Toshiba Personal Computer

PORTEGE M400

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-541

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Toshiba PORTEGE M400 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE M400, referred to as PORTEGE M400 in this manual.

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. Be sure to use the PH Point size "0" and "1" screwdrivers complying with the ISO/DIS 8764-1:1996. 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 Satellite R10 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 assignment
❑ Keyboard scan/character codes
❑ Key layout
❑ Wiring Diagrams
❑ BIOS Rewrite Procedures
❑ EC/KBC Rewrite Procedures
❑ Reliability
❑ Maintenance of TOSHIBA RAID

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 Satellite R10 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 PORTEGE M400 is an ultra thin and lightweight tablet PC realizing cable-less environment on a table by wireless function with an Intel® Core™ Duo or Intel® Core™ Solo processor realizing high performance.

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

❑ Microprocessor

The PORTEGE M400 computer is equipped with an Intel® Core™ Duo Processor or Intel® Core™ Solo Processor. These processors incorporate a math co-processor, a 2MB L2 cache memory.

The PC comes in with one of the following speeds:

- Intel® Core™ Duo Processor

  1.66GHz (Processor Number : T2300)
  1.83GHz (Processor Number : T2400)
  2.00GHz (Processor Number : T2500)
  2.16GHz (Processor Number : T2600)

- Intel® Core™ Solo Processor

  1.66GHz (Processor Number : T1300)

❑ Chipset

Equipped with Intel 945GM as North Bridge, Intel ICH7-M as South Bridge and Texas Instrument PCI7412ZHK as Card Controller.

❑ VGA Controller

An internal Graphics Controller in North Bridge is used.

❑ Memory

Two DDR2 SO-DIMM slots support DDR2 533 or DDR2 667. Memory modules can be installed to a maximum of 4GB (4,096MB). Memory modules of 256MB, 512MB, 1GB and 2GB sizes are available.

❑ HDD

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

- 40/60/80/100/120GB

❑ Selectable Bay

Supports hot-swap with DVD-ROM & CD-R/RW drive, DVD Super Multi drive and 2nd HDD.

❑ USB FDD

A 3.5 inch USB FDD supports 720KB/1.44MB formats.

❑ Display

The display swivels automatically 0/90/180/270 degrees by display driver. LCD and External monitor can be displayed at the same time.

LCD : Built-in 12.1 inch, 16M colors, XGA (1,024×768dots)/
       SXGA+ (1,400×1,050 dots), thin type low temperature poly-silicon TFT color
       display.

External monitor : Supported via an RGB connector.

❑ Digitizer

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

❑ Tablet pen / Reserve pen

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

❑ Keyboard

The keyboard has 84(US)/85(UK) keys and supports Windows key and Hot key.

❑ Touch pad

A touch pad is installed as a pointing device.

❑ Batteries

The computer has three batteries: a rechargeable Lithium-Ion main battery pack, a rechargeable Lithium-Ion secondary battery pack (Provided with some models or option) and an RTC battery (that backs up the Real Time Clock and CMOS memory).

❑   USB (Universal Serial Bus)

Three USB ports are usable. 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.

❑   PC card slot

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

❑   Bridge media slot

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

❑   Sound system

The sound system is equipped with the following features:

- Built-in stereo speakers
- Built-in stereo microphone
- Stereo Headphone jack (3.5mm mini headphone jack)
- External microphone jack (3.5mm mini microphone jack)
- Dial volume
- VoIP (Receiving)

❑   Switch/Button

Windows Security tablet button, ESC/Rotation button, Cross Function button, Presentation button, Toshiba Assist button and Wireless communication switch are available.

❑   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 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 condition. It has an RJ11 modem jack for connecting to a telephone line.

❑   LAN

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

❑   Wireless LAN

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

❑   i.LINK (IEEE1394)

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

❑   Docking port

TOSHIBA Express Port Replicator can be connected through docking port on the
bottom.

❑   Bluetooth

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

❑   Fingerprint sensor

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

Figure 1-1 shows the front of the computer and Figure 1-2 shows the system units configuration.
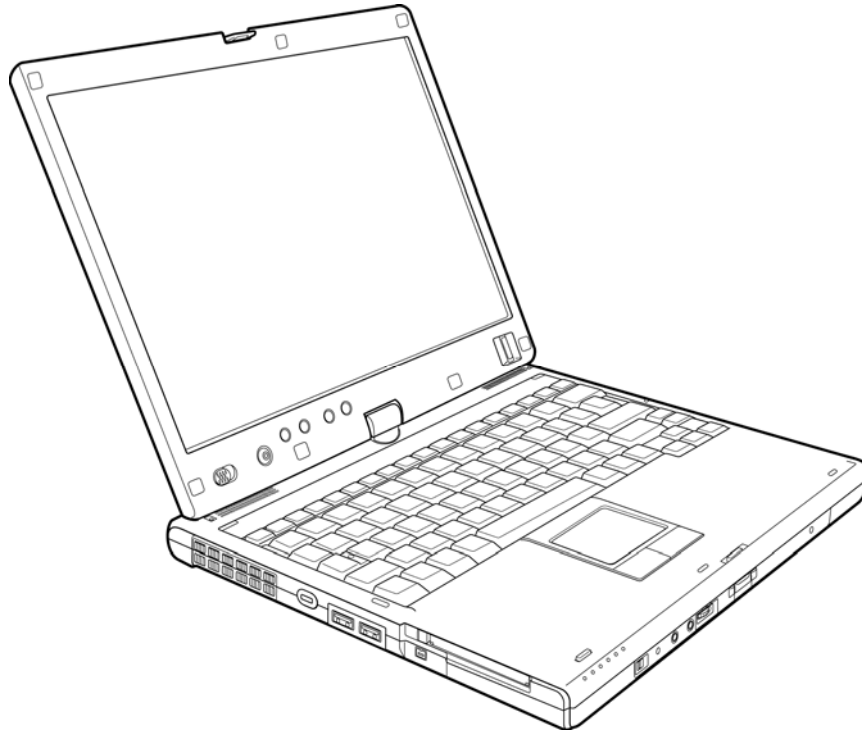
Figure 1-1 Front of the computer
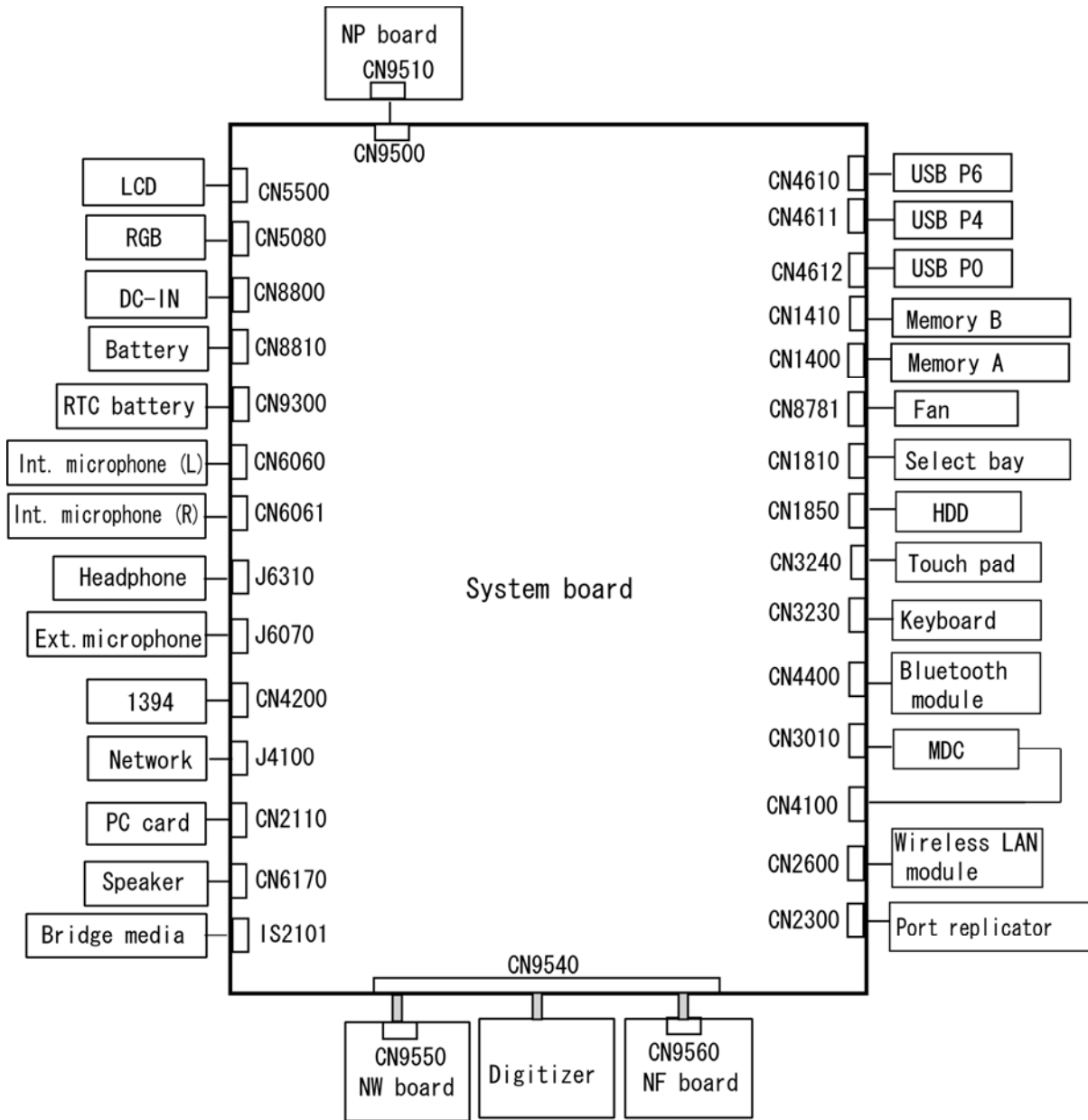
Figure 1-2 System units configuration

Figure 1-3 shows the system block diagram.
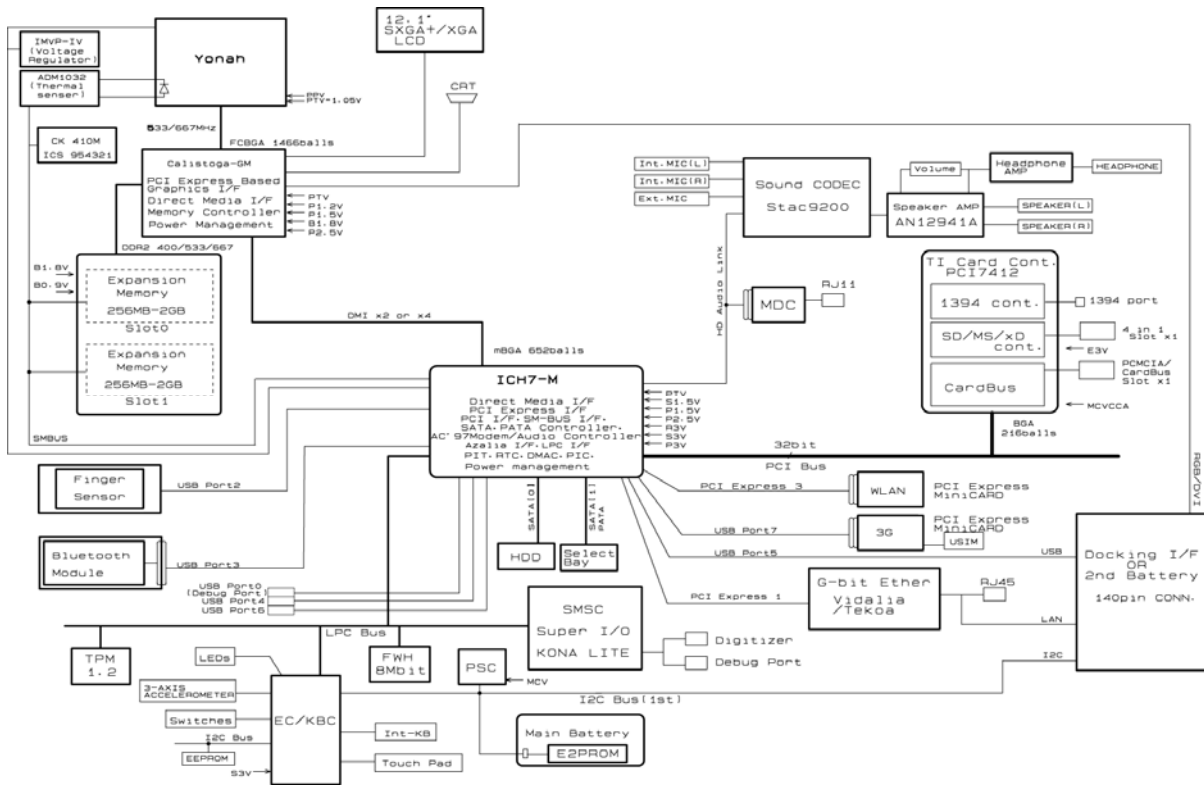
Figure 1-3 System block diagram

The PC contains the following components.

❑ CPU

- Intel® Core™ Solo Processor

     1.66GHz (Processor Number : T1300)

- Intel® Core™ Duo Processor

     1.66GHz (Processor Number : T2300)
     1.83GHz (Processor Number : T2400)
     2.00GHz (Processor Number : T2500)
     2.16GHz (Processor Number : T2600)

   – Core voltage : 0.5V to 1.3V
      FSB   : 667MHz
      L1 cache   : 64KB [32KB (Code) + 32KB (Data)]
      L2 cache   : 2MB
      Support   : Geyservile III, Deeper Sleep Mode
      Package   : 478-pin Micro FC-PGA package

❑ Memory

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

   Memory

   - DDR2-SDRAM
   - DDR2-533 or DDR2-667 memory
   - 1.8 volt operation

   Memory Module

   - 200 pin, SO Dual In-line Memory Module (SO-DIMM)
   - PC2-4300
   - 512MB/1GB/2GB
     – 512MB   512Mb×8
     – 1 GB   512Mb×16
     – 2GB   512Mb×32

❑ BIOS ROM (Flash memory)

   - One STMicro M50FW080NB5G is used.
   - 8Mbits of flash memory are used.

❑   PCI chipset

This gate array incorporates the following elements and functions.

Intel 945GM (North Bridge)

- Yonah Processor System Bus Support
- System Memory Interface : supports DDR2-400/DDR2-533/DDR2-667 4GBmax.
- Internal Graphics Controller : Inter Generation 3.5 Integrated GFX Core (250MHz)
- DMI (Direct Media Interface)
- ICH Support
- 1,466-ball, 37.5×37.5×2.56mm, FC-BGA package

Intel ICH7-M (South Bridge)

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

PC Card Controller (Texas Instruments-made PCI7412ZHK)

- PCI interface
- CardBus/Ultra Media Controller (1soket)
- SD/MMC, Memory Stick, XD card Controller
- IEEEE1394 controller
- 288-ball, 16mm×16mm×1.4mm BGA package

❑ GPU controller (Internal graphic controller)

- VRAM : External DDR SDRAM MAX=224MB, Default=16MB
- PCI Express interface
- LCD I/F LVDS 2ch

❑ Batteries

The main battery is a detachable lithium-ion battery (10.8V, 4700mAh, 6cell), the secondary battery (Provided with some models or option) is a detachable lithium-ion battery (10.8V, 4000mAh, 6cell) and the RTC battery is a nickel hydrogen battery (2.4V-16mAh).

❑ Modem controller

Supported by MDC. Using of the Azalia Line.

❑ LAN controller (Intel-made Vidalia)

Controls LAN and supports 10/100Mbit or Gigabit Ethernet.

❑ Other main system chips

- EC/KBC (Renesas-made LPC microcontroller M306KAFCLRP U0)
- PSC (Toshiba-made TMP86FS49UG)
- Temperature sensor (ADM-made 1032ARMZ)
- Acceleration sensor (ST Micro-made LIS3L02AQ3)
- Super I/O (SMSC-made LPC47N217-JV)
- SOUND CODEC (SigmaTel-made STAC9200)
- SP AMP (Matsushita-made AN12941A) + HP AMP (MAX4410)
- CLK Generator (ICS-made 954321AGLFT)

1.2   2.5-inch Hard Disk Drive

A compact, high-capacity SATA HDD with a height of 9.5mm contains a 2.5-inch magnetic disk and magnetic heads.

Figure 1-4 shows a view of the 2.5-inch HDD and Tables 1-1 list the specifications.
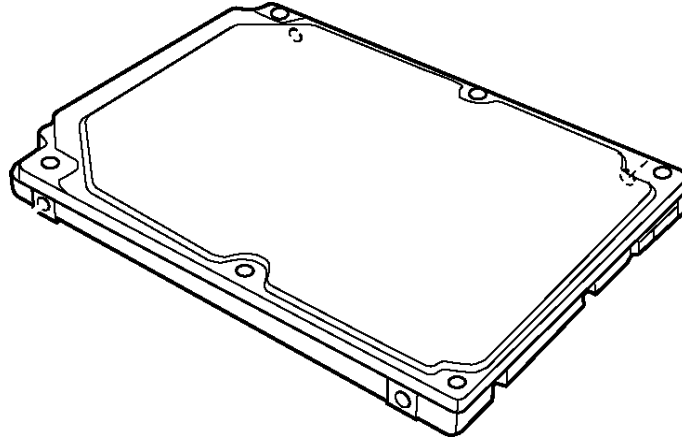
Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD Specification (1/3)

Items		Specifications		
		FUJITSU G8BC00028610	**FUJITSU G8BC00028810**	**FUJITSU G8BC00028A10**
Outline dimensions	Width (mm)	70		
	Height (mm)	9.5		
	Depth (mm)	100		
	Weight (g)	101 max.		
Storage size (formatted)		60GB	80GB	100GB
Speed (RPM)		5,400		
Data transfer rate To/From media (MB/s) To/From host (Gbps)		64.0 max. 1.5 (150 MB/s) max.		
Data buffer size (MB)		8		
Average seek time Read (ms)		12 typ.		
Motor startup time (s)		4 typ.		

Table 1-1 2.5-inch HDD Specifications (2/3)

Items		Specifications			
		TOSHIBA HDD2D34BZK01	**TOSHIBA HDD2D33BZK01**	**TOSHIBA HDD2D32BZK01**	**TOSHIBA HDD2D30BZK01**
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100			
	Weight (g)	98 max.	102 max.		
Storage size (formatted)		40GB	60GB	80GB	100GB
Speed (RPM)		5,400			
Data transfer rate (Mb/s)		218-429			236.1-456.0
Data buffer size (KB)		8,192			16,384
Average seek time Read (ms)		12			
Motor startup time (s)		4 typ.			

Items		Specifications			
		HITACH GST G8BC00029410	**HITACH GST G8BC00029610**	**HITACH GST G8BC00029810**	**HITACH GST G8BC00029A10**
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 max.		
Storage size (formatted)		40GB	60GB	80GB	100GB
Speed (RPM)		5,400			
Data transfer rate To/From media (Mb/s) To/From host (Gbps)		493 max. 1.5			
Data buffer size (MB)		8			
Average seek time Read (ms)		12 typ.			
Motor startup time (s)		3.5 typ.			

Table 1-1 2.5-inch HDD Specifications (3/3)

Items		Specifications	
		TOSHIBA **HDD2D35BZK01**	**TOSHIBA** **HDD2D31BZK01**
Outline dimensions	Width (mm)	69.85	
	Height (mm)	9.5	
	Depth (mm)	100	
	Weight (g)	98 max.	102 max.
Storage size (formatted)		60GB	120GB
Speed (RPM)		5,400	
Data transfer rate (Mb/s)		244.7-474.7	
Data buffer size (KB)		8,192	
Average seek time Read (ms)		12	
Motor startup time (s)		3.5 typ.	

Items		Specifications
		HITACH GST **G8BC0002NA10**
Outline dimensions	Width (mm)	69.85±0.25
	Height (mm)	9.5±0.2
	Depth (mm)	100.2±0.25
	Weight (g)	115 max.
Storage size (formatted)		100GB
Speed (RPM)		7,200
Data transfer rate To/From media (Mb/s) To/From host (Gbps)		629 max. 1.5
Data buffer size (KB)		8,192
Average seek time Read (ms)		10 typ.
Motor startup time (s)		4 typ.

1.3 Optical Drive

1.3.1 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-ROM, DVD-ROM and CD-R/RW.

The DVD-ROM & CD-R/RW drive is shown in Figure 1-5. The dimensions and specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-2, Table 1-3.
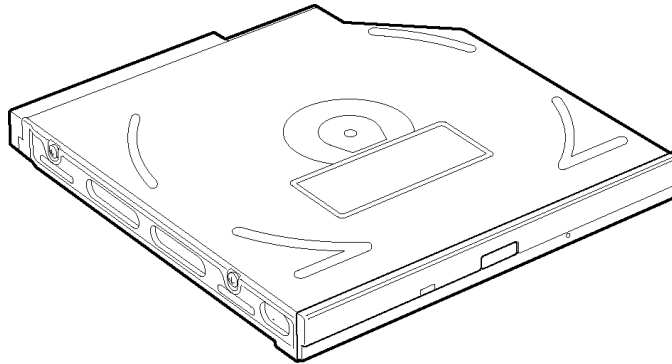
Figure 1-5 DVD-ROM & CD-R/RW drive

Table 1-2 DVD-ROM & CD-R/RW drive outline dimensions

Parameter		Standard value
Outline dimensions	Maker (code)	MATSUSHITA (G8CC00025A20)
	Width (mm)	128 (excluding projections)
	Height (mm)	9.5 (excluding projections)
	Depth (mm)	129 (excluding projections)
	Mass (g)	141±5

Table 1-3 DVD-ROM & CD-R/RW drive specifications

Item	Specifications
	MATSUSHITA G8CC00025A20
Data transfer speed (Read) DVD-ROM CD-ROM	 Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW High Speed CD-RW Ultra Speed CD-RW	 Max. 24x CAV Max. 4x CLV Max. 10x CLV Max. 24x CAV
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode	 16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Access time (ms) CD-ROM DVD-ROM	 150 typ. (Random) 170 typ. (Random)
Data Buffer Capacity	2MB
Supported Disks	CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW DVD:DVD-ROM, DVD-R, DVD-RW, DVD+R, DVD+RW, DVD+RAM, DVD+R DL
Supported Formats	CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, CD-Extra(CD+), CD-text DVD:DVD-R, DVD-RW (Ver.1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.3.2 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.

The DVD Super Multi drive is shown in Figure 1-6. The dimensions and specifications of the DVD Super Multi drive are described in Table 1-4, Table 1-5.
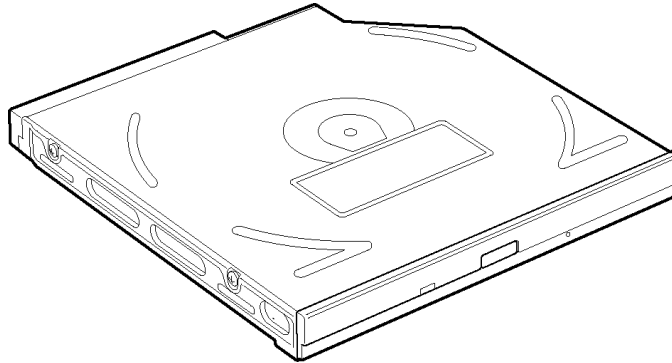
Figure 1-6 DVD Super Multi drive

Table 1-4 DVD Super Multi drive outline dimensions

Parameter		Standard value
Outline dimensions	Maker	MATSUSHITA (G8CC00026A23)
	Width (mm)	128 (excluding projections)
	Height (mm)	9.5 (excluding projections)
	Depth (mm)	129 (excluding projections)
	Mass (g)	145±5

Table 1-5 DVD Super Multi drive specifications

Item	Specifications
	MATSUSHITA G8CC00026A23

Data transfer speed (Read)
 	
  DVD-ROM
  CD-ROM
	
	Max. 8x CAV
	Max. 24x CAV

Data transfer speed (Write)
 	
  CD-R
  CD-RW
  High Speed CD-RW
  Ultra Speed CD-RW
  DVD-R
  DVD-RW
  DVD+R
  DVD+RW
  DVD-RAM
	
	Max. 24x ZCLV
	Max. 4x CLV
	Max. 10x CLV
	Max. 10x CLV
	Max. 2x CLV
	Max. 2x CLV
	Max. 2.4x CLV
	Max. 2.4x CLV
	Max. 2x ZCLV (4.7GB)

ATAPI Burst (MB/s)
 	
  PIO Mode
  DMA Mode
  Ultra DMA Mode
	
	16.6 (PIO MODE4)
	16.6 (Multi Word Mode2)
	33.3 (Ultra DMA Mode2)

Access time (ms)
 	
  CD-ROM
  DVD-ROM
	
	150 typ. (Random)
	180 typ. (Random)

Data Buffer Capacity	2MB

Supported Disks	CD: CD-ROM (12cm, 8cm), CD-R, CD-RW
	
	DVD:DVD-ROM, DVD-R, DVD-RAM,
	     DVD-RW, DVD+R, DVD+RW,
	     DVD+R DL

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

1.3.3 DVD Super Multi drive (Double-layer)

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

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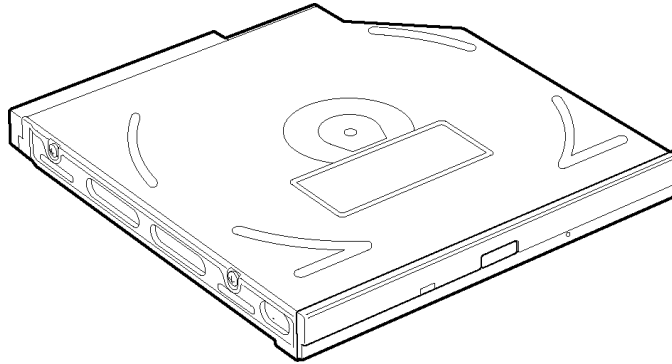
Figure 1-7 DVD Super Multi drive (Double-layer)

Table 1-6 DVD Super Multi drive (Double-layer) outline dimensions

Parameter		Standard value
Outline dimensions	Maker	MATSUSHITA (G8CC00030120)
	Width (mm)	128.0 (excluding projections)
	Height (mm)	9.5 (excluding projections)
	Depth (mm)	129.0 (excluding projections)
	Mass (g)	140±5

Table 1-7 DVD Super Multi drive (Double-layer) specifications

Parameter		Drive Specification
		MATSUSHITA G8CC00030120
Data transfer speed	Read (max.)	DVD-ROM 8x(CAV) CD-ROM 24x(CAV)
	Write (max.)	CD-R 24x (ZCLV) CD-RW 4x(CLV) High Speed CD-RW 10x(CLV) Ultra Speed CD-RW 16x(CLV) DVD-R 8x(ZCLV) DVD-R Double Layer 2x(CLV) DVD-RW 4x(ZCLV) DVD+R 8x(ZCLV) DVD+R Double Layer 2.4x(CLV) DVD+RW 4x(ZCLV) DVD-RAM 2-3x(ZCLV) (4.7GB)
	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 typ. (Random)
	DVD-ROM	180 typ. (Random)
Buffer memory		2MB
Supported Disks	CD	CD-ROM (12cm, 8cm), CD-R, CD-RW
	DVD	DVD-ROM, DVD-R, DVD-R DL, DVD-RAM, DVD-RW, DVD+R, DVD+R DL, DVD+RW
Supported Formats	CD	CD-DA, CD-ROM, CD-ROM XA, Photo CD (multiSession), Video CD, CD-Extra (CD+), CD-text
	DVD	DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-R DL, DVD-RW (Ver.1.1, Ver.1.2), DVD-RAM, DVD+R, DVD+R DL, DVD+RW

1.4 Keyboard

The keyboard is mounted 84(US)/85(UK) keys that consist of character key and control key, and in conformity with ASCII. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure1-8 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-8 Keyboard

1.5 TFT Color Display

The TFT color display consists of a LCD module and FL inverter board.

1.5.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display images and characters of 16M colors with 1,400×1,050(SXGA+)/ 1,024×768(XGA) resolution.

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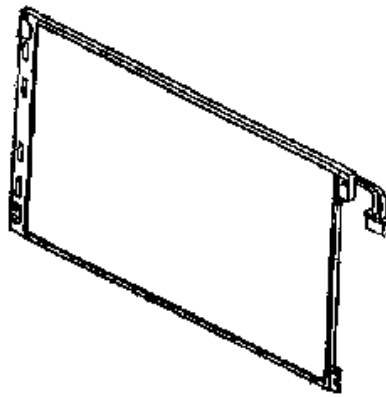
Figure 1-9 LCD module

Table 1-8 LCD module specifications (12.1 TFT)

Item	Specifications
	TMD G33C00037110 (XGA)
Number of Dots	1,024 (W) x 768 (H)
Dot spacing (mm)	0.24(H) x 0.24(V)
Display range (mm)	245.76(W) x 184.32(H)
Outline dimensions	269(W) x 199(H) x 6.7Max(D)

Item	Specifications
	TMD G33C00019210 (SXGA+)
Number of Dots	1,400 (W) x 1050 (H)
Dot spacing (mm)	0.176(H) x 0.176(V)
Display range (mm)	245.76(W) x 184.32(H)
Outline dimensions	269(W) x 199(H) x 6.7Max(D)

1.5.2 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
		G71C00011111
Input	Voltage (V)	5 (DC)
	Power (W)	7
Output	Voltage (V)	750 (r.m.s)
	Power	5W / 7VA
	Current (mA)	6.00 (r.m.s)

1.6 Power Supply

The power supply supplies different voltages to the system board.

The power supply microcontroller has 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.

Table 1-10 lists the power supply output specifications.

Table 1-10 Power supply output specifications

Name	Power supply (Yes/No)				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
PPV	0.5 -1.3	No	No	No	CPU
PTV	1.05	No	No	No	CPU, GMCH, ICH7-M
1R5-P1V	1.5	No	No	No	CPU, GMCH, ICH7-M, PCI-e Mini Card
1R8-B1V	1.8	**Yes**	No	No	GMCH, DDR2-SDRAM
2R5-P2V	2.5	No	No	No	GMCH, ICH7-M
LAN2R5-E2V	2.5	**Yes**	**Yes**/No	No	LAN
MR0R9-B0V	0.9	**Yes**	No	No	GMCH, DDR2-SDRAM
0R9-P0V	0.9	No	No	No	DDR2-SDRAM
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, GMCH, SDRAM (SPD), ICH7-M, HDD, PC-Card Cont., PC-Card Power, PCI-e Mini Card (WLAN, 3G), FWH, LED, TPM, Super I/O, LCD, STAC9200
E3V	3.3	**Yes**	**Yes**/No	No	ICH7-M, PCI-e Mini Card (WLAN, 3G), MDC
S3V	3.3	**Yes**	**Yes**	No	EC/KBC
FM-P3V	3.3	No	No	No	Flash Media
BT-P3V	3.3	No	No	No	Bluetooth
LAN-E3V	3.3	**Yes**	**Yes**/No	No	LAN
LAN1R2-E1V	1.2	**Yes**	**Yes**/No	No	LAN
P5V	5	No	No	No	ICH7-M, ODD, HDD, PC-Card Power, LED, KB, PAD, CRT, FAN, FL-Inv
E5V	5	**Yes**	**Yes**/No	No	ICH7-M, USB Power
M5V	5	**Yes**	**Yes**	No	LED
MCV	5	**Yes**	**Yes**	No	PSC
SND-P5V	5	No	No	No	AN12941A
A4R7-P4V	4.7	No	No	No	STAC9200, AN12941A
R3V	2.0-3.5	**Yes**	**Yes**	**Yes**	ICH7-M(RTC)

1.7 Batteries

The PC has the following three batteries.

- ❑ Main battery

- ❑ Secondary battery (Provided with some models or option)

- ❑ Real time clock (RTC) battery

Table 1-11 lists the specifications for these two batteries.

Table 1-11 Battery specifications

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0004S510	Lithium ion (6 cell)	10.8 V	4,700mAh
	G71C0004S610			
Secondary battery	G71C0006K110	Lithium ion (6 cell)	10.8 V	4,000mAh
	G71C0006K210			
Real time clock (RTC) battery	GDM710000041	Nickel hydrogen	2.4V	16mAh

1.7.1 Main Battery

The main battery is the primary power supply for the computer when the AC adapter is not connected. In standby (instant recovery) mode, the main battery maintains the current status of the computer.

1.7.2 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.

❑ Quick 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 or in standby mode. Table 1-12 lists the main battery charging time.

Table 1-12 Time required for charges of main battery

Battery Capacity	Charging Time	
	Normal charge	Quick charge
Main (4700mAh)	about 3.0 to 13.0	about 3.0
Second (4000mAh)	about 3.0 to 10.5	about 3.0

Quick battery 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.

❑ 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
Main (4700mAh)	Standby mode	About 6 days
	Boot mode	About 70 days
Second (4000mAh)	Standby mode	About 5 days
	Boot mode	About 60 days

1.7.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory. Table 1-14 lists the battery charging time and data preservation times.

Table 1-14 RTC battery charging/data preservation time

		Time
Charging time	AC adapter or main battery in use (Power ON)	about 8 hours
Data preservation time (when fully charged)		about 30 days

1.8 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-15 lists the AC adapter specifications.

Table 1-15 AC adapter specifications

Parameter	Specification	
	G71C00043310 (2-pin)	G71C00049410/G71C00049510 (3-pin)
Power	75W (Peak 90W)	
Input voltage	100V/240V	
Input frequency	50Hz to 60Hz	
Input current	1.5A or less (100V-240V)	
Output voltage	15V	
Output current	0A to 5A (At constant voltage mode) 5A to 6A (At surge load mode)	

Chapter 2

Troubleshooting

Chapter 2   Contents

Figures

Tables

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	9. Modem
2. System board	10. Bluetooth
3. 3.5" USB FDD	11. LAN
4. 2.5" HDD	12. Sound
5. Keyboard	13. Bridge media slot
6. Display	14. Tablet pen
7. Touch pad	15. Wireless LAN
8. Optical drive	16. Fingerprint sensor

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

NOTE: After replacing the System board or CPU, it is necessary to execute the subtest 01 Initial configuration of 3.4 Setting of the hardware configuration in Chapter 3.

The following tools are necessary in addition to tools described in Chapter 3 for implementing the Diagnostics procedures:

1. Phillips screwdrivers
2. Toshiba MS-DOS system FD
3. Debug test cable (for debug port test)
4. RS-232C cross-cable (for debug port test)
5. Test board (for debug port test)
6. External monitor (for display check)

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

(1) Cable connection is described as a line in the figures.
(2) Pin connection is described as an arrow in the figure.
<e.g> Connection of modem
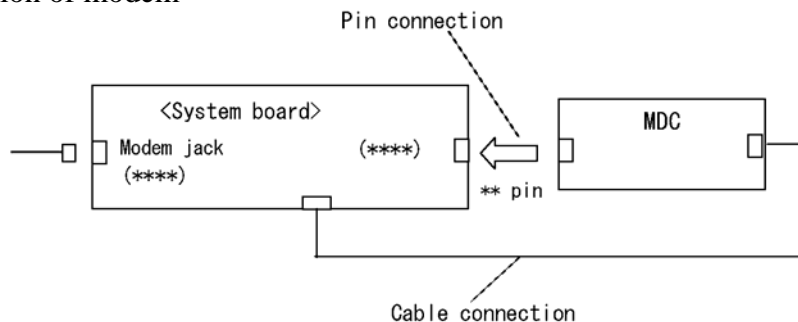
2.2　Troubleshooting Flowchart

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

❑ Make sure that Toshiba Windows® XP Tablet PC Edition is installed on the hard disk. Other operating systems can cause the computer malfunction.

