

**Toshiba Personal Computer**  
**PORTEGE M300**  
**Maintenance Manual**

**TOSHIBA CORPORATION**

**File Number 960-504**

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Toshiba Personal Computer PORTEGE M300 Maintenance Manual

First edition December 2004

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## Preface

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE M300.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

### SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

***DANGER:*** “*Danger*” indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.

***WARNING:*** “*Warning*” indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.

***CAUTION:*** “*Caution*” indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.

***NOTE:*** “*Note*” contains general information that relates to your safe maintenance service.

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

- ❑ Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- ❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1     Hardware Overview describes the PORTEGE M300 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
- Display 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 M300 Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, low power usage and high reliability. This computer incorporates the following features and benefits.

### Microprocessor

The PORTEGE M300 computer is equipped with an Intel Pentium-M/Celeron-M Processor, which operate at 400MHz FSB.

- Intel Pentium-M ULV Processor 1.10GHz (Processor Number ; 733)
- Intel Celeron-M ULV Processor 900MHz (Processor Number ; 353)

### Chipset

The PORTEGE M300 is equipped with Intel 855GME (Montara-GM+) as North Bridge, Intel ICH4-M as South Bridge and Texas Instrument PCI7421 as Card Controller.

### Memory

One 256MB memory is mounted on the system board. One DDR SO-DIMM slots is available for installation of DDR333 (PC2700) compatible 256, 512MB and 1GB memory module.

### HDD

2.5-inch one 30GB/40G/60GB/80GB/100GB HDD is supported.

### USB FDD (Option)

An external two-mode 3.5-inch FDD, which connects with a USB port, supports 720KB and 1.44MB formats and enables booting the computer from a FDD.

### Optical devices

A DVD-ROM & CD-R/RW drive or DVD Super Multi drive is equipped.

### Display

12.1 XGA-TFT color display, resolution 1,024(H)×768(V), 16M colors

A high-resolution external monitor connected to the computer can display up to 2048(H)×1536(V), at 16M colors.

### Touch pad

Touch pad with two buttons is installed as a pointing device.

Keyboard

An-easy-to-use 85/86-key keyboard provides a numeric overlay for fast numeric data entry.

 Docking port

Advanced Port Replicator III can be connected through docking port on the bottom. Following functions are supported by Advanced Port Replicator III.

- RJ 11 port
- RJ45 port
- LINE-IN port
- LINE-OUT port
- USB port
- RGB connector port
- Parallel port
- Serial port
- PS/2 connector port
- DVI port [Not supported when docking with PORTEGE M300]
- i.LINK (IEEE1394) [Not supported when docking with PORTEGE M300]

 Button & Switch

TOSHIBA Assist Button and TOSHIBA Presentation Button are available. Also wireless communication switch can turn on/off the power of bluetooth and wireless LAN function.

 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.

 External monitor port

The external monitor port (RGB connector) supports VESA DDC2B compatible functions.

 PC card slot

The PC card slot (PCMCIA) accommodates one 5mm Type II card. (Based on PC Card Standard, supporting CardBus)



SD Card

A SD Card Slot can accommodate Secure Digital flash memory cards with various capacities.

 CF Card

A CF Card Slot can accommodate compact flash memory cards with various capacities. Dummy card is also equipped to prevent the slot from dust or dirt.

 Internal modem

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

The internal modem provides capability for data and fax communication and supports ITU-T V.90 (V.92) standard. For data reception it operates at 56Kbps and for data transmission it operates at 33.6Kbps. For fax transmission it operates at 14.4Kbps. The speed of data transfer and fax depends on analog telephone line conditions. It has an RJ11 modem jack for connecting to a telephone line.

 Internal LAN

The computer is equipped with LAN circuits that support Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100 BASE-TX).

 i.LINK (IEEE1394)

This port enables high-speed data transfer directly from external devices such as digital video cameras.

 Wireless LAN

Wireless LAN Card can be equipped with mini-PCI slot. Based on IEEE802.11b, b/g, a/b/g with 2.45GHz/5.0GHz Dual-band antenna.

 Bluetooth

Bluetooth module can be equipped. This enables a communication to devices that support Bluetooth Version 1.2/1.1. Adopting AFH (Adaptive Frequency Hopping), reduce the interference with the wireless communication in 2.4GHz.

 Infrared port

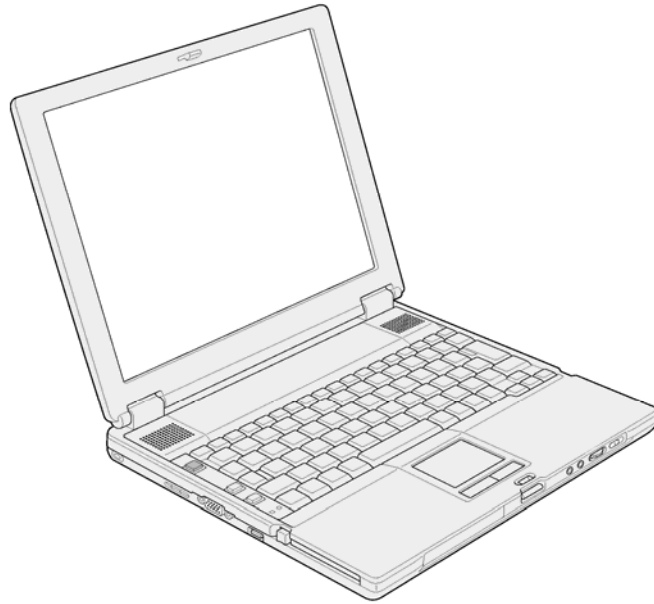
The infrared port is compatible with Fast Infrared (FIR) standards enabling 4 Mbps, 1.152 Mbps, 115.2 kbps, 57.6 kbps, 38.4 kbps, 19.2 kbps or 9.6 kbps data transfer with Infrared Data Association (IrDA) 1.1 compatible external devices.

❑ Sound system

The sound system is equipped with the following features:

- Built in stereo speakers
- Built-in monaural microphone
- Stereo Headphone jack (3.5mm mini headphone jack)
- External microphone jack (3.5mm mini microphone jack)

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.

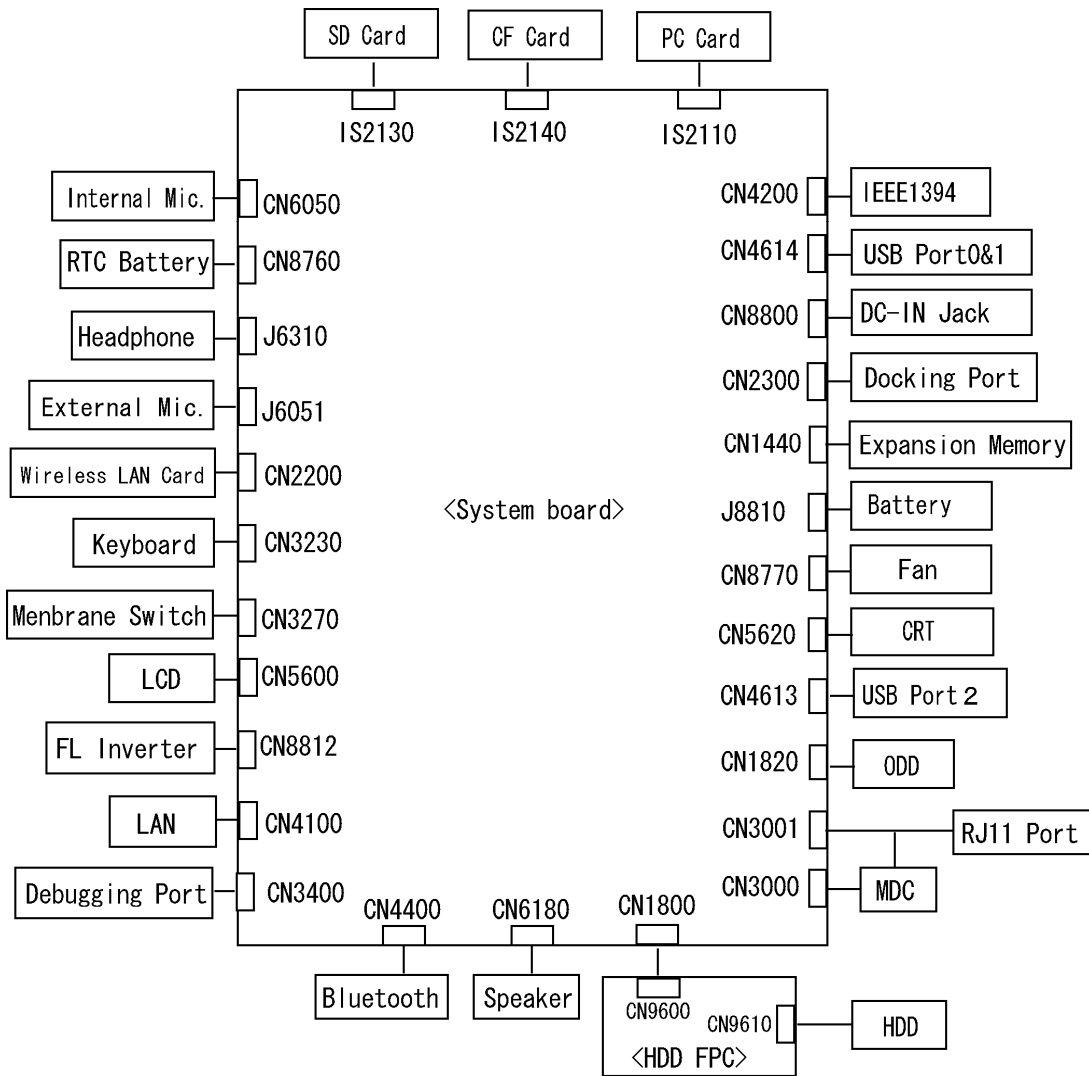


Figure 1-2 System unit configuration

## 1.2 System Unit Block Diagram

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

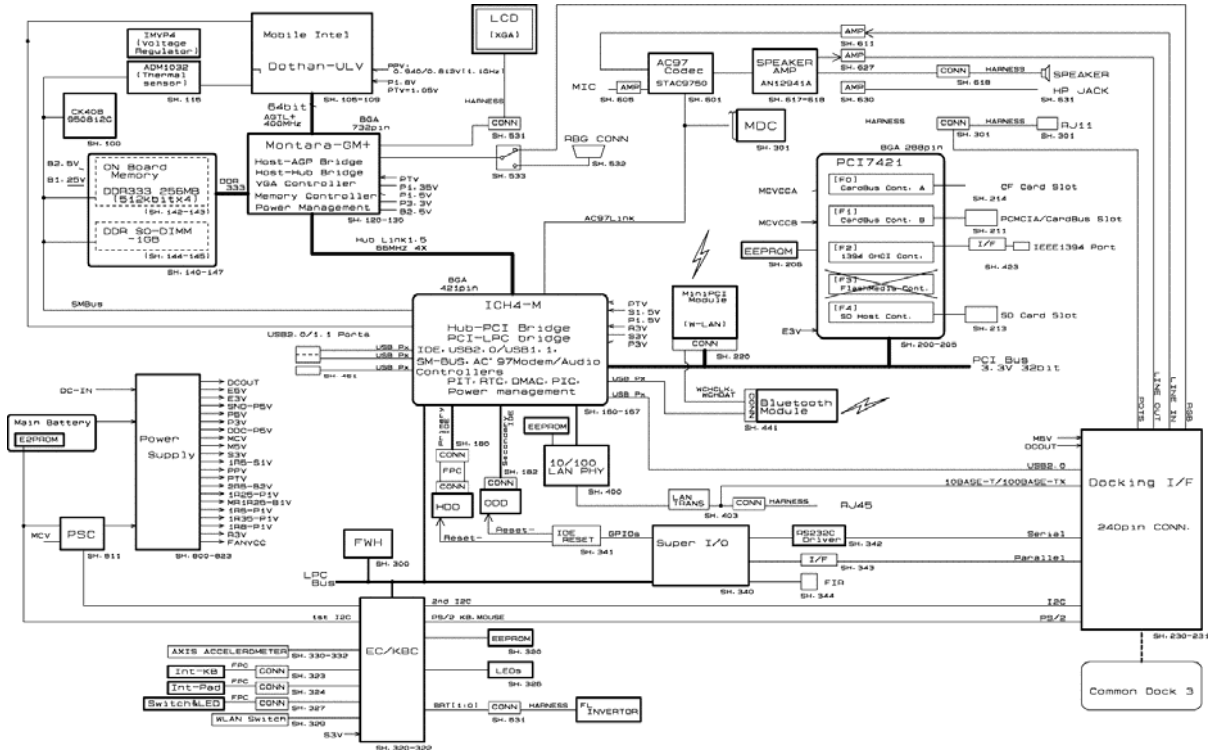


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel® Mobile Pentium®-M ULV Processor 1.10GHz (Processor Number ; 733)
  - Core voltage : 0.94/0.81V
  - FSB : 400MHz
  - L1 cache : 64KB [32KB (Code) + 32KB (Data)]
  - L2 cache : 2MB
  - Support : Enhanced Intel® SpeedStep technology
  
- Intel® Mobile Celeron®-M ULV Processor 900MHz (Processor Number ; 353)
  - Core voltage : 0.94V
  - FSB : 400MHz
  - L1 cache : 64KB [32KB (Code) + 32KB (Data)]
  - L2 cache : 512MB

❑ Memory

One 256MB memory is mounted on the system board. One DDR SO-DIMM slots is available for installation of DDR333 (PC2700) compatible 256, 512MB and 1GB memory module.

- Supports DDR333 (PC2700)
- 2.5 volt operation
- 200 pin, SO Dual In-line Memory Modules (SO-DIMM)

❑ North Bridge ; Intel GMCH-M

- One Intel 855GME is used.
- Features:
  - Memory Controller supporting DDR266/DDR333, Max 1280MB
  - Built in graphic controller
  - RGB, DVI,DVO interface
  - AGP interface(AGP V2.0), x4 mode
  - PCI Interface (R2.2)
  - ACPI 1.0
  - Supports Geyserville III
  - Supports Intel SpeedStep Technology
  - 732-ball 37.5×37.5mm FC-BGA package

South Bridge ; Intel ICH4-M (82801DBM)

- One Intel 82801DBM is used.
- This gate array has the following features:
  - PCI 3.3V/5V Tolerance interface
  - Provides Steerable PCI interrupt for PCI device P&P
  - Enhanced DMA controller
  - Interrupt controller
  - Counter / Timer
  - Supports Distribute DMA.
  - Supports PC/PCI DMA.
  - Supports Serial IRQ.
  - LPC host controller
  - Supports Plug-and-Play.
  - Supports ACPI
  - Internal PCI IDE Controller
  - USB interface
  - SMBus interface
  - Super I/O Interface
  - Audio system
  - SW modem interface
  - 421-ball 31×31mm BGA Package

 PC Card Controller ; Texas Instruments (PCI7421)

- One PCI 7421 is used.
- This gate array has the following functions and components.
  - PCI interface (PCI Revision2.2)
  - CardBus/PC Card controller (Yenta2 Version2.2)
  - SD/MMC card controller (SDHC Ver.1.2)
  - SD IO card controller (Ver.1.1)
  - Memory Stick/Memory Stick Pro Card Controller
  - xD Picture Card Controller
  - IEEE1394a Controller 2 port
  - BGA Package

 Firmware Hub (FWH)

One 4Mbit FWH (STMicro M50FW040N5G) is used.

 Sound Controller

AC-Link (South Bridge), STAC9750 (Sound Codec) and AN12941A-VF (Audio Amp) are used.

❑ EC/KBC (Embedded Controller/Keyboard Controller)

One RENESAS M306KAFCLRP U0 chip functions as both EC and KBC.

❑ Other main system chips

- PSC (Toshiba-made TMP87PM48U)
- Super I/O (SMSC-made LPC47N217-JV)
- Clock Generator (ICS-made 950812CGLFT)
- RS-232C Driver (MAXIM-made MAX3243CAI+TG074)
- Audio AMP (Matsushita-made AN12941A-VF)
- AXIS accelerometer (STMicro-made LIS3L02AQ)

❑ Internal LAN Controller

One Kinnereth (82562ET) chip is used.

- Supports 10/100Mbit Ethernet.
- Supports LED and WOL.

❑ Wireless LAN Card

2.4GHz DSSS/OFDM, 5.0GHz OFDM wireless LAN card is equipped.  
Conformity with IEEE 802.11b, b/g or a/b/g. Theoretical transfer speed is maximum of 54Mbps (with 802.11a, 802.11g), 11Mbps (with 802.11b) and 108Mbps (with Turbo Mode of Atheros module type). Supports 128bit WEP.



### 1.3 USB Floppy Disk Drive

The USB FDD is a thin, high-performance reliable drive that supports 720KB and 1.44MB.

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

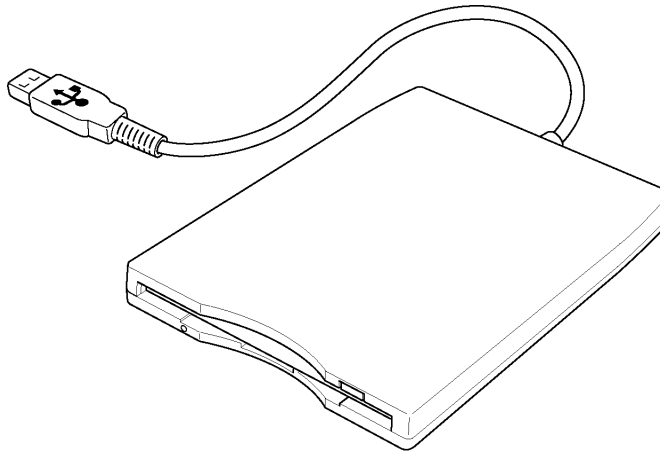


Figure 1-4 USB FDD

Table 1-1 USB FDD specifications

Items		720KB mode	1.44MB mode
Data transfer rate	FDD part	250K bits/second	500K bits/second
	USB	Full speed mode (12M bits/second)	
Disk rotation speed		300rpm	360rpm
Track density		5.3 track/mm (135TPI)	

## 1.4 Hard Disk Drive

A 30GB/40GB/60GB/80GB/100GB 2.5-inch HDD is supported.

The HDD is shown in Figure 1-5 and the specification is shown in Table 1-2 and Table 1-3.

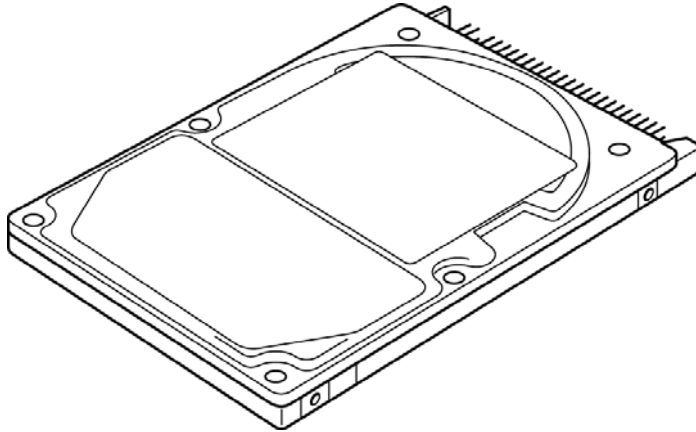


Figure 1-5 HDD

Table 1-2 HDD dimensions

Parameter		Standard value		
		TOSHIBA HDD2190BZE02	TOSHIBA HDD2191VZE02	TOSHIBA HDD2194VZE02
Outline dimensions	Width (mm)	69.85		
	Height (mm)	9.5		
	Depth (mm)	100.0		
	Weight (g)	95		

Parameter		Standard value			
		HGST G8BC0001E311	HGST G8BC0001E411	HGST G8BC0001N611	HGST G8BC0001N811
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	95 (max)		102	

Parameter		Standard value			
		HGST G8BC0001N410	HGST G8BC0001N610	HGST G8BC0001N810	HGST G8BC0001NA10
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	102 (max)			

Table 1-3 HDD Specifications (1/2)

Specification			
Parameter	TOSHIBA HDD2190BZE02	TOSHIBA HDD2194VZE02	TOSHIBA HDD2191VZE02
Storage size (formatted)	40GB	60GB	80GB
Speed (RPM)	4,200	5,400	
Data transfer speed (Mbits/s)	175.0-341.7	202.9-373.3	154.3-298.0
Interface transfer rate (MB/s)	100 (Ultra DMA mode)		
Storage density (Kbpi)	735	-	-
Track density (Ktpi)	88.1	88.8	78.9
Average random seek time (read) (ms)	12		
Average random seek time (write) (ms)	12		
Power-on-to-ready (sec)	4		

Specification				
Parameter	HGST G8BC0001E311	HGST G8BC0001E411	HGST G8BC0001N611	HGST G8BC0001N811
Storage size (formatted)	30GB	40GB	60GB	80GB
Speed (RPM)	4,200			
Data transfer speed (Mbits/s)	512		493	
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density (Kbpi)	702		717	
Track density (Ktpi)	96		96.6	
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	14			
Power-on-to-ready (sec)	3.0		3.5	

Table 1-3 HDD Specifications (2/2)

Specification				
Parameter	HGST G8BC0001N410	HGST G8BC0001N610	HGST G8BC0001N810	HGST G8BC0001NA10
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	5,400			
Data transfer speed (Mbits/s)	493			
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density (Kbpi)	764 (MAX)			
Track density (Ktpi)	113.2			
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	14			
Power-on-to-ready (sec)	3.5			

## 1.5 Optical Drive

### 1.5.1 DVD-ROM & CD-R/RW Drive

The DVD-ROM & CD-R/RW drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM and CD-R/RW. It is a high-performance drive that reads DVD at maximum 8-speed and CD at maximum 24-speed.

The DVD-ROM & CD-R/RW drive is shown in Figure 1-6. The dimensions and specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-4, Table 1-5.

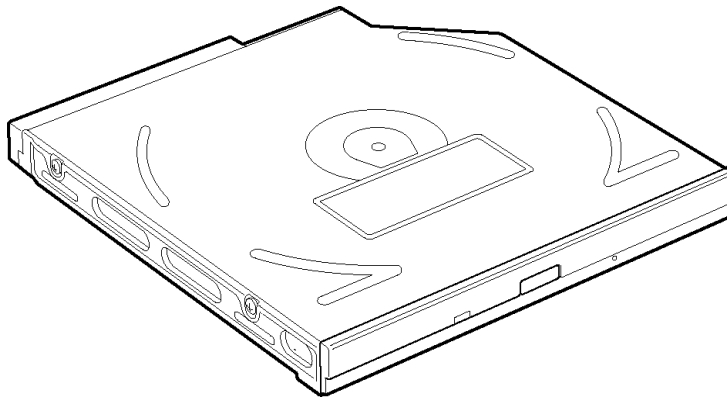


Figure 1-6 DVD-ROM & CD-R/RW drive

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

Parameter		Standard value
Outline dimensions	Maker	MATSUSHITA (G8CC00025110)
	Width (mm)	128
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129.0
	Mass (g)	141±3

Table 1-5 DVD-ROM &amp; CD-R/RW drive specifications

Parameter		Drive Specification
		<b>MATSUSHITA (G8CC00025110)</b>
Data transfer speed	Read (KB/s)	DVD-ROM MAX 8x CAV (MAX 10800 KB/s) CD-ROM MAX 24x CAV (MAX 3600 KB/s)
	Write	CD-R 4x/8x (CLV), 16x (PCAV), MAX24x (CAV) CD-RW 4x(CLV) High Speed CD-RW 4x/8x/10x (CLV) Ultra Speed CD-RW 10x (CLV), MAX24x (CAV)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s PIO MODE4 supported DMA mode 16.6 MB/s Multi-word MODE2 supported Ultra DMA mode 33.3 MB/s Ultra DMA MODE2
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	170 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-ROM XA CD-R, CD-RW Photo CD, Video CD CD-Extra(CD+), CD-text
	DVD	DVD-ROM, DVD-R (DVD-R Multi-boarder supported) DVD-RW(Ver.1.1) DVD-RAM(2.6GB/4.7GB) DVD+R, DVD+RW

### 1.5.2 DVD Super Multi Drive

The DVD Super Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW and DVD-RAM. It is a high-performance drive that reads DVD-ROM at maximum 8-speed and CD at maximum 24-speed. It writes CD at maximum 24-speed.

The DVD Super Multi drive is shown in Figure 1-7. The dimensions and specifications of the DVD Super Multi drive are described in Table 1-6, Table 1-7.

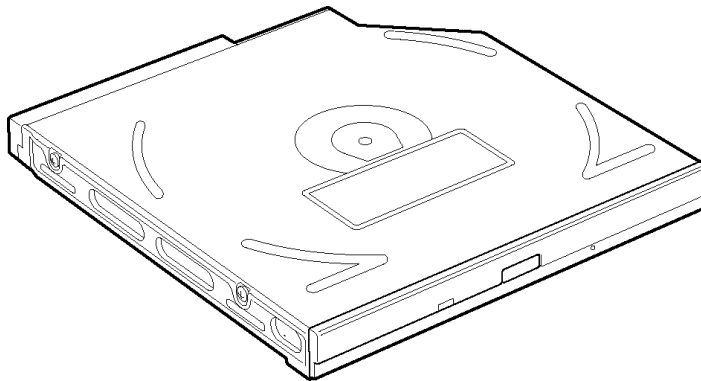


Figure 1-7 DVD Super Multi drive

Table 1-6 DVD Super Multi drive outline dimensions

Parameter		Standard value	
Outline dimensions	Maker	MATSUSHITA (G8CC00026110)	MATSUSHITA (G8CC00026112)
	Width (mm)	128	
	Height (mm)	9.5 (excluding projections)	
	Depth (mm)	129.0	
	Mass (g)	145±10	



Table 1-7 DVD Super Multi drive specifications (1/2)

Parameter		Drive Specification
		MATSUSHITA (G8CC00026110)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8x CAV CD-ROM MAX 24x CAV
	Write	CD-R 4x/8x (CLV), 12x/16x/24x (Zone CLV) CD-RW 4x (CLV) High Speed CD-RW 4x/8x/10x (CLV) Ultra Speed CD-RW 8x/10x (CLV) DVD-R 1x/2x (CLV) DVD-RW 1x/2x (CLV) DVD+R 2.4x (CLV) DVD+RW 2.4x (CLV) DVD-RAM 2x (ZCLV) (4.7GB/9.4GB)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-R, CD-RW, CD-ROM XA, Photo CD, Video-CD, CD-Extra(CD+),CD-text
	DVD	DVD-ROM, DVD-R(3.9GB/4.7GB), DVD-RW (Ver1.1) DVD+R/+RW, DVD Video, DVD-RAM (2.6GB/4.7GB/9.4GB)

Table 1-7 DVD Super Multi drive specifications (2/2)

Parameter		Drive Specification
		MATSUSHITA (G8CC00026112)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8x CAV CD-ROM MAX 24x CAV
	Write	CD-R 4x/8x (CLV), 12x/16x/24x (Zone CLV) CD-RW 4x (CLV) High Speed CD-RW 4x/8x/10x (CLV) Ultra Speed CD-RW 8x/10x (CLV) DVD-R 1x/2x (CLV) DVD-RW 1x/2x (CLV) DVD+R 2.4x (CLV) DVD+RW 2.4x (CLV) DVD-RAM 2x (ZCLV) (4.7GB/9.4GB)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-R, CD-RW, CD-ROM XA, Photo CD, Video-CD, CD-Extra(CD+),CD-text
	DVD	DVD-ROM, DVD-R(3.9GB/4.7GB), DVD-RW (Ver1.1) DVD+R/+RW, DVD Video, DVD-RAM (2.6GB/4.7GB/9.4GB)

## **1.6 Keyboard**

A keyboard which consists of 85/86-key is mounted on the system unit. The keyboard is connected to the system board and controlled by the keyboard controller

Figure 1-8 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



*Figure 1-8 keyboard*

## 1.7 TFT Color Display

The TFT color display consists of 12.1-inch XGA LCD module and FL inverter board.

### 1.7.1 LCD Module

The LCD module displays in resolution of 1024(H)×768(V), 16M colors.

Figure 1-9 shows a view of the LCD module and Table 1-8 lists the specifications.

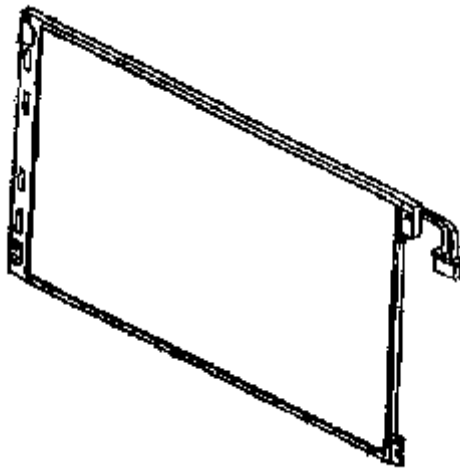


Figure 1-9 LCD module

Table 1-8 LCD module specifications

Item	Specifications
Number of Dots	1,024 (W) x 768 (H)
Dot spacing (mm)	0.240 (H) x 0.240 (V)
Display range (mm)	245.76 (H) x 184.32(V)

### 1.7.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL. Table 1-9 lists the FL inverter board specifications.

*Table 1-9 FL inverter board specifications*

Item		Specifications
		G71C0002K210
Input	Voltage (V)	5.0 (DC)
	Power (W)	4.0
Output	Voltage (V)	750 (r.m.s)
	Power (W / V)	3.6W / 5VA
	Current (mA) (f=70KHz)	4.22 (r.m.s)

## **1.8 Power Supply**

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

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

The power supply output rating is specified in Table 1-10.

Table 1-10 Power supply output rating (1/2)

Name	Power supply (Yes/No)				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No Battery	Object
PPV	0.748-1.484	No	No	No	CPU(VCC)
PTV	1.05	No	No	No	CPU(VCC), GMCH, ICH4-M
1R8-P1V	1.8	No	No	No	CPU(VCCA0)
1R35-P1V	1.35	No	No	No	GMCH
A1R35-P1V	1.35	No	No	No	GMCH(VCCASM)
2R5-B2V	2.5	Yes	No	No	GMCH, DDR-SDRAM
Q2R5-B2V	2.5	Yes	No	No	GMCH(VCCQSM)
MR1R25-B1V	1.25	Yes	No	No	SO-DIM DDR-SDRAM(VREF), GMCH
1R25M-B1V	1.25	Yes	No	No	On board DDR SDRAM(VREF)
1R5-S1V	1.5	Yes	Yes	No	ICH4-M
S3V	3.3	Yes	Yes	No	ICH4-M. EC/KBC, (Acceleration sensor)
M5V	5.0	Yes	Yes	No	ICH4-M. Thermal RESET IC, Docker(PnP ID EEPROM), LEDs,
MCV	5.0	Yes	Yes	No	PSC
E5V	5.0	Yes	No	No	PC Card Power, USB Power
E3V	3.3	Yes	No	No	PCI7421, 1394 EEPROM, PC/CF/SD Card Power, Mini PCI, LAN Power, RS232C Driver/Receiver, MDC
FM-E3V	3.3	Yes	No	No	SD Card
PHY-E3V	3.3	Yes	No	No	PCI7421(1394 OHCI) [Connected to E3V]
LAN-E3V	3.3	Yes	No	No	ICH4-M, LAN PHY, LAN LED [Connected to E3V]
LAN1R5-E1V	1.5	Yes	No	No	ICH4-M
MCVCCA-EYV	3.3	Yes	No	No	PCI7421, CardBus A (CF)
MCVCCB-EYV	3.3/5.0	Yes	No	No	PCI7421, CardBus B (PC-card)
MCVPPB-EYV	5.0	Yes	No	No	CardBus B (PC-card)
R3V	2.0-3.5	Yes	Yes	Yes	ICH4-M(VCCRTC), 32.768KHz generator
1R25-P1V	1.25	No	No	No	DDR-SDRAM(Termination)
1R5-P1V	1.5	No	No	No	GMCH(DVO), ICH4-M

Table 1-10 Power supply output rating (2/2)

Name	Power supply (Yes/No)				
	Voltage [V]	Power OFF Suspend mode	Power OFF Boot mode	No Battery	Object
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, GMCH, ICH4-M, SO-DIMM(SPD), HDD, FIR, Mini-PCI, FWH, Super I/O, AC97 Codec, HP Amp, Acceleration sensor,
P5V	5.0	No	No	No	ICH4-M, HDD, Mini-PCI, KB(LED), PAD, LEDs, HDD RESET, Parallel, RGB(DDC)
FL-P5V	5.0	No	No	No	FL Inverter
DDC-P5V	5.0	No	No	No	CRT
SND-P5V	5.0	No	No	No	Speaker Amp
A4R7-P4V	4.7	No	No	No	AC97 Codec, Speaker Amp, MIC Amp, Line-IN, Line-OUT
ODD-P5V	5.0	No	No	No	ODD, ODD RESET
PNL-P3V	3.3	No	No	No	LCD
BT-P3V	3.3	No	No	No	Bluetooth Module
IF-P5V	5.0	No	No	No	Docker (PS/2)



## 1.9 Batteries

The computer has two types of batteries as follows:

- Main battery pack
- RTC battery

The battery specifications are listed in Table 1-11.

*Table 1-11 Battery specifications*

Battery name		Material		Output voltage	Capacity
Main battery	G71C0004G110	Lithium-Ion	6 Cell	10.8V	4,700mAh
	G71C0004G210				
	G71C0003W110		12 Cell		8,800mAh
	G71C0003W210				
RTC battery	P71035009115	Nickel hydrogen		2.4V	16mAh

### 1.9.1 Main Battery

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

## 1.9.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The power supply microprocessor controls power supply and detects a full charge when the AC adapter and battery are connected to the computer.

### θ Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off. Refer to the following Table 1-12.

*Table 1-12 Time required for charges of main battery*

Condition		Charging Time
Normal charge (Power on)	4700mAh	About 4.0 to 5.5 (hours)
	8800mAh	About 6.0 to 9.0 (hours)
Quick charge (Power off)	4700mAh	About 3.0 (hours)
	8800mAh	About 4.5 (hours)

Charge is stopped in the following cases.

1. The main battery is fully charged
2. The main battery is removed
3. Main battery or AC adapter voltage is abnormal
4. Charging current is abnormal

### θ Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-13.

*Table 1-13 Data preservation time*

Condition		preservation time
Standby mode	4700mAh	About 5 days
	8800mAh	About 9 days
Power off	4700mAh	About 40 days
	8800mAh	About 80 days

### 1.9.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-14 lists the charging time and data preservation period of the RTC battery.

*Table 1-14 RTC battery charging time*

<b>Condition</b>	<b>Time</b>
Power ON (Lights Power LED)	About 8 hours
Data preservation time (Full-charged)	About 30 days

## 1.10 AC Adapter

The AC adapter is used to charge the battery.

Table 1-15 lists the AC adapter specifications.

*Table 1-15 AC adapter specifications*

Parameter	Specification			
	G71C0001A310	G71C0002S310	G71C0004A210	G71C00049210 [Option]
Power	45W	60W		75W
Input voltage	100V to 240V			
Input frequency	50Hz/60Hz			
Input voltage	0.6A to 1.1A	1.5A or less		
Output voltage	DC 15V			
Output current	0A to 3.0A	0A to 4.0A		5.0A

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## **Chapter 2**

# **Troubleshooting Procedures**

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## ***2 Troubleshooting Procedures***

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## 2.1 Troubleshooting

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

The FRUs covered are:

- |                 |                  |                  |
|-----------------|------------------|------------------|
| 1. Power supply | 6. Touch pad     | 11. Wireless LAN |
| 2. System Board | 7. Display       | 12. Bluetooth    |
| 3. USB FDD      | 8. Optical Drive | 13. Sound        |
| 4. 2.5” HDD     | 9. Modem         |                  |
| 5. Keyboard     | 10. LAN          |                  |

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

**NOTE:** 1. When replacing the system board, make sure to follow the procedures below.

(1) Execute the subtest03 DMI information save of 3.3 Setting of the hardware configuration in Chapter 3 in order to save DMI data from the old system board to Floppy disk.

(2) Copy the DMI data to a new system board by executing the subtest04 DMI information recovery and subtest08 System configuration display.

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

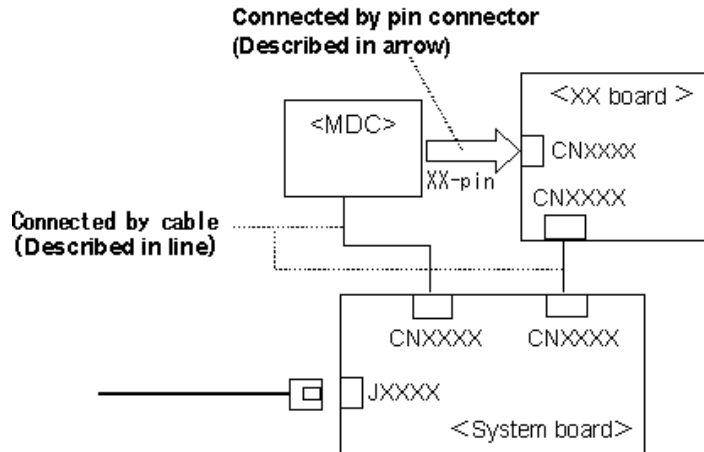
1. Phillips screwdrivers (For replacement procedures)
2. Implements for debugging port check
  - Toshiba MS-DOS system FD
  - RS-232C cross cable
  - Test board with debug port test cable
  - PC for displaying debug port test result

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

(1) Cable connection is described in the figure as line.

(2) Pin connection is described in the figure as arrow.

