV output

Error code	Meaning
A0h	PTV voltage is over 1.26V when the computer is powered on/off.
A1h	PTV voltage is under 0.89V when the computer is powered on.
A2h	PTV voltage is under 0.89V when the computer is booting up.

1R5-E1V output

Error code	Meaning
B0h	1R5-E1V voltage is over 1.80V when the computer is powered on/off.
B1h	1R5-E1V voltage is under 1.275V when the computer is powered on.
B2h	1R5-E1V voltage is under 1.275V when the computer is booting up.
B4h	1R5-E1V voltage is under 1.275V when EV power is maintained and OUTV7=EV is designated.

1R8-B1V output

Error code	Meaning
C0h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
C1h	1R8-B1V voltage is under 1.53V when the computer is powered on.
C2h	1R8-B1V voltage is under 1.53V when the computer is booting up.
C4h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV8=BV is designated.

PPV output

Error code	Meaning
D0h	PPV voltage is over 1.80V when the computer is powered on/off.
D1h	PPV voltage is under 0.32V when the computer is powered on.
D2h	PPV voltage is under 0.32V when the computer is booting up.

PTV output

Error code	Meaning
E0h	PTV voltage is over 1.26V when the computer is powered on/off.
E1h	PTV voltage is under 0.89V when the computer is powered on.
E2h	PTV voltage is under 0.89V 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 adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:
- Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

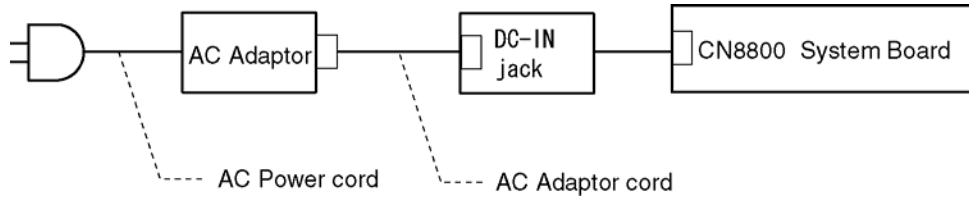
Check 3 In the case of error code 2Xh:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

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

Procedure 3 Connection Check

The power supply wiring diagram is shown below:



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

- Check 1 Disconnect the AC power cord from the wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.
- Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN jack socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure the DC IN jack is firmly connected to the connector CN8800 on the system board.
- If the DC IN jack is not firmly connected, go to Procedure 5.
 - If it is connected, go to Check 4.
- Check 4 Use a multimeter to make sure the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.
- Check 5 Connect a new AC adaptor or AC power cord.
- If the DC IN icon does not light, go to Procedure 5.
 - If the battery icon does not light, go to Check 6.
- Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4 Charge Check

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

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test, go to System test and execute subtest 04 (Quick charge) described in Chapter 3.
4. When charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

Table 2-4 Result code

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

- Check 1 Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).
- Check 2 Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.
- Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.
- Check 5 Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

Procedure 5 Replacement Check

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

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

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

2.4 System Board Troubleshooting

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

The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Printer Port LED Check on Boot Mode

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

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

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If DOS or Windows is properly loaded, go to Procedure 3.

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

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

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

- (a) *** Bad HDD type ***
Check system. Then press [F1] key
- (b) *** Bad RTC battery ***
Check system. Then press [F1] key
- (c) *** Bad configuration ***
Check system. Then press [F1] key
- (d) *** Bad memory size ***
Check system. Then press [F1] key
- (e) *** Bad time function ***
Check system. Then press [F1] key
- (f) *** Bad check sum (CMOS) ***
Check system. Then press [F1] key
- (g) *** Bad check sum (ROM) ***
Check system. Then press [F1] key

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

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

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

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

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

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

Procedure 2 Debugging Port Check (Boot Mode)

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

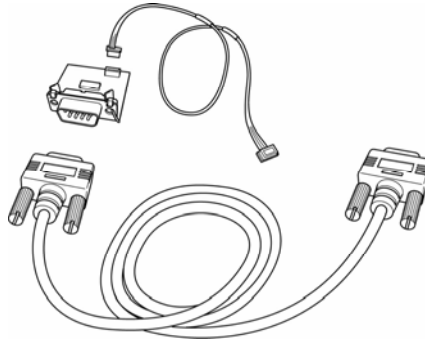
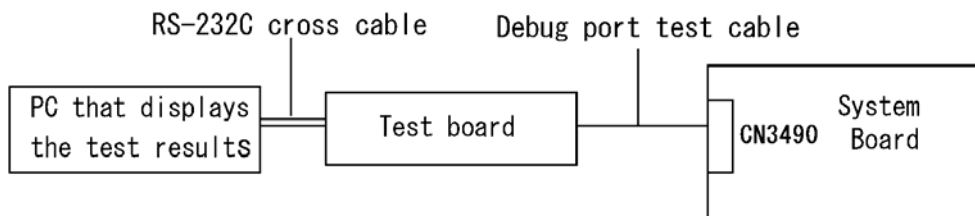


Figure 2-2 Debug port (Boot mode) error status

The test procedures are follows:

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



4. Boot the computer in 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_INI\SYSI_START
D port status	Contents of process
Time (second) to process	

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

Table 2-5 Debug port (Boot mode) error status (1/10)

D port status	Inspection items	Details
Boot block	Permission of A20 and Clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCH and ICH	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of 3rd Bus data	
F000H	Only PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite factor flag initialization	
	CHECK SUM CHECK	Transition to protected mode
		Boot block checksum (skip when returned to S3) (halts when error)
	Checksum other than boot block (skip when returned to S3)	
F001H	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process"
	Transition to system BIOS IRT (when returned to S3)	
	Key input	
	When a key is pressed, check if it is Tilde key or Tab key	
F002H	Initialization of SC	
F005H		
F006H	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
F007H	BIOS signature check	
F008H	Transits to System BIOS IRT	
	BIOS rewrite process	Initialization of ICHM. D31
		DRAM configuration
		Permission of cache (L1 cache only)
	Memory clear	
F009H		Transition to real mode and copy of BIOS to RAM

Table 2-5 Debug port (Boot mode) error status (2/10)

D port status	Inspection items	Details
F00AH	Saving key scan code	
	A setup of TASK_1 second_TSC	
F00BH	Controlling fan	
	Initializing sound items (for BEEP)	Permission of system speaker
		Releasing mute
		Making the volume max (model that can control volume)
When request BIOS, EC/KBC rewriting	Blinks green (cycle:2s, on:1s, off:1s)	
F00CH	BIOS ROM error	Blinks orange (cycle: 2s(On:1s,Off:1s))
	Key input	Prohibition of USB
		BEEP
		Waiting for key input
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset
		Setting parameters for 2HD(1.44MB)
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.
		Setting of parameters for 2DD (720KB)
		Retrieval of "CHGBIOSA.EXE" from the root directory. Directory start header and calculates the sector Read 1 sector of the root directory
		Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.
		Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" Key input when error occurred
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"		

Table 2-5 Debug port (Boot mode) error status (3/10)

D port status	Inspection items	Details
F100H	Cash control processing for HyperThreading	
	Prohibition of cache	
	Initialization of H/W (before DRAM recognition)	Initialization of MCHM
		Initialization of ICH7M.D30.Func0
		Initialization of ICH7M.D31.Func1
		Initialization of USB.Func0/1/2/7
		Initialization of ICH7M.D31.Func3
		Initialization of ICH7M.D31.Func5
	Initialization of FLUTE	
	Initialization of PIT channel 1	(Setting the refresh interval to "30 μ s")
F101H	Check of DRAM type and size (at cold boot)	When unsupported memory is connected, becoming HLT after beep sound (HLT when DRAM size is 0)
	SM-RAM stack area test	HLT When it can not be used as a stack
F102H	Cache configuration	
	Cache permission (L1/L2 Cache)	
	CMOS access test (at cold boot)	(HLT when an error is detected)
	Battery level check of CMOS	
	CMOS checksum check	
	Initialization of CMOS data (1)	
	Setting of IRT status	(Setting of boot status and IRT busy flag, The rest bits are 0)
	Storing DRAM size in CMOS	
F103H	Resume branch (at cold boot)	Not resume when a CMOS error occurred
		Not resume when resume status code is not set
		Resume error check
		S3 returning error (ICH) Resume error F170H RSM_UNKNOWN_ERR
		SM-RAM checksum check Resume error F173H RSM_SMRAM_ERR

Table 2-5 Debug port (Boot mode) error status (4/10)

D port status	Inspection items	Details
(F103)		Check of memory configuration change Resume error F174H RSM_SYSMEM_ERR
		RAM area checksum check in system BIOS Resume error F179H SM_RAMBIOS_ERR
		Expansion memory checksum check Resume error F176H RSM_EXTMEM_ERR
		PnP RAM checksum check Resume error F177H RSM_PNPRAM_ERR
	Transition to RESUME-MAIN	
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Turning area of C0000h to EFFFFh to PCI (Prohibition of DRAM)
Setting of resume error request		
Copying ROM/RAM of system BIOS	(HLT, when error occurs)	
F104H	BIOS signature check (case of cold boot)	
F105H	SMRAM initialization	
	Check of CPU for HyperThreading	
	Microcode Update	
	APIC initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	

Table 2-5 Debug port (Boot mode) error status (5/10)

D port status	Inspection items	Details
F106H	Initialization of devices which need initialization before PCI bus initialization	PIT test (Cold boot only) and initialization Setting of test pattern to channel 0 of PIT#0 Check whether the set test pattern can be read Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms) Initialization of PIT channel 2 (Setting of the sound generator frequency to 664Hz) Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval) HLT, when the time is out Test of PIT channel 2 (Check whether the speaker gate works normally)
		CPU clock measurement
		Check of parameter block A
		Permission of SMI except auto-off function
		Control of excess of rated input power
		Battery discharging current control (1CmA)
		AC adapter rated over current control
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		CPU Initialization Judgment of CPU type Check of supporting Geyserville Make CPU clock High Graphics Aperture Size setup
F107H	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or other than Japan) based on DMI data	
	CMOS default setting check	Sets default setting if bad battery or bad checksum (ROM, CMOS) is detected
	ACPI table initialization (for execution of option ROM)	

Table 2-6 Debug port (Boot mode) error status (6/10)

D port status	Inspection items	Details
(F107H)	Initialization of devices which need initialization before PCI bus initialization	Saving drive mode of AC97/Azalia
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Sound initialization
		PC multi-box status acquisition
		HC initialization, USB device connection recognition and initialization
		Control of built-in LAN permission/prohibition
	PIC initialization	
	PIC test	
	Password Initialization	
F108H	PCI bus initialization	(connection of DS Bus)
	Initialization of LAN information	
	Check of WakeUp factor	
F109H	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
F10AH	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
Acquisition of PCI IRQ		

Table 2-5 Debug port (Boot mode) error status (7/10)

D port status	Inspection items	Details
(F10AH)		Configuration
		Saving of VGA configuration result
F10BH		Task generation for waiting PCI_CONFIGURATION completion
		Initialization of H/W needed after PCI configuration
		HDD initialization sequence start
		Enabling power off
	Output code generation	
F10CH	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10DH	INIT_INT_VECTOR	(Initialization of vectors)
F10EH	INIT_NDP	(Initialization of NDP)
F10FH	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
F110H	INIT_DISPLAY	(Waiting for VGA chip initialization completion, VGA BIOS initialization)
F111H	VGA POST	
F113H	IDISP_LOGO	(Displaying logo)
F114H	SYS_MEM_CHECK	(Check of convention memory)(Boot)

Table 2-5 Debug port (Boot mode) error status (8/10)

D port status	Inspection items	Details
F115H	EXT_MEM_CHECK	(Check of exception in the protected mode)(Boot)
F116H	Exception check in the protected mode INIT_SYS_MEM	Dport=F117h when error occurs Initialization of conventional memory (Reboot)
F118H	CHK_DMA_PAGE	(Check of DMA Page Register) (Boot)
F119H	CHECK_DMACH	(Initialization of DMACH) (Boot)
F11AH	INIT_DMACH	(Initialization of DMA) (Boot)
F11CH	CHECK_SIO	(Check of SIO) (For models supporting SIO)
F11DH	BOOT_PASSWORD	(Check of password) (In the case of "Reboot") Waiting for HDD initialization completion Check of key input during IRT (waiting for KBC initialization completion) Initialization of ATA priority (In the case of "Boot") BM loading process (for models supporting fingerprint authentication) Initialization of BM (for models supporting fingerprint authentication) Check of key input during IRT (waiting for KBC initialization completion) Input of password BM opening (for models supporting fingerprint authentication)

Table 2-5 Debug port (Boot mode) error status (9/10)

D port status	Inspection items	Details
F11FH	EX_IO_ROM_CHECK	(Check of option I/O ROM)
F120H	PRE_BOOT_SETUP	<p>Saving of value in 40:00h (for SIO saving/restoring)</p> <p>Setting of font address for resume password</p> <p>Setting of repeat parameter for USB KB</p> <p>Final check of key input during IRT</p> <p>Storing of T_SHADOW_RAM_SIZE</p> <p>Update of system resource just before booting</p> <p>Rewriting of memory map data of INT15h E820h function</p> <p>Waiting for AC-Link initialization completion</p> <p>Renewal of table for DMI</p> <p>Copying ACPI table to uppermost of extension memory</p> <p>waiting for writing completion of PSC Version BIOS</p> <p>Waiting for completion of setting clock generator When error occurred, halt at F121</p> <p>Waiting for completion of initialization of Serial port (for models supporting SIO)</p> <p>Cancel of NMI Mask</p> <p>TIT check sum</p> <p>Clear of the IRT flag of Runtime side</p> <p>Update of check sum of Runtime side</p> <p>Hibernation branch (for models supporting BIOS Hibernation)</p> <p>Initialization of Bluetooth (for models supporting Bluetooth)</p> <p>Check for existence of target maintenance card</p> <p>Prohibition of unused PC card not used</p> <p>Setting Wakeup status data for ACPI</p> <p>HW initialization just before booting, Waiting for initialization completion</p>

Table 2-5 Debug port (Boot mode) error status (10/10)

D port status	Inspection items	Details
F123H	IRT_SC_INT_END	<p>Notifies the DVI connection status to VGA BIOS (for models supporting DVI)</p> <p>Setting of battery save mode</p> <p>Setting of date</p> <p>Waiting for Bluetooth initialization completion (for models supporting Bluetooth)</p> <p>Update of DMI Wakeup factor, Update of SM-BIOS structure table</p> <p>PCI device configuration space close</p> <p>Cache control</p> <p>Renewal of the parameter block A</p> <p>Process for CPU</p> <p> Make the CPU clock to be set by SETUP</p> <p>Waiting of motor-off completion of disabled HDD</p> <p>Final decision of USB FDD drive information</p> <p>Post processing of PRE_BOOT_SETUP</p> <p>Clear of PWRBTN_STS</p> <p>Enabling POWER Button</p>
F124H	Clear of IRT status	
	Renewal of check sum of Runtime side	
FFFFH		

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

Procedure 3 Diagnostic Test Program Execution Check

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

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. Async test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. CD-ROM/DVD-ROM test
12. Wireless LAN test
13. Sound test
14. LAN/Modem/Bluetooth/IEEE1394 test

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

Procedure 4 Replacement Check

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

Check 1 Visually check for the following:

- a) Cracked or broken connector housing
- b) Damaged connector pins

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

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

2.5 USB FDD Troubleshooting

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

Procedure 1: USB FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check

Procedure 4: Replacement Check

Procedure 1 USB FDD Head Cleaning Check

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

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

If the test program cannot be executed, go to Procedure 3 and Procedure 4.

Procedure 2 Diagnostic Test Program Execution Check

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

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

Table 2-6 FDD error code and status

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

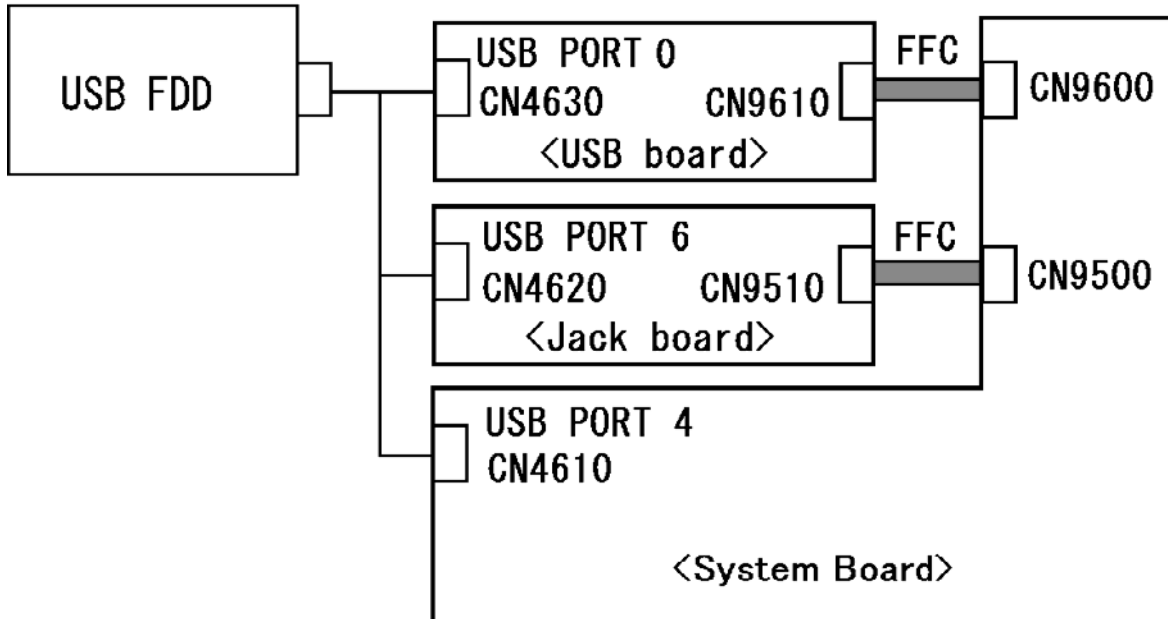
Check 1 If the following message appears, disable the write protect tab on the floppy disk. If any other message appears, perform Check 2.

Write protected

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

Procedure 3 Connector Check

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



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

Procedure 4 Replacement Check

The USB FDD or USB FDD cable may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform the following.

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

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

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

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

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

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

2.6 HDD Troubleshooting

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

Procedure 1: Message Check

Procedure 2: Partition Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

Procedure 1 Message Check

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

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

HDC ERROR (After 5 seconds this message will disappear.)

or

IDE #0 ERROR (After 5 seconds this message will disappear.)

or

IDE #1 ERROR (After 5 seconds this message will disappear.)

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

Insert system disk in drive
Press any key when ready

or

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

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

Procedure 2 Partition Check

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

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 3.
- Check 4 Remove the FD and restart the computer. If the problem still exists, go to Procedure 3.
- Check 5 Using the **SYS** command on the Toshiba DOS system disk, install system files on the HDD.

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

System transferred

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

Procedure 3 Format Check

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

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

Format complete

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

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

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

Format complete

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

Procedure 4 Diagnostic Test Program Execution Check

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

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

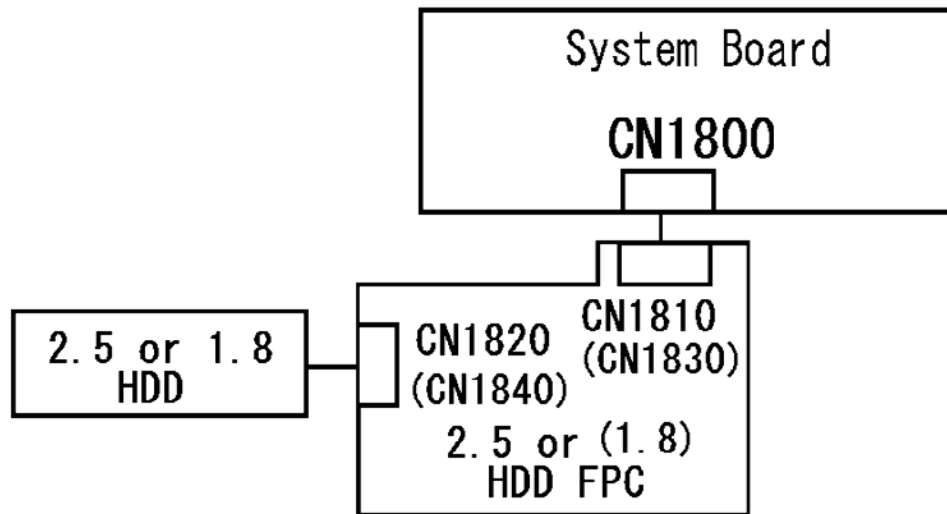
Table 2-7 HDD error code and status

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

Procedure 5 Connector Check and Replacement Check

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

Check 1 Make sure the HDD is firmly connected to CN1800 on the system board.



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

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

2.7 Keyboard and Dual point Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

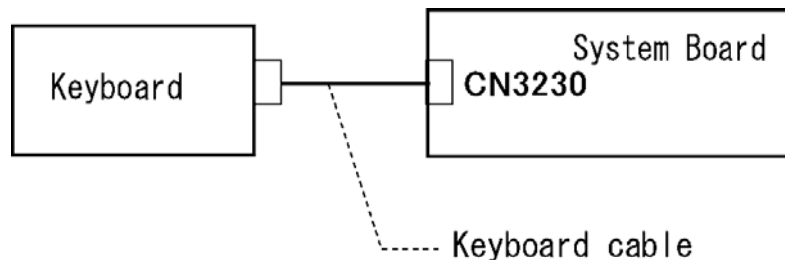
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

Procedure 2 Connector Check and Replacement Check

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

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

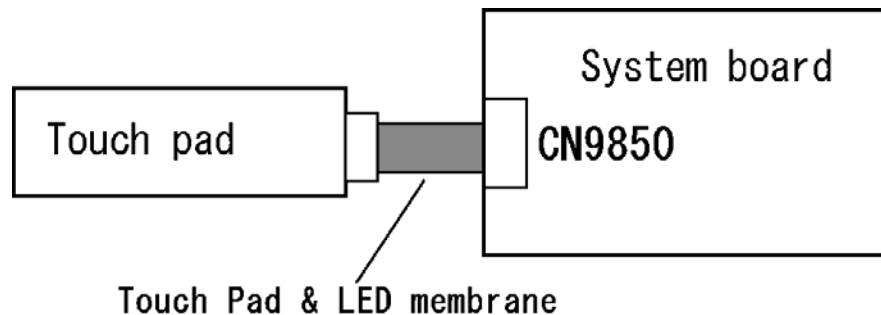
Check 1 Make sure the keyboard cable is securely connected to CN3230 on the system board.



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

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

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



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

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

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

2.8 Display Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Cable Check

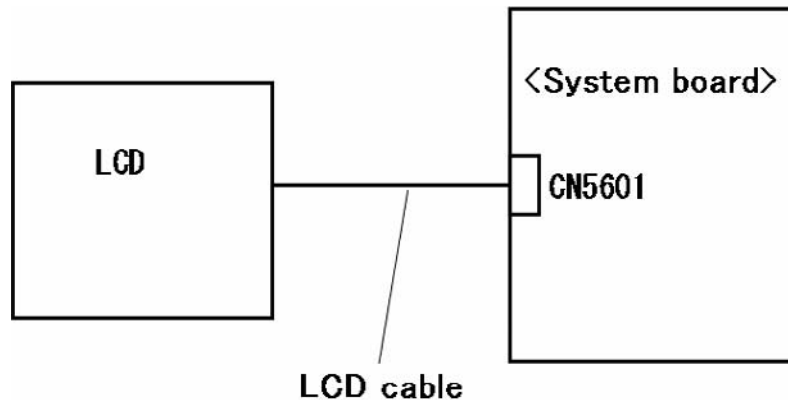
Procedure 3: Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

Procedure 2 Connector Check and Cable Check

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



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

Procedure 3 Replacement Check

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

- Check 1 Replace the LCD cable with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 2.
- Check 2 Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 3
- Check 3 The display controller on the system board may be damaged. Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.9 Optical Drive Troubleshooting

This section describes how to determine if the optical drive (Super Multi drive) in the Slim Select Bay is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The CD-ROM/DVD-ROM test program is stored in the Diagnostics Disk.

For the test, prepare test Media.

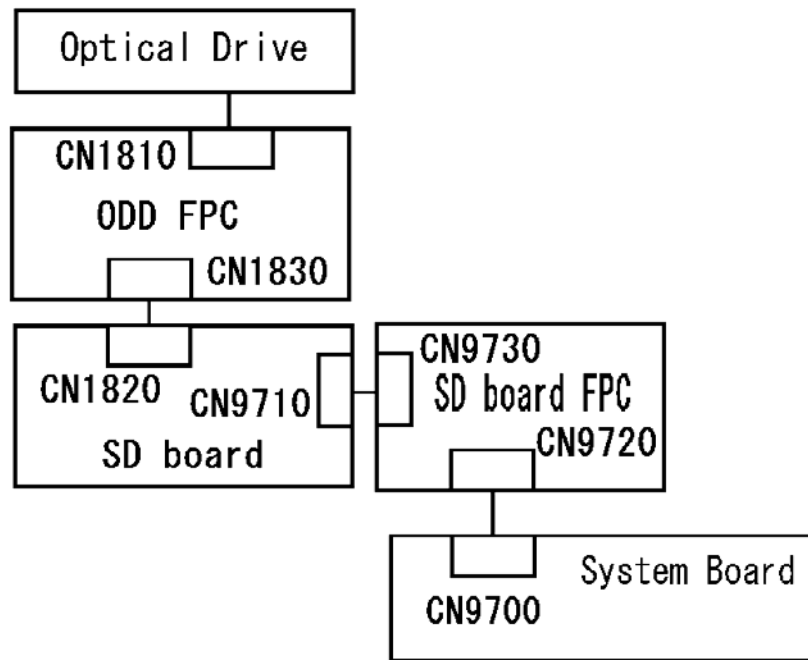
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

Procedure 2 Connector Check and Replacement Check

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

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



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

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

2.10 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

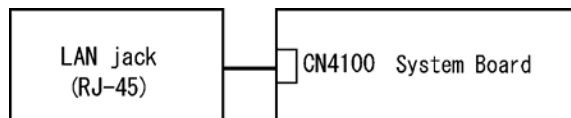
If any error is detected by the test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

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

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

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



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

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

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

2.11 Bluetooth Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connection Check

Procedure 3: Replacement Check

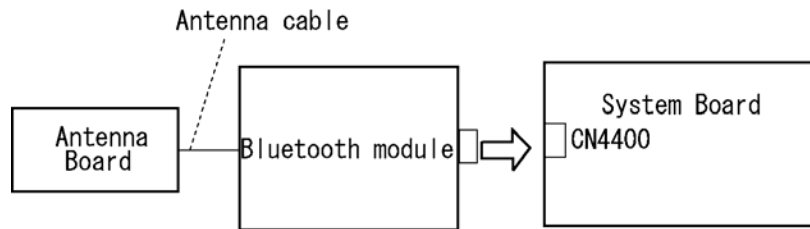
Procedure 1 Diagnostic Test Program Execution Check

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

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

Procedure 2 Connection Check

The Bluetooth function wiring diagram is shown below:



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

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

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

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

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

Procedure 3 Replacement Check

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

- Check 1 The Bluetooth module may be defective or damaged. Replace the Bluetooth module with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 2.
- Check 2 The Bluetooth antenna may be defective or damaged. Replace the Bluetooth antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 3.
- Check 3 The system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.12 Wireless LAN Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antenna Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

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

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

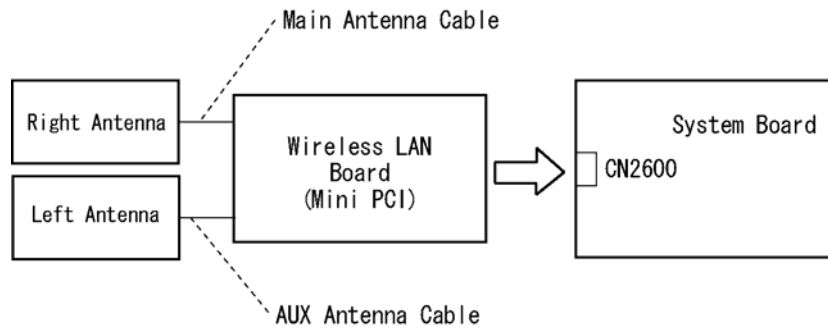
Check 1 Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN.

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

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

Procedure 2 Antenna Connection Check

The wireless LAN wiring diagram is shown below:



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

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

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

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

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

Procedure 3 Replacement Check

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

- Check 1 The wireless LAN board may be defective or damaged. Replace the board with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.
- Check 2 The wireless LAN antenna may be defective or damaged. Replace the antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 The system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

2.13 Sound Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

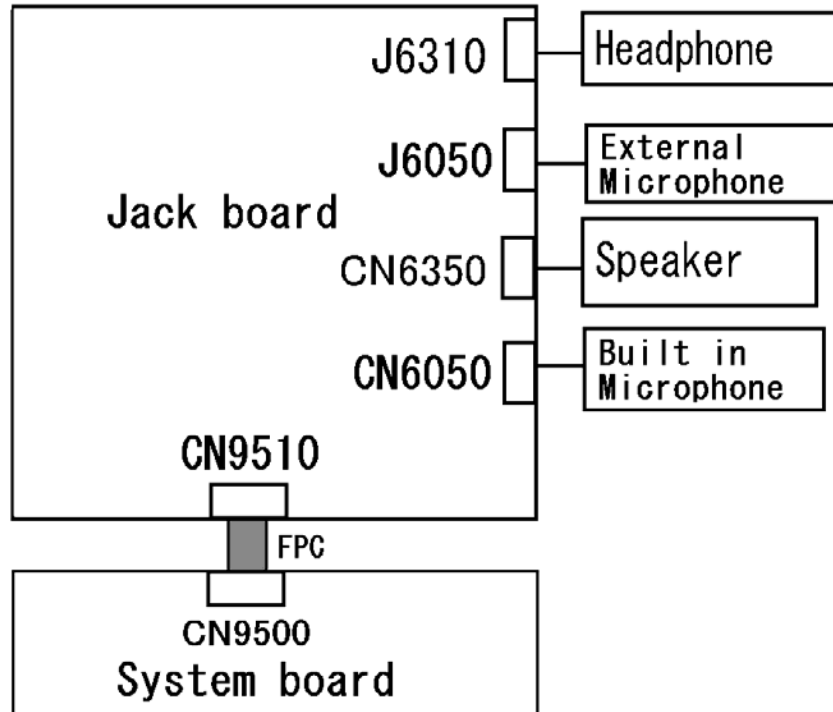
Procedure 1 Diagnostic Test Program Execution Check

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

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

Procedure 2 Connector Check

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



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

Procedure 3 Replacement Check

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

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

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

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

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

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

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

2.14 SD card Slot Troubleshooting

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

Procedure 1: Check on Windows OS

Procedure 2: Connector Check and Replacement Check

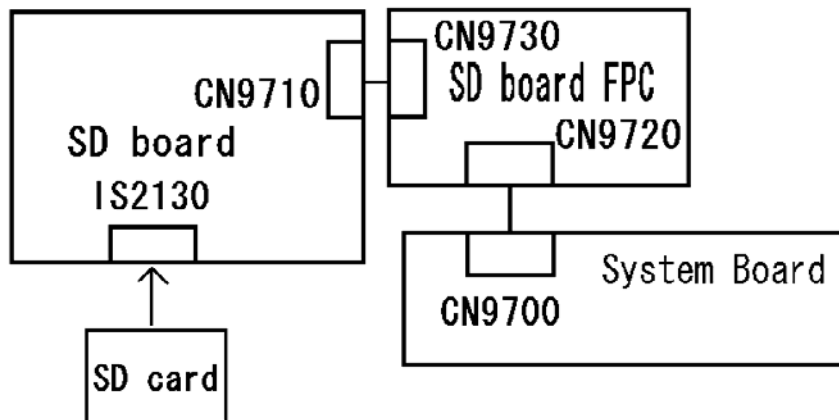
Procedure 1 Check on Windows OS

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

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

Procedure 2 Connector Check and Replacement Check

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



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

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

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

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

2.15 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

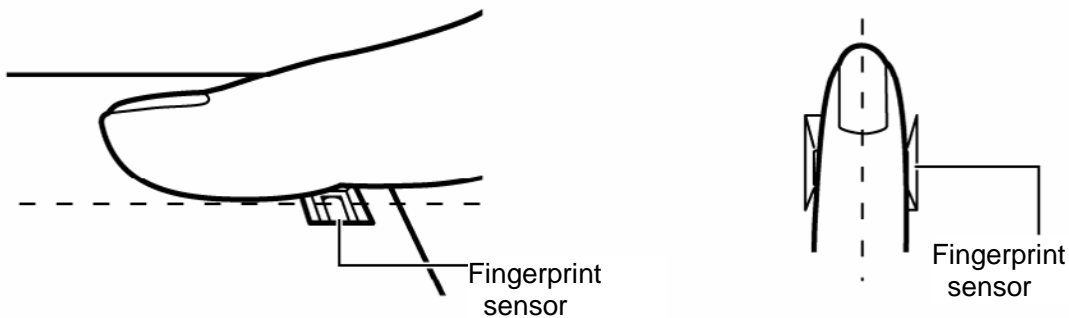
Procedure 2: Registration of fingerprint

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].

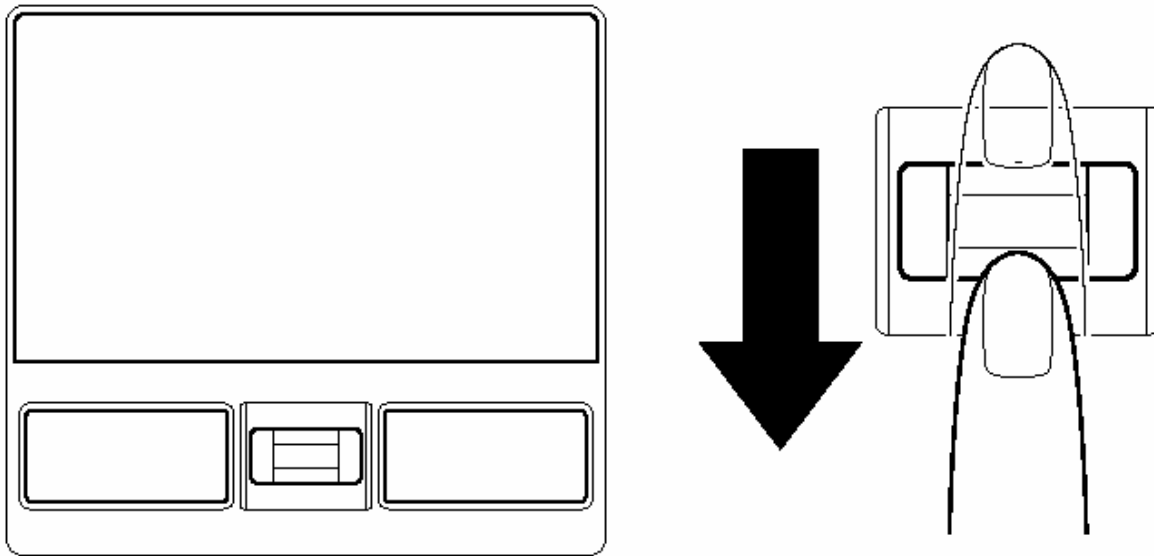
Procedure 2 Registration of fingerprint

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.



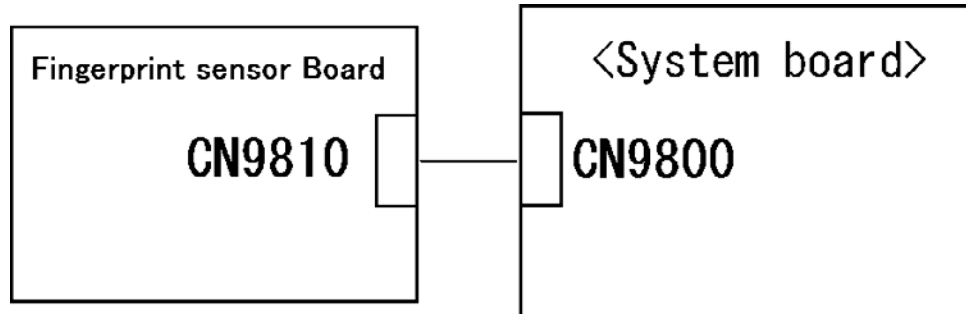
When authenticated, [Success] is displayed in the fingerprint authentication display.

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 cable is connected to the connector CN9810 on the Fingerprint sensor board and connector CN9800 on the system board.



- Check 1 Check the Fingerprint sensor cable is firmly connected to the connector CN9810 on the Fingerprint sensor board and connector CN9800 on the system board. If not, connect it firmly. If the Fingerprint sensor is still not functioning properly, perform Check 2.
- Check 2 The Fingerprint sensor cable may be faulty. Replace it with a new one. If the problem persists, perform Check 3.
- Check 3 The Fingerprint sensor board may be faulty. Replace it with a new one. If the problem persists, perform Check 4.
- Check 4 The system board may be faulty. Replace it with a new one.

Chapter 3

Tests and Diagnostics

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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 which write the hardware information or displays the current information of the computer. It is also included in one of Diagnostic Disks.

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

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

1. Check all cables are connected firmly.
2. Exit any application and close Windows.
3. Check if [All Devices] is selected in the "Device Config." in SETUP menu.

3.1.1 Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions.

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

The DIAGNOSTIC TEST MENU contains the following functional tests:

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

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

Other tests are:

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

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

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

3.1.2 H/W (Hardware) initial information setting tool

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

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

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

- The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

You will need the following equipment to perform this program.

- The Diagnostics Disk (Main T&D)

3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the USB floppy disk drive 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 DIAGNOSTIC PROGRAM is performed from the floppy disk.

Repair test program

- 1 Repair Main
- 2 Repair Initial config set
- 3 Repair Heatrun

Enter a chose...

To start the Diagnostics menu (T&D), press **1**, Repair Main and press **Enter**.

To start the H/W initial information setting tool, press **2**, Repair Initial config set and press **Enter**.

To start the Heatrun test, press **3**, Repair Heatrun and press **Enter**.

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

1. Before replacing, save the DMI information by executing subtest 03 DMI information save in 3.3 Setting of the hardware configuration.
2. Before replacing, apply the DMI information by executing subtest 04 DMI information recovery and subtest 08 System configuration in 3.3 Setting of the hardware configuration.

3.2.1 Diagnostics menu (T&D)

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

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

```
DIAGNOSTICS MENU :

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

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

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

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

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

```
DIAGNOSTIC TEST MENU :
```

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

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

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

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

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

```

SYSTEM TEST NAME      XXXXXX
XXXXXXXXX DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break]       : test end
[Ctrl]+[C]           : key stop

```

```

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

```

```

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

```

```

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

```

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

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

```

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

```

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

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

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

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

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

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

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                                1: Test end
                                2: Continue
                                3: Retry

```

These three selections have the following functions respectively:

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

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

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

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

3.2.2 H/W initial information setting tool

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

```

#####
#####   Repair Initial config set   #####
#####
*      1 ..... Initial configuration      *
*      2 ..... DMI information save       *
*      3 ..... DMI information recovery   *
*      4 ..... System configuration display *
*      5 ..... E2PROM test (MAC/GUID/DMI) *
*                                           *
*      9 ..... Exit to Repair test menu   *
*****
... Press test number [1-5,9] ?

```

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

3.2.3 Heatrun test program

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

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

3.3 Setting of the hardware configuration

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

NOTE: Connect USB FDD, when you perform the DIAGNOSTIC PROGRAM from the CD-ROM. DMI information on the subtest 03 is written in floppy disk.

Subtest 1 Initial configuration

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

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

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

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

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

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

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

Subtest 2 DMI information save

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

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

Subtest 3 DMI information recovery

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

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

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

Subtest 4 System configuration display

This subtest displays the information of the system configuration.

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

Press [Enter] key

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

Subtest 5 E2PROM test (MAC/GUID/DMI)

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

3.4 Heatrun Test

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

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

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

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

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

Press any key and return to the startup menu.

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

3.5 Subtest Names

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

Table 3-1 Subtest names (1/2)

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

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER [It is not supported]	01	Ripple pattern
		02	Function
		03	Wraparound
7	ASYNC	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
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

The following message will appear.

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

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

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

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

The following message will appear.

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

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

The following message will appear.

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

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

The following message will appear.

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

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

After a while, the fan rotating will stop.

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

Subtest 03 Geyserville

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

Subtest 04 Quick charge

This subtest checks the status for the quick charge.