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

```
                        ┌──────────────┐
                        │    START     │
                        └──────┬───────┘
                               │
                ┌──────────────▼──────────────┐
                │    Connect the AC adaptor    │
                │     to the DC IN socket.     │
                └──────────────┬──────────────┘
                               │
                               │
                       ╱───────▼────────╲         No     ┌────────────────────────────┐
                      ╱ Does the DC IN    ╲──────────────▶│ Perform the Power Supply   │
                      ╲  Icon glow?       ╱                │ Troubleshooting Procedures │
                       ╲────────┬────────╱                 │ in section 2.3.            │
                               │ Yes                      └────────────────────────────┘
                               │
                       ╱───────▼────────╲         No     ┌────────────────────────────┐
                      ╱ Does the Battery  ╲──────────────▶│ Perform the Power Supply   │
                      ╲  Icon glow?       ╱                │ Troubleshooting Procedures │
                       ╲────────┬────────╱                 │ in section 2.3.            │
                               │ Yes                      └────────────────────────────┘
                               │
                ┌──────────────▼──────────────┐
                │    Turn the Power Switch on. │
                └──────────────┬──────────────┘
                               │
                       ╱───────▼────────╲        Yes     ┌────────────────────────────┐
                      ╱ Does the DC IN Icon flash ╲──────▶│ Perform the Power Supply   │
                      ╲ when the power is turned on?╱      │ Troubleshooting Procedures │
                       ╲────────┬────────╱                 │ in section 2.3.            │
                               │ No                       └────────────────────────────┘
                               │
                       ╱───────▼────────╲        Yes     ┌────────────────────────────┐
                      ╱ Is an error message ╲────────────▶│ Perform the System Board   │
                      ╲  displayed?        ╱              │ Troubleshooting            │
                       ╲────────┬────────╱                 │ Procedures in section 2.4. │
                               │ No                       └────────────────────────────┘
                               │
                       ╱───────▼────────╲         No     ┌────────────────────────────┐
                      ╱ Is the             ╲─────────────▶│ Perform the Display        │
                      ╲ start-up logo      ╱              │ Troubleshooting Procedures │
                       ╲ message displayed? ╱              │ in section 2.8.            │
                        ╲──────┬──────────╱                └────────────────────────────┘
                               │ Yes
                               │
                ┌──────────────▼──────────────┐
                │ If the " Password= " is message│
                │ is displayed, type the password,│
                │     then press enter.        │
                └──────────────┬──────────────┘
                               │
                               │
                       ╱───────▼────────╲         No     ┌────────────────────────────┐
                      ╱ Is Toshiba         ╲─────────────▶│ Perform the Hard Disk Drive│
                      ╲ Windows XP Tablet PC Edition ╱     │ Troubleshooting Procedures │
                       ╲ being loaded?     ╱              │ in section 2.6.            │
                        ╲──────┬──────────╱                └────────────────────────────┘
                               │ Yes
                              ┌─┐
                              │1│
                              └─┘
```

Figure 2-1 Troubleshooting flowchart (1/2)

①

```
          ╱╲
         ╱  ╲         No     ┌──────────────────────┐
┌───────╱      ╲─────────────▶│Perform the Keyboard  │
│      ╲ Do typed╱            │Troubleshooting       │
│       ╲characters╱          │Procedures in section │
│        ╲appear  ╱           │2.7.                  │
│         ╲correctly?         └──────────────────────┘
│          ╲╱
│           │Yes
│           ▼
│          ╱╲
│         ╱  ╲         No     ┌──────────────────────┐
│        ╱    ╲──────────────▶│Perform the Touch pad │
│       ╲ Do the ╱            │Troubleshooting       │
│        ╲touch pad╱          │Procedures in section │
│         ╲work   ╱           │2.9.                  │
│          ╲correctly?        └──────────────────────┘
│           ╲╱
│            │Yes
```

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

Yes

Do the touch pad work correctly? — No → Perform the Touch pad Troubleshooting Procedures in section 2.9.

Yes

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

Is the diagnostics test loaded? — No → Perform USB 3.5" FDD Troubleshooting Procedures in section 2.5.

Yes

Perform each test.

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

No

Perform/repeat running test

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

No

System is normal.

(END)

Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If any trouble is detected on the System test, Memory test, ASYNC test, Real timer test, NDP test or expansion test, perform the System board Troubleshooting Procedures in Section 2.4.

2. If any trouble is detected on the Keyboard, perform the Keyboard Troubleshooting Procedures in Section 2.7.

3. If any trouble is detected on the Display, perform the Display Troubleshooting Procedures in Section 2.8.

4. If any trouble is detected on the Floppy disk, perform the USB FDD Troubleshooting Procedures in Section 2.5.

5. If any trouble is detected on the Hard disk, perform the HDD Troubleshooting Procedures in Section 2.6.

6. If any trouble is detected on the Touch pad, perform the Touch Pad Troubleshooting Procedures in Section 2.9.

7. If any trouble is detected on the Selectable bay, perform the Selectable bay Troubleshooting Procedures in Section 2.10.

8. If any trouble is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.

9. If any trouble is detected on the Bluetooth, perform the Bluetooth Troubleshooting Procedures in Section 2.12.

10. If any trouble is detected on the LAN, perform the LAN Troubleshooting Procedures in Section 2.13.

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

12. If any trouble is detected on the Bridge media slot, perform the Bridge media Slot Troubleshooting Procedures in Section 2.15.

13. If any trouble is detected on the Tablet pen, perform the Tablet Pen Troubleshooting Procedures in Section 2.16.

14. If any trouble is detected on the Wireless LAN, perform the Wireless LAN Troubleshooting Procedures in Section 2.17.

15. If any trouble is detected on the Fingerprint sensor, perform the Fingerprint sensor Troubleshooting Procedures in Section 2.18.

2.3 Power Supply Troubleshooting

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

         Procedure 1:   Power Supply Icon Check

         Procedure 2:   Error Code Check

         Procedure 3:   Connection Check

         Procedure 4:   Quick Charge Check

         Procedure 5:   Replacement Check

Procedure 1   Power Supply Icon Check

The following two icons indicate the power supply status:

❑ Battery icon

❑ DC IN icon

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

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights 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.
Flashes orange (at being switched on)	The battery level is low and the power is turned on only with the battery.
Doesn't light	Any condition other than those above.

Table 2-2 DC IN icon

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

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

When icons are blinking, perform the following procedure.

1. Remove the battery pack and the AC adapter and cut off the power supply to the computer by force.

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

If icons are 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 recommended AC adapter (G71C00043310 (2-pin), G71C00049410 (3-pin) or G71C00049510 (3-pin)).

Procedure 2   Error Code Check

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

❑ Start   Off for 2 seconds

❑ Error code (8 bit)

     "1"   On for one second

     "0"   On for half second

     Interval between data bits   On for half second

The error code begins with LSB (Least Significant bit)

Example: Error code 11h (Error codes are given in hexadecimal format.)
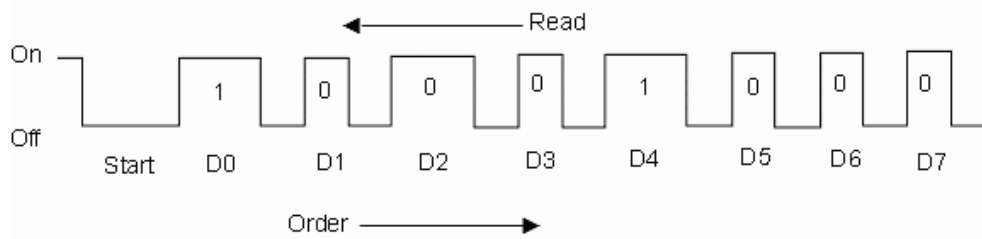
Check 1   Convert the DC IN icon blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

❑ Error code

Error code	Power supply of error detected
1*h	AC Adapter
2*h	1st battery
3*h	2nd battery
4*h	S3V output (P60)
5*h	E5V output (P61)
6*h	E3V output (P62)
7*h	1R5-E1V output (P63_CH0)
8*h	1R-8-B1V output (P64_CH0)
9*h	PPV output (P65_CH0)
A*h	PTV output (P66_CH0)
B*h	1R5-E1V output (P63_CH1)
C*h	1R8-B1V output (P64_CH1)
D*h	PPV output (P65_CH1)
E*h	PTV output (P66_CH1)

❑ DC power supply (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	TOSHIBA Express Port Replicator output voltage is over 16.5V.
12h	Current from the DC power supply is over 7.0A.
13h	Current from the DC power supply is over 0.5A in no load.
14h	Abnormal current of 0[A] correction has been sensed.

❑ First Battery

Error code	Meaning
22h	Main battery discharge current is over 0.5A in no load.
23h	Main battery charge current is over 4.3A in charging.
24h	Abnormal current of 0[A] correction has been sensed.
25h	Main battery charge current is over 0.3A in not charging.

❑ Second Battery

Error code	Meaning
32h	Second battery discharge current is over 0.5A in no load.
33h	Second battery charge current is over 3.5A in charging.
34h	Abnormal current of 0[A] correction has been sensed.
35h	Second battery charge current is over 0.3A in not charging.

❑ S3V output (P60)

Error code	Meaning
40h	S3V voltage is 3.47V.
45h	S3V voltage is 3.14V or less in normal conditions.
46h	S3V voltage is 3.14V or less at booting up.

❑ E5V output (P61)

Error code	Meaning
50h	E5V voltage is over 6.00V.
51h	E5V voltage is 4.50V or less when the computer is powered on.
52h	E5V voltage is 4.50V or less at booting up.
54h	E5V voltage is 4.50V or less when EV power is maintained and "OUTV1 power = EV power" is specified.

❑ E3V output (P62)

Error code	Meaning
60h	E3V voltage is over 3.96V.
61h	E3V voltage is 2.81V or less when the computer is powered on.
62h	E3V voltage is 2.81V or less at booting up.
64h	E3V voltage is 2.81V or less when EV power is maintained and "OUTV2 power = EV power" is specified.

❑ 1R5-E1V output (P63_CH0)

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

❑ 1R8-B1V output (P64_CH0)

Error code	Meaning
80h	1R8-B1V voltage is over 2.16V.
81h	1R8-B1V voltage is 1.53V or less when the computer is powered on.
82h	1R8-B1V voltage is 1.53V or less at booting up.
84h	1R8-B1V voltage is 1.53V or less when BV power is maintained and "OUTV4 power = BV power" is specified.

❑ PPV output (P65_CH0)

Error code	Meaning
90h	PPV voltage is over 1.80V.
91h	PPV voltage is 0.32V or less when the computer is powered on.
92h	PPV voltage is 0.32V or less at booting up.

❑ PTV output (P66_CH0)

Error code	Meaning
A0h	PTV voltage is over 1.32V.
A1h	PTV voltage is 0.85V or less when the computer is powered on.
A2h	PTV voltage is 0.85V or less at booting up.

❑ 1R5-E1V output (P63_CH1)

Error code	Meaning
B0h	1R5-E1V voltage is over 1.80V.
B1h	1R5-E1V voltage is 1.275V or less when the computer is powered on.
B2h	1R5-E1V voltage is 1.275V or less at booting up.
B4h	1R5-E1V voltage is 1.275V or more when EV power is maintained and "OUTV7 power = EV power" is specified.

❑ 1R8-B1V output (P64_CH1)

Error code	Meaning
C0h	1R8-B1V voltage is over 2.16V.
C1h	1R8-B1V voltage is 1.53V or less when the computer is powered on.
C2h	1R8-B1V voltage is 1.53V or less at booting up.
C4h	1R8-B1V voltage is 1.53V or more when BV power is maintained and "OUTV8 power = BV power" is specified.

❑ PPV output (P65_CH1)

Error code	Meaning
D0h	PPV voltage is over 1.80V.
D1h	PPV voltage is 0.32V or less when the computer is powered on.
D2h	PPV voltage is 0.32V or less at booting up.

❑ PTV output (P66_CH1)

Error code	Meaning
E0h	PTV voltage is over 1.32V.
E1h	PTV voltage is 0.85V or less when the computer is powered on.
E2h	PTV voltage is 0.85V or less at booting up.

Check 3   In the case of error code 10h or 12h, go to Procedure 3.

Check 4   In the case of error code 2*h, go to Check 3 of Procedure 3.

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

Procedure 3   Connection Check

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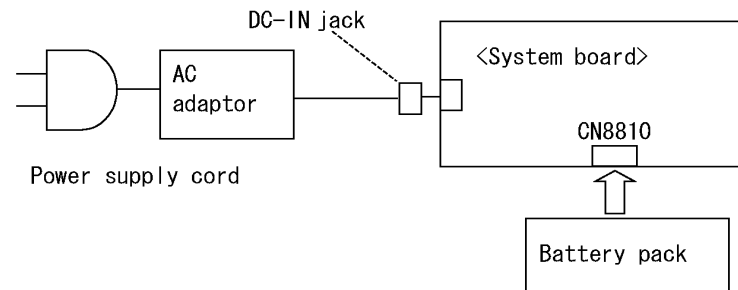
Any of the connectors may be disconnected. Perform starting from Check 1.

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   Replace the AC adapter and the AC power cord with new ones.

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

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

Procedure 4   Quick 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 to the PC. 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 to the PC. 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 power is supplied to the System board by the AC adapter. If either the AC adapter or the System board was damaged, perform the following Checks.

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

Check 1   Replace the AC adapter with a new one. If power is not supplied properly to the PC, perform Check 2.

Check 2   Replace the System board with a new one.

2.4   System board Troubleshooting

This section describes how to determine if the System board is defective. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

       Procedure 1:   Message Check

       Procedure 2:   Debug port (D 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 or Windows XP Tablet PC Edition 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 configuration ***
   Check system.  Then press [F1] key ......
(c)*** Bad memory size ***
   Check system.  Then press [F1] key ......
(d)*** Bad time function ***
   Check system.  Then press [F1] key ......
(e)*** Bad check sum (CMOS) ***
   Check system.  Then press [F1] key ......
(f)*** Bad check sum (ROM) ***
   Check system.  Then press [F1] key ......
(g)RTC battery is low or CMOS checksum is inconsistent
   Press [F1] key to set Date/Time
```

Check 2   If the following error message is displayed on the screen press any key as the message instructs.
The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the System board is damaged. Go to Procedure 3.

```
WARNING:  RESUME FAILURE.

PRESS ANY KEY TO CONTINUE.
```

If any other error message 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 error message (18) is displayed, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If error message (19), (20) or (21) is displayed, go to the 2.5" HDD Troubleshooting Procedures in Section 2.6.

If error message (22) is displayed, go to the USB 3.5" FDD Troubleshooting Procedures in Section 2.5.

If error message `RAID-0 is CRITICAL` or `RAID-1 is DEGRADE` is displayed, go to the 2.5" HDD Troubleshooting Procedures in Section 2.6.

If any other error message is displayed, go to Procedure 2.

```
(1)PIT ERROR
(2)MEMORY REFRESH ERROR
(3)TIMER CH.2 OUT ERROR
(6)FIRST 64KB MEMORY ERROR
(7)FIRST 64KB MEMORY PARITY ERROR
(8)VRAM MEMORY ERROR
(9)SYSTEM MEMORY ERROR
(10)SYSTEM MEMORY PARITY ERROR
(11)EXTENDED MEMORY ERROR
(12)EXTENDED MEMORY PARITY ERROR
(13)DMA PAGE REGISTER ERROR
(14)DMAC #1 ERROR
(15)DMAC #2 ERROR
(16)PIC #1 ERROR
(17)PIC #2 ERROR
(18)KBC ERROR
(19)HDC ERROR
(20)Built-in HDD ERROR
(21)Select Bay HDD ERROR
(22)No FDD ERROR
(23)TIMER INTERRUPT ERROR
(24)RTC UPDATE ERROR

PCI Express error
PROTECTED MODE ERROR
CPU EXCEPTION ERROR
KEYBOARD ERROR
FDC ERROR
Exception ERROR
RAID-0 is CRITICAL
RAID-1 is DEGRADE
```

Procedure 2   Debug Port (D port) Check on Boot Mode

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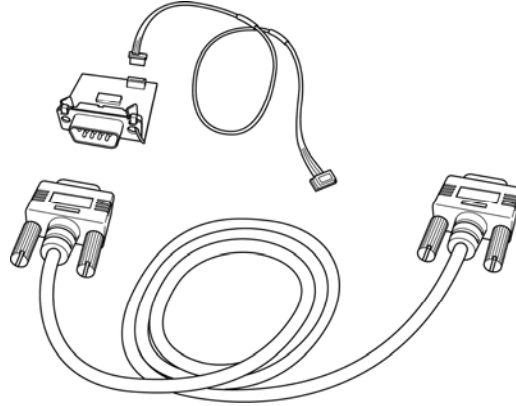
Figure 2-2 A set of tool for debug port test

The test procedures are follows;

1. Connect the debug port test cable to the connector CN3400 of the System board. For disassembling the PC 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 displaying the test results.
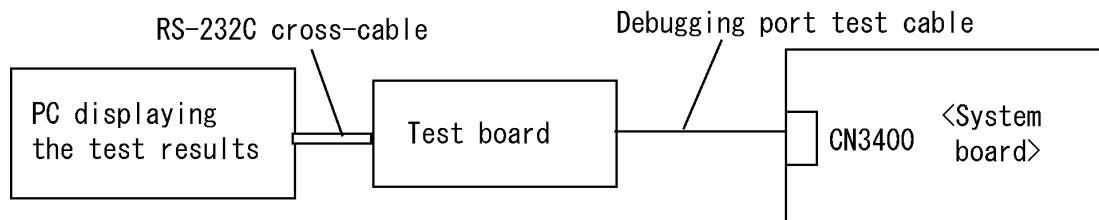
4. Boot the computer in MS-DOS mode.

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

    F100 : 000.000382   IRT_CHK_INI\SYSI_START

    D port status   Time (second) to process   Contents of process

6. When the D port status is FFFFh (normal status), go to Procedure 3.

7. When the D port status falls into any status in Table 2-3, execute Check 1.

Table 2-3 Debug port (Boot mode) error status (1/10)

D port status	Inspection items	Details
	Permission of A20 and Clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCHM, ICHM	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of 3rd Bus data	
F000h	PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite factor flag initialization	
	CHECK SUM CHECK	Transition to protected mode
		Boot block checksum (skipped when returned to S3)
		Halts when error occurs
		Checksum other than boot block (skip when returned to S3)
F001h	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process"
	Transition of process to system BIOS IRT when returned to S3	
	Key input	When a key is pressed, check if it is Tilde key or Tab key
F002h	Initialization of SC	Halts when error occurs D port=F003h or 04h
F006h	BIOS rewrite request check	If Checksum check error occurred on other than Boot Block or rewrite is required by user, go to "BIOS rewrite process"
F007h	Transits to system BIOS IRT	
	BIOS rewrite process	Initialization of ICHM. D31
		DRAM configuration
		Permission of cache (L1 cache only)
		Memory clear
		Transits to real mode and copies BIOS to RAM

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

D port status	Inspection items	Details
F009h	Saving key scan code	
	Setting TASK_1ms_TSC	
	Controlling fan	
	Initializing sound items (for BEEP)	Enabling system speaker
		Releasing mute
		Making the volume max
	When BIOS, EC/KBC rewriting is requested	Blinks green (cycle:2s, on:1s, off:1s)
	When BIOS ROM is abnormal	Blinks orange (cycle:2s, on:1s, off:1s)
	When BIOS renewal is prohibited	Blinks 8 second cycle (On:4s, Off:4s) Beeps 30 second and halts D port=F00Bh
	Key input	Temporary prohibition of USB
		Beeps
		Waiting for key input
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset
		Setting parameters for 2HD(1.44MB)
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite
		Setting of parameters for 2DD (720KB)
		Retrieval of "CHGBIOSA.EXE" from the root directory
		Calculation of directory start head and sector
		Read one sector of the root directory
		Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read
		Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"
		Key input when error occurred
		Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"
F100h	Renewal of micro code (In model supporting HTT)	
	Prohibition of cache	
	Permission of L1/L2 cache in Flash ROM area	

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

D port status	Inspection items	Details
(F100h)	Initialization of H/W (before DRAM recognition)	Initialization of MCHM
		Initialization of ICH7M.D30.Func0
		Initialization of ICH6M.D31.Func0
		Initialization of ICH6M.D31.Func1/2
		Initialization of USB controller
		Initialization of ICH7M.D31.Func3
		Initialization of TI controller
	Initialization of PIT channel 1	(Setting the refresh interval to "30μs")
F101h	Checking DRAM type and size (at cold boot)	When unsupported memory is connected, the system beeps and halts When DRAM size = 0, halts
	Testing the stack area of SM-RAM	When it can not be used as stack area, halts
F102h	Configuring cache memory	
	Permission of L1/L2 cache memory	
	Checking the access of a CMOS (Only in Cold Boot)	When error is detected, halts
	Examining the battery level of CMOS	
	Checksum check of CMOS	
	Initializing data in CMOS (1)	
	Setting up of IRT status	(Setting of boot status and IRT busy flag, The rest bits are set to 0)
	Storing the size of DRAM	
F103h	Branch of resuming (only in Cold Boot)	When a CMOS error is detected, it does not resume
		If "resume status code" is not set, no resume occurs

Table 2-3 Debug port (Boot mode) error status (4/10)

D port status	Inspection items	Details

(F103h)		Resume error check
		  S3 recovery error (ICH) Resume error F17Ah
		  SM-RAM checksum check Resume error F173h
		  Memory configuration change check
		                                        Resume error F173h
		  Checksum check of system BIOS RAM area
		                                        Resume error F179h
		  Checksum check of expansion memory
		                                        Resume error F176h
		  Checksum check of PnP RAM
		                                        Resume error F177h
		
		To resume process (RESUME_MAIN)

	To resume error process	Returns the CPU clock to "Low"
		Prohibition of all SMIs
		Clears resume status
		Returns to ROM
		Forwards the area of C0000h to EFFFFh to PCI (prohibition of DRAM)
		Sets resume error request
	Copying ROM/RAM of system BIOS	Halts, when error occurred
F105h	SMRAM initialization	
	Check if CPU corresponds to Hyper Threading	
	Initialization of APIC	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	

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

D port status	Inspection items	Details
F106h	Initialization of devices which need initialization before PCI bus initialization	PIT test (at Cold boot only) and initialization Setting of test pattern to channel 0 of PIT#0 Check whether the set test pattern can be read. Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms) Initialization of PIT channel 2(Setting of the sound generator frequency to 664Hz) Test of PIT channel 1 (Check whether the refresh signal works properly in 30 micro-s refresh interval.) The system halts when the time is out. Test of PIT channel 2 (Check whether the speaker gate works properly)
		CPU clock measurement
		Check of parameter block A
		Permission of SMI except auto-off function
		Over control of rated input power
		Battery discharge current control (1CmA)
		Over control of AC adapter rated current
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		Checking parameter tab lock A
		CPU Initialization Updating micro-code Judging of CPU type Geyserville support check Setting of CPU clock to "high"
F107h	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or other than Japan) based on DMI data	
	CMOS default setting check	Sets default setting if bad battery or bad checksum (ROM, CMOS) is detected.
	ACPI table initialization (for execution of option ROM)	

Table 2-3 Debug port (Boot mode) error status (6/10)

D port status	Inspection items	Details
(F107h)	Initialization of devices which need initialization before PCI bus initialization	Setting operation mode of IDE device
		Setting operation mode of AC'97/Azalia
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		PCI Express initialization
		Sound initialization
		PC multi-box status acquisition
		HC initialization, USB device connection recognition and initialization
		Recognizing an initializing of SD memory card
		Control of built-in LAN permission/prohibition
	PIC initialization	
	PIC test	
	Password Initialization	
F108h	PCI bus initialization (connection of DS Bus)	
	Initialization of LAN information	
	Check of WakeUp factor	
F109h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
F10AH	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)

Table 2-3 Debug port (Boot mode) error status (7/10)

D port status	Inspection items	Details
(F10Ah)	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		Configuration
		Saving of VGA configuration result
F10Bh	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W needed after PCI configuration	Printer port setting (for models supporting printer)
		HDD initialization sequence start
	Enabling power off	
	Output code generation	
F10Ch	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10Dh	INIT_INT_VECTOR	(Initialization of vectors)
F10Eh	INIT_NDP	(Initialization of NDP)
F10Fh	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
F110h	INIT_DISPLAY (Waiting for VGA chip initialization completion, VGA BIOS initialization)	
F111h	VGA BIOS	
F113h	DISP_LOGO	Displaying logo
F114h	SYS_MEM_CHECK (boot mode)	Check of convention memory
F115h	EXT_MEM_CHECK (boot mode)	Check of exception in the protected mode
F116h	Exception check in the protected mode	Dport=F117h when error occurs
	INIT_SYS_MEM (reboot mode)	Initialization of conventional memory
F118h	CHK_DMA_PAGE (boot mode)	Check of DMA Page Register
F119h	CHECK_DMAC (boot mode)	Check of DMAC

Table 2-3 Debug port (Boot mode) error status (8/10)

D port status	Inspection items	Details
F11Ah	INIT_DMAC (boot mode)	Initialization of DMAC
F11Bh	CHECK_SIO (for models supporting SIO)	Check of Serial port existence
F11Dh	Diagnostic Test	In Models supporting Diagnostic Mode, it is enabled.

F11Eh	BOOT_PASSWORD (password check)	(In Reboot Mode)
		 Waiting for HDD initialization completion
		 Check of key input during IRT (waiting for
		  KBC initialization completion)
		 ATA priority initialization
		(In Boot Mode)
		 BM loading process (for models supporting
		  fingerprint authentication)
		 Initialization of BM (for models supporting
		  fingerprint authentication)
		 Check of key input during IRT (waiting for KBC
		  initialization completion)
		 Input of password
		 I/O LOCK process (for models supporting
		  I/O lock)
		 TPM initialization (models supporting TPM)

F11Fh	EX_IO_ROM_CHECK	Check of option I/O ROM
F120h	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
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource just before booting
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion
		Renewal of table for DMI
		Copying ACPI table to uppermost of extension memory
		Waiting for completion of BIOS rewriting of PSC version

Table 2-3 Debug port (Boot mode) error status (9/10)

D port status	Inspection items	Details
(F120h)		Waiting for completion of initialization of Serial port (for models supporting SIO)
		Waiting for completion of setting clock generator When error occurred, halts at D port=F121h
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (for models supporting Bluetooth)
		Check for existence of target maintenance card
		Prohibition of unused PC card not used
		Setting Wakeup status data for ACPI
		HW initialization just before booting, Waiting for initialization completion
		Notifies the DVI connection status to VGA BIOS (for models supporting DVI)
		Setting of battery save mode
		Setting of date
		Waiting for Bluetooth initialization completion (for models supporting Bluetooth)
		Update of DMI Wakeup factor, Update of SM-BIOS structure table
		PCI device configuration space close
		Cache control
		Process for CPU
		Make the CPU clock to be set by SETUP
		Waiting of motor-off completion of disabled HDD
		Final decision of USB FDD drive information
		Post processing of PRE_BOOT_SETUP
		Clear of PWRBTN_STS
		Enabling POWER Button

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

D port status	Inspection items	Details
F122h	Start of BIOS security check	When error occurred, holts at D port=F166h
F123h	End of BIOS security check	
F124h	Clear of IRT status, renewal of check sum of Runtime side	
FFFFh	End	

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

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

D port error code is as follows:

Error code	Contents
F003h or F004h	SC initialization error
F00Bh	BIOS update error
F117h	Exception check error
F121h	Clock generator error
F166h	BIOD security error

Procedure 3   Diagnostic Test Program Execution Check

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

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

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

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 in good condition, but there is still a problem, go to Check 2.

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

2.5   USB 3.5" FDD Troubleshooting

This section describes how to determine if the USB 3.5" 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.

Insert the Diagnostics Disk in the USB 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 2-4. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-4 FDD error code and status

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

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

```
Write protected
```

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

Procedure 3   Connector Check and Replacement Check

The USB FDD connector may be disconnected from the connector on the System board. Check visually that the connector is connected firmly.

Check 1   Make sure the USB FDD cable is firmly connected to the CN4610 (port 6), CN4611 (port 4) or CN4612 (port 0) of the System board.
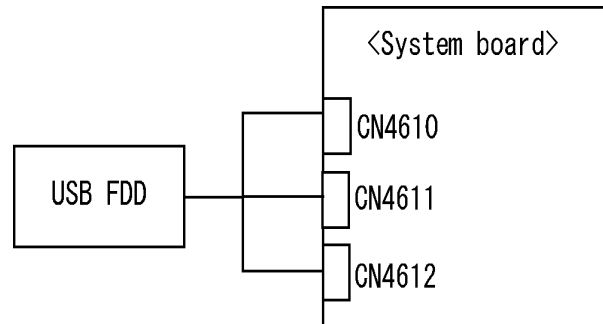
              If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2   The USB FDD may be defective or damaged. Replace it with a new one. If the FDD is still not functioning properly, perform Check 3.

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

2.6   2.5" HDD Troubleshooting

This section describes how to determine if the 2.5" HDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

> 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 2.5" hard disk will be erased when the 2.5" HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s). For the backup, refer to the User's Manual.

Procedure 1   Partition Check

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

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

Check 2   Type **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 exists, 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 exists, 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 of no floppy disk in the FDD. Turn on the computer and check the message on the screen. When an OS starts from the 2.5" HDD, go to Procedure 3. Otherwise, start with Check 1 below and perform the other checks as instructed.

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

```
HDC ERROR
          or
```

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

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

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

Check 3   Using the SYS command of the MS-DOS, transfer the system to the 2.5" 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   The 2.5" HDD, HD board and the connector of the System board may be disconnected (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling the PC.). Reconnect them firmly. If they are firmly connected, go to Procedure 3.

Procedure 3   Format Check

The computer's 2.5" HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 2.5" 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 the 2.5" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

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

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

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

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

Procedure 4   Diagnostic Test Program Execution Check

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

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

Table 2-5 2.5" HDD error code and status

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

Procedure 5   Connector Check and Replacement Check

The HDD is connected to the System board with a HDD cable. The connecting portions may be loose. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks to check the connecting portions:

Check 1   Make sure the HDD cable is firmly connected to the connector CN1850 of the System board and HDD.

```
                                        ┌──────────────────┐
                                        │  <System baord>  │
              ┌──────────────┐          │                  │
              │          ┌─┐ │          │┌┐                │
              │   HDD    │ │─┼──────────┼┘│ CN1850          │
              │          └─┘ │       ╱  │                  │
              └──────────────┘      ╱   └──────────────────┘
                              HDD cable
```
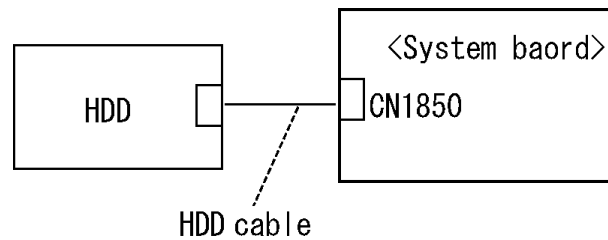
If connection is loose, reconnect firmly and repeat Procedure 4. If there is still an error, go to Check 2.

Check 2   The 2.5" HDD may be damaged. Replace it with a new one and check the operation. If the problem still exists, perform Check 3.

Check 3   The HDD cable may be damaged. Replace it with a new one and check the operation. If the problem still exists, perform Check 4.

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

2.7 Keyboard Troubleshooting

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

    Procedure 1:   Diagnostic Test Program Execution Check

    Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector Check and Replacement Check

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

Check 1   Make sure the keyboard cable is firmly connected to the connector CN3230 on the System board.
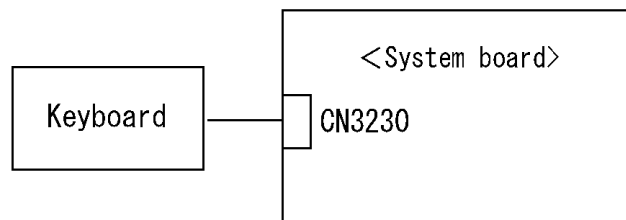
    If the connection is loose, reconnect the cable firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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

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

2.8   Display Troubleshooting

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

> Procedure 1:   External Monitor Check
>
> Procedure 2:   Diagnostic Test Program Execution Check
>
> Procedure 3:   Connector and Cable Check
>
> Procedure 4:   Replacement Check

Procedure 1   External Monitor Check

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

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

If the same problem as the internal monitor appears on the external monitor, the System board
may be damaged. Go to Procedure 2.

Procedure 2   Diagnostic Test Program Execution Check

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

This program checks the display controller on the System board. If an error is detected, go to
Procedure 3.

Procedure 3   Connector and Cable Check

The LCD module is connected to the System board through the LCD/FL cable. Also, the FL inverter is connected the System board through the LCD/FL cable. The cable may be firmly disconnected the board or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If the connection is loose, reconnect the cable firmly and repeat Procedure 2. If there is still an error, go to Procedure 4.
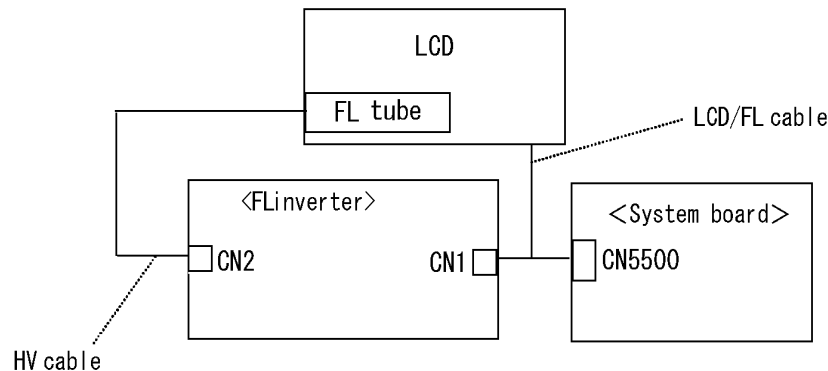
Procedure 4   Replacement Check

(1)   If characters or graphics are not displayed on the internal display, perform Check 1.

(2)   If characters or images are displayed on the internal display but the display is not normal, perform Check 2.

(3)   If characters or images are displayed on the internal display but the display is dark (the back-light does not light), perform Check 5.

Check 1   The display ON/OFF switch may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If there is still an error, go to Check 2.

Check 2   The LCD/FL cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If there is still an error, go to Check 3.

Check 3   The LCD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If there is still an error, go to Check 4.

Check 4   The FL inverter may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If there is still an error, go to Check 5.

Check 5   The FL tube may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If there is still an error, go to Check 6.

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

2.9   Touch pad Troubleshooting

To determine whether the Touch pad is faulty or not, perform the following procedures:

         Procedure 1:   Diagnostic Test Program Execution Check

         Procedure 2:   Connector and Cable Check

         Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the test for Touch pad in 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, the Touch pad keyboard is functioning properly.

Procedure 2   Connector and Cable Check

The Touch pad is connected to the connector CN3240 on the System board with a cable. This cable may have come off the connector of the touch pad or of the System board. Disassemble the computer and check the cable connections. See Chapter 4 for the disassembly procedure. If the cable has come off, connect firmly and make sure the operation. If there is still an error, go to Procedure 3.