<e.g> Connection of modem



## **2.2 Troubleshooting Flowchart**

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

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

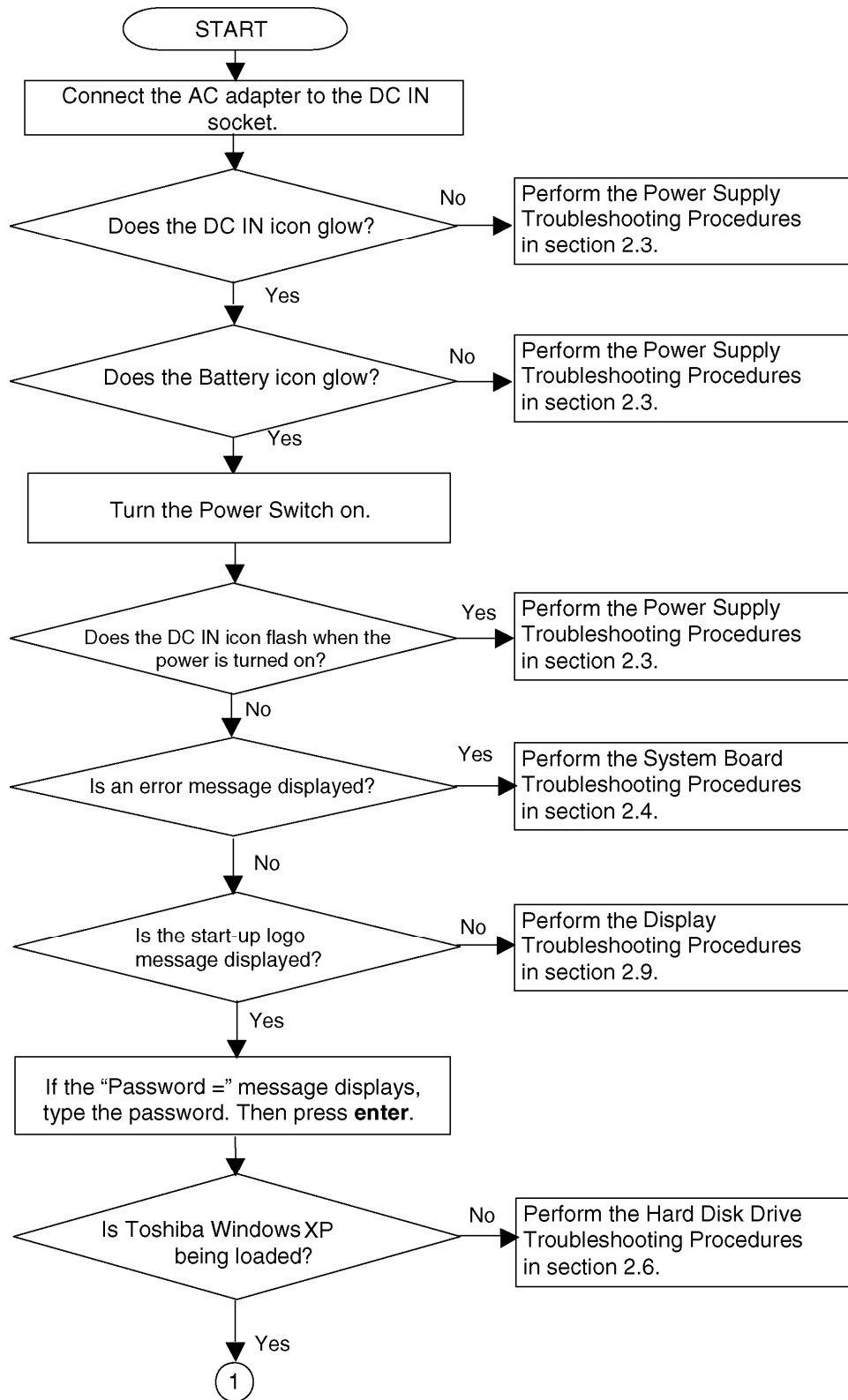


Figure 2-1 Troubleshooting flowchart (1/2)

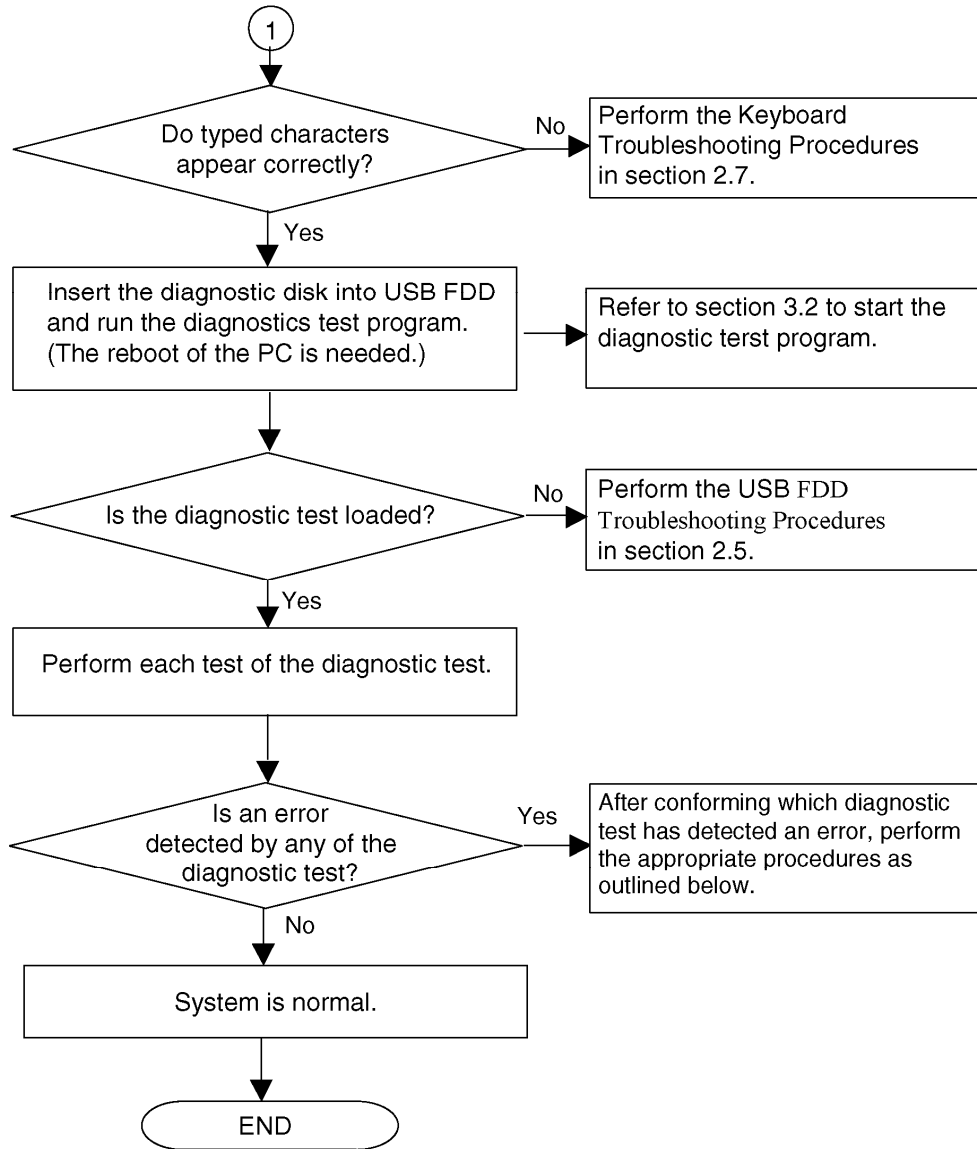


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The 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 and Processor Module 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 Pressed key display test (in Only One Test) and Pressed key code Display test (in DIAGNOSTIC test), perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the Touch pad test (in Only One Test), perform the Touch pad Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the modem test (in LAN/Modem/Bluetooth/IEEE1394 test disk), perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test (in LAN/Modem/Bluetooth/IEEE1394 test disk), perform the LAN Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the Wireless LAN test (in Wireless LAN test disk), perform the Wireless LAN Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the Bluetooth test (in LAN/Modem/Bluetooth/IEEE1394 test disk), perform the Bluetooth Troubleshooting Procedures in Section 2.14.
12. If an error is detected on the sound test (in Sound test disk), perform the Sound Troubleshooting Procedures in Section 2.15.



## 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: Icon Check
- Procedure 2: Error Code Check
- Procedure 3: Connection Check
- Procedure 4: Charge Check
- Procedure 5: Replacement Check

### Procedure 1 Icon Check

The following Icons 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 as listed in Table 2-1 and Table 2-2 below. To check the power supply status, install a battery pack and connect an AC adapter.

*Table 2-1 Battery Icon*

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

Table 2-2 DC IN icon

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

\*1 When the power supply controller detects a malfunction, the DC IN icon blinks and an error code is displayed.

When the icon is blinking, perform the following procedure.

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

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

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

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

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

**NOTE:** Use a supplied AC adapter G71C0001A310, G71C0002S310, G71C0004A210 or G71C00049210 (Option).

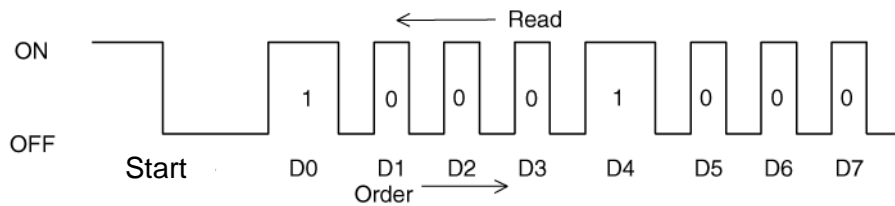
**Procedure 2 Error Code Check**

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

- |                            |                       |
|----------------------------|-----------------------|
| □ Start                    | Off for 2 seconds     |
| □ Error code (8 bit)       |                       |
| “1”                        | On for one second     |
| “0”                        | On for a half second  |
| Interval between data bits | Off for a half second |

The error code begins with the least significant digit.

Example: Error code = 12h (Error codes are given in hexadecimal format.)



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

Table 2-3 Error code

<b>Error code</b>	<b>Where Error occurs</b>
1*h	DC Power (AC Adapter)
2*h	Main battery
3*h	Second battery
4*h	S3V output
5*h	1R5-C1V output
6*h	1R5-C1V output
7*h	PPV output
8*h	PTV output
9*h	E5V output
A*h	E3V output
B*h	PPV output
C*h	1R35-P1V output
D*h	1R25-P1V output
E*h	2R5-B2V output
F*h	-

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

DC IN (AC Adapter, DS9, CDOC)

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5 V.
11h	Advanced Port Replicator output voltage is over 16.5 V.
12h	Current from the DC power supply is over 7.0A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Current sensing IC is not normal when there is no load.

Main Battery

Error code	Meaning
20h	Over voltage has been sensed. (Error code 20h is not supported.)
21h	Main battery charge current is over 7.00 A.
22h	Main battery discharge current is over 0.5 A when there is no load.
23h	Main battery charge current is over 3.10 A when the AC adapter is not directly connected.
24h	Current sensing IC is not normal when there is no load.
25h	Main battery charge current is over 0.3 A when the charging is off.

Second Battery

Error code	Meaning
30h	Over voltage has been sensed. (Error code 30h is not supported.)
31h	Second battery charge current is over 7.00 A.
32h	Second battery discharge current is over 0.5 A when there is no load.
33h	Second battery charge current is over 3.10 A when the AC adapter is not directly connected.
34h	Current sensing IC is not normal when there is no load.
35h	Second battery charge current is over 0.3 A when the charging is off.

S3V output ; (When Power OFF = S3V, When Power ON = E3V)

Error code	Meaning
40h	S3V voltage is 2.81 V or less when the computer is powered on/off.
45h	S3V voltage is 2.81 V or less at power on when the charging is off.

❑ 1R5-C1V output (P61)

Error code	Meaning
50h	1R5-C1V voltage is over 1.80 V when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
54h	1R5-C1V voltage is not normal when the computer is shut down. (CV support)
55h	1R5-C1V voltage is 1.275V or less at power on. (CV support)

❑ 1R5-C1V output (P62)

Error code	Meaning
60h	1R5-C1V voltage is over 2.16 V when the computer is powered on/off.
61h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
62h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
63h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
64h	1R5-C1V voltage is not normal when the computer is shut down. (CV support)
65h	1R5-C1V voltage is 1.275V or less at power on. (CV support)

❑ PPV output (P63 :MUX\_CH0)

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

❑ PTV output (P64)

Error code	Meaning
80h	PTV voltage is over 1.80 V when the computer is powered on/off.
81h	PTV voltage is 0.68 V or less when the computer is powered on.
82h	PTV voltage is 0.68 V or less when the computer is booting up.
83h	PTV voltage is 0.68 V or over when the computer is powered off.
84h	PTV voltage is 0.68 V or less when the computer is suspended.

E5V output (P65)

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

E3V output (P66)

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

PPV output (P63:CH1)

Error code	Meaning
B0h	PPV voltage is over 1.80 V when the computer is powered on/off.
B1h	PPV voltage is 0.56 V or less when the computer is powered on.
B2h	PPV voltage is 0.56 V or less when the computer is booting up.
B3h	PPV voltage is 0.56 V or over when the computer is powered off.

1R35-P1V output (P73)

Error code	Meaning
C0h	1R35-P1V voltage is over 1.62V when the computer is powered on/off.
C1h	1R35-P1V voltage is 0.68 V or less when the computer is powered on.
C2h	1R35-P1V voltage is 0.68 V or less when the computer is booting up.
C3h	1R35-P1V voltage is 0.68 V or over when the computer is powered off.
C4h	1R35-P1V voltage is 0.68 V or less when the computer is suspended.

- 1R25-P1V output (P75)

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

- 2R5-B2V output (P77)

Error code	Meaning
E0h	2R5-B2V voltage is over 3.00 V when the computer is powered on/off.
E1h	2R5-B2V voltage is 2.125 V or less when the computer is powered on.
E2h	2R5-B2V voltage is 2.125V or less when the computer is booting up.
E3h	2R5-B2V voltage is 2.125 V or over when the computer is powered off.
E4h	2R5-B2V voltage is 2.125 V or less when the computer is suspended.

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

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

Check 3 In the case of error code 21h:

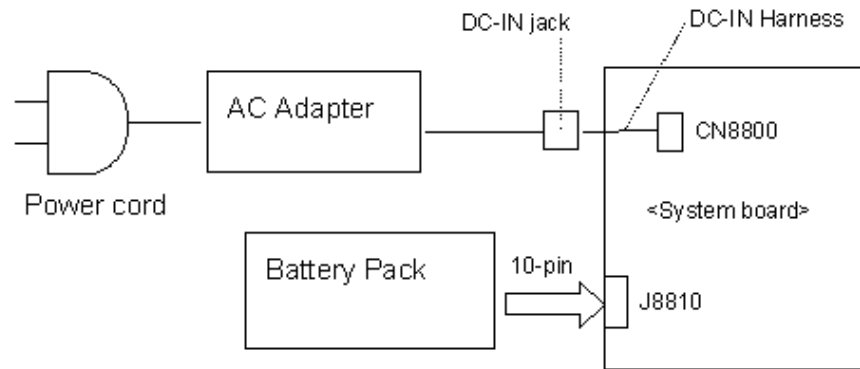
- Go to Procedure 3.

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



**Procedure 3 Connection Check**

The power is supplied as shown below:



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

- Check 1 Make sure the AC adapter and the AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If these cables are connected correctly, go to Check 2.
- Check 2 Make sure the DC-IN harness is firmly plugged to the connector on the system board. If the harness is connected correctly, go to Check 3.
- Check 3 Replace the AC adapter and the AC power cord with new ones.
- If the DC IN icon does not light, go to Procedure 5.
  - If the battery icon does not light, go to Check 4.
- Check 4 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**

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

- Check 1 Make sure the AC adapter is firmly plugged into the DC IN socket.
- Check 2 Make sure the battery pack 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 while connecting the battery pack and the AC adapter. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too high or low. Return the temperature to normal operating condition. If the battery pack is still not charged, go to Check 5.
- Check 5 Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 5.

**Procedure 5 Replacement Check**

The system board, DC-IN harness or AC adapter may be disconnected or damaged. Replace the system board or AC adapter with a new one following the steps described in Chapter 4, *Replacement Procedures*.

When AC adapter is connected ;

- Check 1 AC adapter may be faulty. Replace the AC adapter with a new one. If the problem still occurs, perform Check 2.
- Check 2 DC-IN harness may be faulty. Replace the DC-IN harness with a new one. If the problem still occurs, perform Check 3.
- Check 3 System board may be faulty. Replace the system board with a new one.

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

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

## **2.4 System Board Troubleshooting**

This section describes how to determine if the system board 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: Debugging port 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 MS-DOS is properly loaded, go to Procedure 4.

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

If you press the **F1** key as the message instructs, the SETUP screen appears to set the system configuration. If any other error message is displayed, perform Check 2.

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

**Check 2** If the following error message is displayed on the screen press any key as the message instructs.

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

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

If any other error message is displayed, perform Check 3.

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

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

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

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

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

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

**Procedure 2 Debugging Port Check on Boot Mode**

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

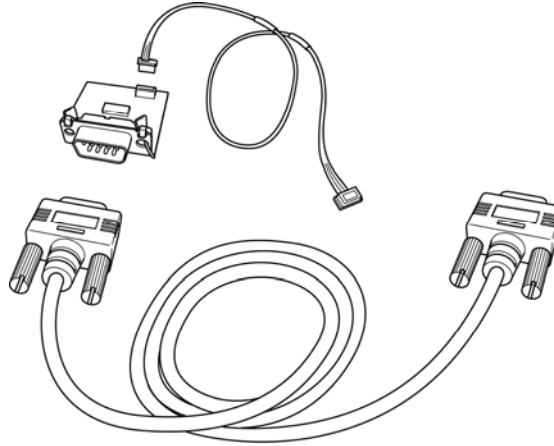
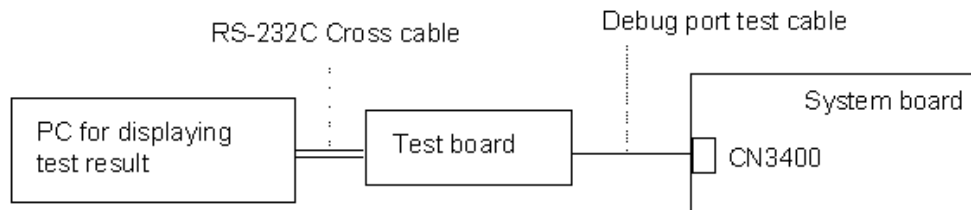


Figure 2-2 A set of tool for debug port test

The test procedures are follows;

1. Connect the debug test cable to the connector CN3400 of the system board. For the position of debug port on the system board, refer to Appendix B. 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 results.



4. Boot the computer in MS-DOS mode.





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

D port status	Inspection items	Details
(F007h)		Releasing of BIOS write-protection
		Enables the I/O space of SMBus
		Permission of SMBus accesses
		Configuration of DRAM
		Permission of cache (only for L1 cache)
		MEMEORY CLEAR
F008h	Transition to RAM BIOS from ROM BIOS	
F009h	Saving of key scan code	
	Setting of TASK_1ms_TSC	
	Display message in navigation panel	(EC/KBC UPDATE, BIOS UPDATE/DAMEGED)
	Key input	
	Reading of CHGBIOSA.EXE/CHGFIRMA.EXE	
	FDC RESET	
	Setting of parameters for 2HD (1.44MB), Setting of transmission rate	
	Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite	
	Setting of parameters for 2DD (720KB), Setting of transmission rate	
	Retrieval of "CHGBIOSA.EXE" from the root directory.	
	Calculates the directory start header and sector.	
	Reading one sector of the root directory.	
	Retrieval the entry of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" from the sector read.	
	Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"	Key input when error
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"		
F100h	Initialization of PIT channel 1	Setting "30μs" to the refresh interval
F101h	DRAM type & check size	Only when cold booting
	Checking DRAM size	
	If DRAM size is "0", the program halt	
	Stack field test of SM-RAM	Program halt when it's not used as stack

Table 2-4 Debug port error status (3/7)

D port status	Inspection items	Details	
F102h	Cache configuration		
	Permission of cache	(Only for L1 cache)	
	CMOS access test (Only when Cold booting)	Program halt when error	
	COMS battery level check		
	CMOS Check sum check		
	CMOS data initialization (1)		
	IRT status setting	Setting "Boot status" and "IRT busy flag" and "0" to the remaining bits.	
	Storing of DRAM size		
F103h	Resume branch check	(Only when cold booting)	
	In the case of CMOS error, no resume occurs.		
	If "resume status code" is not set, no resume occurs.		
	Resume error check		
	ICH4-M Power Failure Error	(Resume error 7AH)	
	SM-RAM checksum error	(Resume error 73H)	
	Memory configuration change check	(Resume error 73H)	
	Checksum of system BIOS RAM area	(Resume error 79H)	
	Go go resume process (RESUME_MAIN)		
	Resume error process		
	Prohibition of all SMI		
	Clears resume status		
	Return to ROM.		
	Forwards the area of C0000h to EFFFFh to PCI	(Prohibition of DRAM)	
	Set resume error request		
	Copying ROM/RAM of system BIOS	(Program halt when error)	
	Resume error process	Return CPU clock in low	
		Prohibition of all SMI	
Resume status Clear			
Return to ROM			
Forwards the area of C0000h to EFFFFh to PCI			

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

D port status	Inspection items	Details
F104h	SMRAM initialization	
	WakeUp factor check	
	SMRAM base rewriting and storing CPU state map for BIOS	
	Permission of SMI based on ASMI	
F106h	Initialization of devices which need initialization before PCI bus initialization.	
	PIT test (Only when Cold booting) 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 (Program halt when time out)
	Test of PIT channel 2	(Check whether the speaker gate works normally.)
	CPU clock measurement	
	Permission of SMI except auto-off function	
	Battery discharging current control	
	Dividing procedures for time measuring by IRT	
	Setting for clock generator	
	CPU Initialization	P6 microcode update
		Set of permission/prohibition of processor serial number ID
Geyserville support check		
Setting of CPU clock "high"		
Graphics Aperture Size setting		
F107h	Saving memory configuration in each row to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or except Japan) based on DMI data	
	CMOS default setting check	(Default set if Bad battery, Bad checksum (ROM, CMOS) detected.)

Table 2-4 Debug port error status (5/7)

D port status	Inspection items	Details
(F107h)	ACPI table initialization	(for execution of option ROM)
	Initialization of devices which need initialization before PCI bus initialization	
	Initialization of temperature control information	
	Set to clock generator	
	PC multi-box status acquisition	
	HC initialization & Device recognition	
	VGA display off & Reset control	
	AC'97 control	
	KBC initialization	
	Sound initialization	
	PIC initialization	
	PIC test	
	Password Initialization	
F108h	HDD initialization sequence start	
	PCI bus initialization	
	WakeUp factor check	
F109h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	Setting power-off Enable
		Clear of WakeUp factor
		CPU speed control
		Panel open/close control
	Serial interrupt control	
	Serial interrupt control	(Before serial interrupt)
	Initialization of PC card slot	
	PCI automatic configuration	Making of work for automatic configuration
	Configuration	
	Saving of VGA configuration result	
F10Bh	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W needed after PCI configuration	Set of permission/prohibition of IEEE1394
	Output code generation	

Table 2-4 Debug port error status (6/7)

D port status	Inspection items	Details
F10Ch	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10Dh	INIT_INT_VECTOR	(Initialization of vectors)
F10Eh	INIT_INDP	(Initialization of NDP)
F10Fh	INIT_SYSTEM	(Initialization of system)
		Storing of CMOS error information to IRT_ERR_STS_BUF
		Timer initialization start
		Initialization of buffers for power saving
		EC initialization & Reading of battery information
		Update of system BIOS (Update of model name and EDID information for LCD)
F110h	INIT_DISPLAY	Waiting for completion of VGA chip initialization, VGA BIOS initialization)
F111h	DISP_LOGO	(Logo display)
F112h	SYS_MEM_CHECK	(Conventional memory check)
F113h	EXT_MEM_CHECK	(Exception check in protected mode)
F114h	CHK_DMA_PAGE	(DMA Page Register check)
F117h	CHECK_DMAC	(DMA check)
F118h	INIT_DMAC	(DMA initialization)
F119h	BOOT_PASSWORD (Waiting for completion of INIT_FDD segmentation)	(Password check)
		Waiting for completion of HDD initialization
		Key input check while IRT (Finish waiting for KBC initialization)
		ATA priority initialization
F11Ch	EX_IO_ROM_CHECK	(Option I/O ROM check)
F11Dh	PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Acquisition of keys pressed during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource before boot

Table 2-4 Debug port LED status (7/7)

D port status	Inspection items	Details
(F11Dh)		Rewriting of memory map data of INT15h E820h function
		Update DMI table
		Copy of ACPI table to top of expansion memory
		Waiting for writing of PSC version to BIOS completion
		Waiting for clock generator setting completion (Stop D port = 1EH when error)
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Upgrade check for CPU, HDD
		Prohibition of unused PC cards
		HW initialization before Boot, Waiting for initialization completion
		Setting of battery save mode
		Setting of date
		Waiting for completion of AC-Link initialization
		Update of DMI Wakeup factor, Update of SMBIOS structure table
		PCI device configuration space close
		Cache control
		CPU process
		Update of parameter block A
Specify CPU clock in SETUP		
Waiting for HDD motor-off which is disabled		
PRE_BOOT_SETUP process		
Clear of PWRBTN_STS		
Set Power Button to Enable		
F11Fh		
FFFFh		

**Procedure 3 Diagnostic Test Program Execution Check**

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

- System test
- Memory test
- Keyboard test
- Display test
- Floppy Disk test
- Printer test
- Async test
- Hard Disk test
- Real Timer test
- NDP test
- Expansion test
- CD-ROM/DVD-ROM test
- Only One test
- Wireless LAN test
- LAN/Modem/Bluetooth/IEEE1394 test
- Sound 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 connectors are properly plugged, 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: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### **Procedure 1 FDD Head Cleaning Check**

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

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

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

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

**Procedure 2 Diagnostic Test Program Execution Check**

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-5. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

*Table 2-5 FDD error code and status*

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

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

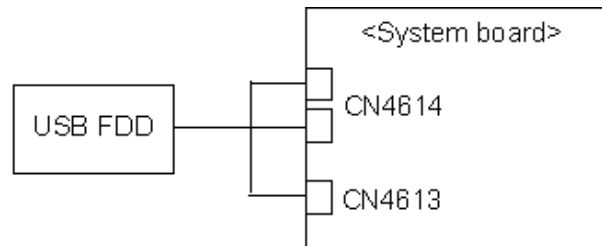
Write protected

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

**Procedure 3 Connector Check and Replacement Check**

The USB FDD is connected to the System Board via USB port.

Check 1 Make sure the USB cable of the FDD is securely connected to the USB port.



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

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

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

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

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

## 2.6 HDD Troubleshooting

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

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

### Procedure 1 Partition Check

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

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

**Procedure 2 Message Check**

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

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

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

HDC ERROR

or

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

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

Insert system disk in drive  
Press any key when ready .....

or

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

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

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

System Transferred

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

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

**Procedure 3    Format Check**

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

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

Check 1    Format an HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

If HDD can not be formatted, perform Check 2.

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

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

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

**Procedure 4 Diagnostic Test Program Execution Check**

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

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are described in Table 2-6. If an error code is not displayed but the problem still occurs, go to Procedure 5.

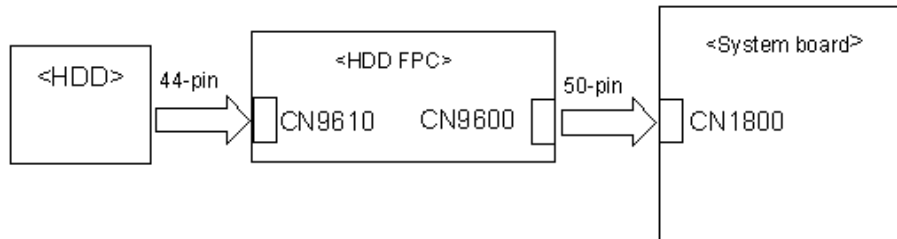
*Table 2-6 Hard disk drive error code and status*

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

**Procedure 5 Connector Check and Replacement Check**

HDD is connected to the system board via HDD FPC. The connection of HDD, HDD FPC or system board may be defective. Otherwise, they may be faulty. Disassemble the computer following instructions in Chapter 4, *Replacement Procedures* and perform the following checks.

- Check 1 Make sure that HDD is firmly connected to HDD FPC and that HDD FPC is firmly connected to system board.



If any of the connections are loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

- Check 2 HDD FPC may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still occurs, perform Check 3.
- Check 3 HDD may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still occurs, perform Check 4.
- Check 4 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.



## **2.7 Keyboard Troubleshooting**

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

### **Procedure 1 Diagnostic Test Program Execution Check**

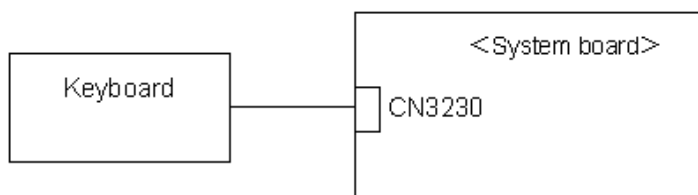
Execute the Keyboard Test (DIAGNOSTIC TEST) and Pressed key display test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

## Procedure 2 Connector and Replacement Check

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

Check 1 Make sure keyboard cable is firmly connected to system board.



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

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

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

## 2.8 Touch pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

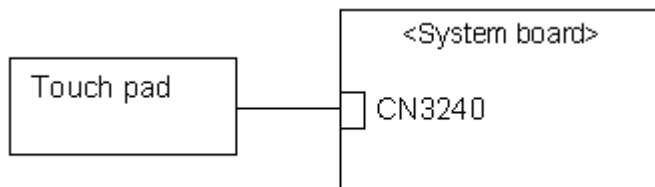
Execute the Touch pad test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

### Procedure 2 Connector and replacement Check

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

Check 1 Make sure the cable is firmly connected to system board.



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

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

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

## 2.9 Display Troubleshooting

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

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Cable Check

Procedure 4: Replacement Check

### Procedure 1 External Monitor Check

Connect an external monitor to the computer's external monitor port, then boot the computer. The computer automatically detects the external monitor.

If the external monitor works correctly, the internal LCD may be faulty. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, system board may be faulty. Go to Procedure 2.

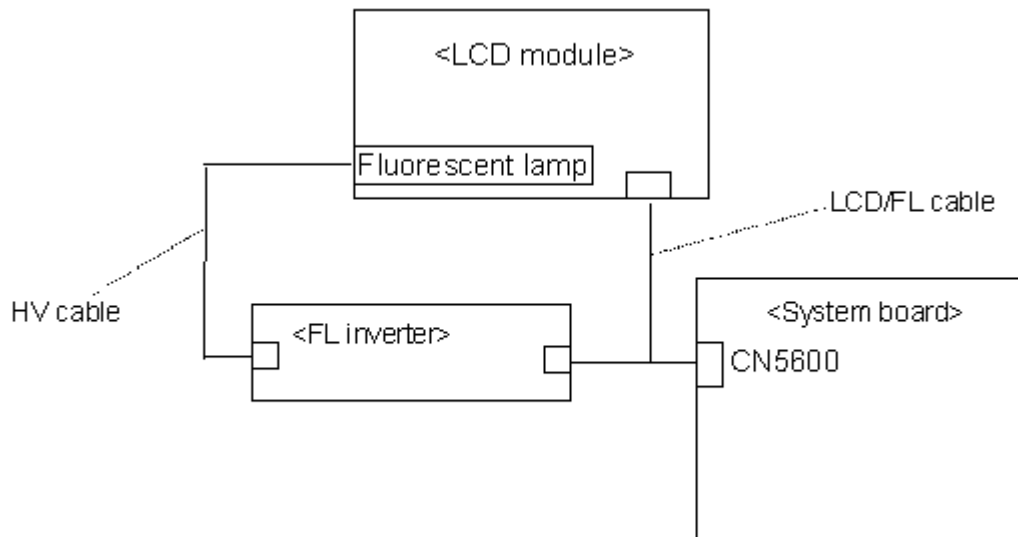
### Procedure 2 Diagnostic Test Program Execution Check

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

**Procedure 3 Connector and Cable Check**

LCD module is directly connected to system board by an LCD/FL cable. Also LCD module is connected to system board via FL inverter. The connections of FL inverter is consist of LCD/FL cable and HV cable. And, fluorescent lamp is connected to FL inverter by HV cable. THESE cables may be disconnected from system board or FL inverter. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*.

If the connection is loose, reconnect firmly and restart the computer. If the problem still occurs, go to Procedure 4.



**Procedure 4 Replacement Check**

Fluorescent lamp, FL inverter, LCD module, HV cable and LCD/FL cable are connected to display circuits. Any of these components may be faulty. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

- If fluorescent lamp does not light, perform Check 1.
- If characters or graphics on the internal display are not displayed clearly, perform Check 4.
- If some screen functions do not operate properly, perform Check 4.
- If fluorescent lamp remains lit when the display is closed, perform Check 5.

Check 1 Replace fluorescent lamp with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still occurs, perform Check 2.

Check 2 LCD/FL cable may be faulty. Replace FL/LCD cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 3.

Check 3 FL inverter may be faulty. Replace FL inverter with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 4.

Check 4 LCD module may be faulty. Replace LCD module with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. 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 Procedure*.

## 2.10 Optical drive Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

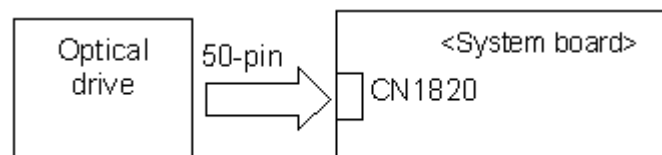
Prepare the tools before the test.

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

### Procedure 2 Connector Check and Replacement Check

The connection of optical drive and system board may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1 Make sure optical drive is firmly connected to the connector on system board.



If the connection is loose, reconnect it firmly and return to Procedure 2. If the problem still occurs, perform Check 2.

Check 2 Optical drive may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 3.

Check 3 System board may be faulty. Replace it with new one following the instructions in Chapter 4.

## 2.11 Modem Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

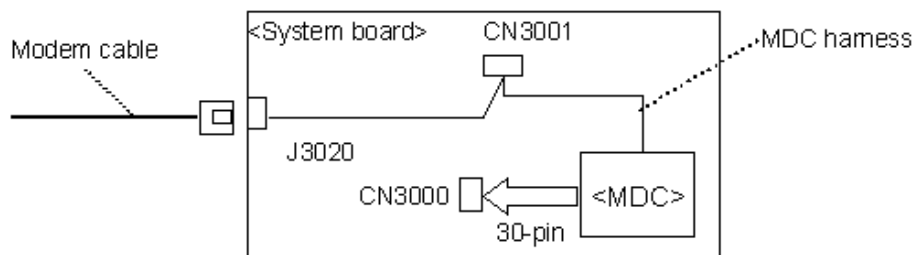
If any error is detected, perform Procedure 2.

### Procedure 2 Connector Check and Replacement Check

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

Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1 Make sure the following connections are firmly connected.



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



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

## 2.12 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

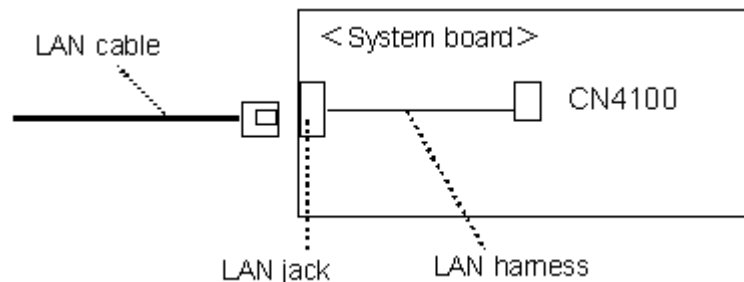
Execute LAN test in the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3 *Tests and Diagnostics* for more information on how to perform the test program.

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

### Procedure 2 Connector Check and Replacement Check

The LAN function is embedded on system board. If LAN malfunctions, its connection is defective or LAN cable and system board may be faulty.

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



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

Check 3 Make sure LAN harness is firmly connected to the connector CN4100. If the problem still occurs, perform Check 4.

Check 4 LAN harness may be faulty. Replace it with a new one. If the problem still occurs, perform Check 5.

Check 5 System board may be faulty. Replace it with a new one following the instruction in Chapter 4.

## 2.13 Wireless LAN Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

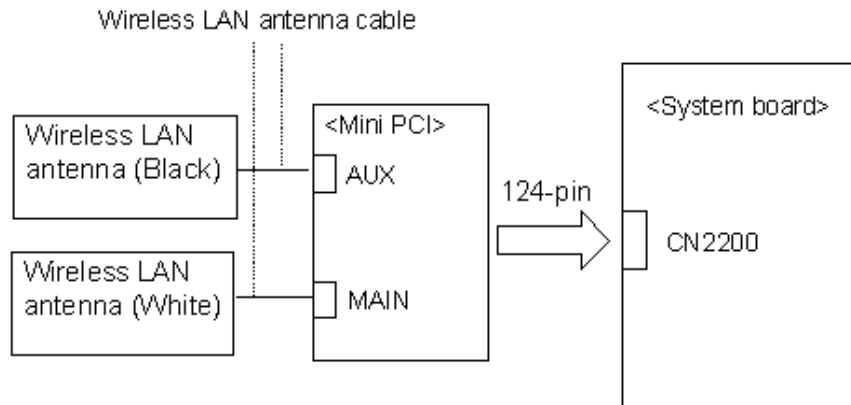
### Procedure 1 Transmitting-Receiving Check

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

- Check 1 Execute Wireless LAN test program to check the transmitting-receiving function of wireless LAN. You will need a second computer that can communicate by wireless LAN. Perform the test following the instructions described in Chapter 3.
- If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

**Procedure 2 Antennas' Connection Check**

The wireless LAN function-wiring diagram is shown below:



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

- Check 1 Make sure that the wireless communication switch is “On”.  
If the switch is “Off”, turn it “On”. If the problem still occurs, perform Check 2.
- Check 2 Make sure that wireless LAN card is firmly connected to the CN2200 (Mini-PCI) on system board. If the connector is defective, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.
- Check 3 Make sure that wireless LAN antenna cables (black and white) are firmly connected to the connectors on wireless LAN card. If wireless LAN antenna cables are not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

**Procedure 3 Replacement Check**

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

- Check 1 Wireless LAN antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.
- Check 2 Wireless LAN card may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.
- Check3 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## **2.14 Bluetooth Troubleshooting**

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

### **Procedure 1 Transmitting-Receiving Check**

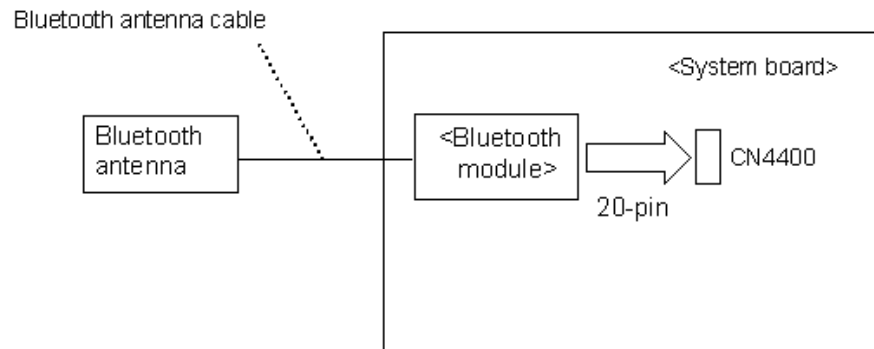
Before starting the test, make sure the wireless communication switch is set in the ON position.

Check 1 Execute Bluetooth test program to check the transmitting-receiving function of Bluetooth. You will need a second computer that can communicate by Bluetooth. Perform the test following the instructions described in Chapter 3.

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

**Procedure 2 Antennas' Connection Check**

The Bluetooth function-wiring diagram is shown below:



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

- Check 1 Make sure that the wireless communication switch is "On".  
If the switch is "Off", turn it "On". If the problem still occurs, perform Check 2.
- Check 2 Make sure that Bluetooth module is firmly connected to the CN4400 on system board. If the connector is defective, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.
- Check 3 Make sure that Bluetooth antenna cables is firmly connected to the connectors on Bluetooth module. If Bluetooth antenna cable is not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

**Procedure 3 Replacement Check**

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

- Check 1 Bluetooth antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.
- Check 2 Bluetooth module may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.
- Check3 System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.



## 2.15 Sound Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

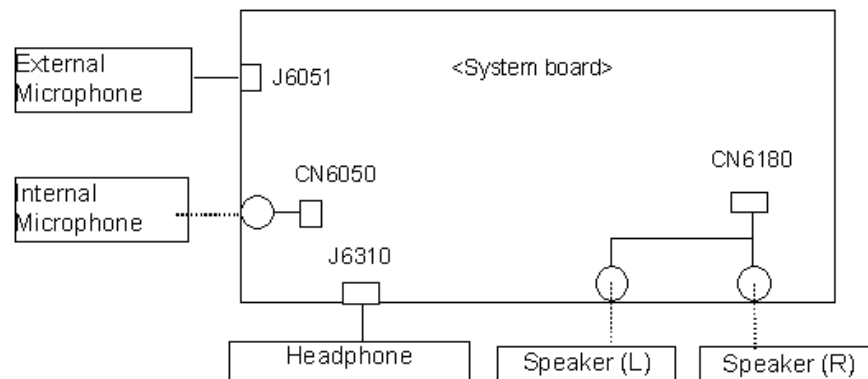
### Procedure 1 Diagnostic Test Program Execution Check

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 PC and check each connection.

If the problem still occurs, go to Procedure 3.

**Procedure 3 Replacement Check**

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

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

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

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

Check 4 Speaker may be faulty. Replace it with a new one following the steps in Chapter 4. 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.

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# **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 Device" is selected in the item [Device Config.] in SETUP menu. After checking the diagnostics, be sure to select "Setup by OS".

### 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
- EXIT TO MS-DOS

The DIAGNOSTIC TEST MENU contains the following functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST

- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST
- CD-ROM/DVD-ROM TEST

Other tests are:

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

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

- USB FDD
- The Diagnostic Disks  
(T&D for maintenance, LAN/Modem/Bluetooth/IEEE1394 test disk for maintenance, Wireless LAN test disk for maintenance and Sound test disk for maintenance)
- A formatted working disk (Floppy disk test)
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- An external CRT monitor supporting monitor ID (Expansion test)
- A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
- A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
- A music CD (Sound test)
- A CD-RW test media (CD-ROM/DVD-ROM test)
- A USB test module (USB test )
- A USB cable (USB test)
- LAN wraparound connector (LAN test)
- Module cable and RJ11 connector checker (Modem test)
- Headphones (Sound test)
- A microphone (Sound test)
- A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)
- PC card wraparound connector (Expansion test)
- RS-232C wraparound connector (Async 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
- Region write
- 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 floppy disk drive.
2. Release the lock of the power switch and turn on the computer with pressing the **F12**. Select the FDD in the display for selecting booting unit. Then, press **Enter** and the following menu appears.

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

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

```
Enter a choice: 1
```

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

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

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

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

(1) Before replacing the system board, execute subtest03 "DMI information save" in 3.3 Setting of the hardware configuration in order to save the DMI information from system board to floppy disk.

(2) After replacing the system board, execute the subtest04 "DMI information recovery" and subtest08 "System configuration display" in 3.3 Setting of the hardware configuration in order to copy the DMI information and system information from the floppy disk.