Subtest 05 DMI read

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

```
*** DMI Data Display Ver X.XX ***  
Model Name       : XXXXXXXXXXXXX  
Version Number  : XXXXXXXXXXXXX  
Serial Number   : XXXXXXXXX  
Model Number    : XXXXXX-XXXXX  
PCN/BND number  : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
UUID Number     : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
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 = 1B30h) is prepared in the conventional memory. The data is made in the Write Buffer, the data in Write Buffer is written in the area of address of 1MB or after. The data is red in the Read Buffer and data is compared in area up to the maximum size.

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

3.8 Keyboard Test

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

Subtest 01 Pressed key code display

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

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

3.9 Display Test

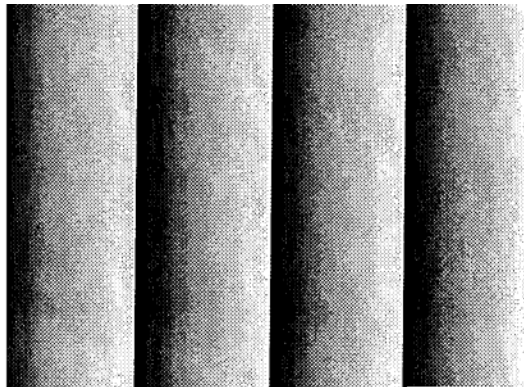
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

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

Subtest 02 Gradation for VGA

This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen, when this subtest is executed.



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

Subtest 03 Gradation for LCD

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

Subtest 04 Gradation & Mode test for VGA

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

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

The display below appears on the screen when this subtest is executed.



(Display example: Mode 12)

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

Subtest 05 All dot on/off for LCD

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

3.10 Floppy Disk Test

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

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

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

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

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

```
FLOPPY DISK          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
```

```
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       : XXXXXXX STATUS        : XXX
```

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

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

Subtest 01 Sequential read

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

Subtest 02 Sequential read/write

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

Subtest 03 Random address/data

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

Subtest 04 Write specified address

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

Subtest 05 Read specified address

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

3.11 Printer Test

NOTE: Printer Test is not supported for this model.

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

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

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

```
channel#1 = XXXXh
channel#2 = XXXXh
channel#3 = XXXXh
```

Select the channel number (1-3) ?

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

Subtest 01 Ripple pattern

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

```
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnop
:"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnop
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN0PQRSTUVWXYZ[\]^_`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[\]^_`abcdefghijklmnopq
rstuvwxyz{|}~

```

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

NOTE: Async Test is not supported for this model.

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

Subtest 01 and 02 require the following data format:

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

Subtest 01 FIR/SIR point to point (send)

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

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

Subtest 02 FIR/SIR point to point (receive)

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

Subtest 03 Wraparound (board)

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

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

3.13 Hard Disk Test

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

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

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

Refer to the operating system instructions.

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

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

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

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

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

HARD DISK TEST 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 number and the last two digits indicate the sector number.

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

Subtest 01 Sequential read

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

Subtest 02 Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03 Random address/data

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

Subtest 04 Cross talk & peak shift

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

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

Subtest 05 Partial Read

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

Subtest 06 Write specified address

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

Subtest 07 Read specified address

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

Subtest 08 Sequential write

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

Subtest 09 W-R-C specified address

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

3.14 Real Timer Test

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

Subtest 01 Real time

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

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

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

```
Enter new date:
```

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

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

3. The following messages will appear:

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

```
Enter new time:
```

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

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

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

Subtest 02 Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03 Real time carry

CAUTION: <i>When this subtest is executed, the current date and time are erased.</i>

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

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

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

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

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

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

3.15 NDP Test

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

Subtest 01 NDP

This test checks the following functions of NDP:

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

3.16 Expansion Test

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

Subtest 01 PCMCIA wrap around [It is not supported]

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

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

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

- Address line
- REG#, CE#1, CE#2 line
- Data line
- Speaker line
- Wait line
- BSY#, BVD1 line

This subtest is executed in the following order:

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

NOTE: Select the subtest 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, an external monitor with monitor ID function is required.

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

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

3.17 CD-ROM/DVD-ROM Test

NOTE: CD-ROM/DVD-ROM Test can be performed only when the DIAGNOSTIC PROGRAM is started from the CD-ROM .

Subtest 01 Sequential read

This subtest is a sequential reading of one-block units of all the logical addresses.

3.18 Error Code and Error Status Names

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

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

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

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

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

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

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

3.19 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

Table 3-3 Hard disk controller status register contents

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

Table 3-4 Error register contents

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

3.20 ONLY ONE TEST

3.20.1 Program Description

This program tests the unique functions of this model.

3.20.2 Operations

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

```
#####
#####          ONLY ONE TEST Menu (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 .....    Exit to Common Test                      *
*
*****
.... Press test number [1-8,9] ?
```

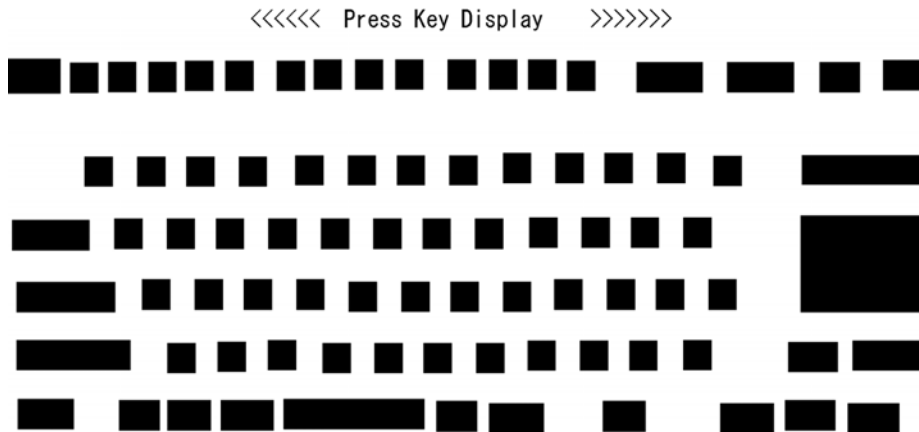
Select the subtest number you want to test and press **Enter**.

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

Subtest 1 Pressed key display

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

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



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

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

Subtest 2 Touch Pad

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

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

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

```

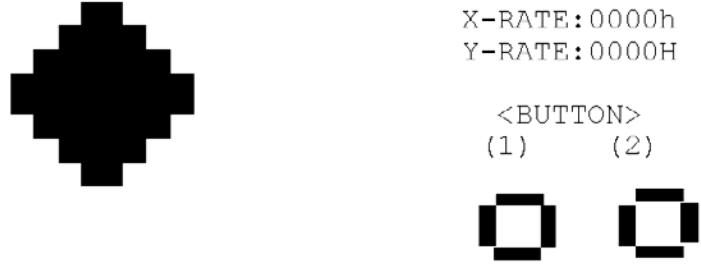
*** IPS TEST PROGRAM (Vx.xx) ***

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

<BUTTON>
(1) (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```



```

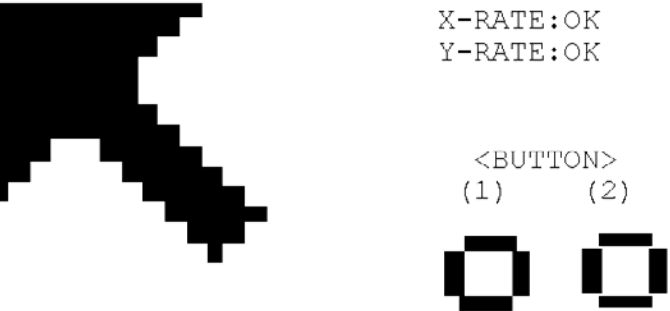
*** IPS TEST PROGRAM (Vx.xx) .***

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

<BUTTON>
(1) (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```



Subtest 3 Wireless communication switch

This subtest checks if the Wireless communication switch works properly. If the test is started with the switch ON, following message appears in the display.

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

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

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

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

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

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

Subtest 4 USB Port Select menu

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

This subtest checks if USB port works properly.

The following menu appears in the display.

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

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

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

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

NG message appears in the display if an error is found during the test.

Confirm the connection of cable, and then execute the test again.

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

Subtest 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.

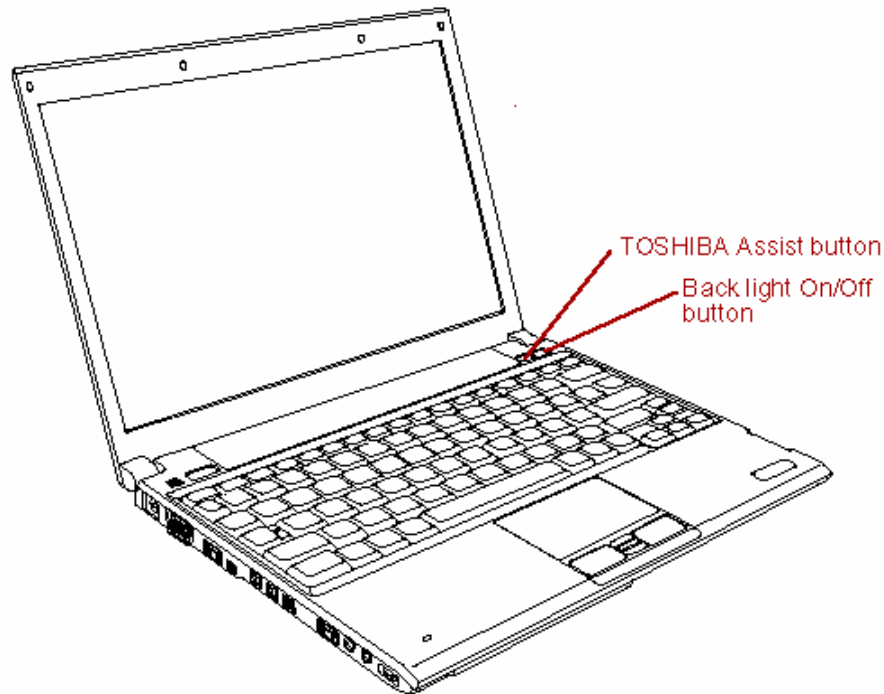
Press **Enter** and following message appears in the display.

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 the moving of the of the front operation panel button.

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

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

Press Function button (Toshiba Assist button)

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

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

Press the Toshiba Presentation button after the following message appears.

Step2	X	1	2
	*	*	<input type="checkbox"/>

Press Function button (Back light On/Off button)

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

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

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

Subtest 7 Acceleration sensor

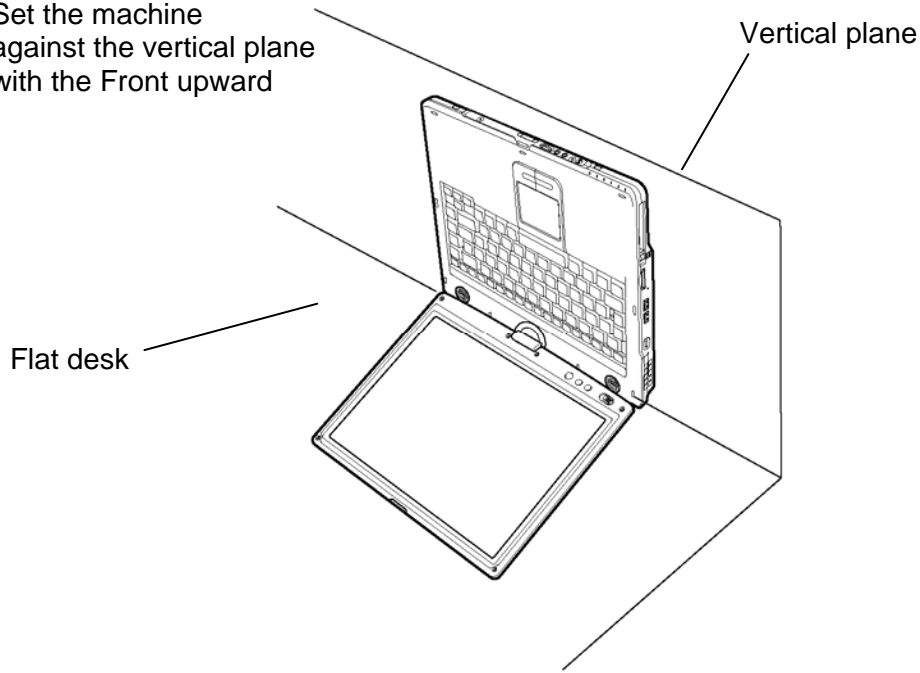
This subtest detects and corrects the each axis (X, Y, Z).

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

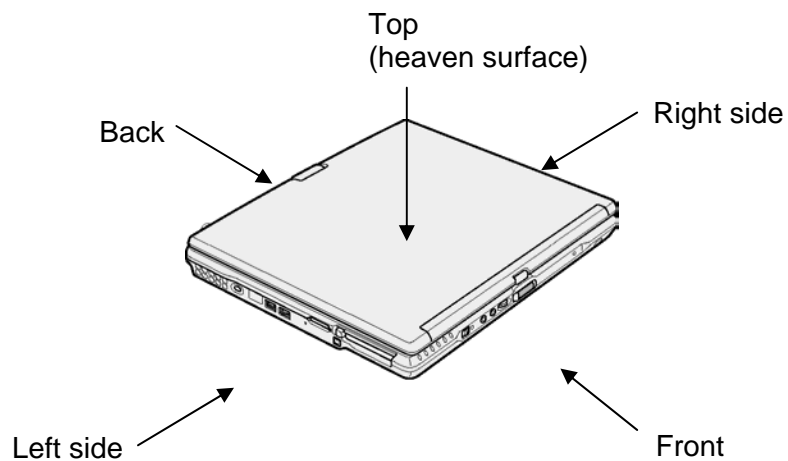
1. Flat desk with vertical plane to get the stability of machine.
2. The vertical wall or plane is necessary.
3. Prevent the machine from shake or shock.

<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.

3.21 Head Cleaning

3.21.1 Function Description

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

3.21.2 Operations

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

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

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.
3. When the "cleaning start" message appears, the FDD head cleaning has begun.
4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

3.22 Log Utilities

3.22.1 Function Description

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

NOTE: Connect USB FDD, when you perform the DIAGNOSTIC PROGRAM from the CD-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

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

1. Pull out the test program and insert a floppy disk which has been formatted by **FORMAT** command of DOS.
2. Select **6** from the **DIAGNOSTIC MENU** and press **Enter**, the following messages for selectable tests will appear in the display in order.

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

3. To execute the test, press **Y** and **Enter**. To cancel the test, press **N** and **Enter**. If you select the selectable tests, follow the instruction message in the display.
4. After selecting the selectable tests, the running test starts automatically. To terminate the program, press **Ctrl + Break**.

3.24 Floppy Disk Drive Utilities

3.24.1 Function Description

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

1. FORMAT

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

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

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

2. COPY

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

3. DUMP

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

4. HDD ID READ

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

3.24.2 Operations

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

```
[ FDD UTILITIES ]

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message.

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

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

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

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

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

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

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

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

Format start

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

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

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

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

3. COPY program

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

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

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

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

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

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

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

- (d) The following message will appear.

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

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

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

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

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

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

4. DUMP program

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

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

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

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

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

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

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

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

- (e) The following message will appear.

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

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

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

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

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

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

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

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

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration.

```
[HDD ID Read (VX.XX)] [Drive #1]
Model No.                = XXXXXXXX
Press [Enter] key
```

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

3.25 System Configuration

3.25.1 Function Description

NOTE: To display the system configuration, the write protect tab should be *OFF* position. If the tab is *ON* position, move the tab to *OFF* position and restart the test. Otherwise the correct information cannot be acquired.

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

1. Processor Type [Code/L2 cache]
2. Chip set [VRAM]
3. BIOS ROM version [1st ID, 2nd ID]
4. Boot ROM version
5. EC total version
6. PS Microprocessor version
7. SVP Par. version
8. Microcode Revision
9. Total Memory Size [Conventional memory]
10. Battery code
11. HWSC
12. FSB [Voltage]
13. 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. ODD Drive
19. T&D total version

3.25.2 Operations

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

```

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

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

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

```

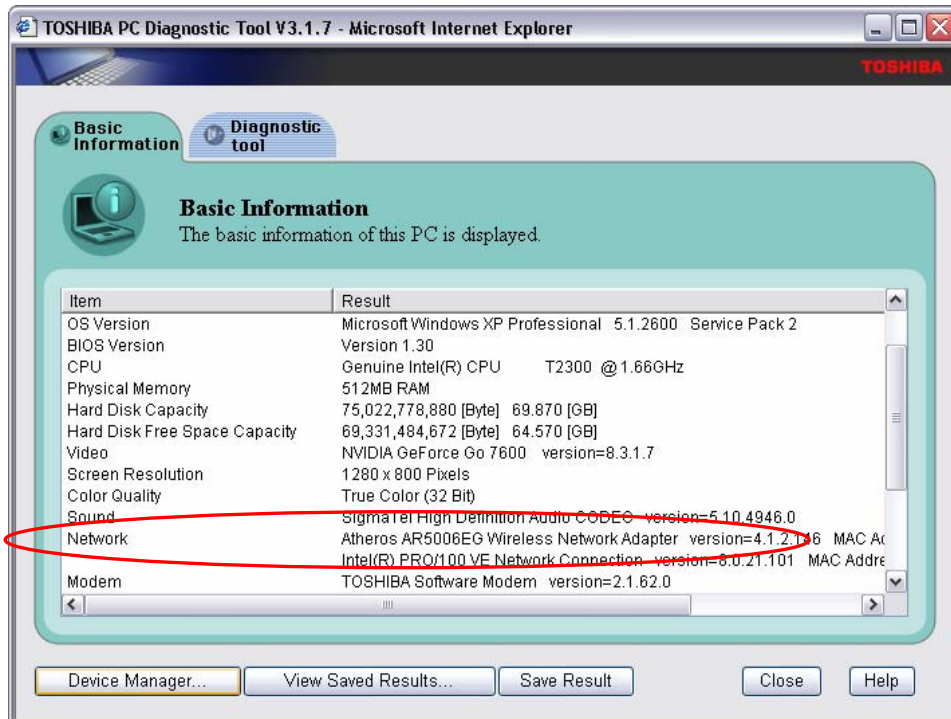
Press **Enter** to return to the DIAGNOSTIC MENU.

3.26 Wireless LAN Test Program (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 AR5006EG(11b/g)” or “Atheros AR5006EX(11a/b/g)” is shown, the correct card is installed in the computer.

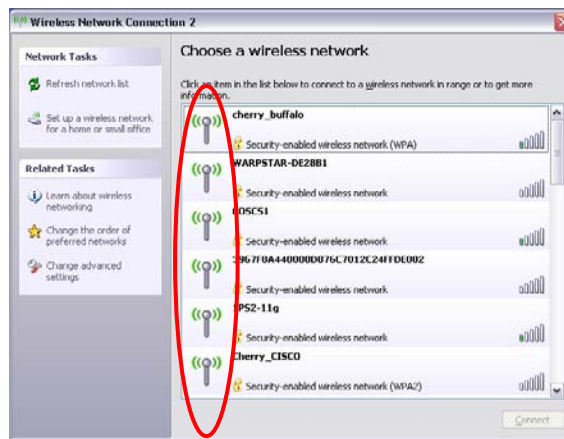


Check of the antenna connection

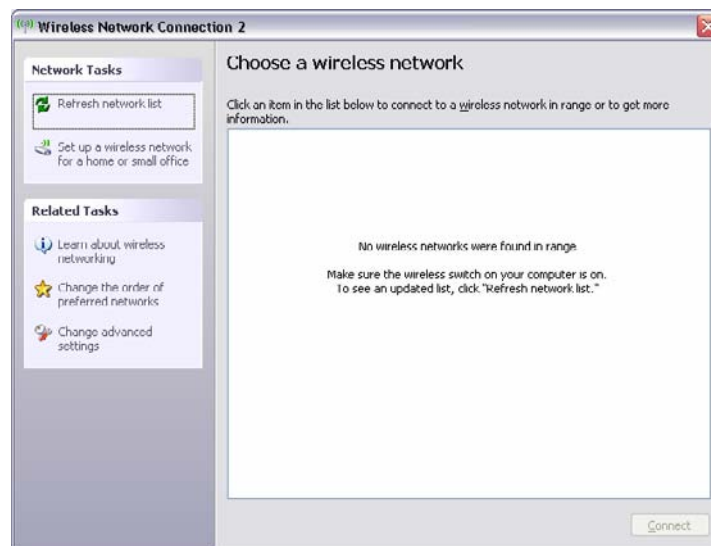
1. Confirm that the icon for wireless LAN appears at the lower right of the screen under the circumstances the wireless LAN communication is available. (It is no problem if a cross is shown on the icon.)



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.



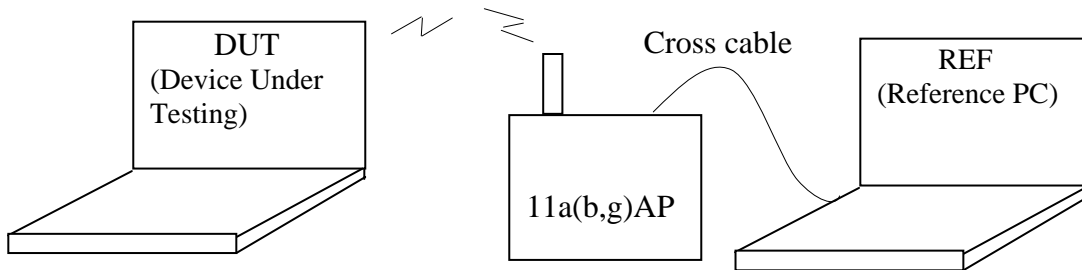
3.27 Wireless LAN Test Program (Intel-made b/g, a/b/g Setting up of REF PC)

For the test of Intel-made wireless LAN cards, configure the test environment as shown below with the following equipment.

- AP (which can operate on Windows XP and is corresponding to access point 11a, 11b and 11g)

NOTE: Set the SSID of AP as follows. (Note that upper case and lower case characters are recognized as different characters.)
AP for check of 11a : 11aAP
AP for check of 11b : 11bAP
AP for check of 11g : 11gAP
Make the security functions of AP (WEP, WPA, etc.) invalid.

- REF (Reference) PC
- Cross cable
- DUT (Device Under Testing)



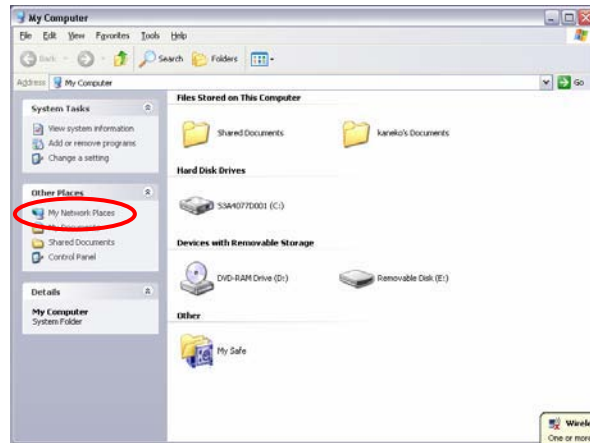
Configuration of equipment for transmitting-receiving test

How to setup the REF PC

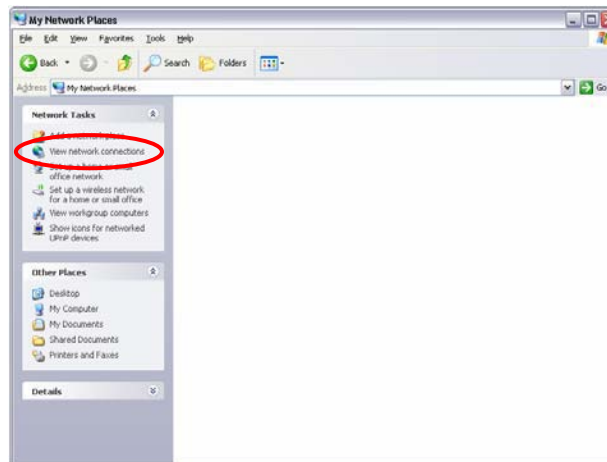
Set up the wireless LAN environment needed for the test before the start of Responder program on REF PC.

1. Copy the R100VWL5.ZIP (wireless LAN program for maintenance, common to Calexico, Golan and Kedron) to REF PC and unzip it. Then “Clx_Res” folder is created and the following three programs are copied in it.
 - PACKET.SYS
 - PACKET.INF
 - WTWINSVR.EXE

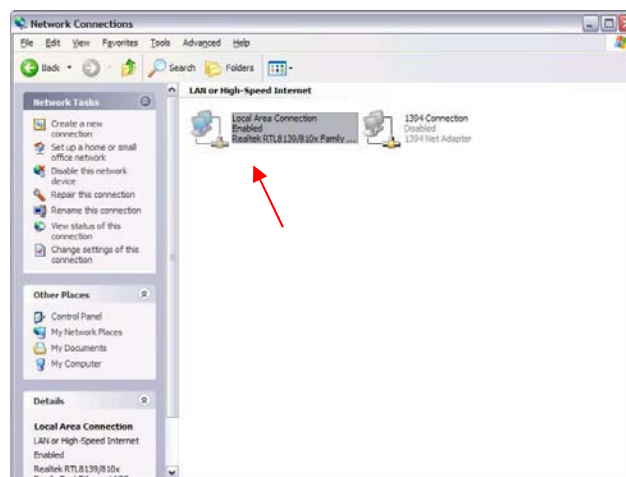
2. Open “My Computer” window and click “My Network places” on the left column.



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

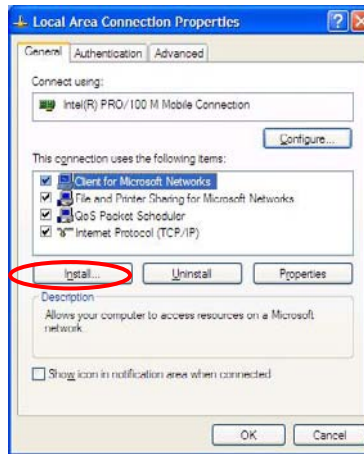


4. The “Network Connections” window appears. Double-click “Local Area Connection”.



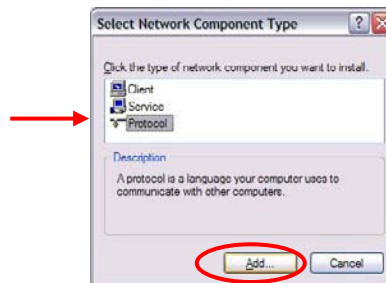
Network Connections window

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



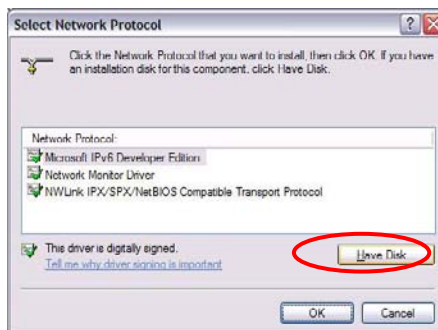
Local Area Connection Properties window

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



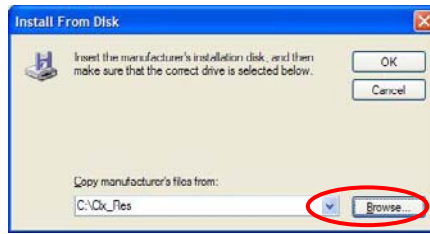
Select Network Component Type window

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



Select Network Protocol window

- 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.)



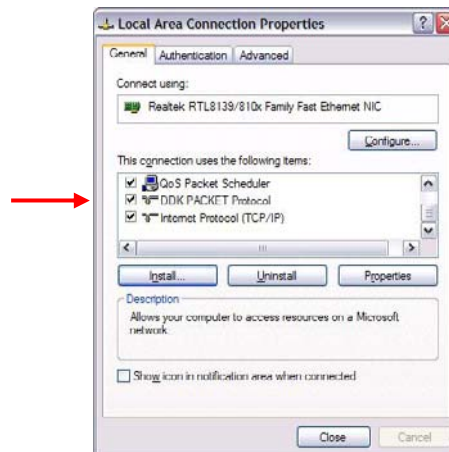
Install From Disk window

- 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

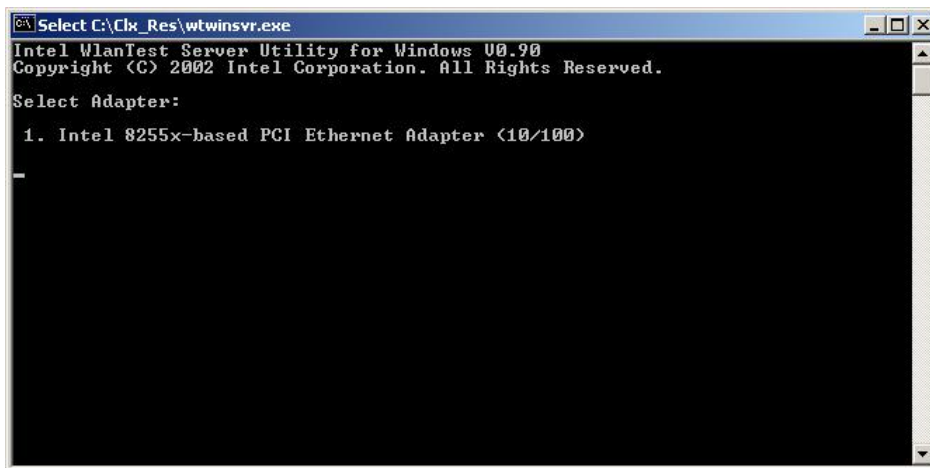
Function : Transmitting/receiving of data to/from DUT via AP

OS available : Windows XP only

How to start : Double-click WTWINSVR icon.

How to start

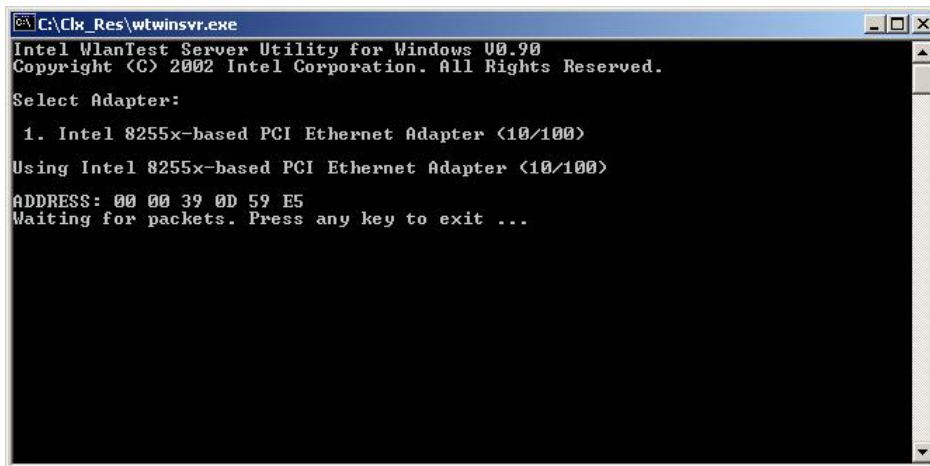
1. Double-click wtwinsvr icon. The following screen will appear.



```
C:\Clx_Res\wtwinsvr.exe
Intel WlanTest Server Utility for Windows 00.90
Copyright (C) 2002 Intel Corporation. All Rights Reserved.
Select Adapter:
1. Intel 8255x-based PCI Ethernet Adapter <10/100>
```

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.



```
C:\Clx_Res\wtwinsvr.exe
Intel WlanTest Server Utility for Windows 00.90
Copyright (C) 2002 Intel Corporation. All Rights Reserved.
Select Adapter:
1. Intel 8255x-based PCI Ethernet Adapter <10/100>
Using Intel 8255x-based PCI Ethernet Adapter <10/100>
ADDRESS: 00 00 39 0D 59 E5
Waiting for packets. Press any key to exit ...
```

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 :Golan) on DUT PC

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 b/g or 802.11 a/b/g Golan). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test.

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

The following menu appears in the display.

```
*****
*      Intel PRO/Wireless XXXABG Network Connection      *
*                  Maintenance T&D Menu                  *
*                                                        *
*      1  : SKU check of Module                          *
*                                                        *
*      2  : MAC Address Check                            *
*                                                        *
*      3  : Antenna Check & communication test of 11b mode *
*                                                        *
*      4  : Communication test of 11a mode               *
*                                                        *
*      5  : Communication test of 11g mode               *
*                                                        *
*      6  : All the tests of 11a/b/g Card                 *
*            (SKU & MAC Check, 11a/b/g communication test) *
*                                                        *
*****
```

SELECT TEST No, (1-6):

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

Subtest01 SKU check of module

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

```
*****
*
*      Module   : Module   : Intel PRO/Wireless XXXXABG   *
*                  Network Connection (Mowl)              *
*      G-code   : G360001U110                             *
*      TA No.   : D26539                                   *
*
*****
```

Press any key and return to the test menu. If a defective is found during the test, **NG** message will appear in the display.

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Using a wrong wireless LAN card (Using unspecified card)
- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02 MAC Address Check

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

```
*****MAC CHECK*****
MAC = XXXXXXXXXXXX
*****
*
*   MAC Address Check : OK !!
*
*****
```

Press any key and return to the test menu.

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

```
*****MAC CHECK*****
ERROR: MAC all F
MAC = XXXXXXXXXXXX
*****
*
*   MAC Address Check : NG !!
*
*****
```

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03 Antenna check & communication test of 11b mode

This subtest execute transmitting/receiving test in 802.11b mode using the main antenna first. If a defective is not found during the test, transmitting/receiving test in 802.11b mode using the AUX antenna is automatically executed.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display. When pressing any key, the following message (which antenna is defective) is displayed

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

Press any key and return to the test menu.

Subtest04 Communication test of 11a mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest05 Communication test of 11g mode

This subtest execute transmitting/receiving test in 802.11g mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest06 All the tests of 11a/b/g Card

All the tests is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11b mode, Communication test of 11a mode and Communication test of 11g mode.

When any error has detected, the test finishes.

3.28.2 Wireless LAN Test Program (Intel-made:Kedron) on DUT PC

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 a/b/g or 802.11 a/b/g/n: kedron). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test.

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

The following menu appears in the display.

```
*****
*      Intel PRO/Wireless XXXABG Network Connection      *
*                  Maintenance T&D Menu                  *
*                                                        *
*      1  : SKU check of Module                          *
*                                                        *
*      2  : MAC Address Check                            *
*                                                        *
*      3  : Communication test of 11a mode                *
*                                                        *
*      4  : Communication test of 11b mode                *
*                                                        *
*      5  : Communication test of 11g mode                *
*                                                        *
*      6  : All the tests of Wireless WiFi Link 4965 Module *
*            (SKU & MAC Check, communication test)       *
*                                                        *
*****
```

SELECT TEST No, (1-6):

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

Subtest01 SKU check of module

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

```
*****
*
*      Module   : Module : Intel PRO/Wireless XXXXABG      *
*                  Network Connection (Mowl)                *
*      G-code   : G360001U110                               *
*      TA No.   : D26539                                    *
*
*****
```

Press any key and return to the test menu. If a defective is found during the test, **NG** message will appear in the display.

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Using a wrong wireless LAN card (Using unspecified card)
- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02 MAC Address Check

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

```
*****MAC CHECK*****
MAC = XXXXXXXXXXXX
*****
*
* MAC Address Check : OK !!
*
*****
```

Press any key and return to the test menu.

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

```
*****MAC CHECK*****
ERROR: MAC all F
MAC = XXXXXXXXXXXX
*****
*
* MAC Address Check : NG !!
*
*****
```

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03 Communication test of 11a mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again

Subtest04 Communication test of 11b mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

Press any key and return to the test menu.

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest05 Communication test of 11g mode

This subtest execute transmitting/receiving test in 802.11g mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

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

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

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest06 All the tests of Wireless WiFi Link 4965 Module

All the tests is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11a mode, Communication test of 11b mode and Communication test of 11g mode.

When any error has detected, the test finishes.

3.29 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 [Not used]
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) *
* * *
* 3 ..... (Marvel) *
* * *
*****
.... Press test number [1-2] ?
```

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

Subtest01 (i82562 + ICHx)

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

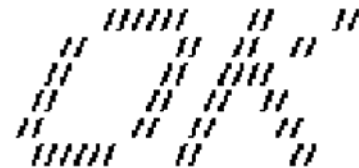
The following message will appear:

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

LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
Destination Address      = 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.

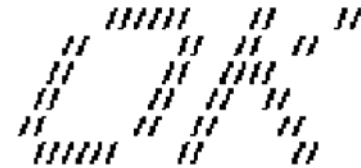
If a defective is found, **NG** message will appear in the display.

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.

Subtest03 (Marvel)

NOTE: This Subtest is not supported in this computer.

3.29.2 Modem test

NOTE: *Modem Test is not supported for this model.*

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

NOTE: *Modem test is not supported for this model.*

```
#####
#####   AC97' Modem Controller Diagnostics program   #####
#####
*
*           1 ..... (ICHx)                               *
*
*           2 ..... (ICH6)                               *
*
*****
.... Press test number[1-2] ?
```

To execute Modem test, press **2** and **Enter**. Following message will appear:

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize           :OK
* Digital Loopback Test              :OK
* RJ11 Connector Check (LED)         :(Operator's Check!!)
```

OK is displayed when a error is detected, **NG** is display when a error is not detected.

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

RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

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

If the color in the LED of the connection checker is orange, press **Y**, otherwise, press **N**.

3.29.3 Bluetooth test

Preparation

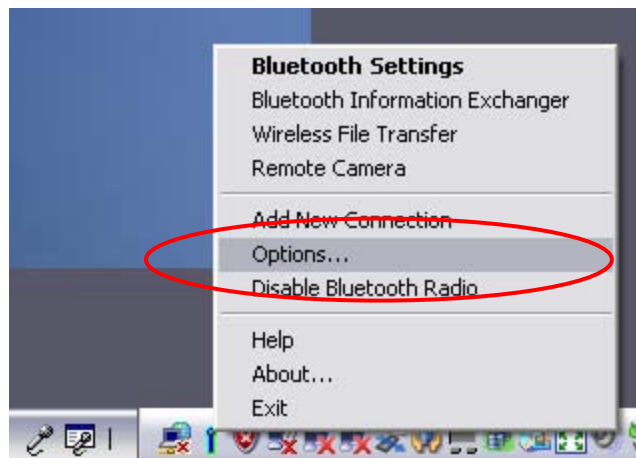
- For the test of Bluetooth function, use the Windows program installed on the target computer (computer to be tested). A responder device (device for transmitting/receiving data) is also needed. (A mobile phone with the Bluetooth function is also available.)
- A Bluetooth card should be installed on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

Test procedure

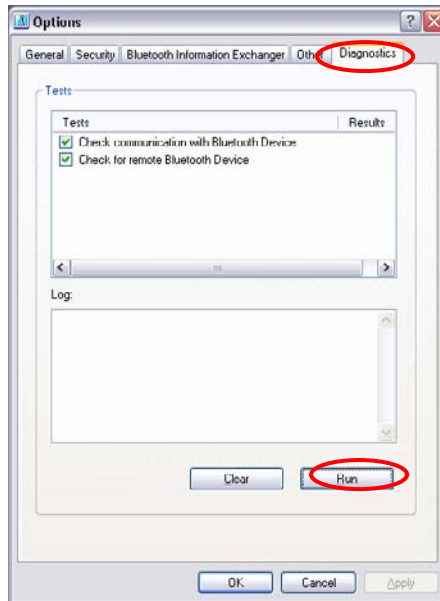
1. Enable the Bluetooth function of the responder device.
2. Make sure the wireless communication switch of the target computer is set to “ON” position.
3. Right-click the Bluetooth icon on the lower right screen of the target computer.



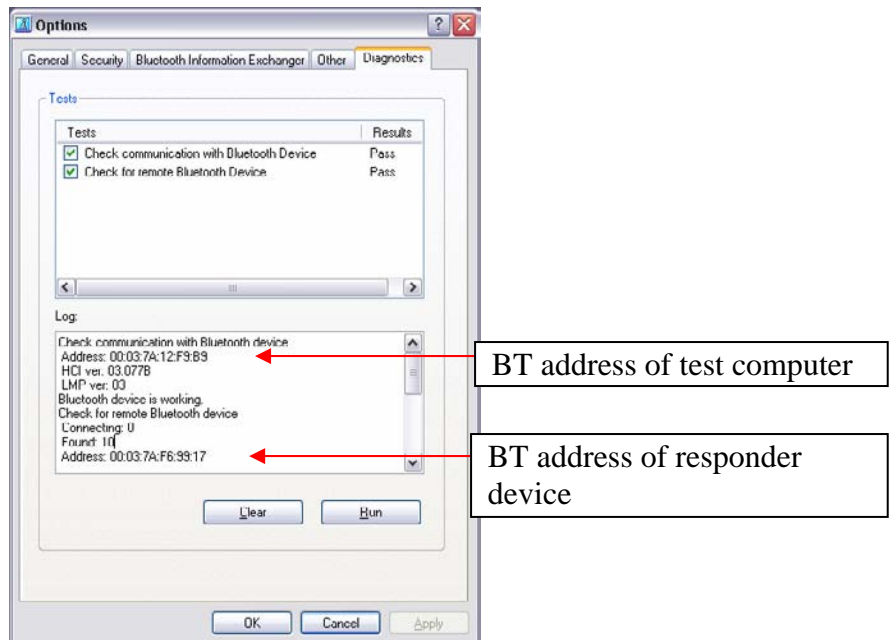
4. Select “Options...”.



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, press **4** and **Enter**.

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

The following menu will appear:

```

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

```

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

Subtest01 Transmit & Receive test

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

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

Subtest 02 Responder set

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

Subtest 03 1394 GUID Display

This program checks the GUID of IEEE1394.

3.30 Sound Test program

Sound TEST disk cannot be used in PORTEGE R500.

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 BIOS SETUP

3.31.1 Function Description

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

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

- 10. PCI Bus
- 11. Security Controlle
 - (a) TPM
 - (b) Clear TPM Owner
- 12. Display
 - (a) Power On Display
 - (b) LCD Display Stretch
 - (c) Multi-Field Driving
- 13. Peripheral
 - (a) Internal Pointing Device
- 14. Legacy Emulation
 - (a) USB KB/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation
 - (c) USB Memory BIOS Support
- 15. PCI LAN
 - (a) Built-in LAN
 - (b) Wireless LAN

3.31.2 Accessing the SETUP Program

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

SYSTEM SETUP (1/2)		ACPI BIOS version = X.XX
MEMORY Total = XXXMB		BOOT PRIORITY Boot Priority = HDD → FDD → CD-ROM → LAN HDD Priority = Built-in HDD → USB
SYSTEM DATE/TIME Date (MM-DD-YYYY) = XX-XX-XXXX Time (HH:MM:SS) = XX:XX:XX		OTHERS Core-Multi Processing = Enabled Dynamic CPU Frequency Mode = Dynamically Switchable Execute-Disable Bit Capability = Not Available Auto Power On = Disabled Performance /Battery Life Setting = Performance Beep Volume = Medium Diagnostic Mode = Disabled USB Sleep and Change = Disabled
PASSWORD User Password = Not Registered Supervisor Password = Not Registered		
HDD PASSWORD HDD = Built-in HDD HDD Password Mode = Master+User User Password = Not Registered Master Password = Not Registered		
↑↓↔: Select items Space,BkSp : Change values PgDn,PgUp : Change pages Esc : Exit without saving Home : Set default values End : Save changes and Exit		

SYSTEM SETUP (2/2)		ACPI BIOS version = X.XX
CONFIGURATION Device Config. = Setup by OS		DISPLAY Power On Display = Auto-Selected LCD Display Stretch = Enabled Multi-Field Driving = Disabled
BATTERY Battery Save Mode = Full Power PCI Express Link ASPM = Enabled Enhanced C-States = Enabled		PERIPHERAL Internal Pointing Device = Enabled
*1 — Built-in HDD = Serial ATA Port0 *2 — SATA Controller Mode = AHCI	LEGACY EMULATION USB KB/Mouse Legacy Emulation = Enabled USB-FDD Legacy Emulation = Enabled USB Memory BIOS Support Type = HDD	
PCI BUS PCI BUS = IRQ10, IRQ11		PCI LAN Built-in LAN = Enabled Wireless LAN = Enabled
SECURITY CONTROLLER TPM = Disabled Clear TPM Owner		
↑↓↔: Select items Space,BkSp : Change values PgDn,PgUp : Change pages Esc : Exit without saving Home : Set default values End : Save changes and Exit		

*1: In the case of a model with built-in 1:1.8 type HDD, it is displayed as follows.