```
┌─────────────────────┐              ┌──────────────────────┐
│                     │              │  <System board>      │
│     Touch pad       │──────────────┤  CN3240              │
│                     │       ·      │                      │
└─────────────────────┘        ·     └──────────────────────┘
                                ·
                      Touch pad cable
```

Procedure 3   Replacement Check

Check 1   The Touch pad may be damaged. Replace it with a new one and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The System board may be damaged. Replace the System board with a new one according to the procedure in Chapter 4.

2.10 Selectable bay (optical drive) Troubleshooting

The Selectable bay can be installed in this model and the Selectable bay optical drive is installed as standard. Here explains the troubleshooting for the optical drive.

To check if the optical drive is defective 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

Prepare the tools before the test. (Refer to tools for implementing the Diagnostics procedures on Chapter 3.)

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.

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

Procedure 2   Connector Check and Replacement Check

The optical drive may be disconnected from the System board or faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the optical drive is firmly connected to the connector CN1810 on the System board.
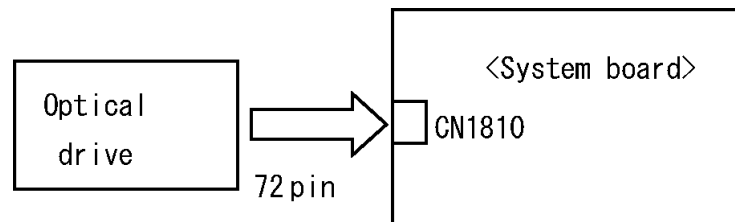
If the connection is loose, reconnect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

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

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

2.11 Modem Troubleshooting

To check if the modem is defective or malfunctioning, 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 Modem test program available as part of the maintenance test program. This program checks the modem. See Chapter 3 for information on how to perform the test.

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

Procedure 2   Connector Check and Replacement Check

The Modem jack (RJ11) is mounted on the System board and MDC is connected to the System board. If the modem malfunctions, the connection may be bad or the MDC or System board might be faulty.

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

Check 1   Make sure the MDC is firmly connected to the CN3010 and the MDC cable is connected to the CN4100 on the System board.
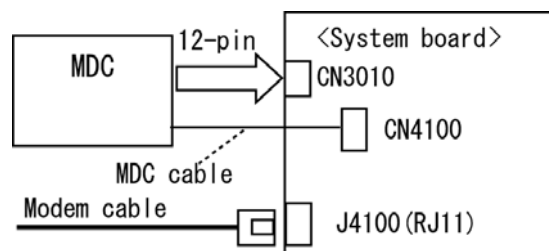
> If any connector is disconnected, connect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2   The MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the modem is not still working properly, perform Check 3.

Check 3   The MDC cable may be faulty. Replace it with a new one following the steps in Chapter 4. If the modem is not still working properly, perform Check 4.

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

2.12 Bluetooth Troubleshooting

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

Procedure 1:   Diagnostic Test Program Execution Check

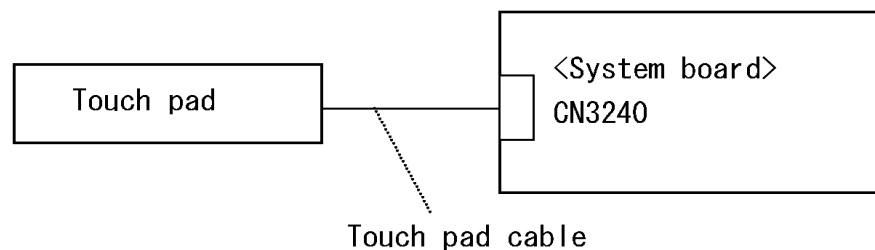Procedure 2:   Connection Check

Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

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

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

Procedure 2   Connection Check

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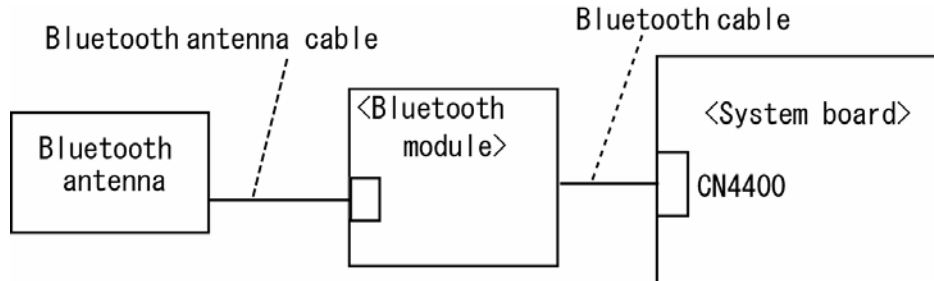
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the Bluetooth cable is firmly connected to connector on the Bluetooth module CN4400 on the System board. If the connector is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth module is still not functioning properly, perform Check 2.

Check 2   Make sure the Bluetooth antenna cable (brown) is firmly connected to the Bluetooth module. If the Bluetooth antenna cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function is still not functioning properly,

Procedure 3   Replacement Check

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

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

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

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

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

2.13 LAN Troubleshooting

To check if the computer's LAN is defective or malfunctioning, 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

To check the LAN function, execute the Sound/LAN/Modem test program subtest 04 (LAN test). See Chapter 3 for information on how to perform the test.

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

Procedure 2   Connector Check and Replacement Check

The LAN function is installed on the System board and the RJ45 jack and the controller is mounted on the System board. If the LAN malfunctions, the System board might be faulty.

Disassemble the computer following the steps described in Chapter 4 and replace the System board.

```
LAN cable              ┌──────────────────────┐
                       │ <System board>       │
                       │                      │
──────────────────┌──┐ ┌─┐ J4100 (RJ45)       │
                  └──┘ └─┘                     │
                       │                      │
                       └──────────────────────┘
```
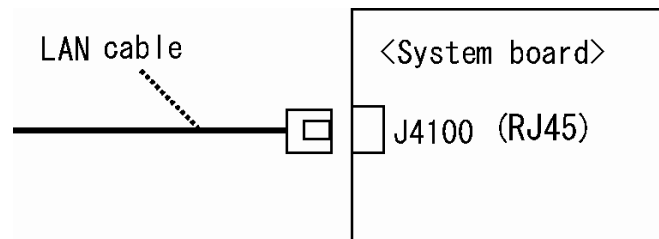
2.14 Sound Troubleshooting

To check if the sound function is defective or malfunctioning, 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 program available as part of the maintenance test program. See Chapter 3 for information on how to perform the test.

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

Procedure 2   Connector Check

The speaker, internal microphones, external microphone and headphone are connected to the System board shown in the following figure. These connections may be loose or cables may come off. Disassemble the computer referring to the steps described in Chapter 4 and make sure each connection. If there is still an error, perform Procedure 3.
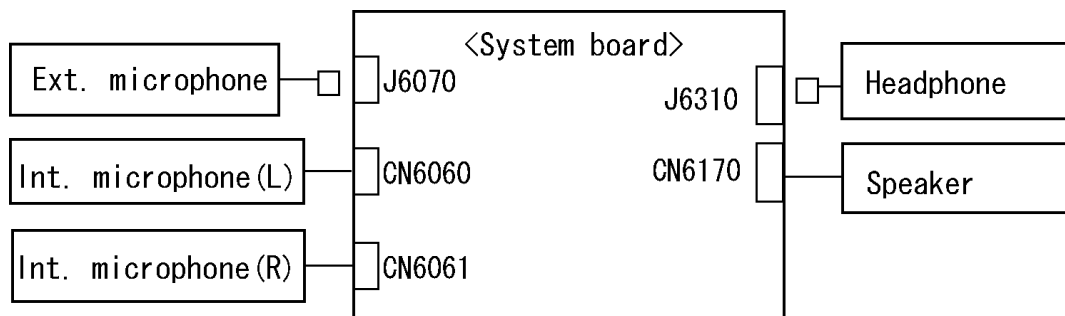
Procedure 3   Replacement Check

Check 1   If the speaker or headphone is not working properly, it may be faulty. Replace it with a new one. If there is still an error, perform Check 2.

Check 2   If the external microphone, internal microphone (L) or internal microphone (R) is not working properly, it may be faulty. Replace it with a new one following the step in Chapter 4. If there is still an error, go to Check 3.

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

2.15 Bridge media Slot Troubleshooting

To check if the Bridge media slot is good or no good, follow the troubleshooting procedures below as instructed.

Procedure 1:   Check on Windows XP Tablet PC Edition

Procedure 2:   Connector Check and Replacement Check

Procedure 1   Check on Windows XP Tablet PC Edition

Insert a Bridge media into the slot. Check if the installed Windows XP Tablet PC Edition recognizes automatically the Bridge media card and the data in the Bridge media card can be read.

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

Procedure 2   Connector Check and Replacement Check

The Bridge media is connected to the connector IS2101 of the system board.

Bridge media supports SD memory card/SDIO card/Memory stick/Memory stick Pro/ xD Picture card.
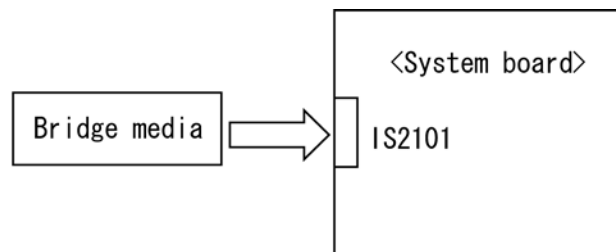
Check 1   Bridge media and system board may be disconnected. Make sure the Bridge media is firmly inserted to IS2101 on the system board. If not, insert it firmly. If the Bridge media is still not functioning properly, perform Check 2.

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

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

2.16 Tablet Pen Troubleshooting

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

CAUTION: *Use the Tablet Pen supplied to this model.*

        Procedure 1:   Check on Windows XP Tablet PC Edition

        Procedure 2:   Tablet pen replacement Check

        Procedure 3:   Connector Check and Replacement Check

Procedure 1   Check on Windows XP Tablet PC Edition

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

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

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

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

Procedure 2   Tablet pen replacement Check

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

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

Procedure 3   Connector Check and Replacement Check

The Digitizer and LCD are connected to the System board as below.

```
                              ┌──────────────────────────────┐
                              │                              │
                              │       <System board>         │
     ┌────────────────┐     ┌─┐│                              │
     │   Digitizer     ├─────┤ ││ CN9540                       │
     └────────────────┘     └─┘│                              │
                              │                              │
                              │                              │
                              └──────────────────────────────┘
```
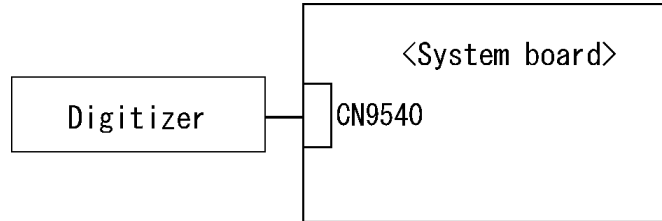
Check 1   The Digitizer may be disconnected. Make sure the Digitizer is connected to the
CN9540 on the System board. If there is still an error, go to Check 2.

Check 2   The Digitizer or the System board may be defective. Replace it with a new one
following the steps in Chapter 4. Then check the tablet pen is working properly.

2.17 Wireless LAN Troubleshooting

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

> Procedure 1:   Transmitting/Receiving Check
>
> Procedure 2:   Check of Antenna connection
>
> Procedure 3:   Replacement Check

Procedure 1   Transmitting/Receiving Check

Make sure the wireless communication switch on the computer is turned ON. If it is not, turn ON.

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

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

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

Procedure 2   Check of Antenna connection

The wireless LAN functional wiring diagram is shown below:
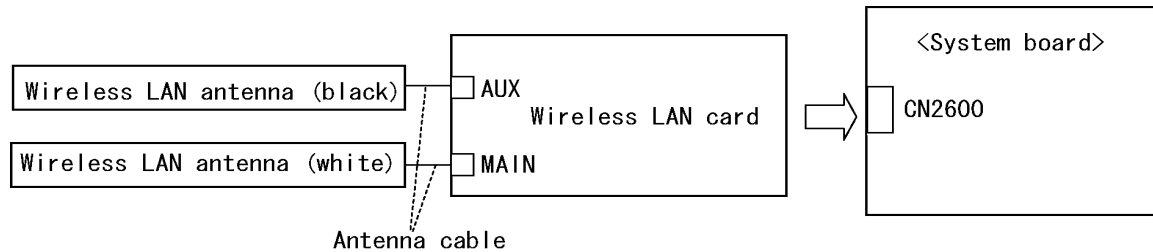
```
                                    ┌──────────────────────┐        ┌─────────────────────────────┐
                                    │                      │        │    <System board>           │
┌──────────────────────────┐       │ ▢AUX                 │        │                             │
│ Wireless LAN antenna (black)│     │       Wireless LAN card│  ⇨   │   ▢ CN2600                 │
└──────────────────────────┘       │                      │        │                             │
┌──────────────────────────┐       │ ▢MAIN                │        │                             │
│ Wireless LAN antenna (white)│     │                      │        │                             │
└──────────────────────────┘       └──────────────────────┘        └─────────────────────────────┘
              Antenna cable
```

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

Check 1   The wireless LAN card and the System board may be disconnected. Make sure the wireless LAN card is firmly connected to the CN2600 of the System board.

     If the board connector is disconnected, connect it firmly and return to Procedure 1. If there is still an error, go to Check 2.

Check 2   Make sure the wireless LAN antennas (black and white) are firmly connected to the Wireless LAN card. If the antennas are disconnected, connect firmly then return to Procedure 1. If there is still an error, perform Procedure 3.

Procedure 3   Replacement Check

Check if the wireless LAN card and the System board are connected properly. If they are properly connected but there is stall an error, any of these components may be damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

Check 1   The wireless LAN card may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 2.

Check 2   The wireless LAN antennas may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 3.

Check 3   The System board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

2.18 Fingerprint sensor Troubleshooting

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

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

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

Procedure 1:   Setting Windows Log-ON password

Procedure 2:   Registration of fingerprint

Procedure 3:   Authentication of fingerprint

Procedure 4:   Connector Check and Replacement Check

CAUTION: *Scan your finger shown below.*
1. Put your finger in parallel to the sensor.
2. Put your finger on the centerline of the sensor.
3. Make sure the first joint of your finger is on the sensor.
4. Slide slowly your finger from the first joint to fingertip at constant speed.
When not recognized, adjust the speed.

Fingerprint sensor

Fingerprint sensor
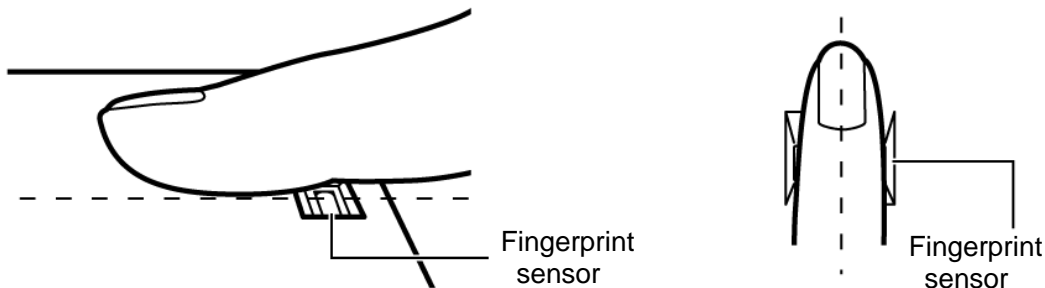
Procedure 1   Setting Windows Log-ON password

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

2. Select "Create a new account" in [User Account].

3. Input the name of Account (e.g. "TOSHIBA") in [Name the new account] and click
   [NEXT] button.

4. Click "Create Account" button in the (default) condition that the "Computer administrator"
   is selected in [Pick an account type].

5. Select the icon of Account (e.g. "TOSHIBA") that has been made in item 2 to item 4 in
   [User Accounts] display.

6. Select "Create a password" after displaying [What do you want to change about ****'s
   account?].

7. Input a password (e.g. "password") in the box under the message of "Type a new password"
   and "Type the new password again to confirm" after displaying [Create a password for
   ****'s account]. Click [Create Password] button.

8. In the [Create a password for ****"'s account] display, click ☒ to close the window.

Procedure 2   Registration of fingerprint

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

2. After displaying [User Enrollment], click [Next].
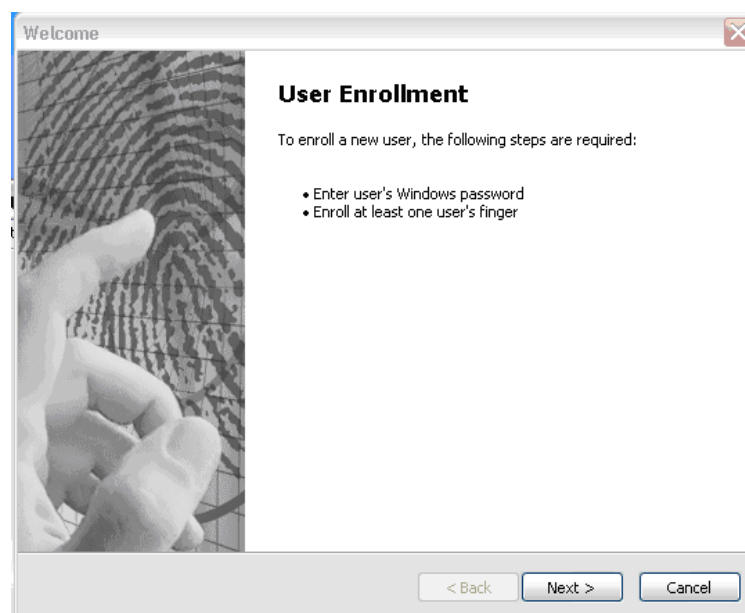
3. In the box of [Enter your password] on [User's Password] display, input the password (e.g. password) which has been input in item 7 of Procedure1. Click [Next].
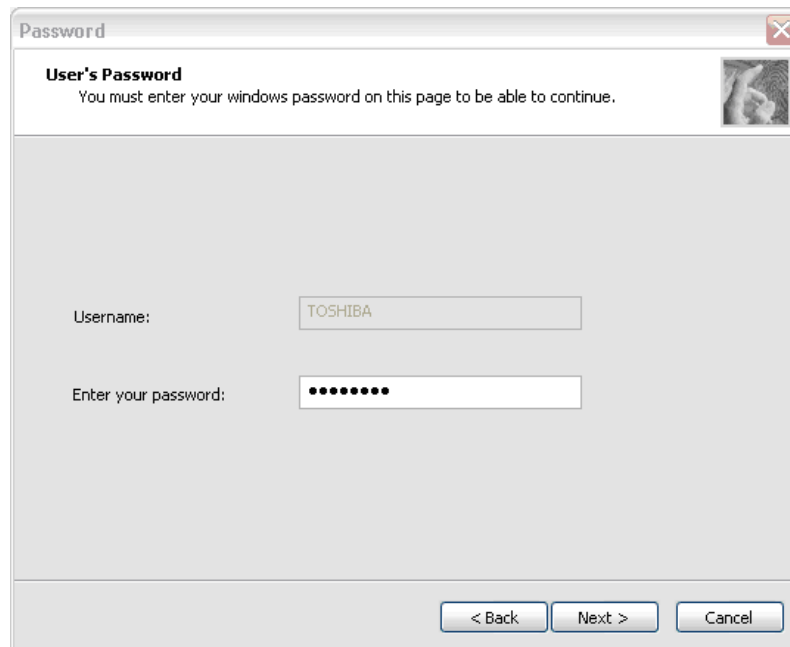
4. After displaying [Enrollment Hints], check off in the box of [Run interactive tutorial] (when proceeding without seeing Tutorial). The display of "if you want really skip or not the Tutorial" appears, and then click [Skip Tutorial].
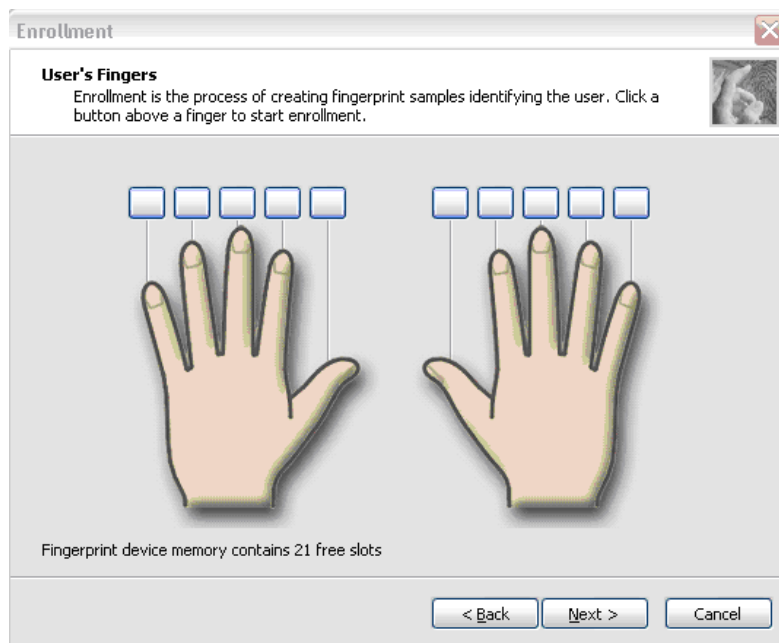
5. After displaying [User's Fingerprint], click the box of thumb of right hand. A small window of "Swipe finger" appears, then swipe three times.
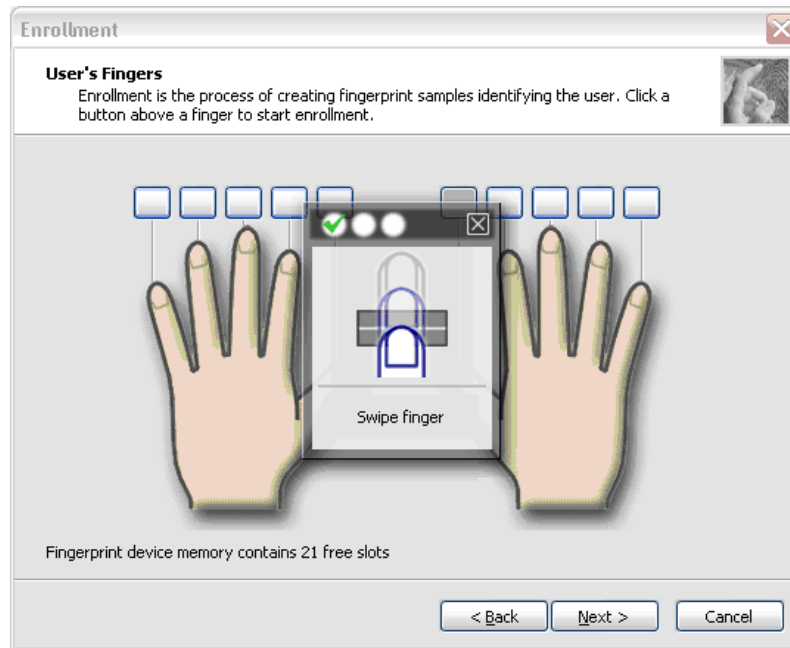
6. The display becomes as follows when the fingerprint is registered correctly. Click [Next].
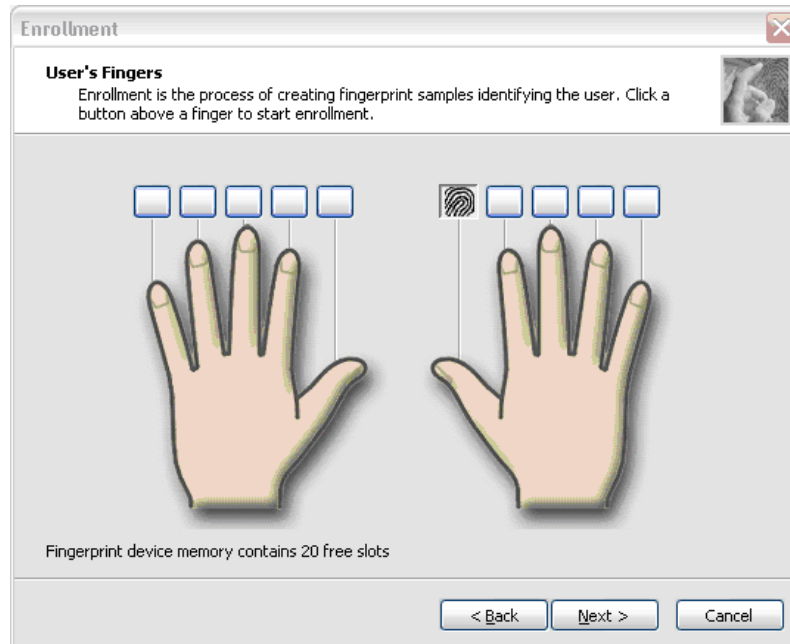
7. After displaying [User Enrollment] dialog, you are asked if you want to register one more finger. Click [No] when you do not want to register one more.

8. When [Advanced Security] is displayed, click [Next].
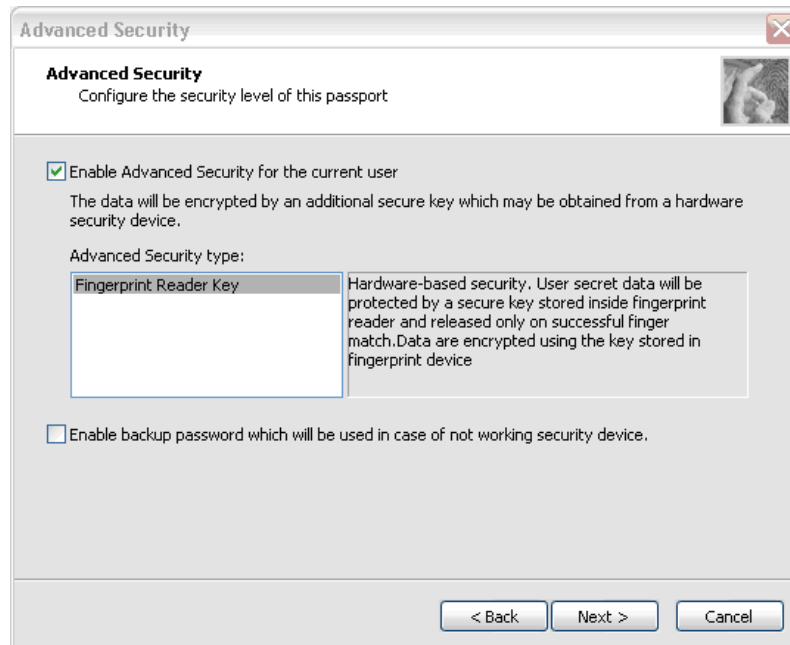
9. When [Finish] is displayed, click [Finish].
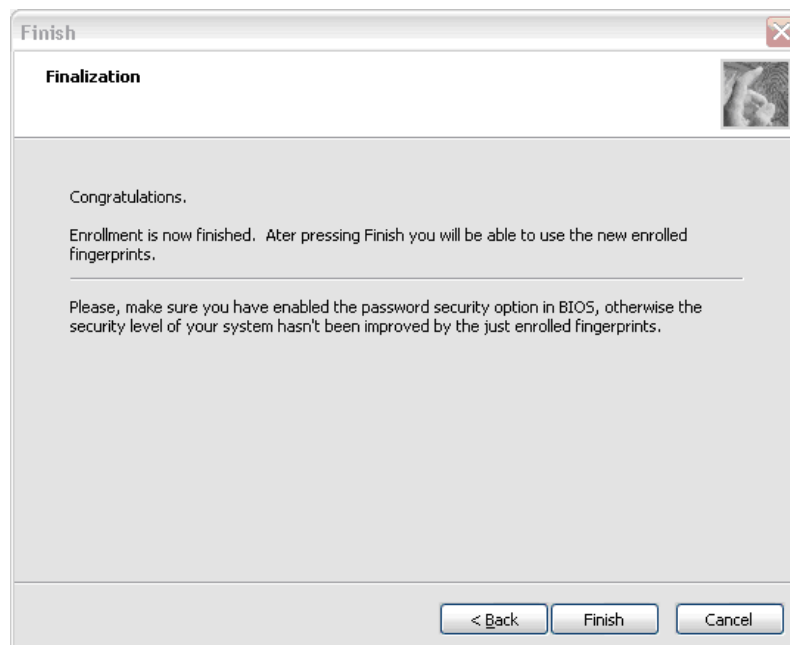
10. The display of "Protector Suite - QL Edition" appears in [Fingerprint Software] window, click [Close].
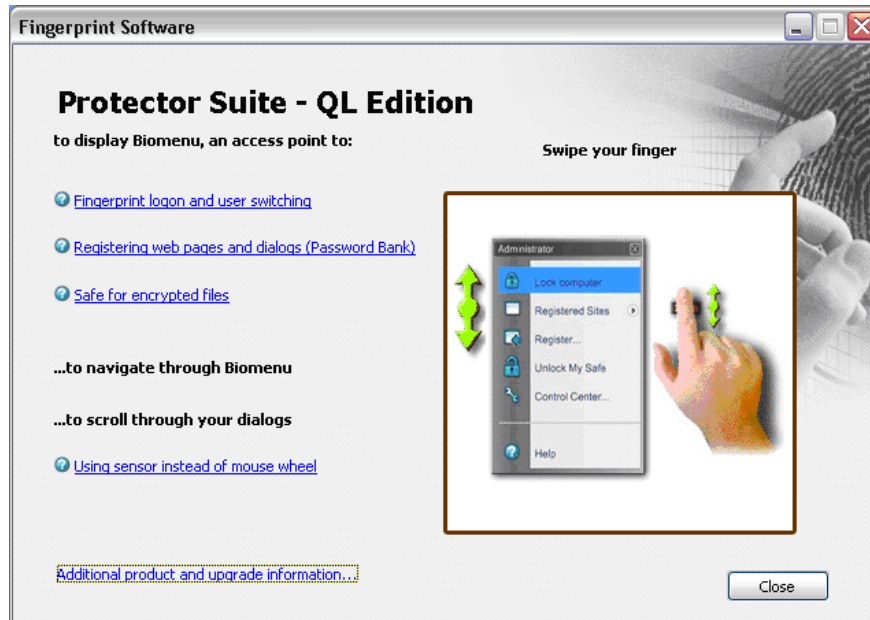
Procedure 3   Authentication of fingerprint

1. Turn on the computer. Windows starts up.

2. In the Windows Log-ON window, scan the fingerprint of registered finger. Make sure that a green check mark is displayed in the box (It means you have logged on).
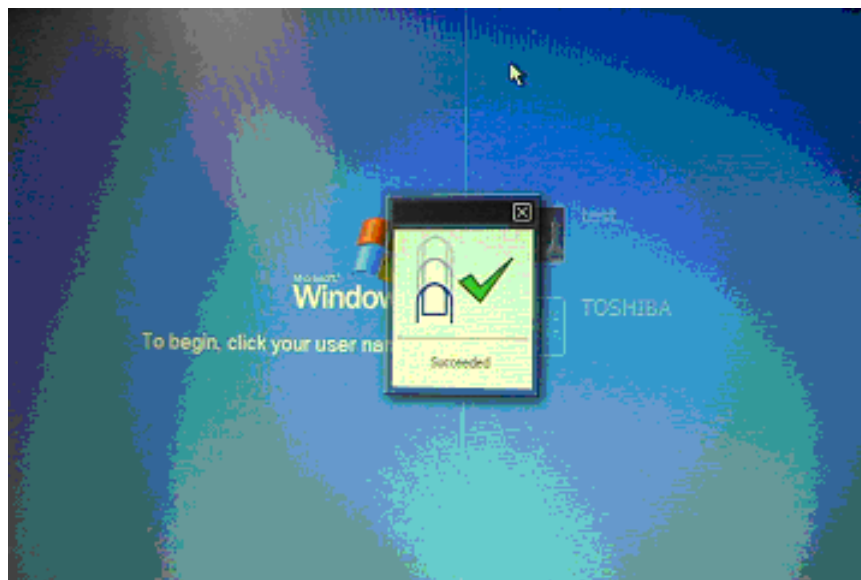
3. After starting Windows, make sure that the name of Account (e.g. "TOSHIBA"), which
    has been inputted in item 3 in Procedure 1 at the top of [Start].

Procedure 4   Connector Check and Replacement Check

The connector CN9560 on the NF board is connected to the connector CN9540 on the system
board.
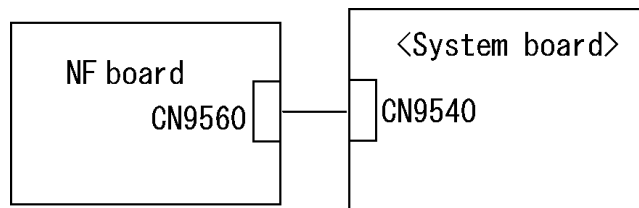
Check 1   Check the NF cable is firmly connected to the connector CN9560 on the NF board
            and connector CN9540 on the system board. If not, connect it firmly. If the finger
            sensor is still not functioning properly, perform Check 2.

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

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

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

Chapter 3

Tests and Diagnostics

Chapter 3 Contents

Figures

Tables

3.1   The Diagnostic Test

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

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

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

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

1.   Check all cables are connected firmly.

2.   Exit any application and close Windows.

3.   Check if "ALL Device" is selected in the 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
- ❑ DMI information save
- ❑ DMI information recovery
- ❑ System configuration display
- ❑ E2PROM test (MAC/GUID/DMI)

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

- ❑ The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

 You will need the following equipment to perform this program.

- ❑ The Diagnostics Disk (Main T&D)

3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

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

2. Turn on the computer 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
```

Select the program you want to execute and press **Enter**. The RAID configuration check screen will be displayed. Refer to 3.3 RAID configurations Check.

When any key is pressed, the RAID configuration check screen is completed and the program selected is executed.

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: After replacing the system board or CPU, it is necessary to execute the subtest 01 Initial configuration in 3.4 Setting of the hardware configuration.

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
 7 - ASYNC TEST
 8 - HARD DISK TEST
 9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 - CD-ROM/DVD-ROM TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU

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

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

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

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

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



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

SUB-TEST MENU :

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

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

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

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

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

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

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

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

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

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

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

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

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

These three selections have the following functions respectively:

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

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

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

3.2.2 H/W initial information setting tool

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

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

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

3.2.3 Heatrun test program

Heatrun test starts executing the same subtest as 3.24 Running Test.

For more details on this test, refer to the section 3.5.