### 3.2.1 Diagnostics menu (T&D)

After pressing **1** and **Enter** in the startup menu, the following menu appears.

```
TOSHIBA personal computer Common DIAGNOSTICS
Version X.XX (c) copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTICS MENU :
1 - DIAGNOSTIC TEST
2 - ONLY ONE TEST
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS
```

```
↑↓→← : 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 Common DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX
```

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

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

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

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

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

```

SYSTEM TEST NAME      XXXXXXXX
                      xxxxxxxx DIAGNOSTIC TEST VX.XX
                      [Ctrl]+[Break] ; test end
                      [Ctrl]+[C]   ; key stop

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

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

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

```

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

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

```

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

```

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

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

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

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

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

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

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                                1: Test end
                                2: Continue
                                3: Retry

```

These three selections have the following functions respectively:

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

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

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

### 3.2.2 H/W initial information setting tool

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

```

#####
#####      H/W initial information setting tool      VX.XX      #####
#####
*          1 ..... Initial configuration                      *
*          2 ..... Region write                              *
*          3 ..... DMI information save                       *
*          4 ..... DMI information recovery                   *
*          8 ..... System configuration display                *
*          9 ..... E2PROM test (MAC/GUID/DMI)                 *
*****
... Press test number[1-4,8,9] ?

```

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

### 3.2.3 Heatrun test program

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

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

### 3.3 Setting of the hardware configuration

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

#### Subtest 01 Initial configuration

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

Setting of the CPU set table  
Setting of the microcode  
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. PORTEGE)
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)  
 Setting of DVD region code (Yes/No)

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

Following message appears in the display. Press any key, then return to the H/W initial information setting tool menu.

```
+-----+
+  It switches off the power on automatically.  +
+-----+
Press any key to continue...
```

#### Subtest 02 Region write

This subtest executes the setting of the region code for DVD drive based on the destination of the machine.

When the region code is already written, test ends without setting.

The following message appears in the display after setting the region code. Press any key to return to the H/W initial information setting tool menu.

```
*****
*****      It completed      *****
*****
*                               *
Press any key to continue...
```

#### Subtest 03 DMI information save

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

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

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

## Subtest 04 DMI information recovery

**NOTE:** 1. After replacing the system board, be sure to execute this subtest and copy the DMI information to a new system board.

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

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.

## Subtest 08 System configuration display

This subtest displays the information of the system configuration.

Confirm the contents and press **Enter**.

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

## Subtest 09 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, select 3-*Repair* *heatrun* in the startup menu, press **Enter**.

After selecting the 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, following message appears in the display.

```
*****  
HEATRUN TEST 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 way as 3.22 LOG UTILITIES. For more detail in the display, refer to 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	Protected Mode (cache off)
		04	Cache memory (on/off)
		05	Stress
3	KEYBOARD	01	Pressed key code display
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address

Table 3-1 Subtest names (2/2)

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

## 3.6 System Test

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

### Subtest 01 ROM Checksum

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

### Subtest 02 Fan ON/OFF

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

The following message will appear.

```
Fan number select (1;FAN#1(CPU), 2;FAN#2(GPU), 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.

### 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       : XXXXXXXXXXXX  
Version Number  : XXXXXXXXXXXX  
Serial Number   : XXXXXXXX  
Model Number    : XXXXXX-XXXXX  
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 Protected Mode (Cache off)

This subtest executes the same way as the subtest02 with the cache off.

Subtest 04 Cache Memory

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 05 Stress

Data (from 1MB to the maximum MB) is written from the 16KB write buffer to the 16KB read buffer and compared the data in the buffers. The read buffer starts from 0001 and the comparison is continued with the following read buffer addresses: 0001, 0003, 0005, 0007, 0009, 000b, 000d and 000f.



### 3.8 Keyboard Test

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

#### Subtest 01 Pressed key code display

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

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

### 3.9 Display Test

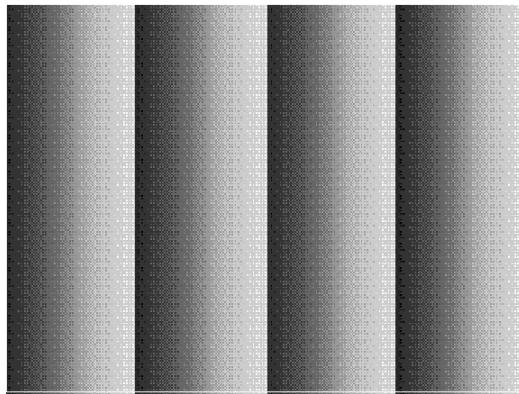
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

This subtest writes the constant data (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 &amp; Mode test for VGA

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

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

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



[ Mode 12 ]

(Display example: Mode 12)

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

## Subtest 05 All dot on/off for LCD

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



### 3.10 Floppy Disk Test

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

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. After selecting the Floppy Disk Test from the DIAGNOSTIC TEST MENU, messages to execute the test drive number, media type and test start truck will be displayed successively. Answer each question with an appropriate response to execute the test.

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

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

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

```
FLOPPY DISK          XXXXXXXX
```

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

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

SUB-TEST MENU :

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

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

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

```
FLOPPY DISK  IN PROGRESS  XXXXXXXX  xxx DIAGNOSTIC TEST VX.XX
                                         [Ctrl]+[Break] : test end
                                         [Ctrl]+[C]   : key stop
```

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

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

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

#### Subtest 01 Sequential read

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

#### Subtest 02 Sequential read/write

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

#### Subtest 03 Random address/data

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

#### Subtest 04 Write specified address

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

#### Subtest 05 Read specified address

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

## 3.11 Printer Test

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

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

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

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

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

Select the channel number (1-3) ?

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

### Subtest 01 Ripple Pattern

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

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

## 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 [\]^_`abcdefghijklmnopqrstuvwxyz{|}~
opqrstuvwxyz{|}~

```

## Subtest 03      Wraparound

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

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



## 3.12 Async Test

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

Subtest 01 and 02 require the following data format:

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

Subtest 01     FIR/SIR Point to point (send)

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

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

Subtest 02     FIR/SIR Point to point (receive)

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

Subtest 03     Wraparound (on board)

**NOTE:** To execute this subtest, an 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:** When executing *subtest02, 03, 04, 06, 08 and 09*, the message [The hard disk will be destroyed.] will be displayed. The contents of the hard disk will be erased when these tests are executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.

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

Refer to the operating system instructions.

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

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

3. This message is used to select whether or not the HDD status is displayed on the screen. The HDC status is described in section 3.19. Select **1** or **2**.

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

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

HARD DISK TEST XXXXXXXX

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

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

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

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

#### 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, then reads the data while moving from cylinder to cylinder. (Test the data interference in the neighbor track)

<b>Worst pattern data</b>	<b>Cylinder</b>
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'150449'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D25044'	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 date is updated and the following messages will appear:

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

```
Enter new time:
```

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

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

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

#### Subtest 02 Backup memory

This subtest checks the following backup memories:

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

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

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

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

## Subtest 03 Real time carry

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

This subtest checks the real time clock increments. Make 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 wraparound

**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:** When selecting 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

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

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

Subtest 01      Sequential read

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

Subtest 02      Read specified address

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

Subtest 03      Random address/data

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

Subtest 04      RW 1point W/R/C

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

### 3.18 Error Code and Error Status Names

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

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

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

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

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

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

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

### 3.19 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

*Table 3-3 Hard disk controller status register contents*

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

Table 3-4 Error register contents

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

## 3.20 Only One Test

### 3.20.1 Program Description

This program tests the unique functions of this model.

### 3.20.2 Operations

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

```
#####
#####          Only One Test Menu (XXXXXXXX)          #####
#####
*
*  1 ..... Pressed Key Display                          *
*  2 ..... Touch Pad                                    *
*  3 ..... Kill Switch                                  *
*  4 ..... USB                                          *
*  5 ..... LED                                          *
*  6 ..... Acceleration sensor                          *
*
*  9 ..... Common Test                                  *
*
*****
.... Press test number[1-6, 9] ?
```

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

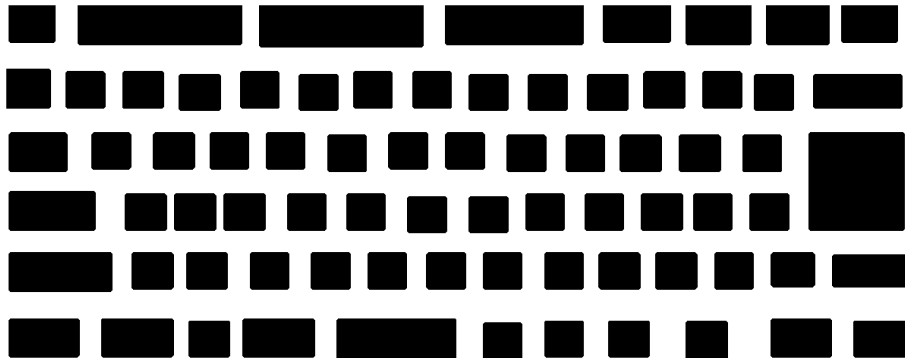
To return to the DIAGNOSTIC TEST menu, select **9** and press **Enter**.



Subtest 01      Pressed key display

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

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



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

## Subtest 02 Touch Pad

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

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

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

```

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

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

<BUTTON>
(1)    (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

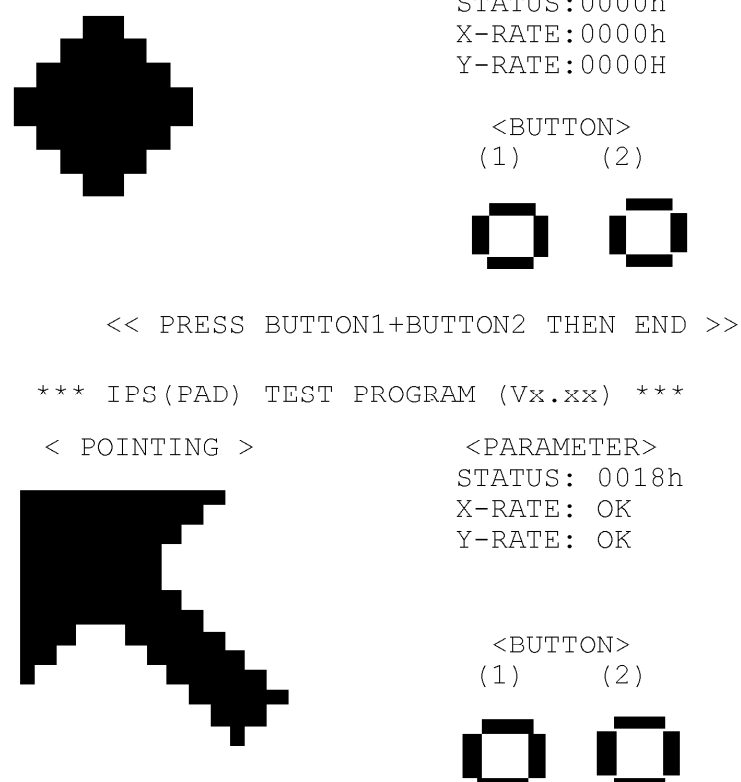
*** IPS (PAD) TEST PROGRAM (Vx.xx) ***

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

<BUTTON>
(1)    (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```



## Subtest 03 Kill Switch

This subtest checks if the Wireless communication switch works properly.

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

```
Kill switch is set to a start position (OFF)
```

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

```
KILL SWITCH ON !!
```

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

```
KILL SWITCH OFF !!
```

After Sliding the switch to OFF position, the screen returns to the Only One Test menu automatically.

## Subtest 04 USB

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

This subtest checks if USB ports work properly.

The following menu appears in the display.

```
#####
#####          USB Port Select (XXXXXXXX)          #####
#####
*
*  0 .....      Port 0 (Upper right)                *
*  1 .....      Port 1 (Lower right)                 *
*  2 .....      Port 2 (Left)                       *
*
*  9 .....      EXIT to Only One Menu                *
*
*****
.... Press test number[0-2, 9] ?
```

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

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

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

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

Press **9** and **Enter** to return to Only One Test menu.

Subtest 05 LED

This subtest checks if each LED lights properly.

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

[HDD Access LED test]

Confirm the LED of HDD status blinks properly.

Press any key and following message appears in the display.

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

(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/Orange

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

Press **Enter** to return to the Only One Test menu.

## Subtest 06 Acceleration sensor

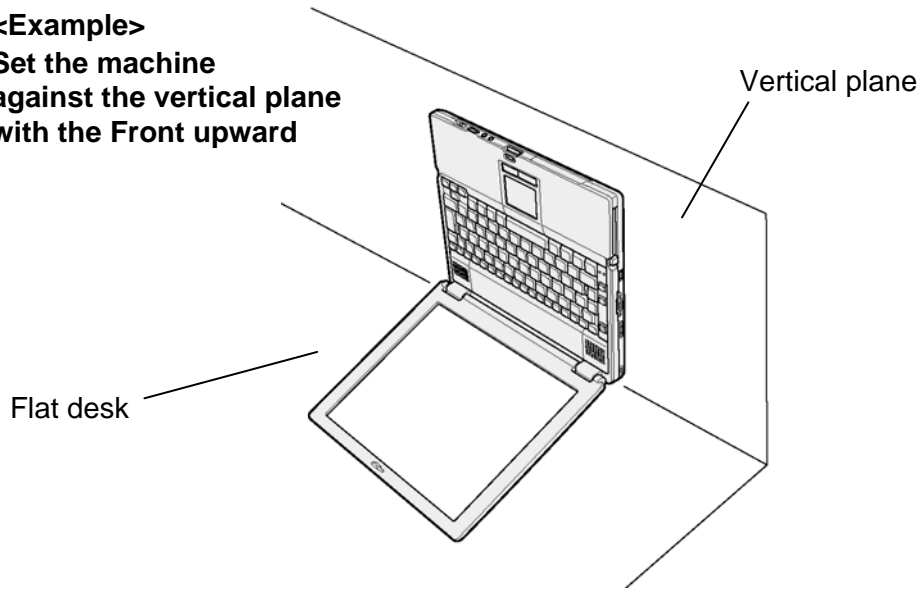
This subtest detects and corrects the each axis (X, Y, Z).

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

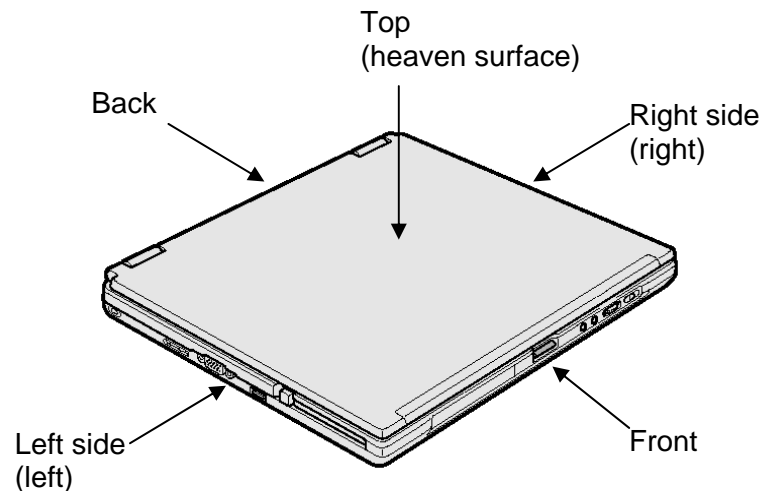
1. Flat desk with vertical plane to get the stability of machine.
2. Prevent the machine from shake or shock.

**<Example>**

**Set the machine  
against the vertical plane  
with the Front upward**



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



*Figure 3-1 Name and positions 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 a defective is found during the each check above, the following message appears in the display. The test is halted at the point when the defective is found.

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

Press **Enter** and return to the Only One Test menu. Then execute the test again.

## 3.21 Head Cleaning

### 3.21.1 Function Description

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

### 3.21.2 Operations

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

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

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



## **3.22 Log Utilities**

### **3.22.1 Function Description**

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

The error information is displayed in the following order:

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

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



## 3.23 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, 06)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtests 01)

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

### 3.23.2 Operations

1. Select **6** from the Diagnostic Menu and press **Enter**, the following messages 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 test (Y/N)?
```

2. 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.
3. 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 MS-DOS FORMAT command.*

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

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

#### 2. COPY

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

#### 3. DUMP

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

#### 4. HDD ID READ

This program reads the hard disk ID and displays hard disk model number.

### 3.24.2 Operations

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

```
[ FDD UTILITIES ]

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

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

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

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

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

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

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

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

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

Format start

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

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

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

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

## 3. COPY program

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

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

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

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

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

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

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

- (d) The following message will appear.

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

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

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

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

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

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

## 4. DUMP program

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

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

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

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

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

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

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

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

- (e) The following message will appear:

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

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

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

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

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

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

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

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

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

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

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

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

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

#### 5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

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

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



## 3.25 System Configuration

### 3.25.1 Function Description

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

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

### 3.25.2 Operations

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

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

* - Processor Type      = XXXXXX-XXXXXMHz      Code = XX    L2 Cache = XXXXXKB
* - Chip set           = XXXXXX                VRAM = XXXXXMB
* - BIOS ROM Version   = VX.XX      1st ID = XXH, 2nd ID = XXH
* - BOOT ROM Version   = VX.XX
* - EC/KBC Version     = VX.XX
* - PS Micom Version   = VX.XX
* - SVP Par. Version   = VX.XX      (Panel=XXXXXXXX, Manu=XXXX, Prod=XXXX)
* - Microcode Revision = VX.XX      (Processor=XXXh)
* - Total Memory Size  = XXXXXMB (Conventional Memory = XXXKB)
* - Battery Code       = XXXXXXXXXXXX
* - HWSC               = XXXXXXXX
* - FSB                = XXXXXMHz (Voltage = XEh)
* - X Printer Adapter  LPT1 = XXXX LPT2 = XXXX LPT3 = XXXX
* - X ASYNC Adapter    COM1 = XXXX COM2 = XXXX COM3 = XXXX
* - X Math CO-Processor
* - X Floppy Disk Drive(s) Track = XX Head = XX, Sector = XX
* - X Hard Disk Drive(s) #1 Sectors = XXXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXXXXX]
                       #2 Sectors = XXXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXXXXX]
* - ODD Drive          = XXXX XXXXXXXX XXXXXXXX [XXXXXXXXXXXXXXXX]

* - T&D Total Version  = VX.XX

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

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

### 3.26 Wireless LAN Test Program (Intel-made b)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11b). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

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

***NOTE:** Use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform this test. An access point is also required (Access point for 802.11b).*

In this test, the following items are tested.

- (1) MAC address Check
- (2) Communication test  
(Connection & Communication test for MAIN and AUX antenna)

To start the Wireless LAN test program, follow the steps below:

***NOTE:** Before starting the wireless LAN test, make sure the Wireless Communication Switch is turned on. Release the write-protection of the floppy disk for the test.*

#### Setting the responder machine

Connect the responder machine to the access point with a cross cable and turn on the access point.

Insert the floppy disk containing the wireless LAN test program into the USB FDD of the responder machine and turn on the responder machine. Then wait until the message appears.

#### Setting the target machine

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

**OK** message appears in the display if the test ends without a defect. Then, press any key to finish the test.

If an error is detected during the MAC address check, **NG** message appears in the display. After pressing any key, following message appears in the display and finish the test.

```

*****
*
*           Mac Address Check :  NG !!
*
*****

```

When a defective is detected during the MAC address check, following typical cause is considered.

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

Checking the connection, execute the test again.

If an error is detected during the connection & communication test for MAIN/AUX, **NG** message appears in the display. After pressing any key, following message appears in the display and finishes the test.

```

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

```

When a defective is detected during the connection & communication test for MAIN/AUX, following typical cause is considered.

- Connection of wireless LAN card
- Connection of wireless LAN antenna cable (Main/Aux)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the test again.

### 3.27 Wireless LAN Test Program (Intel-made b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

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

The following menu appears in the display.

```
*****Intel Calexico 11b/g Card Maintenance test Menu*****
*
*   1 : SKU check of Module
*
*   2 : MAC Address Check
*
*   3 : Antenna Check & communication test of 11b mode
*
*   4 : Communication test of 11g mode
*
*   5 : All the tests of Calexico 11g Card
*       (SKU & MAC Check, 11b/g communication test)
*
*****
```

SELECT TEST No, (1-5) :

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

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   : Intel Calexico 802.11b/g (MoW)
*   G-code   : G36C0000X310
*   PBA No.  : C55369
*
*****
```

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 = 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.

```
*****
ERROR: MAC all 0
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

**Caution:** To execute subtest 03-05, use another computer (with Callexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11b and 802.11g)

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

### Setting the responder machine

Connect the responder machine to the access points (for 802.11b and 802.11g) with a cross cable and turn on the access points.

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

This subtest checks the connection and communication of wireless LAN antenna of Callexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
*****
*
*           Main Antenna 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
- Connection of wireless LAN antenna cable (Main/Aux)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

## Subtest04      Communication test of 11g mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11g mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

```
*****
*
*           11g 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
- Connection of wireless LAN antenna cable (Main)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

## Subtest05      All the tests of Calexico 11b/g Card

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Calexico 802.11b/g card. The test stops at when a defective is found. For more details, refer to each subtest.



### 3.28 Wireless LAN Test Program (Intel-made a/b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11a/b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

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

The following menu appears in the display.

```
*****
*      Intel Calexico2 11a/g 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 Calexico2 11a/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   : Intel Calexico 802.11a/g (MoW)      *
*      G-code   : G36C00018510                       *
*      PBA No.  : C67287                               *
*
*****
```

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 following message will appear in the display.

```
*****
*
*                SKU NG !!
*
*          Other Card or Module not found
*
*****
```

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 = 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.

```
*****
*
*          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

**Caution:** To execute subtest 03-06, use another computer (with Callexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11a, 802.11b and 802.11g )

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

### Setting the responder machine

Connect the responder machine to the access points (for 802.11a, 802.11b and 802.11g) with a cross cable and turn on the access points.

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

This subtest checks the connection and communication of wireless LAN antenna of Callexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
*****
*
*           Aux Antenna 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
- Connection of wireless LAN antenna cable (Main/Aux)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

#### Subtest04 Communication test of 11a mode

This subtest checks the communication of wireless LAN antenna of Calxico 802.11a mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

```
*****
*
*           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
- Connection of wireless LAN antenna cable (Main)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest05      Communication test of 11g mode

This subtest checks the communication of wireless LAN antenna of Callexico 802.11g mode.

For more details on procedure and contents of this subtest, refer to Subtest04 Communication test of 11a mode.

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

This subtest checks SKU information, MAC address of Callexico 802.11a/b/g card, antenna connection and communication test of Callexico 802.11b card and communication test of Callexico 802.11a and Callexico 802.11g. The test stops at when a defective is found. For more details, refer to each subtest.

### 3.29 Wireless LAN Test Program (Askey-made)

This section describes how to perform the wireless LAN transmitting-receiving test (Askey-made Atheros b/g, a/b/g).

**Caution:** To execute subtest 03-07, use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests.

Another wireless communication tool with 2.4GHz like Bluetooth is interfering with the test. Execute this test in the condition where no interference around the computer.

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

#### Setting the responder machine

To execute subtest 03-07, responder machine with wireless LAN communication function (Atheros-made) is required. To set the responder machine, follow the procedures below.

1. Insert the test program disk to the FDD of responder machine and turn on the power.
2. Start the program for responder machine automatically.
3. The program for responder machine is set.

#### Setting the tester (DUT) machine

1. Insert the test program disk 1 to the FDD of tester machine and turn on the power.
2. The program disk 1 is executed and following message will appear in the display.

```
*****
*
*           Atheros MB4x Maintenance T&D (DUT)           *
*
*           Please exchange for DUT media 2               *
*
*****
```

Please input the "S" key and push the "Enter" key :

3. Take out the program disk 1 and insert program disk 2. Then, press **S** and **Enter**.
4. Executing program disk 2, following menu will appear in the display. To execute the subtest, press test number and **Enter**.

```

*****
*   Atheros MB4x(MB44ag/43g) Maintenance T&D Menu   *
*                                                    *
*   1 : SKU check of Module                         *
*                                                    *
*   2 : MAC Address Check                           *
*                                                    *
*   3 : Communication test of 11a mode(MB44ag)      *
*                                                    *
*   4 : Communication test of 11b mode(MB44ag/MB43g)
*                                                    *
*   5 : Communication test of 11g mode(MB44ag/MB43g)
*                                                    *
*   6 : All the tests of MB43g Module               *
*       (SKU & MAC Check, 11b/g communication test) *
*                                                    *
*   7 : All the tests of MB44ag Module              *
*       (SKU & MAC Check, 11a/b/g communication test)
*                                                    *
*****

```

SELECT TEST No, (1-7) :

#### 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   : Atheros MB44ag (RoW)                 *
*   G code   : G36C00010310                         *
*                                                    *
*****

```

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 Address Check : OK !!
*
*****
```

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 (MB44ag)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11a mode. Check the packet, throughput and RSSI and compare them with the standard.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

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

```
*****
*
*           11a Communication Test : NG !!
*
*           Please refer to log. txt
*
*****
```

Press any key and return to the test menu.

Open the log file (log.txt) and check the result.



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

- Connection of wireless LAN card
- Connection of wireless LAN antenna cable (Main/Aux)
- Condition of wireless LAN communication (Interference/obstruction)
- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04      Communication test of 11b mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11b mode.

For more details on the contents, refer to subtest 03.

Subtest05      Communication test of 11g mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11g mode.

For more details on the contents, refer to subtest 03.

Subtest06      All the tests of MB43g Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

Subtest07      All the tests of MB44ag Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11a mode, Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

### 3.30 LAN/Modem/Bluetooth/IEEE1394 Test Program

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

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

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

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

Enter a choice:

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

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

#### 3.30.1 LAN test

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

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

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

Subtest01 (i82562 + ICHx)

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

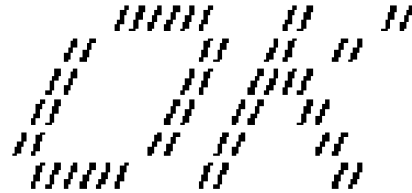
The following message will appear:

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

LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
Destination Address      = xxxxxxxxxxxxxx
Source Address           = xxxxxxxxxxxxxx

** 100Base-TX Full-Duplex **
< TRANSMIT >
< RECEIVE >
```



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

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

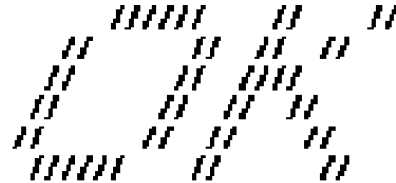
Subtest02 (GbE)

**CAUTION:** Gigabit Ethernet test is not supported for this model.

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip. Select **2** to execute and press **Enter**.

The following message will appear:

```
Testing adaptor...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
* 1000Base Auto-negotiation TxRx Test
*
* CE Test Complete
```



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

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

### 3.30.2 Modem test

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

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!!)
```

**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**.

### 3.30.3 Bluetooth test

To execute this test, input **3** and press **Enter**.

**Note:** Use another computer that can communicate by the Bluetooth as a reference machine to perform this test.

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The following Bluetooth test menu will appear:

```
#####
##### Bluetooth sub system test program VX.XX #####
#####
*
*          1....BD_ADDR check                               *
*
*          3... Communications test (DUT mode)              *
*
*          T....communications test (TEST mode)            *
*
*****
....Press test number [1, 3, T] ? _
```

Press **1** or **3** key to perform the corresponding subtest. To quit the Bluetooth test program, eject the floppy disk and turn the computer off while the menu above is displayed.

## Subtest01 BD\_ADDR check

This subtest checks the BD\_ADDR functions. When the Bluetooth test menu is displayed, press **1** to select the test and press **Enter**. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

Initializing ...

```

When the machine has passed the test, it displays BD\_ADDR. If BD\_ADDR has no problem, the following message is displayed.

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

My BD_ADDR = XXXXXXXXXXXX [h]

PPPPPP  A  SSSS  SSSS
P  P  A A  S  S  S  S
P  P  A  A  S  S
PPPPPP A  A  SSSS  SSSS
P  AAAAAA  S  S
P  A  A S  S S  S
P  A  A  SSSS  SSSS

```

If the target machine has any problem, it displays Error CODE. The following message is displayed.

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

My BD_ADDR = XXXXXXXXXXXX [h]

FFFFFF      A      III  L
F           A A      I  L
F           A  A      I  L
FFFFFF A      A      I  L
F           AAAAAA  I  L
F           A  A      I  L
F           A  A      III LLLLLLL

```

Table 3-5 Error message

Message	Contents
Invalid BD_ADDR (all 00)	0x000000000000
Invalid BD_ADDR (all FF)	0xFFFFFFFFFFFF
Invalid BD_ADDR (bit0=1)	bit40=1b
Invalid BD_ADDR (bit1=1)	bit41=1b
Invalid BD_ADDR (define in the file)	Defined BD_ADDR



If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-6 Error code for Bluetooth test (BD\_ADDR) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

\*\* See the Specification of the Bluetooth System for details.



When the Bluetooth test menu is displayed, press **T** to select the test and press **Enter** in the test machine. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|           |
|   Tester   |
|           |
+-----+

[ESC]:Finish Tester  [SPACE]:Start
Is DUT ready?

```

Then press **Space** to start the Bluetooth communication test.

When the machine has passed the test, it displays BD\_ADDR of the DUT. If the connection with the tester is completed, the progress bar stops. The following message is shown.

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|           | BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

  CCCC   OOO   M   M P P P P P L   EEEEE TTTTTT EEEEE DDDDD
C   C O   O MM  MM P   P L   E       T   E       D   D
C     O   O M M M M P   P L   E       T   E       D   D
C     O   O M  M  M P P P P P L   EEEEE T   EEEEE D   D
C     O   O M   M P   L   E       T   E       D   D
C   C O   O M   M P   L   E       T   E       D   D
  CCCC   OOO   M   M P           LLLLLL EEEEE T   EEEEE DDDDD

Testing is finished

A>_

```

If the target machine has any problem, the following message “INCOMPLETE” is displayed with the Error Code.

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----

+-----+
|          DUT          |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

III  N      N  CCCC   OOO  M      M  P P P P P P  L      EEEEE  TTTTTTT  EEEEEEE
I   NN    N  C   C  O   O  MM   MM  P   P  L      E          T   E
I   N N   N  C       O   O  M M  M  M  P   P  L      E          T   E
I   N N   N  C       O   O  M M  M  P P P P P P  L      EEEEE  T   EEEEEEE
I   N    N N C       O   O  M      M  P       L      E          T   E
I   N    NN C   C  O   O  M      M  P       L      E          T   E
III  N      N  CCCC   OOO  M      M  P          L L L L L L L  EEEEE  T   EEEEEEE

                                Testing is finished

_Press any key to continue. . .

```

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-7 Error code for Bluetooth test (BD\_ADDR of the DUT) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

\*\* See the Specification of the Bluetooth System in detail.

Table 3-7 Error code for Bluetooth test (BD\_ADDR of the DUT) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

\*\* See the Specification of the Bluetooth System in detail.

**3.30.4 IEEE1394 test**

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

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

The following menu will appear:

```

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

```

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

Subtest01      Transmit & Receive test

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

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

Subtest02      Responder set

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

Subtest03      IEEE1394 GUID Display

This program checks the GUID of IEEE1394.

### 3.31 Sound Test program

This section describes how to perform the Sound test. To execute the sound test, refer to the following description.

Insert the test program disk for Sound test in the floppy disk drive and turn on the power. The following message will appear:

```
#####
#####      WSS, Sound blaster pro Diagnostics program      #####
#####
*
*      1 .....      Sound (Standard)      *
*
*      2 .....      Sound (Legacy)      *
*
*      3 .....      CD Sound (Standard)  *
*
*      4 .....      CD Sound (Legacy)    *
*
*      ---It outputs at the speaker and lineout---      *
*
*****
.... Press test number[1-4] ?
```

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

#### 3.31.1 Sound (Standard) test

To execute the Sound (Standard) test, press **1** and **Enter**. The following menu will appear in the display.

```
#####
#####      ICH4-M + AD1981A Diagnostics program      #####
#####
*
*      1 .....      ( Microphone recording & play )      *
*
*      2 .....      ( Sine wave )      *
*
*      3 .....      ( Line IN recording & play )      *
*
*      9 .....      Exit to Main      *
*
*****
.... Press test number[1-3, 9] ?
```



To return to the Sound test menu, Press **9** and **Enter**. Then following message will appear in the display.

```
*****  
*****  May I Restart ?  *****  
*****  
Press any key to continue..
```

After pressing any key, the machine starts rebooting and sound test menu will appear in the display.

Subtest01      Microphone recording & play

This subtest checks the function of the CODEC A/D, D/A converter.

When this subtest is selected, the following message will appear.

```
[Recording & play test !]
```

And the following message will appear.

```
DOS/4GW Protected Mode Run-time Version X.XX  
Copyright (c) Tenberry Software, Inc. XXXX
```

After this message appears, display stops briefly. In this timing, sound is recorded from internal microphone.

After the recording is completed, the computer plays back the sound recorded after the following message.

```
STACWAVE Version X.XX  
Build data: XXX XX XXXX at XX:XX:XX  
Loading "mic.wav".
```

<p><b>NOTE:</b>    <i>The message in the display might have slight difference from those above.</i></p>
---------------------------------------------------------------------------------------------------------

The display returns to the Sound (Standard) test menu after the test ends.

**Subtest02 Sine Wave**

This subtest is executed by loading the COM file (ADSIN.COM). The program expands sine wave data table from 16KB to 64KB, and creates the play data. Then it transfers the data between the DMA and the CODEC to play the sine wave. (It sounds like a continuous beep). By using wave measurable devices such as an oscilloscope, the data can be measured as a sine wave.

When the subtest is executed, the sine wave is played while expanding sine wave from 16KB to 64KB.

The display returns to the Sound (Standard) test menu after the test ends.

**Subtest03 Line IN recording & play**

This subtest executes the same test as the subtest01 by recorded sound from the different port (Line-in port).

For more details on the subtest, refer to the subtest01 Microphone recording & play.

The display returns to the Sound (Standard) test menu after the test ends.

**3.31.2 Sound (Legacy) test**

To execute the Sound (Legacy) test, select **2** and press **Enter**.

**CAUTION:** *Sound (Legacy) test is not supported in this model.*

### 3.31.3 CD Sound (Standard) test

To execute the CD Sound (Standard) test, press **3** and **Enter**. Insert the test media (TOSHIBA TEST CD-ROM or ABEX TEST CD-ROM) or music CD on the market (if the test media can not be prepared). Following menu appears in the display.

For details on use of test media, refer to (1) Test media (Toshiba-made test media).  
For details on use of audio CD on the market, refer to (2) Audio CD.

#### (1) Test media (Toshiba-made test media)

```
CD/DVD TEST  IN PROGRESS XXXXXXXX
```

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

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

```
01 - Japanese Narration
02 - English Narration
03 - Test Tone A (100Hz - 20Hz)
04 - Test Tone B (400Hz - 3KHz L-R)
```

```
Drive # = 0, ATAPI status =00
Command = XX
[[Block address = XXXXXXXXX]]
[[Block length  = XXXXXXXXX]]
Final : Block address = XXXXXXXXX
```

#### Subtest01 Japanese Narration

Selected this subtest, narration in Japanese starts and following message appears in the display.

```
Play start CD sound !
Press any key <Play stop>.
```

Press any key and stop the narration. Then return to the CD Sound (Standard) test menu.

Subtest02 English Narration

Selected this subtest, narration in English starts.

For more details on the procedure, refer to the subtest01.

Subtest03 Test Tone A

**Caution:** Before starting subtest03, be sure to set the sound at proper volume.

This subtest plays sine wave while changing its table from 100Hz to 20Hz.

Return to the CD Sound (Standard) menu after the test ends.

Subtest 04 Test Tone B

This subtest plays sine wave while changing its table from 400Hz to 3KHz and also changing the channel from left speaker to right speaker.

Return to the CD Sound (Standard) menu after the test ends.

## (2) Audio CD

Insert an audio CD and the following menu appears in the display.

```

CD/DVD TEST   IN PROGRESS XXXXXXXX

```

```

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

```

```

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

```

CD Sound track number (01-98 : Track) ?

```

Drive # = 0, ATAPI status =00
Command = XX
[[Block address = XXXXXXXXX]]
[[Block length  = XXXXXXXXX]]
Final : Block address = XXXXXXXXX

```

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

The following message appears in the display and selected track is played.

```

Play start CD sound !
Press any key <play stop>

```

After pressing any key, the music stops and the display returns to the selection menu of the track number.

**NOTE:** When the CD-ROM test is executed, "ALL DEVICE" must be selected in the [Device Config.] of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.

### 3.31.4 CD Sound (Legacy) test

To execute the CD Sound (Legacy) test, select **4** and press **Enter**.

**CAUTION:** Sound (Legacy) test is not supported in this model.

## 3.32 SETUP

### 3.32.1 Function Description

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

1. Memory
2. System Date/Time
3. Battery
4. Password
5. HDD Password
  - (a) HDD
  - (b) HDD Password mode
  - (c) User Password
  - (d) Mater Password
6. Boot Priority
  - (a) Boot Priority
  - (b) Network Boot Protocol
7. Display
  - (a) Power On Display
  - (b) LCD Display Stretch
8. Others
  - (a) Power-up Mode
  - (b) CPU Cache
  - (c) Level 2 Cache
  - (d) Dynamic CPU Frequency Mode
  - (e) Auto Power On
  - (f) Panel power On/Off
  - (g) Performance/Battery Life Setting
9. Configuration
10. I/O Ports
  - (a) Serial
  - (b) Parallel
11. Drives I/O
  - (a) Built-in HDD
  - (b) CD-ROM
12. PCI Bus
13. Peripheral
  - (a) Internal Pointing Device
  - (b) External keyboard "Fn"

(c) Parallel Port Mode

(d) Hard Disk Mode

14. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

(b) USB-FDD Legacy Emulation

15. PCI LAN

### 3.32.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the followings:

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

<p style="text-align: center;"><b>MEMORY</b></p> <p>Total = XXXXX KB</p>	<p style="text-align: center;"><b>BOOT PRIORITY</b></p> <p>Boot Priorit = HDD→FDD→CD-ROM→LAN  HDD Priority = Built-in HDD→PC Card  Network Boot Protocol = PXE</p>
<p style="text-align: center;"><b>SYSTEM DATE/TIME</b></p> <p>Date(MM-DD-YY) = XX-XX-XXXX  Time(HH:MM:SS) = XX:XX:XX</p>	<p style="text-align: center;"><b>DISPLAY</b></p> <p>Power On Display = Auto-Selected  LCD Display Stretch = Enabled</p>
<p style="text-align: center;"><b>BATTERY</b></p> <p>Battery Save Mode = Full Power</p>	<p style="text-align: center;"><b>OTHERS</b></p> <p>Power-up mode = Boot  CPU Cache = Enabled  Level 2 Cache = Enabled  Dynamic CPU Frequency Mode *1  = Dynamically Switchable  Auto Power On = Disabled  Panel Power On/Off *2 = Disabled  Performance/Battery Life Setting  = Performance</p>
<p style="text-align: center;"><b>PASSWORD</b></p> <p>Not Registered</p>	
<p style="text-align: center;"><b>HDD PASSWORD</b></p> <p>HDD = Built-in HDD  HDD Password Mode = User Only  User Password = Not Registered  Master Password = Not Registered</p>	

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

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

<p style="text-align: center;"><b>CONFIGURATION</b></p> <p>Device Config. = Setup by OS</p>	<p style="text-align: center;"><b>PERIPHERAL</b></p> <p>Internal Pointing Device = Enabled  Ext Keyboard "Fn" = Enabled  Parallel Port Mode = ECP  Hard Disk Mode = Enabled IDE (Normal)</p>
<p style="text-align: center;"><b>I/O PORTS</b></p> <p>Serial = COM1(3F8H/IRQ4)  Parallel = LPT1(378H/IRQ7/CH3)</p>	<p style="text-align: center;"><b>LEGACY EMULATION</b></p> <p>USB KB/Mouse Legacy Emulation = Enabled  USB-FDD Legacy Emulation = Enabled</p>
<p style="text-align: center;"><b>DRIVERS I/O</b></p> <p>Built-in HDD = Primary IDE(1F0H/IRQ14)  CD-ROM = Secondary IDE(170H/IRQ15)</p>	<p style="text-align: center;"><b>PCI LAN</b></p> <p>Built-in LAN = Enabled</p>
<p style="text-align: center;"><b>PCI BUS</b></p> <p>PCI BUS = IRQ10, IRQ11</p>	

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

**NOTE:** \*1. This item is displayed only when Pentium model is used for CPU.

\*2. This item is displayed only when "Resume" is set as [Power-up mode] in [OTHERS] menu box.



### 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 15 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. Battery

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
Display Auto off	= 30Min.
HDD Auto off	= 30Min.
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
Display Auto off	= 03Min.
HDD Auto off	= 03Min.
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 1.10GHz (Pentium-M),  
at 900MHz (Celeron-M)  
(Default in Full Power Mode)

**Low** CPU operates at half processing 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.

##### Display Auto Off

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

**Disabled** Disables display automatic power off.

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

##### HDD Auto Off

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

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

LCD Brightness

Use this option to set the level of LCD brightness.

- Super-Bright** Full brightness for maximum visibility.  
**Bright** Full brightness for high visibility.  
**Semi-Bright** Less than full brightness for saving power.

Cooling Method

- 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.*

## 4. Password

This option sets or resets the user password for power on and instant security (**Fn+F1**).

- Registered** The user password has been registered.  
**Not registered** The user password has not been registered.