Primary IDE(1F0H/IRQ14)

*2: In the case of a model with built-in 1.8 type HDD, it is not displayed.

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press ↑ and ↓ to move between items in a column. Press **Fn+↑ (PgUp)** and **Fn + ↓ (PgDn)** to move between the two pages.
2. Press either the **Space bar** or **Back Space** to change the value.

Accepting Changes and Exiting the SETUP Window

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

If the changed item does not require the system to reboot, the following message is displayed:

Are you sure? (Y/N)

If the changed item requires the system to reboot, the following message is displayed:

Are you sure? (Y/N)

The changes you made will cause the system to reboot.

2. To make other changes, press **N**. Repeat the steps above.
3. To accept the changes, press **Y**.

NOTE: You can press **Esc** to quit at any time without saving changes. **SETUP** asks you to confirm that you do not want to save your changes. When **SETUP** is displayed at the next time, the current configuration appears.

The Factory Preset Configuration

When you access **SETUP**, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.
2. To accept the default settings, press **End** and then press **Y**.

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

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

SETUP Options

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

1. Memory

This group of options displays the computer's memory.

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

2. System Date/Time

Sets the date and time.

System Date Sets date.

System Time Sets time.

3. Password

(a) User Password

This option allows you to set or reset the user password for power on.

Registered A password has been registered.

Not Registered Change or remove the password. (Default)

(a) Supervisor Password

This setting, which is displayed on the first page of the setup screen, allows you to register a Supervisor Password of the computer.

Registered Supervisor Password has been registered.

Not Registered Supervisor Password has not been registered (Default).

For details on setting the password, refer to the Online Manual.

4. HDD Password

This option sets HDD password. HDD password is a security function to protect the built-in HDD.

(a) HDD

This item selects the hard disk to set HDD password.

Built-in HDD Sets HDD password for the built-in HDD

(b) HDD Password Mode

This item registers HDD password and can be selected only for registering HDD password. To change HDD Password Mode when HDD password is registered, delete the registered HDD password first, and then register new password.

User Only Sets only User HDD Password (Default)

Master+User Sets Master HDD Password and User HDD Password

(c) User Password

This item sets User password.

For details on setting user password, refer to the User's Manual.

(d) Master Password

This item sets the Master HDD password.

This can be set **Master+User** is set in the HDD password Mode. For details, refer to the User's Manual.

5. Boot Priority

(a) Boot Priority

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

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

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

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

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

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

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

(*1) CD-ROM refers to a Optical Disk Drive.

(b) HDD Priority

This option enables to select the priority for the Built-in HDD or USB.

Built-in HDD → USB (Default)

USB → Built-in HDD

6. Others

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

(a) Core-Multi Processing

The Core Multi-Processing sets the CPU operating mode.

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

Enabled is Dual Core mode.

Disabled is Single Core mode.

Enabled Enables Core Multi-Processing functions. (Default)

Disabled Disables Core Multi - Processing functions.

(b) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings.

Dynamically Switchable

Enables Intel® Core™ Duo processor featuring Intel SpeedStep technology. (Default)

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

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

(c) Execute-Disable Bit Capability

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

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

(a) Auto Power On

Use this option to set a time and date for automatic power on and enable or disable the ring indicator feature. **Alarm Date Option** appears only when **Alarm Time** is enabled.

OPTIONS	
Alarm Time	= Disabled
Wake-up on LAN	= Disabled
on Battery	= Disabled
Critical Battery Wake-up	= Enabled

Set the parameters for the Auto Power On (automatic power on) function and the Wake-up on LAN in the “OPTIONS” window. To set the time, use **Space** or **BackSpace**. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

For the **Alarm Time**, set the time to turn on the power automatically. The “second” cannot be set. When it is set to “Disabled”, the time to turn on automatically is not set.

The **Wake-up on LAN** is a function to turn on the power automatically by the call from the administrator. It can be set to “Enabled” only when “Built-in LAN” is set to “Enabled”. To activate this function, use the AC adapter.

On Battery

The following settings can be changed when the Wake-up on LAN is Enabled.

- Enabled** Wake-up on LAN function whenoperating from the battery.
Disabled Wake-up on LAN function whenoperating from the battery (Default).

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

(b) Performance/Battery Life Setting

Battery operating time and computer processing power can be controlled by changing the memory bus frequency.

Battery Life

Setting the memory bus frequency to 400MHz will give priority to battery operating time over computer processing power.

Performance

Setting the memory bus frequency to 533MHz will give priority to computer processing power over battery operating time (Default).

(c) Beep Volume

This Option sets up the volume of a Beep sound.

Medium→High→OFF→Low

(d) Diagnostic Mode

This option enables/disables the HW Diagnostic test function.

Enabled Disables the HW Diagnostic test function. (Default)

Disabled Enables the HW Diagnostic test function.

(e) USB Sleep and charge

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

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

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

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

7. Configuration

This option lets you set the device configuration.

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

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

8. Battery

(a) Battery Save Mode

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

Full Power The following shows full power settings.

```

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

Low Power The following shows low power settings.

```

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

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

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

Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

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

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

CPU Sleep Mode

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

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility.

Semi-Bright Less than full brightness for saving power.

Cooling Method

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

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

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

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

(b) PCI Express Link ASPM

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

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

(c) Enhanced C-States

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

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

9. Drives I/O

This option displays the address and interrupts level for hard disk drive and optical disk drive. It is for information only and cannot be changed.

(a) Built-in HDD

This option displays the setting of the address and interrupt level of the HDD. This cannot be changed.

(b) SATA Controller Mode

This feature sets the SATA Controller Mode.

Note: The SATA Controller Mode is supported with some models..

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

10. PCI Bus

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

PCI BUS = Serial IRQ10, IRQ11

11. Security Controller

(a) TPM

This setting enables or disables the computer's Trusted Platform Module (TPM) security controller.

Disabled	Disable Trusted Platform Module security(default)
Enabled	Trusted Platform Module security.

(b) Clear TPM Owner

This setting is used to erase the data stored as part of the Trusted Platform Module, as would be required, for example, when disposing of the computer or when the owner of the computer changes. Once this operation is carried out, the Trusted Platform Module configuration settings are erased such that any encrypted data can no longer be decrypted and the files can no longer be read. In view of this you must ensure that you backup or delete the data as necessary before carrying out this operation.

The procedure to follow is as detailed below:

1. Move the cursor to the **Clear TPM Owner** setting and press either the **Space** key or **BACK SPACE** key.
2. A message is displayed at which you should press the **Y, E, S,** and **ENTER** keys in sequence - the Trusted Platform Module information will then be erased.
3. The Trusted Platform Module setting will then change from being **Enable** to **Disabled** and the setting no longer displayed.

Note:

When using TPM, please refer to the Infineon TPM Installation Guide from the C:\TOSAPINS\Infineon TPM Installation Guide and ensure that the user reads as it contains usage information and notes on using TPM security.

12. Display

This group of options configures the computer's display.

(a) Power On Display

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

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

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

(b) LCD Display Stretch

LCD Display Stretch enables or disables a larger display area of the screen.

Enabled Enables the LCD display stretch feature. (Default)

Disabled Disables the LCD display stretch feature.

(c) Multi-Field Driving

This feature enables or disables the power-saving function of the computer's display panel.

Enabled This lowers the power consumption of the computer's display panel.

Disabled Disables Multi-Field Driving feature (Default). This setting is recommended, when playing the movies (e.g. DVD Video).

13. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

Enabled Enables the touch pad. (Default)

Disabled Disables the touch pad.

14. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

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

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

Disabled Disables LEGACY support

(b) USB-FDD Legacy Emulation

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

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

Disabled Disables LEGACY support

(c) USB Memory BIOS Support

This Option sets up the format in which BIOS supports a USB memory.

HDD An HDD format is supported.

FDD An FDD format is supported.

15. PCI LAN

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

(a) Built-in LAN

Enabled Enables Built-in LAN functions. (Default)

Disabled Disables Built-in LAN functions.

(b) Wireless LAN

Enabled Enables Wireless LAN functions. (Default)

Disabled Disables Wireless LAN functions.

Chapter 4

Replacement Procedures

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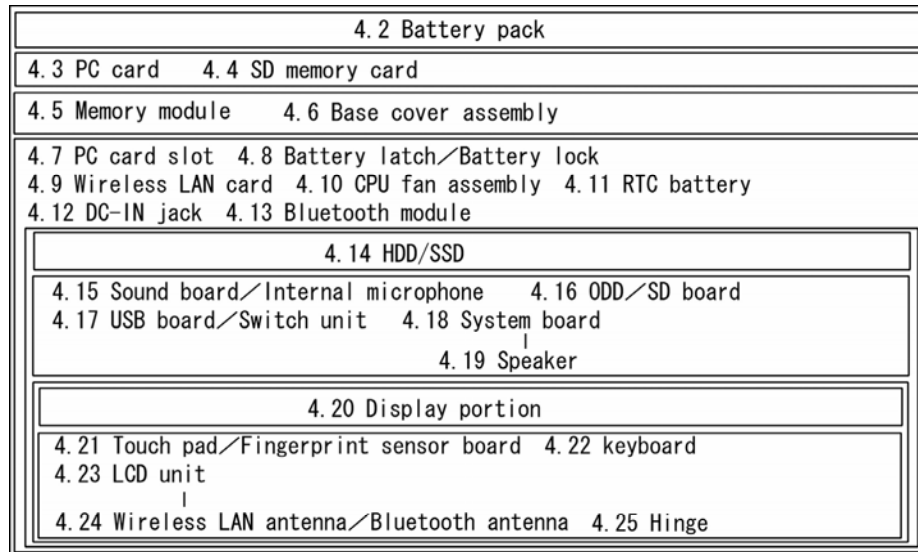
4.1 General

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

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. The numbers in the chart indicate the relevant section numbers in this manual.

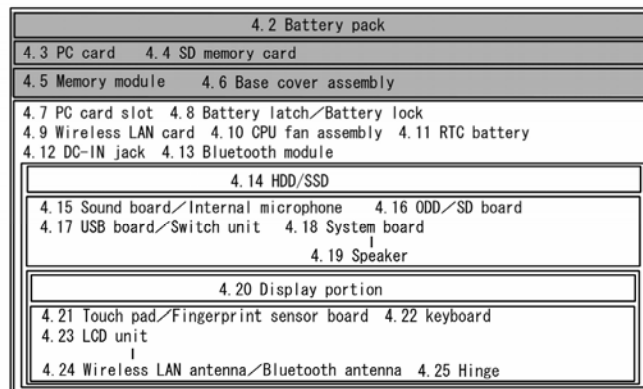
In all cases when removing the FRU, the battery pack must also be removed. When repairing the FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

Refer to the example of the chart described below.



This chart shows which unit(s) you need to remove in advance when you replace one unit.

Example: When you want to replace “4.7 PC card slot”, you need to remove all FRUs down to the “4.2 Battery pack” to “4.6 Base cover assembly” must be removed.



Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

- DANGER:**
- 1) *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.*
 - 2) *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock. Also, do not disassemble individual components in first-level maintenance.*

- WARNING:**
- 1) *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*
 - 2) *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*
 - 3) *Be careful of edges and corners as these may cut.*

- CAUTION:**
- 1) *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*
 - 2) *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*
 - 3) *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*
 - 4) *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*
 - 5) *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*
 - 6) *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

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

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
 - Dust and contaminants
 - Static electricity
 - Extreme heat, cold and humidity
4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.
5. Do not perform any unnecessary work. Always work in accordance with the disassembly and reassembly procedures in this manual.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer, make sure that you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

Four main types of cable connector are used.

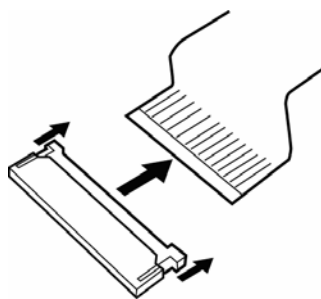
- Pressure plate connector
- Spring connector
- Back flip connector
- Normal pin connector

For pressure plate connectors, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting the cable to the pressure plate connector, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and insert the cable into the connector. Push both tags of the pressure plate such that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. 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.

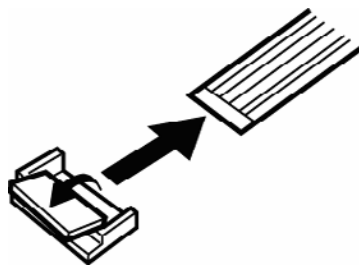
For spring connectors, lift up the stopper frees the cable and allow it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable. Pull the cable to ensure that it is securely connected.

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

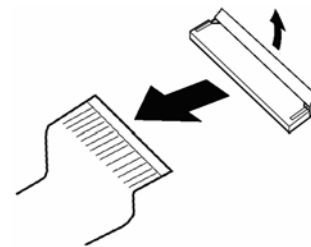
Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.



Pressure plate connector



Spring connector



Back flip connector

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.
- When using new parts with double-side tapes, peel off the separators.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

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

- One Philips screwdriver with type 0 bit (for S-THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap 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

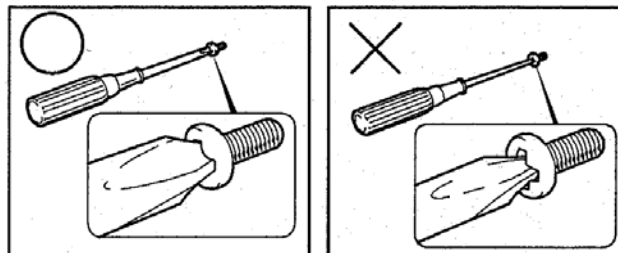
When you fasten screws, be sure to follow the torque list below.

CAUTION: Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.

NOTE: Toshiba recommends that you use an electric screwdriver for quick and easy operations.

- 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, the types and lengths of the screws are indicated on the computer body and PCB.

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

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

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

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

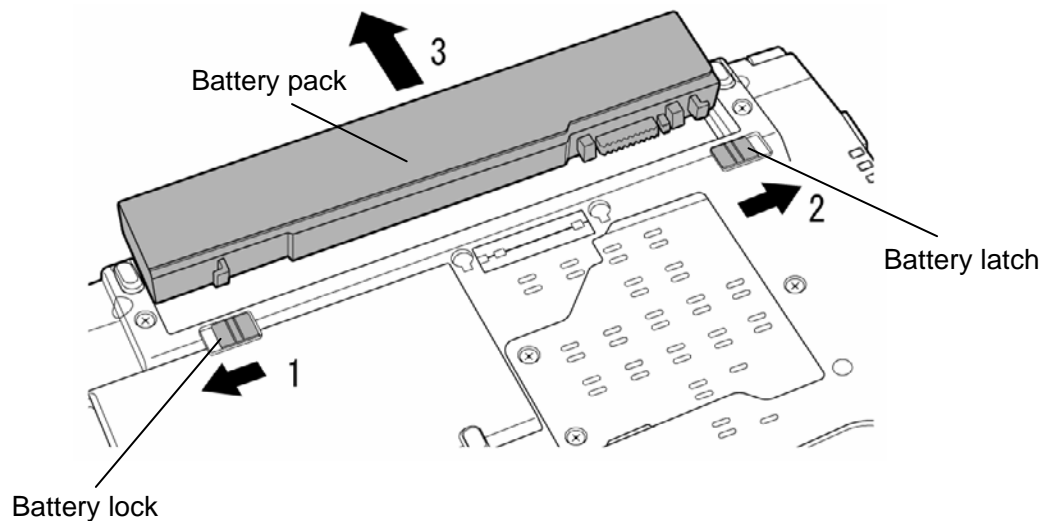


Figure 4-1 Removing the battery pack

NOTE: For environmental reasons, do not throw away a spent battery pack.

Installing the Battery pack

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

CAUTION: *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba for replacements.*

NOTE: *Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.*

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Turn the computer face down.
4. Install the **battery pack** into the battery slot.
5. Slide the **battery lock** into the lock position.

4.3 PC card

Removing the PC card

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

CAUTION: Before you remove the PC card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Press the **eject button** for the PC card you want to remove to extend the button.
2. Press the extended eject button to pop the PC card out.
3. Grasp the **PC card** and pull it out.

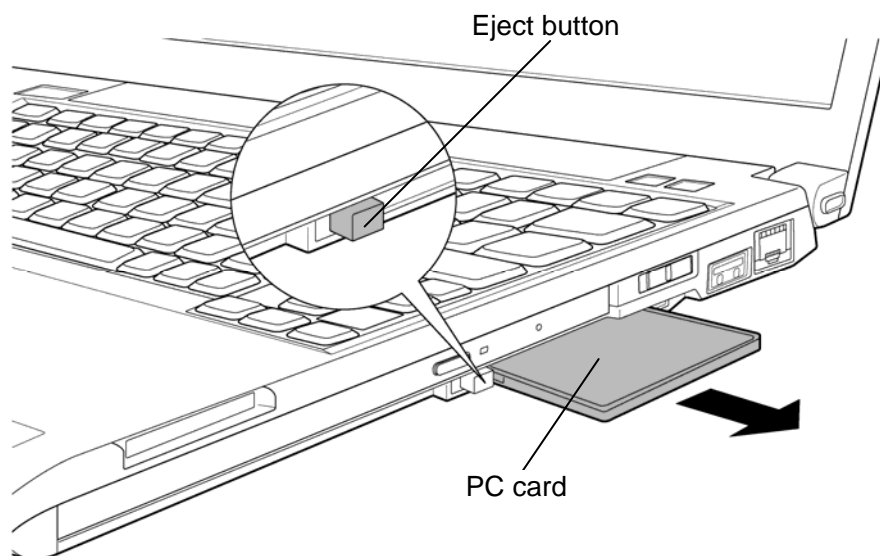


Figure 4-2 Removing the PC card

Installing the PC card

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

1. Make sure that the **eject button** is not extended.
2. Insert the **PC card** into the card slot and push it carefully to ensure a firm connection.

4.4 SD memory card

Removing the SD memory card

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

CAUTION: Before you remove the SD memory card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Push the **SD memory card** in and release it to pop the card out.
2. Grasp the **SD memory card** and pull it out.

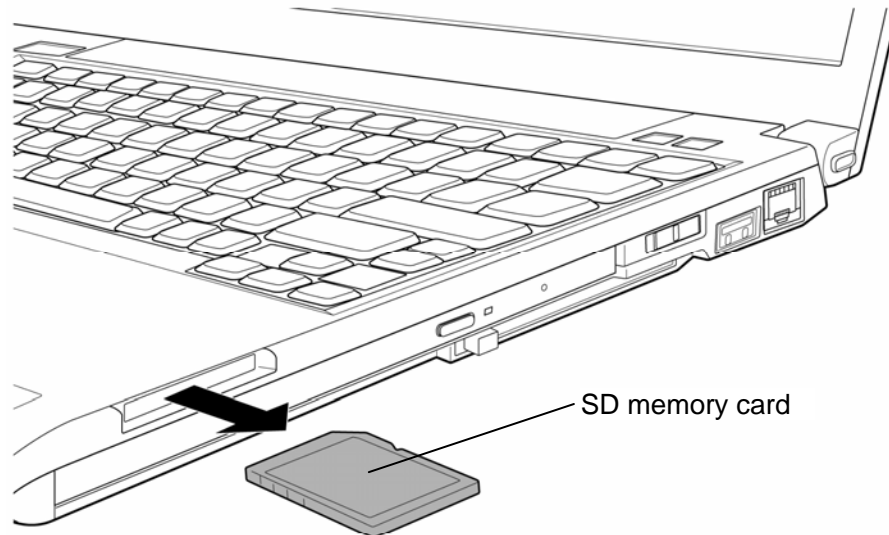


Figure 4-3 Removing the SD memory card

Installing the SD memory card

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

1. Insert the **SD memory card** in the card slot and push it carefully to ensure a firm connection.

4.5 Memory module

Removing the Memory module

CAUTION: The power must be turned off when you remove or insert a memory module. Inserting a memory module with the power on might damage the module or the computer itself. Dust and stains on the connectors may cause memory access problems.

Never press hard or bend the memory module.

To remove the memory module, make sure the computer is powered off, follow the steps below and refer to Figure 4-4 and 4-5.

1. Loosen the following **screws** and remove the **memory cover**.

- M2×4B STEP screw ×2

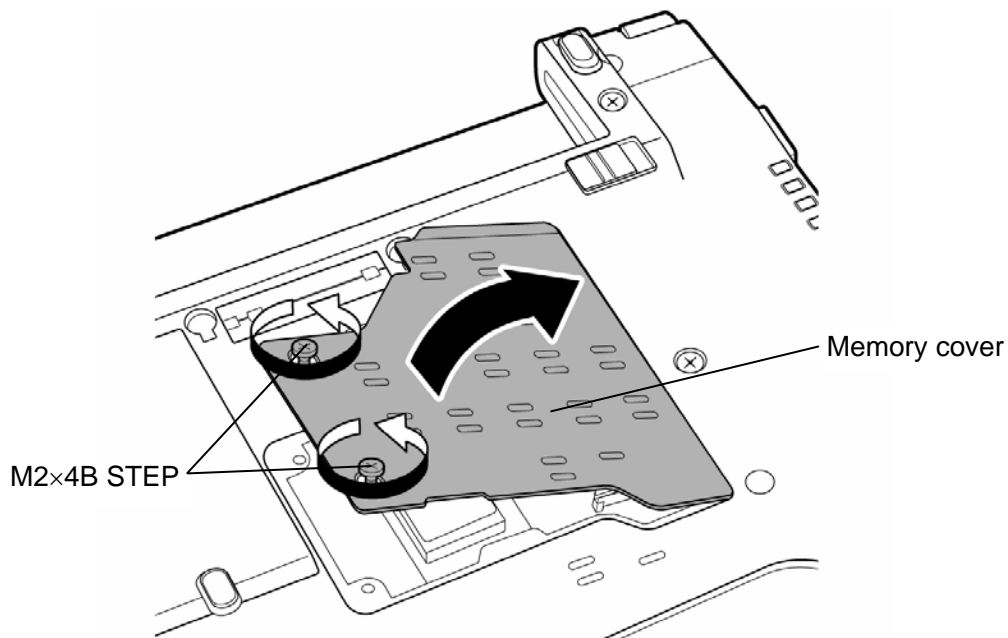


Figure 4-4 Removing the memory module (1)

2. Press two **latches** outward to release them (The memory module stands slantwise).
3. Remove the **memory module** from the connector **CN1460** on the system board.

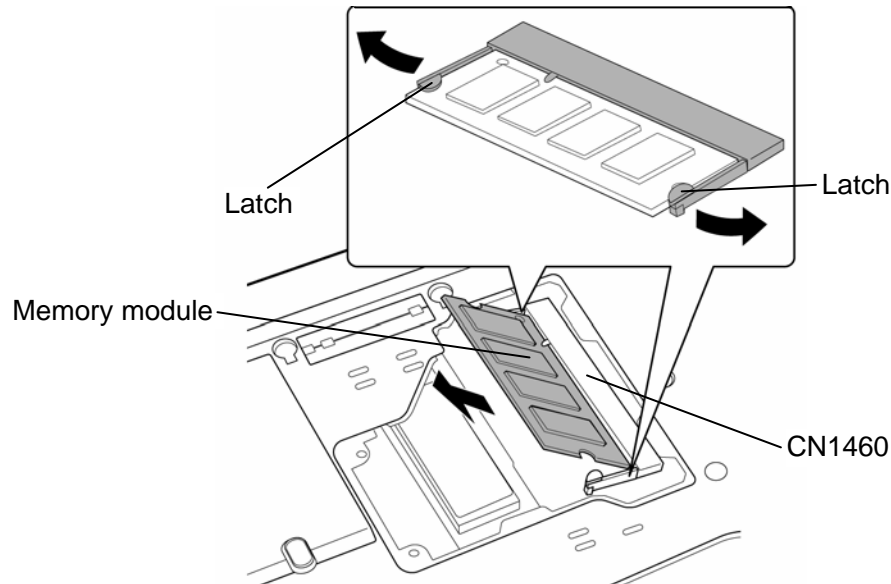


Figure 4-5 Removing the memory module (2)

Installing the Memory module

To install the memory module, make sure that the computer is powered off, follow the steps below and refer to Figure 4-4 and 4-5.

1. Insert the **memory module** into the connector **CN1460** on the system board slantwise.

CAUTION: *Insert the dent of the memory module to the guide of the memory slot.*

2. Press down the memory module until it is latched firmly.
3. Set the **memory cover** and secure it with the following **screws**.

- M2×4B STEP screw ×2

NOTE: *When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly. If the memory is not detected, check that it is connected correctly.*

4.6 Base cover assembly

Removing the Base cover assembly

Click here to view caution on the disassembly/reassembly of the unit.

To remove the base cover assembly, follow the steps below and refer to Figure 4-6 to 4-8.

1. Remove the following screws securing the base cover assembly.

- M2×4C S-THIN HEAD screw ×4 (Described as “A” in the figure)
- M2×6C S-THIN HEAD screw ×10 (Described as “B” in the figure)
- M2.5×6C S-THIN HEAD screw ×2 (Described as “C” in the figure)
- M2×2.4C S-THIN HEAD screw ×1 (Described as “D” in the figure)

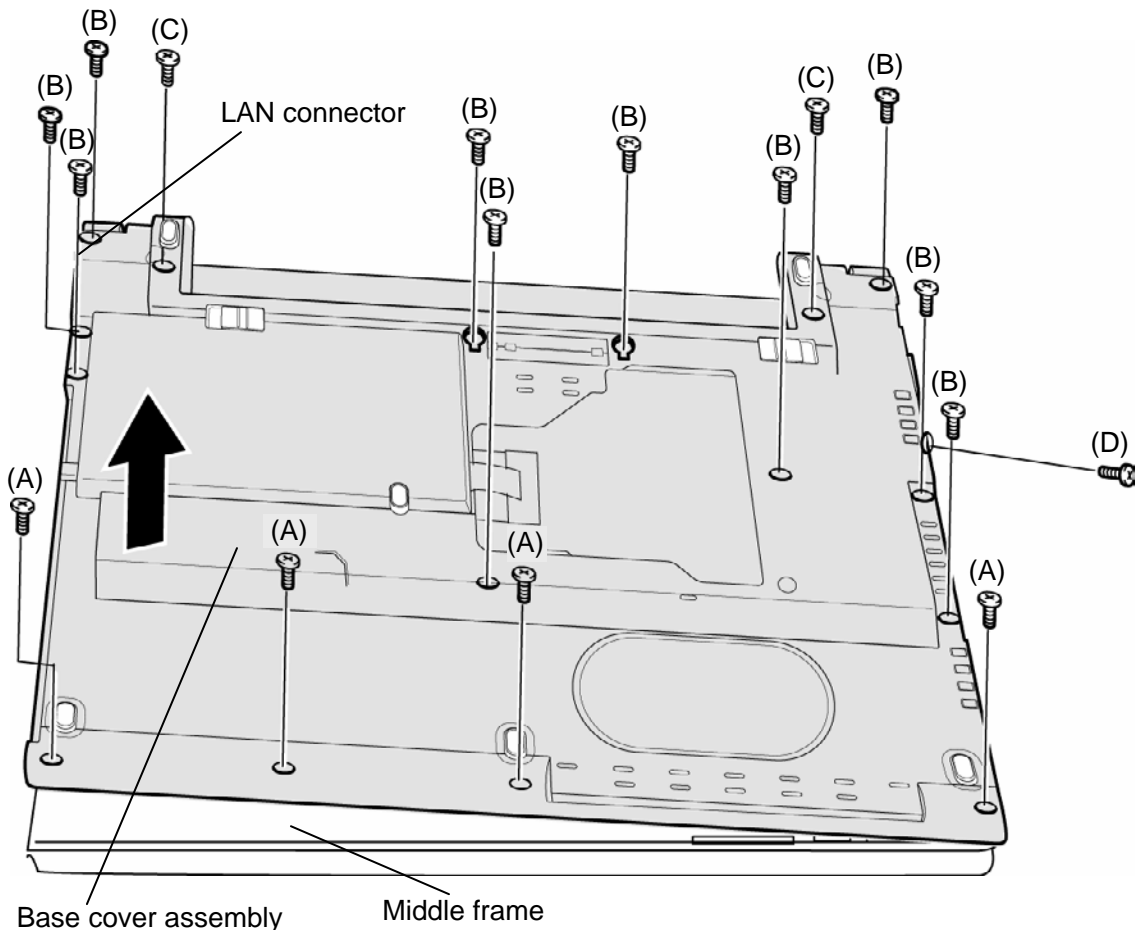


Figure 4-6 Removing the base cover assembly (1)

2. Take out the **tab** under the cover.
3. Lift up the **flip** of the connector and disconnect the **PC card cable** from the connector **CN2110** on the system board while holding the **tab**.

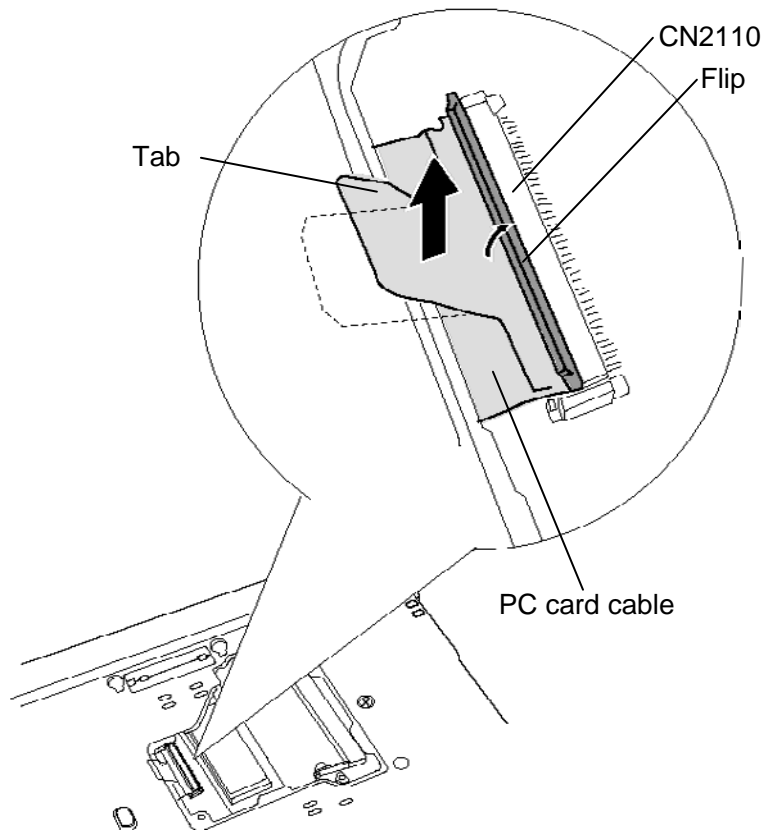


Figure 4-7 Removing the base cover assembly (2)

4. Remove the **base cover assembly** while lifting the LAN connector side first.(See figure 4-6)
5. Peel off the **black tape** from the middle frame.

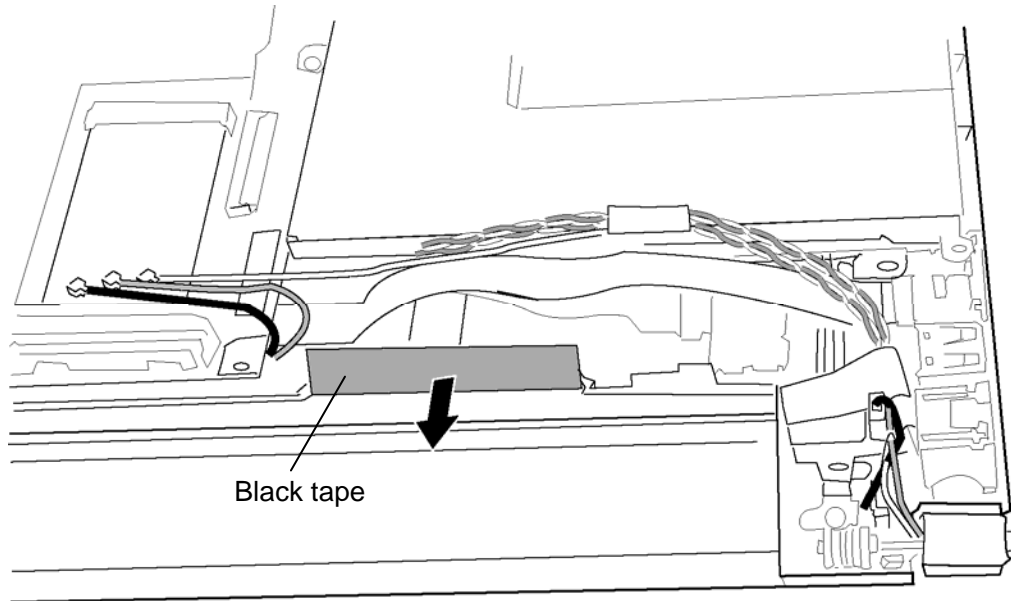


Figure 4-8 Removing the base cover assembly (3)

Installing the Base cover assembly

To install the base cover assembly, follow the steps below and refer to Figure 4-6 to Figure 4-8.

1. Set the **base cover assembly** in place.
2. Secure the **base cover assembly** with the following **screws**.
 - M2×4C S-THIN HEAD screw ×4 (Described as “A” in the figure)
 - M2×6C S-THIN HEAD screw ×10 (Described as “B” in the figure)
 - M2.5×6C S-THIN HEAD screw ×2 (Described as “C” in the figure)
 - M2×2.4C S-THIN HEAD screw ×1 (Described as “D” in the figure)
3. Connect the **PC card cable** to the connector **CN2110** on the system board and insert the **tab** under the cover.
4. Stick the **black tape** to the middle frame in place.

4.7 PC card slot

Removing the PC card slot

To remove the PC card slot, follow the steps below and refer to Figure 4-9.

1. Turn over the base cover assembly.
2. Remove the following **screws** securing the PC card slot.
 - M2×4C S-THIN HEAD screw ×2
 - M2×3C S-THIN HEAD screw ×2
3. Remove the **PC card slot** from the base cover assembly.

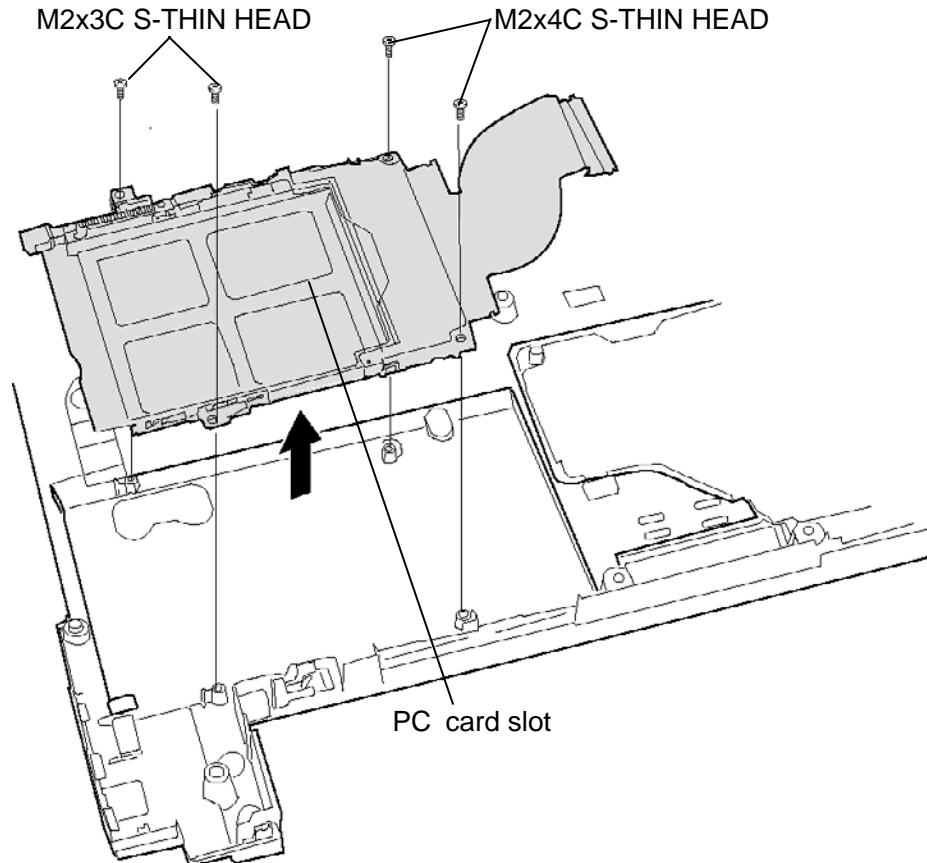


Figure 4-9 Removing the PC card slot

Installing the PC card slot

To install the PC card slot, follow the steps below and refer to Figure 4-9.

1. Set the **PC card slot** to the base cover assembly and secure it with the following screws.

- M2×4C S-THIN HEAD screw ×2
- M2×3C S-THIN HEAD screw ×2

4.8 Battery lock/Battery latch

Removing the Battery lock/Battery latch

To remove the battery lock/battery latch, follow the steps below and refer to Figure 4-10.

1. Remove the **battery lock/battery latch** while pushing hooks inside to release them.

CAUTION: When removing the battery latch, be careful not to lose the spring.

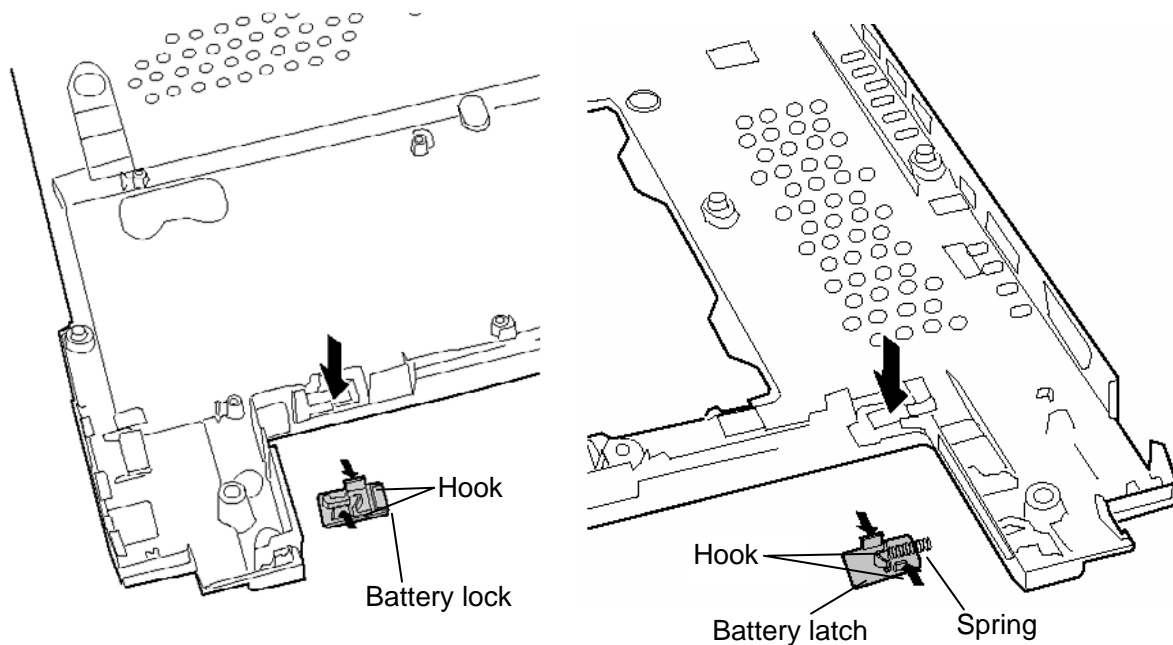


Figure 4-10 Removing the battery lock/battery latch

Installing the Battery lock/Battery latch

To install the battery lock/battery latch, follow the steps below and refer to Figure 4-10.

1. Set (push) the **battery lock/battery latch** to the base cover assembly from the bottom until the **hooks** are engaged.

CAUTION: When installing the battery lock/battery latch, make sure that the direction of installing is correct. After installing, check that the battery lock and battery latch are moved properly.

4.9 Wireless LAN card

Removing the Wireless LAN card

To remove the wireless LAN card, follow the steps below and refer to Figure 4-11.

1. Disconnect three (or two) **wireless LAN antenna cables** from the wireless LAN card.
2. Remove the following **screws** securing wireless LAN card.
 - M2×4C S-THIN HEAD screw ×2
3. Disconnect the **wireless LAN card** from the connector **CN2600** on the system board.