3.3   Check of the RAID configuration

Following screen is displayed for checking the RAID configuration and specifying a failed
drive.

```
TOSHIBA RAID / RAID Information Display Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

    Level    Status        Capacity
LD0 RAID-1 DEGRADE xxGB

    Write cache           : Enable
    Degrade Bootup        : Yes
    MBR Protection        : Disable
    S.M.A.R.T             : Enable

Port Assign    Status  Size Model                  Rev
   0   LD0-0   ONLINE  xxGB xxxxxxx------------- xxxxxxx
   1   LD0-1   FAILED  xxGB xxxxxxx------------- xxxxxxx

< RAID: not OPTIMAL >
```

3.3.1 Explanation of the screen display

Contents of the screen display are shown below.
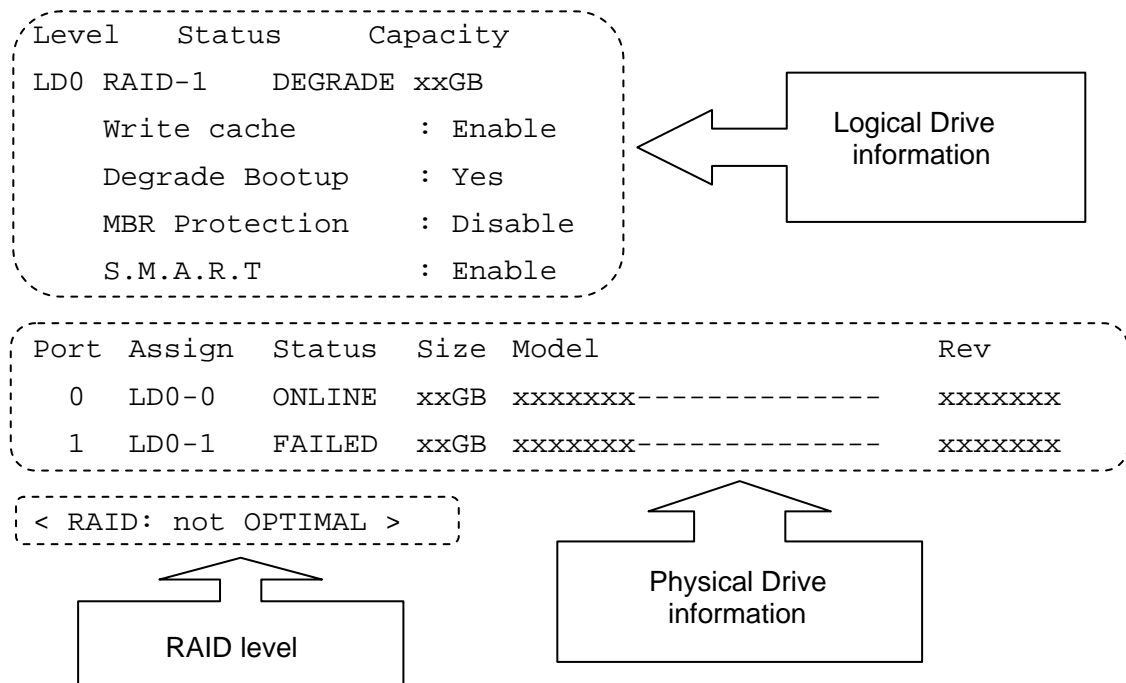
Logical Drive Information:

Displays logical drive number, RAID level, RAID status, contents and setting.

Physical Drive Information:

Displays port number, logical drive number belonged, status and disk information.

RAID level:

Displays RAID level configured.

NON:

Means that RAID is not configured. Confirming the logical drive information can check if a drive exists and check models of the drive.

RAID-0:

There are 1RAID-0 and 2RAID-0 (striping). When "RAID-0 OPTIMAL" is displayed in LD0 and LD1 in the logical drive information, it means 1RAID-0. When "RAID-0 OPTIMAL" is displayed only on the LD0, it means 2RAID-0 (striping). There is no problem in the RAID configuration, when "OPTIMAL" is displayed in the logical drive information.

RAID-1:

Indicates that 2RAID-1 (mirroring) is set. There is no problem in the RAID configuration, when "RAID-1 OPTIMAL" is displayed in the logical drive information.

not OPTIMAL:

Indicates that the RAID configuration is not optimal. See the logical drive information and physical drive information and check the condition of them.

3.3.1.1   Explanation of Logical drive condition

(1) **OPTIMAL:**   Indicates that all disks configuring RAID are normal and condition of the RAID is optimal.

(2) **Degrade:**   Indicates that one HDD failed in the RAID-1 that has redundancy.

(3) **Critical:**   Indicates critical condition that one HDD is failed in the RAID-0 that does not have redundancy.

"OPTIMAL" is displayed in the case of (1) and "not OPTIMAL" is displayed in the case of (2) and (3).

3.3.2 Check of the screen display

Contents of the screen displayed are shown below.

3.3.2.1 RAID-1

When the "RAID-1" is displayed in the [⌐ ⌐] shown below, it is judged that the RAID is configured by two drives.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c)  2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status     Capacity
LD0  RAID-1    DEGRADE     xxGB
      Write cache      : Enable
      Degrade Bootup   : Yes
      MBR Protection   : Disable
      S.M.A.R.T        : Enable

Port  Assign Status   Size  Model                      Rev
  0   LD0-0 ONLINE    xxGB  FUJITSU--------------      xxxxxxx
  1   LD0-1 FAILED    xxGB  FUJITSU-------------       xxxxxxx

< RAID: not OPTIMAL >
```

3.3.2.2 RAID-0 (1)

When there is one LD and "RAID-0 OPTIMAL" is displayed in the [⌐ ⌐] shown below, it is judged that the RAID is configured by two drives.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status     Capacity
LD0  RAID-0 OPTIMAL      xxGB
      Write cache      : Enable
      Degrade Bootup   : Yes
      MBR Protection   : Disable
      S.M.A.R.T        : Enable
Port  Assign Status   Size  Model                      Rev
  0   LD0-0 ONLINE    xxGB  xxxxxxx--------------      xxxxxxx
  1   LD0-1 FAILED    xxGB  xxxxxxx-------------       xxxxxxx
< RAID: not OPTIMAL >
```

The RAID is not configured by two drives in the following display, because there are two
LDs (LD0 and LD1).

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status   Capacity
LD0 RAID-0 OPTIMAL    xxGB
     Write cache      : Enable
     Degrade Bootup   : Yes
     MBR Protection   : Disable
     S.M.A.R.T        : Enable
LD1 RAID-0 OPTIMAL    xxGB
     Write cache      : Enable
     Degrade Bootup   : Yes
     MBR Protection   : Disable
     S.M.A.R.T        : Enable
Port  Assign Status   Size  Model                  Rev
  0   LD0-0 ONLINE     xxGB  FUJITSU--------------   xxxxxxx
  1   LD0-0 ONLINE     xxGB  FUJITSU-------------    xxxxxxx
< RAID: RAID-0 >
```

3.3.2.3   RAID-0 (2)

When there is one LD and "RAID-0 Critical" is displayed in the [   ] shown below, it is
judged that the RAID is configured by two drives.

```
        Level      Status      Capacity
    LD0 RAID-0 CRITICAL   xxGB
         Stripe Size      : 64KB
         Write cache      : Enable
         MBR Protection   : Disable
         S.M.A.R.T        : Enable
   Port Assign  Status   Size  Model                Rev
    0   LD0-0   ONLINE   xxGB  FUJITSU-------------  xxxxxxx
    1   NODRIVE
      < RAID: not OPTIMAL >
```

3.3.3 Identifying the failed HDD

Check the RAID configuration condition from the [_____] shown below and specify a failed drive.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

    Level  Status      Capacity
LD0 RAID-1 DEGRADE     xxGB

    Write cache       : Enable

    Degrade Bootup    : Yes

    MBR Protection    : Disable

    S.M.A.R.T         : Enable

Port  Assign Status  Size Model                 Rev
   0   LD0-0 ONLINE   xxGB FUJITSU------------- xxxxxxx
   1   LD0-1 FAILED   xxGB FUJITSU------------ xxxxxxx
 --------------------------------
 < RAID: not OPTIMAL >
```

3.3.3.1 RAID : OPTIMAL

When RAID is "OPTIMAL" (Both the two drives are normal), it is judged that RAID configuration is normal. There are the following reasons why the repair is requested.

Abnormal noise of the motor from the HDD:

Refer to the *2.5"HDD troubleshooting* in Chapter 2, *Troubleshooting Procedures.*

Access to the HDD is very slow:

Display the drive log by using Independent Utility of the DIAGNOSTIC PROGRAM. Check if ten or more continual logs of the message indicating retry such as "Write Error occurred, Retry the command." or "Other Read Error occurred, Retry the command." are recorded in the drive log of either HDD. If recorded, the drive is failed and should be repaired. Refer to *Independent Utility* in Appendix J.

In the other case above mentioned, it is judged that the MB side fails.

3.3.3.2 RAID : not OPTIMAL

ABSENT or OFFLINE is displayed

When the "ABSENT" or "OFFLINE" is displayed as shown below, the drive is removed by the RAID console and installed again. When the drive is unlocked, "ABSENT" is displayed. When the drive is locked, "OFFLINE" is displayed. Repair is not needed in this case.

```
TOSHIBA RAID / RAID Information Display Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status     Capacity
LD0 RAID-1   DEGRADE     xxGB

    Write cache      : Enable

    Degrade Bootup   : Yes

    MBR Protection   : Disable

    S.M.A.R.T        : Enable

Port Assign  Status  Size  Model              Rev
  0  LD0-0 ONLINE    xxGB  FUJITSU----------  xxxxxxx

  1  LD0-1 ABSENT    xxGB  FUJITSU---------   xxxxxxx

< RAID: not OPTIMAL >
```

NO DRIVE for one drive is displayed

When "NO DORIVE" is displayed and the HDD is connected to the port, follow the procedures below to check the HDD failure.

(1) Install a new HDD.
    When "NO DORIVE" is still displayed, it is judged that the MB or cable fails.

(2) When a new HDD is recognized, it is judged that the HDD removed is failed.
    Specify the reason by using the Independent Utility.

```
TOSHIBA RAID / RAID Information Display    Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

     Level    Status     Capacity
LD0 RAID-1   DEGRADE    xxGB

     Write cache      : Enable

     Degrade Bootup   : Yes

     MBR Protection   : Disable

     S.M.A.R.T        : Enable

Port Assign Status    Size  Model            Rev

  0  LD0-0   ONLINE  xxGB  FUJITSU----------  xxxxxxx

  1           NODRIVE xxGB  FUJITSU----------  xxxxxxx

< RAID: not OPTIMAL >
```

FAIL for one drive is displayed

One drive in the "RAID-1"is failed and degraded. This may look like failure by wrong operation. Specify the reason by using Independent Utility.

```
TOSHIBA RAID / RAID Information Display    Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

     Level     Status   Capacity
LD0 RAID-1    DEGRADE  xxGB
     Write cache       : Enable
     Degrade Bootup    : Yes
     MBR Protection    : Disable
     S.M.A.R.T         : Enable

Port Assign Status Size  Model                     Rev
  0  LD0-0 ONLINE  xxGB  FUJITSU----------------   xxxxxxx
  1  LD0-1 FAILED  xxGB  FUJITSU----------------   xxxxxxx

< RAID: not OPTIMAL >
```

3.4 Setting of the hardware configuration

To execute this program, select `2-Repair initial config set` 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 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 3.26 "System configuration".

Subtest 09   E2PROM test (MAC/GUID/DMI)

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

3.5   Heatrun Test

To execute this program, select `3-Repair heatrun` in the startup menu, press **Enter**.

After selecting the test, the same subtests as 3.24 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.

3.6   Subtest Names

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

Table 3-1 Subtest names (1/2)

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

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER [not supported]	01	Ripple pattern
		02	Function
		03	Wraparound
7	ASYNC [not supported]	01	FIR/SIR point to point (send)
		02	FIR/SIR point to point (receive)
		03	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
11	EXPANSION	01	PCMCIA wraparound
		02	RGB monitor ID
12	CD-ROM /DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	RW 1point W/R/C

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

Subtest 04   Quick charge

This subtest checks the status for the quick charge.

Subtest 05   DMI read

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

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

Model Name      : XXXXXXXXXXX
Version Number  : XXXXXXXXXXXX
Serial Number   : XXXXXXXX
Model Number    : XXXXXX-XXXXX
UUID Number     : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

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

3.8 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 (on/off)

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

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

Subtest 05   Stress

                     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.

3.9   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
```

3.10 Display Test

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

Subtest 01   VRAM read/write for VGA

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

Subtest 02   Gradation for VGA

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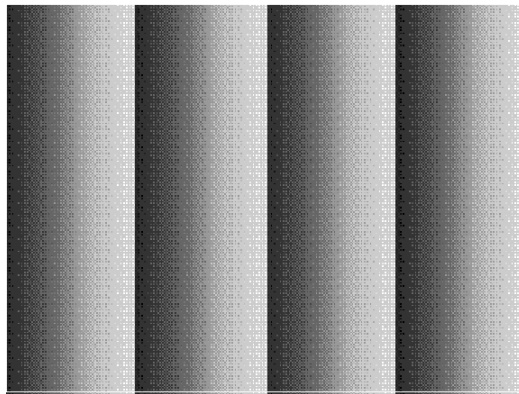
To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03   Gradation for LCD

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

Subtest 04   Gradation & Mode test for VGA

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

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

The display below appears on the screen when this subtest is executed.
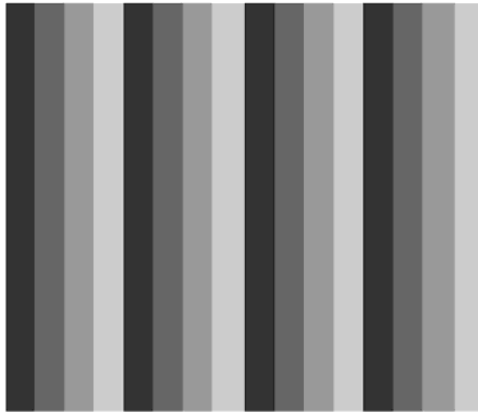
[Mode 12]

(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.

Subtest 06   "H" pattern display

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

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

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

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

Subtest 07   LCD brightness

The LCD brightness changes in the following order:

Super-Bright —> Bright —> Semi-Bright —> Bright —> Super-Bright

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

3.11 Floppy Disk Test

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

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

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

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

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

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


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

SUB-TEST MENU :

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


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

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

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


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

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

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

Subtest 01　　Sequential read

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

Subtest 02　　Sequential read/write

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

Subtest 03　　Random address/data

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

Subtest 04　　Write specified address

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

Subtest 05　　Read specified address

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

3.12 Printer Test

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

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

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

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

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

   Select the channel number (1-3) ?
```

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

Subtest 01   Ripple Pattern

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

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

Subtest 02   Function

       This subtest is for IBM compatible printers, and tests the following functions:

                Normal print
                Double-width print
                Compressed print
                Emphasized print
                Double-strike print
                All characters print

       This subtest prints the various print types shown below:

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

Subtest 03   Wraparound

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

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

3.13 Async Test

CAUTION: Async Test is not supported for this model.

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

Subtest 01 and 02 require the following data format:

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

Subtest 01   FIR/SIR point to point (send)

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

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

Subtest 02   FIR/SIR point to point (receive)

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

Subtest 03   Wraparound (board)

NOTE: To execute this subtest, 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.

3.14 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: 1. *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.*

   2. *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.*

   3. *Refer to the operating system instructions.*

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

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

1. Input the number of HDD test and press **Enter**.

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

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

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

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

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

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

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

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

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

Subtest 01   Sequential read

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

Subtest 02   Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03   Random address/data

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

Subtest 04   Cross talk & peak shift

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

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'150449'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D25044'	7 cylinder

Subtest 05   Partial read

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

Subtest 06   Write specified address

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

Subtest 07   Read specified address

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

Subtest 08   Sequential write

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

Subtest 09   W-R-C specified address

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

3.15 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**.

3.16 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

3.17 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 number01, the following message will appear:
Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

Subtest 02   RGB monitor ID

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

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

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

3.18 CD-ROM/DVD-ROM Test

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

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

3.19 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

3.20 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 HDC 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

3.21 Only One Test

3.21.1 Program Description

This program tests the unique functions of this model.

3.21.2 Operations

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

```
##############################################################
########     Only One Test Menu (XXXXXXXXX)       #######
##############################################################
*                                                            *
*     1                 Pressed Key Display                  *
*     2                 Touch Pad/IPS                        *
*     3                 Kill Switch                          *
*     4                 USB                                  *
*     5                 LED                                  *
*     6                 Acceleration sensor                  *
*     7                 Button                               *
*                                                            *
*     9                 Exit to Common Test                  *
*                                                            *
**************************************************************
.... Press test number[1-7, 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.

```
        <<<<<<    Press Key Display    >>>>>>
```
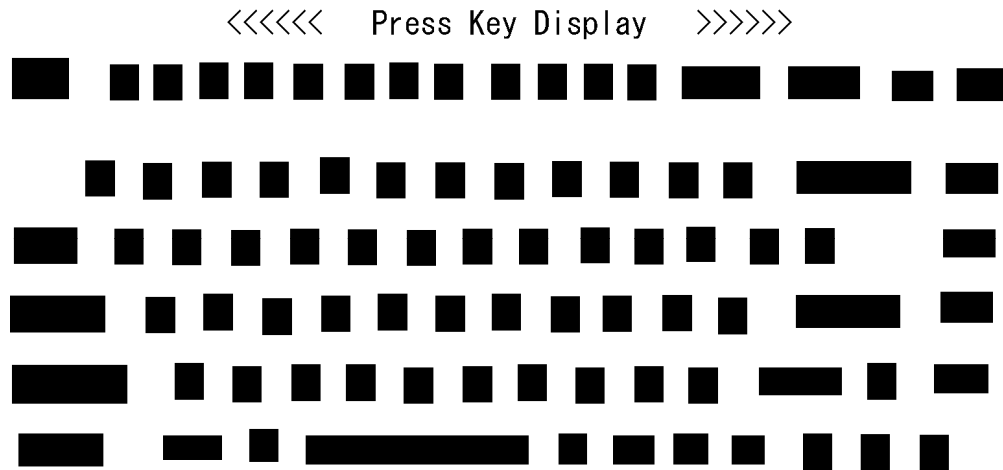
IF TEST OK, Press [Dell][Enter]key

Subtest 02   Touch Pad/IPS

This subtest checks the functions of the pointing stick as shown below.

A) Touch Pad/IPS stick pressure sensing direction and parameter.
B) Touch Pad/IPS switch function check.

This test reports the pointing stick motion response from the IPS and IPS switch. When the stick is pressed towards the upper left, the `<DIRECTION>` display changes according to the following illustration. If an IPS switch is pressed, the `<LAT>` displays appear on the right side one by one. The parameters appear on the center of the display. To exit this subtest, press the four IPS switches at the same time.
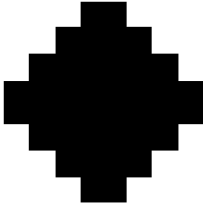
```
  *** IPS(PAD) TEST PROGRAM (Vx.xx) ***

<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 (XXXXXXXXX)         ######
################################################################
*                                                              *
*    0                  Port 0  (Back)                         *
*    1                  Port 1  (Left side back)               *
*    2                  Port 2  (Left side front)              *
*                                                              *
*    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

Vertical plane

Flat desk
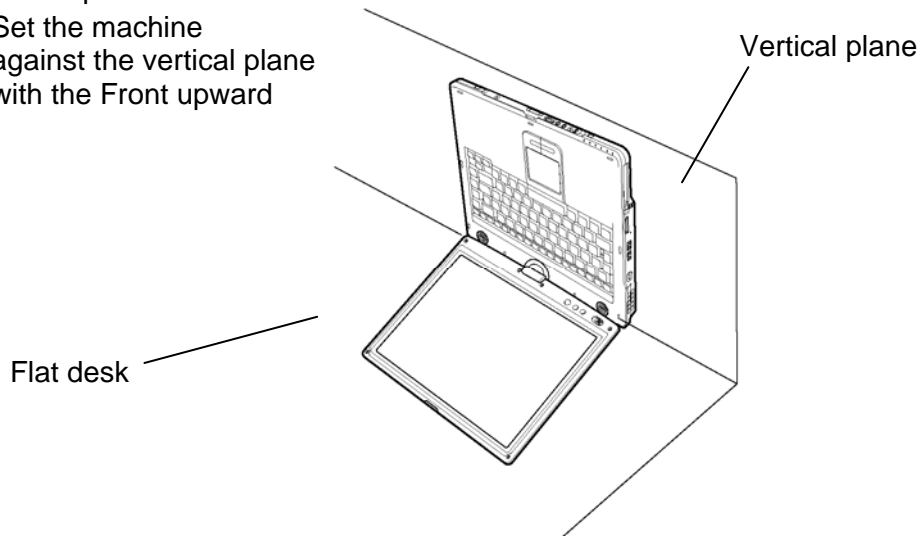
The figure below shows the name and position of each side.
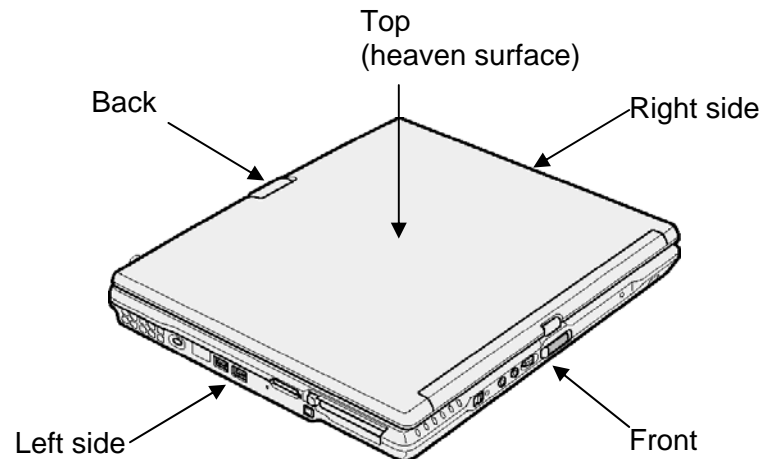
Figure 3-1 Name and positions of each side

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

```
The revision data has written in

Exit to [Enter] / Continue to [Space] key
```

Then press **Space** to continue the test. 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.

Subtest 07   Button

This subtest checks if the buttons in the following figure work properly.
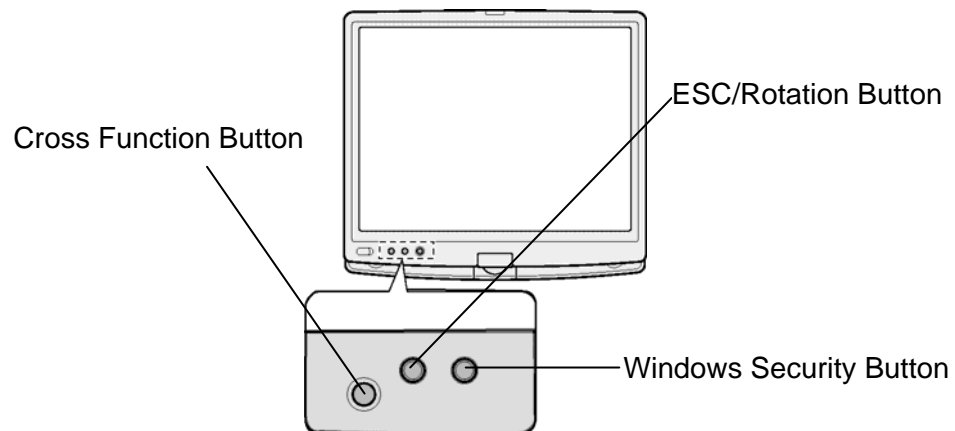
The following message appears in the display.

```
Press [Windows Security Button] key
```

Press Windows security button. Then the following message appears in the
display.

```
Press [Escape/Rotation Button] key
```

Press Escape/Rotation button. Then the following message appears in the
display.

```
Press [Cross Function Button] key
```

Press Cross Function button. If the test ends successfully, the screen returns to
the ONLY ONE TEST menu automatically.

3.22 Head Cleaning

3.22.1 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.

3.22.2 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.

3.23 Log Utilities

3.23.1 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.

3.23.2 Operations

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

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

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

 Error count
```

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

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

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

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

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

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

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

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

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

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

3.24   Running Test

3.24.1 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.

3.24.2 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.**

3.25 Floppy Disk Drive Utilities

3.25.1 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.

3.25.2 Operations

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

   ```
   [ FDD UTILITIES ]

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

2. FORMAT program

   (a) Selecting FORMAT displays the following message:

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

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

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

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

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

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

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

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

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

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

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

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

3. COPY program

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

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

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

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

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

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

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

   (d) The following message will appear.

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

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

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

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

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

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

4. DUMP program

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

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

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

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

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

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

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

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

    (e) The following message will appear:

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

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

```
── Max. address ──
[Track ] = XXXX
[Head  ] = XX
[Sector] = XX

Track number ????
```

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

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

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

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

```
---Max. address ---
[LBA ] = XXXXXXXX

LBA number ????????
```

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

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

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

3.26 System Configuration

3.26.1 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 Total 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. Secondary Drive [Maker/Drive type/Manufacture code/Product code]
19. T&D total version
20. Date/Time

3.26.2 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 = XXXXXXMB
*  – BIOS ROM Version     = VX.XX    1st ID = XXH, 2nd ID = XXH
*  – BOOT ROM Version     = VX.XX
*  – EC Total Version     = VX.XX
*  – PS Micom Version     = VX.XX
*  – SVP Par. Version     = VX.XX    (Panel=XXXXXXXXX, Manu=XXXX, Prod=XXXX)
*  – Microcode Revision  = VX.XX    (Processor=XXXh)
*  – Total Memory Size    = XXXXXXMB (Conventional Memory = XXXKB)
*  – Battery Code         = XXXXXXXXXXXX
*  – HWSC                 = XXXXXXX
*  – 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  = XXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXX]
                            #2 Sectors  = XXXXXXXXXX (XXXGB) [XXXXXXXXXXXXXXXXX]
*  – Secondary Drive       = XXXX XXXXXXXX XXXXXXXXX [XXXXXXXXXXXX]

*  – T&D Total Version   = VX.XX

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

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

3.27 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: 1. *To execute subtest 03-05, use another computer (with Calexico 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)*

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

3. *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 Calexico 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 11g 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: *1. To execute subtest 03-06, use another computer (with Calexico 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)*

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

3. 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 Calexico 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 Calexico 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 Calexico 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 Calexico 11a/ g Card

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

3.29 LAN/Modem/Bluetooth/IEEE1394 Test Program

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

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

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

          1.    LAN

          2.    Modem

          3.    Bluetooth

          4.    IEEE1394

Enter a choice:
```

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

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

3.29.1   LAN test

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

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

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

Subtest01   (i82562 + ICHx)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip.
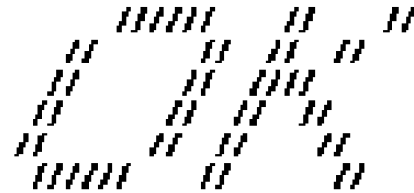
The following message will appear:

```
[LAN transmit & receive test !]

                           COMPLETED  Repeat count  =     00000
                                      Error count   =     00000

LOOPBACK TEST

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

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

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

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

Subtest02   (GbE)

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

The following message will appear:

```
Testing adapter...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
*   1000Base Auto-negotiation TxRx Test
*
*   CE Test Complete
```
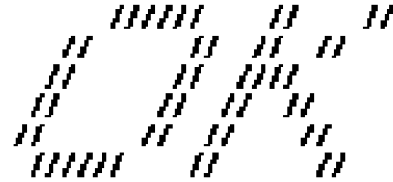
NOTE: The menu displayed by your computer may be slightly different from the one shown above.

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

3.29.2 Modem test

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

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**.

3.29.3   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      SSSSS    SSSSS
                    P      P   A A    S    S S     S
                    P      P  A   A   S          S
                    PPPPPP  A     A  SSSSS    SSSSS
                    P       AAAAAAA       S        S
                    P      A      A S    S S     S
                    P      A      A  SSSSS    SSSSS

```

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       AAAAAAA   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.

Table 3-6 Error code for Bluetooth test (BD_ADDR) (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.

Subtest03   Communication test (DUT mode)

This subtest checks the Bluetooth communication functions. Preparing the tester machine for the Bluetooth test program. Insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Bluetooth test menu will appear:

Press **3** to select the test and press **Enter** in the target machine. The following message will appear:

When the test begins, the machine displays BD_ADDR of the DUT. The progress bar stops when the test is completed. The following message is displayed.

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



    Ready>>>>>>>>>>>>>>>>>>>>>>>>        <- Progress Bar



                         [ESC] : Stop
```

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

   CCCC    OOO   M     M PPPPPP  L        EEEEEE TTTTTTT EEEEEE 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 PPPPPP  L        EEEEEE    T    EEEEEE 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       LLLLLLL EEEEE      T    EEEEEE 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 PPPPPP  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 PPPPPP  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       LLLLLLL 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.

3.29.4   IEEE1394 test

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

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

The following menu will appear:

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

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

Subtest01   Transmit & Receive test

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

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

Subtest02   Responder set

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

Subtest03   1394 GUID Display

> This program checks the GUID of IEEE1394.

3.30 Sound Test program

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**.

3.30.1 Sound (Standard)

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".
```

NOTE: *The message in the display might have slight difference from those above.*

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

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.

3.30.2 Sound (Legacy)

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

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

3.30.3 CD Sound (Standard)

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    : XXXXXX      STATUS     : XXX


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


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

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    : XXXXXX      STATUS     : XXX



   CD Sound track number (01-98 : Track) ?
                                 Drive # = 0, ATAPI status =00
                                 Command = XX
                                 [[Block address = XXXXXXXX]]
                                 [[Block length  = XXXXXXXX]]

                                 Final : Block address = XXXXXXXXX
```

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

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

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

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

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

3.30.4 CD Sound (Legacy)

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

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

3.31 SETUP

3.31.1 Function Description

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

1. Memory

2. System Date/Time

3. Battery

    (a) Battery Save Mode
    (b) PCI Express Link ASPM
    (c) Enhanced C-States

4. Password

5. HDD Password

    (a) HDD
    (b) HDD Password Mode
    (c) User Password
    (d) Master Password

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority

7. Others

    (a) Core-Multi Processing
    (b) Dynamic CPU Frequency Mode
    (c) EXECUTE-Disable Bit Capability
    (d) Virtualization Technology
    (e) Auto Power On
    (f) Diagnostic Mode
    (g) Language During Bootup

8. Configuration

9. Drives I/O

    (a) Built-in HDD
    (b) Select Bay

10. PCI Bus

11. Security Controller

    (a) TPM
    (b) Clear TPM Owner

12. Display
>   (a) Power On Display
>   (b) LCD Display Stretch

13. Peripheral
>   (a) Internal Pointing Device

14. LEGACY EMULATION
>   (a) USB KB/Mouse Legacy Emulation
>   (b) USB-FDD Legacy Emulation
>   (c) USB Memory BIOS Support Type

15. PCI LAN

16. RAID ARRAY
>   (a) Current State
>   (b) Create State
>   (c) Execute Creation

3.31.2 Accessing the SETUP Program

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

```
                          SYSTEM SETUP (1/3)           ACPI BIOS version = X.XX

        ── MEMORY ──                        ── BOOT PRIORITY ──
    Total            = XXXXX MB          Boot Priority = HDD→FDD→CD-ROM→LAN
                                         HDD Priority
        ── SYSTEM DATE/TIME ──                 = Built-in HDD→Second HDD
     Date(MM-DD-YY)   = XX-XX-XXXX
     Time(HH:MM:SS)   = XX:XX:XX              ── OTHERS ──

        ── BATTERY ──                     Core-Multi Processing = Enabled
    Battery Save Mode = Full Power        Dynamic CPU Frequency Mode
                                                      = Dynamically Switchable
    PCI Express Link ASPM = Auto          Execute-Disable Bit Capability
    Enhanced C-Status = Enabled                       = Not Available
        ── PASSWORD ──                    Virtualization Technology = Enabled

    Not Registered                        Auto Power On           = Disabled

        ── HDD PASSWORD──                 Diagnostic Mode         = Disabled
    HDD              = Built-in HDD
    HDD Pasword      = User Only
    User Password    = Not Registered
    Master Password  = Not Registered


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



                          SYSTEM SETUP (2/3)           ACPI BIOS version = X.XX
        ── CONFIGURATION ──                   ── DISPLAY ──
    Device Config. = Setup by OS          Power On Display    = Auto-Selected
                                          LCD Display Stretch = Enabled
        ── DRIVERS I/O ──
    Built-in HDD                              ── PERIPHERAL ──
              = Primary IDE(1F0H/IRQ14)    Internal Pointing Device = Enabled
    Select Bay
              = Secondary IDE(170H/IRQ15)     ── LEGACY EMULATION ──
                                          USB KB/Mouse Legacy Emulation
        ── PCI BUS ──                                         = Enabled
     PCI BUS       = IRQ10, IRQ11         USB-FDD Legacy Emulation = Enabled
        ── SECURITY CONTROLLER ──         USB Memory BIOS Supportr Type =HDD
    TPM           = Disabled
    Clear TPM Owner                           ── PCI LAN ──
                                          Built-in LAN    = Enabled




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


          ─── DRIVERS I/O ───────────────
        ┌─────────────────────────────────┐
        │ Current State                   │
        │    Built-in HDD1 = 1RAID-0      │
        │    Built-in HDD2 = JB0D         │
        │                                 │
        │ Create State                    │
        │    Built-in HDD1 = 1RAID-0      │
        │    Built-in HDD2 = JB0D         │
        │                                 │
        └─────────────────────────────────┘




            Level     Status   Capacity
   LD0      1RAID-0   OPTIMAL   XXGB
   LD1      JB0D      OPTIMAL   XXGB


   Drive      Assign   Status   Size    Model              Rev

   Built-in1  LD0-0    ONLINE   XXGB    XXXXXXX XXXXXXXXX   XXXXXXXX

   Built-in2  LD1-0    ONLINE   XXGB    XXXXXXX XXXXXXXXX   XXXXXXXX




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

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press ↑ and ↓ to move between items in a column. Press **Fn**+↑ **(PgUp)** and **Fn** + ↓ **(PgDn)** to move between the two pages.

2. Press either the **Space bar** or **Back Space** to change the value.

Accepting Changes and Exiting the SETUP Window

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

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

    ```
    Are you sure? (Y/N)
    ```

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

    ```
    Are you sure? (Y/N)
    The changes you made will cause the system to reboot.
    ```

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

3. To accept the changes, press **Y**.

---

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

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.

2. To accept the default settings, press **End** and then press **Y**.

NOTE: When you execute the default setting, the following settings are not changed: Password, HDD Password, Core-Multi Processing and Security Controller.

SETUP Options

The SETUP screen is divided into 16 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

   (a) Battery Save Mode

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

   Full Power   The following shows full power settings.

   ```
   ┌──── BATTERY SAVE OPTIONS ────┐
   │ Processing Speed    = High           │
   │                                      │
   │ CPU Sleep Mode      = Enabled        │
   │                                      │
   │ LCD Brightness      = Bright (*1)    │
   │                                      │
   │ Cooling Method      = Super-Bright (*2) │
   │                                      │
   │          = Maximum Performance       │
   │                                      │
   └──────────────────────────────┘
   ```

   Low Power   The following shows low power settings.

   ```
   ┌──── BATTERY SAVE OPTIONS ────┐
   │ Processing Speed    = Low            │
   │                                      │
   │ CPU Sleep Mode      = Enabled        │
   │                                      │
   │ LCD Brightness      = Semi-Bright (*1) │
   │                                      │
   │ Cooling Method      = Bright (*2)    │
   │                                      │
   │          = 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 1.66/1.83/2.00/2.16GHz
(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.

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.
Cooling optimized	If the CPU becomes too hot, the fan turns on automatically in a high speed to cool down the CPU. Gives priority to the decrease of temperature at the bottom of the PC.

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

(b) PCI Express Link ASPM

This option sets the power saving function of the PCI Express.