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

## 5. HDD Password

This option registers, resets or changes the HDD password.

## (a) HDD

Selects hard disk for setting the password.

- Built-in HDD** The password is set to Built-in HDD.

## (b) HDD Password Mode

Select the HDD password to be registered. This can be selected only when the user HDD password or master password is not registered. When the user HDD password or master password is registered, once delete it and select the mode.

<b>User Only</b>	Sets the User HDD Password only. (Default)
<b>Master+User</b>	Sets the Master HDD Password and User HDD Password.

## (c) User Password

Sets the User HDD Password.  
For details, refer to the User's Manual.

## (d) Master Password

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

## 6. 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.

**FDD→HDD→CD-ROM→LAN:** The computer looks for bootable files in the following order: FDD, HDD, CD-ROM (\*1) and LAN

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

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

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

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

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

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

## (b) Network Boot Protocol

Use this option to set the starting method via a network.

**PXE** Sets to PXE protocol. (Default)

**RPL** Sets to RPL protocol.

## 7. Display

This group of options configures the computer's display.

## (a) Power On Display

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

**Auto-Selected** Selects an external monitor if one is connected.  
Otherwise it selects the internal LCD. (Default)

**LCD+AnalogRGB** Selects both the internal LCD and the external CRT for simultaneous display.

**NOTE:** When starting the computer in Standby or Hibernation, the last configuration is saved. If data does not appear on the display you are using after starting in Standby or Hibernation, pressing **Fn+F5**.

Pressing **Fn+F5** changes the display setting as follows in order: the internal LCD, the external CRT, both the internal LCD and the external CRT.

When an external CRT display, which does not support SVGA mode is connected and "LCD+AnalogRGB" is selected, the external display is not displayed.

## (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.

## 8. Others

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

## (a) Power-up Mode

Use this option to choose between resume and boot mode.

**Boot** Turns on boot mode. (Default)

**Resume** Turns on resume mode.

## (b) CPU Cache

Use this option to enable or disable the CPU cache.

**Enabled** Enables the CPU cache. (Default)

**Disabled** Disables the CPU cache.

## (c) Level 2 Cache

Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option cannot be changed.

**Enabled** Enables the level 2 cache. (Default)

**Disabled** Disables the level 2 cache.

## (d) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings. When the CPU of the computer is Celeron-M, this option is not displayed.

**Dynamically Switchable**

Enables Pentium-M processor featuring Intel SpeedStep technology. (Default)

**Always High** Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.

**Always Low** Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its default speed.

## (e) Auto Power On

This option displays setting for Auto Power On.

**Disabled** Indicates auto power on is not set.

**Enabled** Indicates auto power on is set.

When "Enabled" is selected, the following sub-window appears.

OPTIONS	
Alarm Time	= 00:00:00
Alarm Date Option	= Disabled
Ring Indicator	= Disabled
Wake-up on LAN	= Disabled

Set the parameters for the Auto Power On (automatic power on) function 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.

For the **Alarm Date Option**, set the date to turn on the power automatically. When it is set to “Disabled”, the time to turn on automatically is not set.

The **Ring Indicator** is displayed only when the computer is in Resume mode and this function cannot be used for a PC card-type modem. When any modem is not installed, it is not displayed.

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.

- 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.

(f) Panel Power On/Off

This option is displayed only in the resume mode.

**Enabled** Enables the Panel Power On/Off.

**Disabled** Disables the Panel Power On/Off. (Default)

(g) Performance/Battery Life Setting

Use this option to choose a setting of Memory Bus Clock and Graphics Core Clock from the followings.

**Performance** Initial setting. (Default)

**BatteryLife** Saving power by setting in lower clock and voltage.



When this item is selected, the following sub-window appears. The sub-window displays different clock depending on the memory module type. (DDR333 or DDR 266)

**[DDR333 memory module] ;**

Performance	Battery Life
Memory Bus Clock = 333MHz Graphics Core Clock = 250MHz	Memory Bus Clock = 226MHz Graphics Core Clock = 200MHz

Performance mode = 1.35V (Core Voltage)

Battery Life mode = 1.20V (Core Voltage)

**[DDR266 memory module] ;**

Performance	Battery Life
Memory Bus Clock = 266MHz Graphics Core Clock = 200MHz	Memory Bus Clock = 226MHz Graphics Core Clock = 200MHz

Performance mode = 1.35V (Core Voltage)

Battery Life mode = 1.20V (Core Voltage)

## 9. 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.

**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".

## 10. I/O ports

This option controls settings for the serial and parallel ports.

**NOTE:** This item can be set only when the Advanced Port Replicator III is connected.

## (a) Serial

Use this option to set the COM level for the serial port. The serial port interrupt request level (IRQ) and I/O port base address for each COM level is shown below:

COM level	Interrupt level	I/O address	
COM1	4	3F8H	(Default)
COM2	3	2F8H	
COM3	4	3E8H	
COM3	5	3E8H	
COM3	7	3E8H	
COM4	3	2E8H	
COM4	5	2E8H	
COM4	7	2E8H	
Not Used			Disables port

## (b) Parallel

This option sets the interrupt request level and I/O port base address for the parallel port. When the parallel port mode is set to **Std. Bi-direct**, the options are as follows:

LPT setting	Interrupt level	I/O address	
LPT 1	7	378H	
LPT 2	5	278H	
LPT 3	7	3BCH	
Not Used			Disables port

When the parallel port mode (see settings below) is set to **ECP**, the DMA channel can also be set to **1** or **3**. The default is **3**.

LPT setting	Interrupt level	I/O address	DMA channel
LPT 1	7	378H	3 (Default)
LPT 2	5	278H	3
LPT 3	7	3BCH	3
Not Used			Disables port

When you select one of the above options, except for **Not Used**, a subwindow similar to the one below appears to let you set the DMA. The options for this setting are Channel 1 and Channel 3 (Default).

OPTIONS	
DMA	= Channel 3 (Default)

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

### 11. Drives I/O

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

<b>Built-in HDD</b>	This cannot be changed.
<b>CD-ROM</b>	This cannot be changed. This is not displayed when a drive is not built-in.

### 12. PCI Bus

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

PCI BUS = IRQ10, IRQ11

### 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.

#### (b) Ext Keyboard "Fn"

This option enables or disables Fn key function on the external keyboard.

**Enabled** Enables the feature.

**Disabled** Disables the feature. (Default)

When "Enabled" is selected, the following sub-window appears.

KEYBOARD	
Ext Keyboard "Fn" key equivalent	= Left Ctrl + Left Alt

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting a **Fn** key equivalent will enable you to use "Hotkeys" by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

- = **Left Ctrl + Left Alt (\*1)**
- = **Right Ctrl + Right Alt (\*2)**
- = **Left Alt + Left Shift**
- = **Right Alt + Right Shift**
- = **Left Alt + Caps Lock**

**NOTE:** If these selections ((\*1) or (\*2)) are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.

(c) Parallel Port Mode

Use this option to set information of Parallel Port Mode.

- |                        |                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>ECP</b>             | Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default) |
| <b>Std. Bi-Direct.</b> | Sets the bi-directional setting. This setting should be used with some other parallel devices.                      |

**NOTE:** When using Windows, the setting of "Toshiba HW setup" is enabled and the setting of "Parallel Port Mode" is disabled.

(d) Hard Disk Mode

Use this option to select the hard disk mode.

**Enhanced IDE (normal)**

Select this mode when the HDD is used for MS-DOS®, Windows 95/98/2000/XP, or OS/2®. (Default)

**Standard IDE**

Select this mode when using an OS which does not support the Enhanced IDE. When this mode is selected, up to 528MB is logically available and the rest of the capacity is not usable.

*NOTE: Formats for Enhanced IDE and Standard IDE are different, so if you change the setting, you will have to reformat the hard disk for the appropriate setting.*

#### 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

#### 15. PCI LAN

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

**Enabled** Enables built-in LAN functions. (Default)

**Disabled** Disables built-in LAN functions.



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## **Chapter 4**

# **Replacement Procedures**

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## 4 Replacement Procedures

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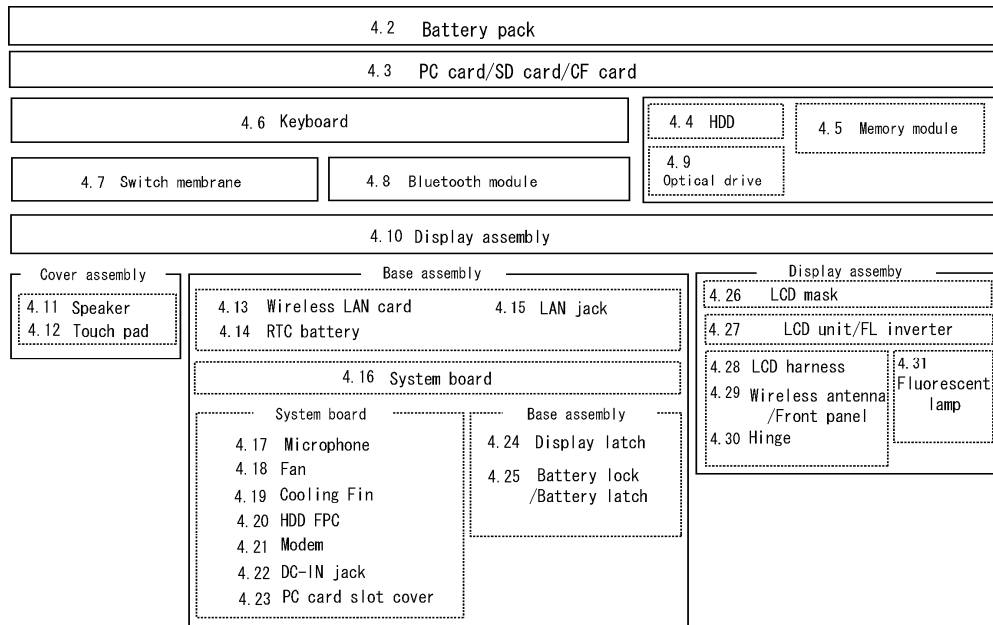
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### 4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card and optional SD card, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.

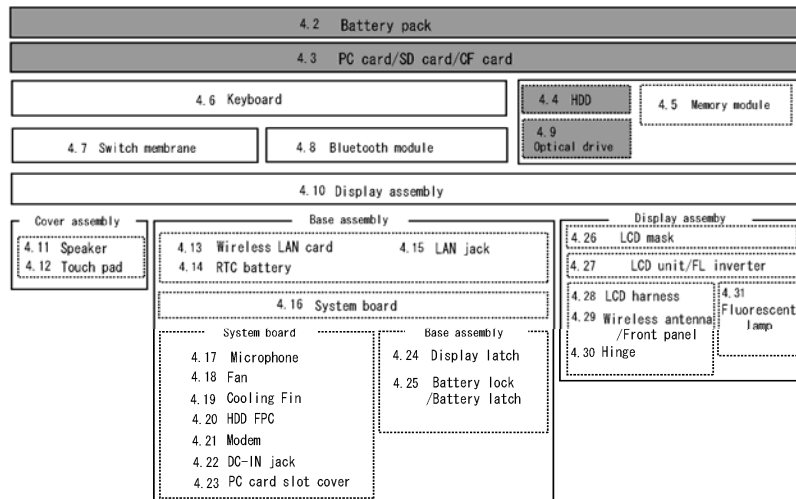


#### How to See the Chart

An example of referring to the chart is shown below.

#### •Removing the Optical drive

4.2 Battery pack to 4.4 HDD directly above the optical drive 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

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
  - Dust and contaminants
  - Static electricity
  - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

## Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnecter.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

## Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.



After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

### **Tools and Equipment**

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

- One M1.4, point size 0 Phillips screwdriver to remove and replace screws
- One M2, point size 0 Phillips screwdriver to remove and replace screws
- One M2.5/M3, point size 1 Phillips screwdriver to remove and replace screws
- One M5 hexagonal screwdriver
- Tweezers, to lift out screws that you cannot grasp with your fingers
- ESD mats for the floor and the table you are working on
- An ESD wrist strap or heel grounder
- Anti-static carpeting or flooring
- Air ionizers in highly static sensitive areas
- 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.*

- M1.4 (1.4mm)                      0.078 N·m (0.8 kgf·cm)
- M2.0 (2.0mm)                      0.167 N·m (1.7 kgf·cm)
- M2.5 (2.5mm)                      0.294 N·m (3.0 kgf·cm)
- M3.0 (3.0mm)                      0.549 N·m (5.6 kgf·cm)

**NOTE:** *The computer contains several flat head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.*

### Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- Even number length screw: brown
- Odd number length screw: white
- Special length screw: blue

Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.

### Marking of Screws on the Computer Body

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

Kind of screws	Symbol
<input type="checkbox"/> BIND screw	B
<input type="checkbox"/> FLAT HEAD screw	F
<input type="checkbox"/> SUPER FLAT HEAD screw	S
<input type="checkbox"/> TAPPING screw	T
<input type="checkbox"/> Other screws (Unique screws, STUD, etc.)	U

Examples:

- 6 mm BIND screw B6
- 12 mm BIND screw B12
- 5 mm FLAT HEAD screw F5
- (Indicates the screwed length in round number regardless the length of the stud.)

## 4.2 Battery pack

### Removing the battery pack

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

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

1. Turn off the computer.
2. Disconnect the AC cable and other external devices from the computer.
3. Turn the computer face down.
4. Release the **battery lock** by sliding the lock toward the arrow direction.
5. While sliding the **battery release latch**, pull out the **battery pack** to the arrow direction.

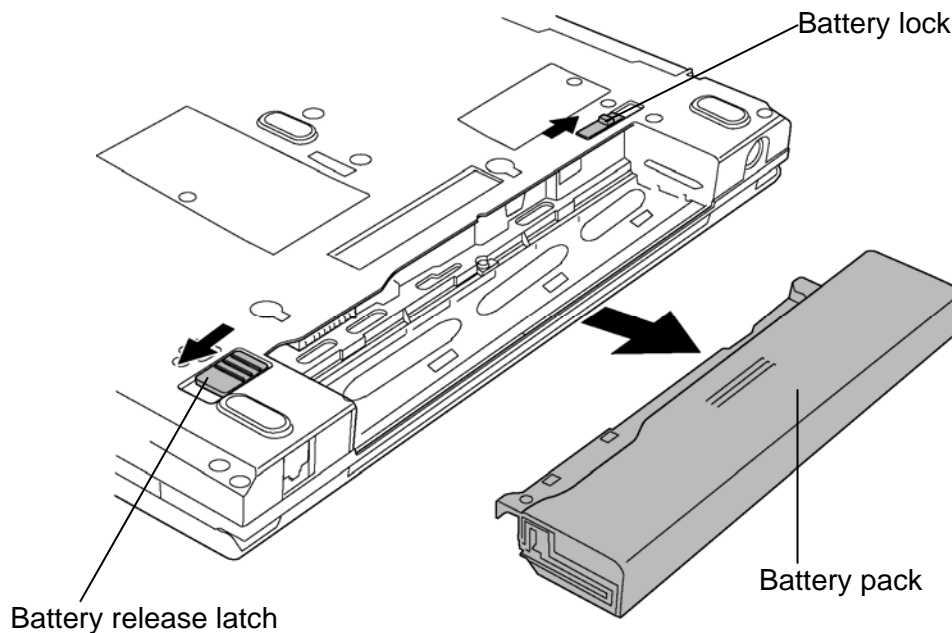


Figure 4-1 Removing the Battery pack

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

### Installing the battery pack

To install the battery pack, follow the steps below and refer to figure 4-1.

**CAUTION:** *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba as replacements.*

**NOTE:** *Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.*

1. Turn off the computer.
2. Disconnect the AC cable and other external devices from the computer.
3. Push **the battery pack** into the battery slot. Make sure the battery pack is installed securely.

## 4.3 PC card/SD card/CF card

### 4.3.1 PC card

#### Removing a PC card

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

**CAUTION:** Before you remove a PC card, refer to the card's documentation and your operating system documentation for proper procedures and precautions.

1. Push the **eject button**. It will pop out when you release it. Then press once more the eject button to eject a PC card.
2. Grasp a **PC card** and pull it out.

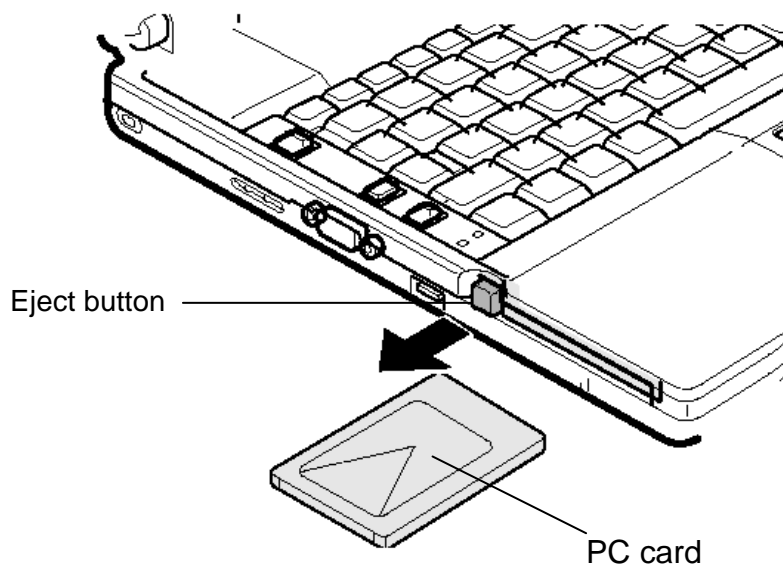


Figure 4-2 Removing a PC card

#### Installing a PC card

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

1. Make sure the **eject button** does not stick out.
2. Insert a **PC card** and press it until it is securely connected.

### 4.3.2 SD card

#### Removing a SD card

To remove a SD card, follow the steps below and refer to figure 4-3.

**CAUTION:** Before you remove a SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Push a **SD card**. It will pop out partly when you release, so pull out the card.

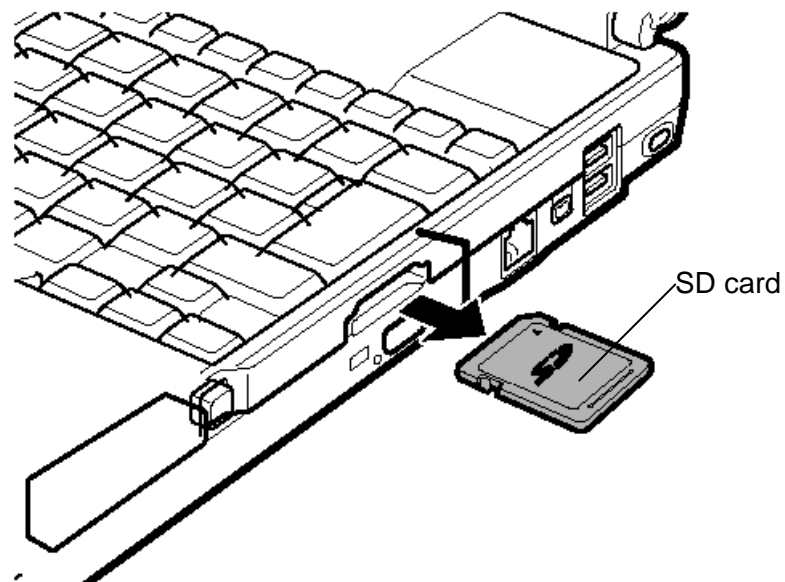


Figure 4-3 Removing a SD card

#### Installing a SD Card

To install a SD card, follow the steps below and refer to figure 4-3.

1. Insert a **SD card** and press it until it is securely connected.

### 4.3.3 CF card

#### Removing a CF card

To remove a CF card, follow the steps below and refer to figure 4-4.

**CAUTION:** Before you remove a CF card, refer to the card's documentation and your operating system documentation for proper procedures and precautions.

1. Push the **eject button**. It will pop out when you release it. Then press once more the eject button to eject a CF card.
2. Grasp a **CF card** and pull it out.

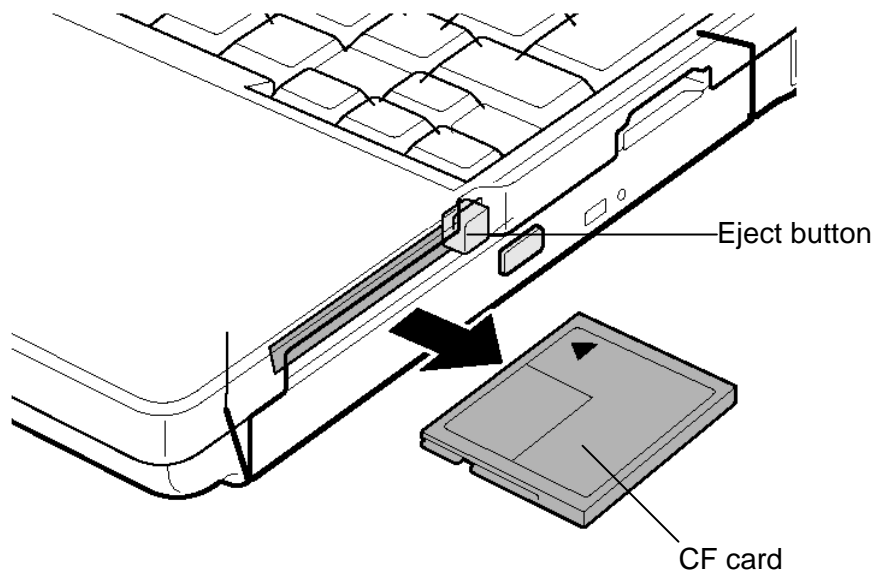


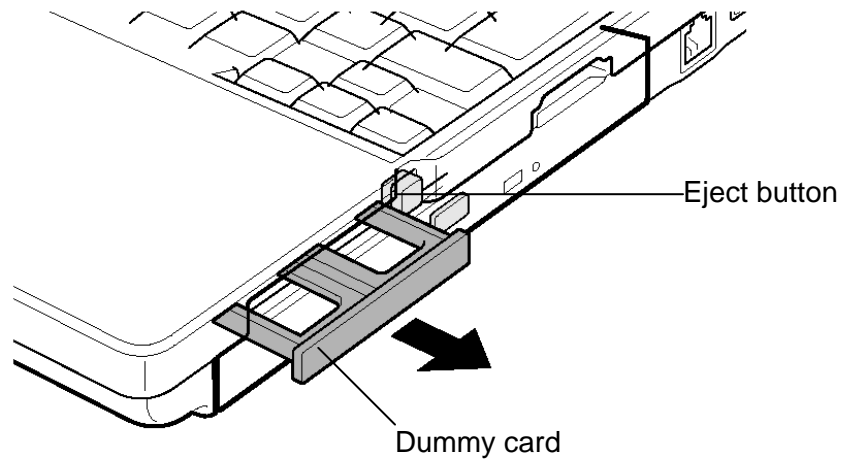
Figure 4-4 Removing a CF card



### Installing a CF card

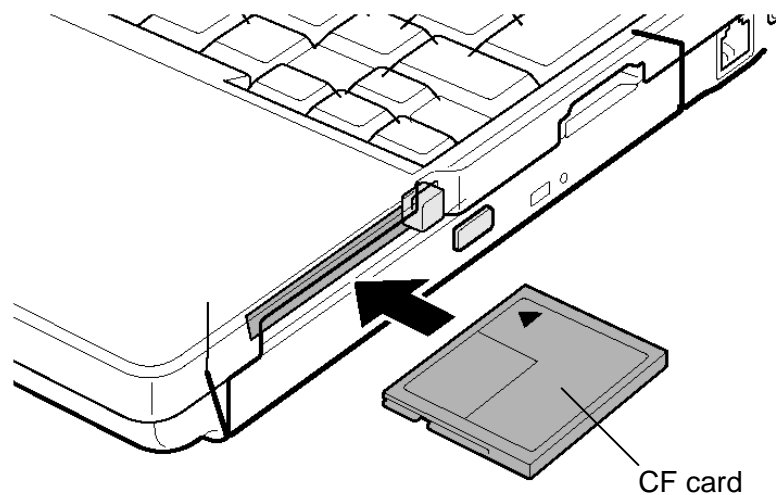
To install a CF card, follow the steps below and refer to figure 4-5 and 4-6.

1. Push the **eject button**. It will pop out when you release it. Then press once more the eject button to eject the dummy card.



*Figure 4-5 Removing the dummy card*

2. Insert a **CF card** and press it until it is securely connected.



*Figure 4-6 Inserting a CF card*

## 4.4 HDD

### Removing the HDD

To remove HDD, follow the steps below and refer to figures 4-7 and 4-8.

**CAUTION:** When handling the HDD, do not press the HDD from the top and bottom surface. Pressing HDD may causes data and device destruction.

1. Turn the computer upside down.
2. Loosen the following **screw (with e-ring)** and remove the **HDD slot cover**.
3. Lift up the **HDD assembly** from screw hole side.
4. Disconnect the HDD assembly carefully from the connector of the **HDD FPC**.

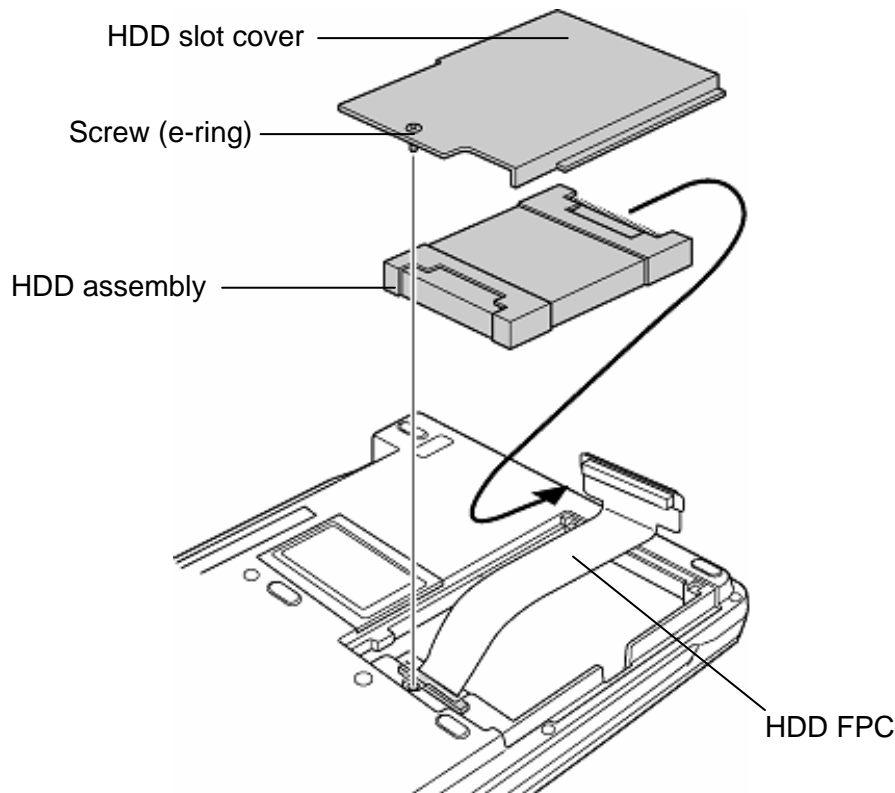


Figure 4-7 Removing the HDD assembly

5. Remove the **HDD cushion rubbers** from the both sides of HDD assembly.
6. Remove the following **screws** and slide out the **HDD** from the **HDD bracket**.
  - M3.0×4.0S FLAT HEAD screw ×4

**NOTE:** When removing the HDD bracket, be sure to remove the screws in the reverse order of the number marked on the holder (4→3→2→1).

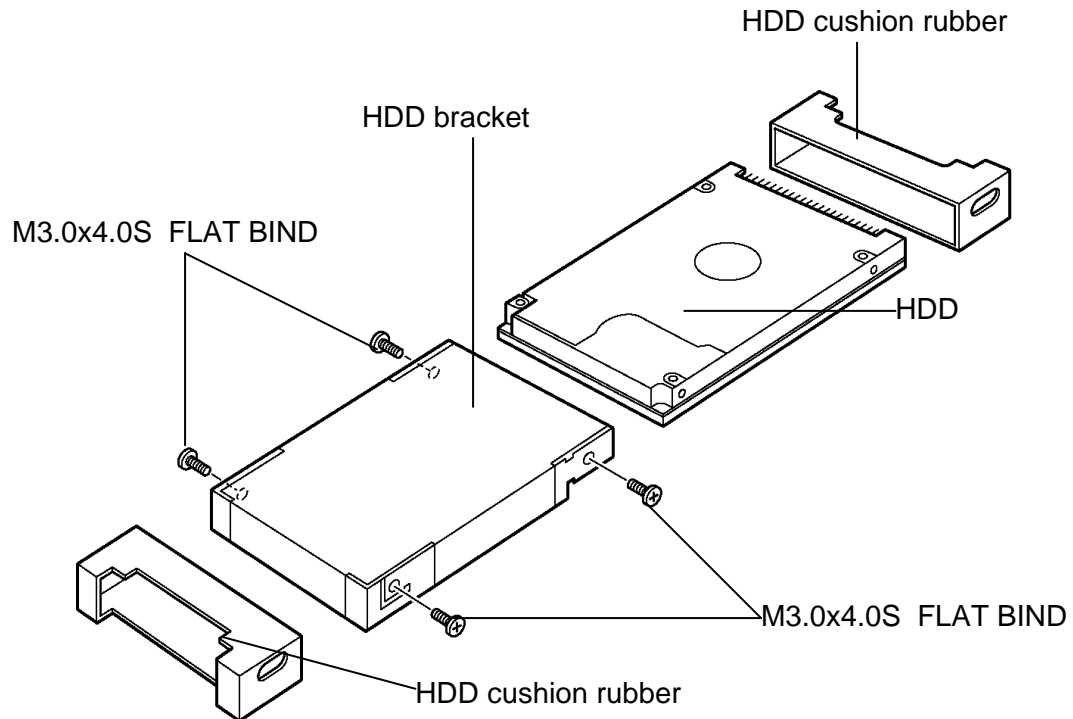


Figure 4-8 Removing the HDD

## Installing the HDD

To install the HDD, follow the steps below and refer to figures 4-7 and 4-8.

1. Install a HDD into the **HDD bracket** and secure it with the following **screws**.

□ M3.0×4.0S FLAT HEAD screw ×4

**NOTE:** *When installing the HDD bracket, be sure to secure the screws in the order of the number marked on the holder (1→2→3→4).*

2. Cover the **HDD cushion rubbers** to the both sides of HDD assembly.
3. Connect the HDD assembly to the connector of the **HDD FPC**.
4. Seat the **HDD assembly** in the slot of the computer.

**NOTE:** *When installing the HDD assembly to the slot, make sure that the printed character "UP" on the HDD cushion rubber is not seen from the slot.*

5. Install the **HDD slot cover** and secure it with the **screw (with e-ring)**.

## 4.5 Memory module

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

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

*Never press hard or bend the memory module.*

### Removing a memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedures and refer to figure 4-9.

1. Turn the computer upside down.
2. Loosen the **screw (with e-ring)** and remove the **memory slot cover**.
3. Remove the **memory slot cover**.
4. Open the left and right latches and remove a **memory module** from the connector **CN1440** on the system board.

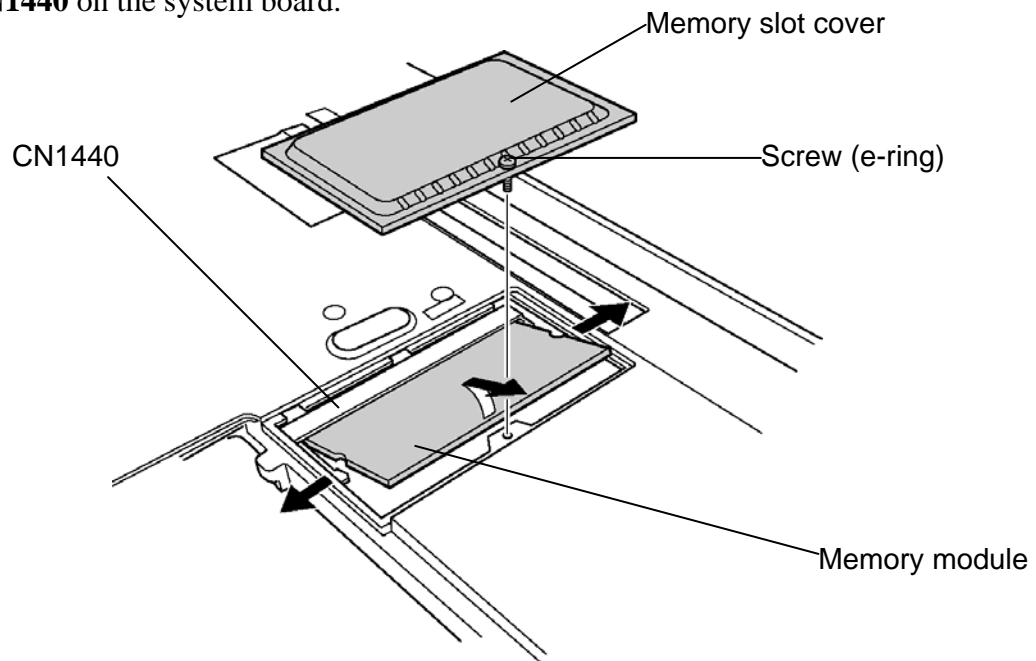


Figure 4-9 Removing a memory module

### Installing a memory module

To install a memory module, confirm that the computer is in boot mode. Then follow the steps below and refer to figures 4-9.

1. Insert a **memory module** into the connector **CN1440** of the system board slantwise and press it to connect firmly.

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

*Never press hard or bend a memory module.*

2. Install the **memory slot cover** and secure it with the **screw (with e-ring)**.
3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that a new memory module is detected correctly.
4. If the memory is not detected, check that it is connected correctly.

## 4.6 Keyboard

### Removing the Keyboard

To remove the keyboard, follow the steps below and refer to figures 4-10 to 4-12.

**CAUTION:** When removing the keyboard, hold the edge of it. Do not touch the key top. Otherwise, the key top may drop.

1. Remove the following **screw** on the bottom.

□ M2.0×6.0B BIND screw ×1

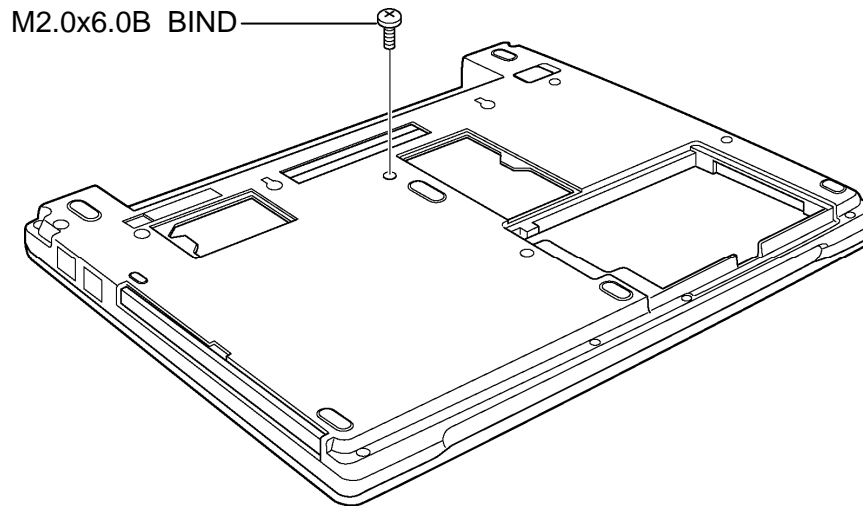


Figure 4-10 Removing the screw (fixing keyboard)

2. Turn the computer face up and open the display.
3. Lifting up the **speaker cover (S)** from the **slit** side and remove it.
4. Slide the **speaker cover (L)** toward the arrow direction and remove it.
5. Remove the following **screws** securing the keyboard.

□ M2.0×3.0S S-THIN FLAT BIND screw ×2

or

□ M2.0×4.0B LH STICK ×1 (Left side)  
 M2.0×3.0S S-THIN FLAT BIND screw ×1 (Right side)

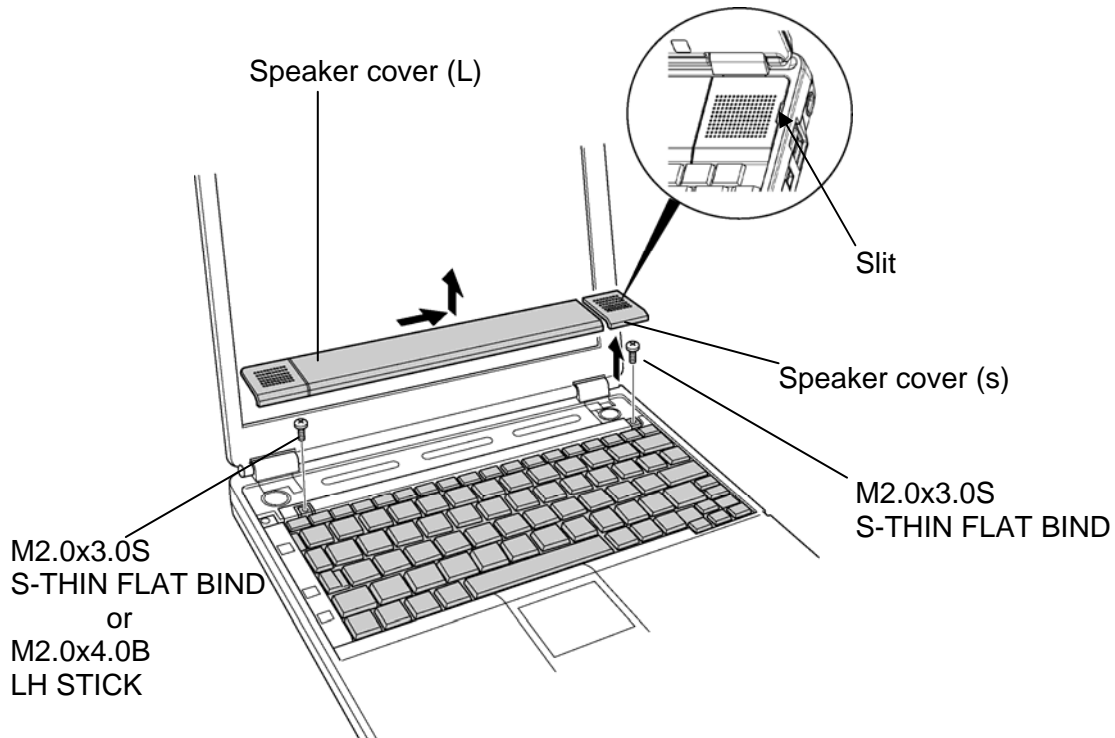


Figure 4-11 Removing the speaker covers

6. Lift the upper side of the **keyboard** and turn it's face down on the palm rest.
7. Peel off the **cover tape** sticking over the slit for keyboard flexible cable.
8. Turning up the **cover sheet**, disconnect the **keyboard flexible cable** from the connector **CN3230** on the system board.
9. Pull out the keyboard flexible cable through the **slit** and remove the **keyboard**.

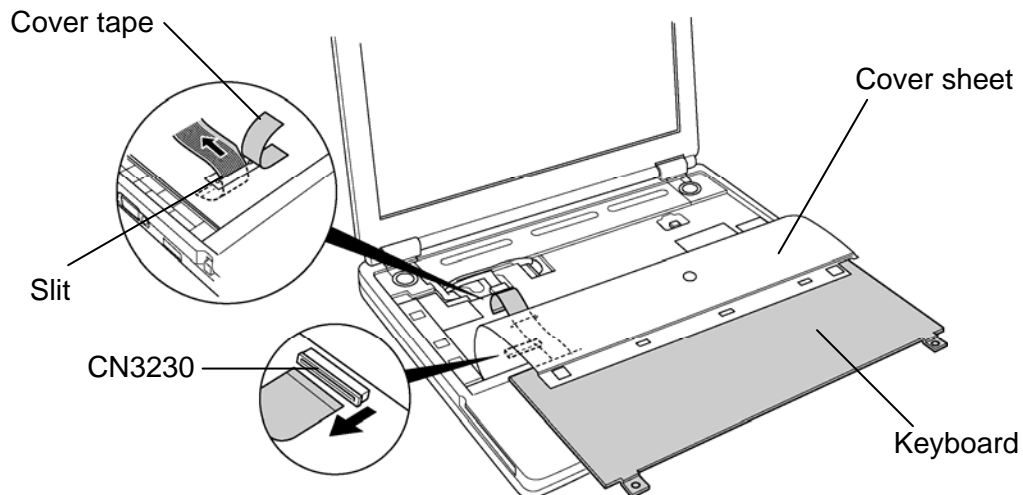


Figure 4-12 Removing the keyboard



## Installing the Keyboard

To install the keyboard, follow the steps below and refer to figures 4-10 to 4-12.

1. Place the keyboard face down on the palm rest and connect the **keyboard flexible cable** to the connector **CN3230** on the system board after passing the cable through the slit of cover sheet.
2. Stick the **cover tape** over the slit of cover sheet.