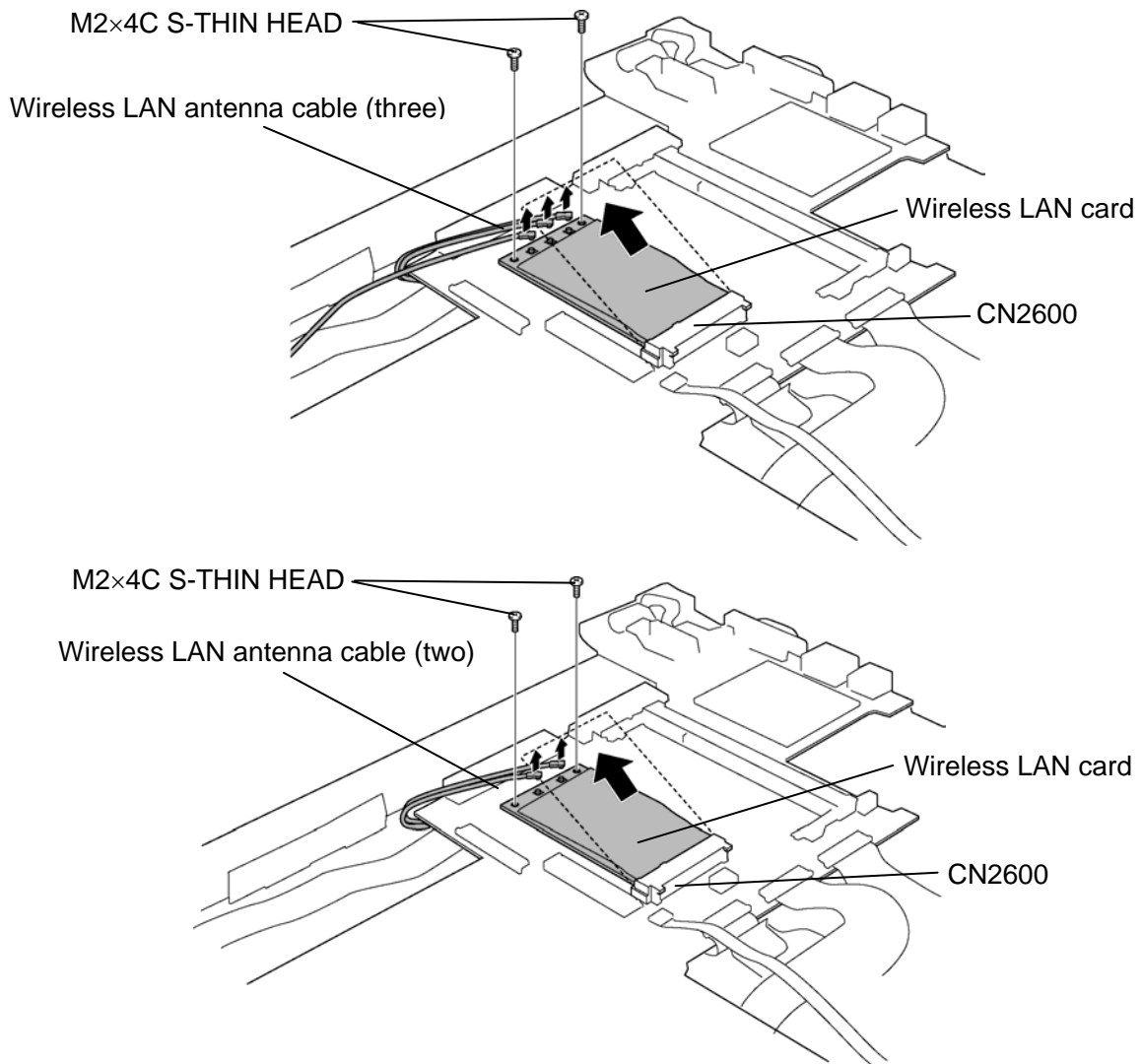


Figure 4-11 Removing the wireless LAN card

CAUTION: Do not touch the connectors on the wireless LAN card on the computer.
Debris on the connectors may cause the wireless LAN card access problems.

Installing the Wireless LAN card

To install the wireless LAN card, follow the steps below and refer to Figure 4-11.

1. Insert the **wireless LAN card** to the connector **CN2600** on the system board slantwise and press it to connect firmly.

CAUTION: Insert the dent of the wireless LAN card to the guide of the slot.

2. Secure the wireless LAN card with the following **screws**.
 - M2×4C S-THIN HEAD screw ×2
3. Connect three (or two) **wireless LAN antenna cables** to the connectors on the wireless LAN card.

NOTE: In the wireless LAN card that has three connectors, connect the white cable to 1, black to 2 and gray to 3 marked on the wireless LAN card.
In the wireless LAN card that has two connectors, connect the white cable to main and black to aux marked on the wireless LAN card.

4.10 CPU fan assembly

Removing the CPU fan assembly

To remove the CPU fan assembly, follow the steps below and refer to Figure 4-12.

CAUTION: *The CPU can become very hot during operation. Be sure to let it cool before starting repair work.
When you remove the CPU fan assembly, wipe the grease off of the bottom of the heat sink and top of the CPU. Apply new grease when installing.*

1. Remove the following **screws** securing the CPU fan assembly.
 - M2×6C S-THIN HEAD ×2
2. Disconnect the **fan cable** from the connector **CN8771** on the system board and remove the **CPU fan assembly** from the slot.

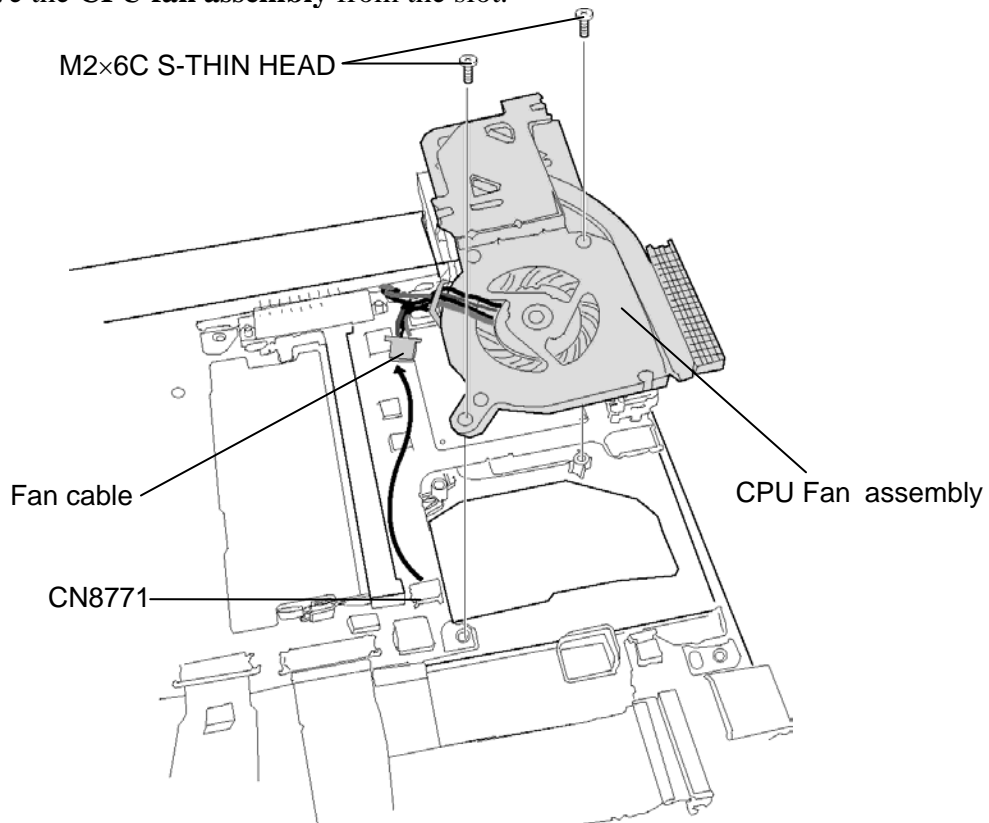


Figure 4-12 Removing the CPU Fan assembly

CAUTION: *Do not apply pressure to the fan.*

Installing the CPU fan assembly

To install the CPU fan assembly, follow the steps below and refer to Figure 4-12 and 4-13.

1. Wipe the grease off of the bottom of the heat sink and top of the CPU.
2. Apply new **grease** on the CPU using a special syringe as shown in the following figure. Apply new grease evenly on the CPU chip.

CAUTION: Apply the silicon grease 0.2g 0.1mL Max to cover the chip surface using the special applicator.
Use a spatula to spread new grease.
The height of new grease shall not be over the height of the CPU chip.

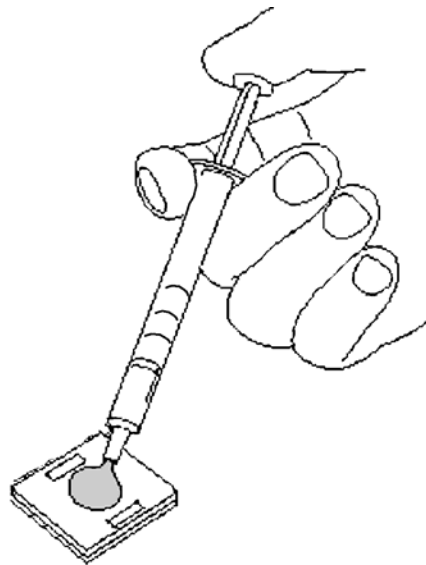
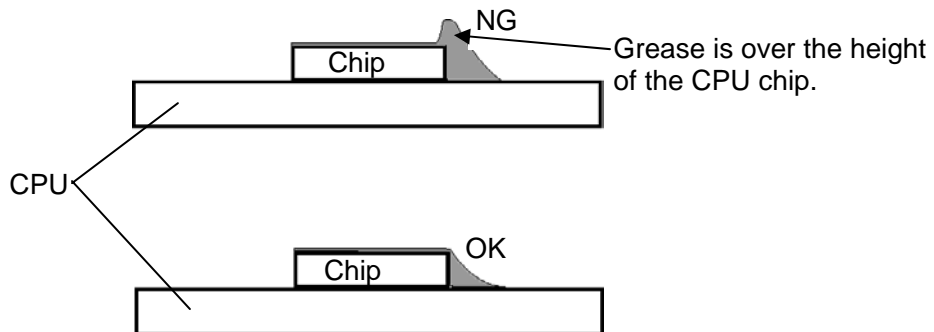
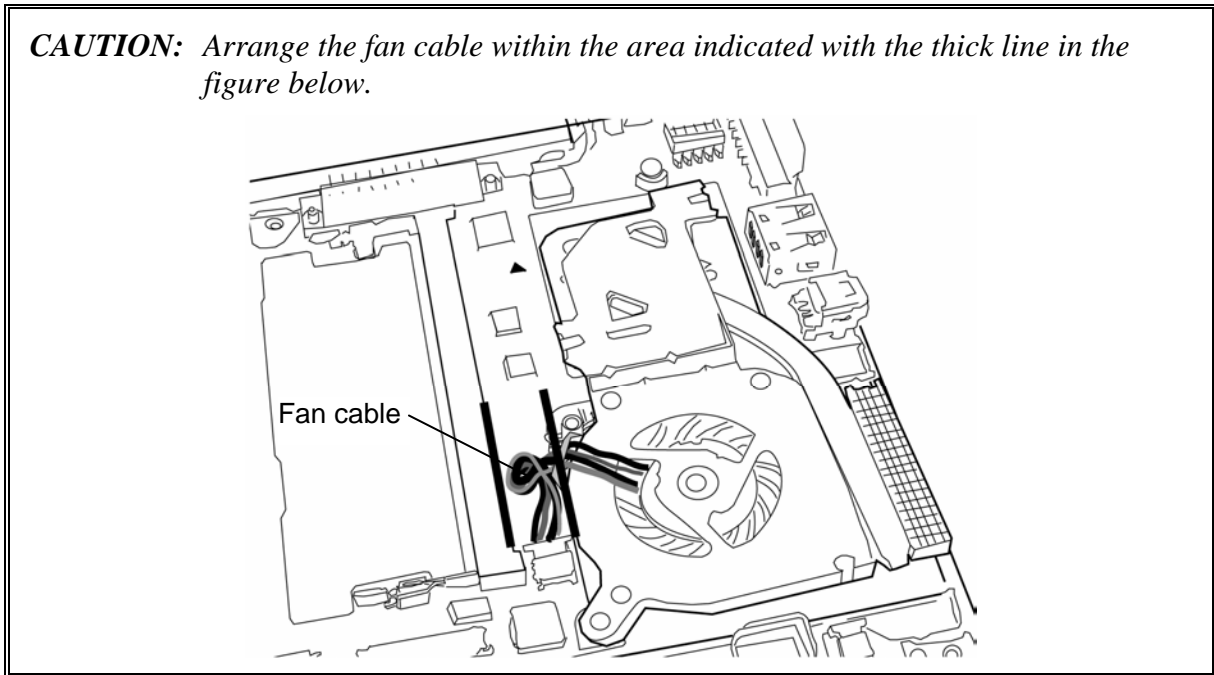


Figure 4-13 Applying new grease

3. Connect the **fan cable** to the connector **CN8771** on the system board.
4. Set the **CPU fan assembly** to the slot and secure it with the following screws.
 - M2×6C S-THIN HEAD ×2

CAUTION: Arrange the fan cable within the area indicated with the thick line in the figure below.



4.11 RTC battery

Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to Figure 4-14.

1. Disconnect the **RTC battery cable** from the connector **CN9300** on the system board.
2. Remove the **RTC battery holder** fixed to the base cover with the **double-sided tape**.

CAUTION: A cushion is fixed to the bottom of the RTC battery holder with a double-sided tape and the cushion is fixed to the base cover with a double-sided tape. When removing the RTC battery holder, be careful not to break the cushion of the bottom of the RTC battery holder.

3. Open the **RTC battery holder** while peeling adhered portion with the **double-sided tape** and remove the **RTC battery** from the RTC battery holder.

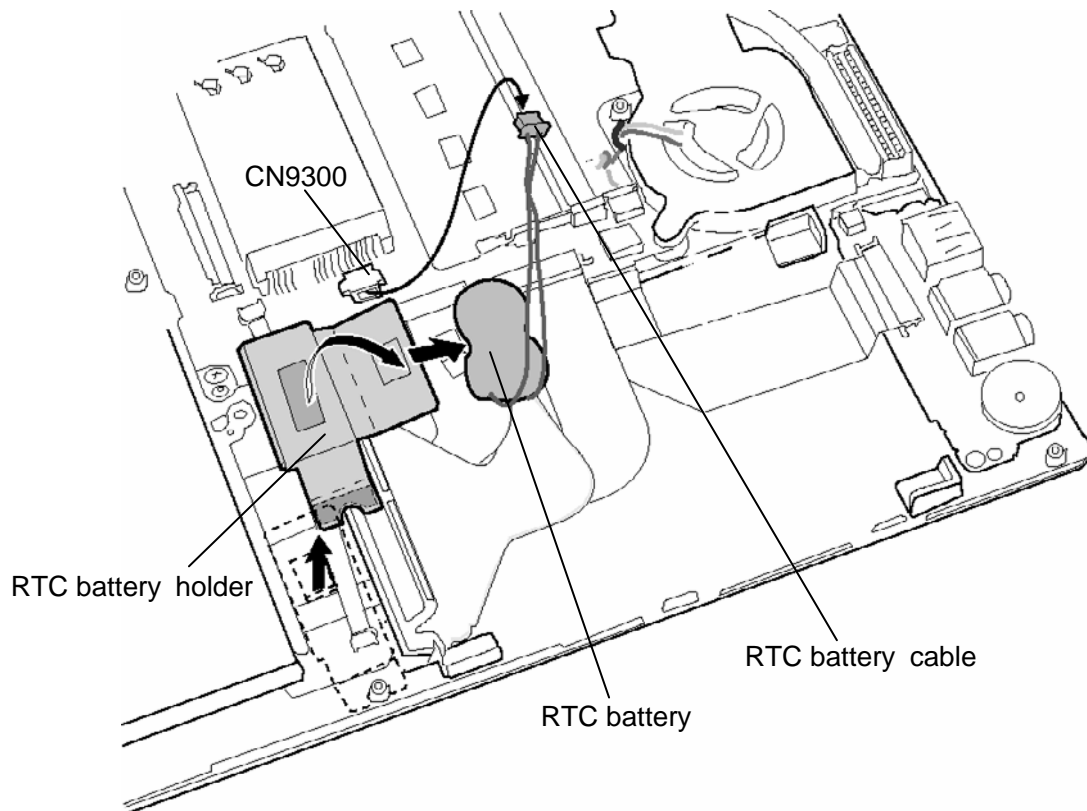


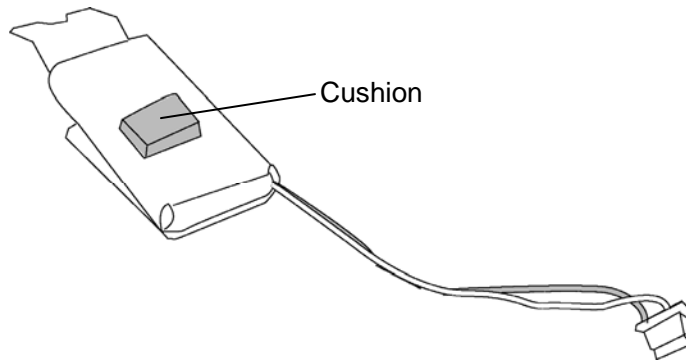
Figure 4-14 Removing the RTC battery

Installing the RTC battery

To install the RTC battery, follow the steps below and refer to Figure 4-14.

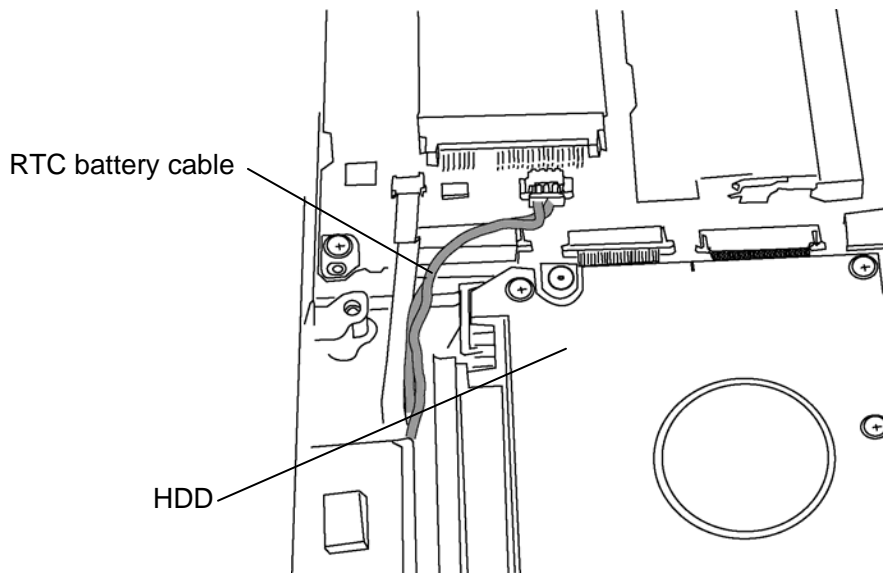
1. Set the **RTC battery** to the RTC battery holder and close of the **RTC battery holder** while adhering the cover portion with the double-sided tape.

CAUTION: When the cushion of the bottom of the RTC battery holder is broken, remove the broken cushion and set a new cushion to the double-side tape on the RTC battery holder.



2. Set (stick) the **RTC battery holder** in place.
3. Connect the **RTC battery cable** to the connector **CN9300** on the system board.

CAUTION: Arrange the RTC battery cable not to be pinched by the HDD as shown in the figure below.



4.12 DC-IN jack

Removing the DC-IN jack

To remove the DC-IN jack, follow the steps below and refer to Figure 4-15.

1. Disconnect the **DC-IN jack cable** from the connector **CN8800** on the system board and remove the **DC-IN jack** from the slot.

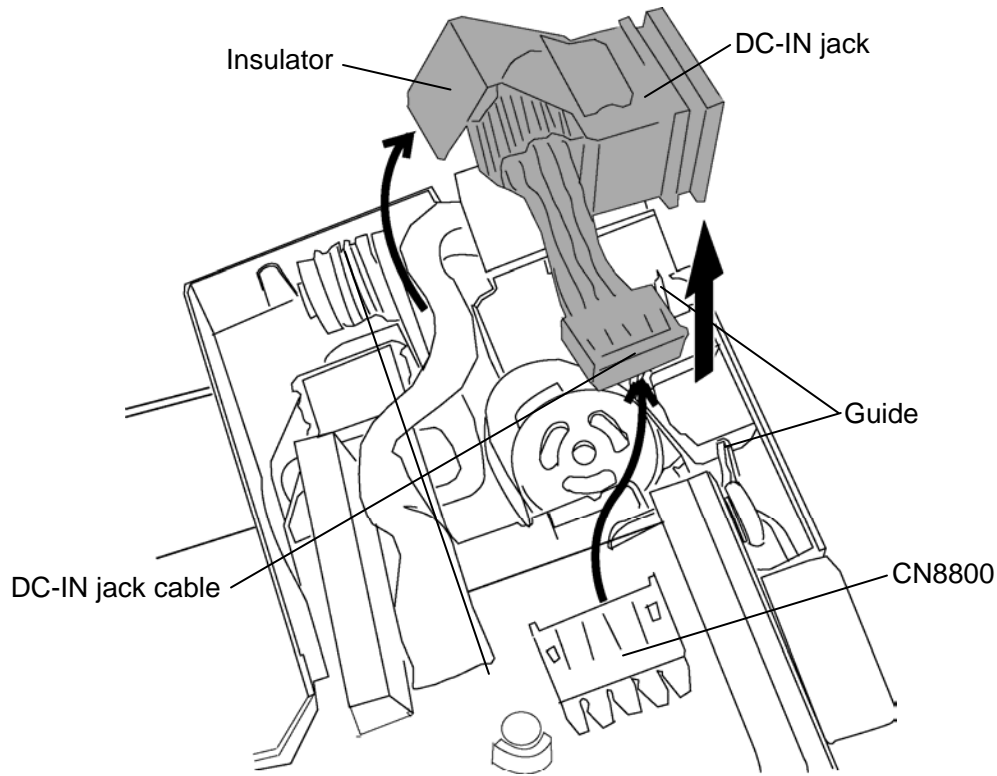


Figure 4-15 Removing the DC-IN jack

Installing the DC-IN jack

To install the DC-IN jack, follow the steps below and refer to Figure 4-15.

1. Set the **DC-IN jack** into the guide of the slot and connect the **DC-IN jack cable** to the connector **CN8800** on the system board.

CAUTION: When installing a new DC-IN jack, stick a new insulator in place.

4.13 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-16.

*The Bluetooth module is not mounted in some models.

1. Disconnect the **USB cable** carefully from the connector **CN9610** on the USB board.
2. Disconnect the **Bluetooth antenna cable** and **Bluetooth cable** from the connector on the Bluetooth module.
3. Remove the following screw and **Bluetooth module**.
 - M2x3C S-THIN HEAD ×1

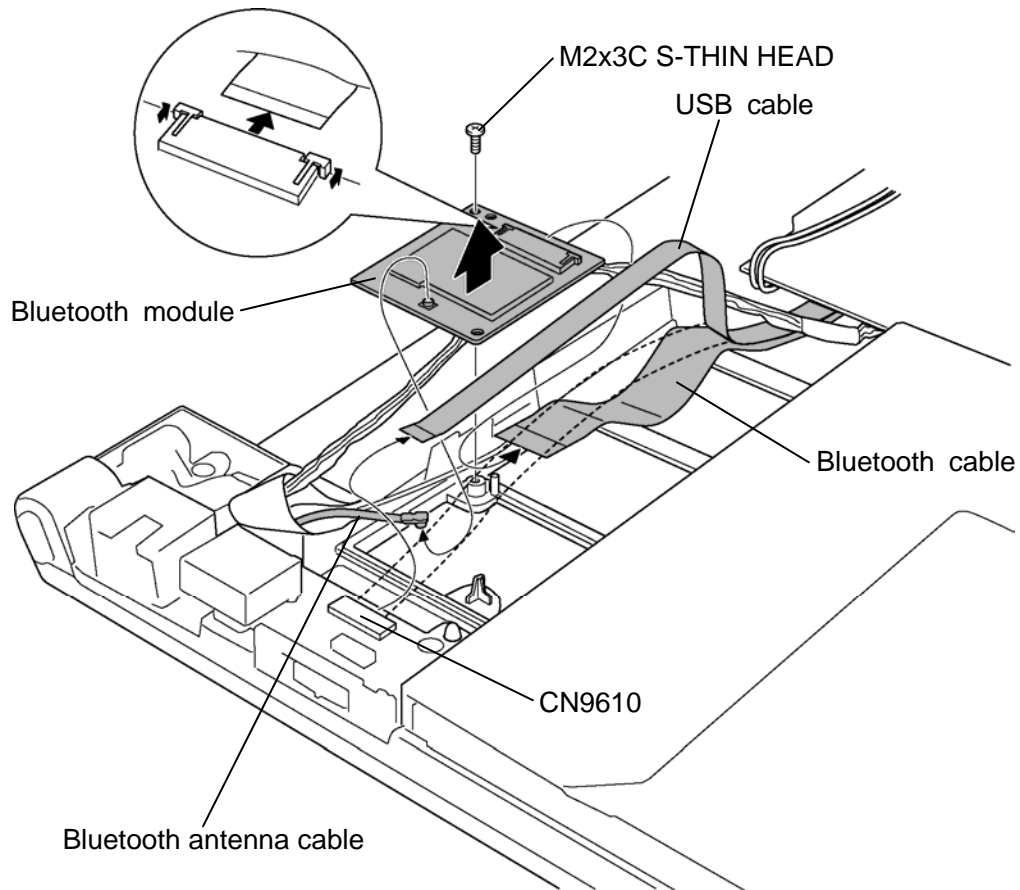


Figure 4-16 Removing the Bluetooth module

Installing the Bluetooth module

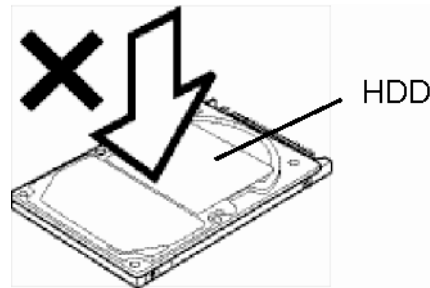
To install the Bluetooth module, follow the steps below and refer to Figure 4-16.

1. Set the **Bluetooth module** to the slot and secure it with the following **screw**.
 - M2×3C S-THIN HEAD ×1
2. Connect the **Bluetooth antenna cable** and **Bluetooth cable** to the connector on the Bluetooth module.
3. Connect the **USB cable** to the connector **CN9610** on the USB board.

CAUTION: *When connecting the USB cable, insert it carefully not to bend the connector portion.*

4.14 HDD/SSD

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



There is a possibility that the black shield layer of the 1.8-inch HDD cable/SSD cable, 2.5-inch HDD cable and SD cable is peeled off (different from the usual polyimide cover), if any tape is stuck to the black shield layer. Handle with care of installing/removing.

- (1) Do not use the 1.8-inch HDD cable/SSD cable, 2.5-inch HDD cable or SD cable which the black shield layer is peeled off.
When the black shield layer of the 1.8-inch HDD cable/SSD cable, 2.5-inch HDD cable and SD cable is peeled off, orange or gray color will appear on the surface.
- (2) Do not stick any tape (except for the insulator stuck to the connector portion) to the black shield layer of the 1.8-inch HDD cable/SSD cable, 2.5-inch HDD cable and SD cable.

4.14.1 2.5" HDD

Removing the 2.5" HDD

To remove the 2.5" HDD, follow the steps below and refer to Figure 4-17.

1. Lift up the **2.5" HDD** in the direction of the arrow in the figure below.
2. Disconnect the **2.5" HDD cable** from the connector on the 2.5" HDD.

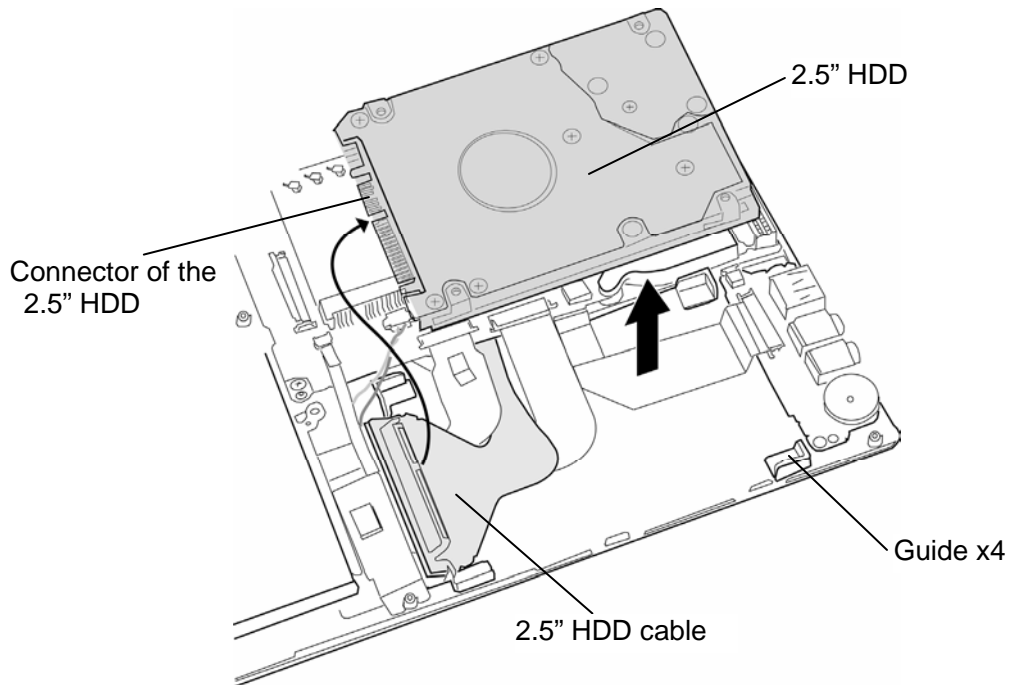


Figure 4-17 Removing the 2.5" HDD

Installing the 2.5" HDD

To install the 2.5" HDD, follow the steps below and refer to Figure 4-17.

1. Connect the **2.5" HDD cable** to the connector on the 2.5" HDD.
2. Set the **2.5" HDD** into the **guides** of the slot.

4.14.2 1.8" HDD

Removing the 1.8" HDD

To remove the 1.8" HDD, follow the steps below and refer to Figure 4-18.

1. Turn over the 1.8" HDD in the direction of the arrow in the figure below and remove four **cushions** from the 1.8" HDD.
2. Disconnect the **1.8" HDD cable** from the connector on the 1.8" HDD.

CAUTION: The 1.8-inch HDD cable and SSD cable are the same.

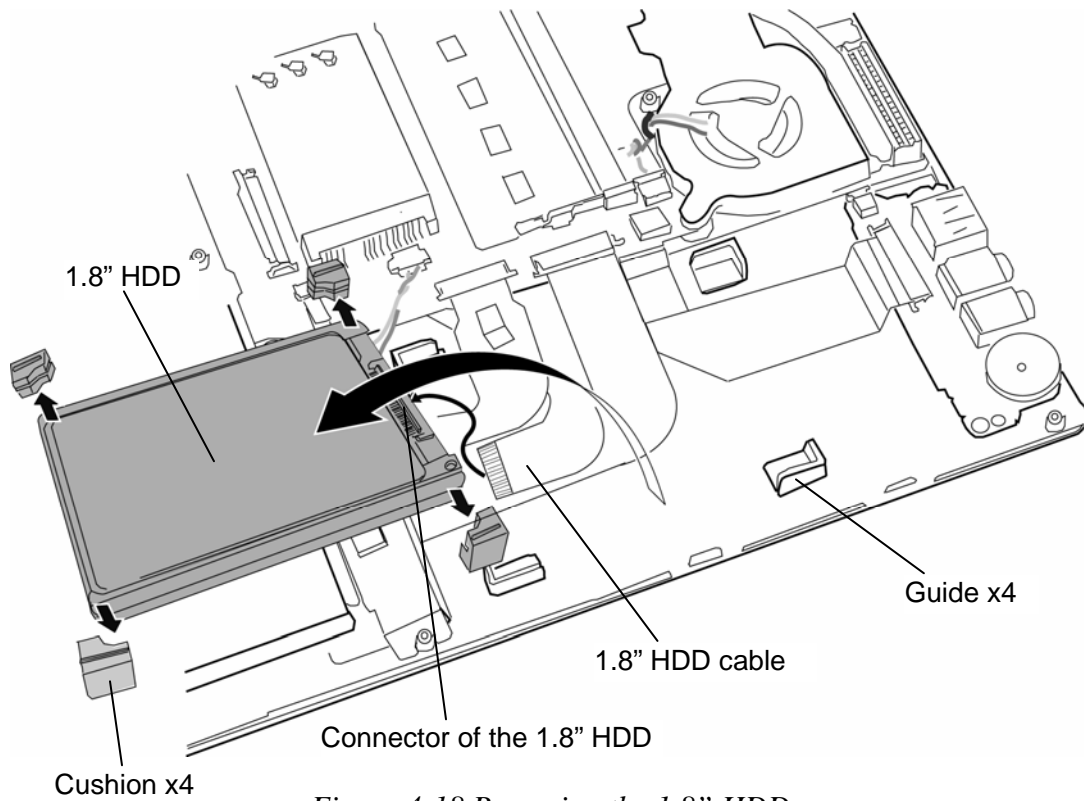


Figure 4-18 Removing the 1.8" HDD

Installing the 1.8" HDD

To install the 1.8" HDD, follow the steps below and refer to Figure 4-18.

1. Set four **cushions** to the 1.8" HDD.
2. Turn over the 1.8" HDD and connect the **1.8" HDD cable** to the connector on the 1.8" HDD.
3. Turn the **1.8" HDD** face up and set it into the **guides** of the slot.

CAUTION: *There are two types of system board for 2.5" HDD and 1.8" HDD. When connecting the 1.8" HDD to the system board for 2.5" HDD, the 1.8" HDD shall be broken. Do not connect the 1.8" HDD to the system board for 2.5" HDD.*

4.14.3 SSD

Removing the SSD

To remove the SSD, follow the steps below and refer to Figure 4-19.

1. Remove the following **screws** and **SSD**. (SSD cable is connected on the back of the SSD)
 - M1.4x3C S-THIN HEAD ×3
2. Disconnect the **SSD cable** from the connector on the SSD.

CAUTION: The 1.8-inch HDD cable and SSD cable are the same.

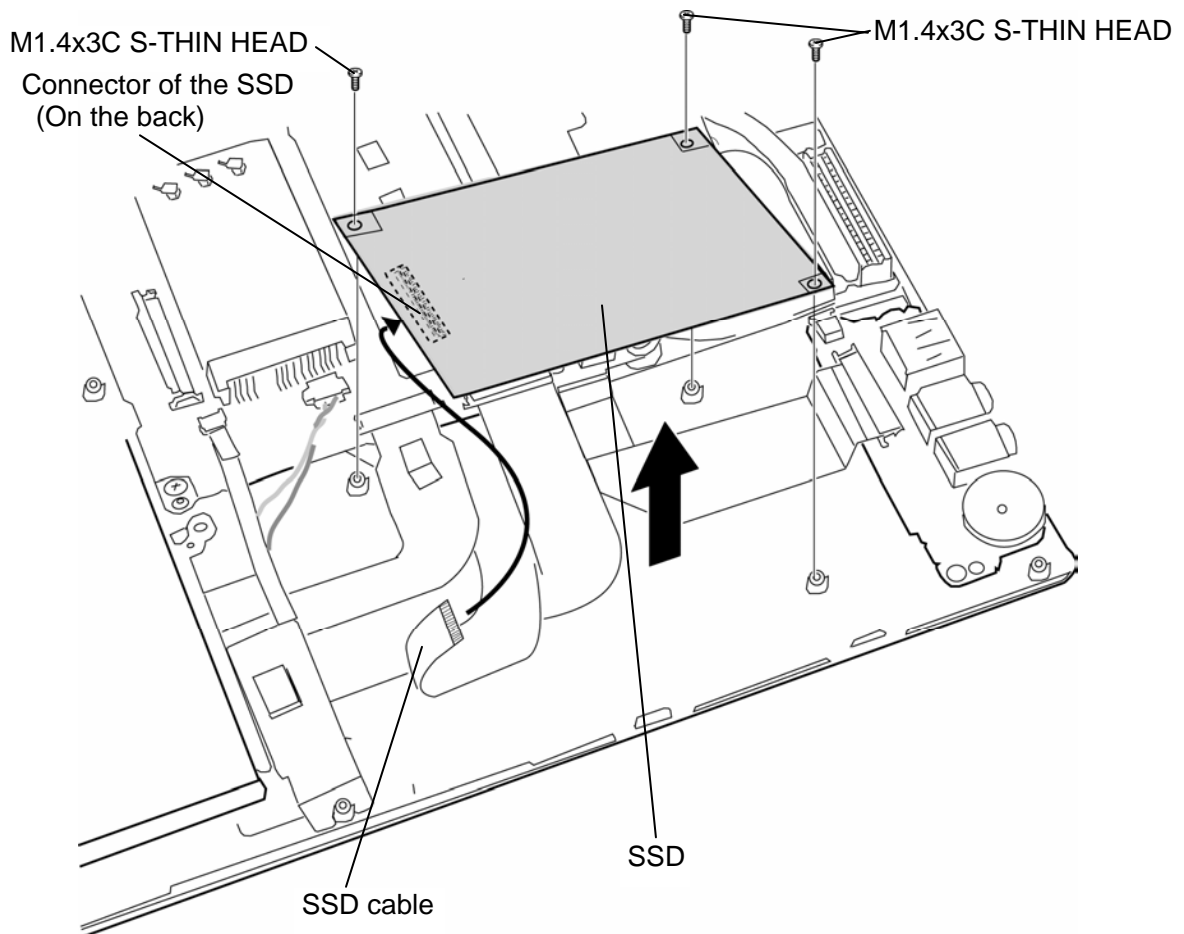


Figure 4-19 Removing the SSD

Installing the SSD

To install the SSD, follow the steps below and refer to Figure 4-19.

1. Connect the **SSD cable** to the connector on the SSD.
2. Set the **SSD** into the slot and secure it with the following **screws**.
 - M1.4×3C S-THIN HEAD ×3

4.15 Sound board/Internal microphone

Removing the Sound board/Internal microphone

To remove the sound board/internal microphone, follow the steps below and refer to Figure 4-20 and Figure 4-21.

1. Remove the following **screw** securing the sound board.
 - M2×4C S-THIN HEAD ×1
2. Disconnect the **sound cable** and **speaker cable** from the connector **CN9510** and **CN6350** on the sound board and remove the **sound board** from the slot.

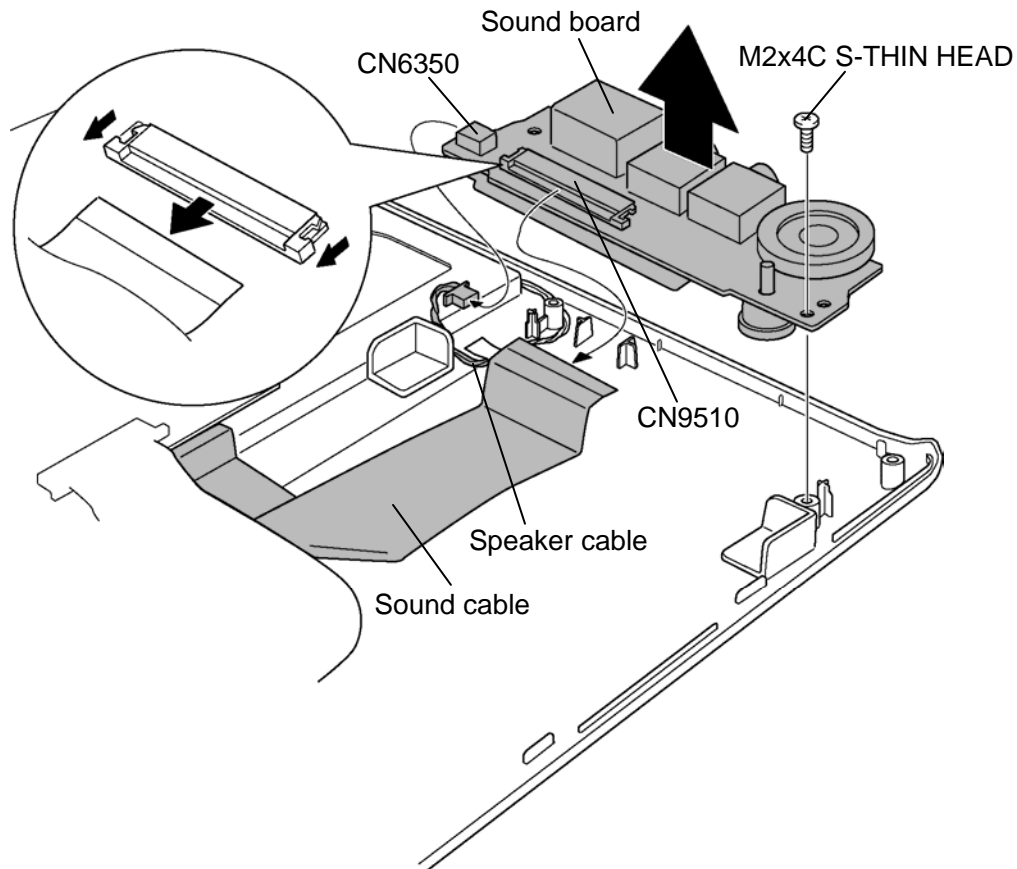


Figure 4-20 Removing the sound board/internal microphone (1)

3. Disconnect the **microphone cable** from the connector **CN6050** on the sound board and remove the **internal microphone** from the sound board.

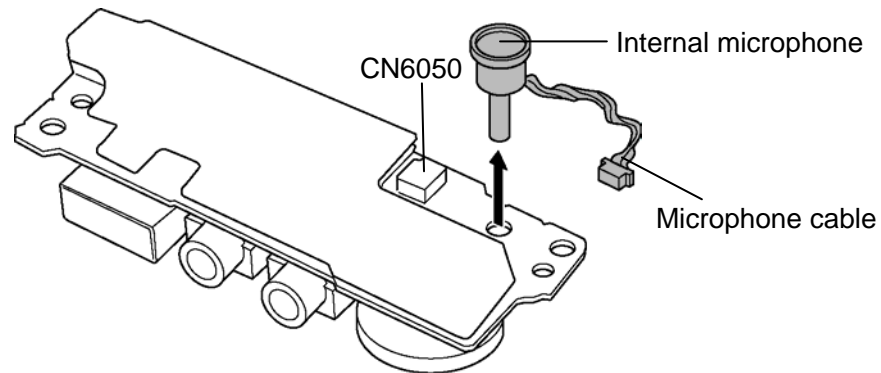


Figure 4-21 Removing the sound board/internal microphone (2)

Installing the Sound board/Internal microphone

To install the sound board/internal microphone, follow the steps below and refer to Figure 4-20 and 4-21.

1. Set the internal microphone to the slot of the sound board and connect the **microphone cable** to the connector **CN6050** on the sound board.
2. Connect the **sound cable** and **speaker cable** to the connector **CN9510** and **CN6350** on the sound board.
3. Set the **sound board** to the slot and secure it with following **screw**.
 - M2×4C S-THIN HEAD ×1

4.16 ODD/SD board

Removing the ODD/SD board

To remove the ODD/SD board, follow the steps below and refer to Figure 4-22 to 4-24.