Auto	Saves power consumption, when the PCI Express device is not used while the battery is working.
Disabled	Disables the power saving function and gives priority to the performance.
Enabled	Saves power consumption, when the PCI Express device is not used. (Default)

(C) Enhanced C-States

This option enables or disables the Enhanced C-States.

Enabled	Lowers the power consumption. (Default)
Disabled	Does not lower power consumption.

4. Password

This option sets or resets the user password for power on.

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

Hard disk for setting the password.

Built-in HDD   The password is set to Built-in HDD. (This can be changed when HDD is installed in Select Bay. "Second HDD" is displayed.)

(b) HDD Password Mode

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

User Only   Sets only User HDD Password (Default)

Master+User   Sets Master HDD Password and User HDD Password

(c) User Password

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

(d) Master Password

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

6. Boot Priority

    (a) Boot Priority

        This option sets the priority for booting the computer. Select from the following settings.

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)

NOTE: *1. CD-ROM refers to an Optical drive.*

      2. When a floppy disc drive is not connected, it boots up from SD memory card in spite of selecting FDD.

    (b) HDD Priority

        Use this option to set the starting method from hard disk drive.

        Built-in HDD → Second HDD→USB (Default)

          : The priority is set as Built-in HDD → Second HDD→USB. (Default)

        Second HDD → Built-in HDD→USB

          : The priority is set as Second HDD → Built-in HDD→ USB

        Built-in HDD →USB→ Second HDD

          : The priority is set as Built-in HDD → USB→ Second HDD

Second HDD →USB → Built-in HDD

: The priority is set as Second HDD → USB → Built-in HDD.

USB → Built-in HDD → Second HDD

: The priority is set as USB → Built-in HDD → Second HDD.

USB → Second HDD → Built-in HDD

: The priority is set as USB → Second HDD → Built-in HDD.

NOTE: If the boot command can not be detected from the prior HDD, booting target changes to other devices.
Some modules may not be displayed.

---

7. Others

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

(a) Core-Multi Processing

NOTE: This is not displayed in PCs with a single core CPU.

The Core Multi-Processing sets the CPU operating mode.

Enabled   Enables Core Multi-Processing functions. (Default)

Disabled   Disables Core Multi - Processing functions.

(b) Dynamic CPU Frequency Mode

Use this option to choose a setting from the followings. When the CPU of the computer is Celeron-M, this option is not displayed.

Dynamically Switchable

> Enables Intel$^®$ Core™ Duo Processor or Intel$^®$ Core™ Solo Processor featuring Intel SpeedStep technology. (Default)

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

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

(c) EXECUTE-Disable Bit Capability

Selects the function to reports whether the CPU Execute-Disable Bit is available or not to OS. The Execute-Disable Bit Capability is a function that strengthens the security to protect PC from the buffer overflow attack by a computer virus and an illegal access.

Available   Make the Execute-Disable Bit Capability usable. (Available)

Not Available   Disables the Execute-Disable Bit Capability. (Not Available) (Default)

(d) Virtualization Technology

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

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

Enabled   Enables Virtualization Technology.

Disabled   Disables Virtualization Technology. (Default)

(e) 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         │
 │ Wakeup 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 **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 adapter and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.*

*2. 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) Diagnostic Mode

This option sets whether the BIOS Setup Diagnostic test is enabled.

Disabled   The Diagnostic test is disabled.

Enabled   The Diagnostic test is enabled.

(g) Language During Bootup

This option selects the language during bootup. This message appears only on the model for TCL (Canada).

English   The message is displayed in English. (Default)

French   The message is displayed in French.

8. 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 Devices".*

---

9. 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.

    Built-in HDD   This item cannot be changed.

    Select Bay   This item cannot be changed.

10. PCI Bus

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

```
PCI BUS   = IRQ10, IRQ11
```

11. Security Controller

   (a) **TPM**

Disables the security controller called TPM (Trusted Platform Module). When the cursor is on the **Enable** (**Disable**) and the **Space** is pressed, message is displayed and the PC waits **Y** or **N** key input by the user. When Y is pressed, it is sets to **Enable** (**Disable**). After changing, the cursor could not be moved on the **TPM** tem. This option can be changed after rebooting.

    Disabled   Disables the TPM. (Default)

    Enabled   Enables the TPM.

   (b) **Clear TPM Owner**

This is not displayed when the **TPM** is set to **Disabled**. This is executed, when the PC is disposed or the owner of the PC changes. When the cursor is on this item and the **Space** is pressed, message is displayed and the PC waits **Y**, **E**, **S** and **Enter** key inputs by the user.

When **Y**, **E**, **S** and **Enter** keys are pressed, the data is disposed.
After changing, the display of **TPM** item is changed to **Disabled** and this item becomes not displayed and the cursor could not be moved on the **TPM** item.

12. Display

This group of options configures the computer's display.

(a) Power On Display

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

Auto-Selected	Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)
LCD +Analog RGB	Selects both the internal LCD and the external CRT for simultaneous display.
System LCD only	Selects only internal LCD display even if the external monitor is connected.

NOTE: *1. 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, press **Fn+F5** to change the active display device.*

    2. 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

NOTE: This is not displayed in PCs with a SXGA+ LCD.

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.

13. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

Enabled   Enables the touch pad. (Default)

Disabled   Disables the touch pad.

14. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

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

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

Disabled   Disables LEGACY support

(b) USB-FDD Legacy Emulation

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

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

Disabled   Disables LEGACY support

(c) USB Memory BIOS Support Type

This option sets the type of the USB memory as a startup device.

HDD   Sets the type of the USB memory to be equivalent to the HDD (Default).
          (Based on the [HDD] order in the [Boot Priority Options] item. The order with respected to the other HDD can be set in the [HDD Priority Options] item.)

FDD   Sets the type of the USB memory to be equivalent to the FDD.
          (Based on the [HDD] order in the [Boot Priority Options] item.)

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.

16. RAID ARRAY

Use this option to select the peripheral's mode.

This option sets the RAID configuration.

(a) Current State

This option indicates the current hard disk condition. Content set in "Create State" is displayed, when booting BIOS setup next time.

Built in HDD1   Displays RAID configuration level of the built-in HDD1.

Built in HDD2   Displays RAID configuration level of the built-in HDD2.

(b) Create State

This option sets the RAID configuration level.

NOTE: *All data of the hard disk is deleted when setting of the RAID configuration is changed in the BIOS setup.*
Therefore, it is recommended that the user password or the supervisor password is registered to prevent changing of setting the RAID configuration by the third party.
Moreover, registering the supervisor password can make add the restriction so that a user without the management authority can not change the setting of the BIOS setup.

Built in HDD1   Sets RAID configuration level of the built-in HDD1.

Built in HDD2   Sets RAID configuration level of the built-in HDD2.

(c) Execute Creation

This option is displayed, only when the setting is changed in the "Create State".

Set the cursor bar to "Execute Creation" and press **Space** or **Back Space**. The following message will appear:

```
Warning: If you change RAID array, you need to install OS
again. Are you sure? All data on the HDD(s) will be
```

```
destroyed. Do you really want to do this? If "Yes",
please type the key string which is written in manual.
```

Input 1234 (press **1**, **2**, **3**, **4** key) and press **Enter**.
The change of the RAID configuration will be reflected.

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1 Overview

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

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

```
┌─────────────────────────────────────────────────────────┐
│                  4.2 Battery pack                        │
├─────────────────────────────────────┬───────────────────┤
│         4.3 PC card/ Bridge media    │ 4.25 LCD unit/ FL inverter │
├─────────────────────────────────────┤                   │
│ 4.4 Touch pen case 4.5 HDD 4.6 Slim select bay module │ 4.26 Digitizer │
├─────────────────────────────────────┤ 4.27 Finger print sensor │
│             4.7 Keyboard             │       board (NF board)  │
├─────────────────────────────────────┤ 4.28 Switch board  4.31 FL lamp │
│ 4.8 Memory Module   4.10 Wireless LAN card │   (NW board) │
│                                      │ 4.29 LCD latch assembly │
│ 4.9 Bluetooth module  4.11 Touch pad │                   │
├─────────────────────────────────────┴───────────────────┤
│             4.12 Top cover assembly                      │
└──────────────────────────────────────┬──────────────────┘
  ── Base Assembly ──                    ── Cover assembly ──
  ┌ - - - - - - - - - - - - - - ┐       4.22 Sensor board 4.23 Speaker
  │ 4.13 System board/ RTC battery │
  └ - - - - - - - - - - - - - - ┘         4.24 Hinge spacer
  4.14 Cover latch  4.15 Battery lock assembly/ Pen holder assembly
  4.16 Microphone/Front panel  4.17 Fan   4.19 MDC  4.21 HDD cable
                                            4.30 Hinge assembly
        4.18 Heat sink/ CPU   4.20 GPU heat sink
```

Chart Notation

The chart shows the case for the following example:

• Removing the Top cover assembly

All FRUs down to the "4.2 Battery pack" to "4.11 Touch pad" above a 4.12 Top cover assembly must be removed

```
┌─────────────────────────────────────────────────────────┐
│                  4.2 Battery pack                        │
├─────────────────────────────────────┬───────────────────┤
│         4.3 PC card/ Bridge media    │ 4.25 LCD unit/ FL inverter │
├─────────────────────────────────────┤                   │
│ 4.4 Touch pen case 4.5 HDD 4.6 Slim select bay module │ 4.26 Digitizer │
├─────────────────────────────────────┤ 4.27 Finger print sensor │
│             4.7 Keyboard             │       board (NF board)  │
├─────────────────────────────────────┤ 4.28 Switch board  4.31 FL lamp │
│ 4.8 Memory Module   4.10 Wireless LAN card │   (NW board) │
│ 4.9 Bluetooth module  4.11 Touch pad │ 4.29 LCD latch assembly │
├─────────────────────────────────────┴───────────────────┤
│             4.12 Top cover assembly                      │
  ── Base Assembly ──                    ── Cover assembly ──
  ┌ - - - - - - - - - - - - - - ┐       4.22 Sensor board 4.23 Speaker
  │ 4.13 System board/ RTC battery │
  └ - - - - - - - - - - - - - - ┘         4.24 Hinge spacer
  4.14 Cover latch  4.15 Battery lock assembly/ Pen holder assembly
  4.16 Microphone/Front panel  4.17 Fan   4.19 MDC  4.21 HDD cable
                                            4.30 Hinge assembly
        4.18 Heat sink/ CPU   4.20 GPU heat sink
```

Safety Precautions

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

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

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

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

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

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

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

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

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

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

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

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

Before You Begin

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

Do not disassemble the computer unless it is operating abnormally.

Use the designated tools.

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

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

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

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

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

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

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

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

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

Disassembly Procedure

Four main types of cable connector are used.

- Pressure plate connector

- Spring connector

- Back flip connector

- Normal pin connector

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

For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

For back flip connectors, lifting up the flip plate frees the cable and allows it to be pulled out. To reconnect, hold the flip plate in the up position and insert the cable, then lower the flip plate to secure the cable.

Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.
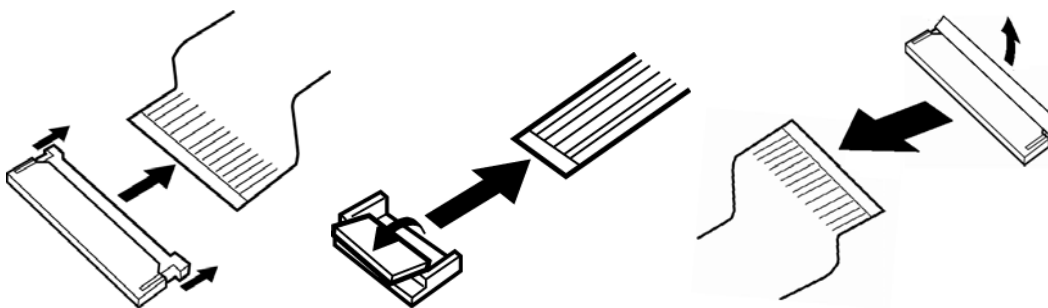
Pressure plate connector   Spring connector   Back flip connector

Assembly Procedure

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

Take note of the following general points when assembling the computer.

- Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.

- Check that all cables and connectors are securely connected.

- Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.

- Check that all latches are securely closed.

- Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

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

- One Philips screwdriver with type 0 bit (for THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- One screwdriver for TORX screw
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap and heel grounder
- Anti-static carpet or flooring
- A pair of needle-nose pliers
- Air-ionizers in highly static sensitive areas
- Antenna coaxial cable disconnector

Screw Tightening Torque

Use the following torque when tightening screws.

CAUTION: *Overtightening may damage screws or parts. Undertightening may allow screws to loosen (and possibly fall out) causing a short circuit or other damage.*

NOTE: *To tighten screws quickly and accurately, an electric screwdriver is recommended.*

- M2 (2mm)   0.167 N•m (1.7 kgf •cm)

- M2.5 (2.5mm)   0.294 N•m(3.0 kgf•cm)

- M3 (3mm)   0.549 N•m(5.6 kgf•cm)

NOTE: *To prevent damage to THIN HEAD screws, use type 0 pit philips screwdriver. Use, however, the PH point size "1" screwdriver for screws fixing the expansion memory slot cover and the keyboard. Press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).*
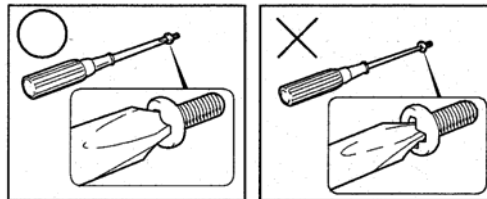
Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

❑ Even numbered length screws: Brown

❑ Odd numbered length screws: White

❑ Special length screw: Blue

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

Grip area

Screw Notation

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

Format:

Screw shape + Screw length (mm)

Screw shape

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

Example: B6 ... 6mm BIND screw

4.2   Battery pack

Removing the battery pack

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

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

---

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all other external devices from the computer.

3. Turn the computer upside down.

4. Release the **battery lock**.

5. Pull out the **battery pack** while sliding the **battery latch** toward the arrow pointing.
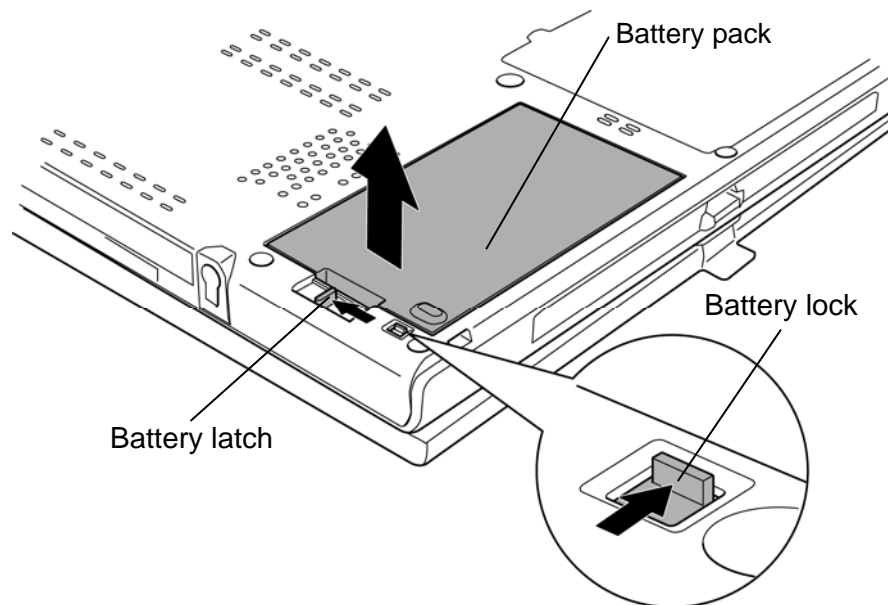
Figure 4-1 Removing the battery pack

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

Installing the battery pack

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

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

> *NOTE:*   *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all other external devices from the computer.

3. Insert the connector of the battery pack to the connector of the computer. Press the **battery pack** until the battery is locked.

4. Slide the **battery** into the lock position.

4.3   PC card/Bridge media

4.3.1 PC card

Removing the PC card

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

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

1. Turn the computer upside down.

2. Push the **ejection button**. It will pop out. Then press the eject button once more to eject the PC card.

3. Grasp the **PC card** and remove it.
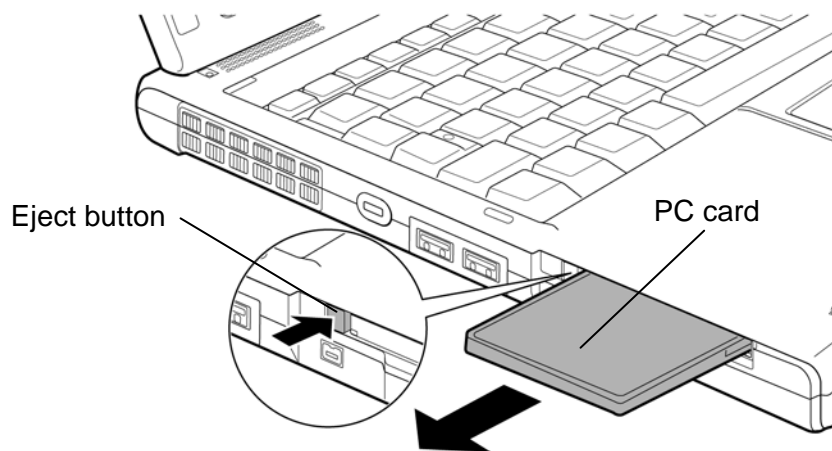
Figure 4-2 Removing the PC card

Installing the PC card

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

1. Make sure the eject button does not stick out.

2. Insert the **PC card** carefully and make sure a firm connection.

4.3.2 Bridge media

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

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

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

---

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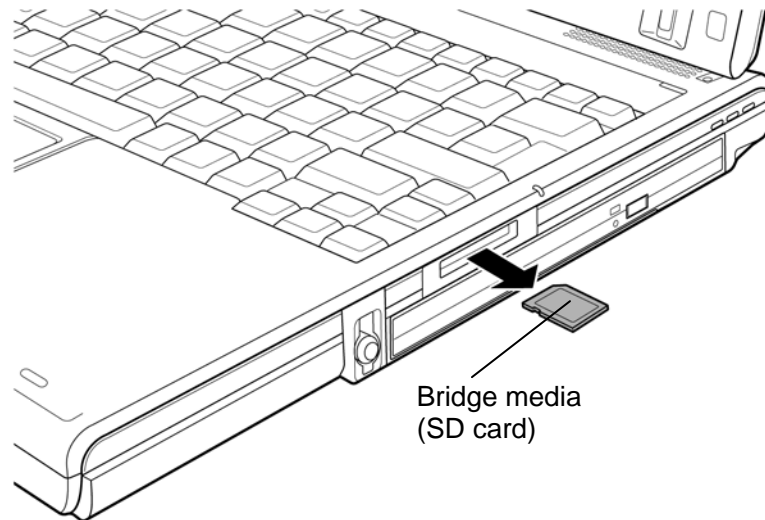
Figure 4-3 Removing the Bridge media

Installing the Bridge media

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

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

4.4　Touch pen case

Removing the Touch pen case

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

1. Push lightly the point shown by the arrow using an **object** with a thin tip.

2. Slide the **touch pen case** as shown in the following figure and remove it.
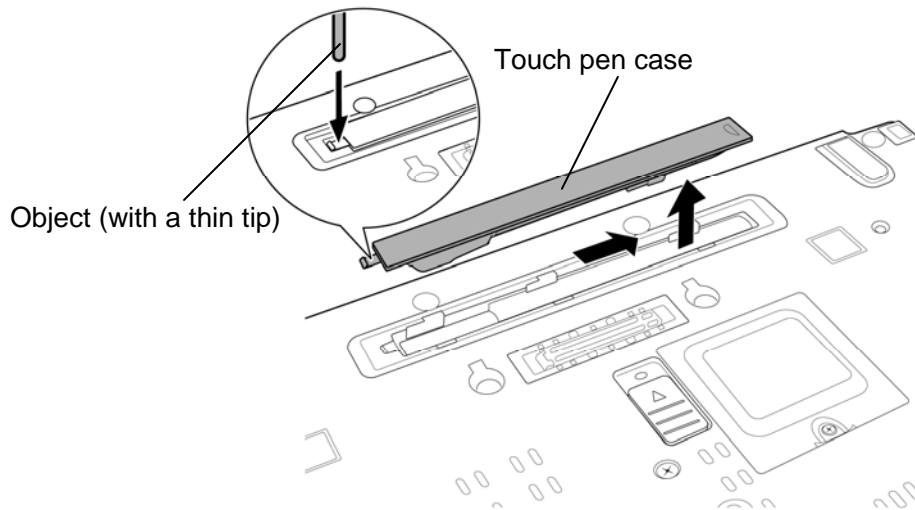
Figure 4-4　Removing the touch pen case

Installing the Touch pen case

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

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

4.5 HDD

Removing the HDD

The following describes the procedure for removing the HDD. (See Figure 4-5 to 4-7.)

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

1. Turn the computer upside down.

2. Loosen two **screws** (with e-ring) fixing the HDD slot cover and remove the **HDD slot cover**.
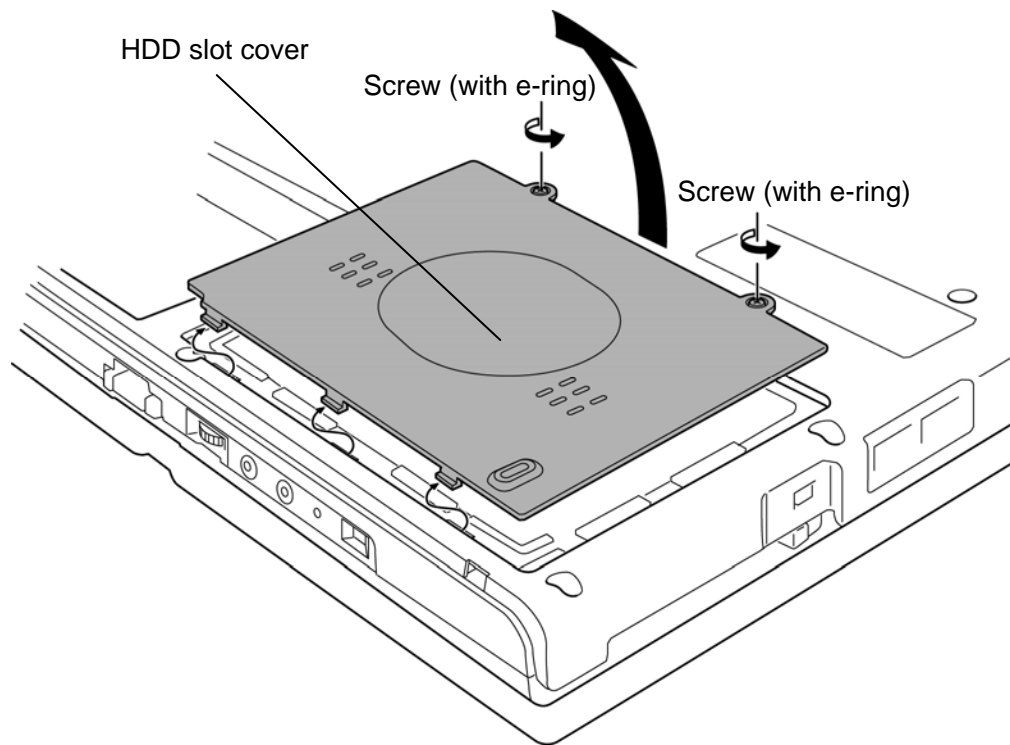
Figure 4-5 Removing the HDD slot cover

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

NOTE: *When removing the HDD assembly, be careful not to tear the tab. If the tab is torn, replace the HDD holder with a new one.*
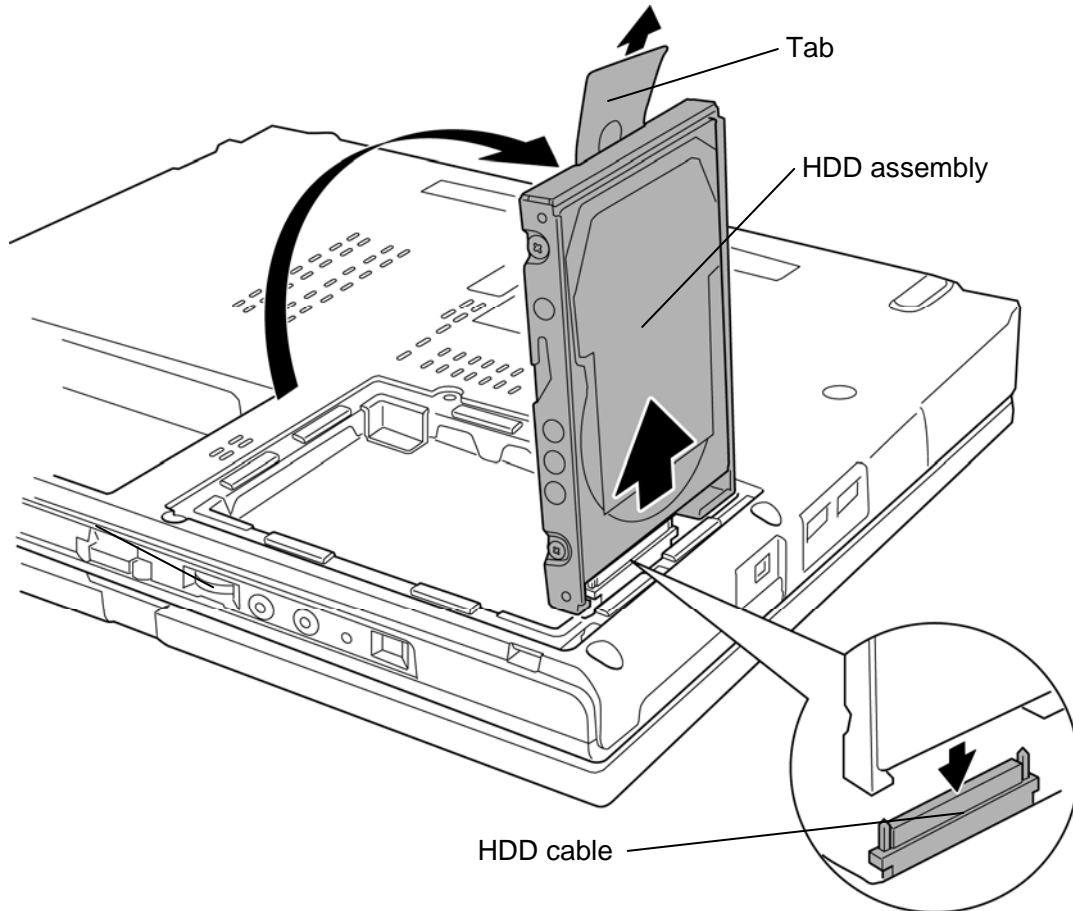
Figure 4-6 Removing the HDD assembly

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

    - M3.0×4.0S   FLAT HEAD screw   ×4

5. Detach the **HDD holder** and **HDD**.

HDD holder
(HDD frame and tab)

M3.0x4.0S FLAT HEAD

M3.0x4.0S
FLAT HEAD

M3.0x4.0S
FLAT HEAD

HDD
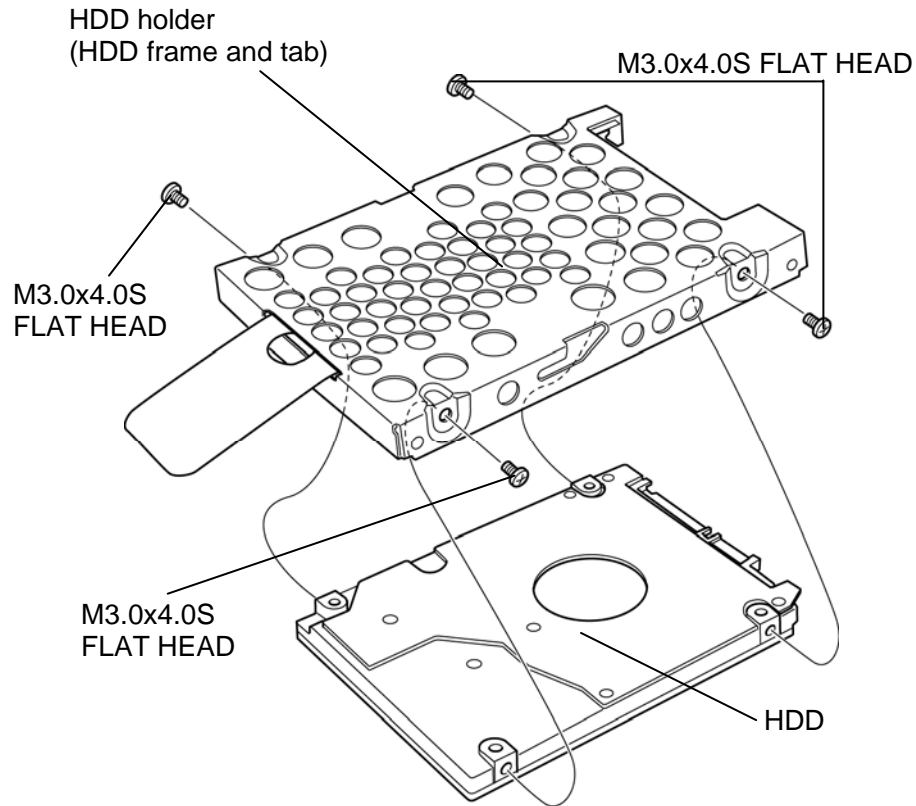
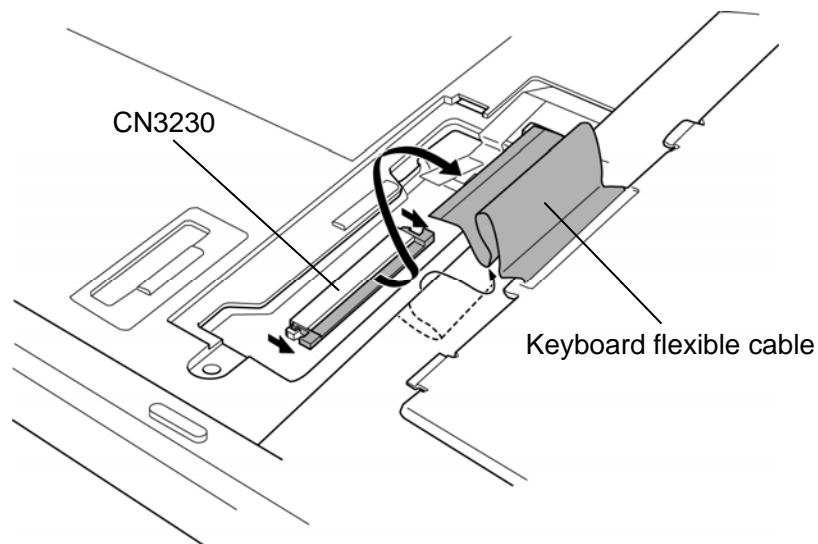*Figure 4-7 Removing the HDD*

Installing the HDD

The following describes the procedure for installing the HDD. (See Figure 4-5 to 4-7.)

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

---

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

    - M3.0×4.0S   FLAT HEAD screw   ×4

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

---

2. Set the connector of the **HDD cable** upward and connect the **HDD assembly** to the
    connector. Press the HDD assembly to ensure a firm connection.

3. Set the **HDD assembly** into the slot.

4. Seat the **HDD cover** and secure it with two **screws** (with e-ring).

4.6   Slim select bay module

Removing the slim select bay module

The following describes the procedure for removing the slim select bay module. (See Figure 4-8 and 4-9.)
The explanation and figure shown below are the optical drive removing/installing.

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

---

1. Remove the following **screw** securing the **latch** and drive the removed screw into the screw hole. (The slim select bay is unlocked.)

    - M2.0×4.0B   BIND screw   ×1

2. While sliding the **latch** toward the arrow direction in the Figure 4-8, pull out the **slim select bay module** to disconnect it from the system board.
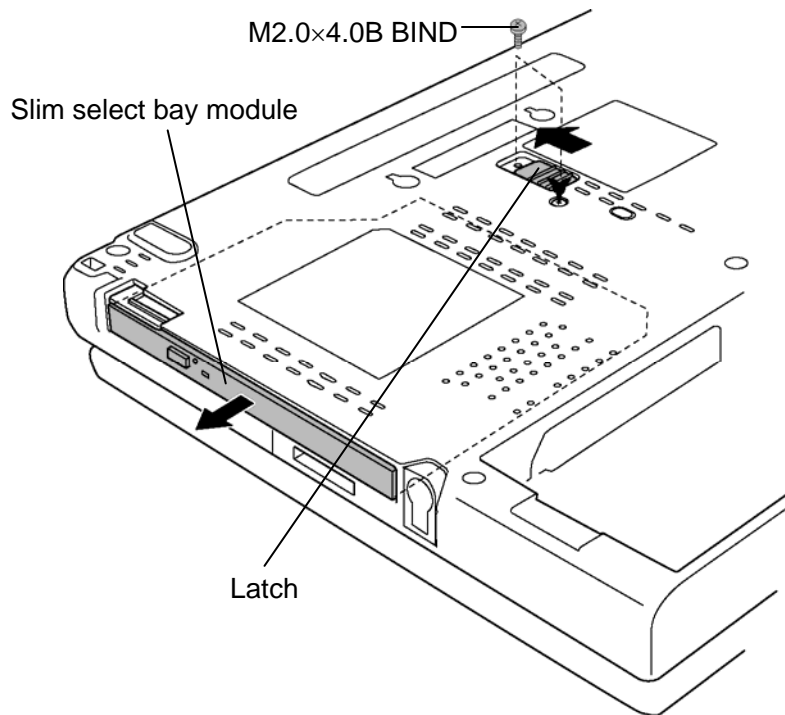
Figure 4-8 Removing the slim select bay module

2. Remove the following **screws**, **connector cover** and **connector** from the optical drive assembly.

    -   M2.0×6.0S   BIND screw   ×2

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

    -   M2.0×3.0S   S-THIN HEAD screw   ×1

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

    -   M2.0×6.0S   BIND screw   ×1

    -   M2.0×22.0S   BIND screw   ×1
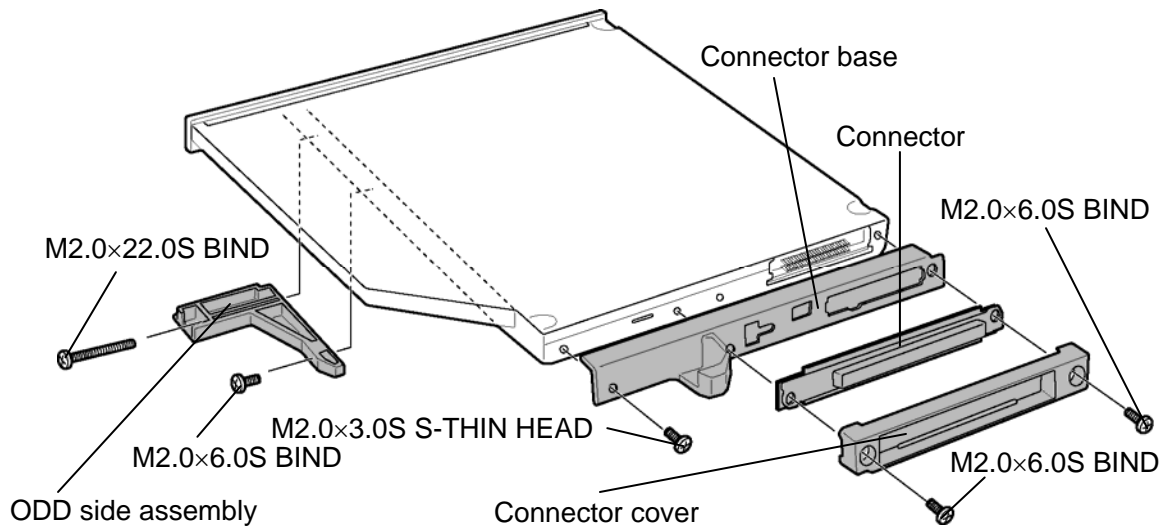
Figure 4-9 Detaching the optical drive assembly

Installing the slim select bay module

The following describes the procedure for installing the slim select bay module. (See Figure 4-8 and 4-9.)