**CAUTION:** *Cover tape can not be reused. Be sure to use a new cover tape when replacing.*

3. Turn the **keyboard** face up and put it on the computer. Make sure that there is no gap between the keyboard and the computer.
4. Secure the keyboard with the following **screws**.

**CAUTION:** *Be sure to screw the LH STICK in the left side, if the LH STICK is used for the computer, when securing the keyboard.*

□ M2.0×3.0S S-THIN FLAT BIND screw ×2

or

□ M2.0×4.0B LH STICK ×1 (Left side)  
 □ M2.0×3.0S S-THIN FLAT BIND screw ×1 (Right side)

5. Slide and install the **speaker cover (L)** to the computer.

**CAUTION:** *When installing the speaker cover (L), make sure that speaker cable and wireless LAN antenna cables are not come out from the guide. And also, be careful not to catch the cables between cover assembly and speaker cover (L).*

6. Install the **speaker cover (S)** to the computer.
7. Turn the computer upside down and secure the **keyboard** with the following **screw** on the bottom.

□ M2.0×6.0B BIND screw ×1

## 4.7 Switch membrane

### Removing the switch membrane

To remove the switch membrane, follow the steps below and refer to figures 4-13.

1. Remove the following **screw** and remove the **switch cover**.

- M2.0×3.0S S-THIN FLAT BIND screw ×1

2. Disconnect the switch membrane from the connector **CN3270** on the system board.

3. Remove the following **screws** and remove the **switch membrane**.

- M2.0×3.0S S-THIN FLAT BIND screw ×2

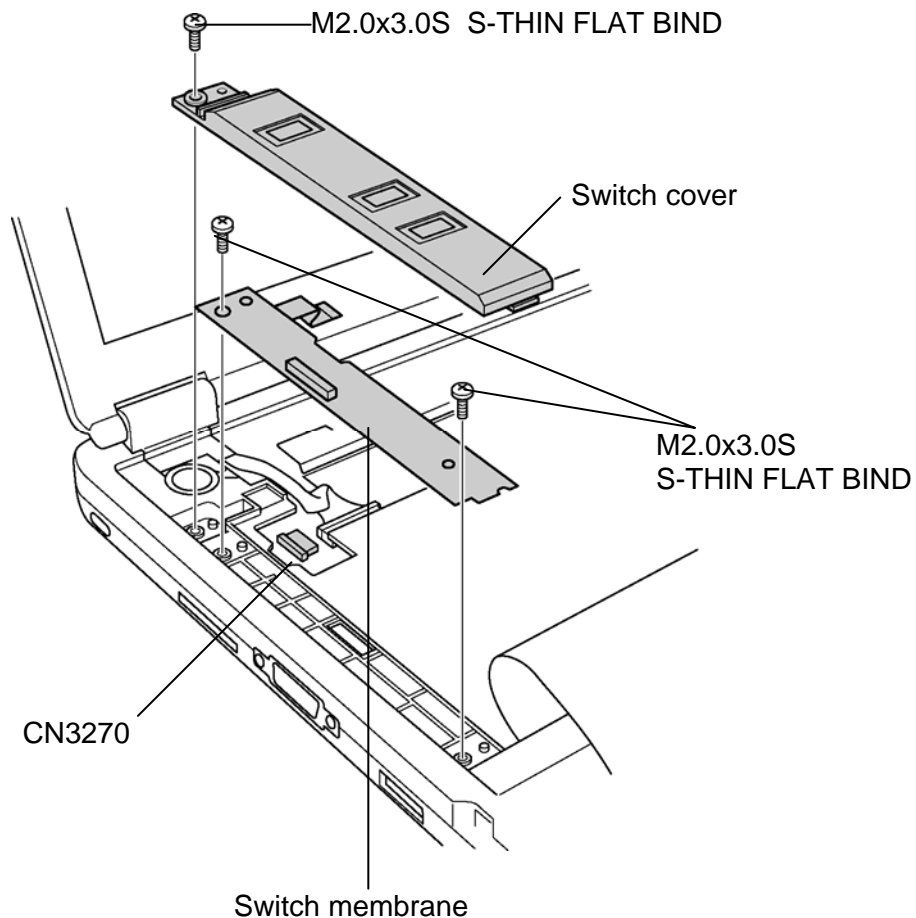


Figure 4-13 Removing the switch membrane

### Installing the switch membrane

To install the switch membrane, follow the steps below and refer to figures 4-13.

1. Slide and set the **switch membrane** along the guide and secure it with the following **screws**.
  - M2.0×3.0S S-THIN FLAT BIND screw ×2
2. Connect the switch membrane to the connector **CN3270** on the system board.

**CAUTION:** *When connecting the switch membrane, be careful not to connect it slantwise and be sure to lock the connector.*

3. Install the **switch cover** and secure it with the following **screw**.

- M2.0×3.0S S-THIN FLAT BIND screw ×1

**CAUTION:** *When installing the switch cover, put the tab of switch membrane into the switch cover.*

## 4.8 Bluetooth

### Removing a Bluetooth

To remove a bluetooth, follow the steps below and refer to figures 4-14.

1. Remove the following **screw** securing a bluetooth module.
  - M2.0×3.0S S-THIN FLAT BIND screw ×1
2. Disconnect the **bluetooth flat cable** from both a bluetooth module and connector **CN4400** on the system board.
3. Disconnect the **bluetooth antenna cable** from a bluetooth module.

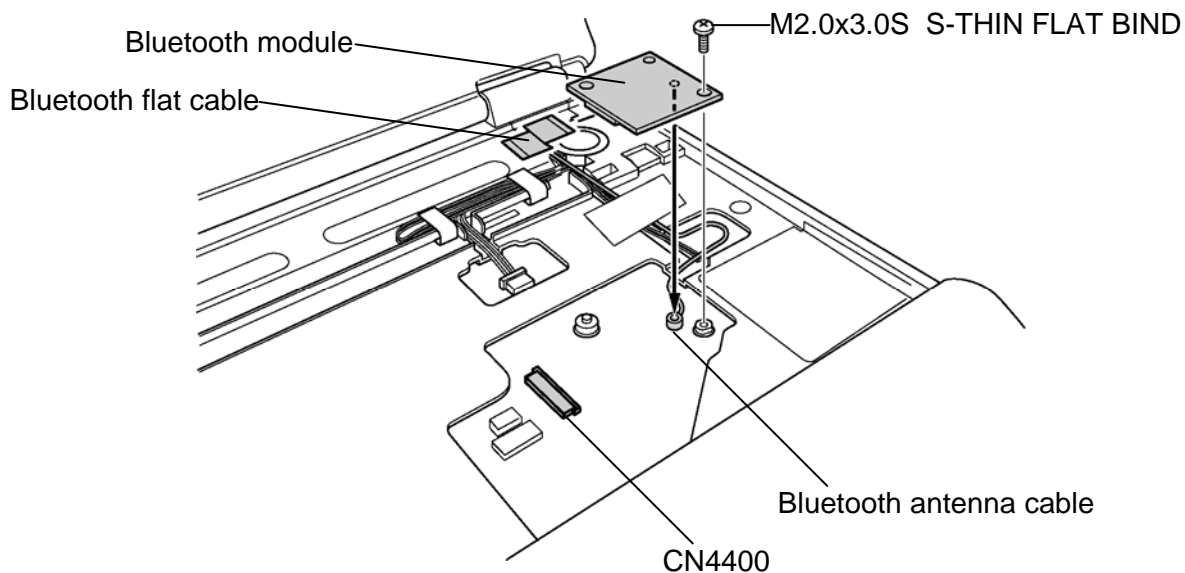


Figure 4-14 Removing a bluetooth module

### Installing a Bluetooth

To install a bluetooth, follow the steps below and refer to figures 4-14.

1. Connect the **bluetooth antenna cable** to the connector on a bluetooth module
2. Connect the **bluetooth flat cable** to both a bluetooth module and the connector **CN4400** on the system board.
3. Install a **bluetooth module** along the guide and secure it with the following **screw**.
  - M2.0×3.0S S-THIN FLAT BIND screw ×1

## 4.9 Optical drive

### Removing an optical drive

To remove an optical drive, follow the steps below and refer to figures 4-15 and 4-16.

1. Turn over the computer and remove the following **screws** securing an optical drive assembly.

- M2.5×10.0B FLAT BIND screw ×1
- M2.0×4.0B BIND screw ×1

2. Push out an **optical drive assembly** by pressing it from the **slot** and remove it.

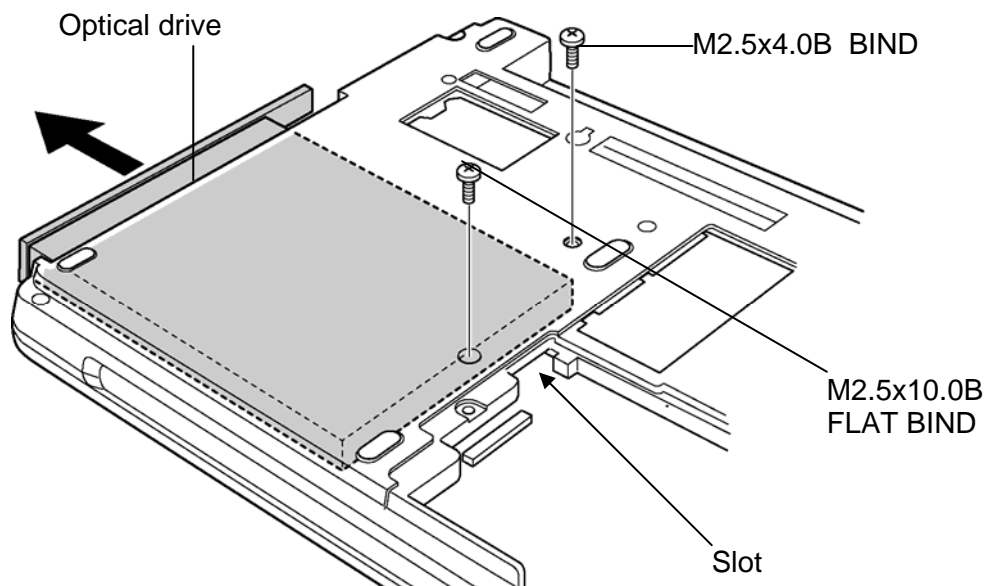


Figure 4-15 Removing an optical drive assembly

3. Remove the following **screws** securing the **rear bracket** and remove it from an optical drive assembly.
  - Unique screw Stepping screw ×2
4. Remove the following **screw** securing the **side bracket** and remove it from an optical drive assembly.
  - M2.0×3.0S S-THIN FLAT BIND screw ×1

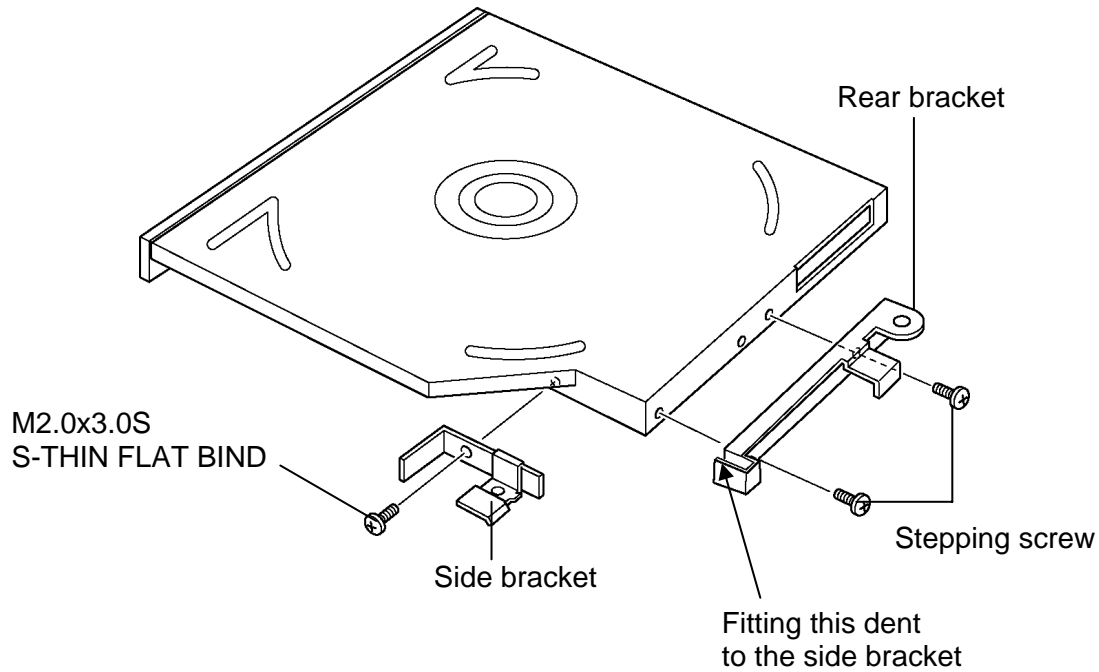


Figure 4-16 Removing the brackets

### Installing an optical drive

To install an optical drive, follow the steps below and refer to figures 4-15 to 4-16.

1. Install the **side bracket** to the optical drive assembly and secure it with the following **screw**.
  - M2.0×3.0S S-THIN FLAT BIND screw ×1
2. Fitting the dent to the side bracket, install the **rear bracket** to an optical drive assembly and secure it with the following **screws**.
  - Unique screw Stepping screw ×2
3. Insert an **optical drive assembly** into the optical drive slot carefully.

**CAUTION:** *When inserting an optical drive, be sure to turn the computer face up. Also, be careful not to insert the drive upside down.*

4. Turn over the computer and secure **an optical drive** with the following **screws**.
  - M2.5×10.0B FLAT BIND screw ×1
  - M2.0×4.0B BIND screw ×1

## 4.10 Display assembly

### Removing the display assembly

To remove the display assembly, follow the steps below and refer to figures 4-17 to 4-21.

1. Close the display and turn the computer face down.
2. Remove the following **screws** on the bottom.
  - M2.0×6.0B BIND screw ×9 (Described "6" in the figure)
  - M2.0×4.0B BIND screw ×1 (Described "4" in the figure)

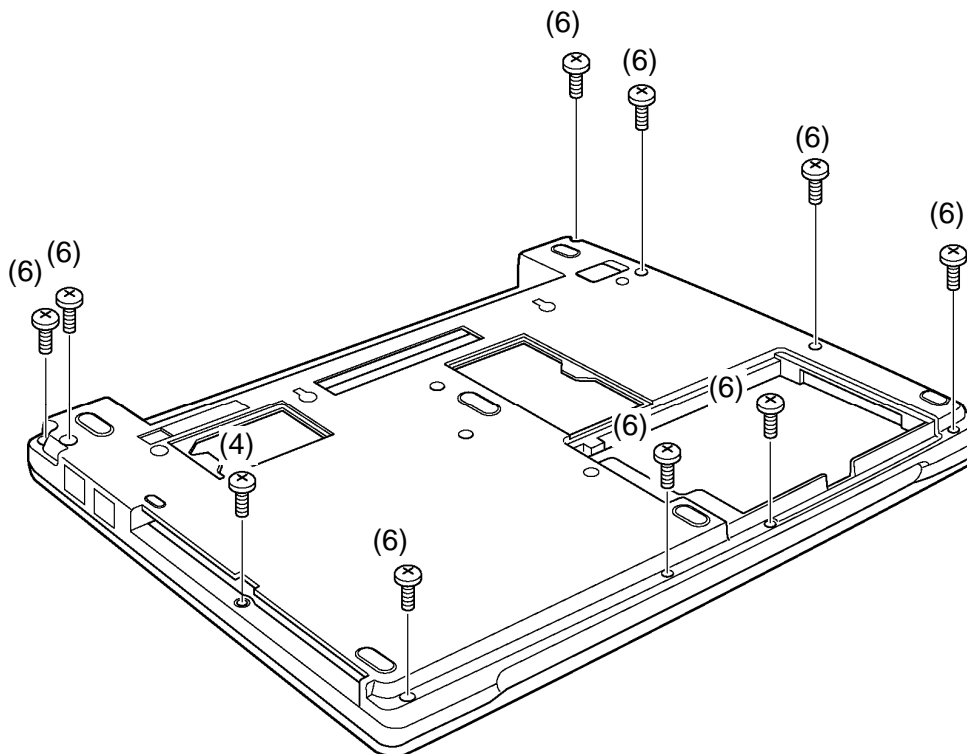


Figure 4-17 Removing the screws (bottom)



3. Open the display and remove the following **screw** securing the **GND cable** and cover assembly.
  - M2.0×6.0B BIND screw ×1
4. Remove the following **screws** securing the cover assembly.
  - M2.0×6.0B BIND screw ×2
5. Disconnect the **LCD harness** from the connector **CN5600** on the system board.
6. Disconnect the **inverter harness** from the connector **CN8812** on the system board.
7. Disconnect the **LAN harness** from the connector **CN4100** on the system board.
8. Disconnect the **speaker cable** from the connector **CN6180** on the system board.
9. Disconnect the **touch pad cable** from the connector **CN3240** on the system board.

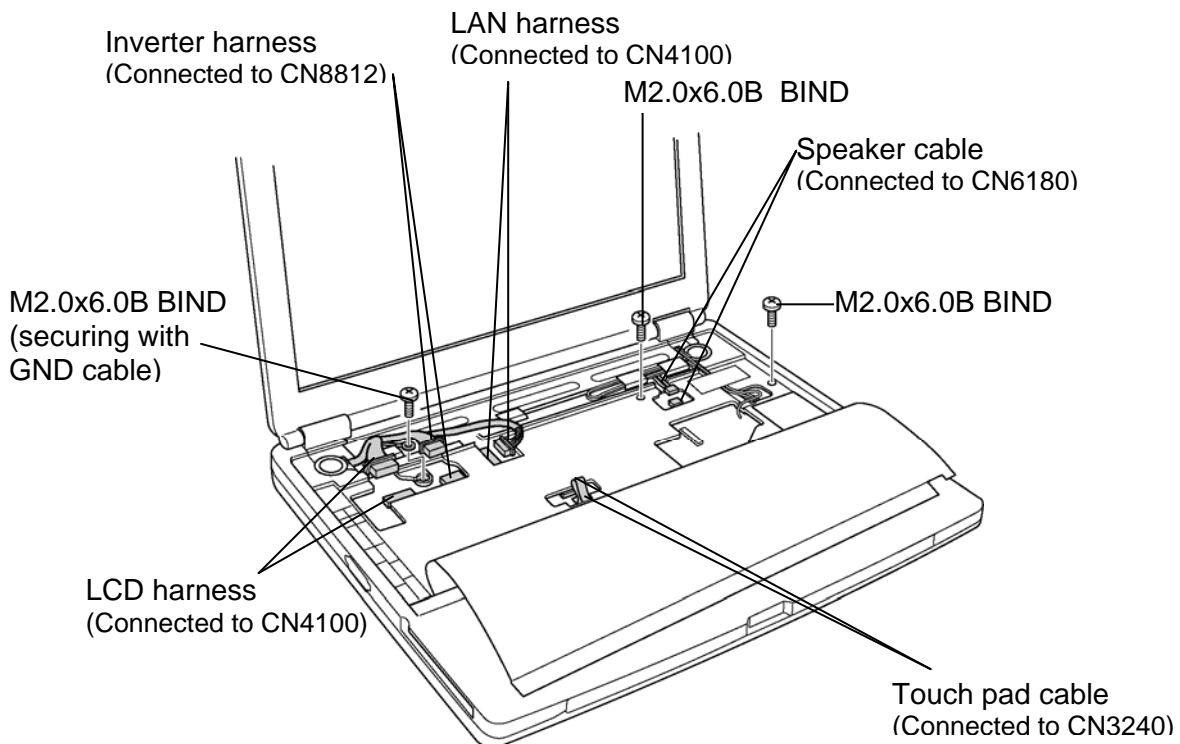


Figure 4-18 Removing the screws and cables

10. Peel off the **glass tape 1** and pull out the **bluetooth antenna cable** from the guide of cover assembly.
11. Turn up the **insulators 1** and pull out the **wireless LAN antenna cables** from the guide of cover assembly.

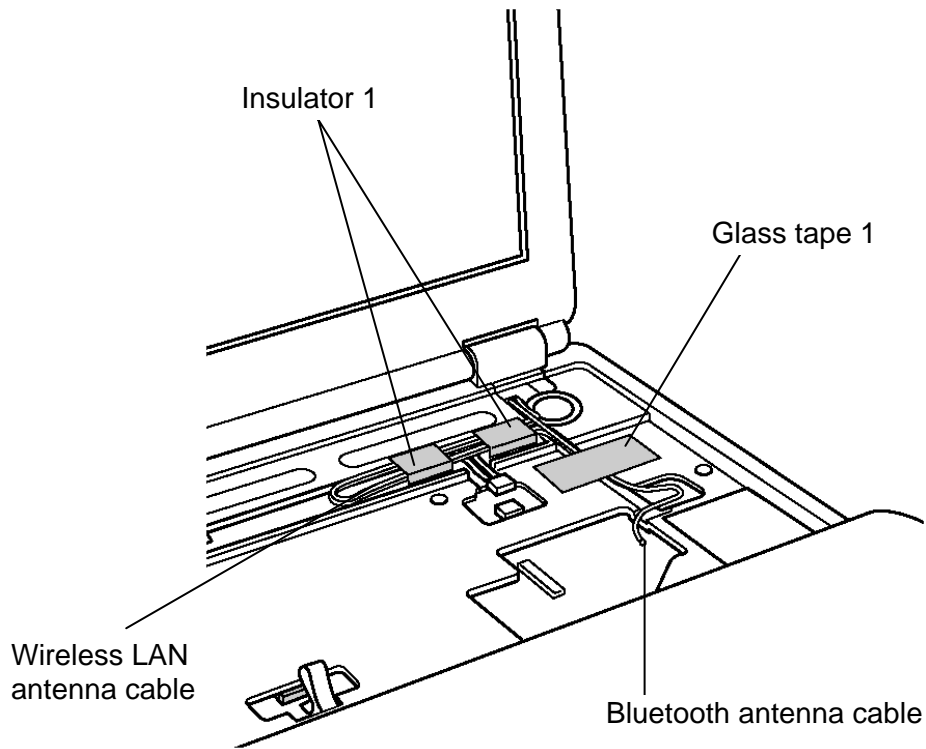


Figure 4-19 Removing the antenna cables

12. Remove the following **screws** securing the hinge caps and remove the **hinge caps**.

- M2.5x8.0B FLAT BIND screw ×2

13. Remove the following **screws** securing the hinges and remove the **hinges**.

- M2.5x8.0B FLAT BIND screw ×2

14. Part the **display assembly** from the base assembly and put it apart with antenna cables connected between both assemblies.

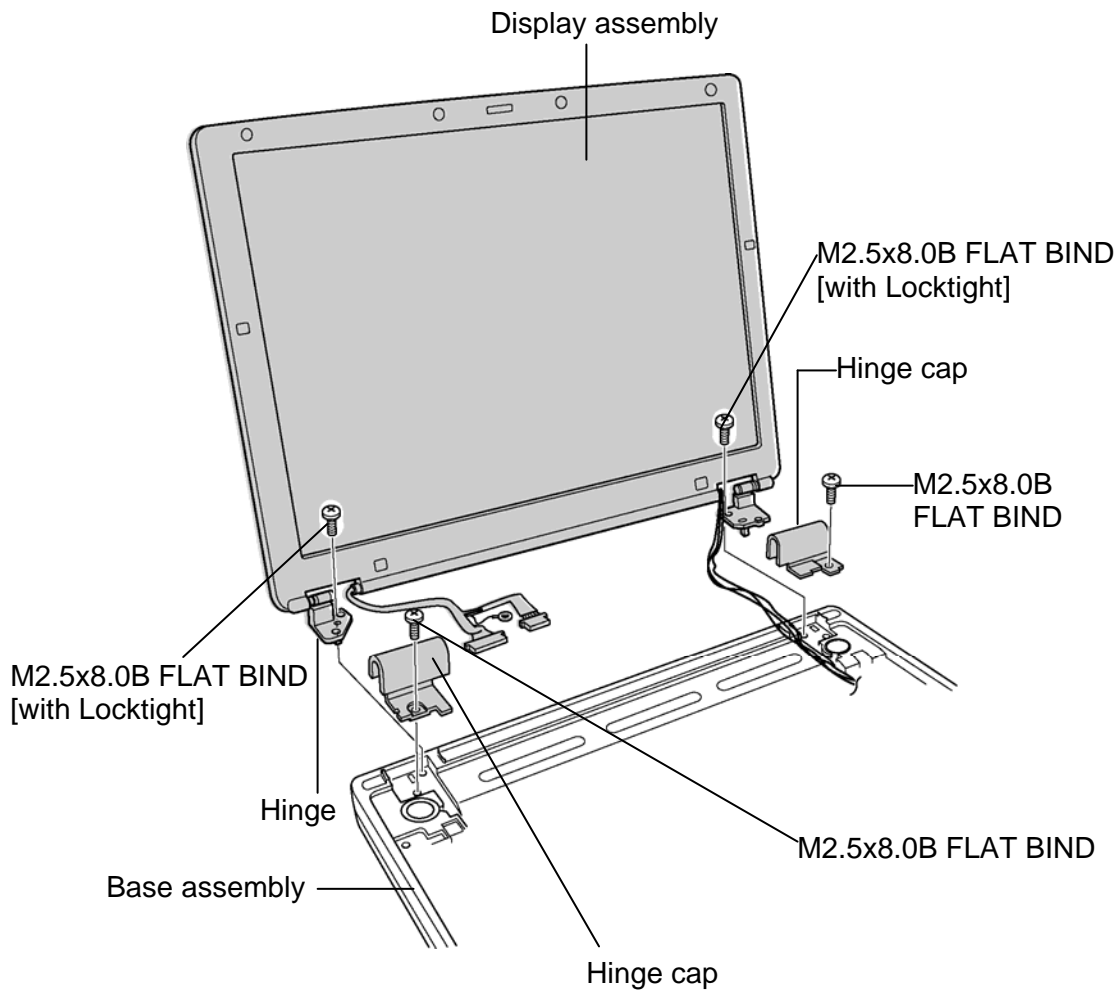


Figure 4-20 Removing the display assembly

15. While lifting up the cover assembly slightly, peel off the **glass tape 2** on the system board.
16. Turn up the **insulator 2** on the system board and disconnect the **wireless LAN antenna cables** from the wireless LAN card.

**CAUTION:** When turning up the insulator 2, be careful not to break the SD card slot cover.

17. Pull out the **wireless LAN antenna cables** from the slot of cover assembly.
18. Pull out the **LAN harness** from the slot of cover assembly.
19. Part the **cover assembly** from the base assembly.

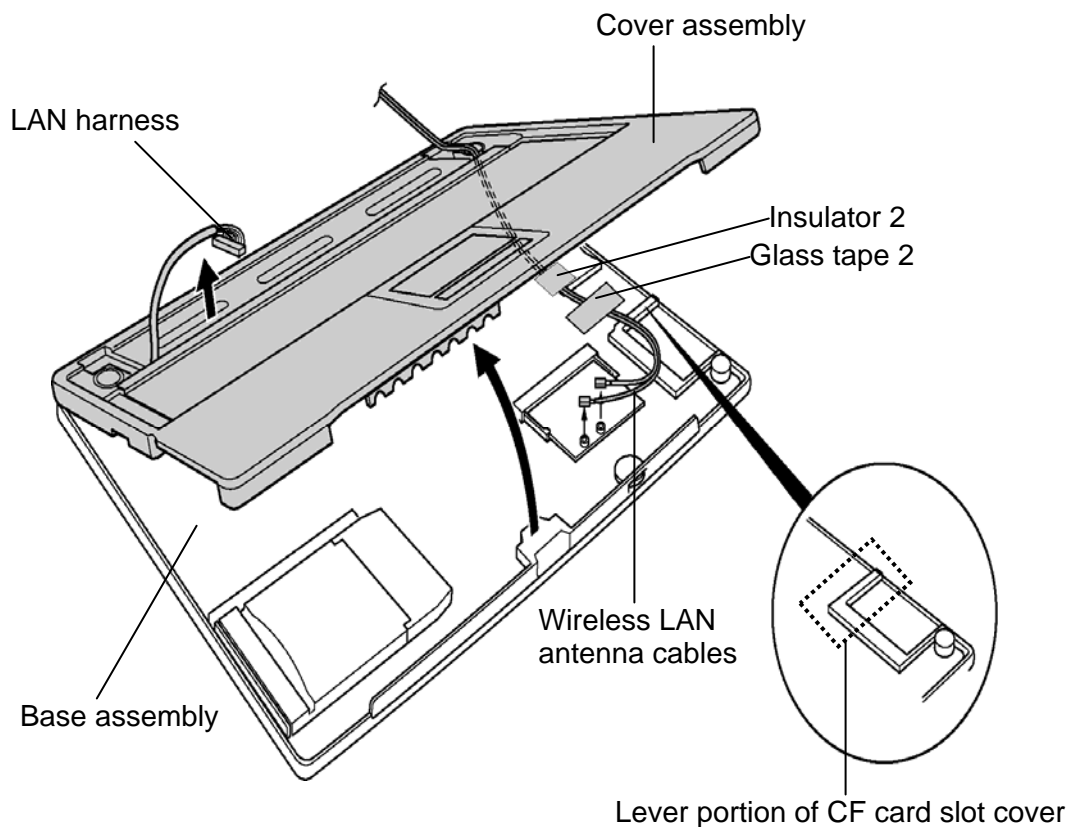


Figure 4-21 Removing the cover assembly

## Installing the display assembly

To install the cover, follow the steps below and refer to figures 4-17 to 4-21.

1. Passing the wireless LAN antenna cables through the slot of cover assembly, connect the **wireless LAN antenna cables** to the connectors on the wireless LAN card.

**CAUTION:** Be sure to connect the wireless LAN antenna cables to the proper connectors on the wireless LAN card (White cable to MAIN and Black cable to AUX).

2. Arrange the wireless LAN antenna cables on the system board and secure them with the **insulator 2**.

**CAUTION:** (1) Arrange the wireless LAN antenna cables away from the lever portion of CF card slot cover. And be sure to check if the cables are not caught in the CF card slot lever.

(2) When sticking the insulator 2, be careful not to break the SD card slot.

3. Secure the wireless LAN antenna cables with the **glass tape 2**.
4. Passing the **LAN harness** through the slot of cover assembly, install the **cover assembly** to the base assembly.
5. Install the **display assembly** to the base assembly and secure the **hinges** with the following screws.

□ M2.5x8.0B FLAT HEAD ×2

**CAUTION:** When installing the display assembly, be sure to apply Locktight-425 or Locktight-7400 to the screws securing the hinges.

6. Install the **hinge caps** and secure them with the following screws.

□ M2.5x8.0B FLAT HEAD ×2

7. Connect the **LAN harness** to the connector **CN4100** on the system board.
8. Connect the **LCD harness** to the connector **CN5600** on the system board.

**CAUTION:** When connecting the LAN harness, be careful not to arrange the harness under the insulator.

9. Connect the **inverter harness** to the connector **CN8812** on the system board.
10. Connect the **speaker cables** to the connector **CN6180** on the system board.

11. Connect the **touch pad cable** to the connector **CN3240** on the system board.
12. Arrange the wireless LAN antenna cables along the guide of base assembly and secure them with **insulators 1**.

**CAUTION:** *When arranging the wireless LAN antenna cables, make sure wireless LAN antenna cables are not come out from the guide.*

13. Arrange the **bluetooth antenna cable** along the guide of base assembly and secure all antenna cables with **glass tape 1**.

**CAUTION:** *When arranging the bluetooth antenna cable, make sure bluetooth antenna cable is not come out from the guide.*

14. Secure the cover assembly and **GND cable** with the following **screw**.

- M2.0x6.0B BIND screw ×1

**NOTE:** *Be sure to secure the GND cable with the caulked side upward.*

15. Secure the **cover assembly** with the following **screws**.

- M2.0x6.0B BIND screw ×2

16. Turn the computer face down and secure the cover assembly with the following **screws** from the bottom.

- M2.0×6.0B BIND screw ×9 (Described "6" in the figure)
- M2.0×4.0B BIND screw ×1 (Described "4" in the figure)

## 4.11 Speaker

### Removing the speaker

To remove the speaker, follow the steps below and refer to figures 4-22.

1. Pull out the **speaker** from the slot of cover assembly.
2. Peeling off the **insulators**, pull out the speaker cables from the guide of cover assembly.

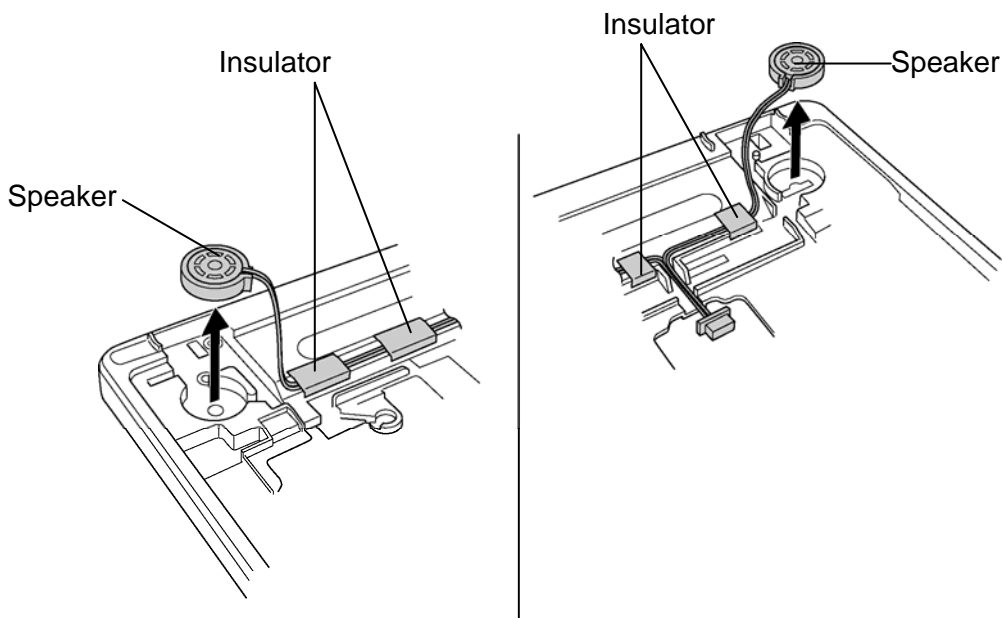


Figure 4-22 Removing the speaker

### Installing the speaker

To install the speaker, follow the steps below and refer to figures 4-22.

1. Install the **speaker** to the slot of cover assembly.
2. Arrange the speaker cable along the guide and secure them with **insulators**.

## 4.12 Touch Pad

### Removing the Touch Pad

To remove the touch pad, follow the steps below and refer to figures 4-23 and 4-24.

1. Peel off the **adhered portion** of cover sheet and remove the **cover sheet** from the cover assembly.

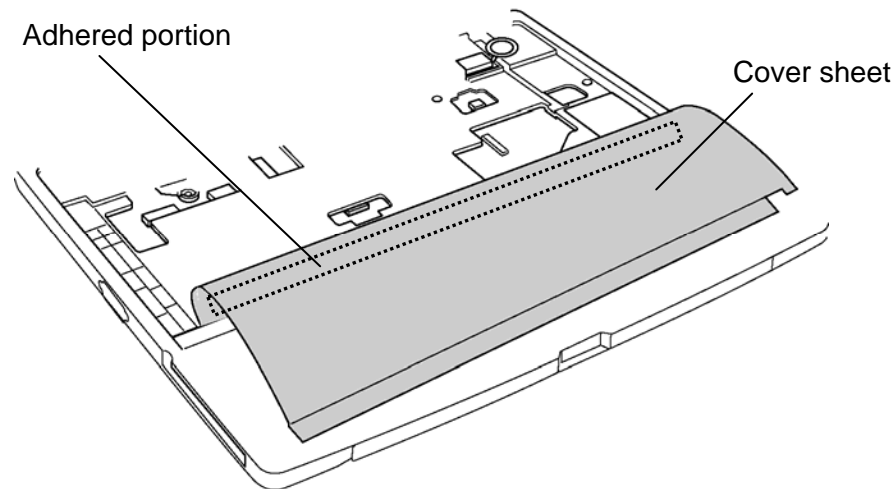


Figure 4-23 Peeling off the cover sheet

2. Remove the **pad cover** while releasing the latches.
3. Remove the following **screws** securing the touch pad.
  - M2.0x3.0S S-THIN FLAT BIND screw ×2
4. Remove the **touch pad** while peeling off the adhered portion from cover assembly.



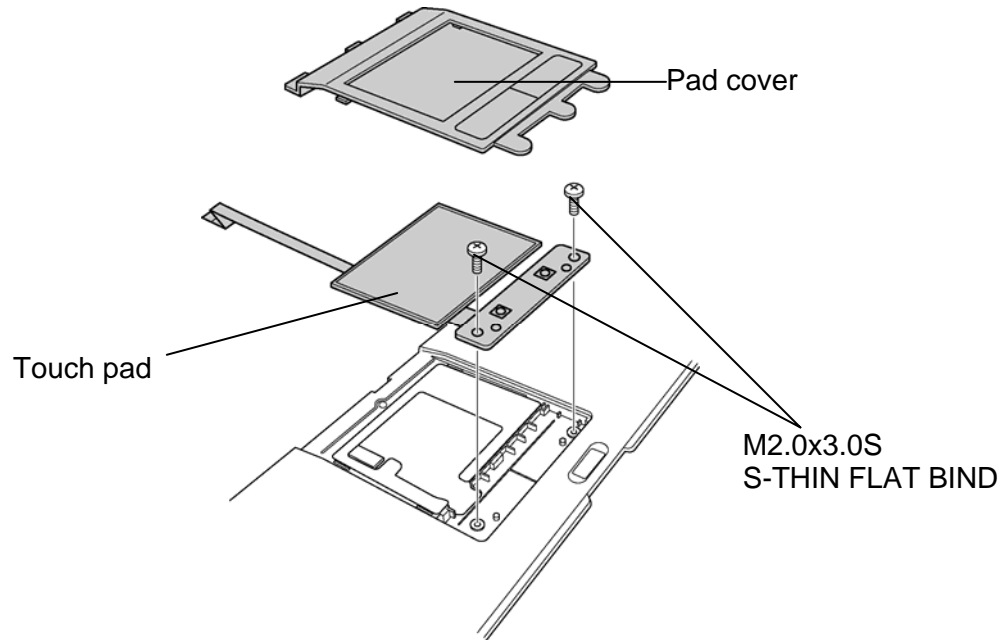


Figure 4-24 Removing the touch pad

### Installing the Touch Pad

To install the touch pad, follow the steps below and refer to figures 4-23 and 4-24.

1. Arranging the touch pad cable, stick the **touch pad** in place and secure it with following screws.
  - M2.0x3.0S S-THIN FLAT BIND screw ×2
2. Install the **pad cover** while locking latches.
3. Stick the **cover sheet** along the guide of cover assembly.

**CAUTION:** Do not reuse the cover sheet. Be sure to use a new cover sheet after peeling off the cover sheet from the cover assembly.

## 4.13 Wireless LAN card

### Removing the wireless LAN card

To remove the wireless LAN card, follow the steps below and refer to figure 4-25.

1. Open the left and right latches and remove the **wireless LAN card** from the connector **CN2200** on the system board.

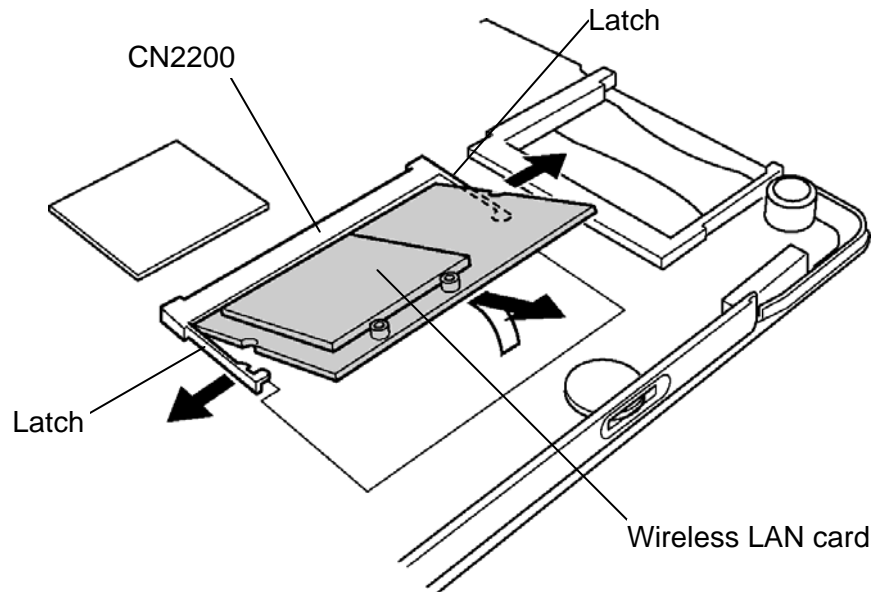


Figure 4-25 Removing the wireless LAN card

### Installing the wireless LAN card

To install the wireless LAN card, follow the steps below and refer to figure 4-25.