1. Disconnect the **FP cable** carefully from the connector **CN9800** on the system board.
2. Disconnect the **SD cable** from the connector **CN9700** on the system board.
3. Stand the ODD and remove the following **screws**.
 - M2×3C S-THIN HEAD ×2
4. Slide the SD board outside and lift up the **SD board** and **ODD** to remove. (SD cable is fixed to the middle frame by the **double-sided tape**.)

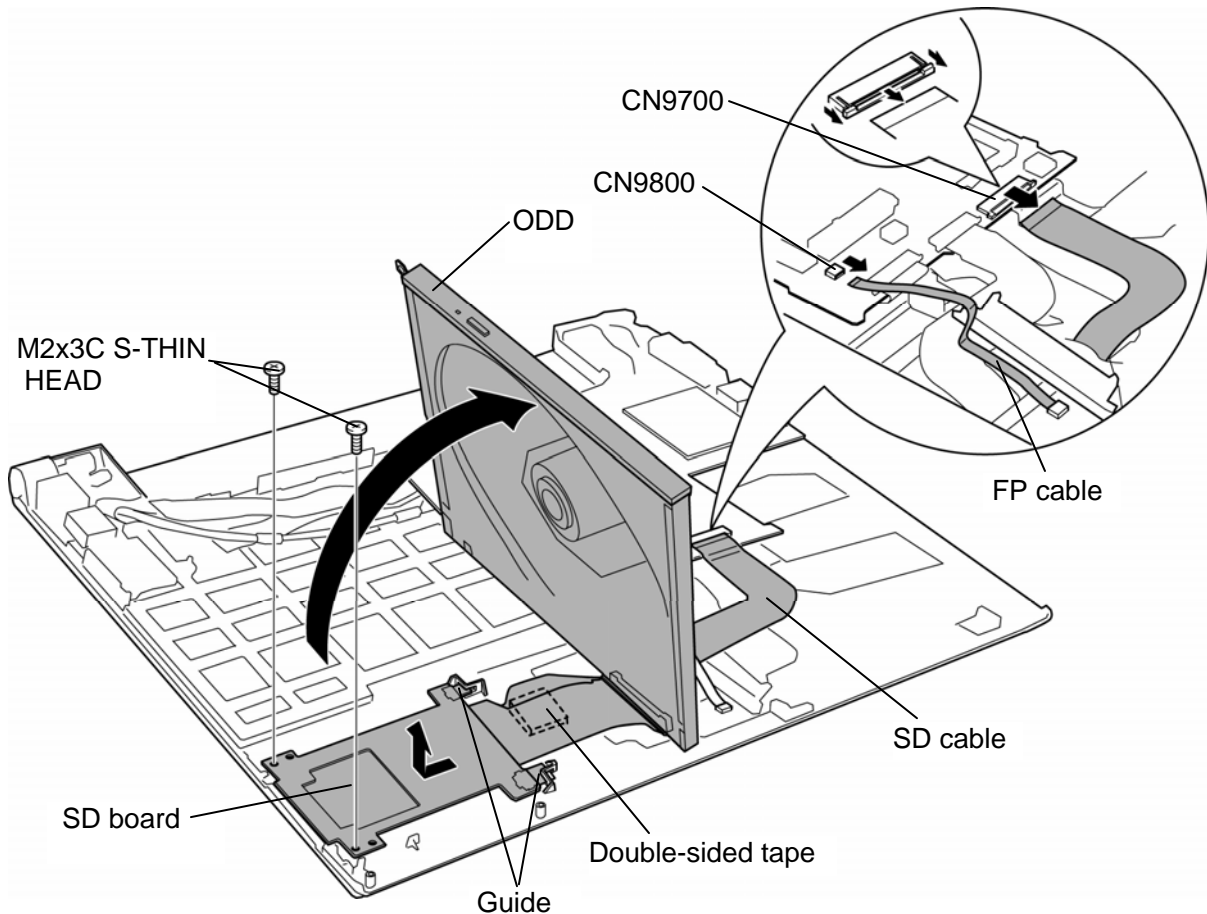


Figure 4-22 Removing the ODD/SD board (1)

5. Disconnect the **SD cable** and **ODD cable** from the connectors **CN9710** and **CN1820** on the SD board.

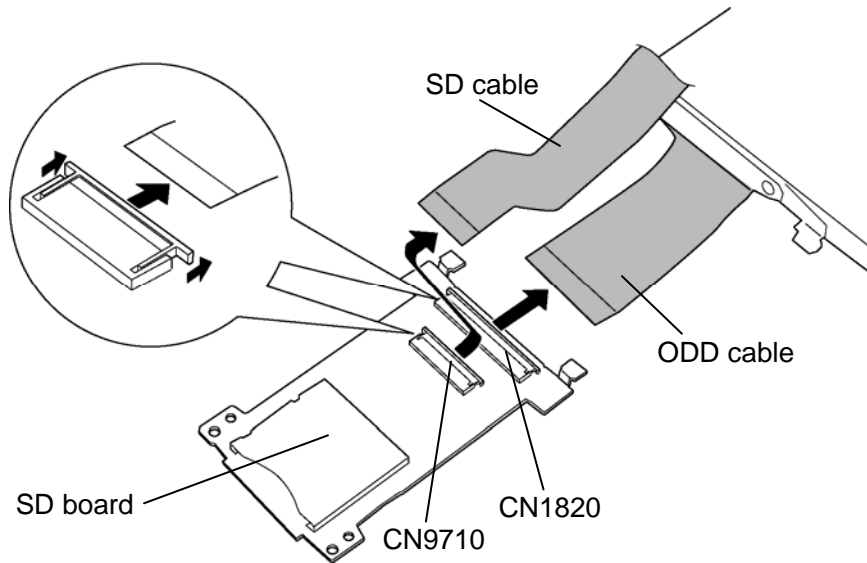


Figure 4-23 Removing the ODD/SD board (2)

6. Remove the following **screws** and two **metal plates** from the ODD.

- M2×4C S-THIN HEAD ×2

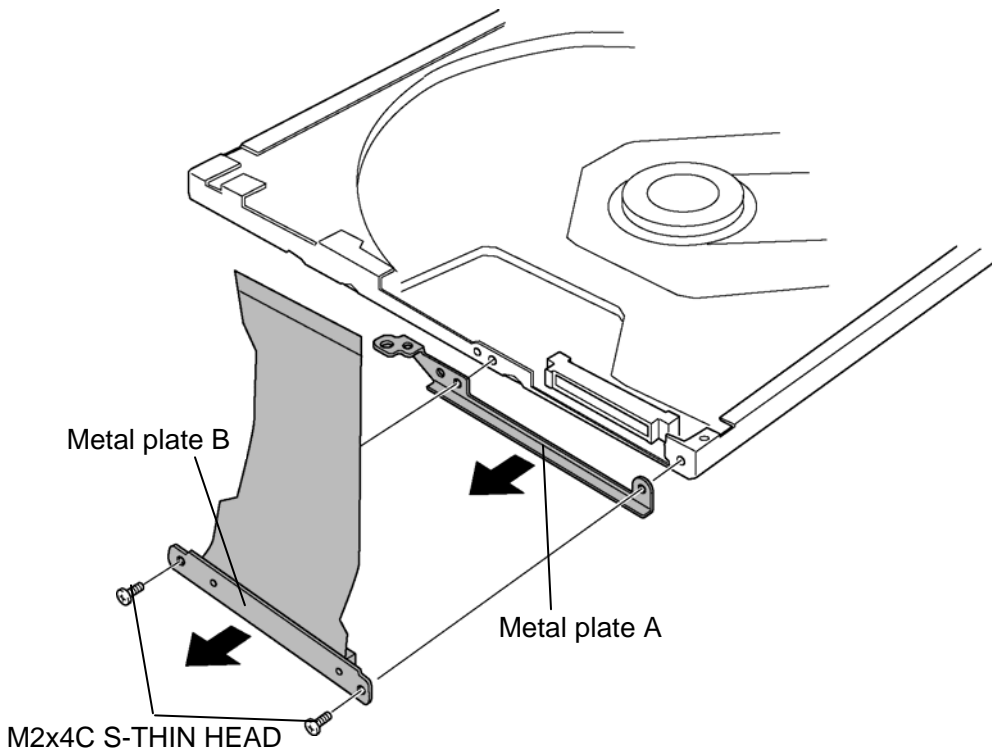


Figure 4-24 Removing the ODD/SD board (3)

Installing the ODD/SD board

To install the ODD/SD board, follow the steps below and refer to Figure 4-22 to 4-24.

1. Set two **metal plates** to the ODD and secure them with the following **screws**.
 - M2×4C S-THIN HEAD ×2
2. Connect the **SD cable** and **ODD cable** to the connectors **CN9710** and **CN1820** on the SD board.
3. Peel off the **double-side tape** on the middle frame.
4. Stick a new **double-sided tape** and peel off the separator.
5. Stand the ODD and install the **SD board** with the edge under the **guides**.
6. Secure the SD board with the following **screws**.
 - M2×3C S-THIN HEAD ×2
7. Set the **ODD** in place.

CAUTION: *The laser beam goes out when turning on the power of the computer, because there is no cover on the ODD. The power must be turned off when you remove or install the ODD.*

8. Connect the **SD cable** and **FP cable** to the connectors **CN9700** and **CN9800** on the system board.

CAUTION: *When connecting the FP cable, insert it carefully not to bend the connector portion.*

4.17 USB board/Switch unit

Removing the USB board/Switch unit

To remove the USB board/switch unit, follow the steps below and refer to Figure 4-25 and 4-26.

1. Open the **insulator** and peel off the **glass tape** fixing the LAN cable.
2. Take out the **LAN jack** from the slot.
3. Disconnect the **sensor cable** from the connector **CN9620** on the USB board.
4. Remove the following **screw** and **USB board**.

- M2×3C S-THIN HEAD ×1

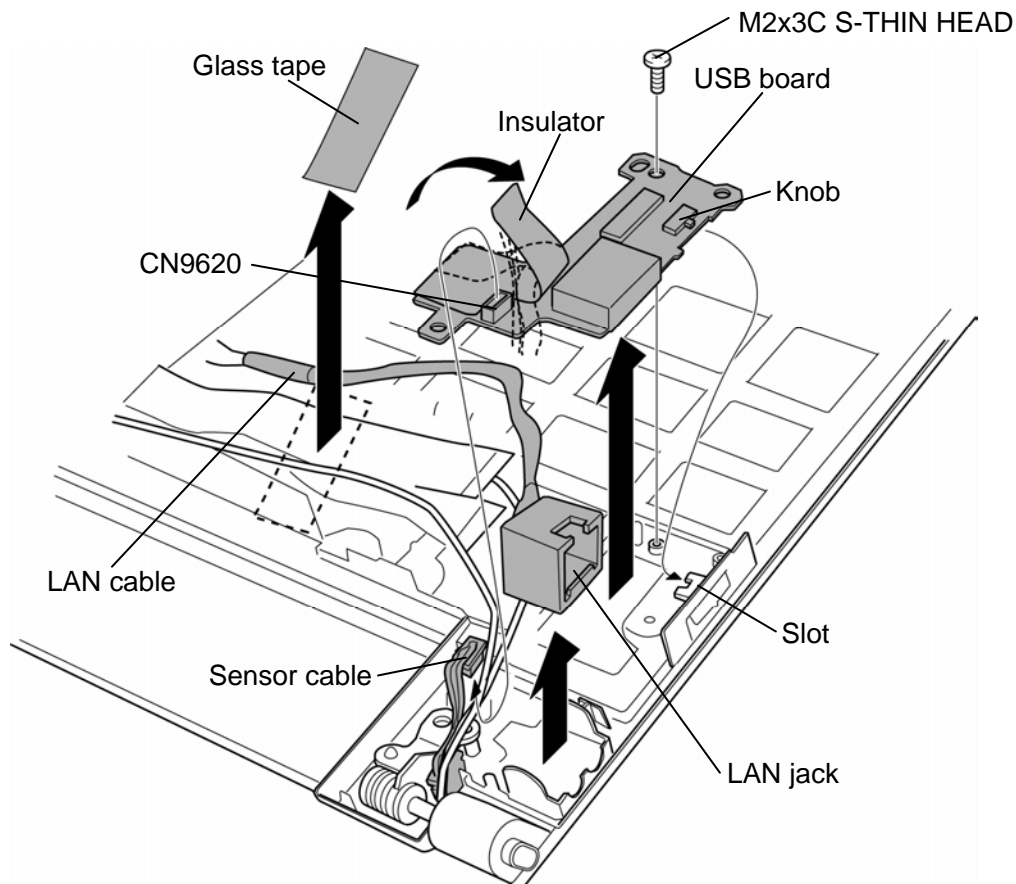


Figure 4-25 Removing the USB board/switch unit (1)

5. Remove the **switch unit** adhered with the double-sided tape.

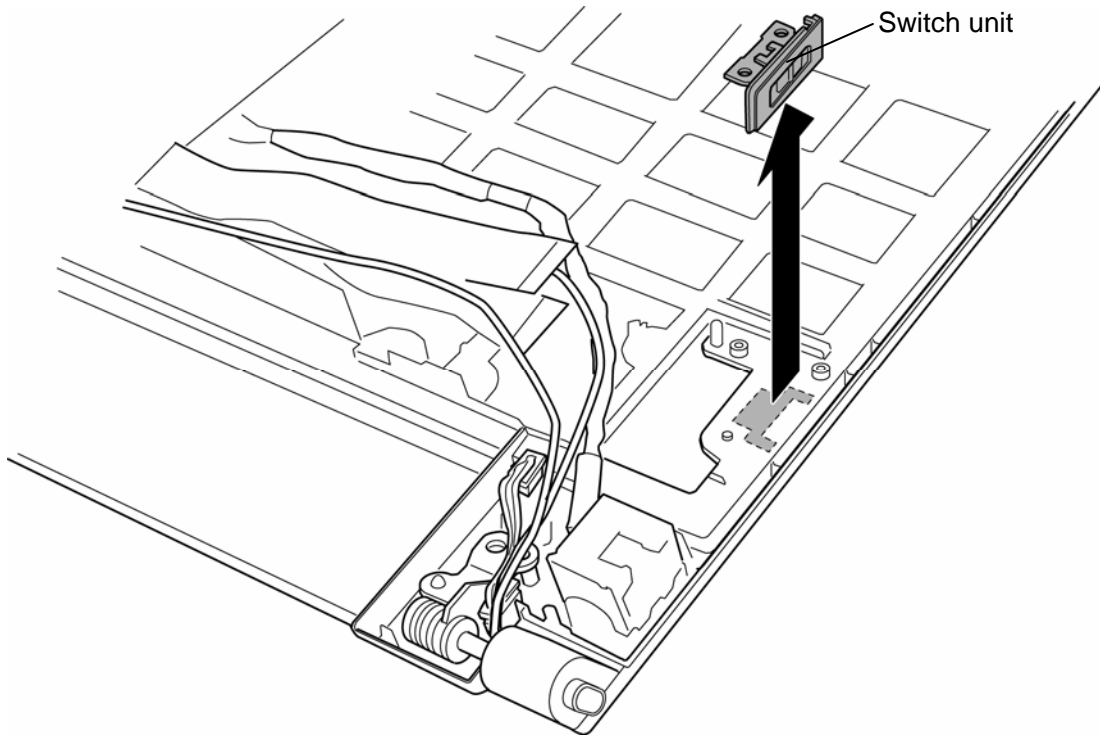


Figure 4-26 Removing the USB board/switch unit (2)

Installing the USB board/switch unit

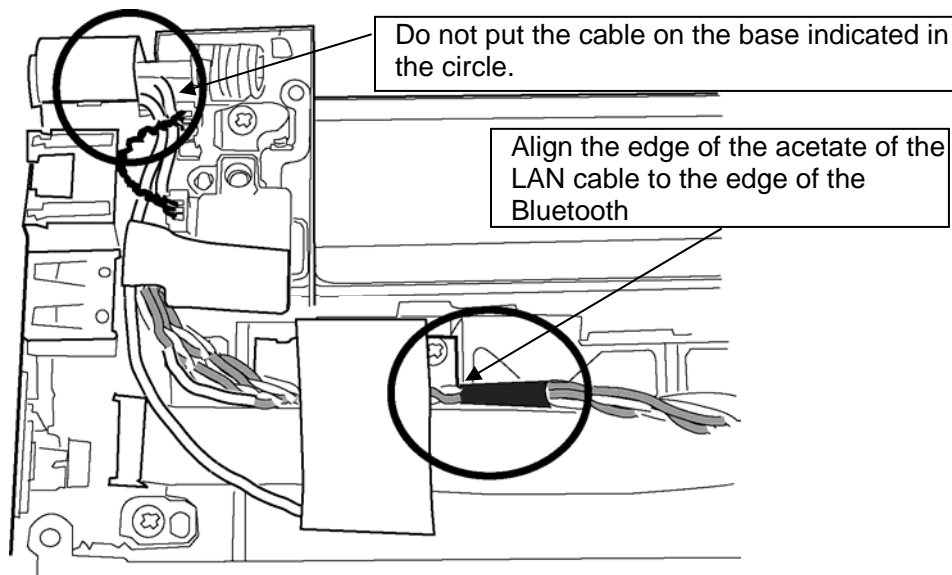
To install the USB board/switch unit, follow the steps below and refer to Figure 4-25 and 4-26.

1. Set the **switch unit** while adhering the double-sided tape.
2. Insert the **USB board** and secure it with the following **screw**.
 - M2×3C S-THIN HEAD ×1

CAUTION: When installing the USB board, align the switch knob of the USB board to the slot of the switch unit.
A double-sided tape is stuck to a new switch unit. Wipe off the double-sided tape adhered.

3. Connect the **sensor cable** to the connector **CN9620** on the USB board.
4. Install the **LAN jack** into the slot and fix the LAN cable with the **insulator** and **glass tape**.

CAUTION: When installing the LAN jack and arranging the LAN cable, follow the procedure indicated in the figure below.



4.18 System board

Removing the System board

To remove the system board, follow the steps below and refer to Figure 4-27 and 4-28.

1. Remove the following **screws** securing the system board.
 - M2×4C S-THIN HEAD ×1
 - M3×5C BIND ×2
2. Peel off the **glass tape** and disconnect the **LCD cable**, **TP cable** and **KB cable** from the connectors **CN5601**, **CN9850** and **CN3230** on the system board.
3. Remove the **system board**.

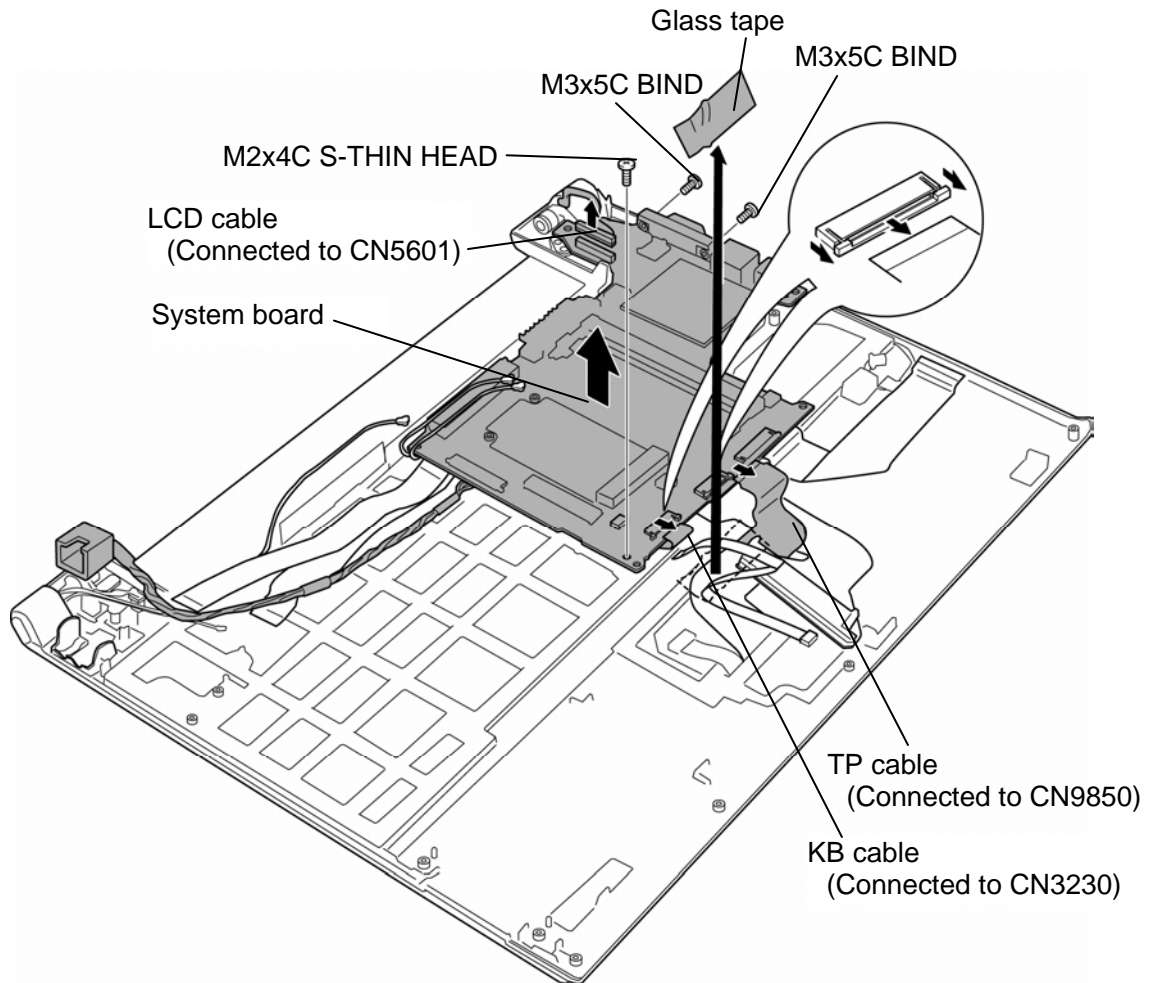


Figure 4-27 Removing the system board (1)

4. Disconnect the **HDD cable** (or **SSD cable**), **USB cable**, **LAN cable**, **sound cable** and **BT cable** from the connectors **CN1800**, **CN9600**, **CN4100**, **CN9500** and **CN4400** on the system board.

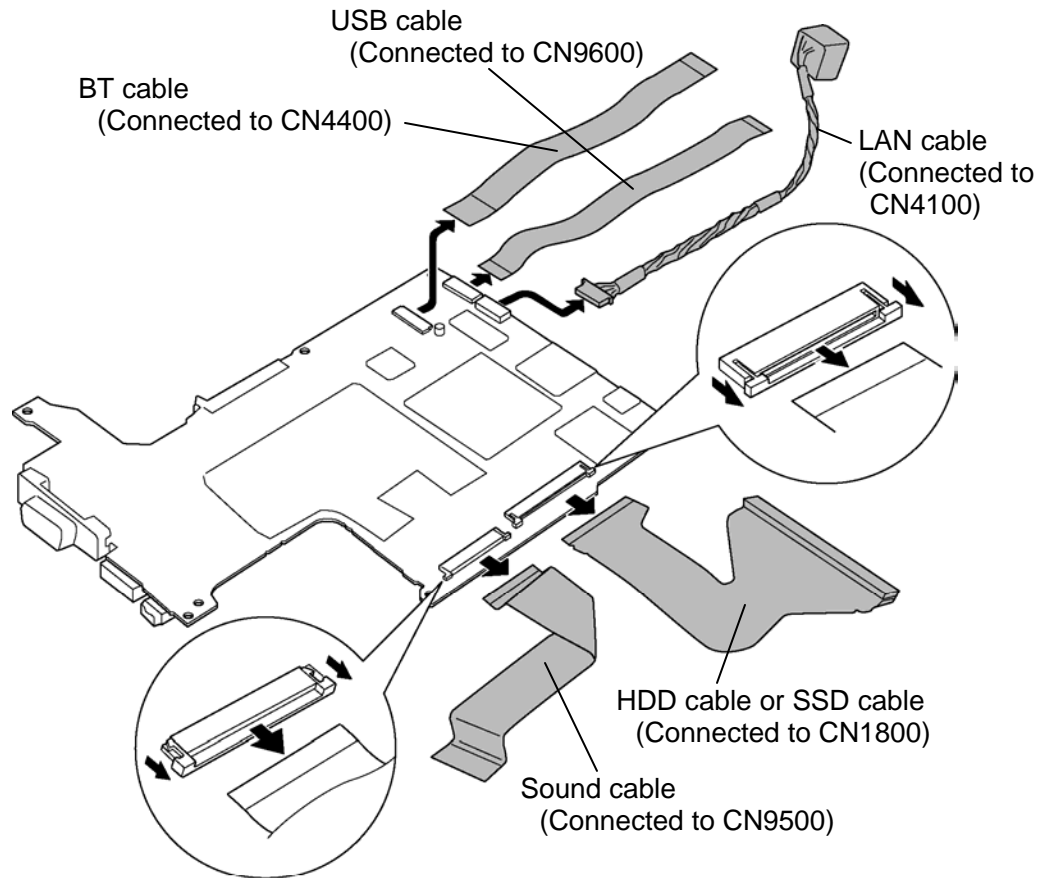


Figure 4-28 Removing the system board (2)

Installing the System board

To install the system board, follow the steps below and refer to Figure 4-27 and 4-28.

1. Connect the **HDD cable** (or **SSD cable**), **USB cable**, **LAN cable**, **sound cable** and **BT cable** to the connectors **CN1800**, **CN9600**, **CN4100**, **CN9500** and **CN4400** on the system board.
2. Set the **system board** in place and connect the **LCD cable**, **TP cable** and **KB cable** to the connectors **CN5601**, **CN9850** and **CN3230** on the system board, then stick the **glass tape**.
3. Secure the system board with the following **screws**.
 - M2×4C S-THIN HEAD ×1
 - M3×5C BIND ×2

4.19 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-29.

1. Peel off the **polyimide tape**.

CAUTION: Do not reuse the removed polyimide tape.

2. Take out the **speaker** from the slot.
3. Open four **insulators** and remove the **speaker cable** from the slot.

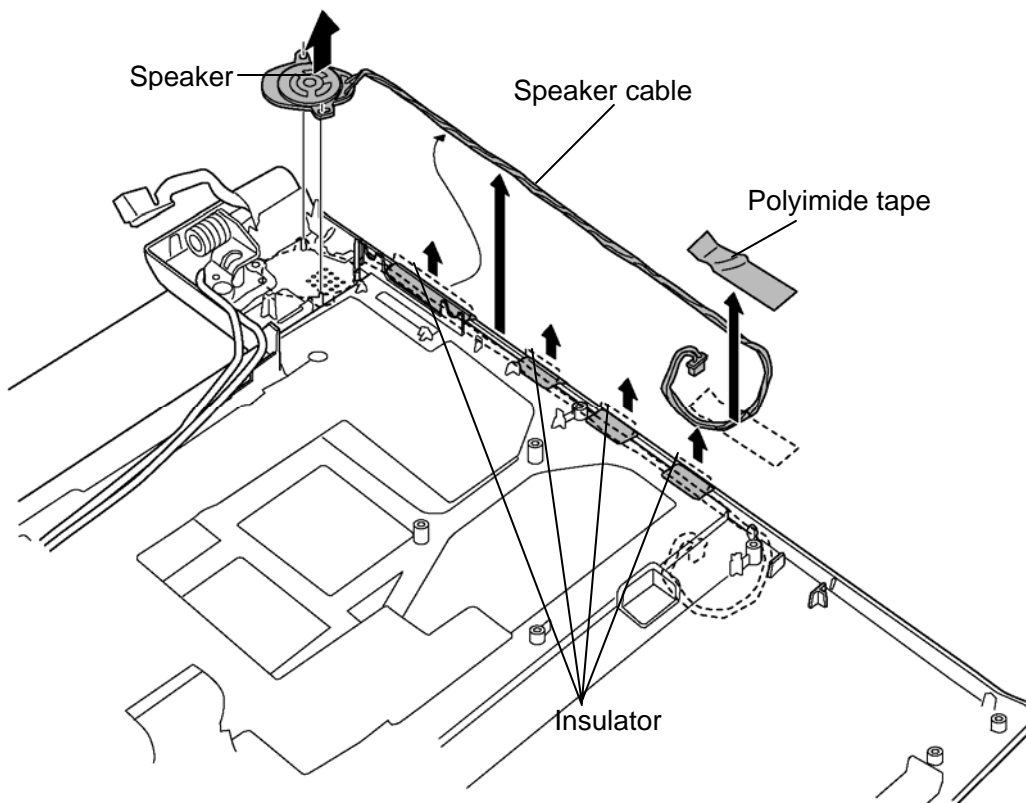


Figure 4-29 Removing the speaker

Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-29.

1. Set the **speaker** to the slot.
2. Open four **insulators** and arrange the **speaker cable** into the slot.
3. Close four **insulators** to fix the speaker cable.
4. Stick a new **polyimide tape** in place to fix the speaker cable.

4.20 Display portion

Removing the Display portion

To remove the display portion, follow the steps below and refer to Figure 4-30 to 4-32.

1. Open the display 90 degrees and put the computer on the stand.
2. Pull out the **wireless LAN antenna cables** under the **insulator**.
3. Remove the following **screws** securing the hinge.
 - M2.5x4C S-THIN HEAD ×2
4. Lift the **display portion** a little and remove it from the **middle frame**.

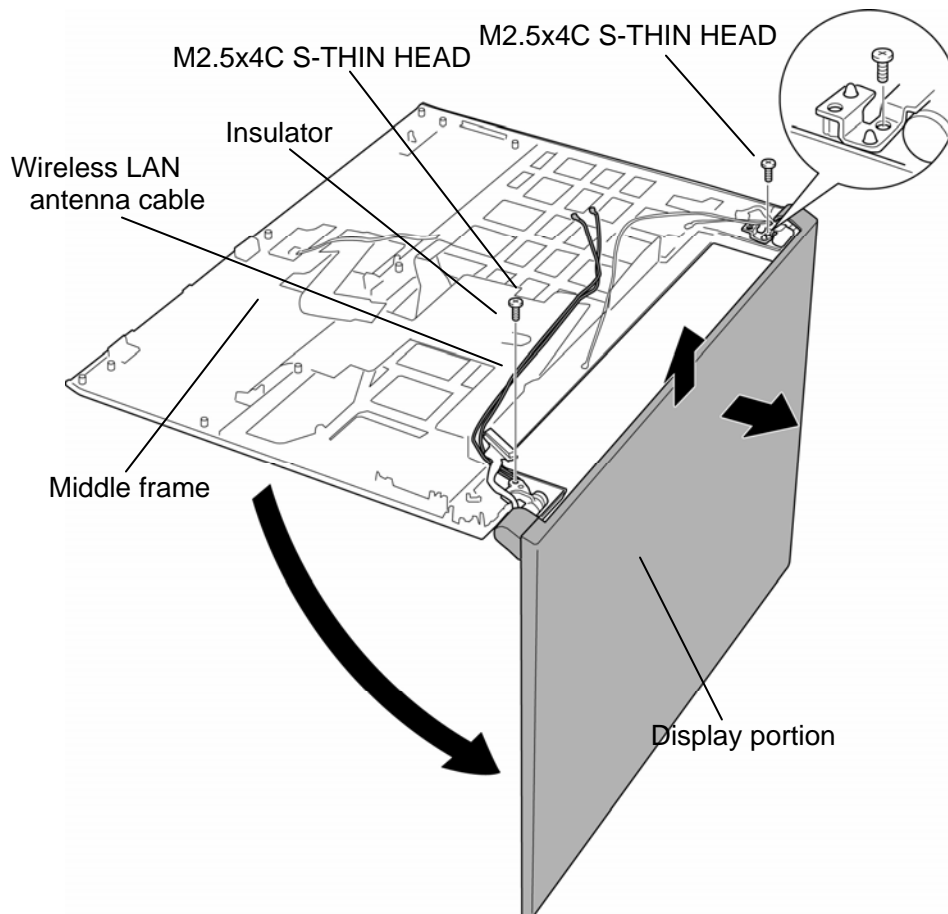


Figure 4-30 Removing the display portion (1)

5. Push the **hook** outside and remove the **application button holder**.
6. Disconnect the **sensor cable** from the connector on the sensor board.
7. Remove the **sensor board** from the application button holder.

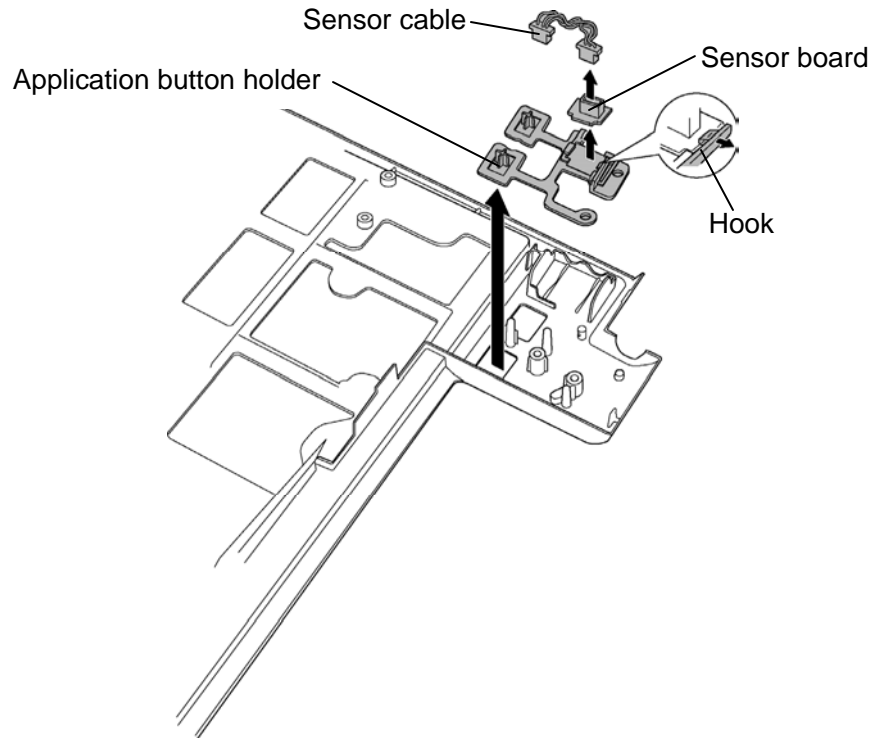


Figure 4-31 Removing the display portion (2)

8. Remove the **power switch holder** from the slot.

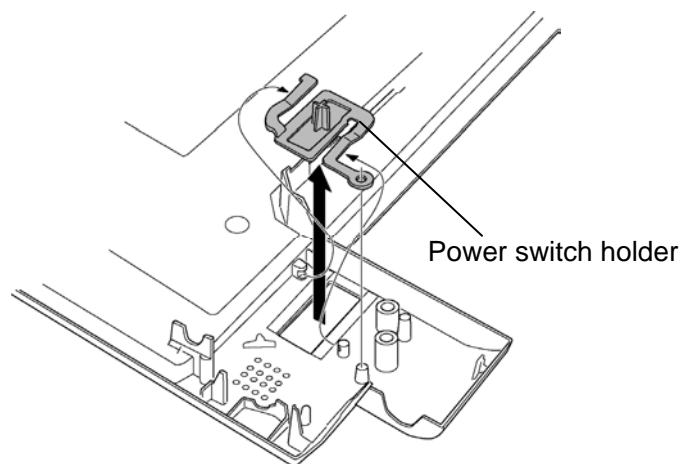


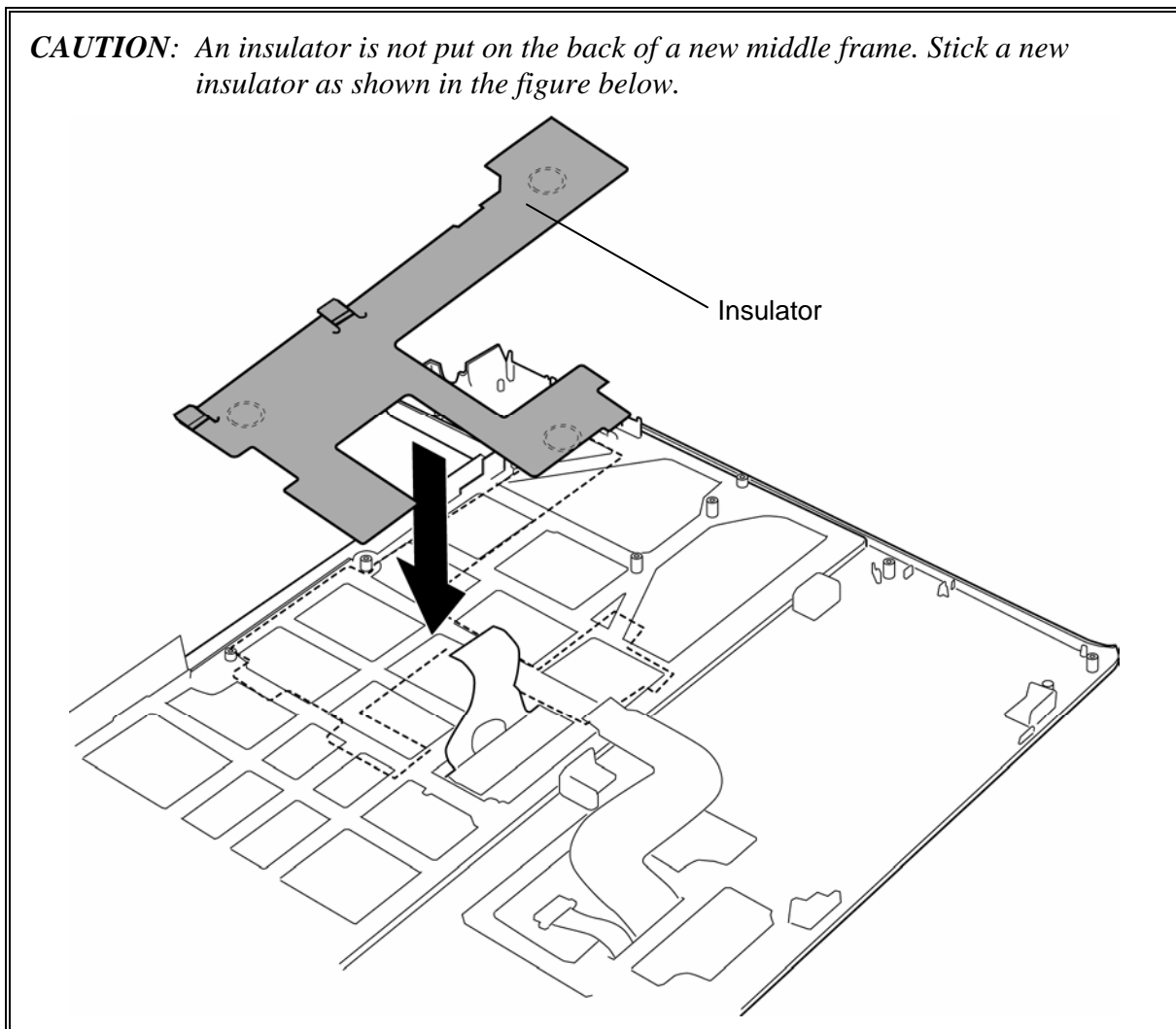
Figure 4-32 Removing the display portion (3)

Installing the Display portion

To install the display portion, follow the steps below and refer to Figure 4-30 to 4-32.

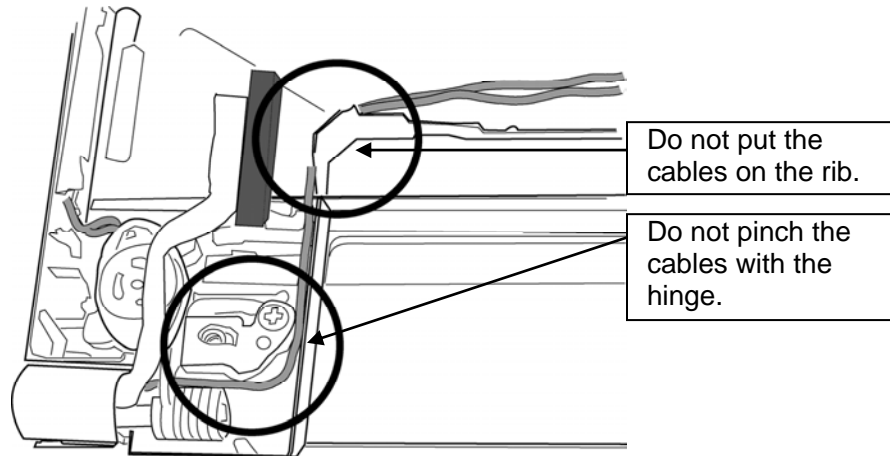
1. Set the **power switch holder** to the slot.
2. Set the **sensor board** to the application button holder and connect the **sensor cable** to the connector on the sensor board.
3. Set the **application button holder** to the slot.
4. Set the **display portion** to the **middle frame**.

CAUTION: An insulator is not put on the back of a new middle frame. Stick a new insulator as shown in the figure below.



5. Secure the hinge portion with the following **screws**.
 - M2.5×4C S-THIN HEAD ×2
6. Pass the **wireless LAN antenna cables** through the insulator.

CAUTION: Arrange the wireless LAN antenna cable of the lower left portion as shown in the figure below.



4.21 Touch pad/Fingerprint sensor board

Removing the Touch pad/Fingerprint sensor board

To remove the touch pad/fingerprint sensor board, follow the steps below and refer to Figure 4-33 and 4-34.

1. Turn over the middle frame and disconnect the **TP cable** from the connector on the touch pad board.
2. Disconnect the **FP cable** from the connector **CN9810** on the fingerprint sensor board.
3. Turn the middle frame face up and remove the **touch pad** adhered with the double-sided tape.
4. Remove the **touch pad button** adhered with the double-sided tape while releasing the **latches**.