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

   - M2.0×6.0S   BIND screw   ×1

   - M2.0×22.0S   BIND screw   ×1

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

   - M2.0×3.0S   S-THIN HEAD screw   ×1

3. Install the **connector cover** and **connector** to the optical drive assembly and secure it with the following **screws**.

   - M2.0×6.0S   BIND screw   ×2

4. Insert the **slim select bay module** into the computer to connect it to the connector on the system board. Press to ensure a firm connection.

5. Remove the following **screw** from the screw hole. Then secure the latch with the **removed screw**. (The slim select bay is locked.)

   - M2.0×4.0B   BIND screw   ×1

4.7 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard. (See Figure 4-10 to 4-13.)

1. Turn the computer face up.

2. Open the display and make it flat.

3. Insert your fingers into the slot on both sides and lift up the **keyboard holder** to remove.
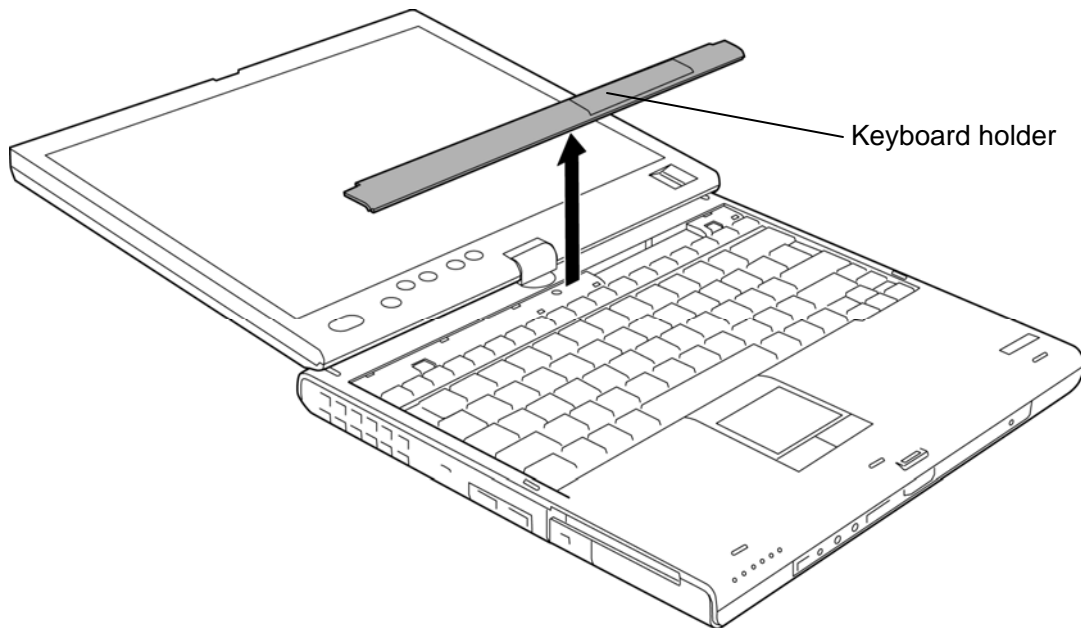
Keyboard holder

Figure 4-10 Removing the keyboard holder

4. Remove the following **screws** securing the keyboard.

   - M2.0×3.0S   BIND screw   ×2

5. Lift the top edge of the **keyboard** while releasing two **latches** and turn it face down on the palm rest.

Latch

M2.0x3.0S BIND

M2.0x3.0S BIND
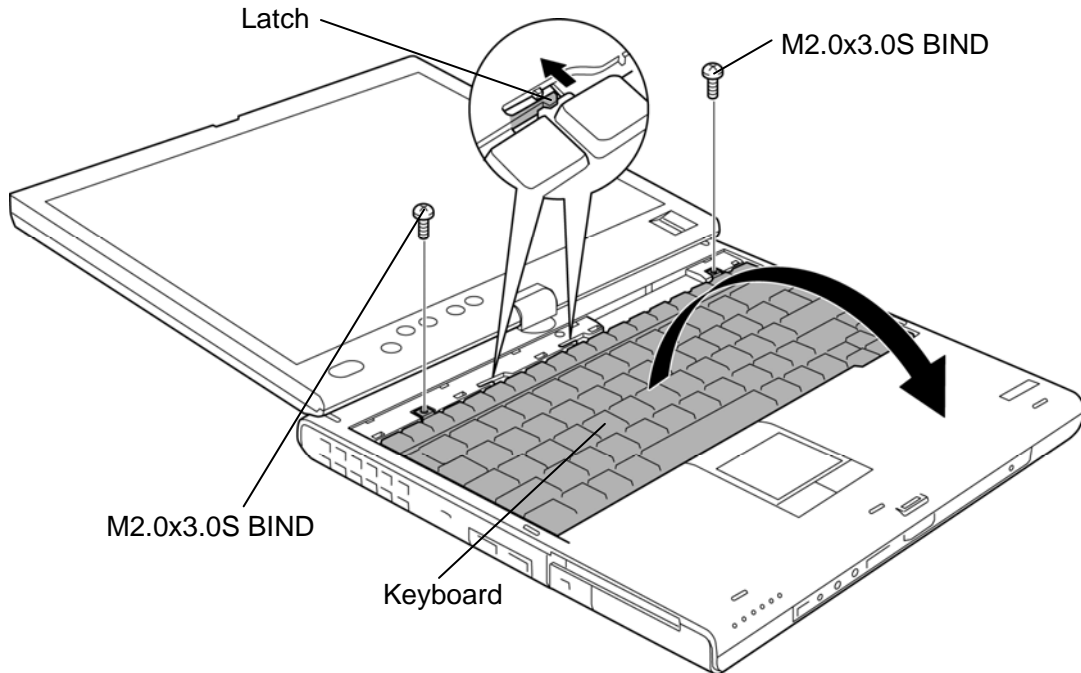
Keyboard

Figure 4-11 Removing the screw

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

- M2.5×3.0S   S-THIN HEAD screw   ×1
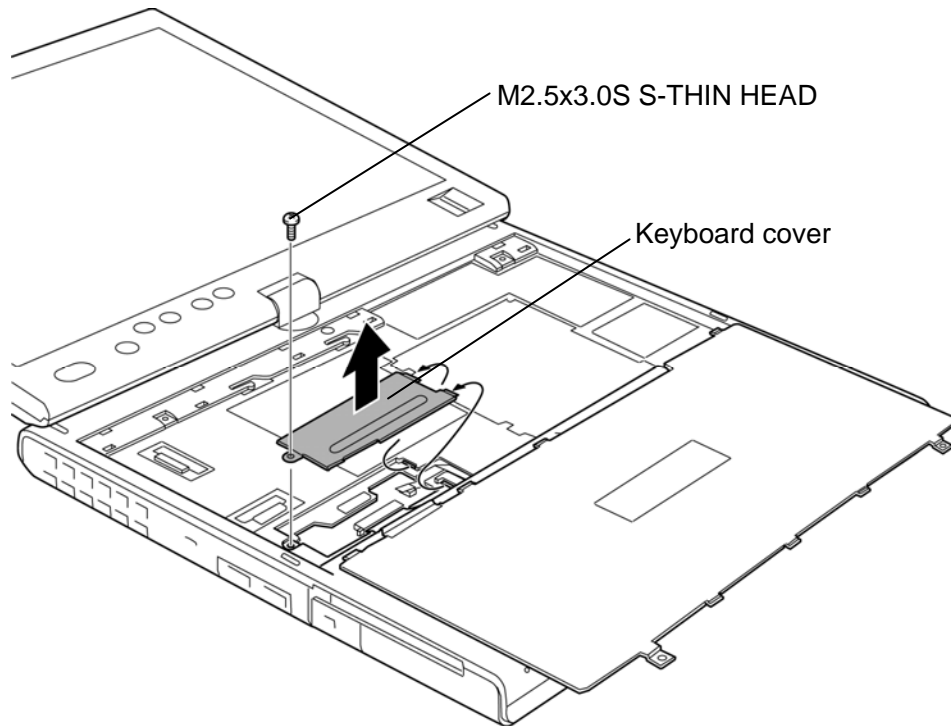
Figure 4-12 Removing the keyboard cover

7. Disconnect the **keyboard flexible cable** from the connector **CN3230** on the system board and remove the **keyboard**.

Figure 4-13 Removing the keyboard

Installing the keyboard

The following describes the procedure for installing the keyboard. (See Figure 4-10 to 4-13.)

1. Place the keyboard face down on the palm rest.

2. Connect the **keyboard flexible cable** to the connector **CN3230** on the system board.

3. Install the **keyboard cover** and secure it with the following **screw**. (Insert the guide of the keyboard cover first)

   - M2.5×3.0S   S-THIN HEAD screw   ×1

CAUTION: *Extra portion of the keyboard cable must be put under the keyboard flexible cover.*

---

4. Turn the **keyboard** face up and set it in place. Make sure that there is no gap between the keyboard and edge of the palm rest.

5. Secure the **keyboard** with the following **screws**.

   - M2.0×3.0S   BIND screw   ×2

6. Install the **keyboard holder** while engaging the latches.

4.8   Memory module

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

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

Never press hard or bend the memory module.

Removing the memory module

To remove the memory module(s), make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-14 and 4-15.)

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

    - M2.5×3.0S   S-THIN HEAD screw   ×2
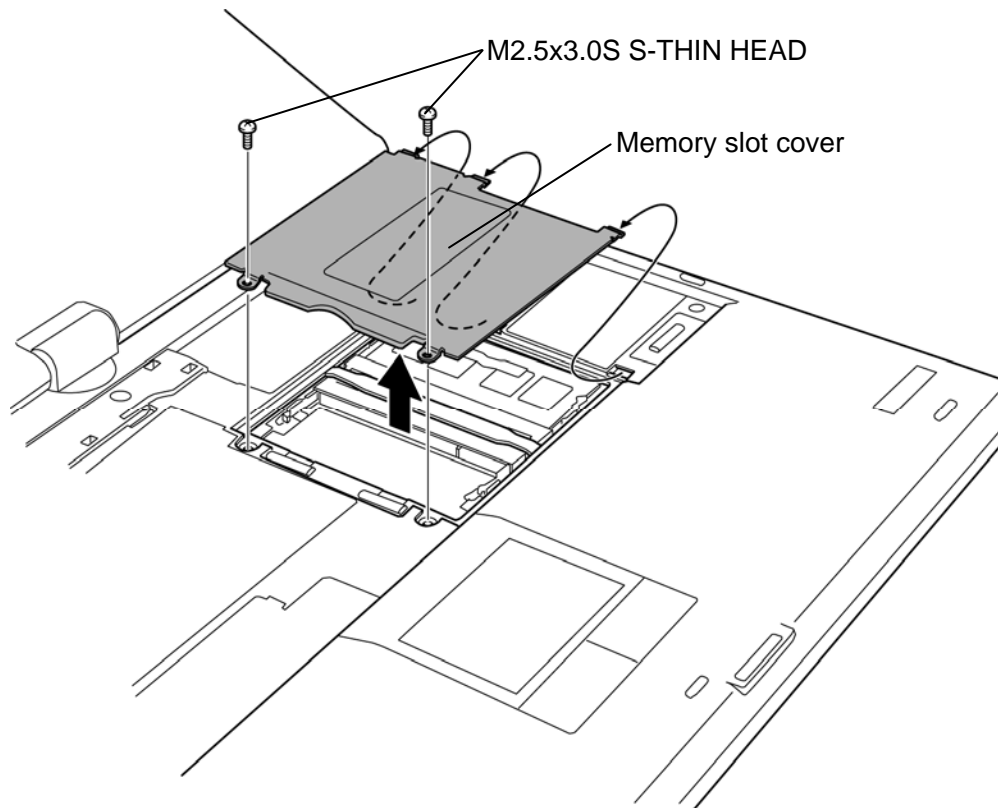
Figure 4-14 Removing the memory slot cover

---

2. Open the left and right **latches** and remove the **memory module(s)**.
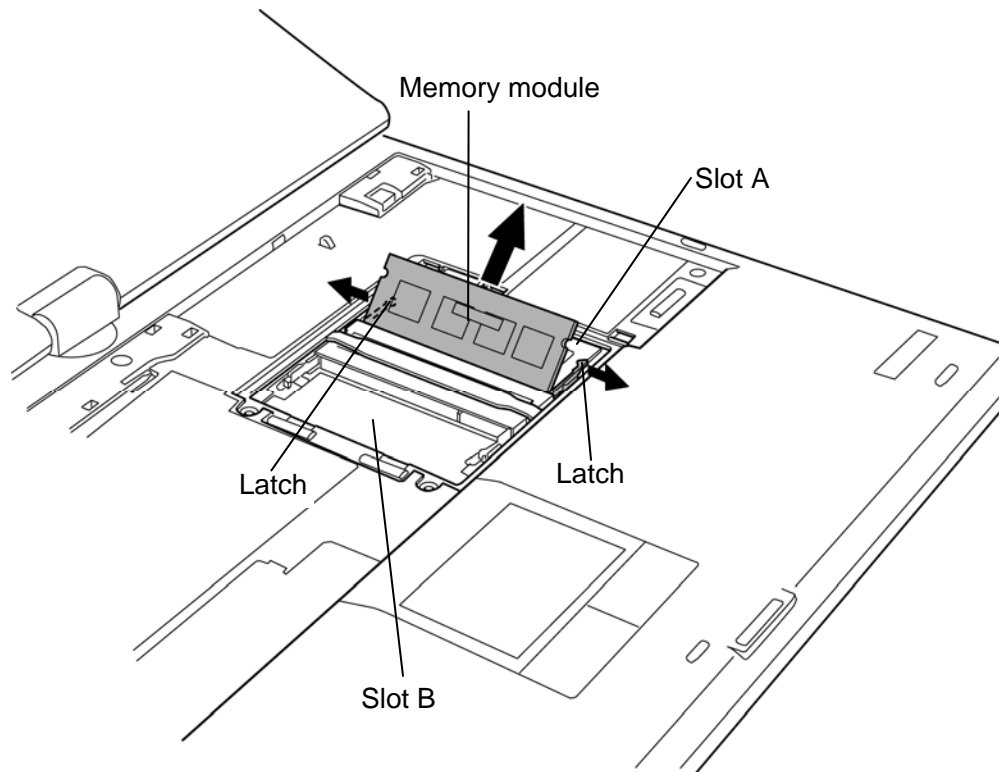
Figure 4-15 Removing the memory module

Installing the memory module

To install the memory module(s), make sure the computer is in boot mode and powered off. Then perform the following procedure. (See Figure 4-14 and 4-15.)

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

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

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

Never press hard or bend the memory module.

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

---

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

   - M2.5×3.0S   S-THIN HEAD screw   ×2

4.9 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below. (See Figure 4-16.)

CAUTION: Do not try to remove the Bluetooth module with the computer turned on. You can damage the computer or Bluetooth module. Do not touch the connectors on the Bluetooth module on the computer. Debris on the connectors may cause Bluetooth access problems.

1. Peel off the **insulator** and **spacer**.

2. Disconnect the **Bluetooth antenna cable** from the Bluetooth module using an antenna coaxial cable disconnector.

3. Disconnect the **Bluetooth cable** from the connector **CN4400** on the system board.

4. Remove the **Bluetooth module** from the slot and disconnect the **Bluetooth cable** from the connector on the Bluetooth module.
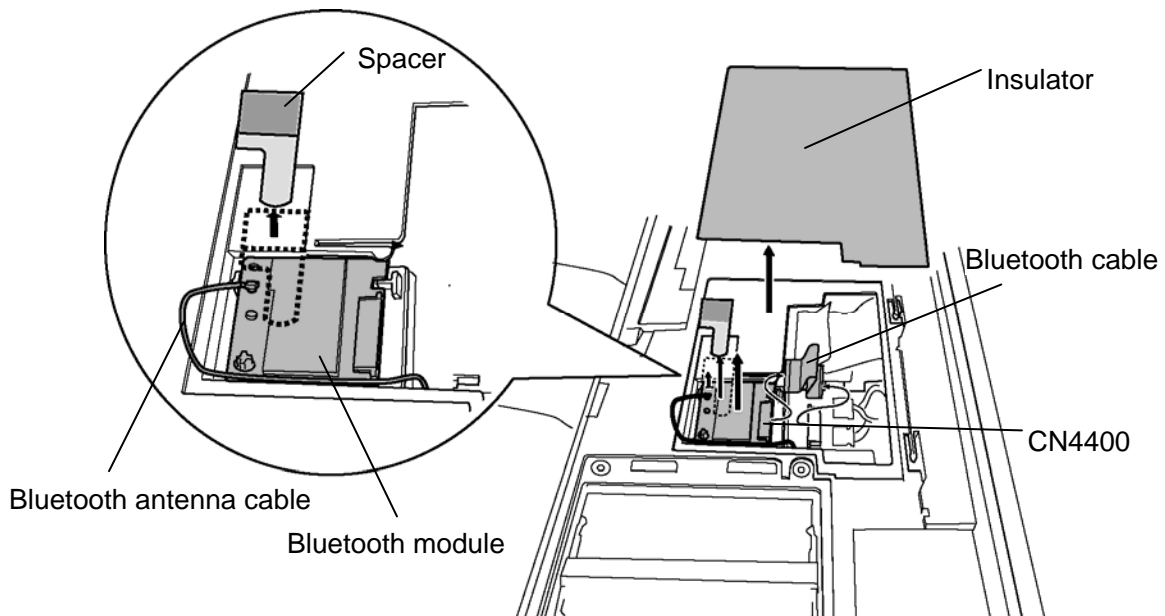
Figure4-16 Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below. (See Figure 4-16.)

1. Connect the **Bluetooth cable** to the connector on the Bluetooth module.

2. Connect the **Bluetooth cable** to the connector **CN4400** on the system board and set the **Bluetooth module** to the slot in place.

3. Connect the **Bluetooth antenna cable** to the connector on the Bluetooth module.

4. Stick the **spacer** in place referring Figure 4-16.

5. Stick the **glass tape**.

4.10 Wireless LAN card

Removing the Wireless LAN card

To remove the Wireless LAN card, follow the steps below. (See Figure 4-17.)

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

---

1. Peel off the **insulator**.

2. Remove the following **screw** and **metal plate**.

    - M2.0×4.0B   BIND screw or M2.0×4.0B   TORX screw ×1

3. Disconnect the **wireless LAN antenna cables** (black and white) from the wireless
    LAN card using an antenna coaxial cable disconnector.

4. Remove the following **screw** and disconnect the **wireless LAN card** from the
    connector on the system board.

    - M2.0×4.0B   BIND screw   ×1
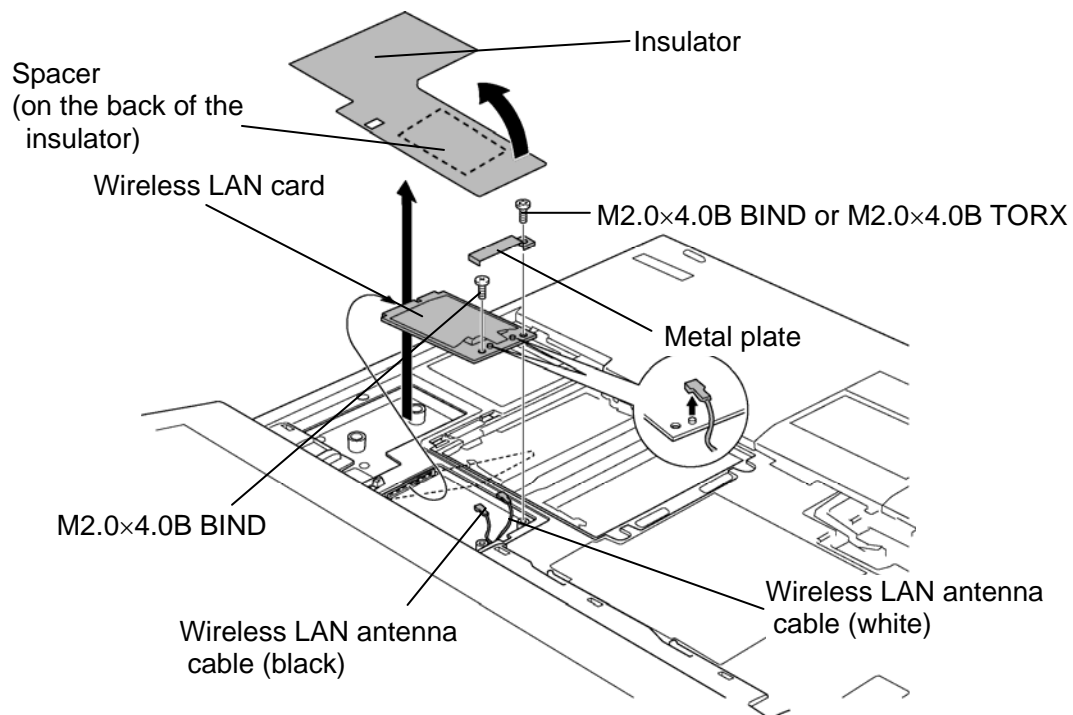
Figure 4-17   Removing the Wireless LAN card

Installing the Wireless LAN card

To install the Wireless LAN card, follow the steps below. (See Figure 4-17.)

CAUTION: *Be sure to switch the computer off before installing the wireless LAN card. Otherwise, the computer or the wireless LAN card may be damaged.*

---

1. Insert the **wireless LAN card** to the connector slantwise and press it to connect firmly.

2. Connect the **wireless LAN antenna cables** to the connectors on the wireless LAN card and secure it with the following **screw**.

    - M2.0×4.0B   BIND screw   ×1

3. Install the **metal plate** in place and secure it with the following **screw**.

    - M2.0×4.0B   BIND screw or M2.0×4.0B   TORX screw ×1

4. Stick the **insulator** (with the **spacer**).

CAUTION: *1. When replacing with a new insulator, a new spacer should be stuck to the back of the insulator.*

                  2. When keyboard supports (for the model of no wireless LAN) are stuck, the spacer is not necessary.

4.11 Touch pad

Removing the Touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-18 to 4-21.)

1. Turn over the computer and remove the following **screw**.

    - M2.5×10.0B   FLAT HEAD screw   ×1
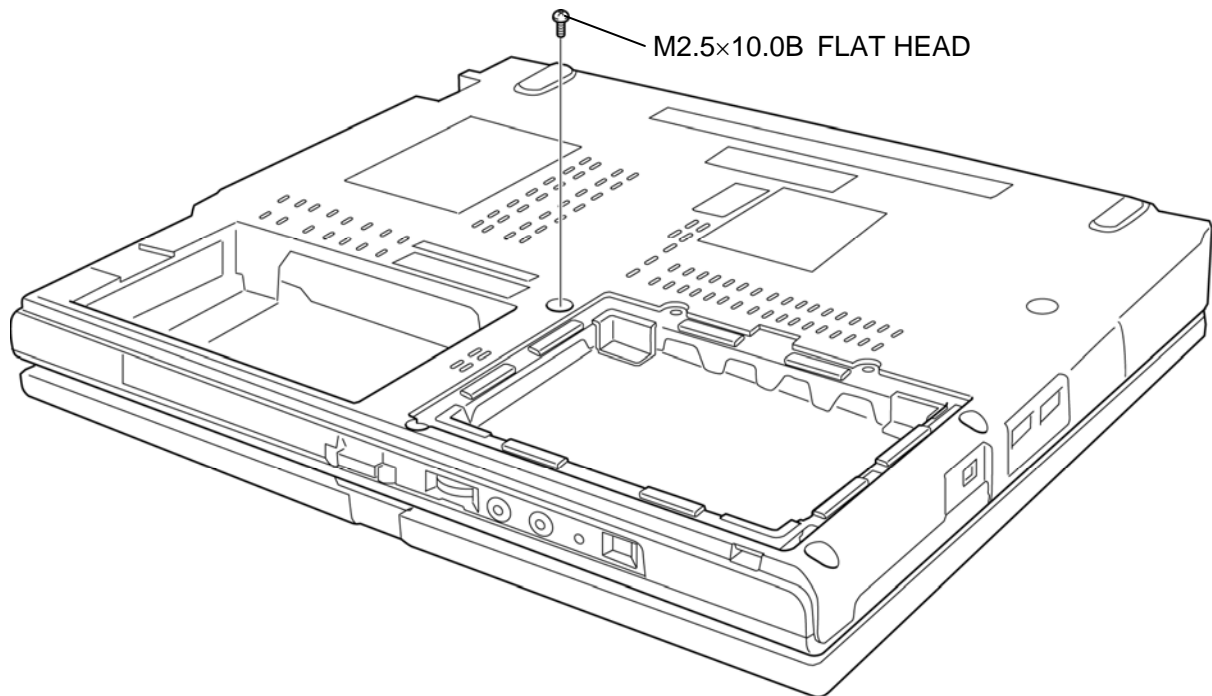
Figure 4-18 Removing the screw

2. Turn the computer face up and open the display.

3. Remove the **touch pad cover** while releasing the latches.
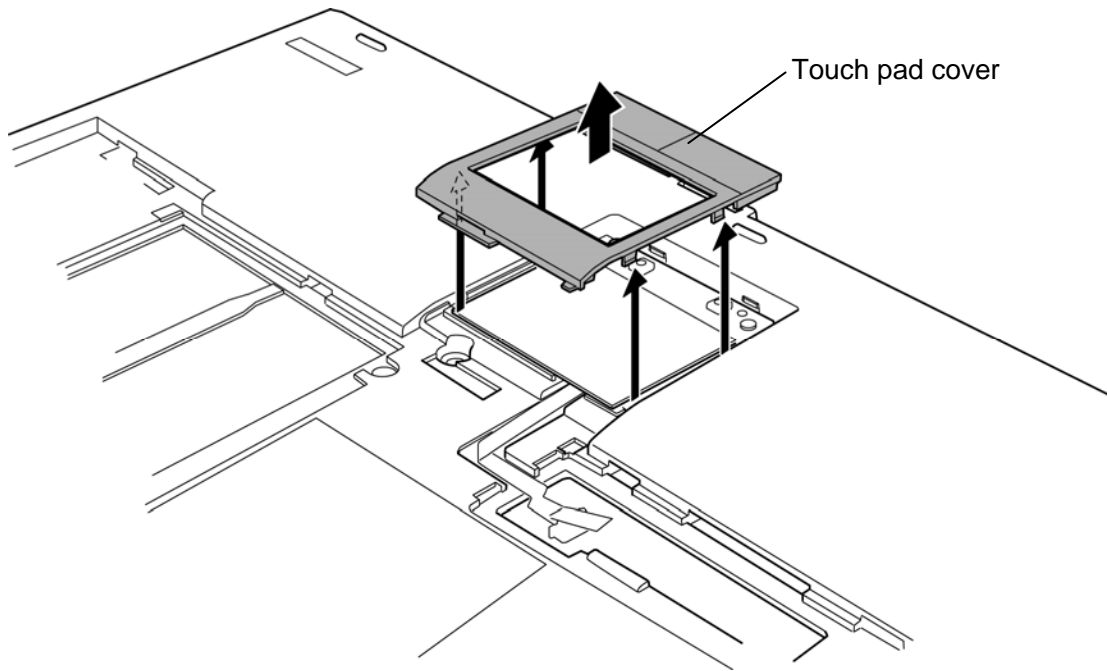
Touch pad cover

Figure 4-19   Removing the touch pad cover

4. Disconnect the **touch pad cable** from the connector **CN3240** on the system board.

5. Remove the following **screws** fixing the touch pad assembly.

    - M2.0×3.0S   S-THIN HEAD screw   ×2

6. Remove the **touch pad assembly** while peeling the adhered portion.
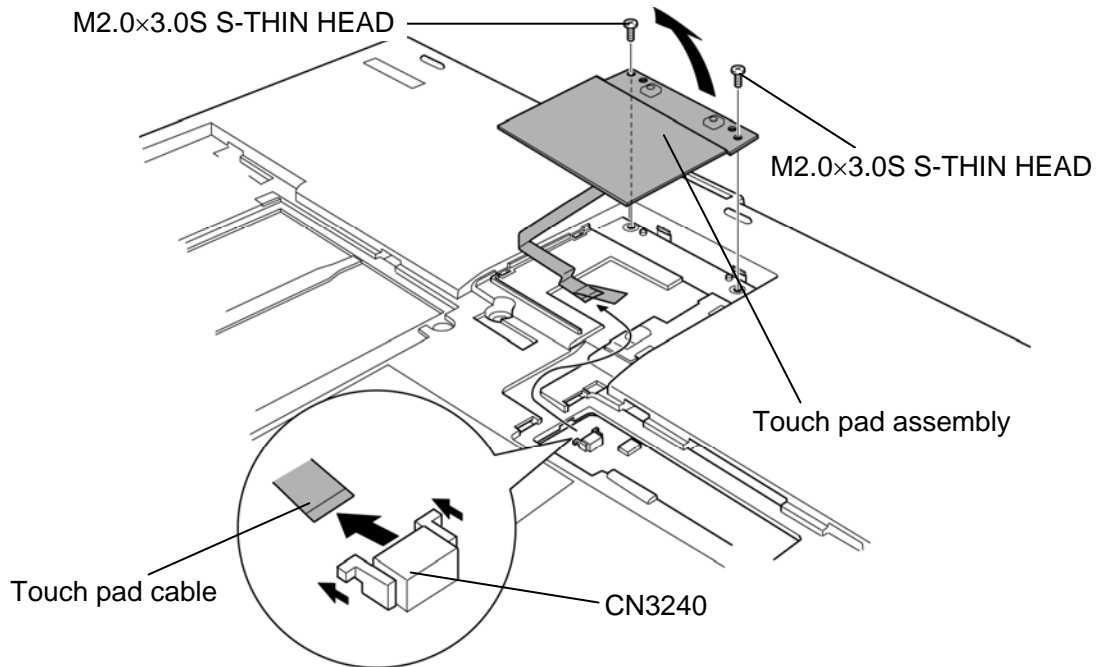
Figure 4-20   Removing the touch pad assembly

7. Peel off the **glass tape** and disconnect the **touch pad cable** from the connector on the touch pad.
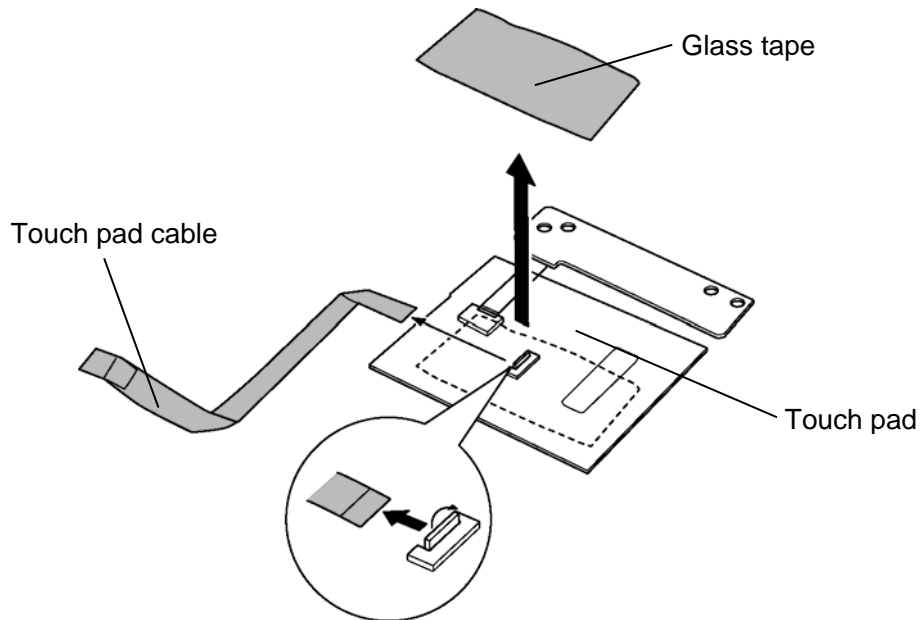
Figure 4-21   Removing the touch pad

Installing the Touch pad

The following describes the procedure for installing the touch pad. (See Figure 4-18 to 4-21.)

1. Connect the **touch pad cable** to the connector on the touch pad and stick the **glass tape**.

2. Install the **touch pad assembly** to the slot and secure it with the following **screws**.

   - M2.0×3.0S   S-THIN HEAD screw   ×2

3. Connect the **touch pad cable** to the connector **CN3240** on the system board.

4. Install the **touch pad cover** while engaging latches.

5. Close the display and turn over the computer.

6. Secure the following **screw** to fix the touch pad.

   - M2.5×10.0B   FLAT HEAD screw   ×1

4.12 Top cover assembly

Removing the top cover assembly

The following describes the procedure for removing the top cover assembly. (See Figure 4-22 and 4-26.)