1. Insert the **wireless LAN card** into the connector **CN2200** of the system board slantwise and press it to connect firmly.

## 4.14 RTC battery

### Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to figure 4-26.

1. Pull out the **RTC battery** from the **slot** of base assembly.
2. Disconnect the RTC battery cable from the connector **CN8760** on the system board.
3. Pull out the **spacer** from the slot.

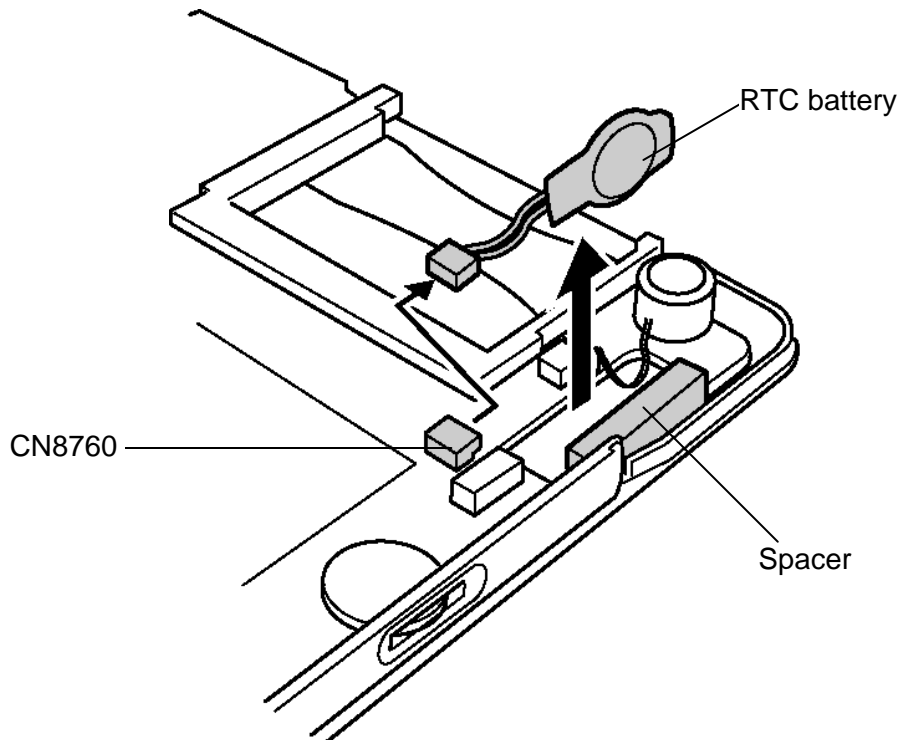


Figure 4-26 Removing the RTC battery

### Installing the RTC battery

To install the RTC battery, follow the steps below and refer to figure 4-26.

1. Connect the RTC battery cable to the connector **CN8760** on the system board.
2. Insert the **RTC battery** into the **slot** of base assembly.
3. Set the **spacer** into the slot.

## 4.15 LAN jack

### Removing the LAN jack

To remove the LAN jack, follow the steps below and refer to figure 4-27.

1. Open the **insulator** covering the **core** portion of LAN harness.
2. Lift the **LAN jack** straight up and remove it from the base assembly.

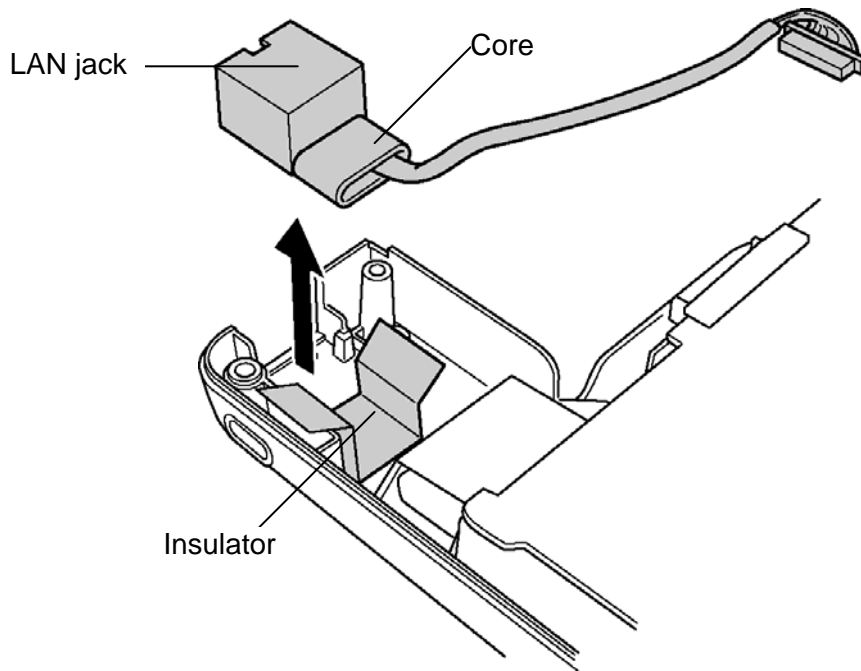


Figure 4-27 Removing the LAN jack

### Installing the LAN jack

To install the LAN jack, follow the steps below and refer to figure 4-27.

1. Install the **LAN jack** to the slot of base assembly.
2. Cover the **core** portion of LAN harness with **insulator**.

## 4.16 System board

**CAUTION:** 1. When handling the system board, hold the edges.

2. When replacing with a new system board, be sure to follow the procedures below.

(1) Execute the substest03 DMI information save of 3.3 Setting of the hardware configuration in Chapter 3.

(2) Copy the DMI data to a new system board by executing substest04 DMI information recovery and substest08 System configuration display.

### Removing the system board

To remove the system board, follow the steps below and refer to figure 4-28.

1. While pulling out the **DC-IN jack** and **modem jack** from the base assembly, lift up the **system board** and remove it toward the arrow direction.

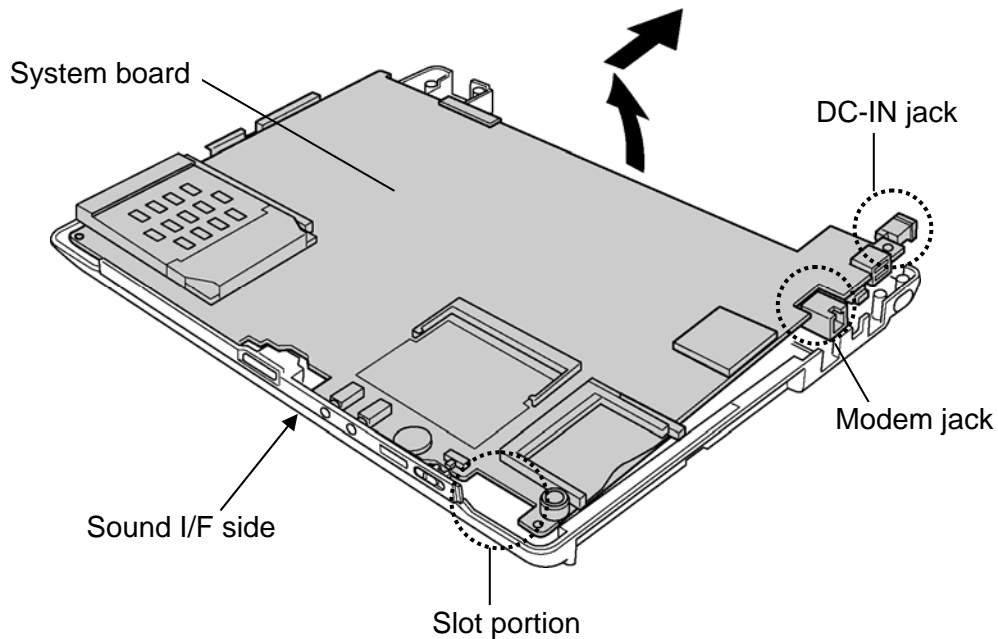


Figure 4-28 Removing the system board

### Installing the system board

To install the system board, follow the steps below and refer to figure 4-28.

1. While fitting the **DC-IN jack** and **modem jack** into the slot of base assembly, install the **system board** from the **sound I/F side**.

***NOTE:** After installing the system board to the base assembly, put the microphone cable into the slot.*

## 4.17 Microphone

### Removing the microphone

To remove the microphone, follow the steps below and refer to figure 4-29.

1. Disconnect the microphone cable from the connector **CN6050** on the system board.
2. Remove the **microphone** from the system board.

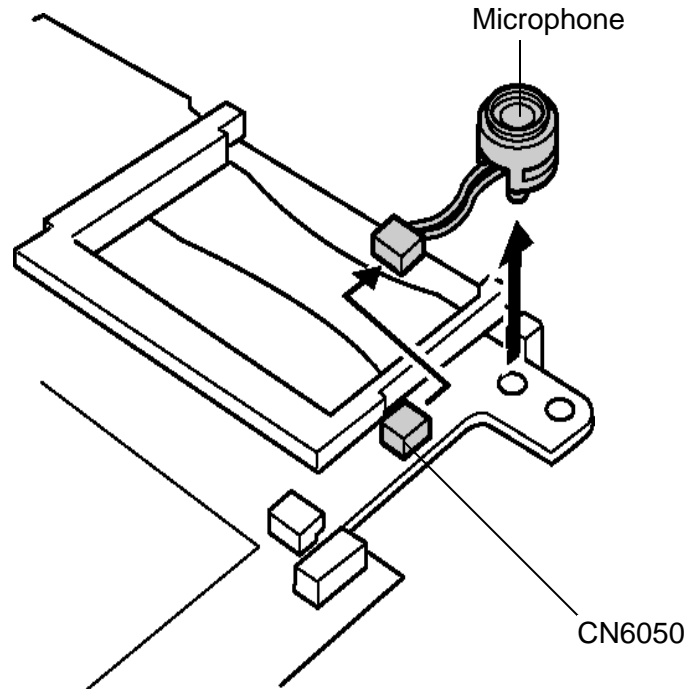


Figure 4-29 Removing the microphone

### Installing the microphone

To install the microphone, follow the steps below and refer to figure 4-29.

1. Insert the edge of the **microphone** into the hole of system board.
2. Pull the edge of microphone from the back of the system board and secure it to the system board.
3. Connect the microphone cable to the connector **CN6050** on the system board.

## 4.18 Fan

### Removing the fan

To remove the fan, follow the steps below and refer to figure 4-30.

1. Disconnect the **fan cable** from the connector **CN8770** on the system board.
2. Remove the following **screws** and remove the **fan**.

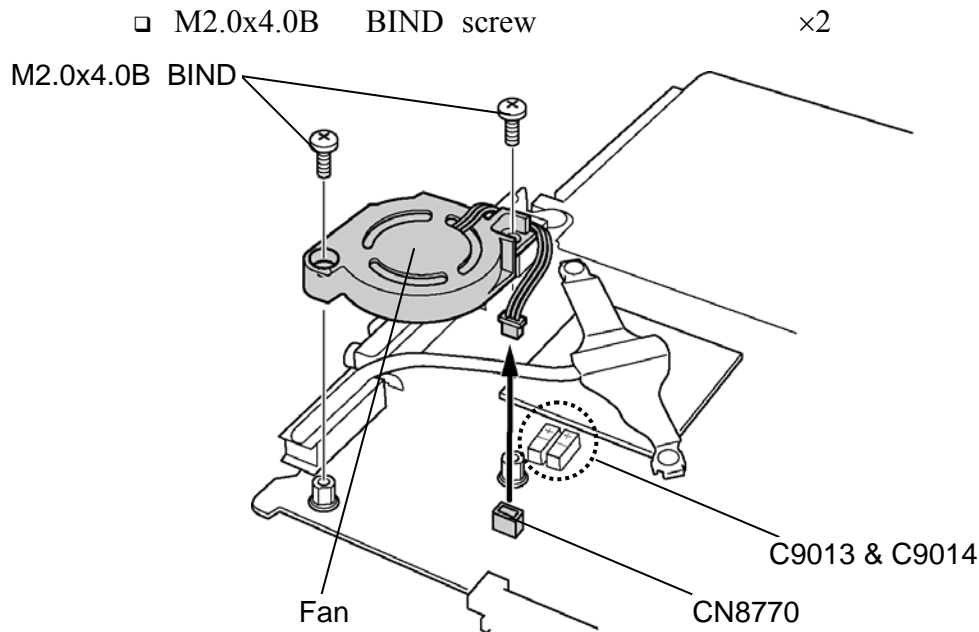


Figure 4-30 Removing the fan

### Installing the fan

To install the fan, follow the steps below and refer to figure 4-30.

1. Install the **fan** and secure it with the following **screws**.
  - M2.0x4.0B BIND screw ×2
2. Connect the **fan cable** to the connector **CN8770** on the system board.

**CAUTION:** Arrange the fan cable away from C9013 and C9014 on the system board.



## 4.19 Cooling fin

### Removing the cooling fin

To remove the cooling fin, follow the steps below and refer to figures 4-31.

1. Remove the following **screws** and **cooling fin** from the system board.

- M2.0x3.0S S-THIN FLAT BIND screw ×2

**NOTE:** When removing the cooling fin, be sure to remove the screws in the reverse order of the number marked on the cooling fin (2→1).

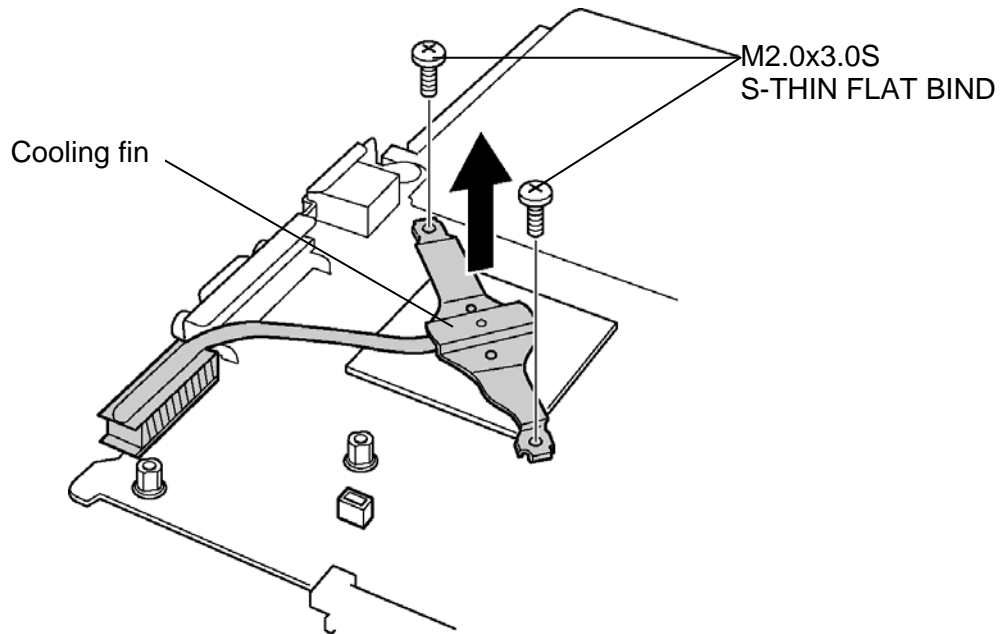


Figure 4-31 Removing the cooling fin

### Installing the cooling fin

To install the cooling fin, follow the steps below and refer to figures 4-31 and 4-32.

1. If there is already silicon grease on the CPU and cooling fin, clean them with a cloth.
2. Using a special applicator, apply **silicon grease** so that the CPU chip on the CPU is completely covered.

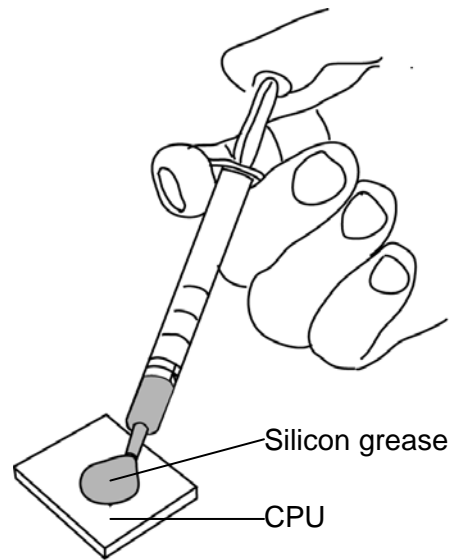


Figure 4-32 Applying silicon grease

3. Install the **cooling fin** and secure it with the following **screws**.
  - M2.0x3.0S S-THIN FLAT BIND screw ×2

**NOTE:** When installing the cooling fin, be sure to install the screws in the order of the number marked on the cooling fin (1→2).

## 4.20 HDD FPC

### Removing the HDD FPC

To remove the HDD FPC, follow the steps below and refer to figures 4-33.

1. Raise the **slider** of connector **CN1800** by lifting it up toward the arrow direction.
2. Remove the **HDD FPC** from the system board.

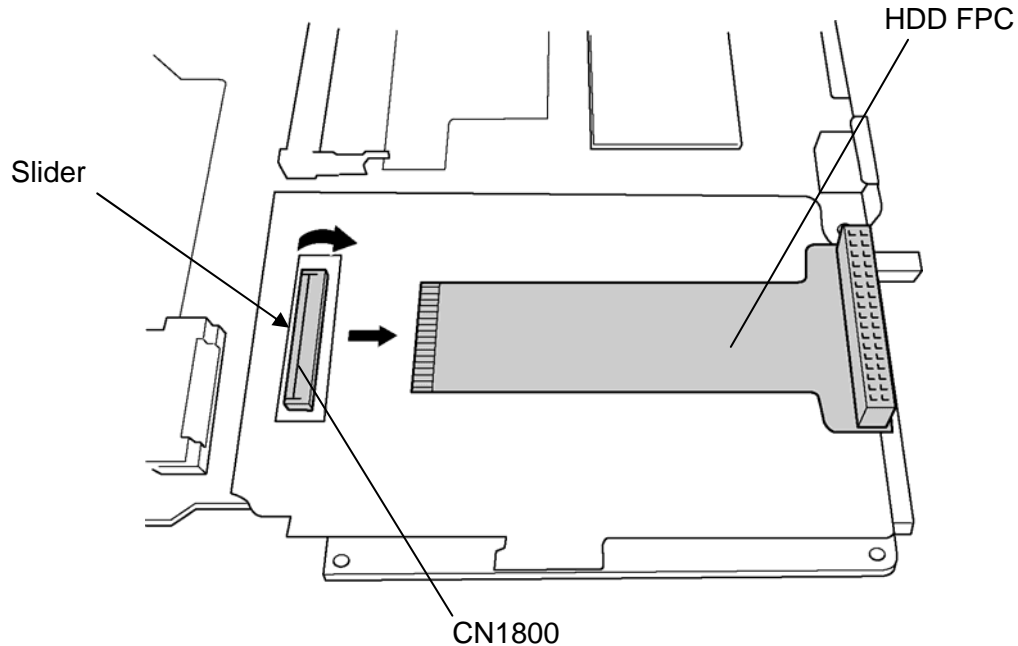


Figure 4-33 Removing the HDD FPC

### Installing the HDD FPC

To install the HDD FPC, follow the steps below and refer to figures 4-33.

1. Connect the **HDD FPC** to the connector **CN1800** on the system board.
2. Push down the **slider** of connector and secure the lock.

**CAUTION:** To lock the connector by slider, follow the procedures below.

- (1). Push down the slider of connector from the top by pressing whole top surface.
- (2). Secure the lock by pushing down the slider completely.

## 4.21 Modem

### Removing the modem

To remove the modem, follow the steps below and refer to figures 4-34 and 4-35.

1. Remove the following **screws** securing the MDC.
  - M2.0x4.0Z BIND screw ×2
2. Disconnect the **MDC** from the connector **CN3000** on the system board by lifting it straight up.
3. Disconnect the **modem cable** from the connector of the MDC.

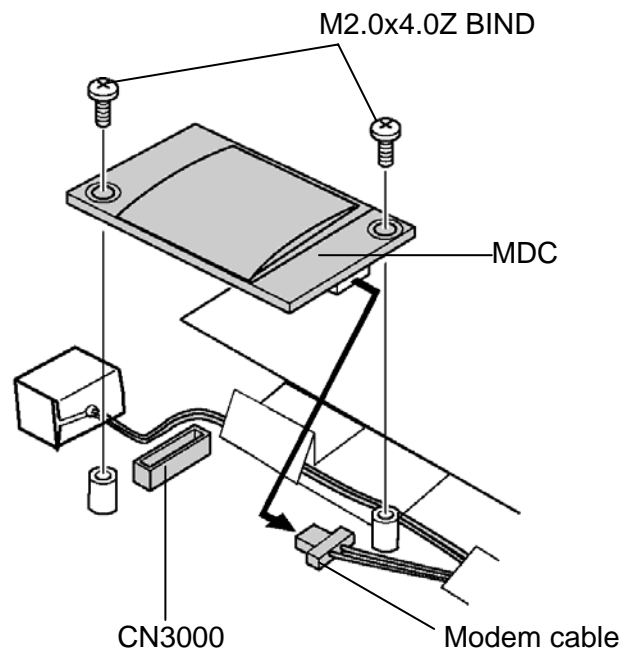


Figure 4-34 Removing the MDC

4. Disconnect the modem cable from the connector **CN3001** on the system board.
5. Turning up the **insulators 1** covering the modem cable, pull out the modem cable.
6. Opening the **insulator 2** covering the **core** of modem cable, pull out the modem cable from the slit of insulator and remove it from the system board.

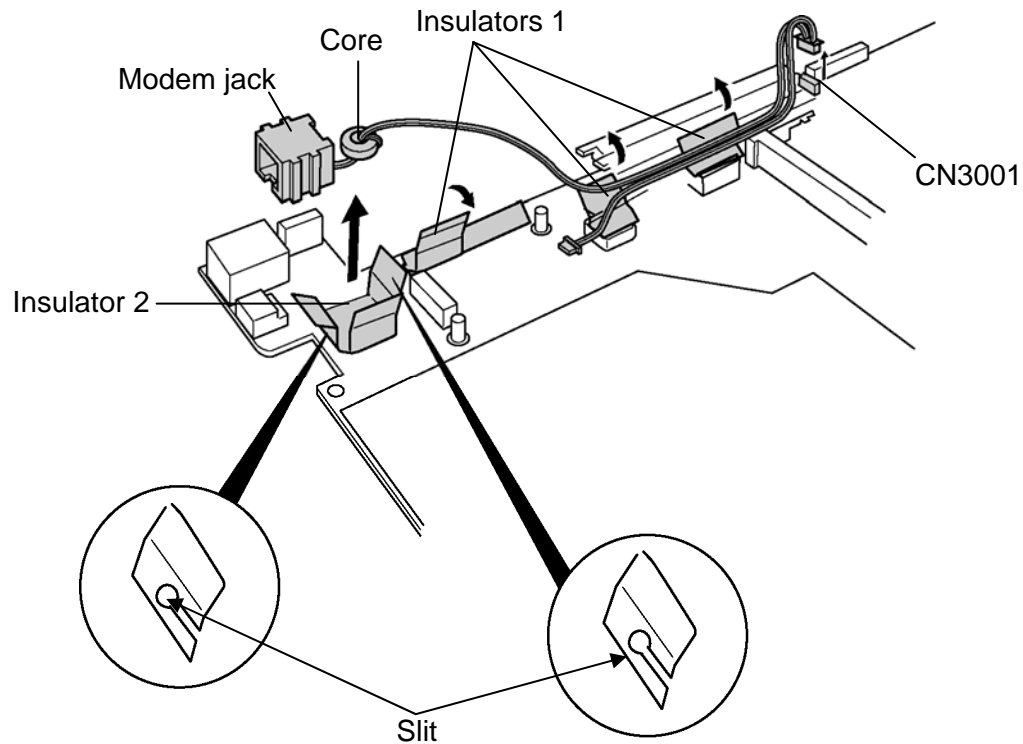


Figure 4-35 Removing the modem jack

### Installing the modem jack

To install the modem jack, follow the steps below and refer to figures 4-34 and 4-35.

1. Set the **modem jack** to the system board and cover the **core** of modem cable with **insulator 2**.
2. Passing the modem cable through the slits, arrange the modem cable and connect it to the connector **CN3001** on the system board.
3. Secure the modem cable with the **insulator 1**.
4. Connect the **modem cable** to the connector of the MDC.
5. Connect the **MDC** straight down to the connector **CN3000** on the system board.
6. Secure the MDC with the following screws.

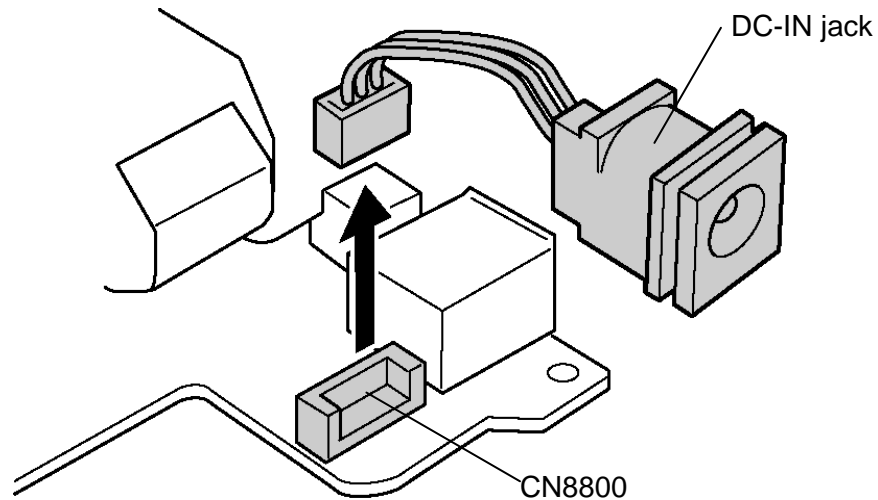
□ M2.0x4.0Z      BIND screw      ×2

## 4.22 DC-IN jack

### Removing the DC-IN jack

To remove the DC-IN jack, follow the steps below and refer to figure 4-36.

1. Disconnect the **DC-IN harness** from the connector **CN8800** on the system board and remove it.



*Figure 4-36 Removing the DC-IN jack*

### Installing the DC-IN jack

To install the DC-IN jack, follow the steps below and refer to figure 4-36.

1. Connect the **DC-IN harness** to the connector **CN8800** on the system board.

## 4.23 PC card slot cover

### Removing the PC card slot cover

To remove the PC card slot cover, follow the steps below and refer to figure 4-37.

1. Turning up the **insulator**, remove the following **screws** securing the PC card slot cover.
  - M2.0x4.0B FLAT BIND screw ×4
2. Release the **hook** and remove the **PC card slot cover** from the system board.

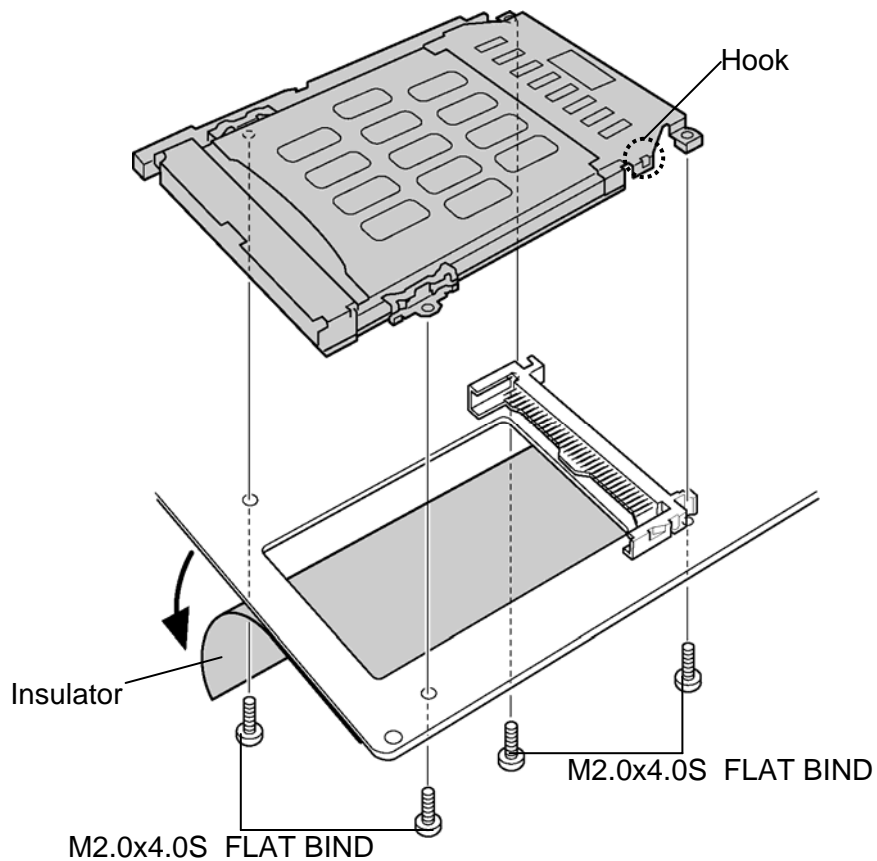


Figure 4-37 Removing the PC card slot cover

**Installing the PC card slot cover**

To install the PC card slot cover, follow the steps below and refer to figures 4-37.

1. While locking the **hook** of PC card slot cover, install the **PC card slot cover**.
2. Secure the PC card slot cover with following **screws**.
  - M2.0x4.0B FLAT BIND screw ×4
3. Stick the **insulator** on the system board.



## 4.24 Display latch

### Removing the display latch

To remove the display latch, follow the steps below and refer to figures 4-38 and 4-39.

1. Remove the following **screws** and remove the **LED panel**.

□ M2.0x4.0B BIND screw ×4

2. Part the **display latch assembly** from the LED panel.

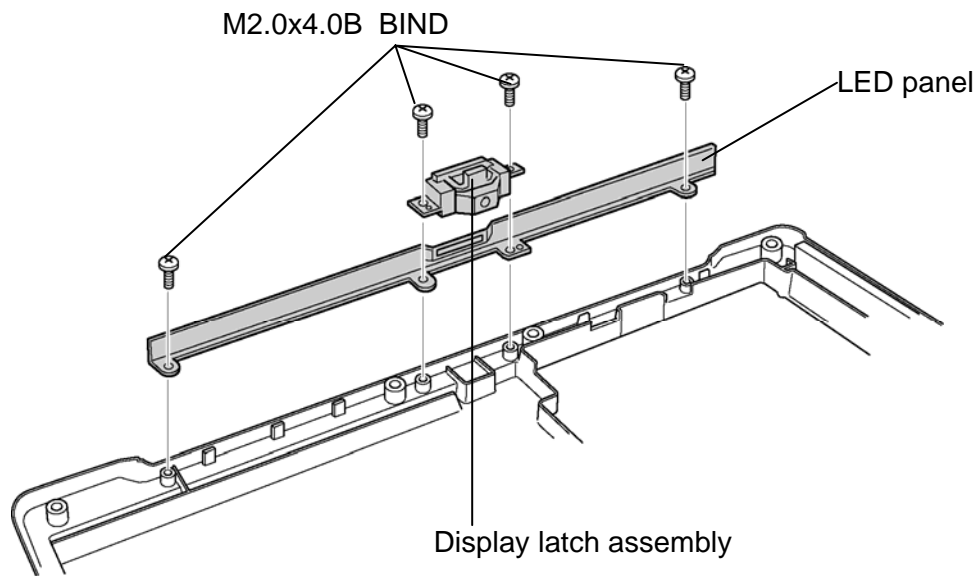


Figure 4-38 Removing the LED panel

3. Release the **tabs** and disassemble the display latch assembly.

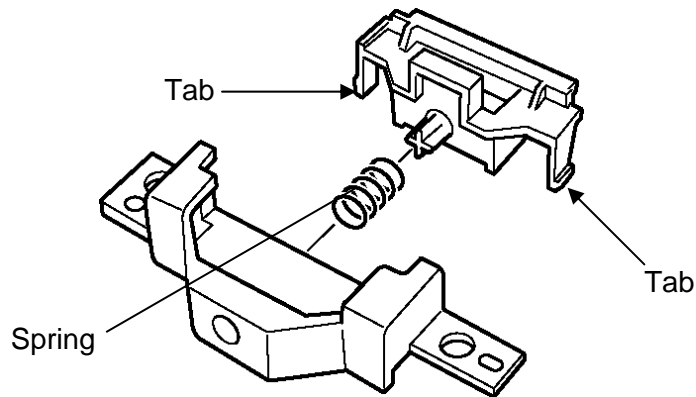


Figure 4-39 Disassembling the display latch assembly

**Installing the display latch**

To install the display latch, follow the steps below and refer to figures 4-38 and 4-39.

1. Set the **spring** to the display latch assembly.
2. Lock the **tabs** and assemble the display latch assembly.
3. Installing the **display latch assembly** and **LED panel** to the base assembly, secure them with the following **screws**.

□ M2.0x4.0B BIND screw ×4

## 4.25 Battery lock/Battery latch

### Removing the battery lock/battery latch

To remove the battery lock/battery latch, follow the steps below and refer to figures 4-40.

1. Release the **tabs** and disassemble the **battery lock**.
2. Pull out the **spring** from the battery lock.
3. After turning up the **insulator**, disassemble the **battery latch** while releasing **tab**.
4. Pull out the **spring** from the battery latch.

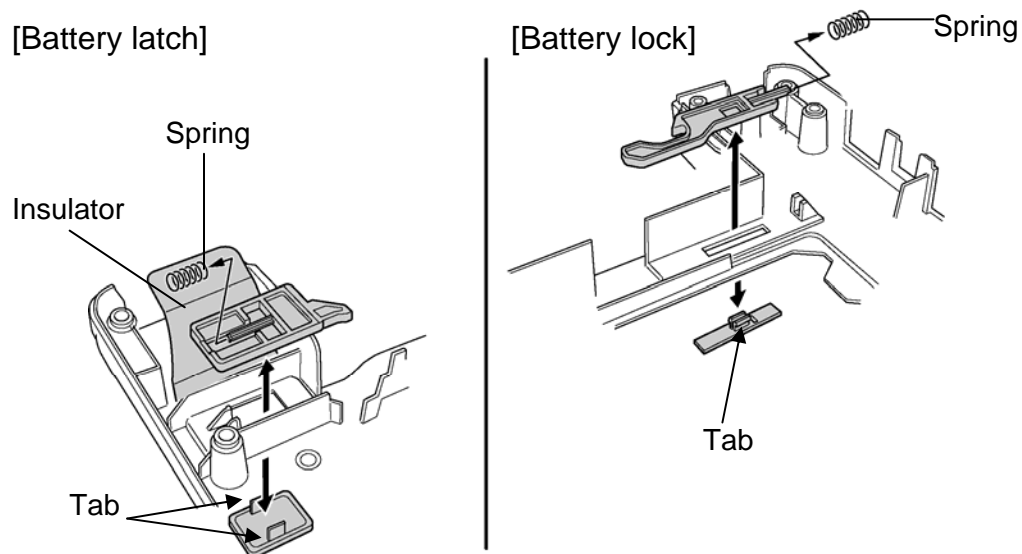


Figure 4-40 Removing the battery lock/battery latch

### Installing the battery lock/battery latch

To install the battery lock/battery latch, follow the steps below and refer to figures 4-40.

1. Set the **spring** to the battery latch.
2. Lock the **tabs** to the battery latch and assemble the **battery latch**.
3. Set the **spring** to the battery lock.
4. Lock the **tab** to the battery lock and assemble the **battery lock**.
5. Cover the battery lock with the **insulator**.

## 4.26 LCD mask

**CAUTION:** There is no bezel on the LCD. Be careful not to give mechanical stress to the LCD in the work.

Never scratch the surface of the LCD.

### Removing the LCD mask

To remove the LCD mask, follow the steps below and refer to figures 4-41.

1. Remove three **mask rubbers** and the following **screws**.
  - M2.0x4.0S S-THIN FLAT BIND screw ×2
2. Remove four **mask seals** and the following **screws**.
  - M2.0x4.0S S-THIN FLAT BIND screw ×2
3. Release the latches on the LCD mask and remove the **LCD mask** while inserting your fingers between the LCD mask and LCD unit.

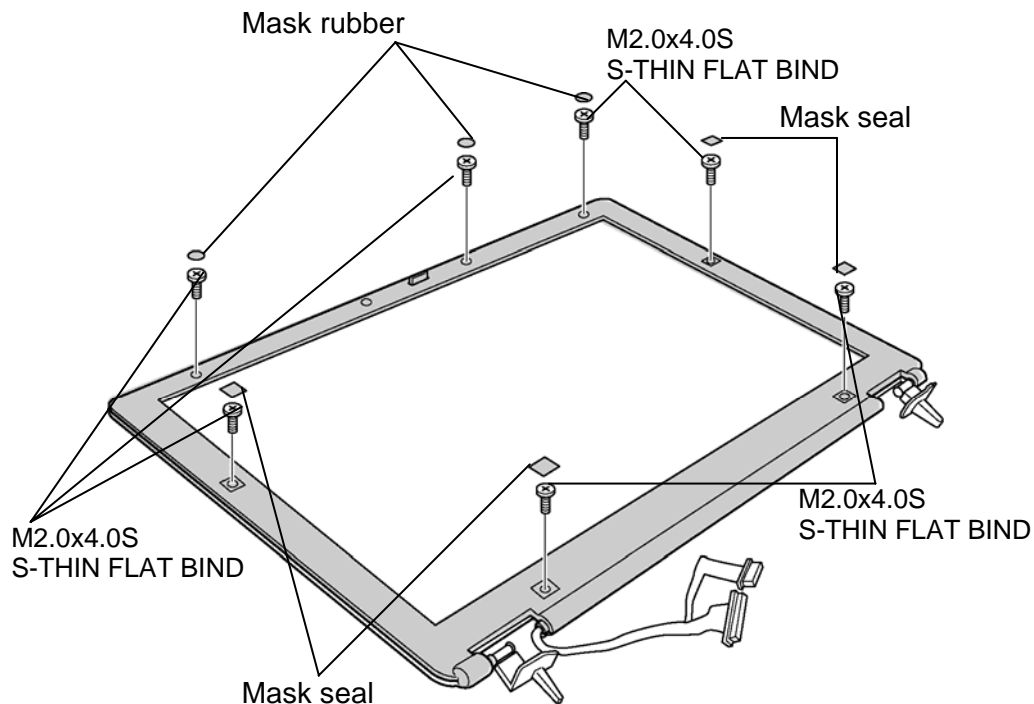


Figure 4-41 Removing the LCD mask

### Installing the LCD mask

To install the LCD mask, follow the steps below and refer to figures 4-41.

1. Install the **LCD mask** while fitting the latches.

**NOTE:** *Be careful not to catch the LCD harness, wireless LAN antenna cables and bluetooth antenna cable between LCD mask and display cover.*

*When installing the LCD mask, make sure there is no gap between the LCD mask and display cover.*

2. Secure the LCD mask with the following **screws**.
  - M2.0x4.0S S-THIN FLAT BIND screw ×4
3. Stick three **mask rubbers** to the LCD mask.
4. Stick four **mask seals** to the LCD mask.

## 4.27 LCD unit/ FL inverter

### Removing the LCD unit /FL Inverter

To remove the LCD unit/FL inverter, follow the steps below and refer to figures 4-42 and 4-43.

1. Turning up the **insulator** in order (1→2), gently remove the **FL inverter** upward while peeling off the double-sided tape on the bottom.
2. Remove the following **screw** and **GND cable** from the display assembly.
  - M2.0x4.0B FLAT BIND screw ×1
3. Lift up the **LCD unit** carefully.
4. Peel off the **copper tape** at the connector on the back of LCD unit and disconnect the **LCD harness** from the LCD unit.
5. Remove the **LDC unit** from the LCD cover.
6. Remove the **FL inverter** from the LCD cover while peeling off the double-sided tape.