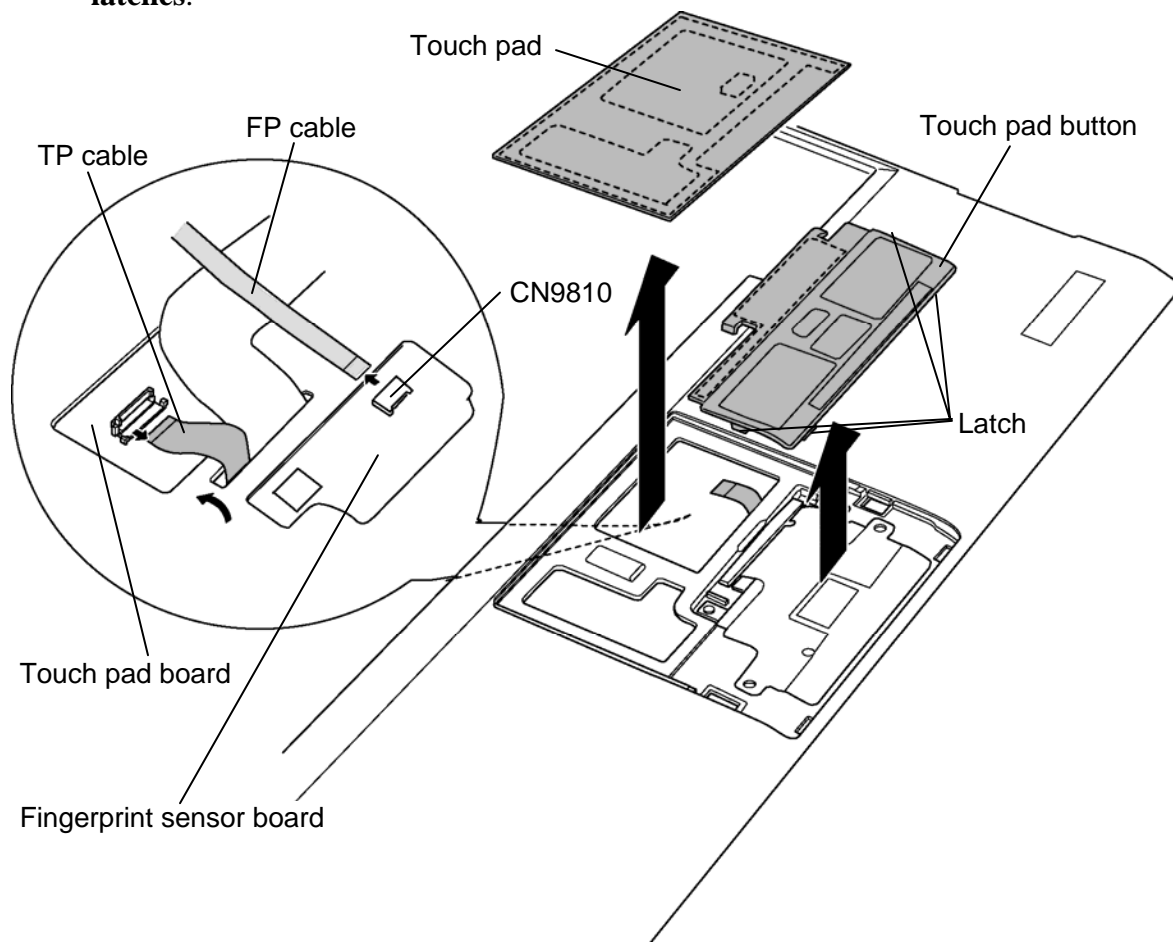


Figure 4-33 Removing the touch pad/fingerprint sensor board (1)

5. Peel off the **TP cable** adhered with the double-sided tape and remove the tip point of the cable (connector terminal side) from the hole.
6. Remove the following **screw** securing the fingerprint sensor board.
 - M2×3C S-THIN HEAD ×1
7. Remove the **fingerprint sensor board** adhered with the double-sided tape from the slot.

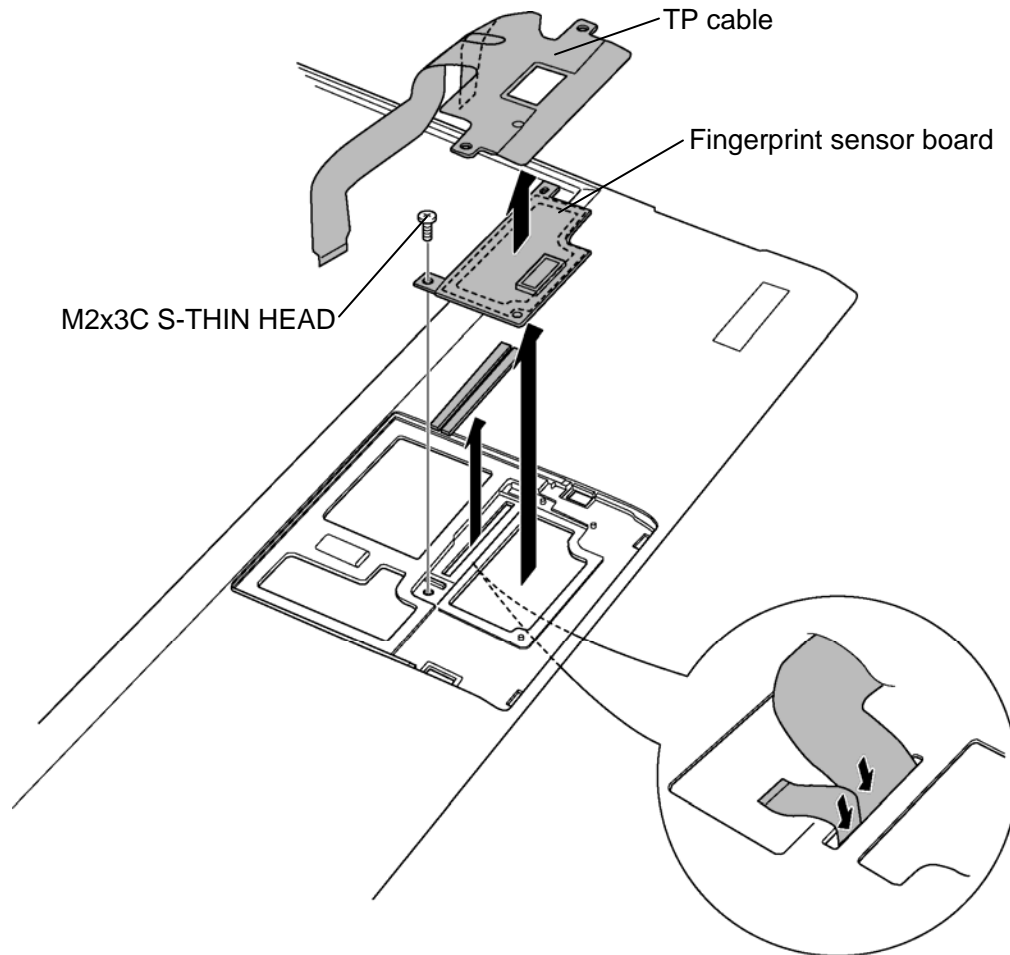


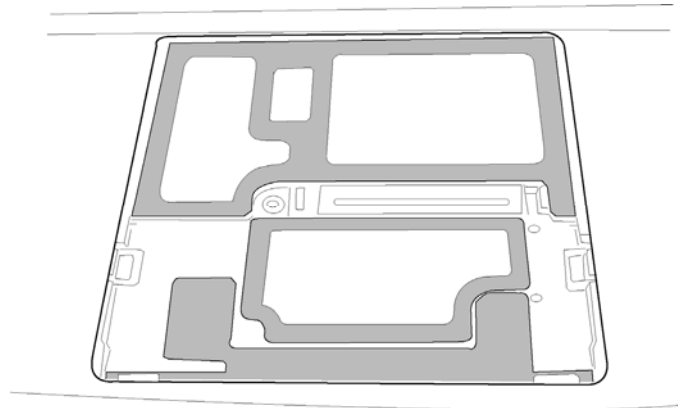
Figure 4-34 Removing the touch pad/fingerprint sensor board (2)

Installing the Touch pad/Fingerprint sensor board

To install the touch pad/fingerprint sensor board, follow the steps below and refer to Figure 4-33 and 4-34.

1. Wipe off the double-sided tape on the middle frame and touch pad button and stick a new double-sided tape on them.
2. Stick the **fingerprint sensor board** and secure it with the following **screw**.
 - M2×3C S-THIN HEAD ×1
3. Pass the tip point of the **TP cable** (connector terminal side) through the hole and stick the cable in place.
4. Stick the **touch pad button** in place and engage the **latches**.
5. Stick the **touch pad** in place
6. Turn over the middle frame and connect the **TP cable** to the connector on the touch pad board.
7. Connect the **FP cable** to the connector **CN9810** on the fingerprint sensor board.

CAUTION: Do not reuse the removed touch pad, TP cable, touch pad button and fingerprint sensor board.
When removing (peeling) the touch pad, TP cable, touch pad button and fingerprint sensor board, wipe off the double-sided tape on the middle frame and touch pad button. Stick new double-sided tapes on the middle frame and touch pad button.
A new double-sided tape is stuck to a new middle frame and touch pad for adhering a touch pad, TP cable and fingerprint sensor board.
The double-side tapes on the middle frame are shown in the figure below.



4.22 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-35.

1. Peel off the **keyboard** adhered to the insulator.
2. Peel off the **insulator** from the middle frame.

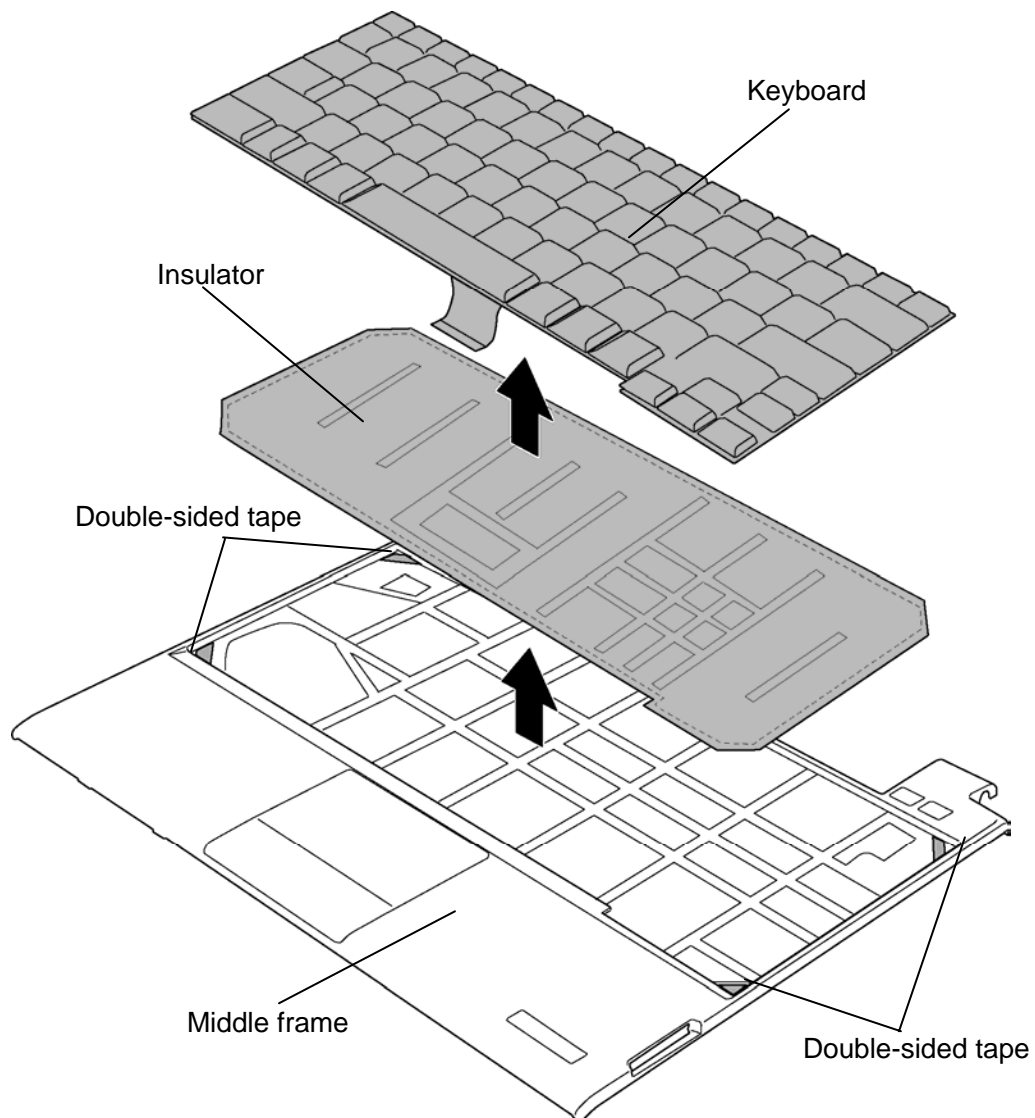


Figure 4-35 Removing the keyboard

Installing the Keyboard

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

CAUTION: *Do not reuse the removed keyboard and insulator. Use new keyboard and insulator.
Wipe off the double-sided tapes on the middle frame and stick new double-sided tapes on the middle frame.
Double-side tapes are stuck on both sides of a new insulator to stick the insulator and keyboard to the middle frame.*

1. Wipe off the double-sided tapes on the middle frame.
2. Stick four new **double-sided tapes** in place on the middle frame.
3. Stick a new **insulator** on the middle frame.
4. Stick a new **keyboard** on the insulator.

4.23 LCD unit

Removing the LCD unit

To remove the LCD unit, follow the steps below and refer to Figure 4-36 and 4-37.

1. Peel off three **mask cushions** and one **mask seal** from the LCD mask.
2. Remove the following screws and **LCD mask**.
 - M2×2.4C FLAT HEAD screw ×4

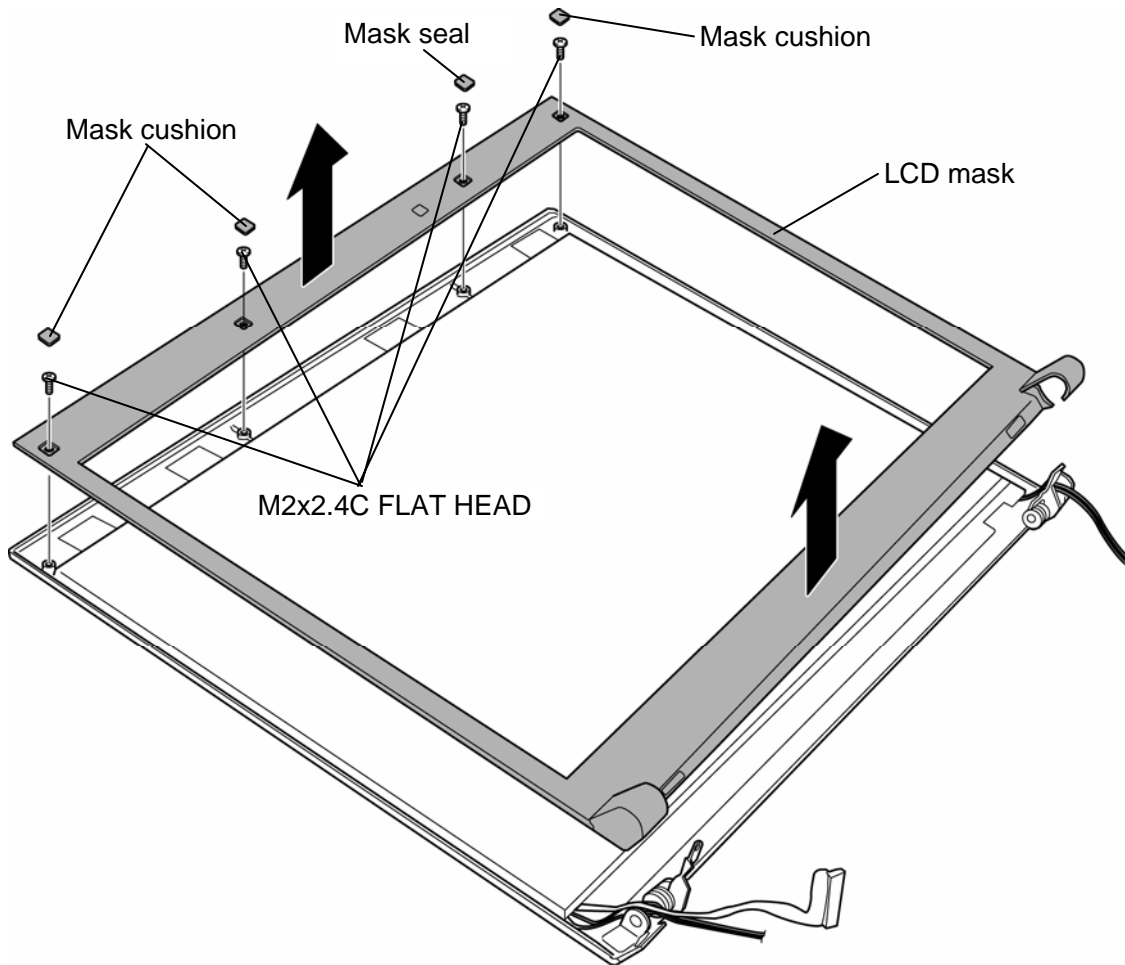


Figure 4-36 Removing the LCD unit (1)

3. Remove the **LCD unit** from the LCD cover.
4. Disconnect the **LCD cable** from the connector on the LCD unit.

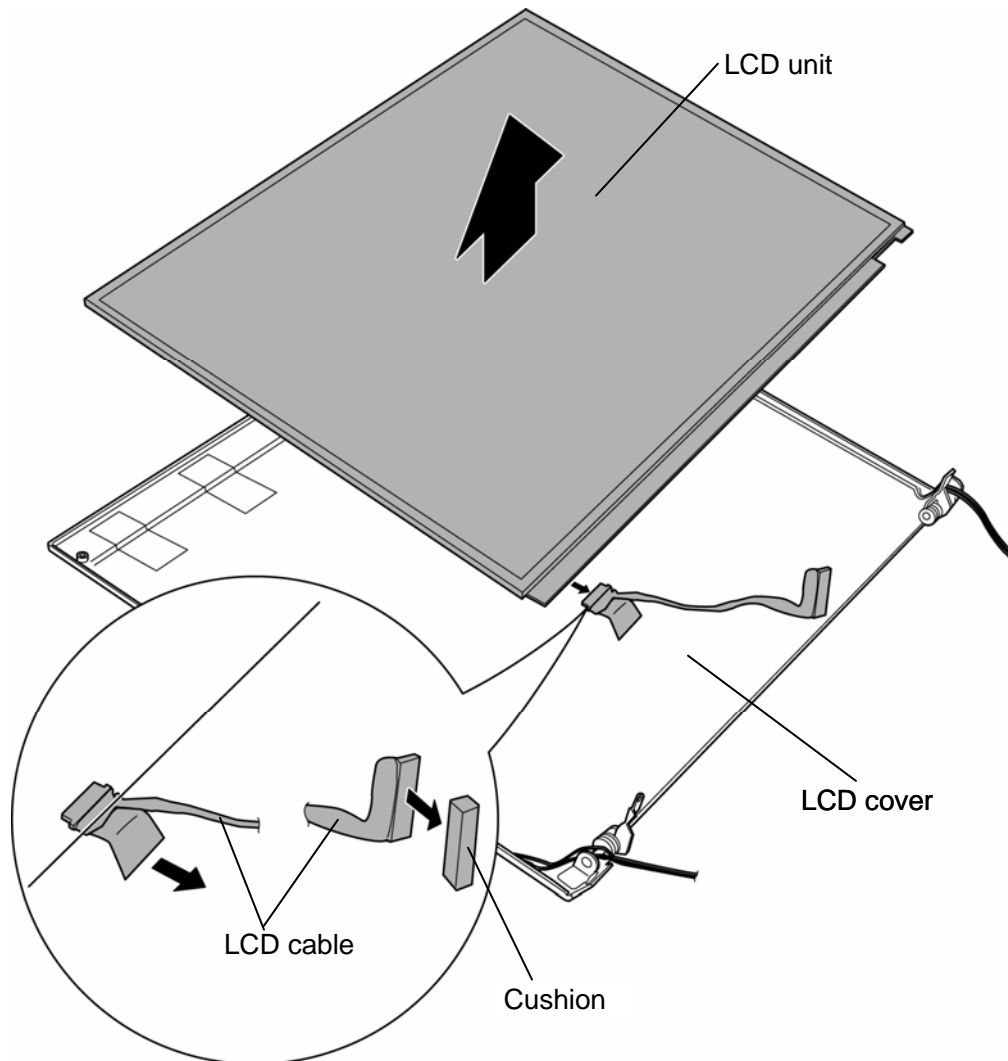


Figure 4-37 Removing the LCD unit (2)

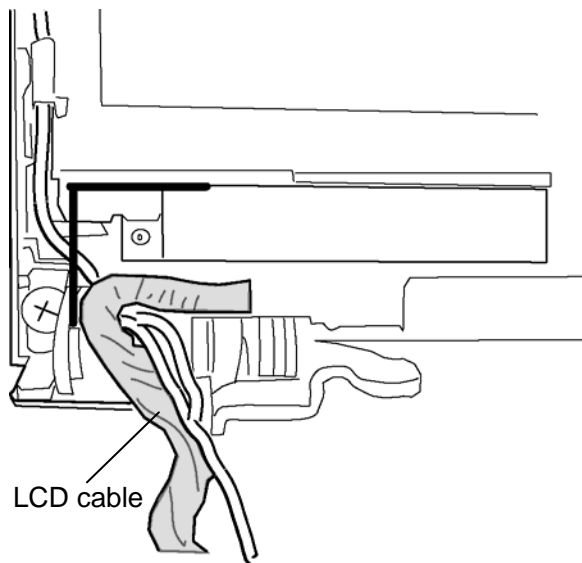
Installing the LCD unit

To install the LCD unit, follow the steps below and refer to Figure 4-36 and 4-37.

CAUTION: When installing a new LCD cable, stick a new cushion to the LCD cable.

1. Connect the **LCD cable** to the connector on the LCD unit.
2. Install the **LCD unit** to the **LCD cover** and arrange the **LCD cable** in place.

CAUTION: Do not put the LCD cable on the LCD unit.



3. Place the **LCD mask** to the LCD unit and secure it with the following **screws**.
 - M2×2.4C FLAT HEAD screw ×4
4. Stick three **mask cushions** and one **mask seal** on the LCD mask.

4.24 Wireless LAN antenna/Bluetooth antenna

Removing the Wireless LAN antenna/Bluetooth antenna

To remove the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-38.

1. Peel off the **insulators** fixing the wireless LAN antenna cables and Bluetooth antenna cable.
2. Peel off the **wireless LAN antennas** and **Bluetooth antenna** from the LCD cover.

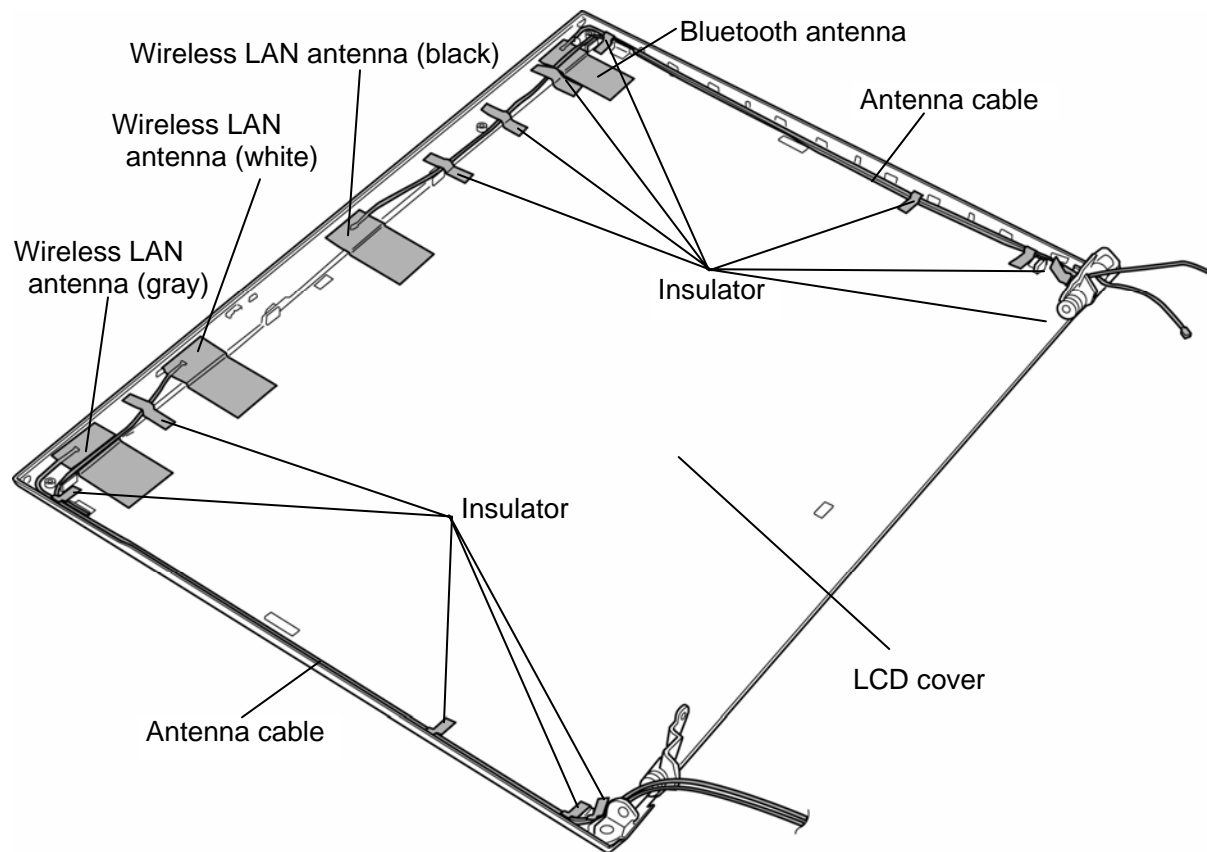
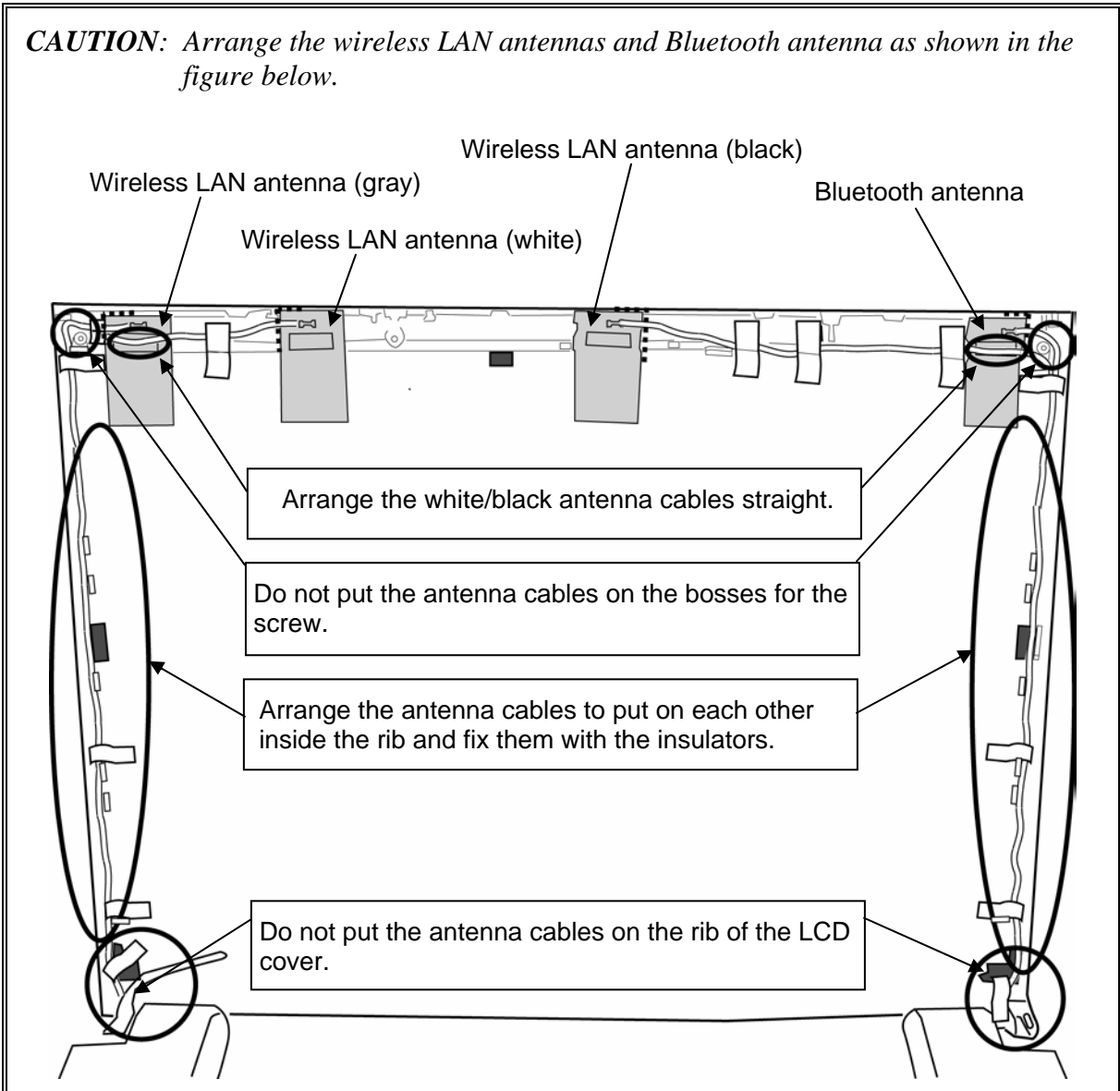


Figure 4-38 Removing the wireless LAN antenna/Bluetooth antenna

Installing the Wireless LAN antenna/Bluetooth antenna

To install the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-38.

1. Stick the **wireless LAN antennas** and **Bluetooth antenna** on the LCD cover in place.
2. Stick eight **insulators** in place to fix the wireless LAN antenna cables and Bluetooth antenna cable.



4.25 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to Figure 4-39.

1. Remove the following **screws** securing the hinges and plate.
 - M2×4C S-THIN HEAD ×2
2. Remove the **hinges** (right and left) and **plate** (right) from the LCD cover.

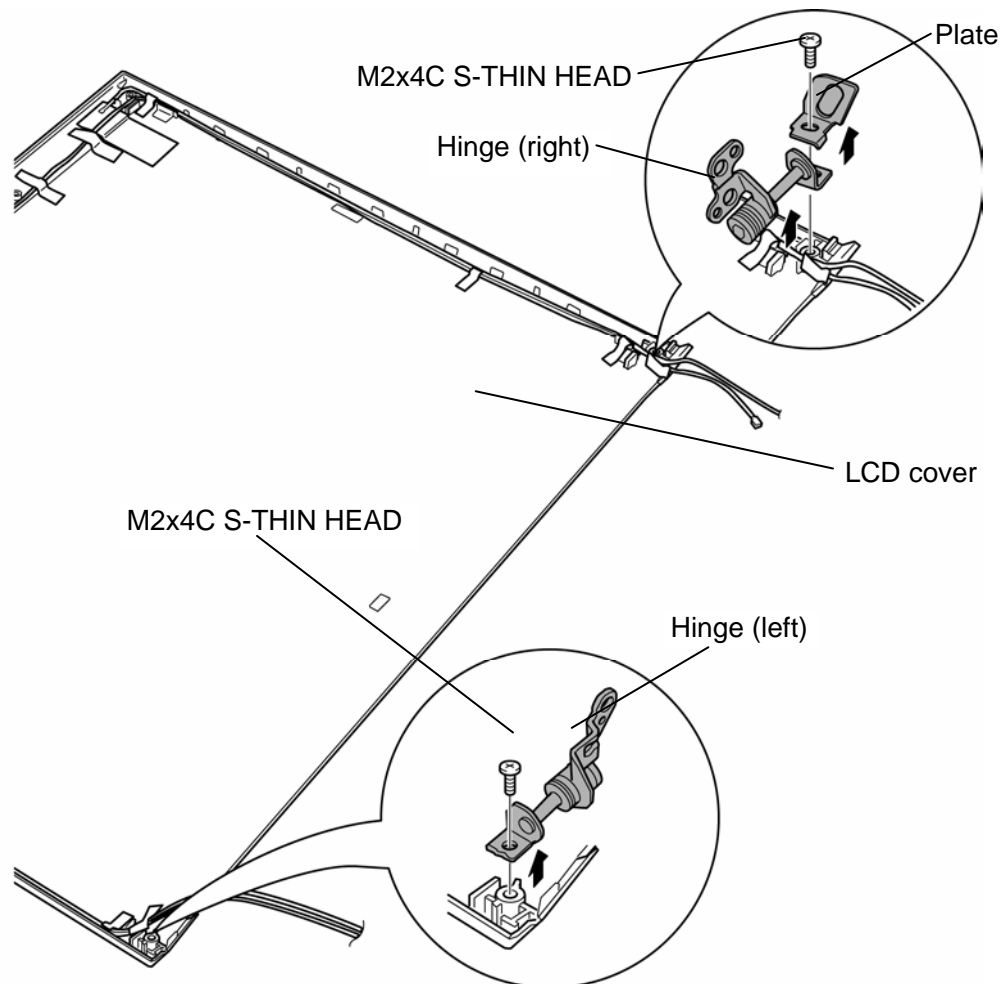


Figure 4-39 Removing the hinge

Installing the Hinge

To install the hinge, follow the steps below and refer to Figure 4-39.

1. Set the **hinges** (right and left) and **plate** (right) to the LCD cover, and secure them with the following **screws**.

- M2×4C S-THIN HEAD ×2

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Finger Sensor board

Table C-23	System board interface connector (6-pin)	C-18
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SW Board

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Jack Board

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SD Board		
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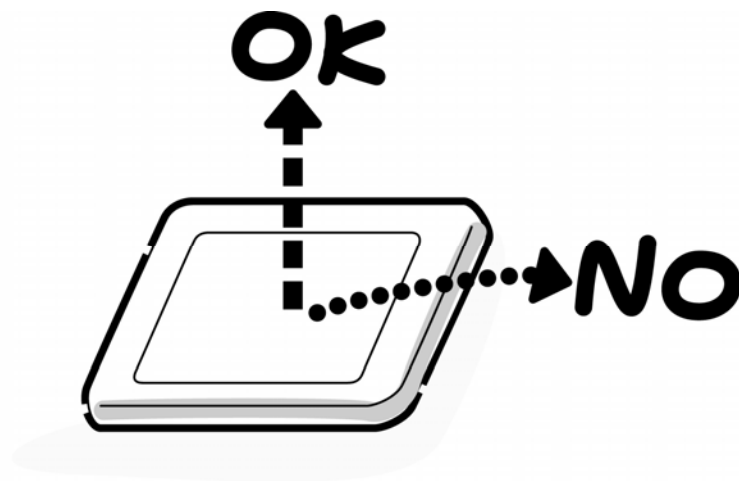
Table I-1 MTBF I-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



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

Do not force the module into place, because stress can affect its performance. Also, the panel's polarized surface is easily scarred, so be carefully when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

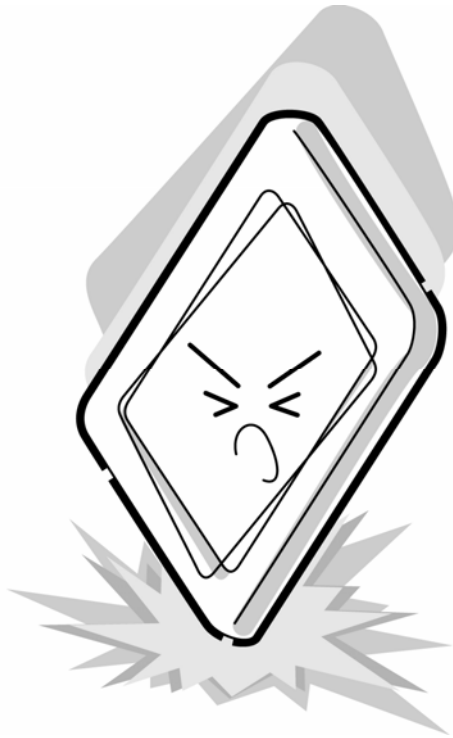
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



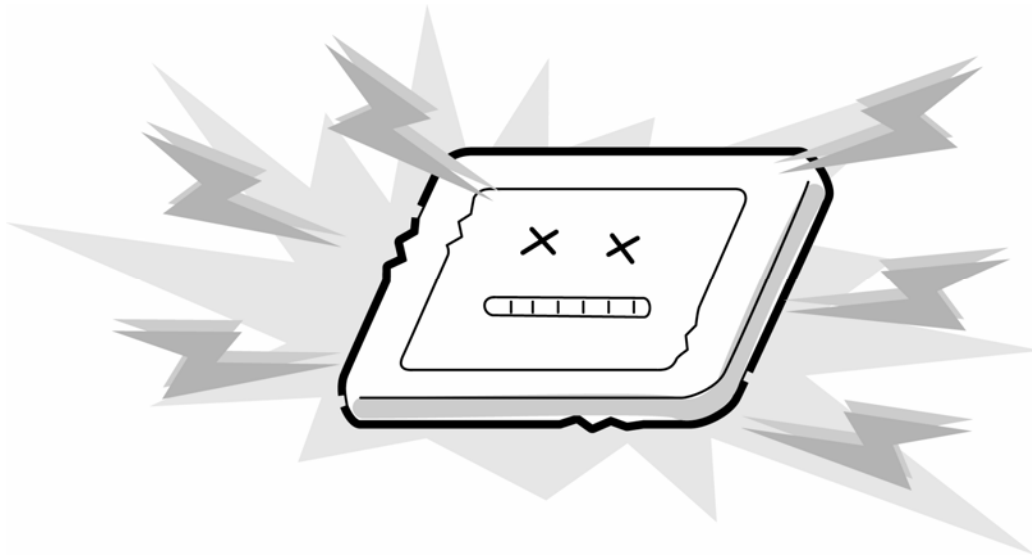
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



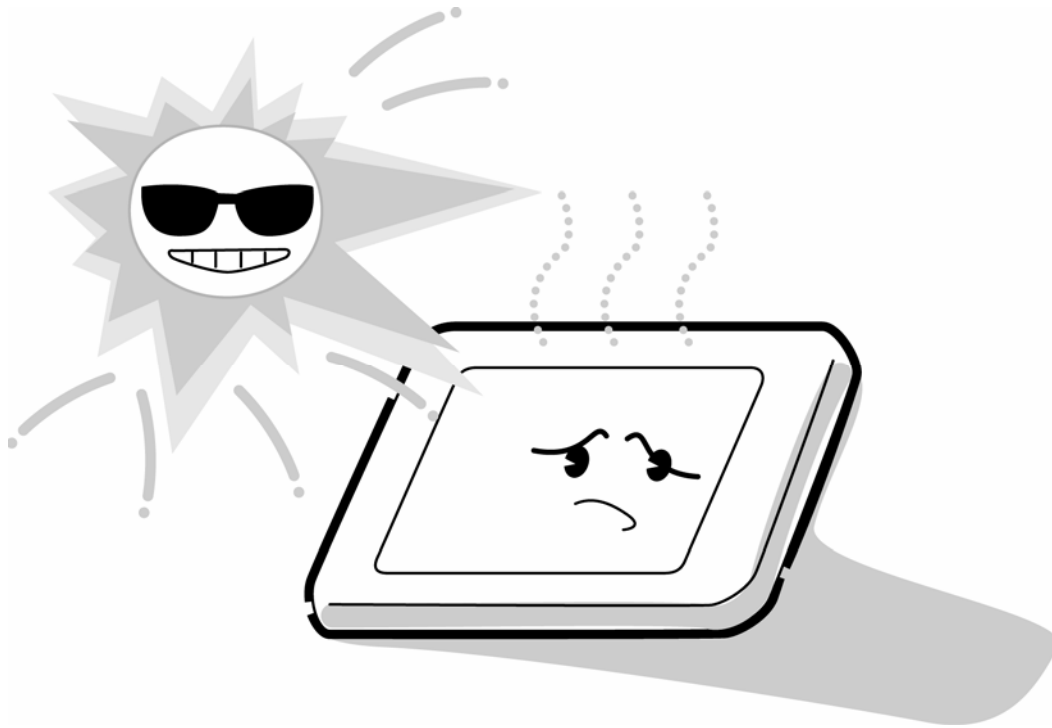
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



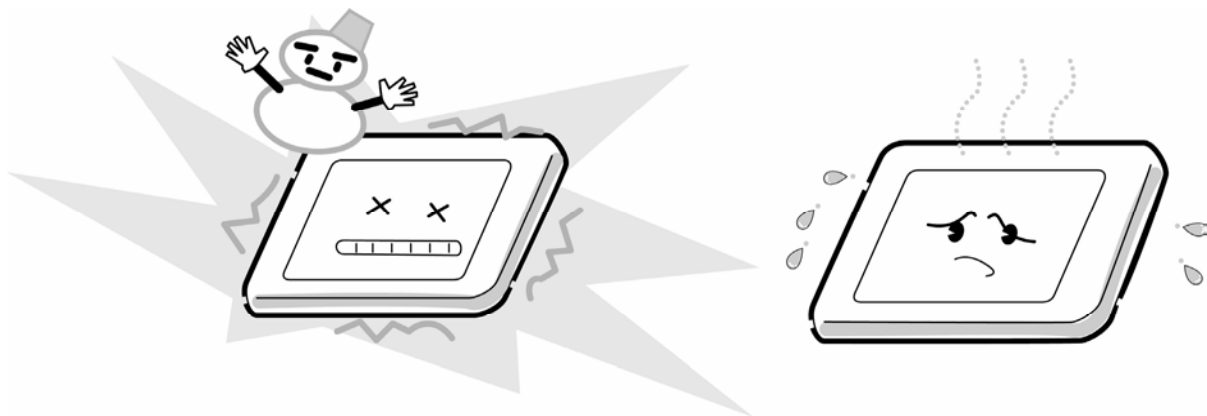
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