1. Close the display and turn over the computer.

2. Remove the following **screws**.

    - M2.5×10.0B   FLAT HEAD screw   ×2 ("10" in the figure below)
    - M2.5×6.0B   FLAT HEAD screw   ×8 ("6" in the figure below)
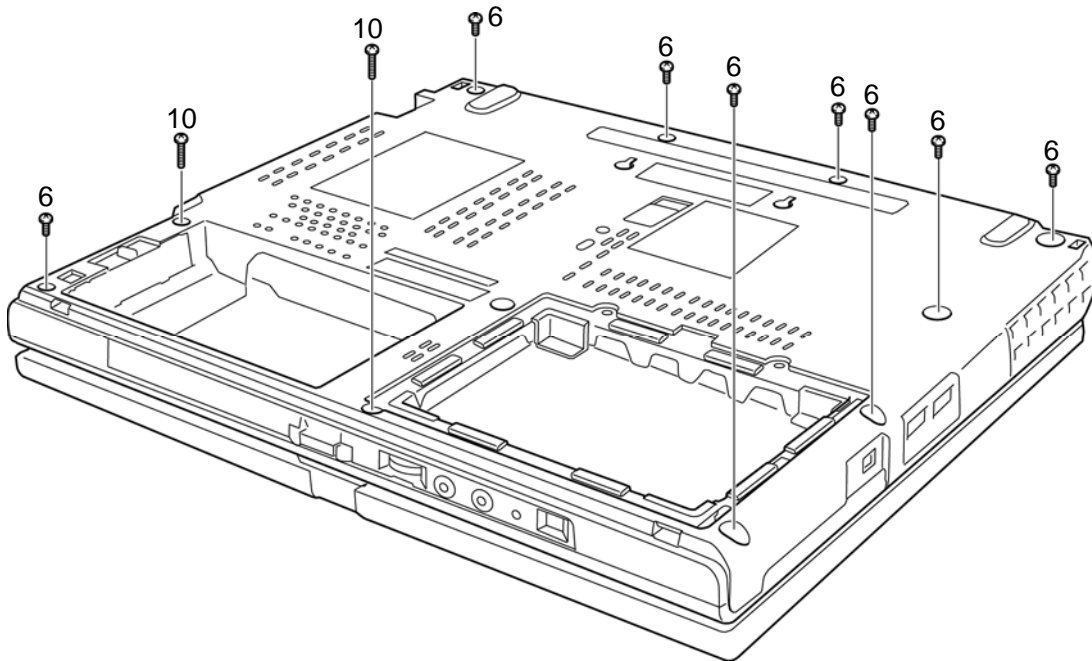
Figure 4-22   Removing the top cover assembly (1)

3. Turn the computer face up.

4. Open the display and make it flat.

5. Remove the following **screws**.

   - M2.0×4.0B   BIND screw   ×2
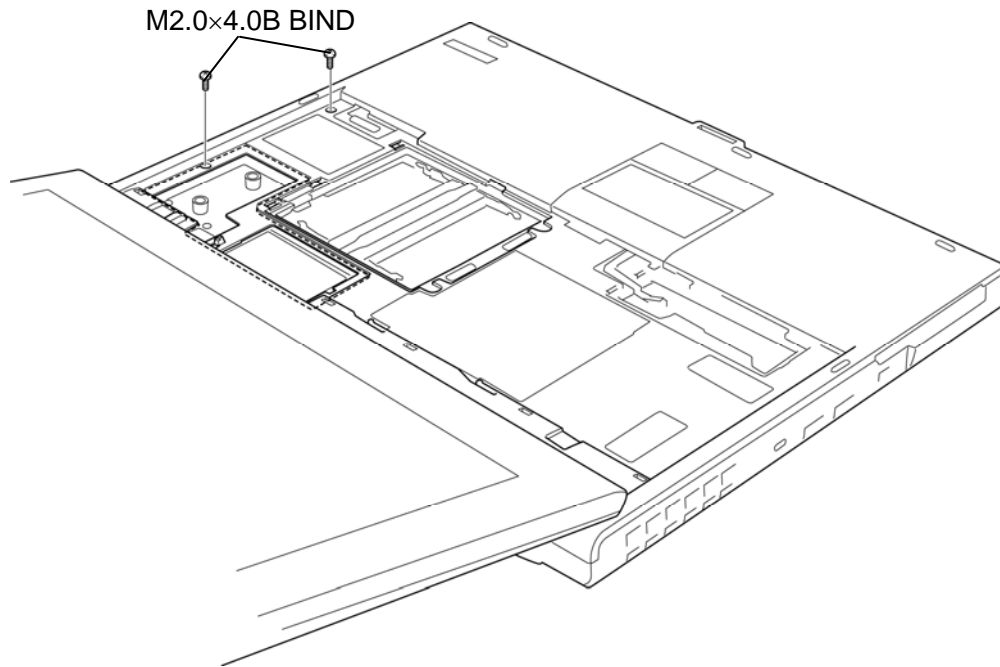
Figure 4-23 Removing the top cover assembly (2)

6. Disconnect the **speaker cable**, **NP board cable**, **LCD cable** and **digitizer cable** from the connector **CN6170**, **CN9500**, **CN5500**, and **CN9540** on the system board.

NP board cable
(connected to CN9500)

Speaker cable
(connected to CN6170)

LCD cable
(connected to CN5500)

Digitizer cable
(connected to CN9540)
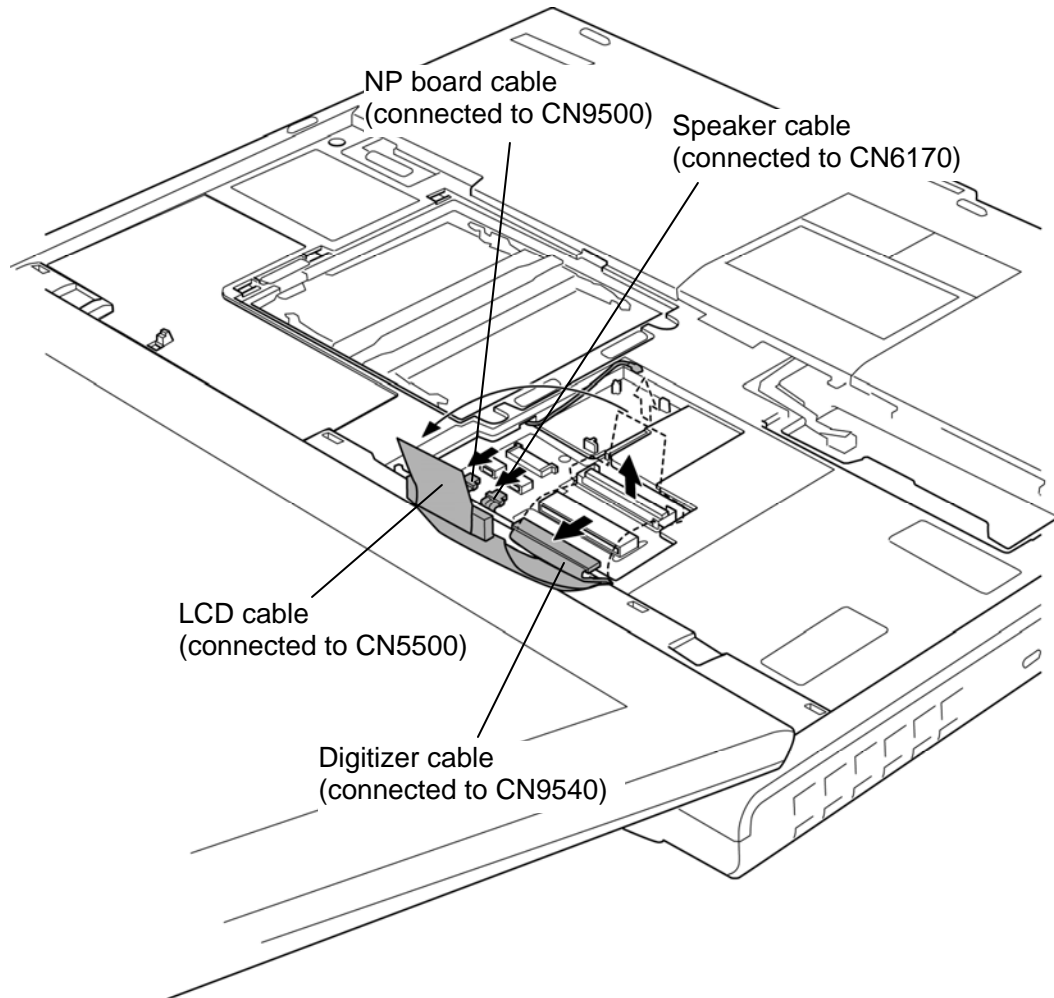
Figure 4-24 Removing the top cover assembly (3)

7. Remove the following **screw**.

    • M2.5×10.0B   FLAT HEAD screw   ×1

8. Remove the **hinge rear cover**.

9. Turn the display 90 degrees and remove the following **screws**.

    • M2.5×6.0B   FLAT HEAD screw   ×2
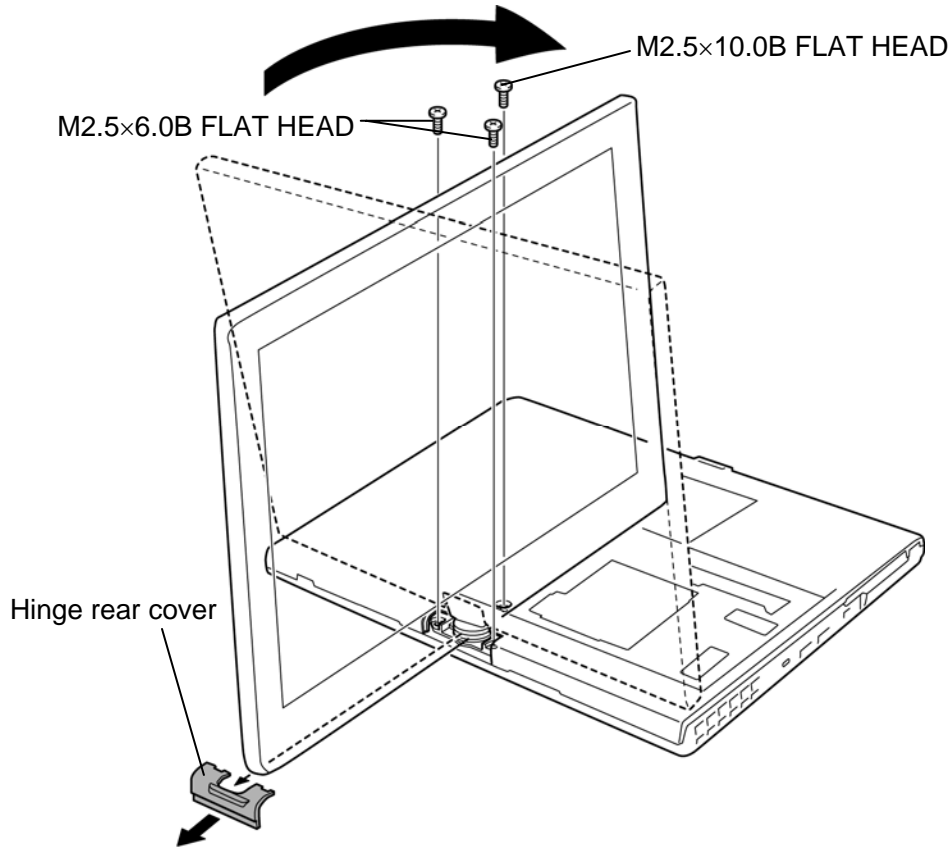
Figure 4-25 Removing the top cover assembly (4)

10. Lift up the **top cover assembly** from the base assembly.
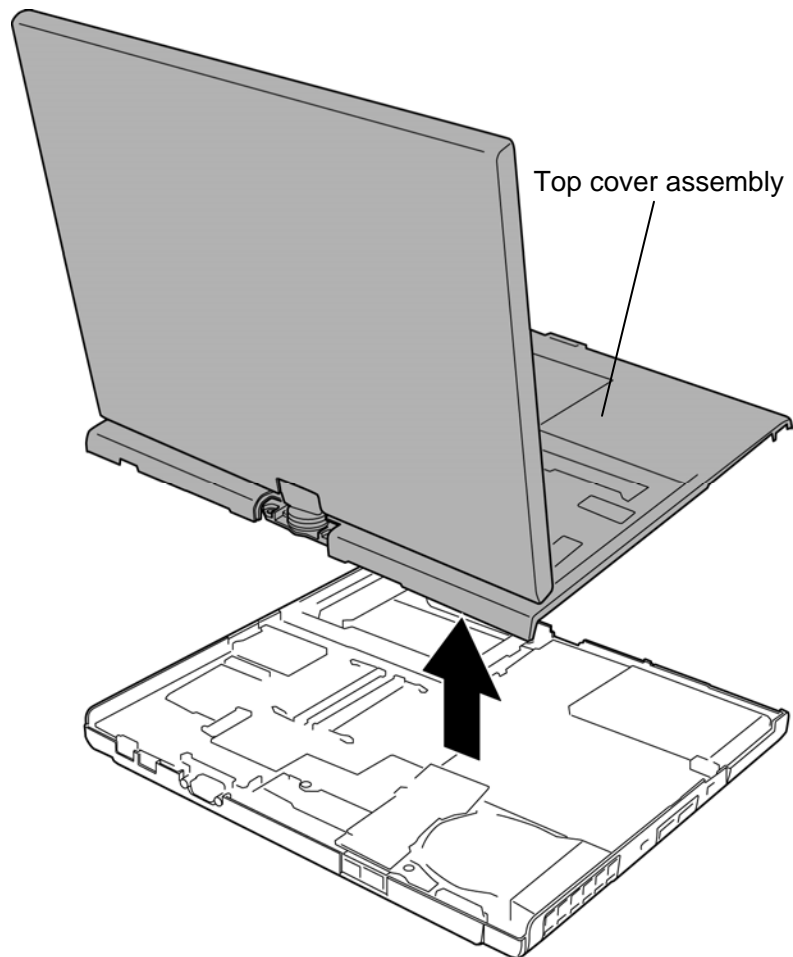
Top cover assembly

Figure 4-26 Removing the top cover assembly (5)

Installing the top cover assembly

The following describes the procedure for installing the top cover assembly. (See Figure 4-22 and 4-26.)

1. Install the **top cover assembly** to the base assembly.

2. Turn the display 90 degrees.

3. Secure the following **screws**.

    - M2.5×6.0B   FLAT HEAD screw   ×2

4. Turn the display 90 degrees. (The display is returned to the former position.)

5. Install the **hinge rear cover**.

6. Secure the following **screw**.

    - M2.5×10.0B   FLAT HEAD screw   ×1

7. Connect the **speaker cable**, **NP board cable**, **LCD cable** and **digitizer cable** to the connector **CN6170**, **CN9500**, **CN5500**, and **CN9540** on the system board.

8. Secure the following **screws**.

    - M2.0×4.0B   BIND screw   ×2

9. Close the display and turn over the computer.

10. Secure the following screws to fix the **top cover assembly**.

    - M2.5×10.0B   FLAT HEAD screw   ×2
    - M2.5×6.0B   FLAT HEAD screw   ×8

4.13 System board/RTC battery

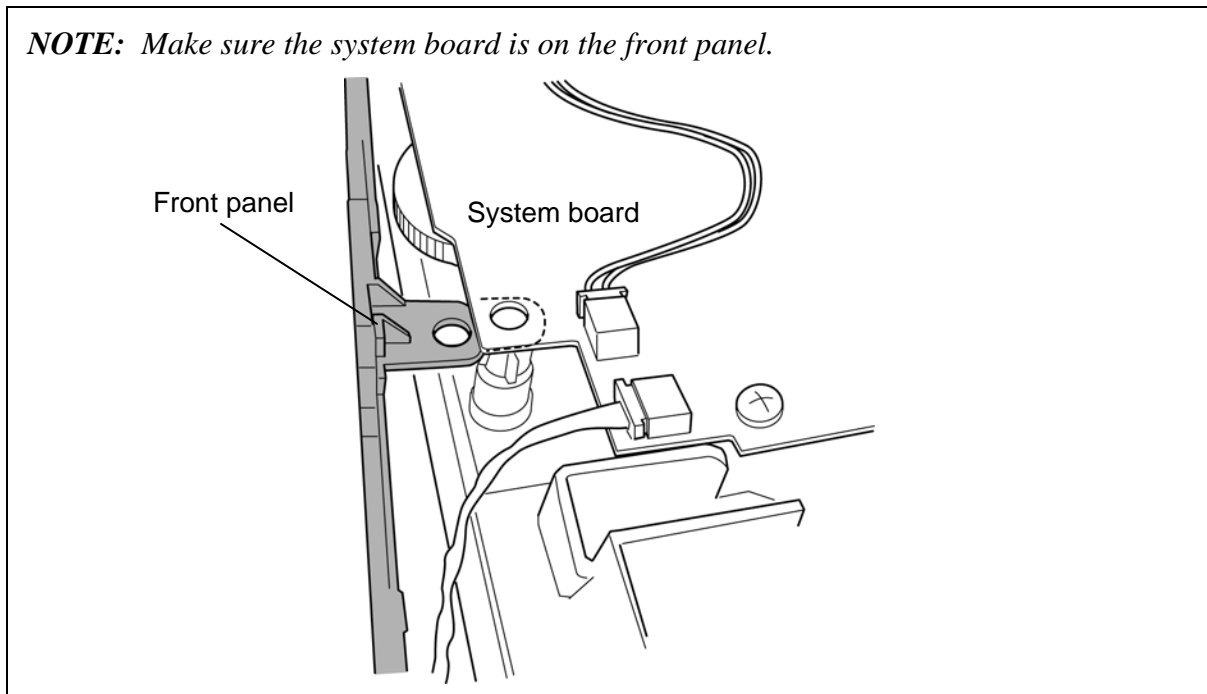### Removing the System board/RTC battery

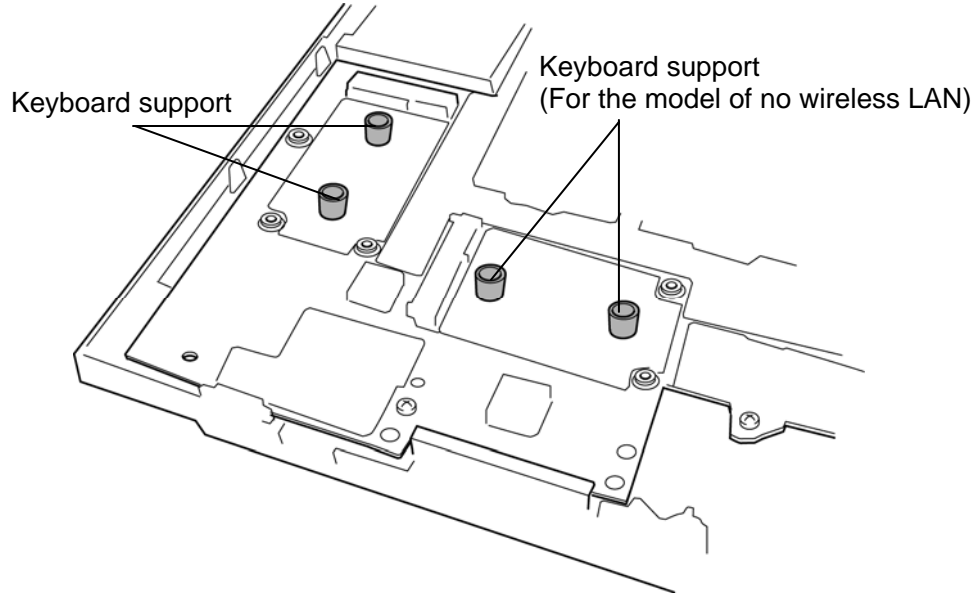The following describes the procedure for removing the system board/RTC battery. (See Figure 4-27.)

1. Remove the following **screws** securing the system board.

    • M2.5×6.0B   FLAT HEAD screw   ×3

2. Turn up the **insulator** and remove the RTC battery from the slot.

3. Remove the **system board** (with the RTC battery).

4. Disconnect the **RTC battery cable** from the connector **CN9300** on the system board to remove the **RTC battery**.
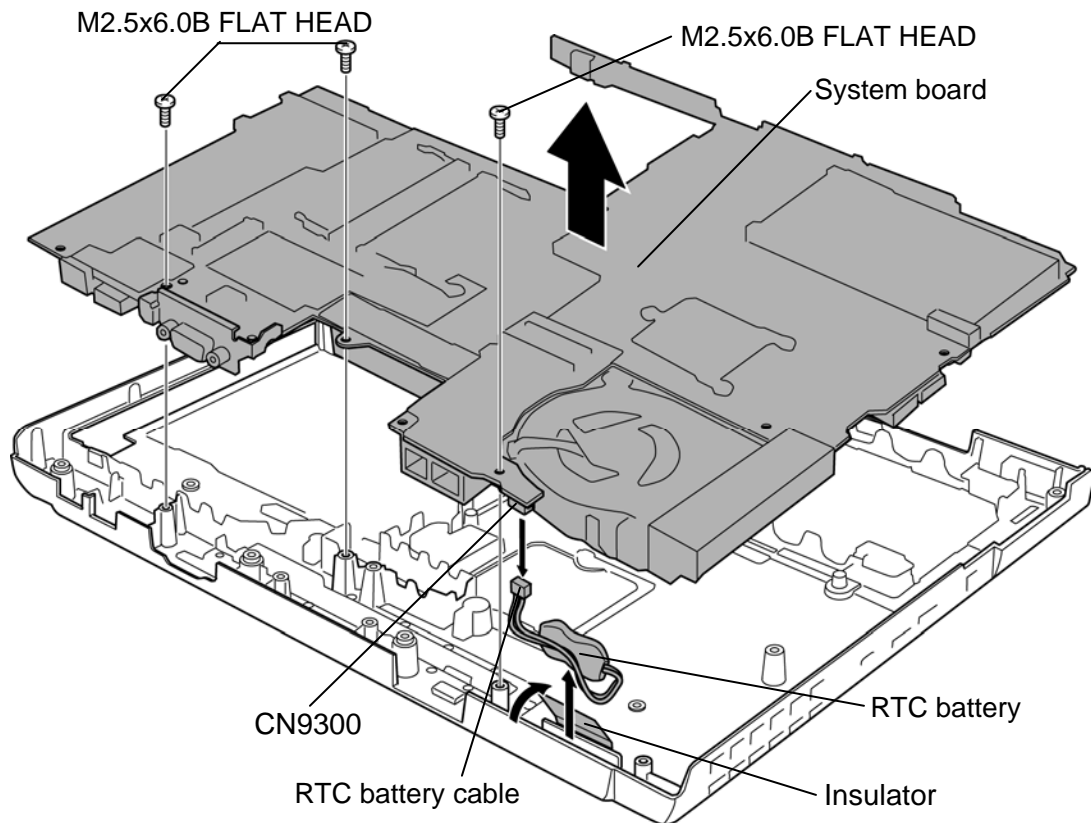
Figure 4-27 Removing the system board/RTC battery

Installing the system board/RTC battery

The following describes the procedure for installing the system board/RTC battery. (See Figure 4-27.)

1. Connect the **RTC battery cable** to the connector **CN9300** on the system board.

2. Install the **system board** to the base assembly and secure it with the following **screws**.

   - M2.5×6.0B   FLAT HEAD screw   ×3

NOTE: Make sure the system board is on the front panel.

3. Install the **RTC battery** to the slot and wrap it with the **insulator**.

CAUTION: *When installing new system board, stick new keyboard supports on the*
            system board.

Keyboard support

Keyboard support
(For the model of no wireless LAN)

4.14 Cover latch

Removing the Cover latch

The following describes the procedure for removing the cover latch. (See Figure 4-28.)

1. Remove the **cover cap** on the bottom while releasing latches.

2. Peel off the **insulator** on the cover latch.

3. Remove the **cover latch** to the direction in the figure below. Be careful not lose the spring.
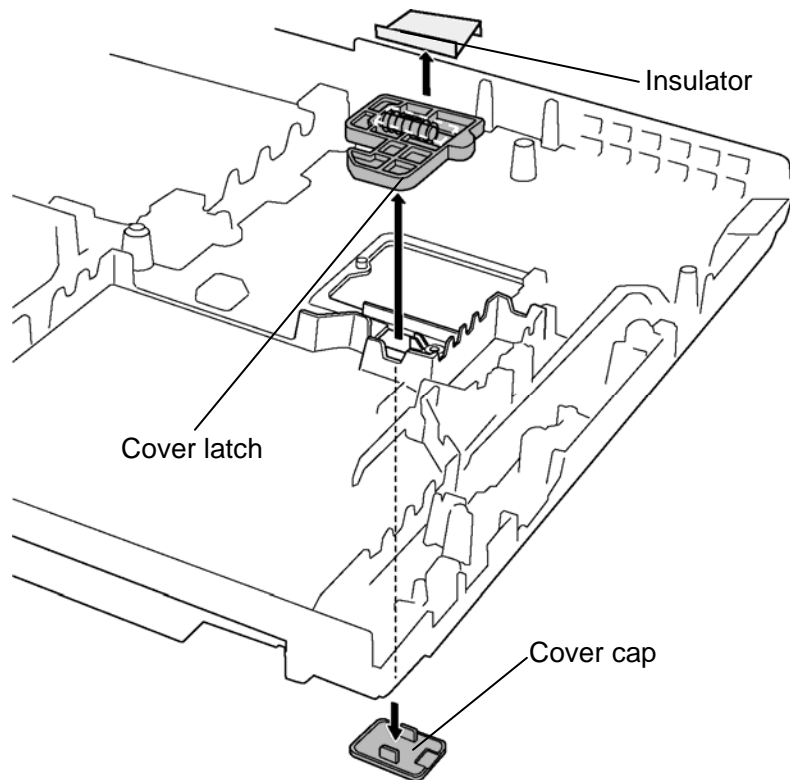
Figure 4-28 Removing the Cover latch

Installing the Cover latch

The following describes the procedure for installing the cover latch (See Figure 4-28).

1. Install the **cover latch** and stick the **insulator** to the plates outside the spring. (The insulator prevents the spring of cover latch from removing.)

2. Push the **cover cap** from the bottom.

4.15 Battery lock assembly/Pen holder assembly

Removing the Battery lock assembly/Pen holder assembly

The following describes the procedure for removing the battery lock assembly/pen holder assembly. (See Figure 4-29.)

1. Remove the **pen holder assembly** from the slot.
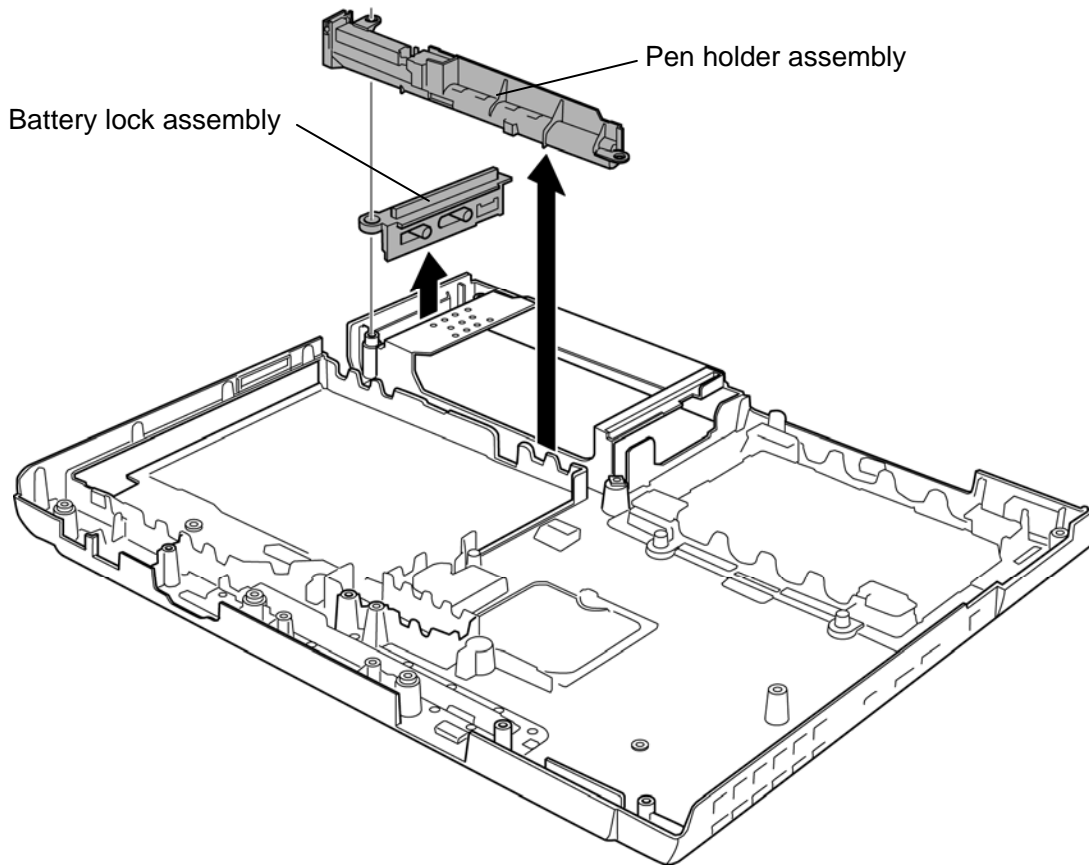
2. Remove the **battery lock assembly** from the slot.

Figure 4-29 Removing the battery lock assembly/pen holder assembly

Installing the Battery lock assembly/Pen holder assembly

The following describes the procedure for installing battery lock assembly/pen holder assembly (See Figure 4-29).

1. Install the **battery lock assembly** to the slot.

2. Install the **pen holder assembly** to the slot

4.16 Microphone/Front panel

Removing the Microphone/Front panel

The following describes the procedure for removing the microphone/front panel. (See Figure 4-30.)

1. Peel off the **insulator** and **glass tape**.

2. Disconnect two **microphone cables** (left and right) from the connector **CN6060** and **CN6061** on the system board.

3. Remove the **front panel** from the base assembly.

4. Remove the **microphone hold plates** (left and right) and **microphones** (left and right) from the front panel.
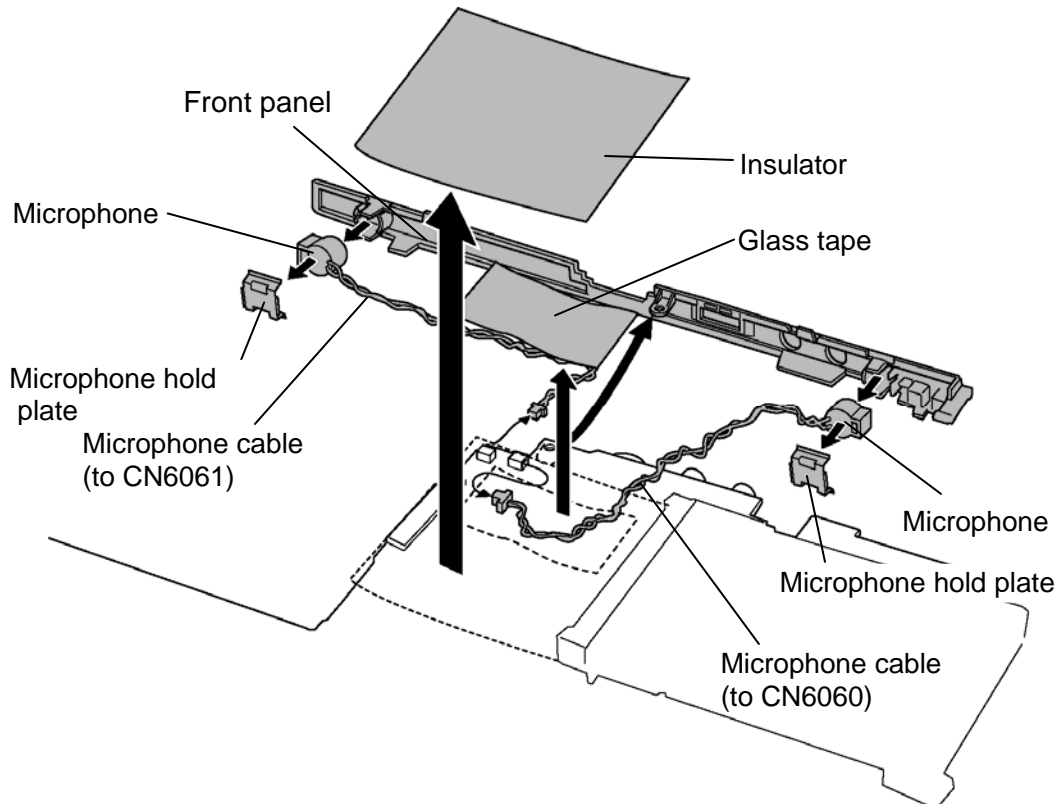
Figure 4-30 Removing the microphone/front panel

Installing the Microphone/Front panel

The following describes the procedure for installing the microphone/front panel. (See Figure 4-30.)

1. Install the **microphones** (left and right) to the front panel.

2. Install the **microphone hold plates** (left and right) to the front panel.

3. Install the **front panel** to the system board in place.

4. Connect two **microphone cables** (left and right) to the connector **CN6060** and **CN6061** on the system board.

5. Stick the **glass tape** and **insulator** in place.

4.17 Fan

Removing the Fan

The following describes the procedure for removing the fan. (See Figure 4-31.)

1. Turn over the system board.

2. Peel off the **glass tape** and disconnect the **fan cable** from the connector **CN8781** on the system board.

3. Turn the system board face up.

4. Remove the following **screws** and **fan**.

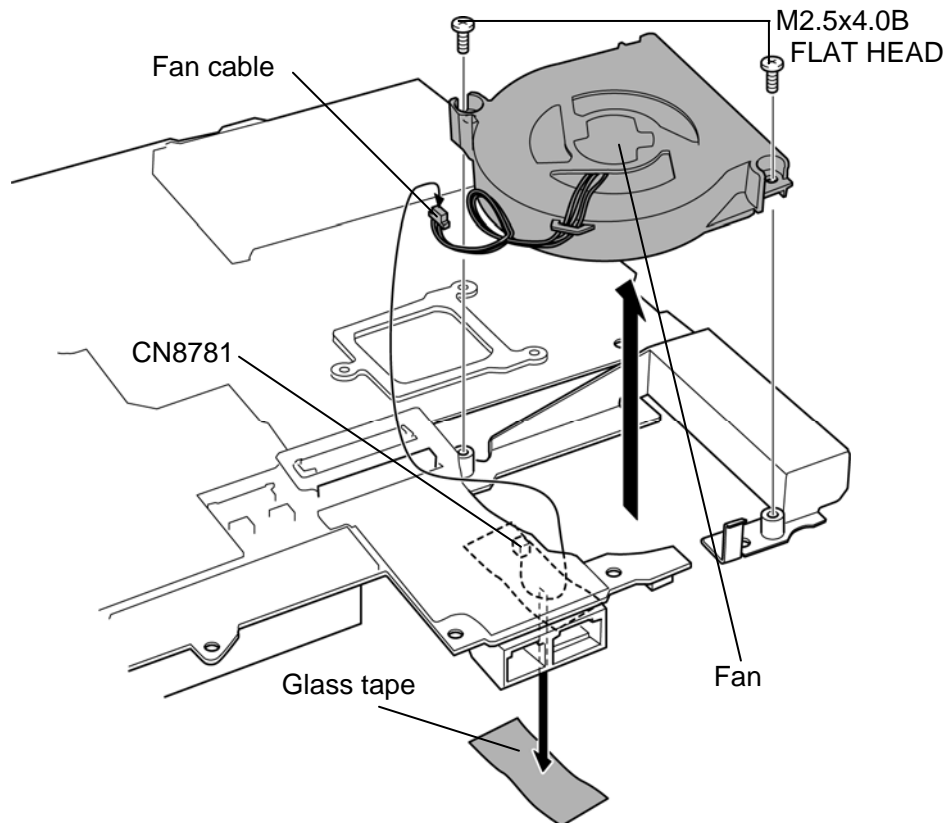   - M2.5×4.0B   FLAT HEAD screw   ×2

Figure 4-31 Removing the fan

Installing the Fan

The following describes the procedure for installing the fan. (See Figure 4-31.)

1. Install the **fan** and secure it with the following **screws**.

    *   M2.5×4.0B   FLAT HEAD screw   ×2

2. Turn over the system board.

3. Connect the **fan cable** to the connector **CN8781** on the system board and stick the **glass tape**.

4.18 Heat sink/CPU

Removing the Heat sink/CPU

The following describes the procedure for removing the heat sink/CPU. (See Figure 4-32 and 4-33.)

1. Turn over the system board.

2. Remove the following **screws** securing the CPU hold plate in the reverse order of the numbers marked on the CPU hold plate and remove the **CPU hold plate**.