**CAUTION:** *The removed FL inverter is not reusable. Therefore when installing the FL inverter, it must be a new one.*

7. Disconnect the **LCD harness** and **HV cable** from the FL inverter.

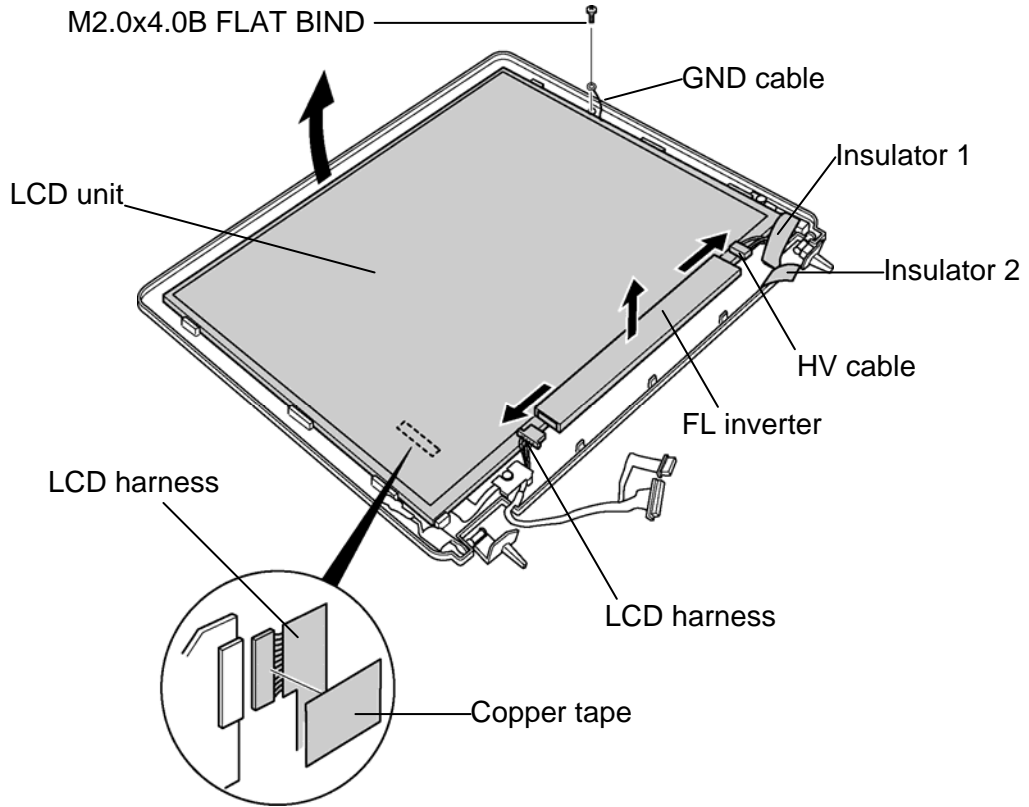


Figure 4-42 Removing the LCD unit

8. Removing the following **screw**, remove the **GND cable** and **washer** from the LCD unit.

□ M1.4x2.0S S-THIN FLAT BIND screw ×1

**CAUTION:** GND cable is removed from LCD unit only when LCD unit must be replaced.

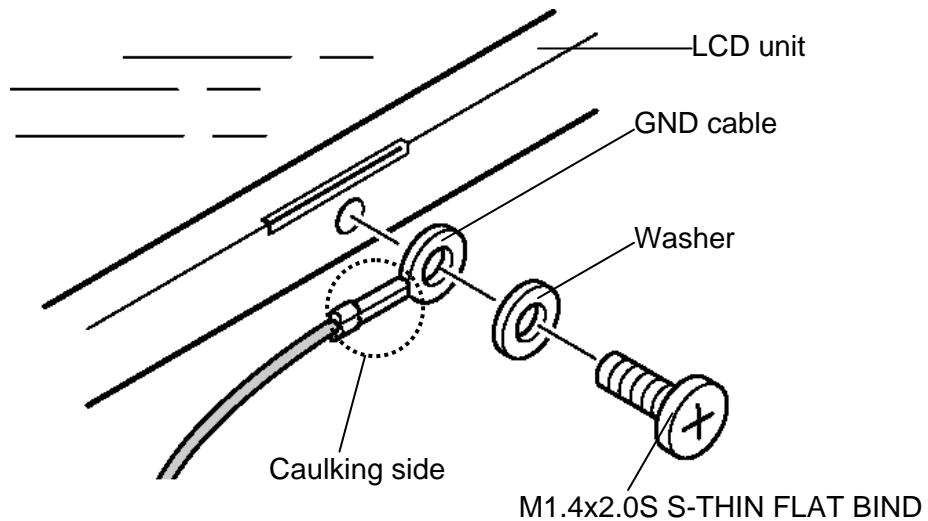


Figure 4-43 Removing the GND cable



### Installing the LCD unit /FL Inverter

To install the LCD unit/FL inverter, follow the steps below and refer to figure 4-42, 4-43.

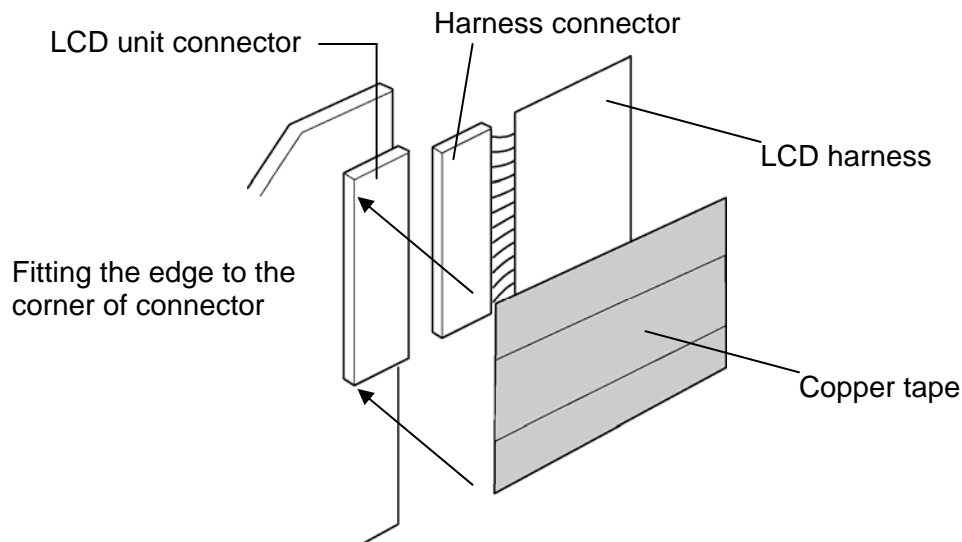
1. Secure the **GND cable** and **washer** to the LCD unit with the following **screw**.

□ M1.4x2.0S S-THIN FLAT BIND screw ×1

**NOTE:** Be sure to secure the GND cable with the caulking side outward.

2. Connect the **LCD harness** to the connector on the back of LCD unit and stick the **copper tape** over the connector.

**NOTE:** (1) Stick the copper tape by fitting its edge to the corner of LCD unit connector.  
(2) Make sure that there is no floating and coming-off of copper tape and that the copper tape is stuck over the LCD unit connector, harness connector and LCD harness.



3. Place the **LCD unit** along the guide of LCD cover.
4. Secure the **GND cable** with the following **screw**.

□ M2.0x4.0B FLAT BIND screw ×1

**NOTE:** Be sure to secure the GND cable with the caulking side upward.

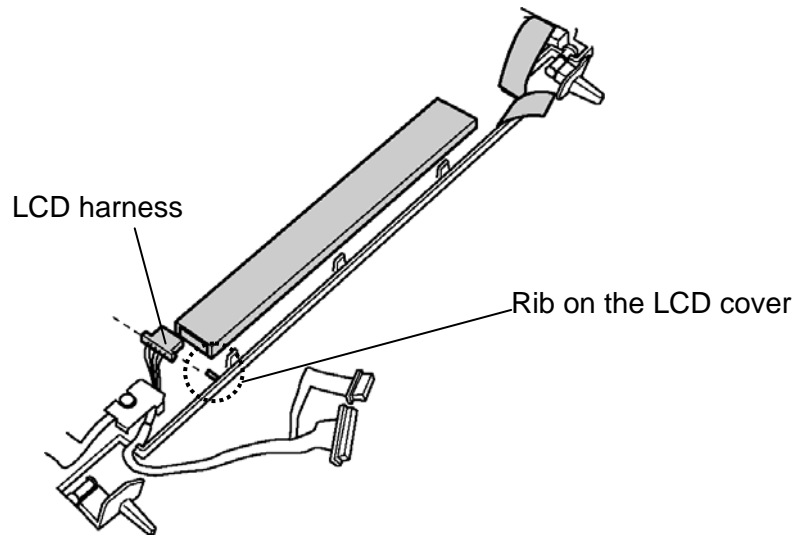
5. Connect the **LCD harness** and the **HV cable** to the FL inverter.

**CAUTION:** *The FL inverter once removed from the computer is not reusable. When installing the FL inverter, use always a new one.*

6. Place the **FL inverter** on the display cover with double-sided tape.

**NOTE:** (1) *Install the FL inverter to set the edge of LCD harness connector in the position of rib on the LCD cover.*

(2) *Make sure the harness is not stretched after connecting.*



7. Bend the **insulator** in order (2→1) and stick the **insulator 1** on the FL inverter.

## 4.28 LCD harness

### Removing the LCD harness

To remove the LCD harness, follow the steps below and refer to figures 4-44.

1. Remove the following **screw** securing the LCD harness holder.
  - M2.0x3.0S S-THIN FLAT BIND screw ×1
2. After releasing the LCD harness holder from the **hook**, remove the **LCD harness holder** from the LCD cover.
3. Remove the **LCD harness** from the LCD cover.

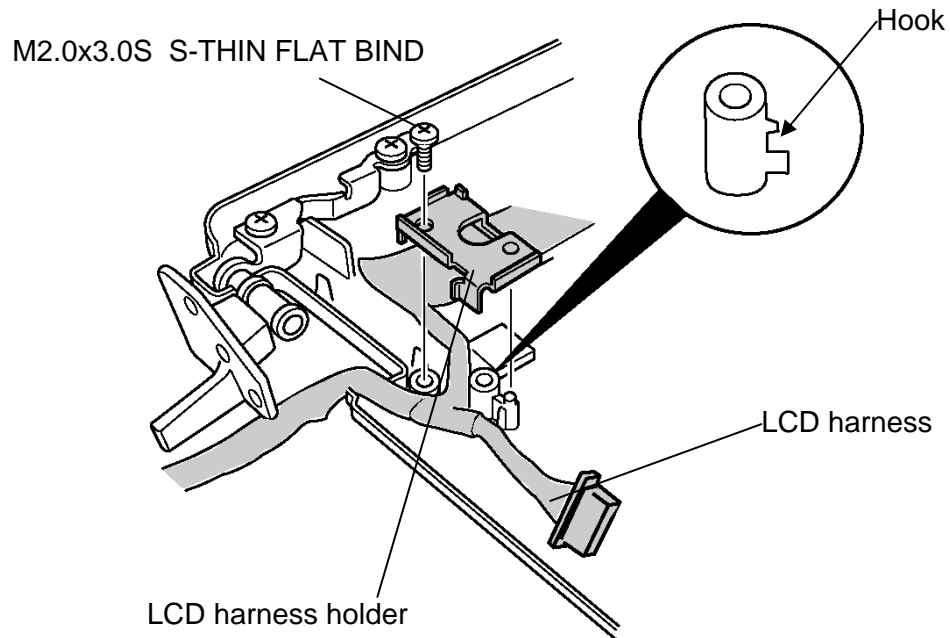


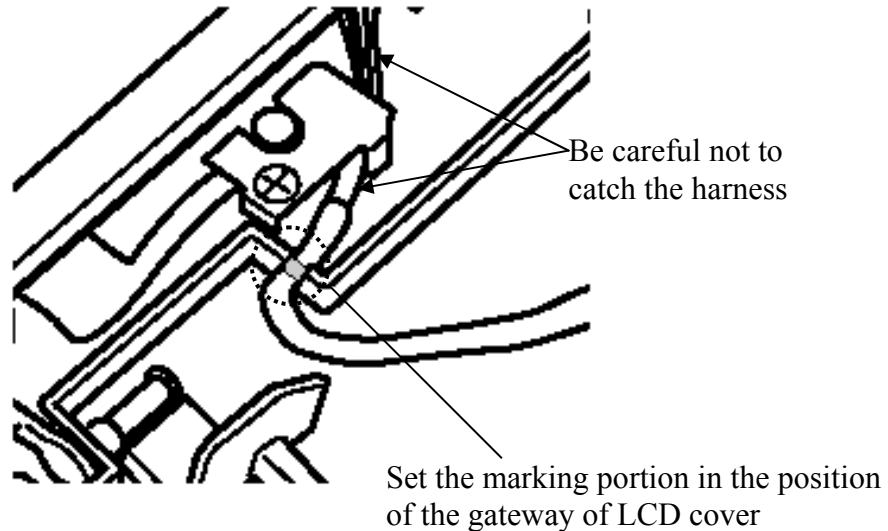
Figure 4-44 Removing the LCD harness

### Installing the LCD harness

To install the LCD harness, follow the steps below and refer to figure 4-44.

1. Arrange the **LCD harness** along the guide of LCD cover.

**NOTE:** Arrange the LCD harness to set the marking portion of LCD harness in the position of gateway of LCD cover.



2. Install the **LCD harness holder** while locking the **hook** portion and secure it with the following **screw**.

□ M2.0x3.0S S-THIN FLAT BIND screw ×1

**CAUTION:** When installing the LCD harness holder, be careful not to catch the LCD harness in LCD harness holder.

## 4.29 Wireless antennas /Front panel

### Removing the wireless antennas / Front panel

To remove the wireless antennas / front panel, follow the steps below and refer to figures 4-45 and 4-46.

1. Peel off six **acetate tapes** on the antenna cables.
2. Turn up the two **insulators** securing the wireless LAN antenna cables.
3. While peeling off the wireless antennas, remove the **wireless LAN antennas** and **bluetooth antenna** from LCD cover by pulling it through the guide slit.

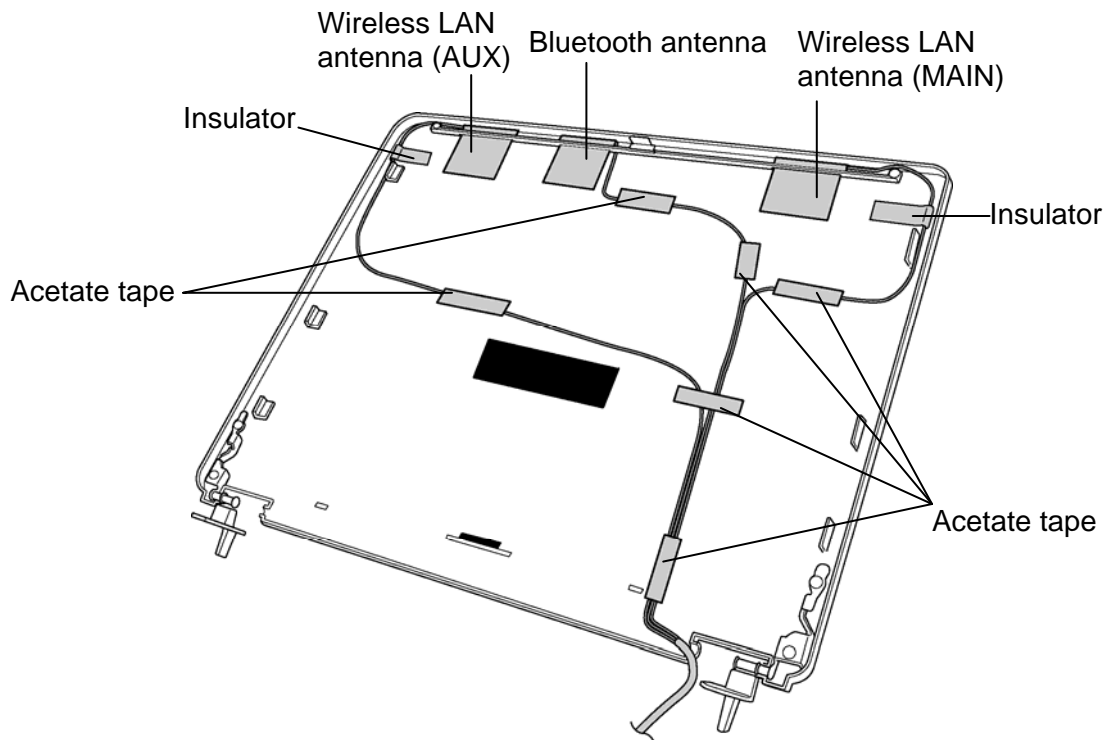


Figure 4-45 Removing the wireless antennas

4. Remove the following **screw** and **front panel** while releasing latches.

- M2.0x3.0S S-THIN FLAT BIND screw ×1

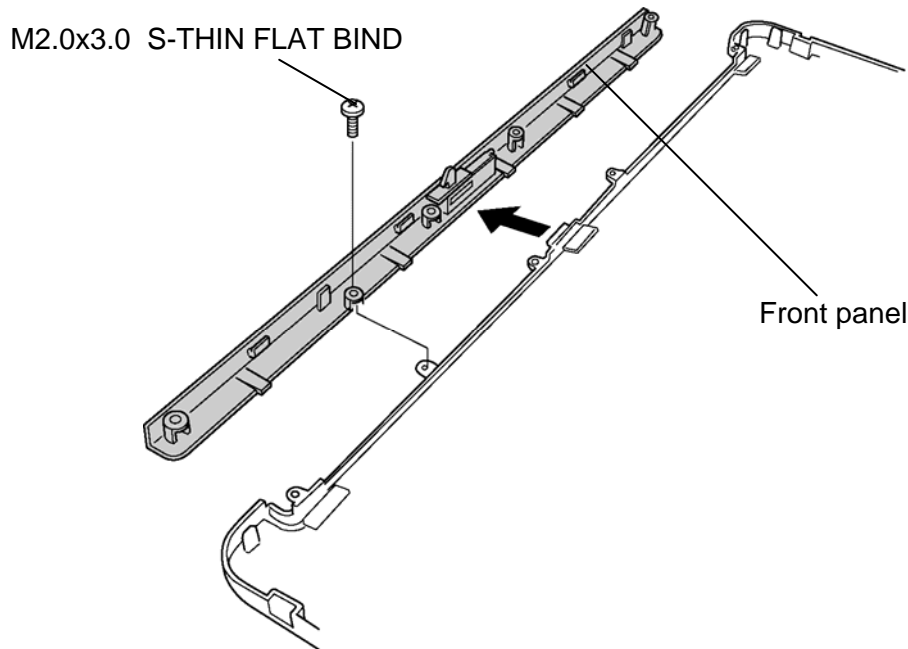


Figure 4-46 Removing the front panel

### Installing the wireless antennas / Front panel

To install the wireless antennas / Front panel, follow the steps below and refer to figure 4-45 and 4-46.

1. Install the **front panel** and secure it with the following **screw**.
  - M2.0x3.0S S-THIN FLAT BIND screw ×1
2. Passing **wireless LAN antennas** through the guide slit, stick them on the LCD cover.
3. Passing **bluetooth antenna** through the guide slit, stick it on the LCD cover.
4. Fix **wireless LAN antenna cables** with two **insulators** on both sides.
5. Arrange the wireless antenna cables on the LCD cover and fix them with six **acetate tapes**.

## 4.30 Hinge

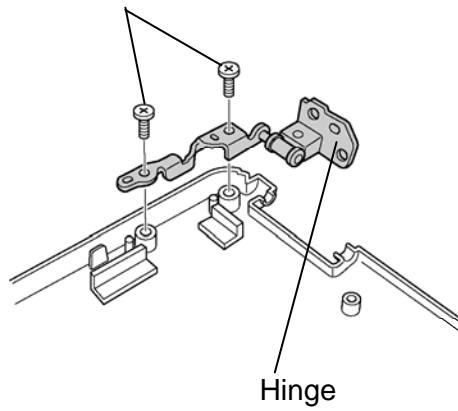
### Removing the hinge

To remove the hinge, follow the steps below and refer to figures 4-47.

1. Remove the following **screws** securing the both sides of **hinges** and remove them.

□ M2.5x4.0B FLAT BIND screw ×4

M2.5x4.0B FLAT BIND  
[With Locktight]



M2.5x4.0B FLAT BIND  
[with Locktight]

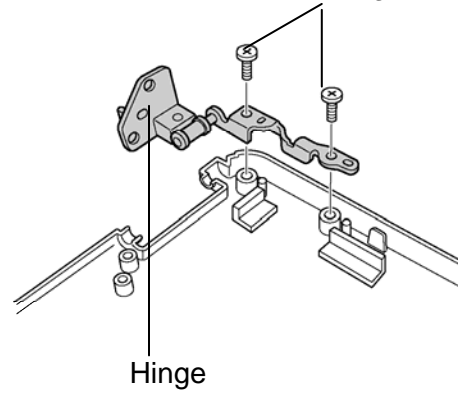


Figure 4-47 Removing the Hinge

### Installing the hinge

To install the hinge, follow the steps below and refer to figures 4-47.

1. Install both sides of **hinges** and secure them with following **screws**.

□ M2.5x4.0S FLAT BIND screw ×4

**CAUTION:** When installing the hinges, be sure to apply Locktight-425 or Locktight-7400 to the screws.

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# Appendices

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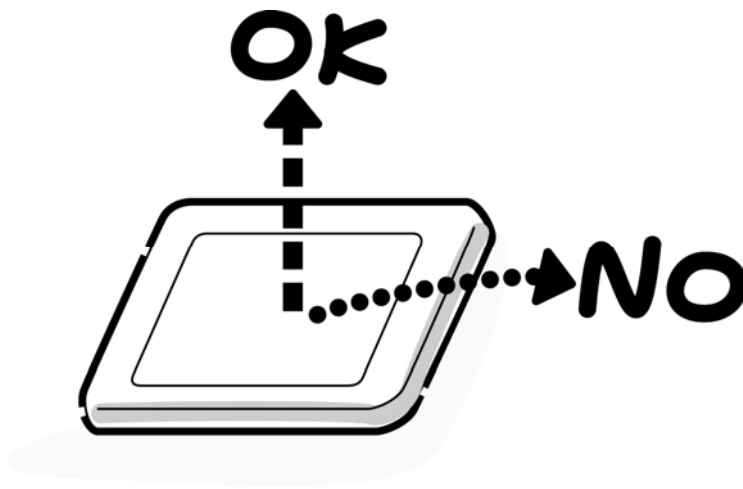
## Appendix A Handling the LCD Module

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### Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.





3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

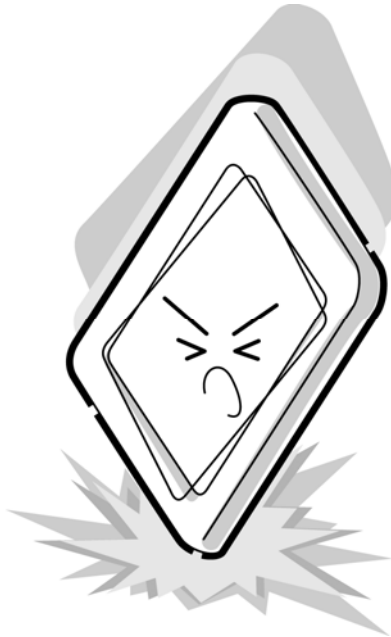
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



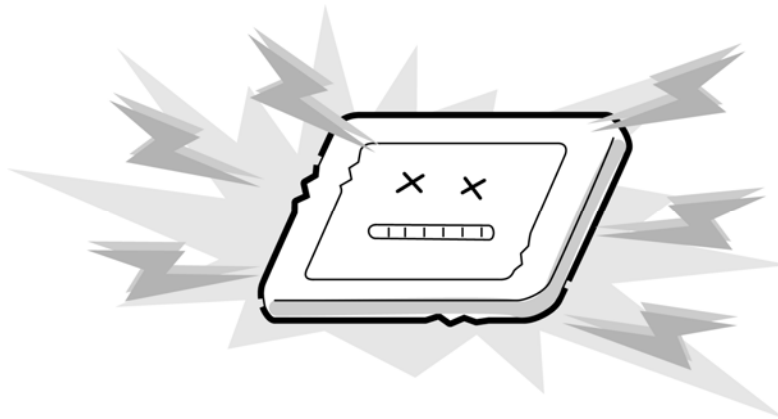
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



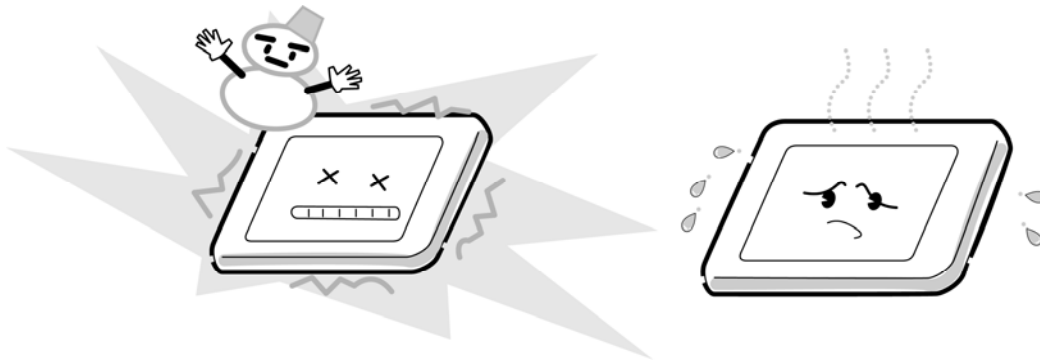
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



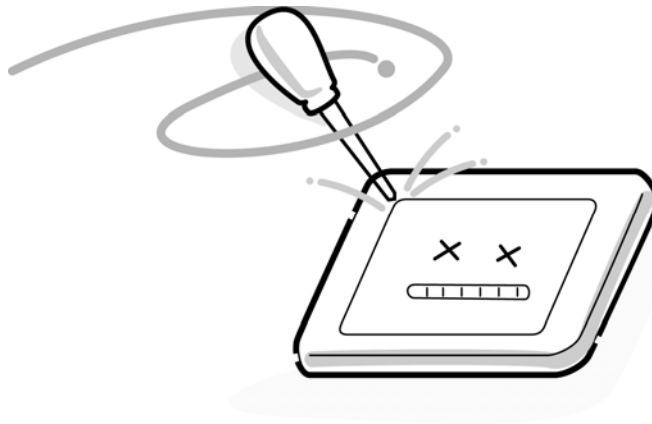
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



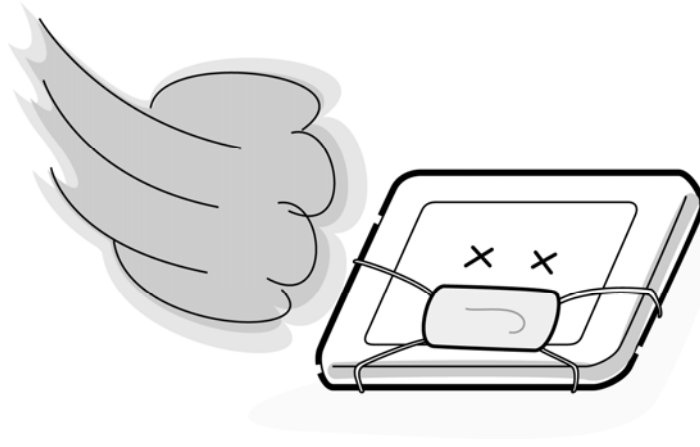
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.





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## Appendix B Board Layout

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### B.1 System Board Front View <FNCSY\*>

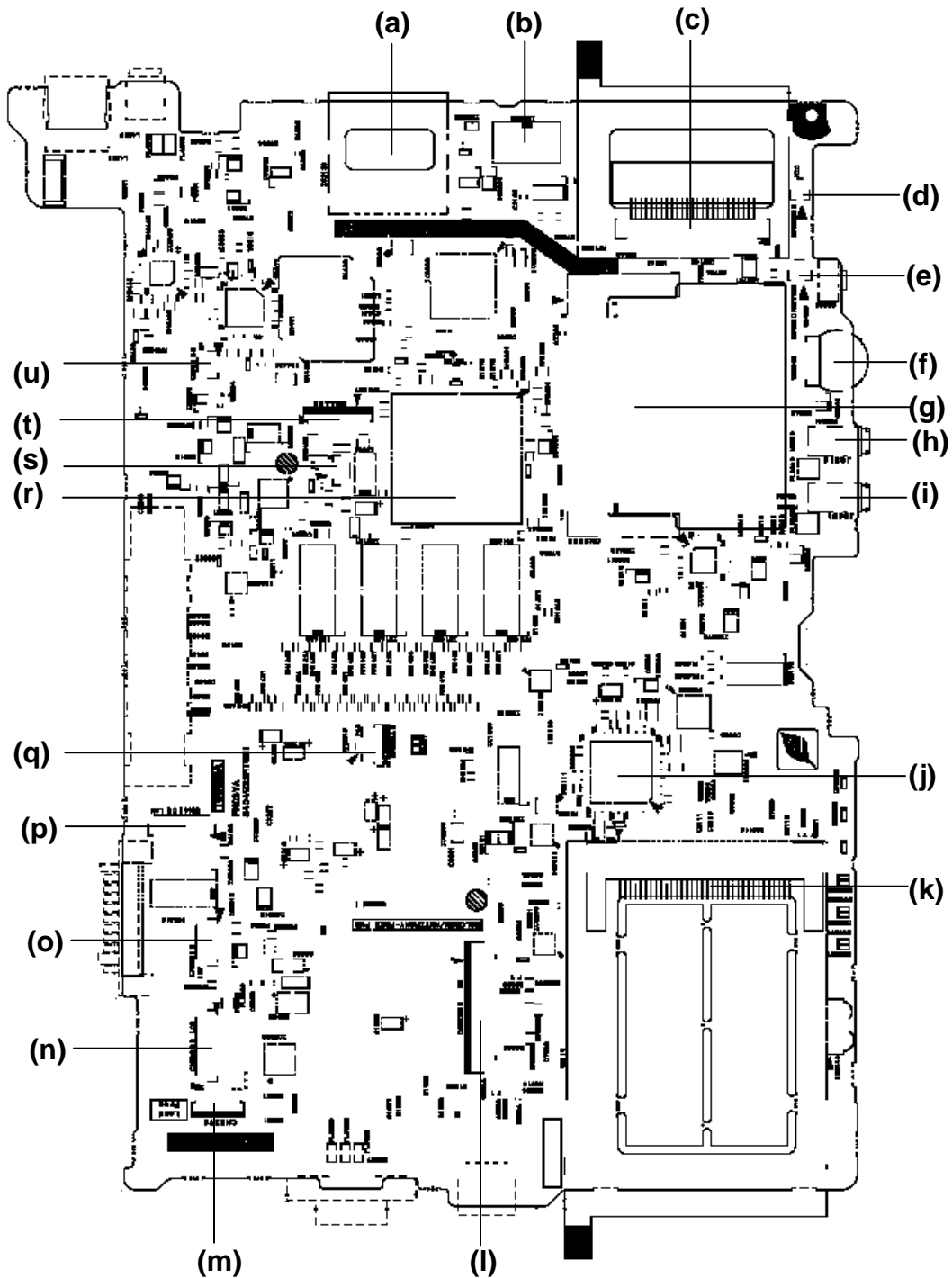


Figure B-1 System board layout (front)

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

Mark	Number	Name
(a)	IS2130	SD Card I/F connector
(b)	IC3000	FWH
(c)	IS2140	CF Card I/F connector
(d)	CN6050	Internal Microphone connector
(e)	CN8760	RTC Battery I/F connector
(f)	VR6240	Volume Controller
(g)	CN2200	Wireless LAN Card I/F connector
(h)	J6310	Headphone I/F connector
(i)	J6051	External Microphone /F connector
(j)	IC3200	EC/KBC
(k)	IS2110	PC Card I/F connector
(l)	CN3230	Keyboard I/F connector
(m)	CN3270	Switch Membrane I/F connector
(n)	CN5600	LCD I/F connector
(o)	CN8812	Inverter I/F connector
(p)	CN4100	LAN I/F connector
(q)	CN3240	Pad I/F connector
(r)	IC6000	South Bridge (ICH4-M)
(s)	CN3400	Debugging Port I/F connector
(t)	CN4400	Bluetooth I/F connector
(u)	CN6180	Speaker connector

B.2 System Board Back View <FNCSY\*>

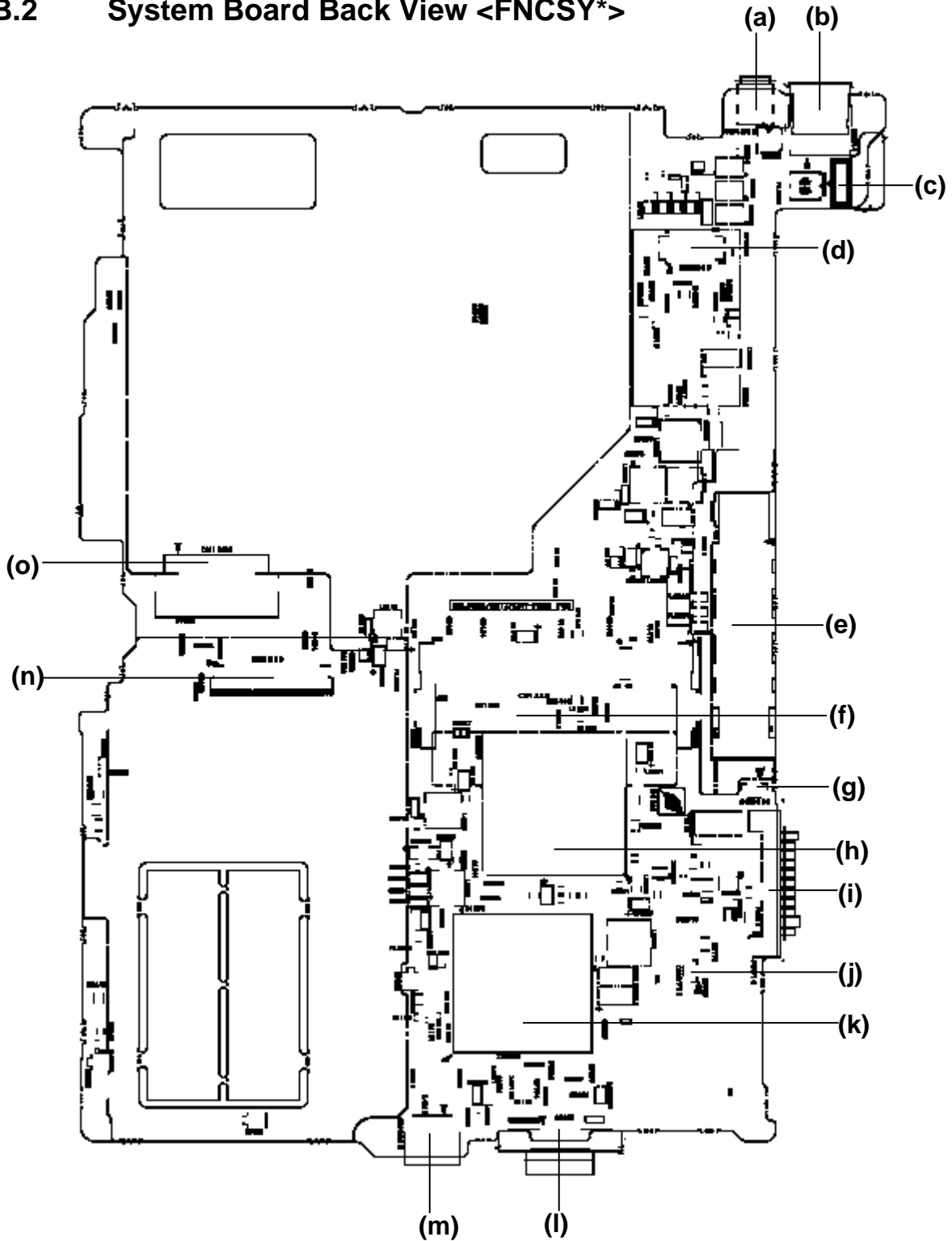


Figure B-2 System board layout (back)

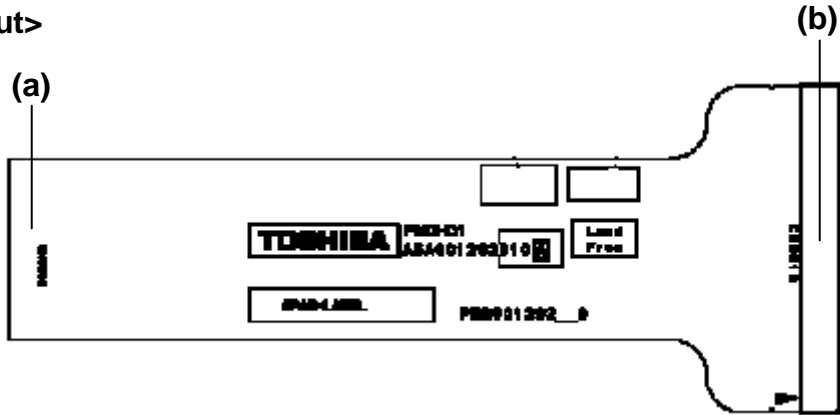


Table B-2 System board ICs and connectors (back)

Mark	Number	Name
(a)	CN4200	IEEE1394 I/F connector
(b)	CN4614	USB Port0&3
(c)	CN8800	DC-IN connector
(d)	CN3000	MDC I/F connector
(e)	CN2300	Docking Port I/F connector
(f)	CN1440	Memory Module I/F connector
(g)	CN3001	MDC Harness connector
(h)	IC1200	North Bridge (Montara-GM+)
(i)	J8810	Battery I/F connector
(j)	CN8770	Fan connector
(k)	IC1005	CPU
(l)	CN5620	CRT I/F connector
(m)	CN4613	USB Port5
(n)	CN1800	HDD FPC I/F connector
(o)	CN1820	ODD I/F connector

**B.3 HDD FPC View <FNCHD\*>**

<Front layout>



<Back layout>

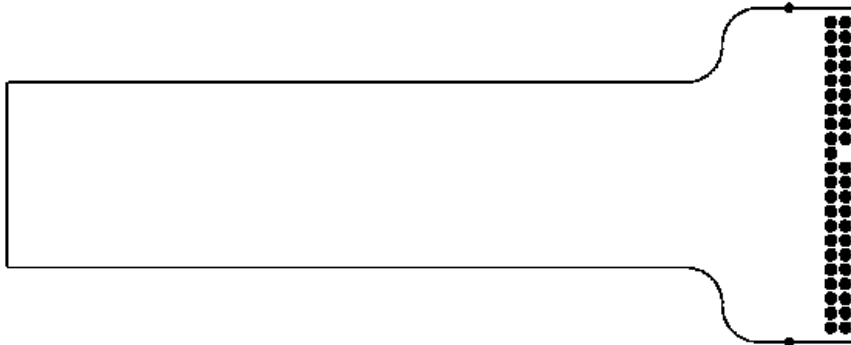


Figure B-3 HDD FPC layout

Table B-3 HDD FPC connectors

Mark	Number	Name
(a)	CN9600	System board I/F connector
(b)	CN9610	HDD I/F connector



## Appendix C Pin Assignment

### System Board FNCSY\*

#### C.1 CN1440 Memory connector (200-PIN)

Table C-1 Memory connector (200-PIN) (1/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	VREF	-	2	VREF	-
3	GND	-	4	GND	-
5	SDQ01-B2P	I/O	6	SDQ04-B2P	I/O
7	SDQ00R-B2P	I/O	8	SDQ05-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0-B2P	I/O	12	SDM00-B2P	I
13	SDQ06-B2P	I/O	14	SDQ02-B2P	I/O
15	GND	-	16	GND	-
17	SDQ07-B2P	I/O	18	SDQ03-B2P	I/O
19	SDQ09-B2P	I/O	20	SDQ13-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08-B2P	I/O	24	SDQ12-B2P	I/O
25	SDQS1-B2P	I/O	26	SDM01-B2P	I
27	GND	-	28	GND	-
29	SDQ14-B2P	I/O	30	SDQ15-B2P	I/O
31	SDQ10-B2P	I/O	32	SDQ11-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK3-B2P	I	36	2R5-B2V	-
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20-B2P	I/O	42	SDQ17-B2P	I/O
43	SDQ21-B2P	I/O	44	SDQ16-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2-B2P	I/O	48	SDM02-B2P	I
49	SDQ18-B2P	I/O	50	SDQ19-B2P	I/O
51	GND	-	52	GND	-
53	SDQ23-B2P	I/O	54	SDQ22-B2P	I/O
55	SDQ29-B2P	I/O	56	SDQ28-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-

Table C-1 Memory connector (200-PIN) (2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
59	SDQ25-B2P	I/O	60	SDQ24-B2P	I/O
61	SDQS3-B2P	I/O	62	SDM03-B2P	I
63	GND	-	64	GND	-
65	SDQ27-B2P	I/O	66	SDQ30-B2P	I/O
67	SDQ31-B2P	I/O	68	SDQ26-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	N.C	-	86	N.C	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	N.C	-	98	N.C	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMAB05-B2P	I	108	SMA04-B2P	I
109	SMA03-B2P	I	110	SMA02-B2P	I
111	SMAB01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS2-B2N	I	122	SCS3-B2N	I
123	N.C	-	124	N.C	-