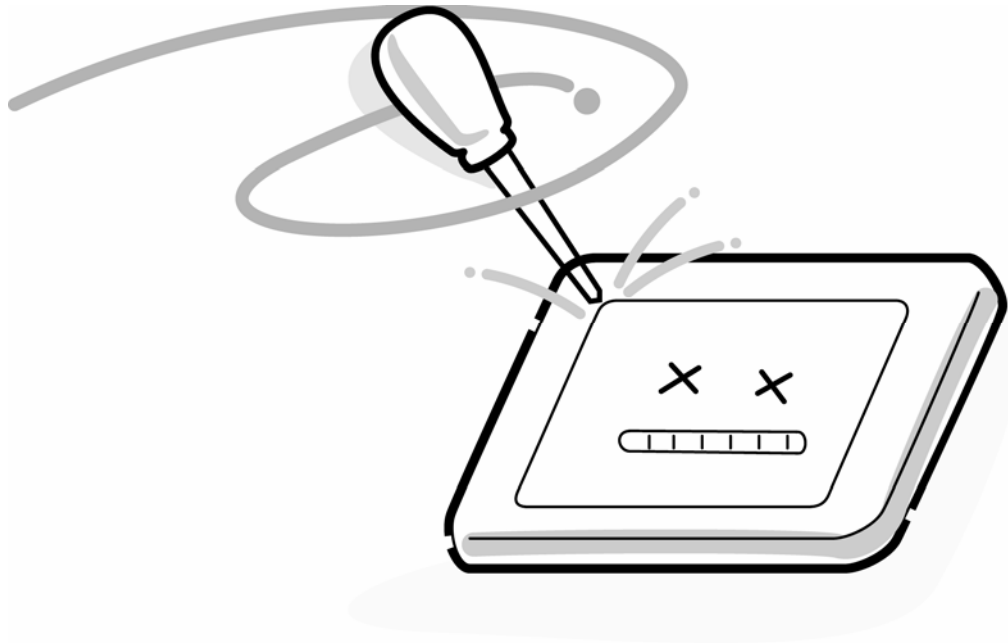
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



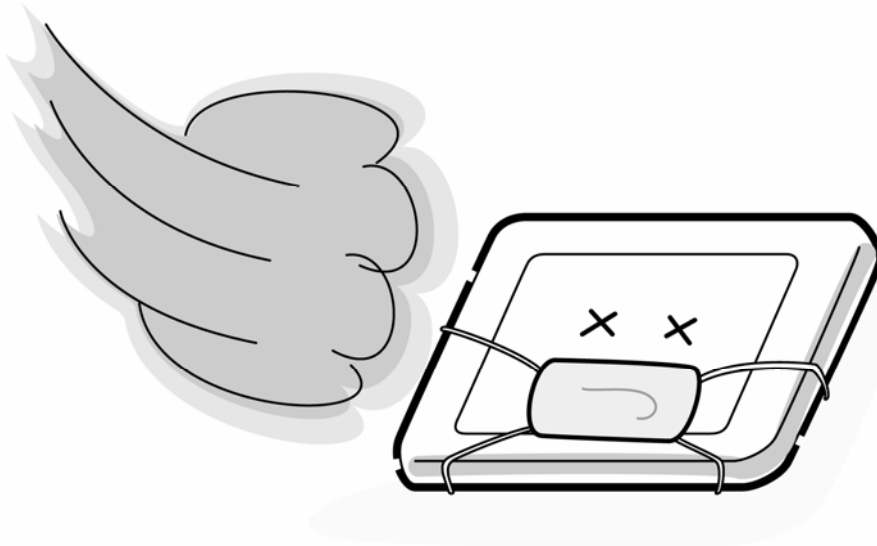
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System board (FMUSY*) Front View

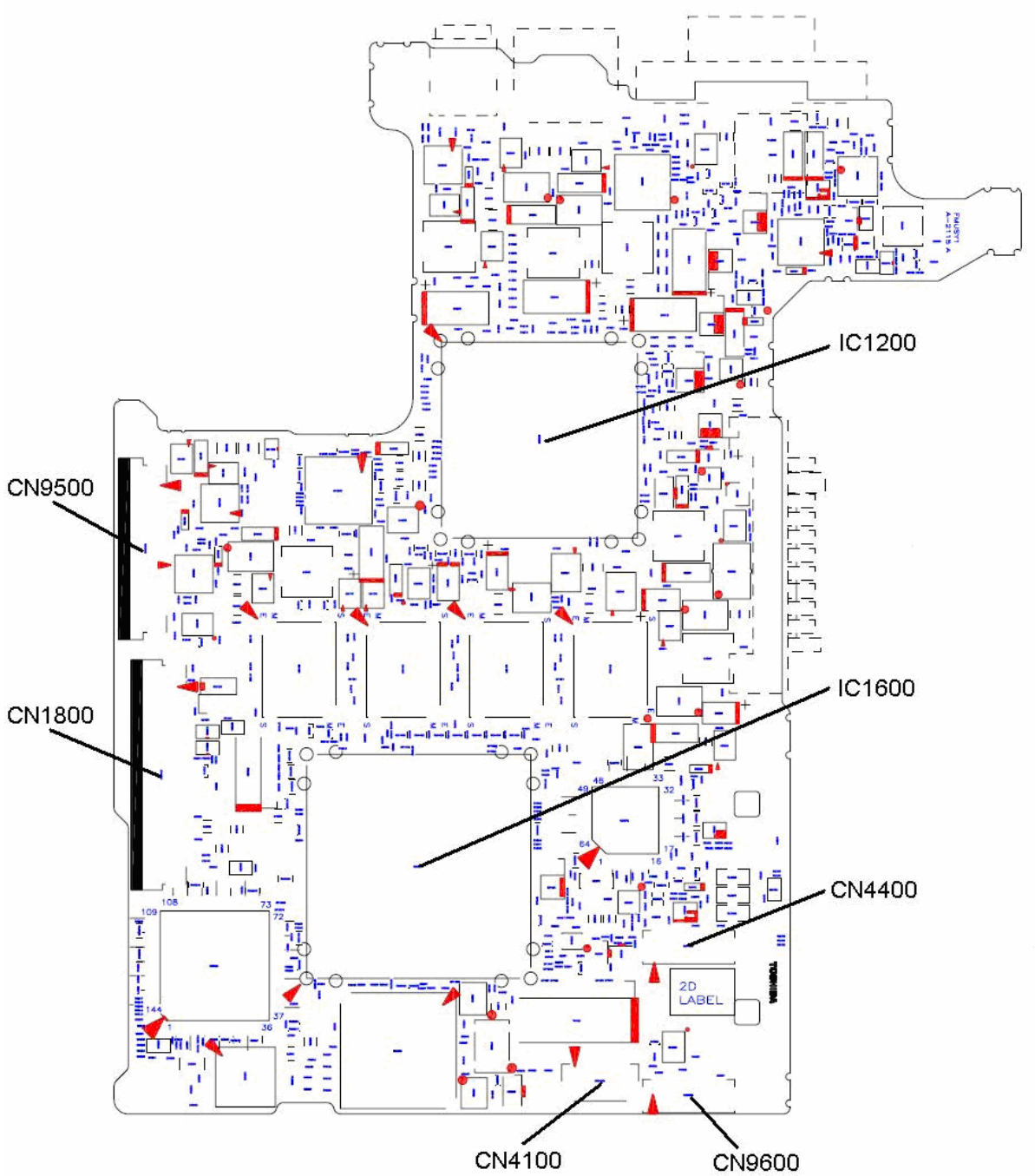


Figure B-1 System board(FMUSY*) layout (front)

Table B-1 System board(FMUSY) connectors (front)*

Number	Name
CN1800	HDD I/F connector
CN4100	LAN I/F connector
CN4400	Bluetooth I/F connector
CN9500	FMUJA* board I/F connector
CN9600	FMUUS* board I/F connector
IC1200	North Bridge (Intel PM945GMS)
IC1600	South Bridge ICH7-M (Intel 82801GBM)

B.2 System board (FMUSY*) Back View

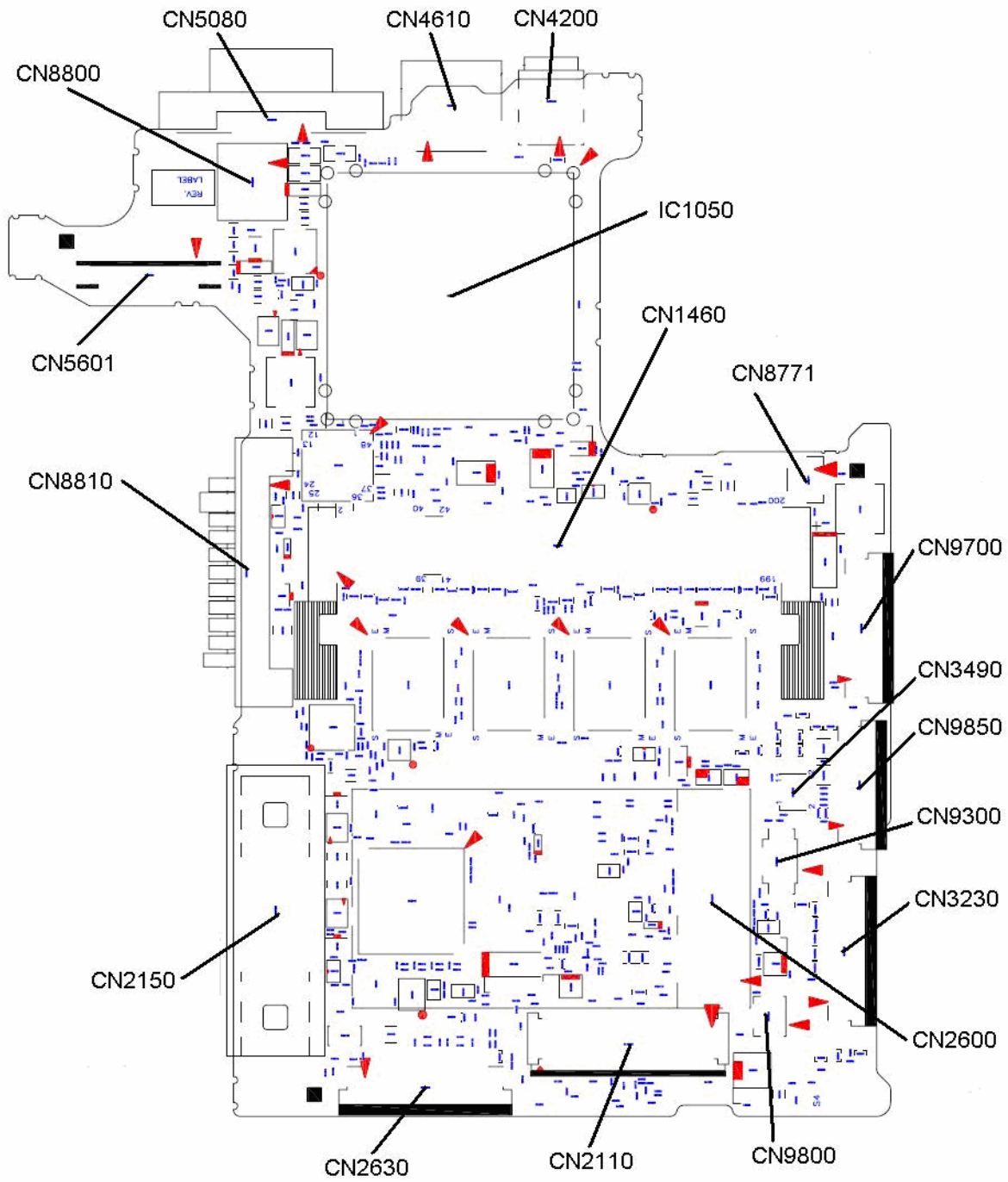
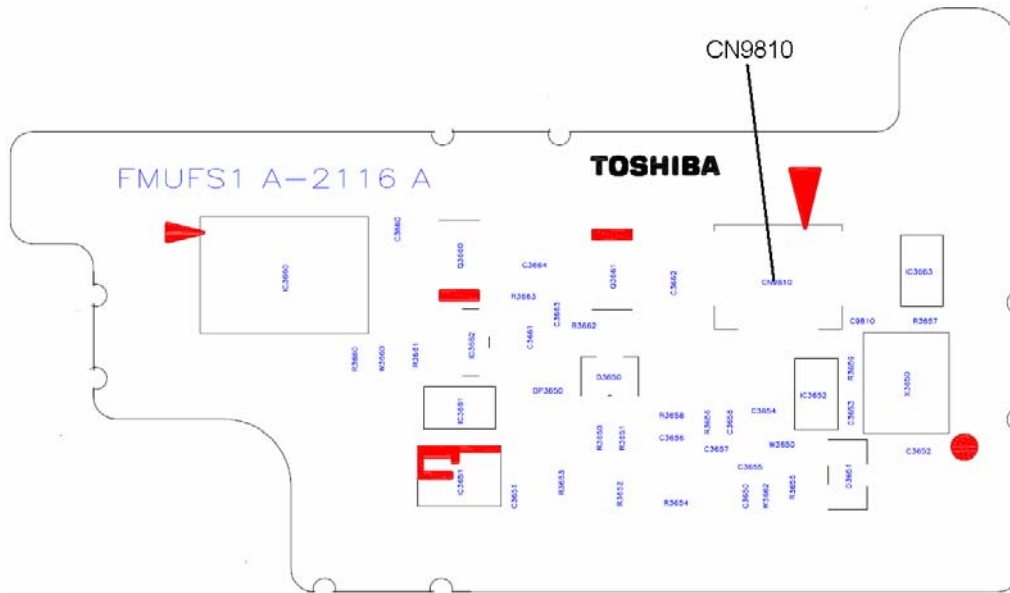


Figure B-2 System board(FMUSY*) layout (back)

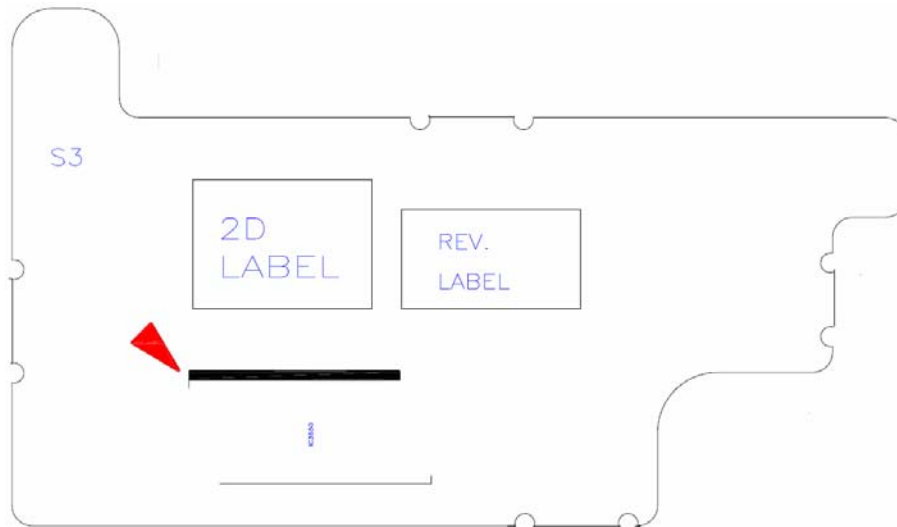
Table B-2 System board (FMUSY*) connectors and ICs (back)

Number	Name
CN1460	Memory connector
CN2110	PC Card I/F connector
CN2150	Docking I/F connector
CN2600	Mini PCI Express I/F connector
CN2630	FMU3G* board I/F connector
CN3230	Keyboard I/F connector
CN3490	It is debugging port for development only
CN4200	1394 I/F connector
CN4610	USB (PORT4) I/F connector
CN5080	CRT I/F connector
CN5601	LCD I/F connector
CN8771	FAN I/F connector
CN8800	DC-IN connector
CN8810	Battery connector
CN9300	RTC battery connector
CN9700	FMUSS* board I/F connector
CN9800	FMUFS* board I/F connector
CN9850	Membrane I/F connector
IC1050	CPU

B.3 Finger Sensor board (FMUFS*) View



(front)



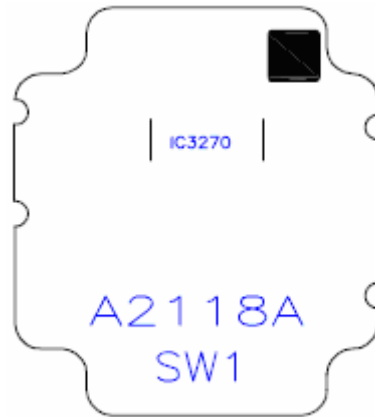
(back)

Figure B-3 Finger Sensor board (FMUFS*) layout (front/back)

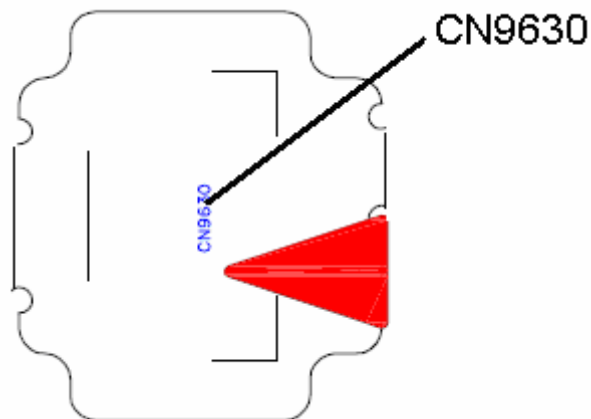
Table B-3 Finger Sensor board (FMUFS*) connector (front)

Number	Name
CN9810	System board I/F connector

B.4 SW board (FMUSW*) View



(front)



(back)

Figure B-4 SW board (FMUSW*) layout (front/back)

Table B-4 SW board (FMUSW*) connector (back)

Number	Name
CN9630	FMUUS* board I/F connector

B.5 Jack board (FMUJA*) View

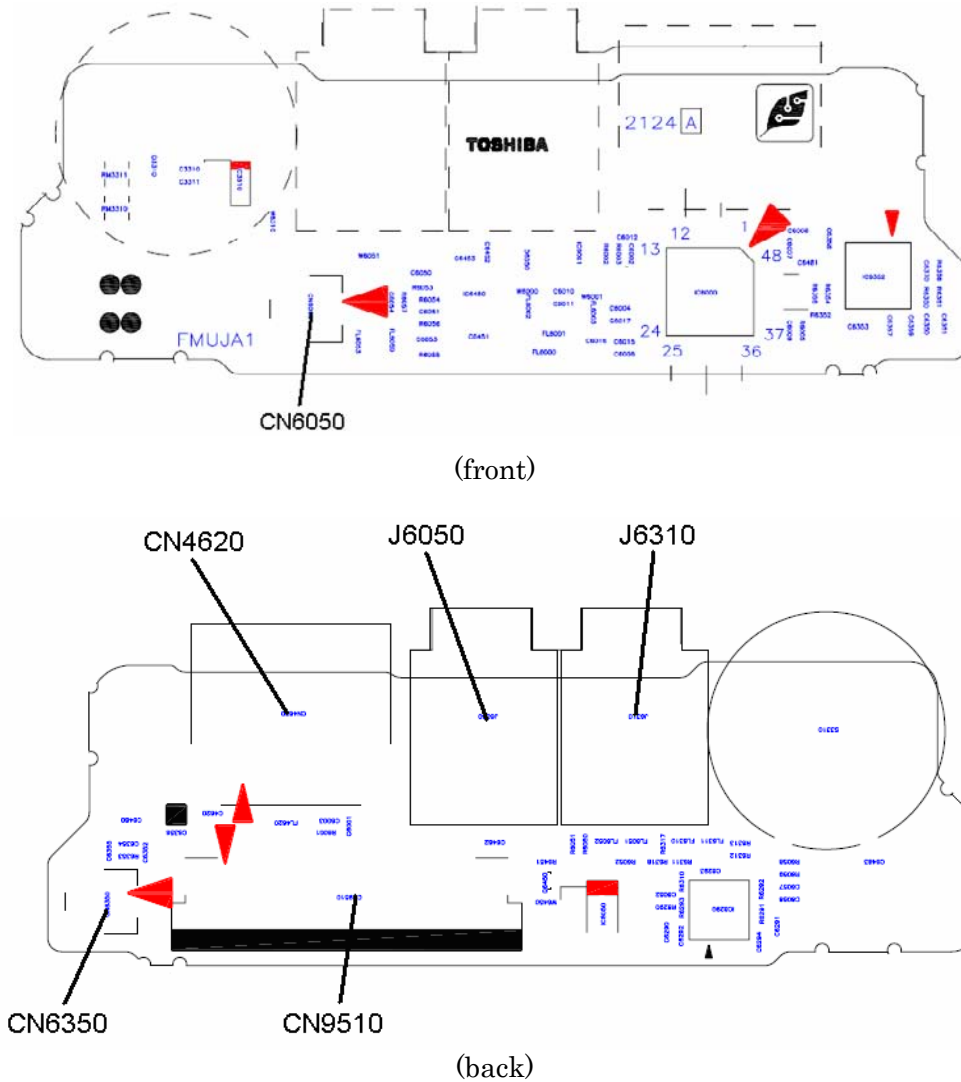
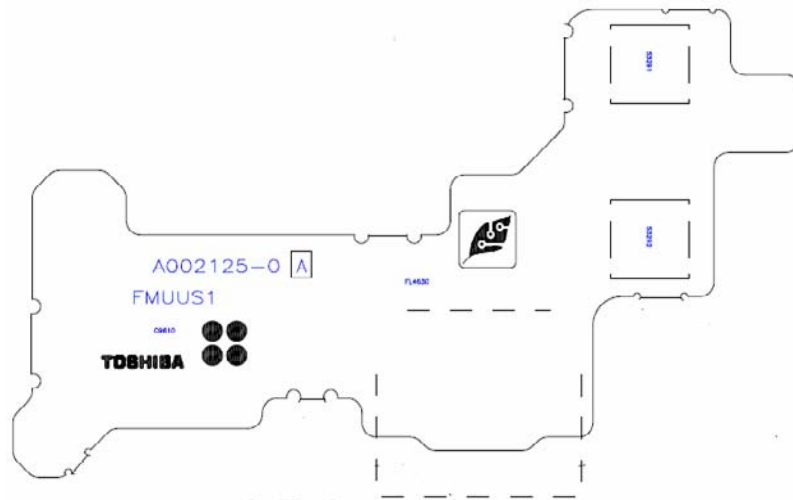


Figure B-5 Jack board (FMUJA*) layout (front/back)

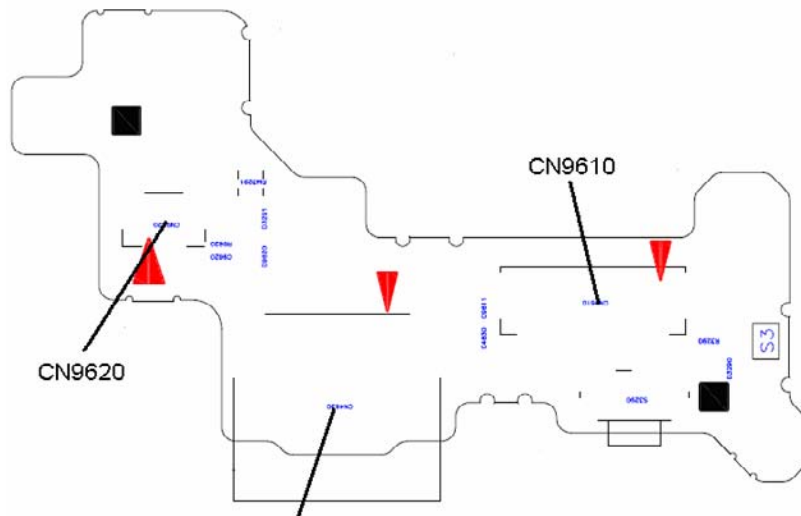
Table B-5 Jack board (FMUJA*)connector (front/back)

Number	Name
CN4620	USB (PORT6) I/F connector
CN6050	Int-Microphone I/F connector
CN6350	Speaker I/F connector
CN9510	System board I/F connector
J6050	Ext-Microphone I/F connector
J6310	Headphone I/F connector

B.6 USB board (FMUUS*) View



(front)



(back)

Figure B-6 USB board (FMUUS*) layout (front/back)

Table B-6 USB board (FMUUS*) connector (back)

Number	Name
CN4630	USB (PORT0) I/F connector
CN9610	System board I/F connector
CN9620	FMUSW* board I/F connector

B.7 SATA HDD FPC (FMUSH*) View

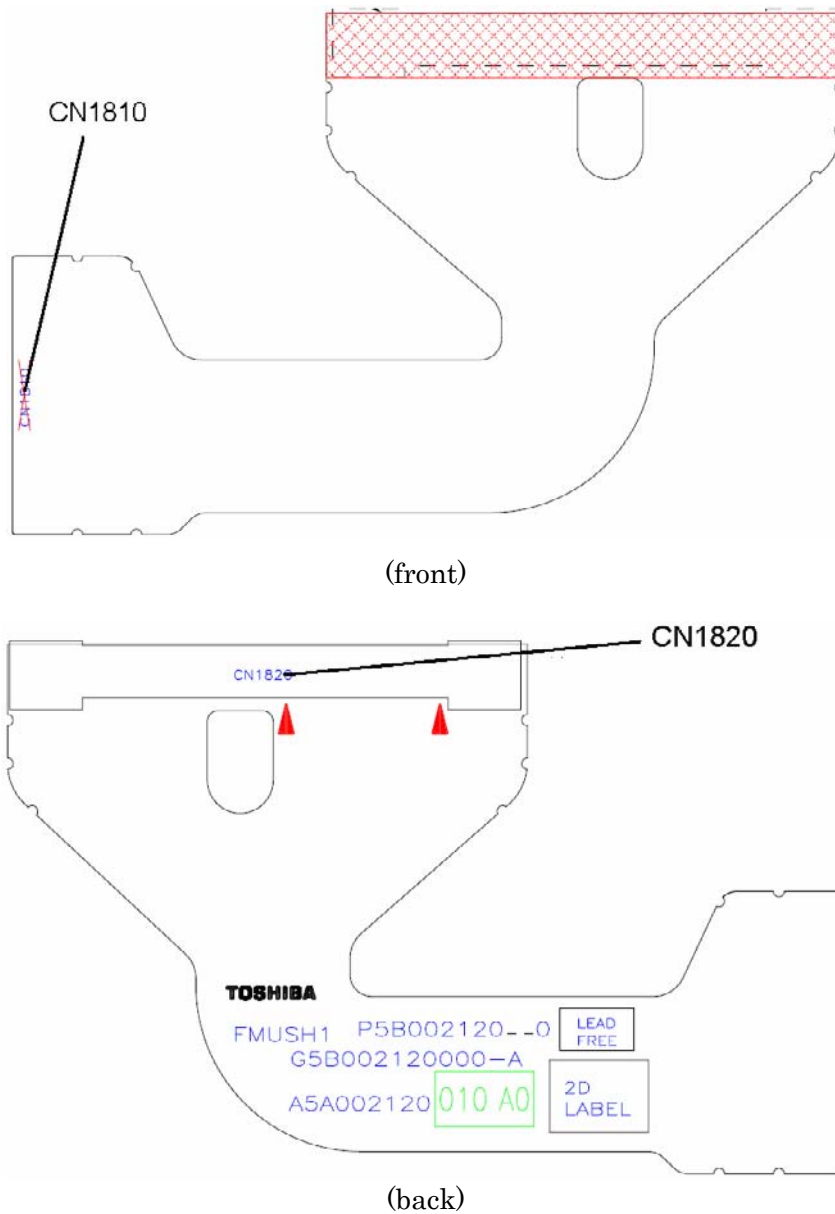


Figure B-7 SATA HDD FPC(FMUSH*) layout (front/back)

Table B-7 SATA HDD FPC(FMUSH*) connector (front/back)

Number	Name
CN1810	System board I/F connector
CN1820	SATA HDD I/F connector

B.8 PATA HDD FPC (FMUPH*) View

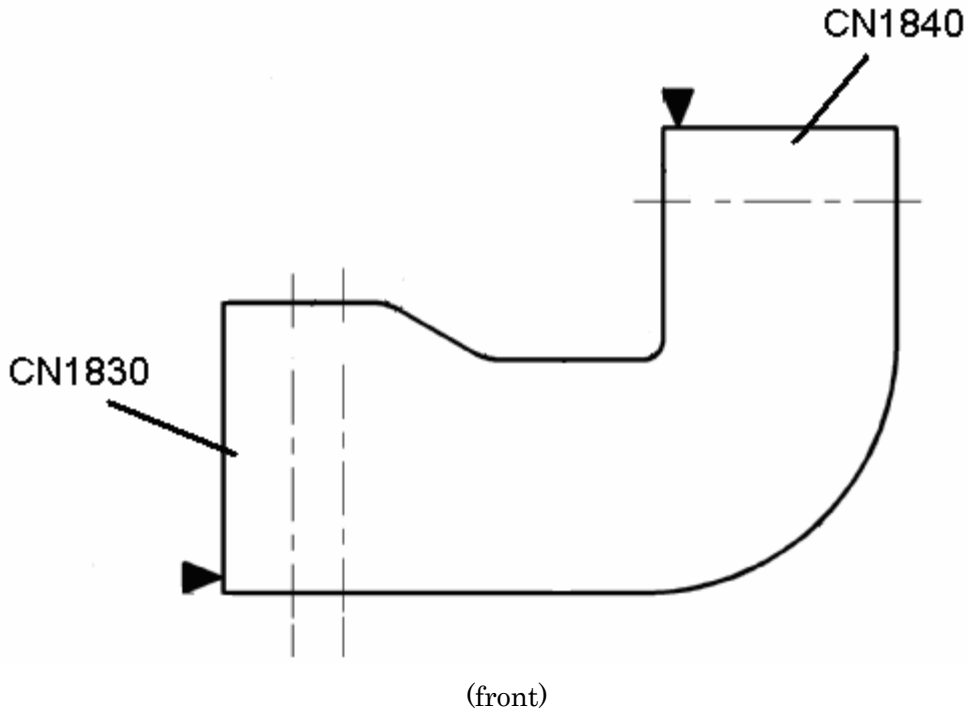


Figure B-8 PATA HDD FPC(FMUPH*) layout (front)

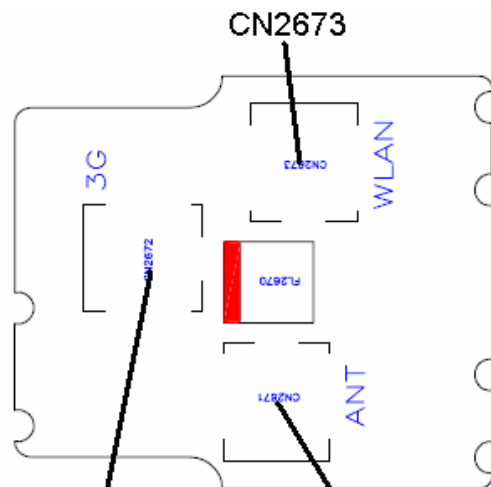
Table B-8 PATA HDD FPC(FMUPH*) connector (front)

Number	Name
CN1830	System board I/F connector
CN1840	PATA HDD I/F connector

B.9 Antenna board (FMUAT*) View



(front)



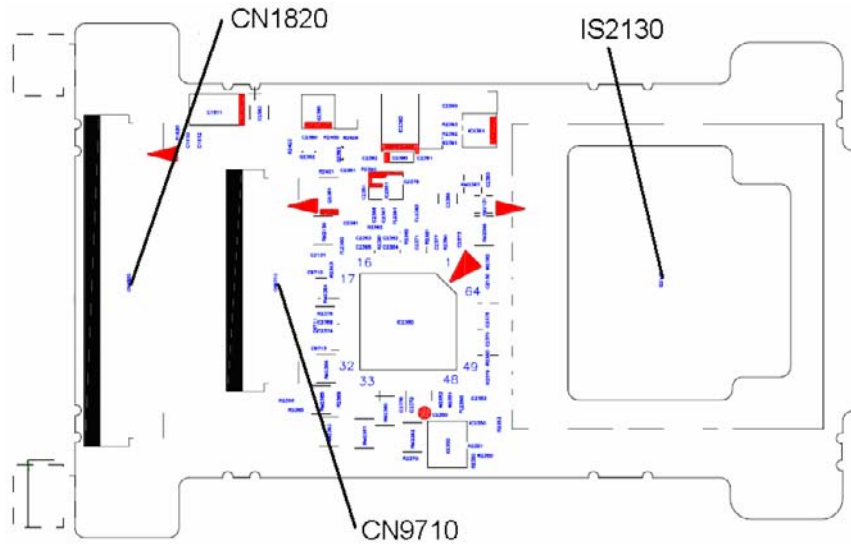
(back)

Figure B-9 Antenna board(FMUAT*) layout (front/back)

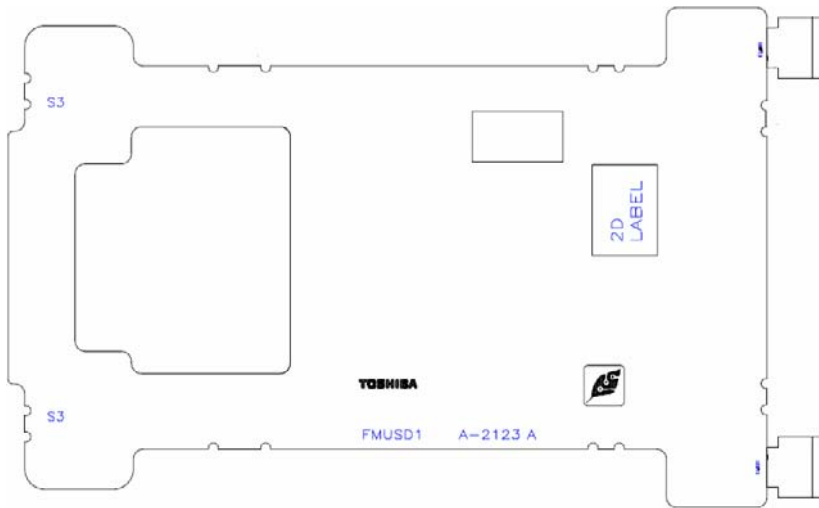
Table B-9 Antenna board(FMUAT*) connector (back)

Number	Name
CN2671	ANT I/F connector
CN2672	3G I/F connector
CN2673	WLAN connector

B.10 SD board (FMUSD*) View



(front)



(back)

Figure B-10 SD board(FMUSD*) layout (front)

Table B-10 SD board(FMUSD*) connector (front)

Number	Name
CN1820	FMUOD* board I/F connector
CN9710	FMUSS* board I/F connector
IS2130	SD CARD I/F connector

B.11 ODD FPC (FMUOD*) View

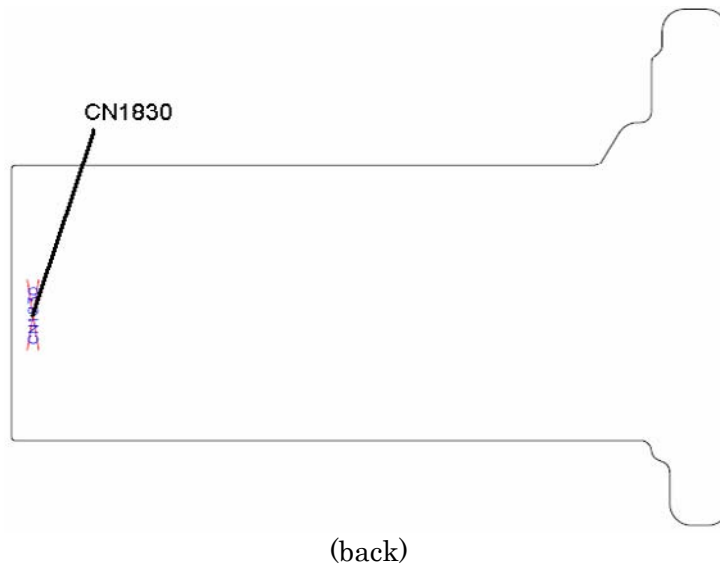
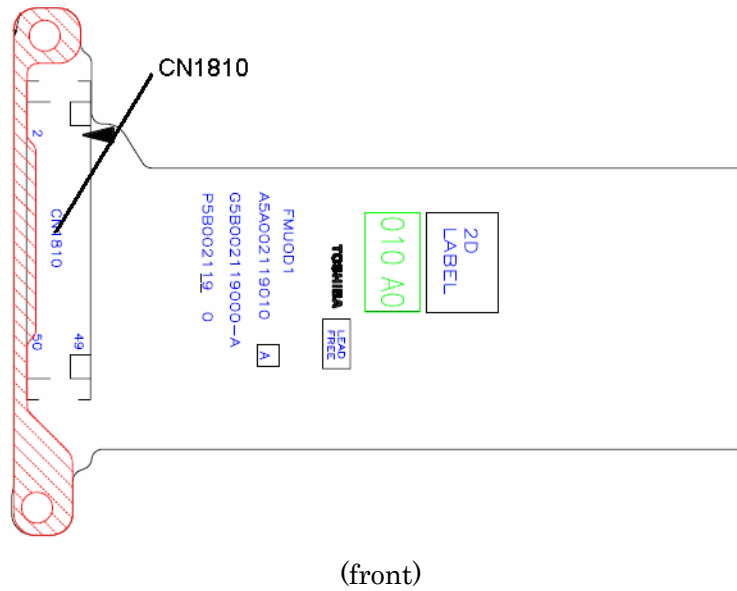


Figure B-11 ODD FPC(FMUOD*) layout (front/back)

Table B-11 ODD FPC(FMUOD*) connector (front/back)

Number	Name
CN1810	ODD I/F connector
CN1830	FMUSD* board I/F connector

B.12 SD board interface FPC (FMUSS*) View



Figure B-12 SD board interface FPC(FMUSS*) layout (front)

Table B-12 SD board interface FPC FPC(FMUSS*) connector (front)

Number	Name
CN9720	System board I/F connector
CN9730	FMUSD* board I/F connector

Appendix C Pin Assignments

System board (FMUSY*)

C.1 CN1460 SO-DIMM connector (200-pin)

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

Pin No.	Signal Name	Pin No.	Signal Name
1	MRVREF-B0V	2	GND
3	GND	4	ADQ07-B1P
5	ADQ00-B1P	6	ADQ06-B1P
7	ADQ04-B1P	8	GND
9	GND	10	ADM0-B1P
11	ADQS0-B1N	12	GND
13	ADQS0-B1P	14	ADQ01-B1P
15	GND	16	ADQ05-B1P
17	ADQ02-B1P	18	GND
19	ADQ03-B1P	20	ADQ13-B1P
21	GND	22	ADQ12-B1P
23	ADQ14-B1P	24	GND
25	ADQ08-B1P	26	ADM1-B1P
27	GND	28	GND
29	ADQS1-B1N	30	XMCK0-B1P
31	ADQS1-B1P	32	XMCK0-B1N
33	GND	34	GND
35	ADQ15-B1P	36	ADQ11-B1P
37	ADQ09-B1P	38	ADQ10-B1P
39	GND	40	GND
41	GND	42	GND
43	ADQ22-B1P	44	ADQ20-B1P
45	ADQ18-B1P	46	ADQ21-B1P
47	GND	48	GND
49	ADQS2-B1N	50	TSDIMA-P3N
51	ADQS2-B1P	52	ADM2-B1P
53	GND	54	GND
55	ADQ19-B1P	56	ADQ16-B1P
57	ADQ23-B1P	58	ADQ17-B1P
59	GND	60	GND

Table C-1 SO-DIMM connector (200-pin) (2/3)

Pin No.	Signal Name	Pin No.	Signal Name
61	ADQ27-B1P	62	ADQ29-B1P
63	ADQ26-B1P	64	ADQ28-B1P
65	GND	66	GND
67	ADM3-B1P	68	ADQS3-B1N
69	NC	70	ADQS3-B1P
71	GND	72	GND
73	ADQ30-B1P	74	ADQ24-B1P
75	ADQ31-B1P	76	ADQ25-B1P
77	GND	78	GND
79	MCKE0-B1P	80	MCKE1-B1P
81	1R8-B1V	82	1R8-B1V
83	NC	84	NC
85	ABS2-B1P	86	NC
87	1R8-B1V	88	1R8-B1V
89	AMA12-B1P	90	AMA11-B1P
91	AMA09-B1P	92	AMA07-B1P
93	AMA08-B1P	94	AMA06-B1P
95	1R8-B1V	96	1R8-B1V
97	AMA05-B1P	98	AMA04-B1P
99	AMA03-B1P	100	AMA02-B1P
101	AMA01-B1P	102	AMA00-B1P
103	1R8-B1V	104	1R8-B1V
105	AMA10-B1P	106	ABS1-B1P
107	ABS0-B1P	108	ARAS-B1N
109	AWE-B1N	110	MCS0-B1N
111	1R8-B1V	112	1R8-B1V
113	ACAS-B1N	114	MODT0-B1P
115	MCS1-B1N	116	AMA13-B1P
117	1R8-B1V	118	1R8-B1V
119	MODT1-B1P	120	NC
121	GND	122	GND
123	ADQ36-B1P	124	ADQ35-B1P
125	ADQ37-B1P	126	ADQ32-B1P
127	GND	128	GND
129	ADQS4-B1N	130	ADM4-B1P
131	ADQS4-B1P	132	GND

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

Pin No.	Signal Name	Pin No.	Signal Name
133	GND	134	ADQ34-B1P
135	ADQ39-B1P	136	ADQ33-B1P
137	ADQ38-B1P	138	GND
139	GND	140	ADQ45-B1P
141	ADQ41-B1P	142	ADQ44-B1P
143	ADQ46-B1P	144	GND
145	GND	146	ADQS5-B1N
147	ADM5-B1P	148	ADQS5-B1P
149	GND	150	GND
151	ADQ40-B1P	152	ADQ43-B1P
153	ADQ47-B1P	154	ADQ42-B1P
155	GND	156	GND
157	ADQ48-B1P	158	ADQ53-B1P
159	ADQ49-B1P	160	ADQ52B1P
161	GND	162	GND
163	NC	164	XMCK1-B1P
165	GND	166	XMCK1-B1N
167	ADQS6-B1N	168	GND
169	ADQS6-B1P	170	ADM6-B1P
171	GND	172	GND
173	ADQ50-B1P	174	ADQ54-B1P
175	ADQ51-B1P	176	ADQ55-B1P
177	GND	178	GND
179	ADQ63-B1P	180	ADQ60-B1P
181	ADQ56-B1P	182	ADQ57-B1P
183	GND	184	GND
185	ADM7-B1P	186	ADQS7-B1N
187	GND	188	ADQS7-B1P
189	ADQ58-B1P	190	GND
191	ADQ61-B1P	192	ADQ59-B1P
193	GND	194	ADQ62-B1P
195	SMBDT2-P3P	196	GND
197	SMBCK2-P3P	198	GND
199	P3V	200	GND
1T	GND	2T	GND