Table C-1 Memory connector (200-PIN) (3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
125	GND	-	126	GND	-
127	SDQ33-B2P	I/O	128	SDQ36-B2P	I/O
129	SDQ32-B2P	I/O	130	SDQ37-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4-B2P	I/O	134	SDM04-B2P	I/O
135	SDQ39-B2P	I/O	136	SDQ34R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38-B2P	I/O	140	SDQ35-B2P	-
141	SDQ40-B2P	I/O	142	SDQ41-B2P	I
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ45-B2P	I/O	146	SDQ44-B2P	I/O
147	SDQ55-B2P	I/O	148	SDM05-B2P	I/O
149	GND	-	150	GND	-
151	SDQ46-B2P	I/O	152	SDQ47-B2P	I/O
153	SDQ43-B2P	I/O	154	SDQ42-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ52-B2P	I/O	164	SDQ53-B2P	I/O
165	SDQ49-B2P	I/O	166	SDQ48-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6-B2P	I/O	170	SDM06-B2P	I
171	SDQ51-B2P	I/O	172	SDQ55-B2P	I/O
173	GND	-	174	GND	-
175	SDQ50-B2P	I/O	176	SDQ54-B2P	I/O
177	SDQ60-B2P	I/O	178	SDQ61-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56-B2P	I/O	182	SDQ57-B2P	I/O
183	SDQS7-B2P	I/O	184	SDM07-B2P	I
185	GND	-	186	GND	-
187	SDQ52R-B2P	I/O	188	SDQ62-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ63-B2P	I/O

*Table C-1 Memory connector (200-PIN) (4/4)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	P3V	-
195	SMBCLK-P3P	I/O	196	GND	-
197	P3V	-	198	GND	-
199	N.C	-	200	N.C	-

**C.2 CN1800 HDD FPC I/F connector (50-PIN)***Table C-2 HDD FPC I/F connector (50-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	IDRSTA-P5N	I
3	PDD07-P3P	I	4	GND	
5	PDD08-P3P	O	6	PDD06-P3P	O
7	PDD09-P3P	O	8	GND	
9	PDD05-P3P	I	10	PDD10-P3P	O
11	PDD04-P3P	I	12	GND	
13	PDD11-P3P	O	14	PDD03-P3P	I
15	PDD12-P3P		16	GND	
17	PDD02-P3P	I	18	PDD13-P3P	O
19	PDD01-P3P	I	20	GND	-
21	PDD14-P3P	O	22	PDD00-P3P	I
23	PDD15-P3P	O	24	GND	-
25	PDDREQ-P3P	I	26	PDIOW-P3N	I
27	GND	-	28	PDIOR-P3N	I
29	GND		30	PIORDY-P3P	I
31	GND		32	PDDACK-P3N	I
33	IRQ14-P3P	I	34	GND	-
35	PDA1-P3P	O	36	PAD0-P3P	O
37	PDA2-P3P	O	38	GND	
39	PDCS1-P3N	I	40	PDCS3-P3N	O
41	P5V	-	42	P5V	-
43	P5V	-	44	P5V	
45	P5V		46	HDDLED-P5N	I
47	GND	-	48	GND	-
49	GND	-	50	GND	-



**C.3 CN1820 ODD I/F connector (50-PIN)**

Table C-3 ODD I/F connector (50-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(AUDIO-L)	-	2	(AUDIO-R)	-
3	N.C.	-	4	N.C.	-
5	IDRSTB-P5N	I	6	SDD08-P3P	I/O
7	SDD07-P3P	I/O	8	SDD09-P3P	I/O
9	SDD06-P3P	I/O	10	SDD10-P3P	I/O
11	SDD05-P3P	I/O	12	SDD11-P3P	I/O
13	SDD04-P3P	I/O	14	SDD12-P3P	I/O
15	SDD03-P3P	I/O	16	SDD13-P3P	I/O
17	SDD02-P3P	I/O	18	SDD14-P3P	I/O
19	SDD01-P3P	I/O	20	SDD15-P3P	I/O
21	SDD00-P3P	I/O	22	SDDREQ-P3P	I/O
23	GND	-	24	SDIOR-P3N	I
25	SDIOW-P3N	I	26	GND	-
27	SIORDY-P3P	O	28	SDDACK-P3N	I
29	IRQ15-P3P	O	30	N.C.	-
31	SDA1-P3P	I	32	N.C.	-
33	SDA0-P3P	I	34	SDA2-P3P	I
35	SDCS1-P3N	I	36	SDCS3-P3N	I
37	(DASP)	-	38	SB-P5V	-
39	SB-P5V	-	40	SB-P5V	-
41	SB-P5V	-	42	SB-P5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	N.C.	-	48	GND	-
49	N.C.	-	50	N.C.	-
1T	GND	-	2T	GND	-

**C.4 IS2110 PC card I/F connector (68-PIN)**

Table C-4 PC card I/F connector (68-PIN) (1/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	BCAD00-EYP	I/O
3	BCAD01-EYP	I/O	4	BCAD03-EYP	I/O
5	BCAD05-EYP	I/O	6	BCAD07-EYP	I/O
7	BCCBE0-EYN	I/O	8	BCAD09-EYP	I/O
9	BCAD11-EYP	I/O	10	BCAD12-EYP	I/O
11	BCAD14-EYP	I/O	12	BCCBE1-EYN	I/O
13	BCPAR-EYP	I/O	14	BCPERR-EYN	I/O
15	BCGNT-EYN	I	16	BCINT-EYN	O
17	MCVCCB-EYV	I	18	MCVPPB-EYV	I
19	BCCLK-EYP	I	20	BCIRDY-EYN	I/O
21	BCCBE2-EYN	I/O	22	BCAD18-EYP	I/O
23	BCAD20-EYP	I/O	24	BCAD21-EYP	I/O
25	BCAD22-EYP	I/O	26	BCAD23-EYP	I/O
27	BCAD24-EYP	I/O	28	BCAD25-EYP	I/O
29	BCAD26-EYP	I/O	30	BCAD27-EYP	I/O
31	BCAD29-EYP	I/O	32	BCD02-EYP	I/O
33	BCCLKR-EYN	I/O	34	GND	-
35	GND	-	36	BCCD1-E3N	O
37	BCAD02-EYP	I/O	38	BCAD04-EYP	I/O
39	BCAD06-EYP	I/O	40	BCD14-EYP	I/O
41	BCAD08-EYP	I/O	42	BCAD10-EYP	I/O
43	BCVS1-E3P	I/O	44	BCAD13-EYP	I/O
45	BCAD15-EYP	I/O	46	BCAD16-EYP	I/O
47	BCA18-EYP	I/O	48	BCLOCK-EYN	I/O
49	BCSTOP-EYN	I/O	50	BCDEVS-EYN	I/O
51	MCVCCB-EYV	O	52	MCVPPB-EYV	I
53	BCTRDY-EYN	I/O	54	BCFRAM-EYN	I/O
55	BCAD17-EYP	I/O	56	BCAD19-EYP	I/O
57	BCVS2-E3P	I/O	58	BCRST-EYN	I
59	BCSERR-EYN	I/O	60	BCREQ-EYN	I/O
61	BCCBE3-EYN	I/O	62	BCAUDI-EYP	O

Table C-4 PC card I/F connector (68-PIN) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	BCSTSC-EYP	O	64	BCAD28-EYP	I/O
65	BCAD30-EYP	I/O	66	BCAD31-EYP	I/O
67	BCCD2-E3N	I/O	68	GND	-

## C.5 IS2130 SD card I/F connector (12-PIN)

Table C-5 SD card I/F connector (12-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SDAT3-E3P	I/O	2	SDCMD-E3P	I/O
3	GND	-	4	SD-E3V	-
5	SDCLK-E3P	O	6	GND	-
7	SDAT0-E3P	I/O	8	SDAT1-E3P	I/O
9	SDAT2-E3P	I/O	10	SDCD-E3N	I
11	SDWP-E3P	-	12	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

**C.6 IS2140 CF card I/F connector (50-PIN)**

Table C-6 CF card I/F connector (50-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	CFD03-EYP	I/O
3	CFD04-EYP	I/O	4	CFD05-EYP	I/O
5	CFD06-EYP	I/O	6	CFD07-EYP	I/O
7	CFCE1-EYN	I/O	8	CFA10-EYN	I/O
9	CFOE-EYN	I/O	10	CFA09-EYP	I/O
11	CFA08-EYP	I/O	12	CFA07-EYP	I/O
13	MCVCCA-EYV	-	14	CFA06-EYP	I/O
15	CFA05-EYP	I/O	16	CFA04-EYP	I/O
17	CFA03-EYP	I/O	18	CFA02-EYP	I/O
19	CFA01-EYP	I/O	20	CFA00-EYP	I/O
21	CFD00-EYP	I/O	22	CFD01-EYP	I/O
23	CFD02-EYP	I/O	24	CFWP-EYP	I/O
25	CFCD2-E3N	I	26	CFCD1-E3N	I
27	CFD11-EYP	I/O	28	CFD12-EYP	I/O
29	CFD13-EYP	I/O	30	CFD14-EYP	I/O
31	CFD15-EYP	I/O	32	CFCE2-EYN	I/O
33	CFVS1-E3P	I/O	34	CFIORD-EYN	I/O
35	CFIOWR-EYN	I/O	36	CFWE-EYN	I
37	CFRDY-EYP	O	38	MCVCCA-EYV	-
39	CFA25-EYP	-	40	CFVS2-E3N	I/O
41	CFRST-EYP	I	42	CFWAIT-EYN	O
43	CFIPAC-EYN	-	44	CFREG-EYN	I/O
45	CFBVD2-EYP	O	46	CFBVD1-EYP	O
47	CFD08-EYP	I/O	48	CFD09-EYP	I/O
49	CFD10-EYP	I/O	50	GND	-
1T	GND	-	2T	GND	-

**C.7 CN2200 Wireless LAN card I/F connector (124-PIN)**

Table C-7 Wireless LAN card I/F connector (124-PIN) (1/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	WLON-S3N	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIRQA-P3N	I/O	18	P5V	-
19	P3V	-	20	PIRQG-P3N	I/O
21	N.C.	-	22	N.C.	-
23	GND	-	24	E3V	-
25	X33MPC-P3P	I	26	PCIRST-S3N	I
27	GND	-	28	P3V	-
29	PREQ2-P3N	O	30	PGNT2-S3N	I
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	I/O
35	AD29-P3P	I/O	36	WCHCLK-P3P	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	-
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	WCHDAT-P3P	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD21-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-

Table C-7 Wireless LAN card I/F connector (124-PIN) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I	66	TRDY-P3N	I/O
67	SERR-P3N	I/O	68	STOP-P3N	I/O
69	GND	-	70	P3V	-
71	PERR-P3N	I/O	72	DEVSEL-P3N	0
73	CBE1-P3N	I/O	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	I/O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	N.C.	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	E3V	-
1T	GND	-	2T	GND	-

**C.8 CN3001 Modem cable connector (4-PIN)***Table C-8 Modem cable connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MDMTIP-E3P	I/O	2	MDMTIP-E3P	I/O
3	MDMRNG-E3P	I/O	4	MDMRNG-E3P	I/O

**C.9 CN3000 MDC I/F connector (30-PIN)***Table C-9 MDC I/F connector (30-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C	-	2	GND	-
3	GND	-	4	N.C	-
5	N.C	-	6	N.C	-
7	N.C	-	8	GND	-
9	N.C	-	10	N.C	-
11	N.C	-	12	N.C	-
13	N.C	-	14	N.C	-
15	GND	-	16	E3V	-
17	E3V	-	18	N.C	-
19	GND	-	20	GND	-
21	N.C	-	22	M97SY2-P3P	I
23	M97OT2-P3P	I	24	N.C	-
25	M97RS2-S3N	I	26	M97IN2-E3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O
1T	GND	-	2T	GND	-

**C.10 CN3230 Keyboard I/F connector (30-PIN)***Table C-10 Keyboard I/F connector (30-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C	-	2	N.C	-
3	CAPLED-P5N	I	4	P5V	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	I
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	I
17	KBRT02-S3N	I	18	KBRT03-S3N	I
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	I	22	KBRT05-S3N	I
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	I	26	KBRT07-S3N	I
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	N.C	-	30	N.C	-
1T	GND	-	2T	GND	-

**C.11 CN3240 Pad I/F connector (8-PIN)***Table C-11 Pad I/F connector (8-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P5V	-	2	P5V	-
3	IPDDAT-P5P	I/O	4	IPDCLK-P5P	I/O
5	N.C.	-	6	GND	-
7	GND	-	8	GND	-
1T	GND	-	2T	GND	-



**C.12 CN3400 Debug port connector (4-PIN)***Table C-12 Debug port connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P3V	-	2	RXD-E3P	O
3	TXD-P3P	I	4	GND	-
1T	GND	-	2T	GND	-

**C.13 CN4100 LAN I/F connector (8-PIN)***Table C-13 LAN I/F connector (8-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	BIDCP-EXP	I	2	BIDCN-EXN	I
3	BIDDP-EXP	O	4	BIDDN-EXN	O
5	BIDAP-EXP	I	6	BIDAN-EXN	I
7	BIDBP-EXP	O	8	BIDBN-EXN	O
9	N.C.	-	10	N.C.	-
11	LINK-E3N	I	12	ACT-E3N	I
13	LAN-E3V	-	14	LAN-E3V	-

**C.14 CN3270 Switch membrane I/F connector (13-PIN)***Table C-14 Switch membrane I/F connector (13-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PNLOFF-S3N	O	2	GPBTNB-S3N	O
3	GPBTNA-S3N	O	4	GND	-
5	N.C.	-	6	PWRSW-S3N	O
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	ARWLED-S3P	I	12	NUMLED-S3P	I
13	P5V	-			
1T	GND	-	2T	GND	-

**C.15 CN4200 IEEE1394 I/F connector (4-PIN)***Table C-15 IEEE1394 I/F connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TPBO-E3N	I/O	2	TPBO-E3P	I/O
3	TPAO-E3N	I/O	4	TPAO-E3P	I/O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

**C.16 CN4400 Bluetooth I/F connector (20-PIN)***Table C-16 Bluetooth I/F connector (20-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	N.C.	-
3	BTMDL-P3N	O	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	BTRST-S3N	I
9	N.C.	-	10	N.C.	-
11	GND	-	12	N.C.	-
13	GND	-	14	WCHCLK-P3P	O
15	N.C.	-	16	USBP4-S3P	I/O
17	USBP4-S3N	I/O	18	WCHDAT-P3P	I
19	N.C.	-	20	BT-P3V	-
1T	GND	-	2T	GND	-

**C.17 CN5044 USB Port0 & Port3 I/F connector (8-PIN)***Table C-17 USB Port0 & 3 I/F connector (8-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USB0PS-E5V	I	2	USBP0-S3N	-
3	USBP0-S3P	I/O	4	GND	-
5	USB0PS-E5V	I/O	6	USBP3-S3N	I/O
7	USBP3-S3P	I/O	8	GND	-
1T	GND	-	2T	GND	-

**C.18 CN5043 USB Port5 I/F connector (4-PIN)***Table C-18 USB Port5 I/F connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USB1PS-E5V	I	2	USBP5-S3N	I/O
3	USBP5-S3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

**C.19 CN5600 LCD connector (15-PIN)***Table C-19 LCD connector (15-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PNL-P3V	-	2	PNL-P3V	-
3	N.C	-	4	GND	-
5	TXDTA0-PYP	I	6	TXDTA0-PYN	I
7	GND	-	8	TXCLKA-PYP	I
9	TXCLKA-PYN	I	10	GND	-
11	TXDTA1-PYP	I	12	TXDTA1-PYN	I
13	GND	-	14	TXDTA2-PYP	I
15	TXDTA2-PYN	I			

**C.20 CN8812 Inverter I/F connector (9-PIN)***Table C-20 Inverter I/F connector (9-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	FL-P5V	-	2	FL-P5V	-
3	FL-P5V	-	4	BRT2DA-S3P	I
5	GND	-	6	GND	-
7	GND	-	8	BRT1-P5P	I
9	BRT0-P5P	I			

**C.21 CN5620 CRT I/F connector (15-PIN)***Table C-21 CRT I/F connector (15-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MRED-PXP	I	2	MGREEN-PXP	I
3	MBLUE-PXP	I	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	(DDC-P5V)	-	10	GND	-
11	N.C	-	12	CRTSDA-P5P	I
13	MHSYNC-P3P	I	14	MVSYNC-P3P	I
15	CRTSCL-P5P	I			
1T	GND	-	2T	GND	-

**C.22 CN6050 Internal microphone connector (2-PIN)***Table C-22 Internal microphone connector (2-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(VREF1-P2V)	I	2	A-GND	-

**C.23 J6051 External microphone connector (5-PIN)***Table C-23 External microphone connector (5-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	A-GND	-	2	(MICIN-PXP)	I
3	(VREF1-P2V)	I	4	(VREF1-P2V)	I
5	N.C	-			

**C.24 CN8800 DC-IN connector (4-PIN)***Table C-24 DC-IN connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(PVL POWER)	O	2	(PVL POWER)	O
3	GND		4	GND	

**C.25 J8810 Battery I/F connector (10-PIN)***Table C-25 Battery I/F connector (10-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVBL1	-	2	BTMP1	O
3	(DCHG)	-	4	M5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT10V-S5N	O
9	GND	-	10	GND	-

**C.26 CN6180 Speaker connector (4-PIN)***Table C-26 Speaker connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SPOTL-PXN	O	2	SPOTL-PXP	O
3	SPOTR-PXP	O	4	SPOTR-PXN	O

**C.27 J6310 Headphone connector (5-PIN)***Table C-27 Headphone connector (5-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	A-GND	-	2	HEADL-PXP	I
3	HEADR-PXP	I	4	A-GND	-
5	SPKEN-P4P	O			

**C.28 CN8760 RTC battery connector (3-PIN)***Table C-28 RTC battery connector (3-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(Vbat)	-	2	N.C	-
3	R3V	-			

**C.29 CN8770 Fan connector (3-PIN)***Table C-29 Fan connector (3-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	FAN VCC	-	2	GND	-
3	FANG-P3P	O			

**C.30 CN2300 Docking port I/F connector (240-PIN)**

Table C-30 Docking port I/F connector (240-PIN) (1/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
A1	DSKDC	O	A2	GND	-
A3	DSKDC	O	A4	GND	-
1	DCOUT	O	2	DCOUT	O
3	DOCDT1-S3N	O	4	IF-P5V	-
5	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	N.C.	-
9	DPCONF-S5P	O	10	GND	-
11	GND	-	12	DDCACK-P3P	I/O
13	DRED-PXP	I	14	DGREEN-PXP	I
15	DBLUE-PXP	I	16	DVSYNC-P3P	I
17	(DVISCL-P3P)	I/O	18	N.C.	-
19	GND	-	20	(DVI_PRTCT2)	-
21	(DVI_PRTCT1)	-	22	(DVITX2-P3P)	I
23	(DVITX2-P3N)	I	24	(DVITX1-P3P)	I
25	(DVITX1-P3N)	I	26	(DVITX0-P3P)	I
27	(DVITX0-P3N)	I	28	GND	-
29	GND	-	30	(DVITXC-P3P)	I
31	(DVITXC-P3N)	I	32	(DVIDET-S3N)	I
33	(DVIPD0)	O	34	N.C.	-
35	(QSWON-B3P)	I	36	(DIRQD-S3N)	I/O
37	GND	-	38	(PCM2SP-B3P)	O
39	(DPMRST-S3N)	I	40	(DAD00-P3P)	I/O
41	GND	-	42	(DAD00-P3P)	I/O
43	(DAD02-P3P)	I/O	44	(DAD06-P3P)	I/O
45	GND	-	46	(XDPCI-P3P)	I
47	(DAD09-P3P)	I/O	48	(DAD11-P3P)	I/O
49	GND	-	50	(DAD11-P3P)	I/O
51	(DAD15-P3P)	I/O	52	(DINTA-P3N)	I/O
53	RESERVED	-	54	RESERVED	-
55	BIDDP-EXP	O	56	BIDDN-EXN	O

Table C-30 Docking port I/F connector (240-PIN) (2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
57	RESERVED	-	58	RESERVED	-
59	MDMRNG-E3P	I/O	60	MDMTIP-E3P	I/O
61	DCOUT	O	62	DCOUT	O
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	EXMSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	(DNVSON-S3P)	I
69	(DILSON-S3P)	I	70	(NVPCNF-S3P)	O
71	GND	-	72	DDCADA-P3P	I/O
73	(GPU-GND)	-	74	(GPU-GND)	-
75	(GPU-GND)	-	76	DHSYNC-P3P	I
77	(DVISDA-P3P)	I/O	78	(DVI_PRTCT3)	-
79	GND	-	80	(DVITX5-P3P)	-
81	(DVITX5-P3N)	-	82	(DVITX4-P3P)	-
83	(DVITX4-P3N)	-	84	(DVITX3-P3P)	-
85	(DVITX3-P3N)	-	86	DVI16	-
87	DVI17	-	88	GND	-
89	GND	-	90	(DOC_ON_LED1)	-
91	N.C.	-	92	(DOC_ON_LED2)	-
93	(DVIPD1)	I	94	DVI_PRTCT4	-
95	(DCADIO-S3P)	O	96	(DSMI-B3P)	O
97	GND	-	98	(DCKRUN-P3N)	I/O
99	(PME-S3P)	O	100	(DAD01-P3P)	I/O
101	GND	-	102	(DAD03-P3P)	I/O
103	(DAD05-P3P)	I/O	104	(DAD07-P3P)	I/O
105	GND	-	106	(DAD08-P3P)	-
107	(DAD10-P3P)	I/O	108	(DAD10-P3P)	I/O
109	GND	-	110	(DAD14-P3P)	I/O
111	(DCBE1-P3N)	I/O	112	(DPAR-P3P)	I/O
113	Reserved	-	114	Reserved	-



Table C-30 Docking port I/F connector (240-PIN) (3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
115	BIDCN-EXN	I/O	116	Reserved	-
117	BIDCP-EXP	I/O	118	Reserved	-
119	Reserved	-	120	Reserved	-
121	DCOUT	O	122	DCOUT	O
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	M5V	-	126	(DTPA-E3P)	I/O
127	GND	-	128	(DTPB-E3P)	I/O
129	(USBON1-E5N)	I	130	(USBOC1-E3N)	O
131	GND	-	132	(USBON2-E5N)	I
133	(USBOC2-E3N)	O	134	SNDMUT-S3N	I/O
135	SNDVCC_OFF	-	136	DOU TL-PXP	I/O
137	DINL-PXP	I/O	138	DINR-PXN	I/O
139	GND	-	140	PWRSW-S3N	O
141	DCD-PYP	O	142	DSR-PYP	O
143	TXD-EYN	I	144	RING-PYP	O
145	PE-P5P	O	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	I
155	(DPGNT-P3N)	I	156	(DAD30-P3P)	I/O
157	GND	-	158	(DAD28-P3P)	I/O
159	(DAD26-P3P)	I/O	160	(DAD24-P3P)	I/O
161	GND	-	162	(DIDSL-P3P)	I/O
163	(DAD22-P3P)	I/O	164	(DAD20-P3P)	I/O
165	GND	-	166	(DCBE0-P3N)	I/O
167	(DAD18-P3P)	I/O	168	(DAD16-P3P)	I/O
169	GND	-	170	(DCBE2-P3N)	I/O
171	(DTRDY-P3N)	I/O	172	(DSTOP-P3N)	I/O
173	GND	-	174	Reserved	-
175	LAN-E3V	-	176	Reserved	-
177	Reserved	-	178	N.C.	-

Table C-30 Docking port I/F connector (240-PIN) (4/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
179	BIDAP-EXP	O	180	BIDAN-EXN	O
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	N.C.	-	186	(DTPA-E3N)	I/O
187	GND	-	188	(DTPB-E3N)	I/O
189	USBP2-S3P	I/O	190	USBP2-S3N	I/O
191	GND	-	192	(USBP3-S3P)	I/O
193	(USBP3-S3N)	I/O	194	DOU-TR-PXP	-
195	DOU-TR-PXN	-	196	DOU-TL-PXN	-
197	DINL-PXN	-	198	DINR-PXP	-
199	GND	-	200	RXD-PYN	O
201	RTS-EYP	I	202	CTS-PYP	O
203	DTR-EYP	I	204	SELCT-P5P	O
205	BUSY-P5P	O	206	ACK-P5N	O
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	I	212	PINIT-P5N	I
213	ERROR-P5N	O	214	AUTFD-P5N	I
215	(DPREQ-P3N)	O	216	(DAD31-P3P)	I/O
217	GND	-	218	(DAD29-P3P)	I/O
219	(DAD27-P3P)	I/O	220	(DAD25-P3P)	I/O
221	GND	-	222	(DCBE23-P3N)	I/O
223	(DAD23-P3P)	I/O	224	(DAD21-P3P)	I/O
225	GND	-	226	(DCPCLR-P3P)	I/O
227	(DAD19-P3P)	I/O	228	(DAD17-P3P)	I/O
229	GND	-	230	(DFRAME-P3N)	I/O
231	(DIRDY-P3N)	I/O	232	(DDEVSL-P3N)	I/O
233	GND	-	234	ACT-E3N	O
235	LINK-E3N	O	236	DOCDT2-S3N	O
237	Reserved	-	238	Reserved	-
239	BIDBP-EXP	I	240	BIDBN-EXN	I

## HDD FPC FNCHD\*

## C.31 CN9600 System board I/F connector (50-PIN)

Table C-31 System board I/F connector (50-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	IDRSTA-P5N	I/O
3	PDD07-P3P	I/O	4	GND	-
5	PDD08-P3P	I/O	6	PDD06-P3P	I/O
7	PDD09-P3P	I/O	8	GND	-
9	PDD05-P3P	I/O	10	PDD10-P3P	I/O
11	PDD04-P3P	I/O	12	GND	-
13	PDD11-P3P	I/O	14	PDD03-P3P	I/O
15	PDD12-P3P	I/O	16	GND	-
17	PDD02-P3P	I/O	18	PDD13-P3P	I/O
19	PDD01-P3P	I/O	20	GND	-
21	PDD14-P3P	I/O	22	PDD00-P3P	I/O
23	PDD15-P3P	I/O	24	GND	-
25	PDDREQ-P3P	I/O	26	PDIOW-P3N	I/O
27	GND	-	28	PDIOR-P3N	I/O
29	GND	-	30	PIORDY-P3P	I/O
31	GND	-	32	PDDACK-P3N	I/O
33	IRQ14-P3P	I/O	34	GND	-
35	PDA1-P3P	I/O	36	PDA0-P3P	I/O
37	PDA2-P3P	I/O	38	GND	-
39	PDCS1-P3N	I/O	40	PDCS3-P3N	I/O
41	P5V	-	42	P5V	-
43	P5V	-	44	P5V	-
45	P5V	-	46	DASP-P5N	I/O
47	P3V	-	48	P3V	-
49	P3V	-	50	P3V	-

**C.32 CN9610 HDD I/F connector (44-PIN)**

Table C-32 HDD I/F connector (44-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	IDRSTA-P5N	I/O	2	GND	-
3	PDD07-P3P	I/O	4	PDD08-P3P	I/O
5	PDD06-P3P	I/O	6	PDD09-P3P	I/O
7	PDD05-P3P	I/O	8	PDD10-P3P	I/O
9	PDD04-P3P	I/O	10	PDD11-P3P	I/O
11	PDD03-P3P	I/O	12	PDD12-P3P	I/O
13	PDD02-P3P	I/O	14	PDD13-P3P	I/O
15	PDD01-P3P	I/O	16	PDD14-P3P	I/O
17	PDD00-P3P	I/O	18	PDD15-P3P	I/O
19	GND	-	20	Reserved	-
21	PDDREQ-P3P	I/O	22	GND	-
23	PDIOW-P3N	I/O	24	GND	-
25	PDIOR-P3N	I/O	26	GND	-
27	PDIORDY-P3P	I/O	28	GND	-
29	PDDACK-P3N	I/O	30	GND	-
31	IRQ14-P3P	I/O	32	(IOCS16#)	
33	PDA1-P3P	I/O	34	(PDIAG#)	
35	PDA0-P3P	I/O	36	PDA2-P3P	I/O
37	PDCS1-P3N	I/O	38	PDCS3-P3N	I/O
39	DASP-P5N	I/O	40	GND	-
41	P5V	-	42	P5V	-
43	GND	-	44	N.C.	-



## Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0 )	0B	8B	45	F0	45	*2
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	18	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[ {	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\	2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*2
38	K	25	A5	42	F0	42	*2
39	L	26	A6	4B	F0	4B	*2
40	; :	27	A7	4C	F0	4C	*2
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*2
53	, <	33	B3	41	F0	41	*2
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

**Appendix. D Keyboard Scan/Character Codes**

*Table D-1 Scan codes (set 1 and set 2) (3/4)*

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70	*1
76	Del	E0 53	E0 D3	E0 71	E0 F0	71	*1
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B	*1
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C	*1
81	End	E0 4F	E0 CF	E0 69	E0 F0	69	*1
83	↑	E0 48	E0 C8	E0 75	E0 F0	75	*1
84	↓	E0 50	E0 D0	E0 72	E0 F0	72	*1
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D	*1
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A	*1
89	→	E0 4D	E0 CD	E0 74	E0 F0	74	*1
110	Esc	01	81	76	F0	76	
112	F1	3B	BB	05	F0	05	
113	F2	3C	BC	06	F0	06	
114	F3	3D	BD	04	F0	04	
115	F4	3E	BE	0C	F0	0C	
116	F5	3F	BF	03	F0	03	
117	F6	40	C0	0B	F0	0B	
118	F7	41	C1	83	F0	83	
119	F8	42	C2	0A	F0	0A	
120	F9	43	C3	01	F0	01	
121	F10	44	C4	09	F0	09	*3



Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57	D7	78	F0	78			*3	
123	F12	58	D8	07	F0	07			*3	
124	PrintSc	*6	*6	*6	*6				*6	
126	Pause	*7	*7	*7	*7				*7	
202	Fn	—	—	—	—				*4	
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

**Notes:**

- \*1 Scan codes differ by mode.
- \*2 Scan codes differ by overlay function.
- \*3 Combination with the **Fn** key makes different codes.
- \*4 **Fn** key does not generate a code by itself.
- \*5 This key corresponds to key No. 42 in a 102-key model.
- \*6 Refer to Table D-6, No. 124 key scan code.
- \*7 Refer to Table D-7, No. 126 key scan code.

**Appendix. D Keyboard Scan/Character Codes**

*Table D-2 Scan codes with left Shift key*

Cap No.	Key top	Code set 1				Code set 2													
		Make		Break		Make		Break											
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	E0	12

**Note :** The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left <b>Shift</b>	With right <b>Shift</b>
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

*Table D-3 Scan codes in Numlock mode*

Cap No.	Key top	Code set 1								Code set 2									
		Make				Break				Make				Break					
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

*Table D-4 Scan codes with Fn key*

Cap No.	Keytop	Code set 1				Code set 2				
		Make		Break		Make		Break		
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
121	ARROW		45		C5		77		F0	77
122	NUMERIC		45		C5		77		F0	77
123	Scrl		46		C5		7E		F0	7E

**Appendix. D Keyboard Scan/Character Codes**

*Table D-5 Scan codes in overlay mode*

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
08	7	(7)	47		C7			6C	F0	6C
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

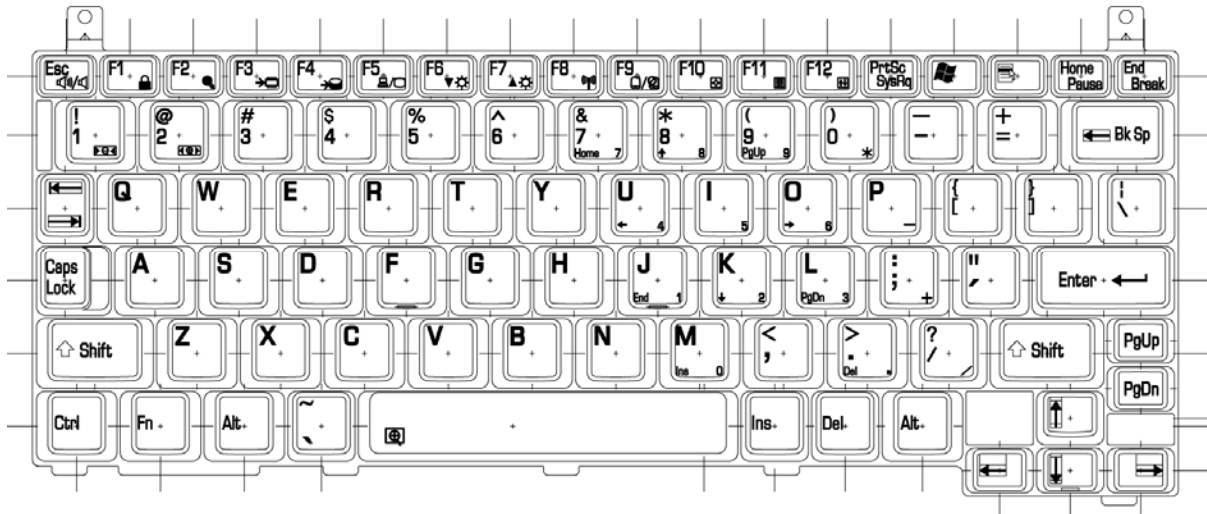


Figure E-1 key layout (US)

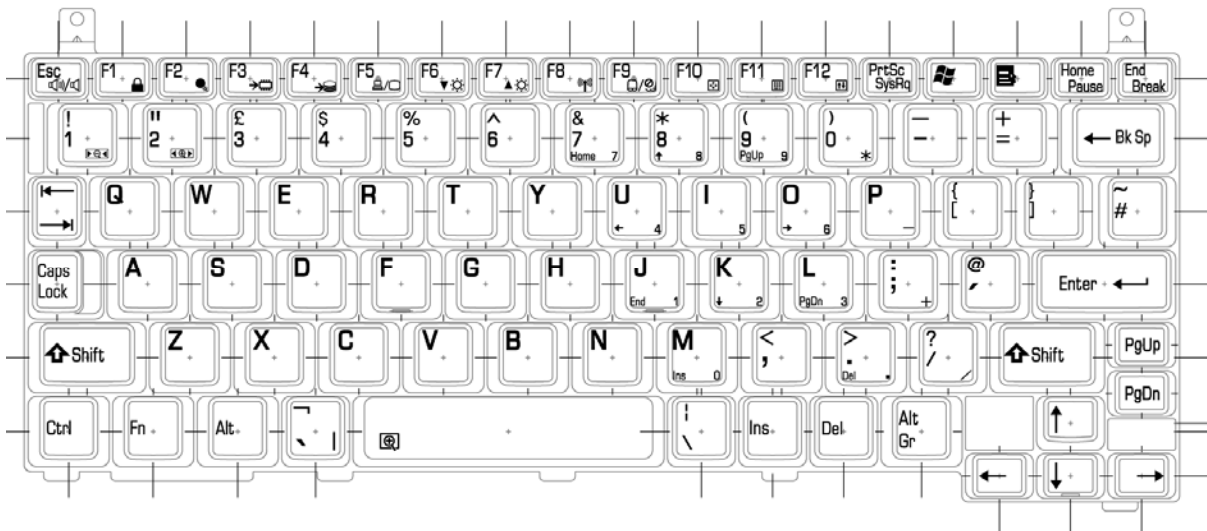


Figure E-2 key layout (UK)

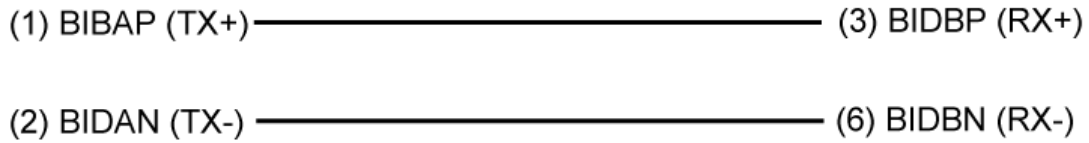


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## Appendix F Wiring Diagrams

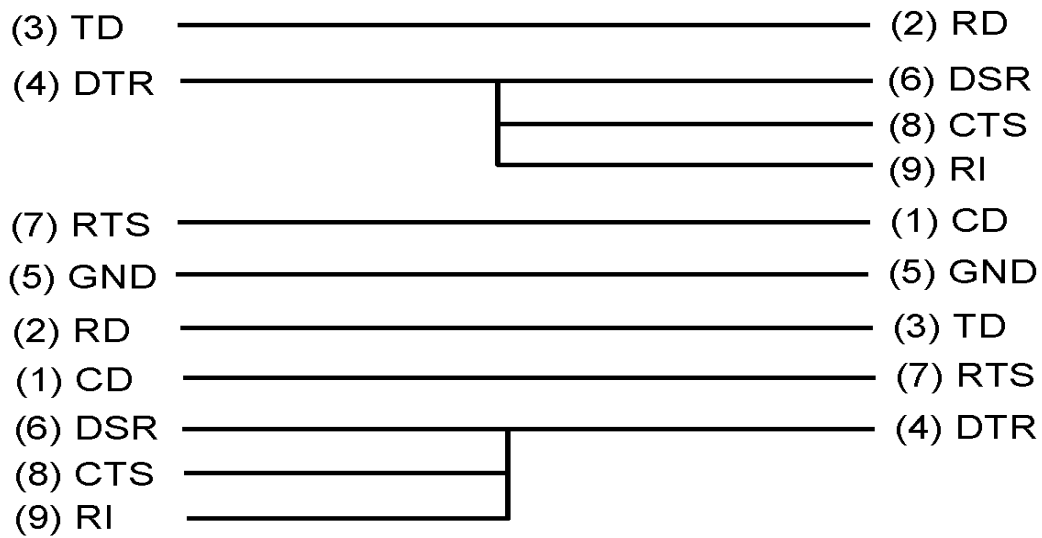
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### F.1 LAN Loopback Connector



*Figure F-1 LAN loopback Connector*

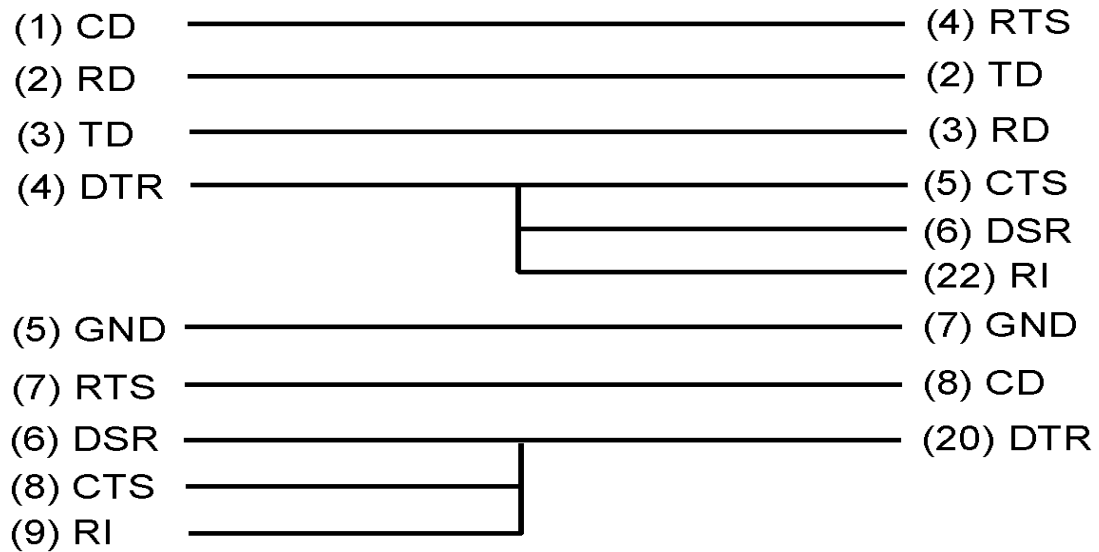
### F.2 RS-232C Cable (9-pin to 9-pin)



*Figure F-2 RS232C cable (9-pin to 9-pin)*



**F.3 RS-232C Cable (9-pin to 25-pin)**



*Figure F-3 RS232C cable (9-pin to 25-pin)*

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## Appendix G BIOS Rewrite Procedures

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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 rewriting disk for the computer that has renewed BIOS data.

### Rewriting the BIOS

**Note:**

1. *Connect the AC adaptor to the computer when you rewrite the BIOS.*
2. *Do not turn off the power while you are rewriting the BIOS. If the rewrite fails, it might be impossible to start up the computer.*
3. *If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been damaged. In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.*

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 a USB FDD and insert the BIOS rewriting disk into either the USB FDD.
5. Turn on the power while holding down the  key (US) or  key (UK). The BIOS rewriting starts.
6. When the process is completed, eject the BIOS rewriting disk and the system is reset. The



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## Appendix H EC/KBC Rewrite Procedures

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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. Be sure to connect both battery and AC adapter 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 content of the EC/KBC has been erased. In this case, insert the EC/KBC rewriting disk, and the EC/KBC will be rewritten.
  5. The time of rewriting EC/KBC depends 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 a USB FDD and insert the EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the **Tab** key. The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.



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## Appendix I Reliability

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The following table shows MTBF (Mean Time between Failures).

*Table I-1 MTBF*

<b>MTBF</b>	<b>Time (hours)</b>
System	5,228



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