C.2 CN1800 HDD interface connector (50-pin)

Table C-2 HDD interface connector (50-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	IDRSTB-P3N	2	GND
3	PDD07-P3P	4	PDD08-P3P
5	PDD06-P3P	6	PDD09-P3P
7	PDD05-P3P	8	PDD10-P3P
9	PDD04-P3P	10	PDD11-P3P
11	GND	12	PDD03-P3P
13	PDD12-P3P	14	PDD02-P3P
15	PDD13-P3P	16	PDD01-P3P
17	PDD14-P3P	18	PDD00-P3P
19	PDD15-P3P	20	GND
21	PDDREQ-P3P	22	PDIOW-P3N
23	GND	24	PDIOR-P3N
25	GND	26	PIORDY-P3P
27	GND	28	PDDACK-P3N
29	IDEIRQ-P3P	30	GND
31	PDA1-P3P	32	PDA0-P3P
33	PDA2-P3P	34	GND
35	PDCS1-P3N	36	PDCS3-P3N
37	HDDLED-P3N	38	P5V
39	P5V	40	P5V
41	P5V	42	NC
43	NC	44	GND
45	ZSATR0-P1P	46	ZSATR0-P1N
47	GND	48	ZSATT0-P1N
49	ZSATT0-P1P	50	GND
1T	GND	2T	GND

C.3 CN2110 PC Card interface connector (80-pin)

Table C-3 PC Card interface connector (80-pin)(1/2)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	ACAD00-PYP	4	ACCD1-P3N
5	ACAD01-PYP	6	ACAD02-PYP
7	ACAD03-PYP	8	ACAD04-PYP
9	ACAD05-PYP	10	ACAD06-PYP
11	ACAD07-PYP	12	GND
13	ACD14-PYP	14	ACCBE0-PYN
15	ACAD08-PYP	16	ACAD09-PYP
17	ACAD10-PYP	18	ACAD11-PYP
19	ACVS1-P3P	20	GND
21	ACAD12-PYP	22	ACAD13-PYP
23	ACAD14-PYP	24	ACAD15-PYP
25	ACCBE1-PYN	26	ACAD16-PYP
27	ACPAR-PYP	28	GND
29	ACA18-PYP	30	ACPERR-PYN
31	ACLOCK-PYN	32	ACGNT-PYN
33	ACSTOP-PYN	34	ACINT-PYN
35	ACDEVS-PYN	36	MCVCCA-PYV
37	MCVCCA-PYV	38	MCVCCA-PYV
39	MCVCCA-PYV	40	MCVCCA-PYV
41	MCVPPA-PYV	42	MCVPPA-PYV
43	MCVPPA-PYV	44	MCVPPA-PYV
45	MCVPPA-PYV	46	ACCLK-PYP
47	ACTRDY-PYN	48	ACIRDY-PYN
49	ACFRAM-PYN	50	ACCBE2-PYN
51	ACAD17-PYP	52	ACAD18-PYP
53	ACAD19-PYP	54	GND
55	ACAD20-PYP	56	ACVS2-P3P
57	ACAD21-PYP	58	ACRST-PYN
59	ACAD22-PYP	60	ACSERR-PYN

Table C-3 PC Card interface connector (80-pin)(2/2)

Pin No.	Signal Name	Pin No.	Signal Name
61	ACAD23-PYP	62	GND
63	ACREQ-PYN	64	ACAD24-PYP
65	ACCBE3-PYN	66	ACAD25-PYP
67	ACAUDI-PYP	68	ACAD26-PYP
69	ACSTSC-PYP	70	GND
71	ACAD27-PYP	72	ACAD28-PYP
73	ACAD29-PYP	74	ACAD30-PYP
75	ACD02-PYP	76	ACAD31-PYP
77	ACCLKR-PYN	78	ACCD2-P3N
79	GND	80	GND

C.4 CN2150 Docking interface connector (64-pin)*Table C-4 Docking interface connector (64-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
P1	DSKDC	P2	GND
P3	D-E5V	P4	GND
S1	DOCDT2-S3N	S2	NC
S3	FJCTRQ-S3N	S4	DOCON-P5P
S5	GND	S6	DVIDET-S3N
S7	GND	S8	XDCK0-P3P
S9	XDCK0-P3N	S10	GND
S11	ZDTX1-P3P	S12	ZDTX1-P3N
S13	GND	S14	IDSCL-P3P
S15	IDSDA-P3P	S16	GND
S17	DRED-PXP	S18	DGREEN-PXP
S19	DBLUE=PXP	S20	DHSYNC-P3P
S21	GND	S22	LINK-E3N
S23	ACT-E3N	S24	NC
S25	NC	S26	NC
S27	ZBIDAP-EXP	S28	ZBIDAN-EXN
S29	ZBIDCP-EXP	S30	ZBIDCN-EXN
S31	D-E3V	S32	D-E3V
S33	PWRSW-S3N	S34	GND
S35	ZUSBDC-E3P	S36	ZUSBDC-E3N
S37	GND	S38	DVISDA-P5P
S39	DVISCL-P5P	S40	GND
S41	ZDTX2-P3P	S42	ZDTX2-P3N
S43	GND	S44	ZDTX0-P3P
S45	ZDTX0-P3N	S46	GND
S47	GND	S48	GND
S49	GND	S50	DVSYNC-P3P
S51	GND	S52	LAN-E3V
S53	DOCDT1-S3N	S54	NC
S55	NC	S56	NC
S57	ZBIDBP-EXP	S58	ZBIDBN-EXN
S59	ZBIDDP-EXP	S60	ZBIDDN-EXN
1T	GND	2T	GND
3T	GND	4T	GND

C.5 CN2600 Mini PCI Express interface connector (52-pin)

Table C-5 Mini PCI Express interface connector (52-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	PEWAKE-E3N	2	WFLN-E3V
3	WCHDA1-P3P	4	GND
5	WCHCL1-P3P	6	WLAN-P1V
7	WLXRQ1-P3N	8	WIMPWR-E3V
9	GND	10	WIMDAT-E3P
11	XPEWL-P0N	12	WIMCLK-E3P
13	XPEWL-P0P	14	WIMRST-E3P
15	WIM-GND	16	NC
17	NC	18	GND
19	NC	20	WLWDIS-E3N
21	GND	22	(PERST)
23	ZPERWL-P1N	24	WFLN-E3V
25	ZPERWL-P1P	26	GND
27	GND	28	WLAN-P1V
29	GND	30	NC
31	ZPETWL-P1N	32	NC
33	ZPETWL-P1P	34	GND
35	GND	36	ZUSBWM-E3N
37	GND	38	ZUSBWM-E3P
39	WFLN-E3V	40	WMMDL-P3N
41	WFLN-E3V	42	WMLED-E3N
43	GND	44	NC
45	NC	46	NC
47	NC	48	WLAN-P1V
49	NC	50	GND
51	NC	52	WFLN-E3V
1T	GND	2T	GND

C.6 CN2630 FMU3G* board interface connector (35-pin)*Table C-6 FMU3G* board interface connector (35-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	WMSLCH-E3N	2	WIMPWR-E3V
3	WIMRST-E3P	4	GND
5	WIMCLK-E3P	6	GND
7	WIMDAT-E3P	8	WIM-GND
9	GND	10	TMP3G-SXP
11	GND	12	3GWAKE-E2P
13	GND	14	PLTRS3-E3N
15	GND	16	3GRST-S3N
17	3GRFON-S3N	18	GND
19	H8SCL1-E2P	20	H8SDA1-E2P
21	GND	22	ZUSB3G-E3N
23	ZUSB3G-E3P	24	GND
25	3GMDL-P3N	26	3GLED-E3P
27	3GON-S3N	28	E3V
29	E3V	30	E3V
31	E3V	32	E3V
33	E3V	34	NC
35	GND		
1T	GND	2T	GND

C.7 CN3230 Keyboard interface connector (30-pin)

Table C-7 keyboard interface connector (30-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	NUMLED-P5N	2	ARWLED-P5N
3	CAPLED-P5N	4	P5V
5	NC	6	KBRT06-S3N
7	KBRT02-S3N	8	KBRT03-S3N
9	KBRT05-S3N	10	KBRT01-S3N
11	KBRT04-S3N	12	KBRT07-S3N
13	KBRT00-S3N	14	NC
15	KBSC00-S3N	16	KBSC09-S3N
17	KBSC03-S3N	18	KBSC02-S3N
19	KBSC05-S3N	20	KBSC04-S3N
21	KBSC06-S3N	22	KBSC08-S3N
23	KBSC10-S3N	24	KBSC01-S3N
25	KBSC11-S3N	26	KBSC07-S3N
27	KBSC15-S3N	28	KBSC12-S3N
29	KBSC13-S3N	30	KBSC14-S3N
1T	GND	2T	GND

C.8 CN4100 LAN interface connector (8-pin)

Table C-8 LAN interface connector (8-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	ZBIDDN-EXN	2	ZBIDDP-EXP
3	ZBIDAP-EXP	4	ZBIDAN-EXN
5	ZBIDBP-EXP	6	ZBIDBN-EXN
7	ZBIDCN-EXN	8	ZBIDCP-EXP

C.9 CN4200 1394 interface connector (4-pin)*Table C-9 1394 interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ZTPB0-P3N	2	ZTPB0-P3P
3	ZTPA0-P3N	4	ZTPA0-P3P
1T	GND	2T	GND
3T	GND	4T	GND

C.10 CN4400 Bluetooth interface connector (20-pin)*Table C-10 Bluetooth interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	NC
3	BTMDL-P3N	4	NC
5	NC	6	NC
7	NC	8	BTRST-S3N
9	NC	10	NC
11	GND	12	NC
13	GND	14	WCHCLK-P3P
15	NC	16	ZUSBBT-E3P
17	ZUSBBT-E3N	18	WCHDAT-P3P
19	NC	20	BT-P3V
1T	GND	2T	GND

C.11 CN4610 USB (PORT4) interface connector (4-pin)*Table C-11 USB (PORT4) interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB1PS-E5V2	2	ZUSBP4-E3N
3	ZUSBP4-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.12 CN5080 CRT interface connector (15-pin)*Table C-12 CRT interface connector (15-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	MRED-PXP	2	MGREEN-PXP
3	MBLUE-PXP	4	NC
5	GND	6	GND
7	GND	8	GND
9	P5V	10	GND
11	NC	12	MCRTSD-P5P
13	MHSYNC-P3P	14	MVSYNC-P3P
15	MCRTSC-P5P		
1T	GND	2T	GND

C.13 CN5601 LCD interface connector (34-pin)*Table C-13 LCD interface connector (34-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	LEDBL5-GND
3	LEDBL4-GND	4	LEDBL3-GND
5	LEDBL2-GND	6	LEDBL1-GND
7	LEDBL0-GND	8	NC
9	LEDBL-PYV	10	NC
11	PNL-P2V	12	PNL-P2V
13	PNL-P2V	14	PNL-P2V
15	GND	16	GND
17	GND	18	(IC5310-4)
19	NC	20	NC
21	NC	22	FSDA-P3P
23	FSCL-P3P	24	P3V
25	NC	26	GND
27	XTXCKA-PYP	28	XTXCKA-PYN
29	ZTXDA2-PYN	30	ZTXDA2-PYP
31	ZTXDA1-PYP	32	ZTXDA1-PYP
33	ZTXDA0-PYP	34	ZTXDA0-PYN
1T	GND	2T	GND

C.14 CN8771 FAN interface connector (4-pin)*Table C-14 FAN interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	FANPON-P5N	2	FANG-P3P
3	GND	4	(IC8773-4)

C.15 CN8800 DC-IN connector (4-pin)*Table C-15 USB(Port4) interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	PVL	2	PVL
3	GND	4	GND

C.16 CN8810 Battery connector (10-pin)*Table C-16 Battery connector (10-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(Q8811-1)	2	BTMP1
3	(Q8811-4)	4	M5V
5	PSCL-M5P	6	PSDA-M5P
7	GND	8	DBT10V-S5N
9	GND	10	GND

C.17 CN9300 RTC battery connector (3-pin)*Table C-17 RTC battery connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ZS_PWCHKF	2	NC
3	GND		
1T	GND	2T	GND

C.18 CN9500 FMUJA* board interface connector (36-pin)*Table C-18 FMUJA* board interface connector (36-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	GND
3	GND	4	GND
5	GND	6	ROTENB-P3N
7	ROTENA-P3N	8	SND-GND
9	SND-GND	10	PVON-R3N
11	P5V	12	P5V
13	ATBEEP-P3P	14	PCBEEP-P3P
15	AMPSD-S3N	16	P3V
17	SNDMUT-S3N	18	GND
19	AZRST0-E3N	20	AZSDO0-P3P
21	AZSDI0-P3P	22	GND
23	AZSYC0-P3P	24	GND
25	XAZBC0-P3P	26	GND
27	GND	28	ZUSBP6-E3P
29	ZUSBP6-E3N	30	GND
31	NC	32	USB2PS-E5V
33	USB2PS-E5V	34	USB2PS-E5V
35	USB2PS-E5V	36	USB2PS-E5V
1T	GND	2T	GND

C.19 CN9600 FMUUS* board interface connector (20-pin)

Table C-19 FMUUS board interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	RFSWON-S3N
3	USB0PS-E5V	4	USB0PS-E5V
5	USB0PS-E5V	6	USB0PS-E5V
7	USB0PS-E5V	8	GPBTNA-S3N
9	GND	10	ZUSBP0-E3P
11	ZUSBP0-E3N	12	GND
13	GND	14	GND
15	GND	16	GND
17	GPBTNB-S3N	18	GND
19	PNLOFF-S3N	20	S3V
1T	GND	2T	GND

C.20 CN9700 FMUSS* board interface connector (30-pin)

Table C-20 FMUSS board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	ZUSBOD-E3N
17	ZUSBOD-E3P	18	GND
19	GND	20	GND
21	GND	22	MBVON-E5N
23	P3V	24	P3V
25	ODDMDL-P3N	26	P5V
27	P5V	28	P5V
29	P5V	30	P5V
1T	GND	2T	GND

C.21 CN9800 FMUFS* board interface connector (6-pin)*Table C-21 FMUFS* board interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	ZUSBFS-E3P
3	ZUSBFS-E3N	4	GND
5	FGSPON-S3N	6	E3V
1T	GND	2T	GND

C.22 CN9850 Membrane interface connector (24-pin)*Table C-22 Membrane interface connector (24-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	P5V	2	P5V
3	IPDDAT-P5P	4	IPDCLK-P5P
5	GND	6	GND
7	NC	8	M5V
9	WANLED-E3P	10	M5V
11	RFLED-S3P	12	P5V
13	SDLED-P5N	14	P5V
15	HDDLED-P5N	16	M5V
17	BAT1GR-S5N	18	BAT10oR-S5N
19	M5V	20	PWLEGR-S3P
21	PWLEOR-S3P	22	M5V
23	DCINGR-S5N	24	DCINOR-S5N
1T	GND	2T	GND

Finger Sensor board (FMUFS*)**C.23 CN9810 System board interface connector (6-pin)***Table C-23 System board interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	E3V	2	FGSPON-S3N
3	GND	4	ZUSBFS-E3N
5	ZUSBFS-E3P	6	GND
1T	GND	2T	GND

SW board (FMUSW*)**C.24 CN9630 FMUUS* board interface connector (3-pin)***Table C-24 FMUUS* board interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	S3V	2	PNLOFF-S3N
3	GND		

JACK board (FMUJA*)**C.25 CN4620 USB (PORT6) interface connector (4-pin)***Table C-24 FMUUS* board interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	ZUSBP6-E3N
3	ZUSBP6-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.26 CN6050 Int-Microphone interface connector (2-pin)*Table C-26 Int-Microphone interface connector (2-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	IMICIN-PXP	2	GND

C.27 CN6350 Speaker interface connector (2-pin)*Table C-27 Speaker interface connector (2-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	SP_OUT_+	2	SP_OUT_-

C.28 CN9510 System board interface connector (36-pin)*Table C-28 System board interface connector (36-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USB2PS-E5V	2	USB2PS-E5V
3	USB2PS-E5V	4	USB2PS-E5V
5	USB2PS-E5V	6	NC
7	GND	8	ZUSBP6-E3N
9	ZUSBP6-E3P	10	GND
11	GND	12	XAZBC0-P3P
13	GND	14	AZSYC0-P3P
15	GND	16	AZSDI0-P3P
17	AZSDO0-P3P	18	AZRST0-E3N
19	GND	20	SNDMUT-S3N
21	P3V	22	AMPSD-S3N
23	PCBEEP-P3P	24	ATBEEP-P3P
25	P5V	26	P5V
27	PVON-R3N	28	SND-GND
29	SND-GND	30	ROTENA-P3N
31	ROTENB-P3N	32	GND
33	GND	34	GND
35	GND	36	GND
1T	GND	2T	GND

C.29 J6050 Ext-Microphone interface connector (6-pin)*Table C-29 Ext-Microphone interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	A-GND	2	EMICIN-PXP
3	EMICB-P2V	4	A-GND
5	DETCTA-P4N	6	EMICB-P2V

C.30 J6310 Headphone interface connector (6-pin)*Table C-30 Headphone interface connector (6-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	A-GND	2	HEADL-PXP
3	HEADR-PXP	4	DETCTA-P4N
5	A-GND	6	NC

USB board (FMUUS*)**C.31 CN4630 USB (PORT0) interface connector (4-pin)***Table C-31 FMUUS* board interface connector (4-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	USBOPS-E5V	2	ZUSBP0-E3N
3	ZUSBP0-E3P	4	GND
1T	GND	2T	GND
3T	GND		

C.32 CN9610 System board interface connector (20-pin)*Table C-32 System board interface connector (20-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	RFSWON-S3N
3	USB0PS-E5V	4	USB0PS-E5V
5	USB0PS-E5V	6	USB0PS-E5V
7	USB0PS-E5V	8	GPBTNA-S3N
9	GND	10	ZUSBP0-E3P
11	ZUSBP0-E3N	12	GND
13	GND	14	GND
15	GND	16	GND
17	GPBTNB-S3N	18	GND
19	PNLOFF-S3N	20	S3V
1T	GND	2T	GND

C.33 CN9620 FMUSW* board interface connector (3-pin)*Table C-33 FMUSW* board interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	S3V	2	PNLOFF-S3N
3	GND		

SATA HDD FPC (FMUSH*)

C.34 CN1810 System board interface connector (50-pin)

Table C-34 System board interface connector (50-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	GND
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	GND
21	NC	22	NC
23	GND	24	NC
25	GND	26	NC
27	GND	28	NC
29	NC	30	GND
31	NC	32	NC
33	NC	34	GND
35	NC	36	NC
37	NC	38	P5V
39	P5V	40	P5V
41	P5V	42	NC
43	GND	44	GND
45	ZSATR0-P1P	46	ZSATR0-P1N
47	GND	48	ZSATT0-P1N
49	ZSATT0-P1P	50	GND

C.35 CN1820 SATA HDD interface connector (10-pin)*Table C-35 SATA HDD interface connector (10-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
S1	GND	S2	ZSATT0-P1P
S3	ZSATT0-P1N	S4	GND
S5	ZSATR0-P1N	S6	ZSATR0-P1P
S7	GND		
P1	NC	P2	NC
P3	NC	P4	GND
P5	GND	P6	GND
P7	P5V	P8	P5V
P9	P5V	P10	GND
P11	GND	P12	GND
P13	NC	P14	NC
P15	NC		
1T	GND	2T	GND

PATA HDD FPC (FMUPH*)**C.36 CN1830 System board interface connector (50-pin)***Table C-36 System board interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	IORSTB-P3N	2	GND
3	PDD07-P3P	4	PDD08-P3P
5	PDD06-P3P	6	PDD09-P3P
7	PDD05-P3P	8	PDD10-P3P
9	PDD04-P3P	10	PDD11-P3P
11	GND	12	PDD03-P3P
13	PDD12-P3P	14	PDD02-P3P
15	PDD13-P3P	16	PDD01-P3P
17	PDD14-P3P	18	PDD00-P3P
19	PDD15-P3P	20	GND
21	PDDREQ-P3P	22	PDIOW-P3N
23	GND	24	PDIOR-P3N
25	GND	26	PIORDY-P3P
27	GND	28	PDDACK-P3N
29	IDEIRQ-P3P	30	GND
31	PDA1-P3P	32	PDA0-P3P
33	PDA2-P3P	34	GND
35	PDCS1-P3N	36	PDCS3-P3N
37	HDDLED-P3N	38	P3V
39	P3V	40	P3V
41	P3V	42	NC
43	NC	44	GND
45	NC	46	NC
47	GND	48	NC
49	NC	50	GND

C.37 CN1840 PATA HDD interface connector (40-pin)*Table C-37 PATA HDD interface connector (40-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	P3V
3	P3V	4	HDDLED-P3N
5	PDCS3-P3N	6	PDCS1-P3N
7	PDA2-P3P	8	PDA0-P3P
9	NC	10	PDA1-P3P
11	IDEIRQ-P3P	12	PDDACK-P3N
13	GND	14	PIORDY-P3P
15	GND	16	PDIOR-P3N
17	PDLOW-P3N	18	GND
19	PDDREQ-P3P	20	GND
21	PDD15-P3P	22	PDD00-P3P
23	PDD14-P3P	24	PDD01-P3P
25	PDD13-P3P	26	PDD02-P3P
27	PDD12-P3P	28	PDD03-P3P
29	PDD11-P3P	30	PDD04-P3P
31	PDD10-P3P	32	PDD05-P3P
33	PDD09-P3P	34	PDD06-P3P
35	PDD08-P3P	36	PDD07-P3P
37	GND	38	IDRSTB-P3N
39	NC	40	NC

Antenna board (FMUAT*)**C.38 CN2671 ANT interface connector (3-pin)***Table C-38 ANT interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-2)	2	GND
3	GND		

C.39 CN2672 3G interface connector (3-pin)*Table C-39 3G interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-6)	2	GND
3	GND		

C.40 CN2673 WLAN interface connector (3-pin)*Table C-40 W-LAN interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	(FL2670-4)	2	GND
3	GND		

SD board (FMUSD*)**C.41 CN1820 FMUOD* board interface connector (3-pin)***Table C-41 FMUOD* board interface connector (3-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ODD-P5V	2	ODD-P5V
3	ODD-P5V	4	ODD-P5V
5	ODD-P5V	6	ODD-P5V
7	ODD-P5V	8	NC
9	ODDMDL-P3N	10	GND
11	UDCS3-P3N	12	UDCS1-P3N
13	GND	14	UDA2-P3P
15	UDA0-P3P	16	UDA1-P3P
17	GND	18	IDEINT-P5P
19	UDD1CK-P3N	20	GND
21	UIORDY-P3P	22	GND
23	UDIOW-P3N	24	GND
25	UDIOR-P3N	26	GND
27	UDDREQ-P3P	28	GND
29	UDD15-P3P	30	UDD14-P3P
31	UDD13-P3P	32	UDD12-P3P
33	GND	34	UDD00-P3P
35	UDD01-P3P	36	UDD02-P3P
37	UDD03-P3P	38	GND
39	UDD04-P3P	40	UDD05-P3P
41	UDD06-P3P	42	UDD07-P3P
43	GND	44	UDD08-P3P
45	UDD09-P3P	46	UDD10-P3P
47	UDD11-P3P	48	GND
49	UIDRST-P3N	50	GND
1T	GND	2T	GND

C.42 CN9710 FMUSS* board interface connector (30-pin)*Table C-42 FMUSS* board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	ODDMDL-P3N	16	GND
17	ZUSBOD-E3N	18	ZUSBOD-E3P
19	GND	20	GND
21	GND	22	GND
23	GND	24	MBVON-E5V
25	P3V	26	P3V
27	UIBRST-S3N	28	P5V
29	P5V	30	P5V
1T	GND	2T	GND

C.43 IS2130 SD CARD interface connector (12-pin)*Table C-43 SD CARD interface connector (12-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
P1	NC	P2	NC
P3	NC	P4	GND
P5	GND	P6	GND
P7	P5V	P8	P5V
P9	P5V	P10	GND
P11	GND	P12	GND
P13	NC	P14	NC
P15	NC		
S1	GND	S2	ZSATTO-P1P
S3	ZSATTO-P1N	S4	GND
S5	ZSATRO-P1N	S6	ZSATRO-P1P
S7	GND		
1T	GND	2T	GND

ODD FPC (FMUOD*)**C.44 CN1810 ODD interface connector (50-pin)***Table C-44 ODD interface connector (50-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	2	NC
3	GND	4	NC
5	UIDRST-P3N	6	UDD08-P3P
7	UDD07-P3P	8	UDD09-P3P
9	UDD06-P3P	10	UDD10-P3P
11	UDD06-P3P	12	UDD11-P3P
13	UDD04-P3P	14	UDD12-P3P
15	UDD03-P3P	16	UDD13-P3P
17	UDD02-P3P	18	UDD14-P3P
19	UDD01-P3P	20	UDD15-P3P
21	UDD00-P3P	22	UDDREQ-P3P
23	GND	24	UDIOR-P3N
25	UDIOW-P3N	26	GND
27	UIORDY-P3P	28	UDDACK-P3N
29	IDEINT-P5P	30	NC
31	UDA1-P3P	32	NC
33	UDA0-P3P	34	UDA2-P3P
35	UDCS1-P3N	36	UDCS3-P3N
37	NC	38	ODD-P5V
39	ODD-P5V	40	ODD-P5V
41	ODD-P5V	42	ODD-P5V
43	GND	44	GND
45	GND	46	GND
47	NC	48	GND
49	NC	50	NC
1T	GND	2T	GND

C.45 CN1830 FMUSD* board interface connector (50-pin)*Table C-45 FMUSD* board interface connector (12-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	ODD-P5V	2	ODD-P5V
3	ODD-P5V	4	ODD-P5V
5	ODD-P5V	6	ODD-P5V
7	ODD-P5V	8	ODD-P5V
9	NC	10	GND
11	GND	12	UDCS3-P3N
13	UDCS1-P3N	14	GND
15	UDA2-P3P	16	UDA0-P3P
17	UDA1-P3P	18	GND
19	IDEINT-P5P	20	UDDACK-P3N
21	GND	22	UIORDY-P3P
23	GND	24	UDIOW-P3N
25	GND	26	UDIOR-P3N
27	GND	28	UDDREQ-P3P
29	GND	30	UDD15-P3P
31	UDD14-P3P	32	UDD13-P3P
33	UDD12-P3P	34	GND
35	UDD00-P3P	36	UDD01-P3P
37	UDD02-P3P	38	UDD03-P3P
39	GND	40	UDD04-P3P
41	UDD05-P3P	42	UDD06-P3P
43	UDD07-P3P	44	GND
45	UDD08-P3P	46	UDD09-P3P
47	UDD10-P3P	48	UDD11-P3P
49	GND	50	UIDRST-P3N

SD board interface FPC (FMUSS*)**C.46 CN9720 System board interface connector (30-pin)***Table C-46 System board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	ZUSBOD-E3N
17	ZUSBOD-E3P	18	GND
19	GND	20	GND
21	GND	22	MBVON-E5N
23	P3V	24	P3V
25	ODDMDL-P3N	26	P5V
27	P5V	28	P5V
29	P5V	30	P5V

C.47 CN9730 FMUSD* board interface connector (30-pin)*Table C-47 FMUSD* board interface connector (30-pin)*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	SDAT3-P3P
3	SDCMD-P3P	4	GND
5	SDCLK-P3P	6	GND
7	SDAT0-P3P	8	SDAT1-P3P
9	SDAT2-P3P	10	GND
11	SDCD-P3N	12	SD-P3V
13	SD-P3V	14	SDWP-P3P
15	GND	16	ZUSBOD-E3N
17	ZUSBOD-E3P	18	GND
19	GND	20	GND
21	GND	22	MBVON-E5N
23	P3V	24	P3V
25	ODDMDL-P3N	26	P5V
27	P5V	28	P5V
29	P5V	30	P5V

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*1
09	8 *	09	89	3E	F0	3E	*1
10	9 (0A	8A	46	F0	46	*1
11	0)	0B	8B	45	F0	45	*1
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*1
24	I	17	97	43	F0	43	*1
25	O	13	98	44	F0	44	*1
26	P	19	99	4D	F0	4D	*1
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\	2B	AB	5D	F0	5D	*2
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*1
38	K	25	A5	42	F0	42	*1
39	L	26	A6	4B	F0	4B	*1
40	; :	27	A7	4C	F0	4C	*1
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*1
53	, <	33	B3	41	F0	41	*1
54	. >	34	B4	49	F0	49	*1
55	/ ?	35	B5	4A	F0	4A	*1
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70	*4
76	Del	E0 53	E0 D3	E0 71	E0 F0	71	*4
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B	*4
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C	*4
81	End	E0 4F	E0 CF	E0 69	E0 F0	69	*4
83	↑	E0 48	E0 C8	E0 75	E0 F0	75	*4
84	↓	E0 50	E0 D0	E0 72	E0 F0	72	*4
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D	*4
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A	*4
89	→	E0 4D	E0 CD	E0 74	E0 F0	74	*4
110	Esc	01	81	76	F0	76	
112	F1	3B	BB	05	F0	05	
113	F2	3C	BC	06	F0	06	
114	F3	3D	BD	04	F0	04	
115	F4	3E	BE	0C	F0	0C	
116	F5	3F	BF	03	F0	03	
117	F6	40	C0	0B	F0	0B	
118	F7	41	C1	83	F0	83	
119	F8	42	C2	0A	F0	0A	
120	F9	43	C3	01	F0	01	
121	F10	44	C4	09	F0	09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				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	Refer to table 2-25								
126	Pause	Refer to table 2-25								
202	Fn									*5
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

Notes:

1. * Scan codes differ by overlay function.
2. * This key corresponds to key No. 42 in the 102 key mode.
3. * Combination with the **Fn** key makes different codes.
4. * Scan codes differ by mode.
5. * The Fn key does not generate a code by itself..

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12

Note : The table above shows scan codes with the left **Shift** key.
In the case of Key no. 55 Overlay mode only.

In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A	E0 52	E0 D2	E0 AA	E0 12	E0 70	E0 F0	70 E0 F0 12
76	DEL	E0 2A	E0 53	E0 D3	E0 AA	E0 12	E0 71	E0 F0	71 E0 F0 12
79	←	E0 2A	E0 4B	E0 CB	E0 AA	E0 12	E0 6B	E0 F0	6B E0 F0 12
80	Home	E0 2A	E0 47	E0 C7	E0 AA	E0 12	E0 6C	E0 F0	6C E0 F0 12
81	End	E0 2A	E0 4F	E0 CF	E0 AA	E0 12	E0 69	E0 F0	69 E0 F0 12
83	↑	E0 2A	E0 48	E0 C8	E0 AA	E0 12	E0 75	E0 F0	75 E0 F0 12
84	↓	E0 2A	E0 50	E0 D0	E0 AA	E0 12	E0 72	E0 F0	72 E0 F0 12
85	PgUp	E0 2A	E0 49	E0 C9	E0 AA	E0 12	E0 7D	E0 F0	7D E0 F0 12
86	PgDn	E0 2A	E0 51	E0 D1	E0 AA	E0 12	E0 7A	E0 F0	7A E0 F0 12
89	→	E0 2A	E0 4D	E0 CD	E0 AA	E0 12	E0 74	E0 F0	74 E0 F0 12
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2		
			Make	Break	Make	Break	
09	8	(8)	48	C8	75	F0	75
10	9	(9)	49	C9	7D	F0	7D
11	0	(*)	37	B7	7C	F0	7C
23	U	(4)	4B	CB	6B	F0	6B
24	I	(5)	4C	CC	73	F0	73
25	O	(6)	4D	CD	74	F0	74
26	P	(-)	4A	CA	7B	F0	7B
37	J	(1)	4F	CF	69	F0	69
38	K	(2)	50	D0	72	F0	72
39	L	(3)	51	D1	7A	F0	7A
40	;	(+)	4E	CE	79	F0	79
52	M	(0)	52	D2	70	F0	70
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0	4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0 7C	E0 F0 12
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt +		54	D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common *	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

*: This key generates only make codes.

Appendix E Key Layout

E.1 United Kingdom (UK) Keyboard

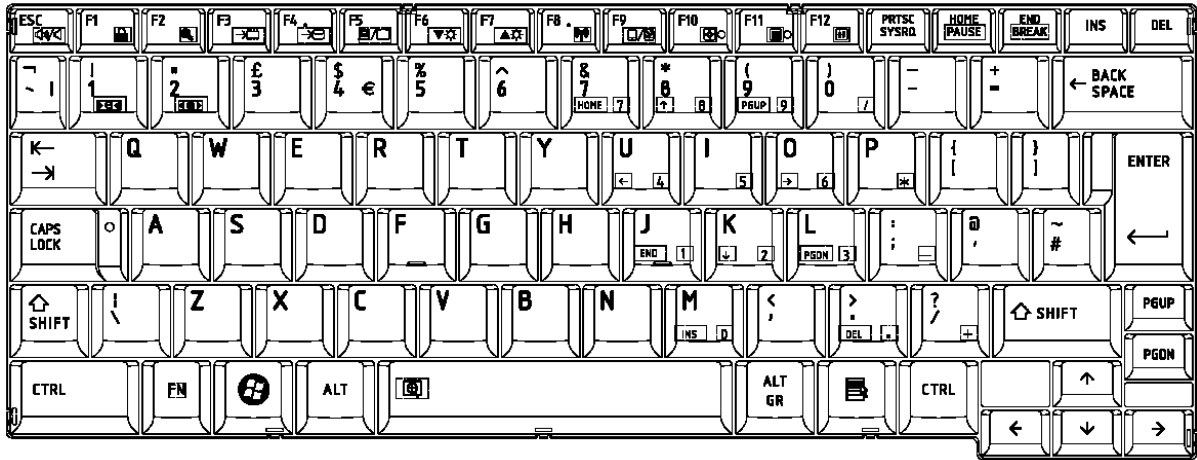


Figure E-1 UK keyboard

E.2 United States (US) Keyboard

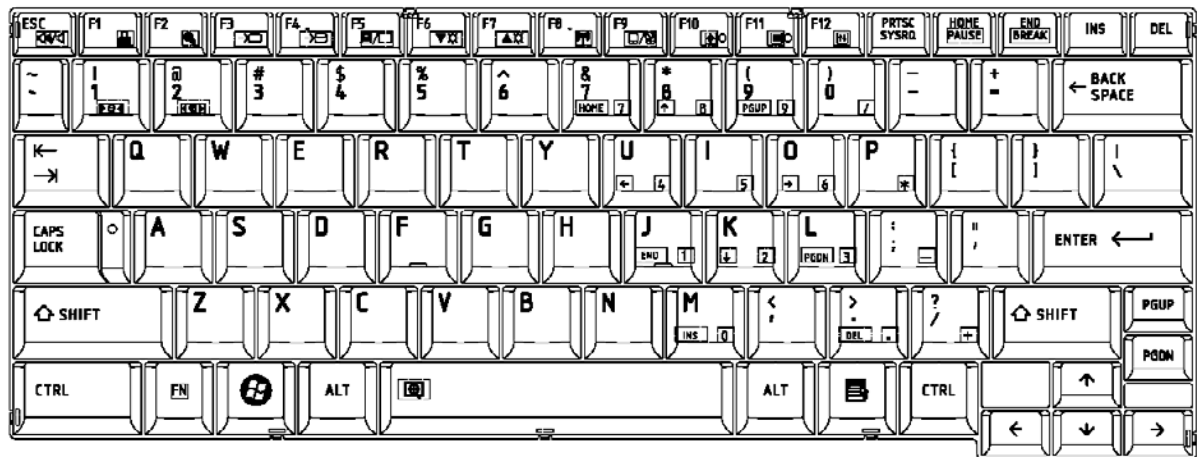


Figure E-2 US keyboard

E.3 Thai Keyboard

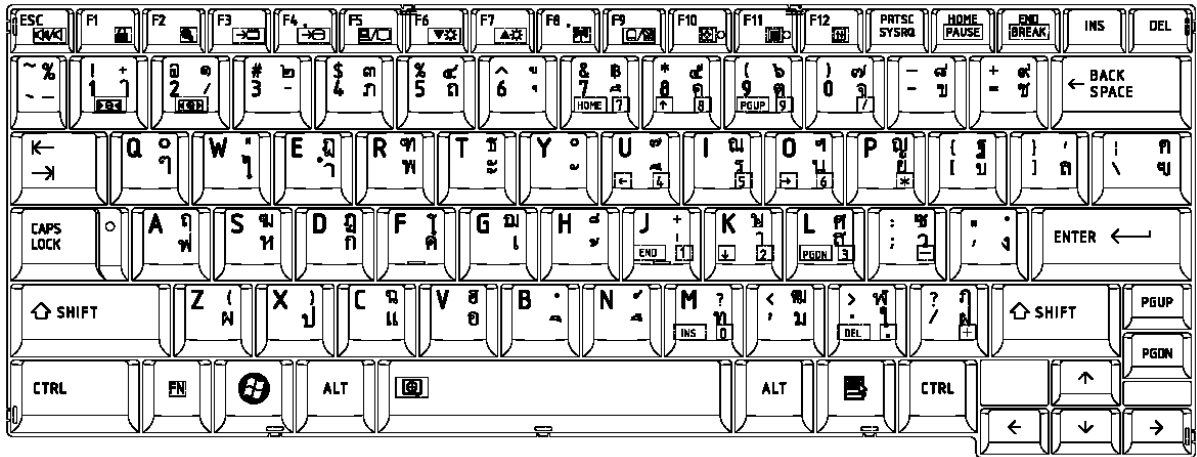


Figure E-3 Thai keyboard

E.4 Canadian French Keyboard

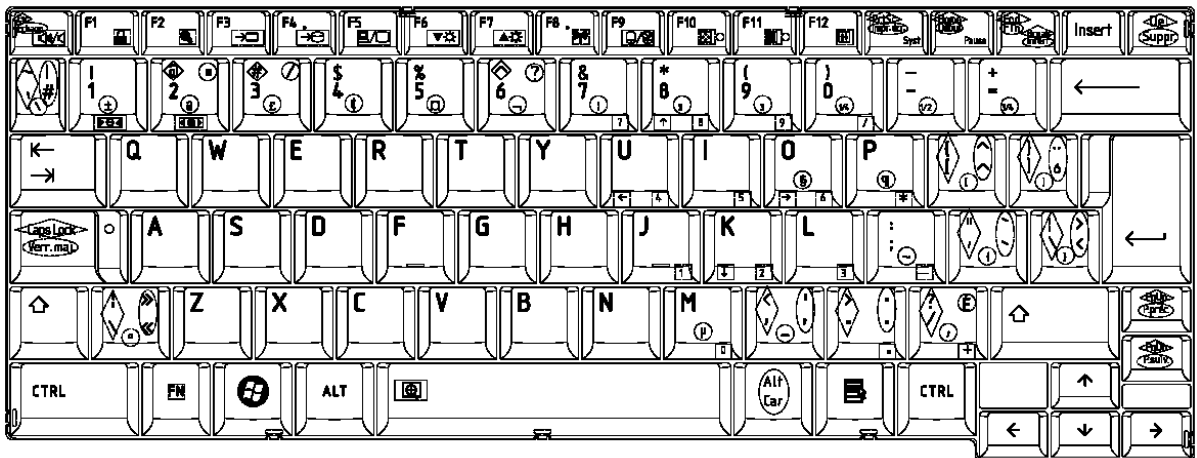


Figure E-4 Canadian French keyboard

Appendix F Wiring diagrams

F.1 RGB Monitor Loopback Connector

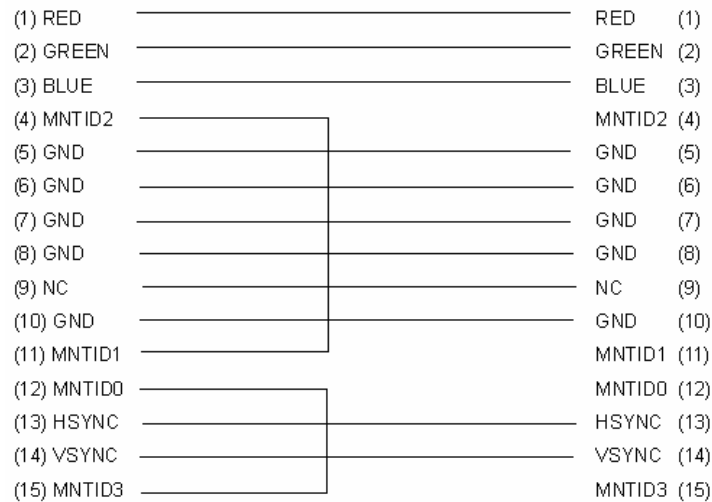


Figure F-1 RGB Monitor Loopback Connector

F.2 LAN Loopback Connector

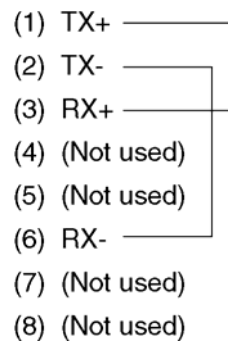


Figure F-2 LAN Loopback Connector

Appendix G BIOS rewrite procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

- BIOS/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Connect an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the tilde character key until a beep sounds.

For example



6. The BIOS rewriting starts
7. When the process is completed, it beeps and the system automatically reboots.

<p>NOTE:</p> <ol style="list-style-type: none">1. <i>Connect the AC adapter to the computer when you rewrite the BIOS.</i>2. <i>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.</i>3. <i>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.</i>

Appendix H EC/KBC rewrite procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

- EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
 2. Connect the AC adaptor to the computer when you rewrite the EC/KBC.
 3. Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.
 4. If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC have been erased. In this case, insert the BIOS/EC/KBC rewriting disk and the EC/KBC will be rewritten.
 5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC Card.
4. Connect an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a beep sounds.) The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

4

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures).

Table I-1 MTBF

	Time (hours)
MTBF	5,700.98