   - M2.0×4.0B   BIND screw   ×3

CAUTION: *Remove the screws in the order of mark "3", "2" and "1" on the CPU holder.*
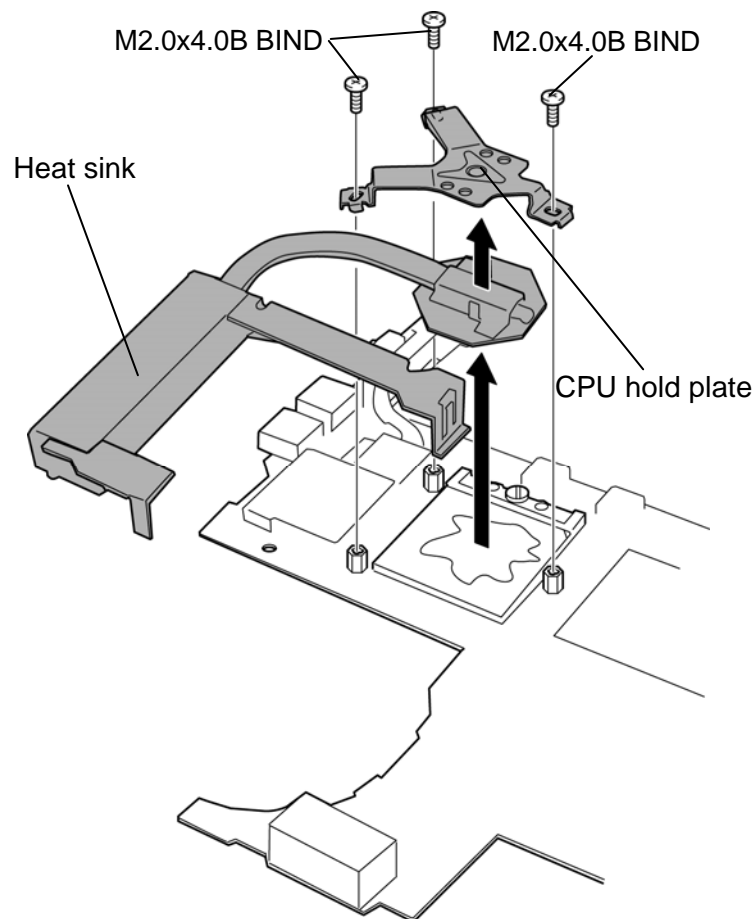

Figure 4-32 Removing the heat sink

3. Remove the **heat sink** on the CPU.

CAUTION: *When removing the heat sink, be careful not to damage the CPU under the*
          fin.

---

4. Unlock the CPU by rotating counterclockwise the **cam** on the CPU socket by 90
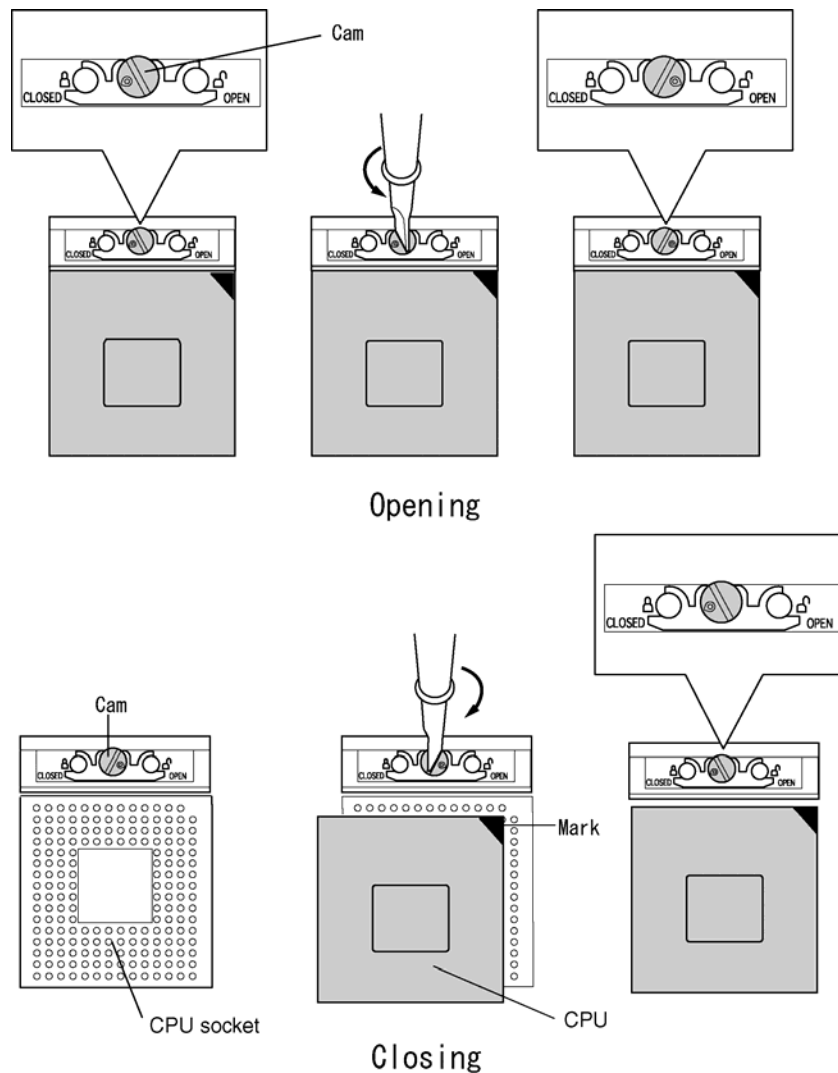   degrees with a flat-blade driver.

Figure 4-33 Replacing the CPU

4. Remove the **CPU**.

CAUTION: *When removing the CPU, lift it up right above. Otherwise, pins of CPU may*
          be damaged.

Installing the Heat sink/CPU

The following describes the procedure for installing the heat sink/CPU. (See Figure 4-32 to 4-34.)

1. Make sure that the **cam** of the CPU socket is in the unlock (OPEN) position.

2. Install the **CPU** on the CPU socket and check the CPU is installed on the correct position.

3. Lock the CPU by rotating clockwise the cam on the CPU socket by 90 degrees with a flat-blade driver.

4. If there is already silicon grease on the CPU and heat sink, clean it with a cloth. Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.

> *NOTE*: *Apply the silicon grease enough to cover the chip surface using the special applicator.*
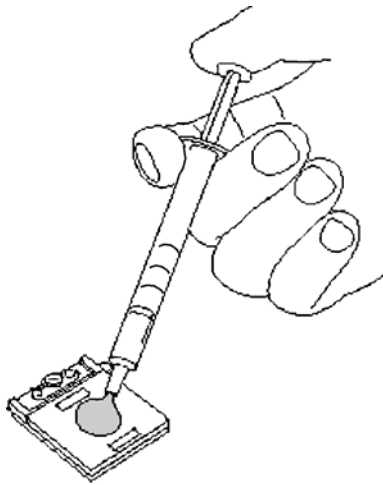

Figure 4-34 Applying silicon grease

5. Install the **heat sink** on the CPU.

6. Install the **CPU hold plate** and secure it with the following screws in the order of the number on the CPU hold plate.

   - M2.0×4.0B   BIND screw   ×3

> *CAUTION:* *Tighten the screws in the order of mark "1", "2" and "3" on the CPU holder.*

4.19 MDC

Removing the MDC

The following describes the procedure for removing the MDC. (See Figure 4-35 and 4-36.)

1. Remove the following **screws** securing the MDC.

   - M2.0×4.0B   BIND screw   ×2

2. Remove the **MDC** from the connector **CN3010** on the system board.

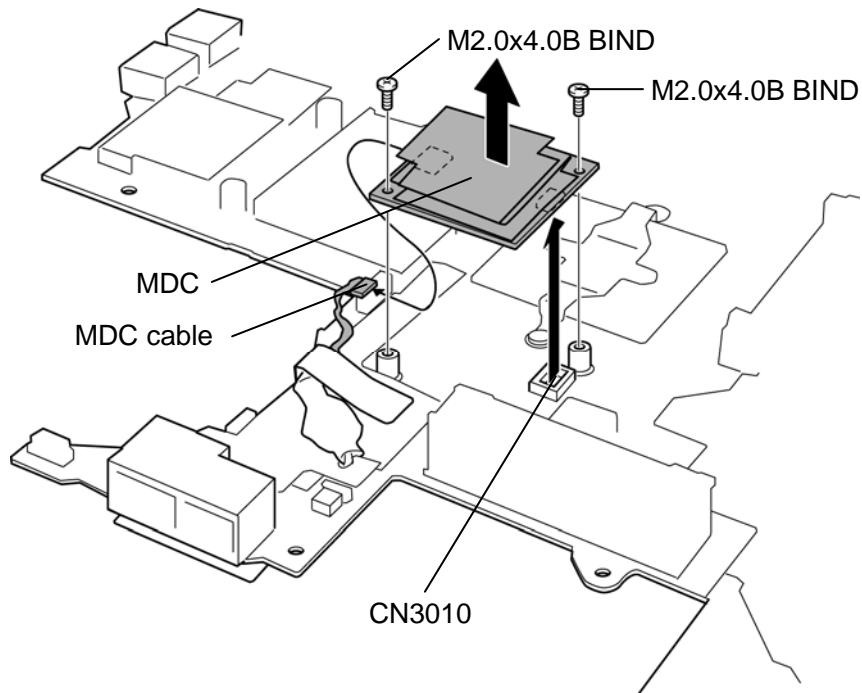3. Disconnect the **MDC cable** from the connector on the MDC.

Figure 4-35 Removing the MDC

4. Turn up two points of **insulator** and disconnect the **MDC cable** from the connector **CN4100** on the system board.
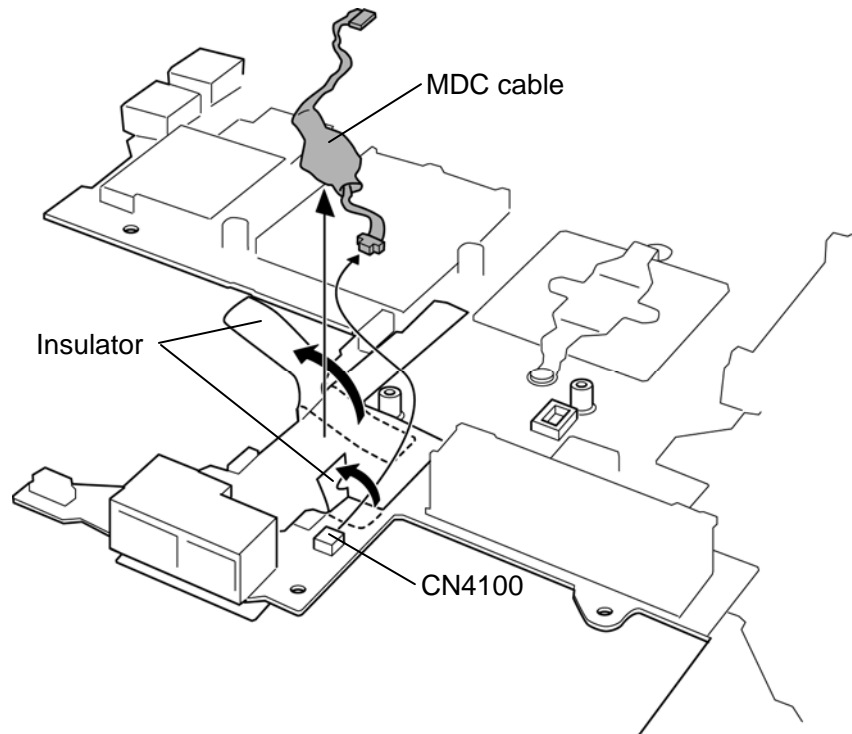

Figure 4-36 Removing the modem cable

Installing the MDC

The following describes the procedure for installing the MDC. (See Figure 4-35 and 4-36.)

1. Connect the **MDC cable** to the connector **CN4100** on the system board and wrap it with **insulator**.

2. Connect the **MDC cable** to the connector on the MDC.

3. Install the **MDC** to the connector **CN3010** on the system board and secure it with the following **screws**.

   - M2.0×4.0B   BIND screw   ×2

4.20 GPU heat sink

Removing the GPU heat sink

The following describes the procedure for removing the GPU heat sink. (See Figure 4-37.)

1. Remove the following **screws** and **GPU heat sink**.
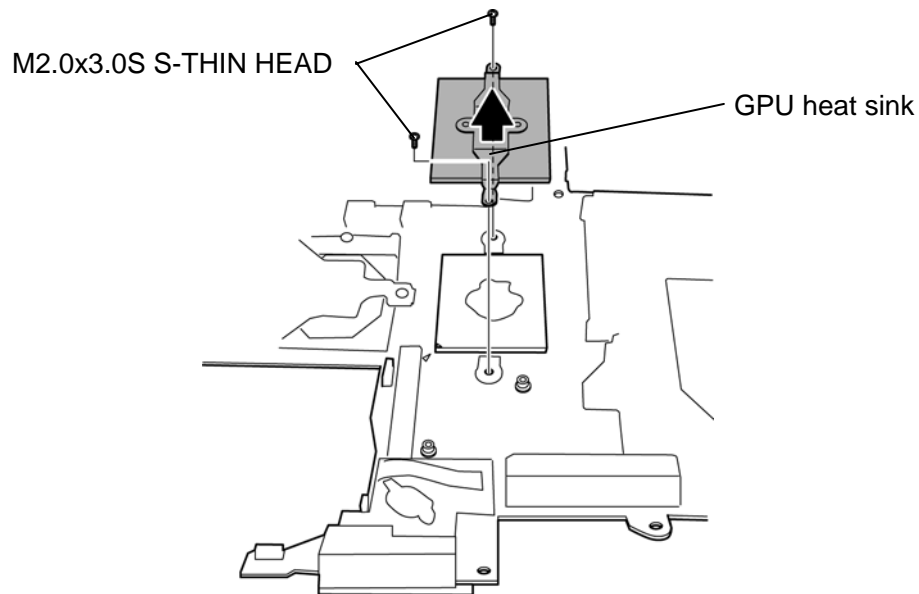
   - M2.0×3.0S   S-THIN HEAD screw   ×2

Figure 4-37 Removing the GPU heat sink

Installing the GPU heat sink

The following describes the procedure for installing the GPU heat sink. (See Figure 4-37.)

1. If there is already silicon grease on the GPU and GPU heat sink, clean it with a cloth. Using a special applicator, apply silicon grease so that the GPU chip on the GPU is completely covered.

NOTE: For details on applying the silicon grease, refer to Installing the CPU.

2. Install the **GPU heat sink** and secure it with the following **screws**.

   - M2.0×3.0S   S-THIN HEAD screw   ×2

4.21 HDD cable

Removing the HDD cable

The following describes the procedure for removing the HDD cable. (See Figure 4-38.)

1. Peel off the **insulator** and disconnect the HDD cable from the connector **CN1850** on the system board.

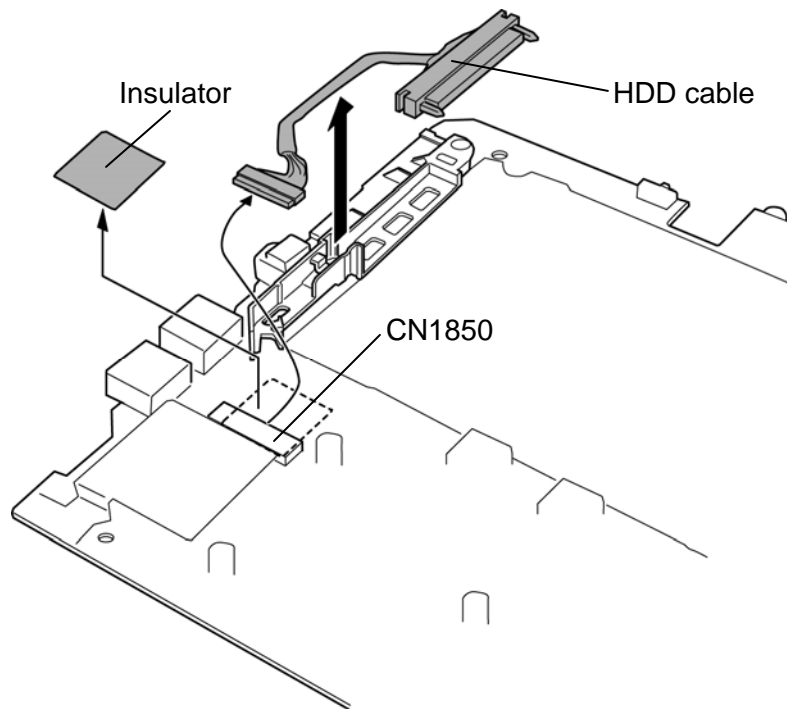2. Remove the **HDD cable** from the slot.

Figure 4-38 Removing the HDD cable

Installing the HDD cable

The following describes the procedure for installing the HDD cable. (See Figure 4-38.)

1. Install the **HDD cable** to the slot.

2. Connect the HDD cable to the connector **CN1850** on the system board and stick the **insulator**.

4.22 Sensor board

Removing the Sensor board

The following describes the procedure for removing the sensor board. (See Figure 4-39.)

1. Remove the **sensor board** from the slot.

2. Disconnect the **sensor cable** from the connector on the sensor board.
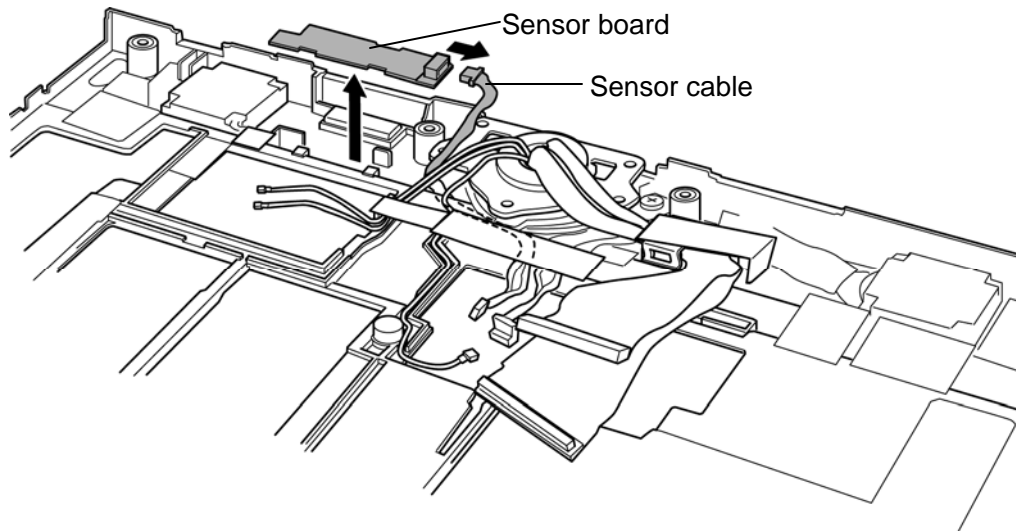
Figure 4-39 Removing the sensor board

Installing the Sensor board

The following describes the procedure for installing the sensor board. (See Figure 4-39.)

1. Connect the **sensor cable** to the connector on the sensor board.

2. Install the **sensor board** to the slot.

4.23 Speaker

Removing the speaker

The following describes the procedure for removing the speaker. (See Figure 4-40 and 4-41.)

1. Peel off the **insulator** and remove the **harness box cover**.

2. Remove the following **screws**.

   - M2.5×6.0B   FLAT HEAD screw   ×2

3. Peel off two **insulators** and one **acetate tape**.
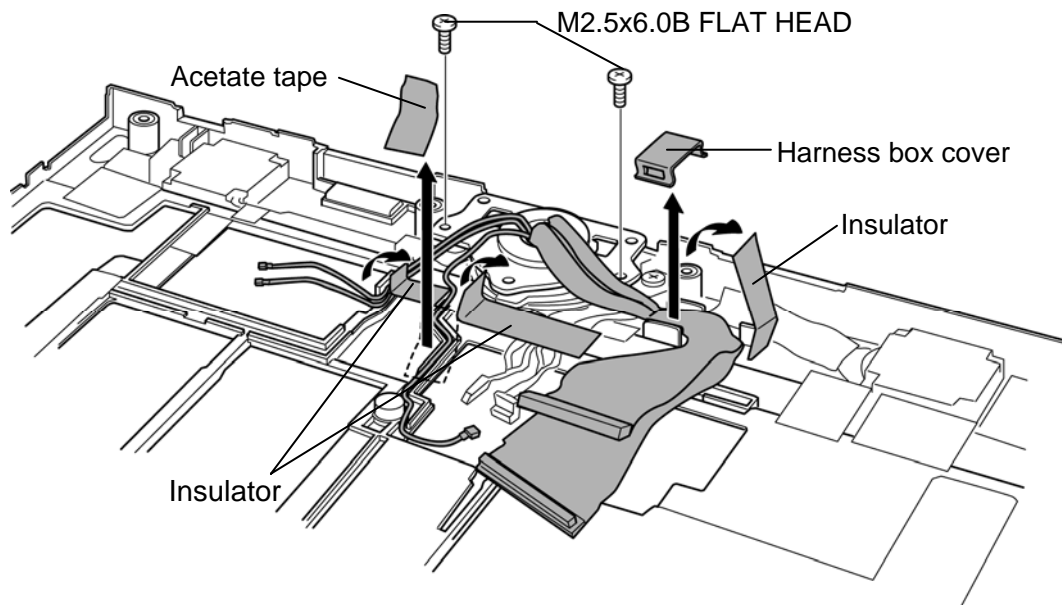
Figure 4-40 Removing the harness box cover

4. Remove the **speaker covers** while releasing latches.

5. Peel off the **insulator** and two **acetate tapes** and take the **speakers** out of the speaker slots.
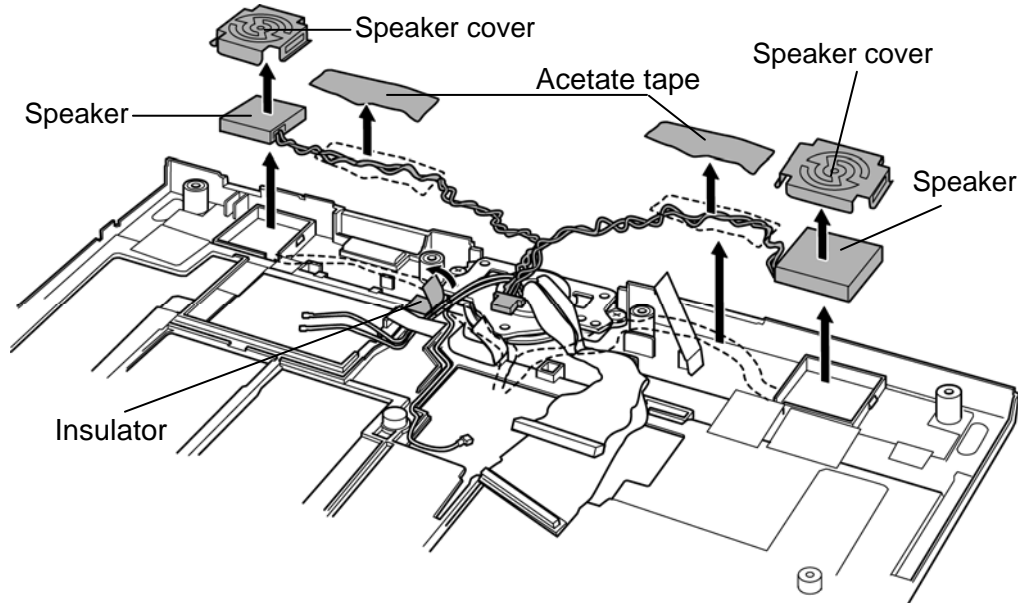
Figure 4-41 Removing the speaker

6. Remove the middle frame.

Installing the speaker

The following describes the procedure for installing the speaker. (See Figure 4-40 and 4-41.)

1. Install the middle frame to the top cover.

2. Install the **speaker** to the slot on both sides.

3. Install the **speaker covers** to the slot on both sides while hooking the latches.

4. Arrange the **speaker cable** in place.

5. Stick two **insulators** and three **acetate tapes** in place.

6. Secure the following **screws** to fix the middle frame and top cover.

   * M2.5×6.0B   FLAT HEAD screw   ×2

7. Install the **harness box cover** and stick the **insulator** in place.

4.24 Hinge spacer

Removing the hinge spacer

The following describes the procedure for removing the hinge spacer. (See Figure 4-42.)

1. Remove the following **screws** and **hinge spacer**.

   - M2.5×6.0B   FLAT HEAD screw   ×2
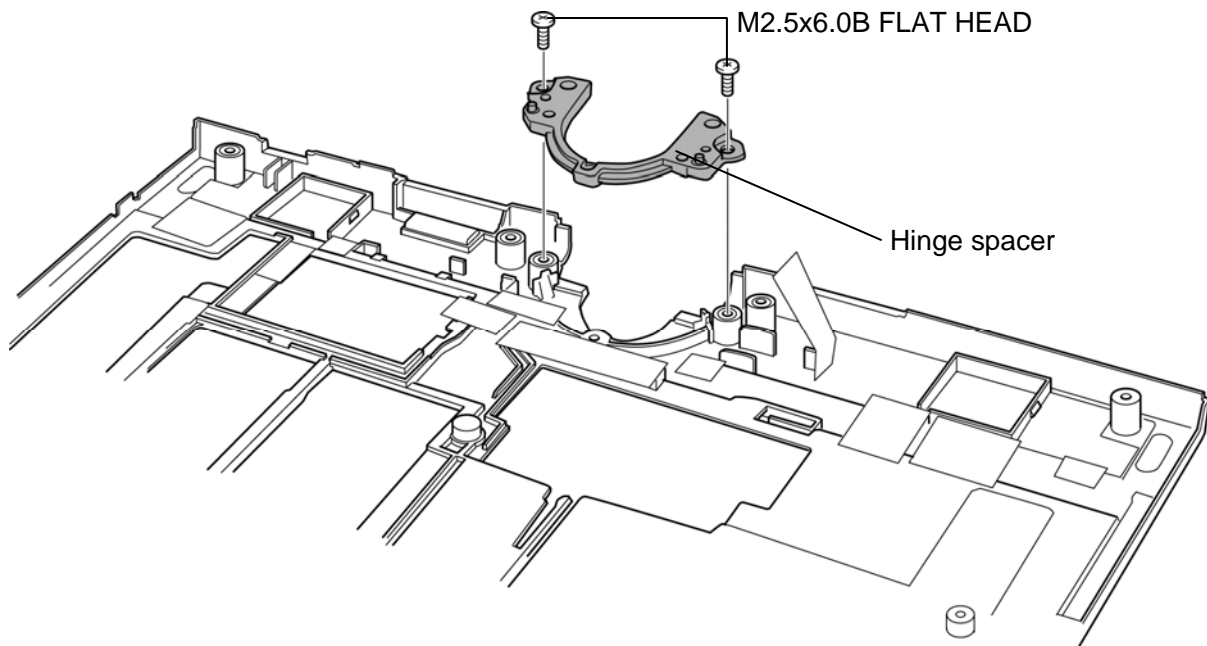
Figure 4-42 Removing the hinge spacer

Installing the hinge spacer

The following describes the procedure for installing the hinge spacer. (See Figure 4-42.)

1. Install the **hinge spacer** to the slot and secure it with the following **screws**.

   - M2.5×6.0B   FLAT HEAD screw   ×2

4.25 LCD unit/FL inverter

Removing the LCD unit/FL inverter

The following describes the procedure for removing the LCD unit/FL inverter. (See Figure 4-43 to 4-46.)

NOTE: When replacing the LCD unit, do not give the hinge portion a strong press. It may cause the breakage of the hinge assembly.
Also, Use a stand or something under the LCD part to keep the LCD part level while replacing it.

1. Turn the display 180 degree and close the display. (LCD turns to the front.)

2. Peel off the **mask seals** (7 points) from the LCD mask and remove the following **screws** securing the LCD mask.

    - M2.5×6.0B   FLAT HEAD screw   ×6
    - M2.0×6.0S   BIND screw   ×1

3. Insert your fingers into the slot on both sides and remove the **LCD mask** while releasing latches.
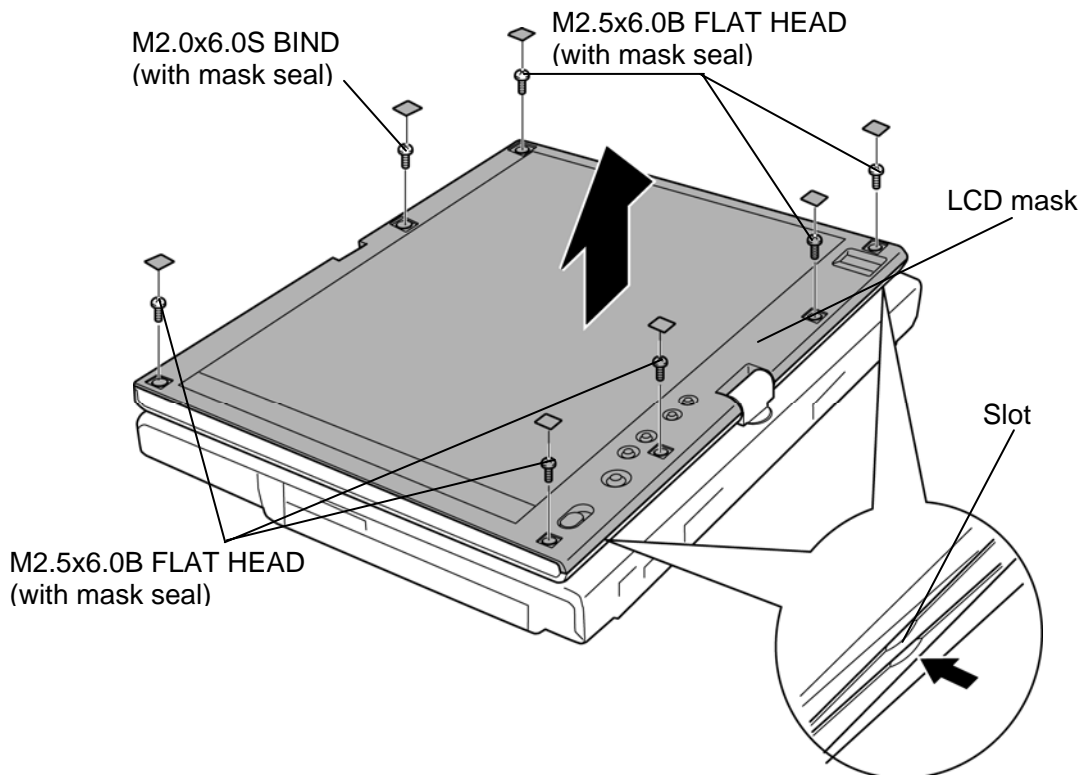
Figure 4-43 Removing the LCD mask

4. Peel off one **insulator** from the FL inverter and take out the **other one** under the LCD unit.

5. Remove the **FL inverter** from the slot while peeling the adhered portion.

6. Disconnect two **cables** from the connector of the FL inverter.
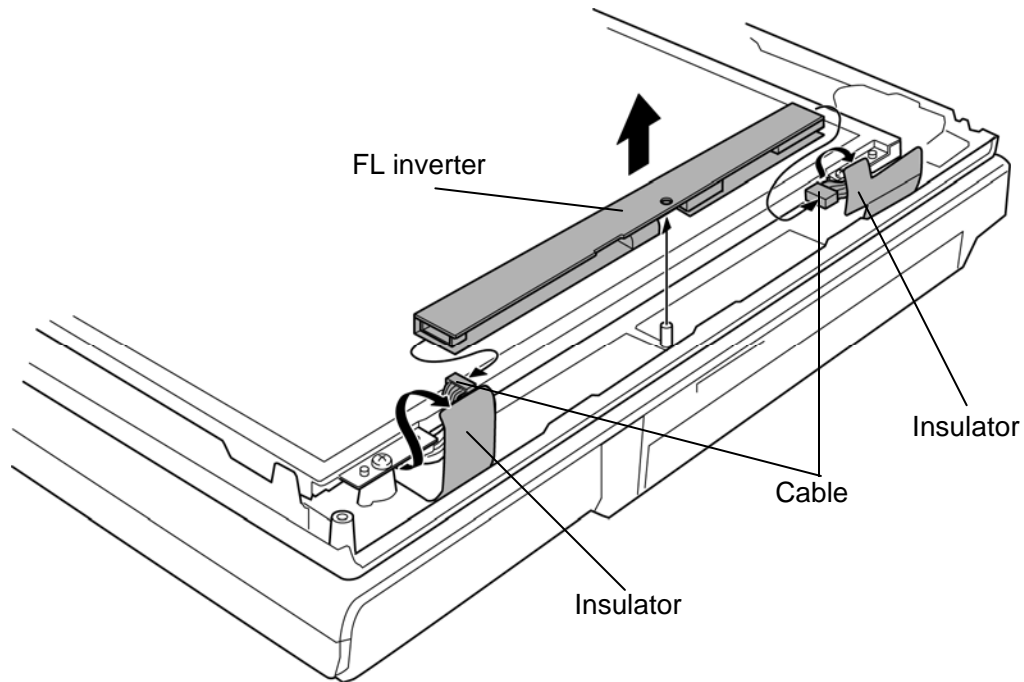
Figure 4-44 Removing the FL inverter

7. Remove the following **screws** securing the LCD unit.

    - M2.0×4.0B   BIND screw   ×4

8. Raise the top edge of the LCD unit on the display cover.

NOTE: When putting the LCD unit on the display cover, lay a mat or something under the LCD unit to protect the computer and the LCD from a scratch or breakage.
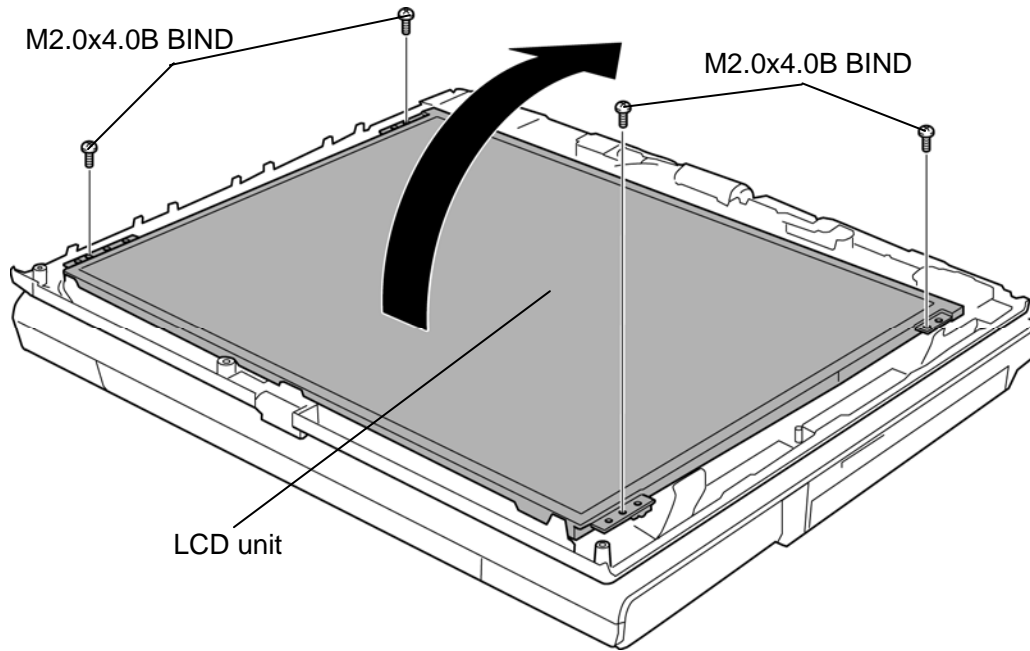
Figure 4-45 Removing the LCD unit (1)

9. Peeling off two **glass tapes** and disconnect the **LCD cable** and **digitizer cable** from the connectors on the back of the LCD unit.

CAUTION: When removing the cables, be careful not to damage the connectors.

10. Remove the **LCD unit** from the display cover.
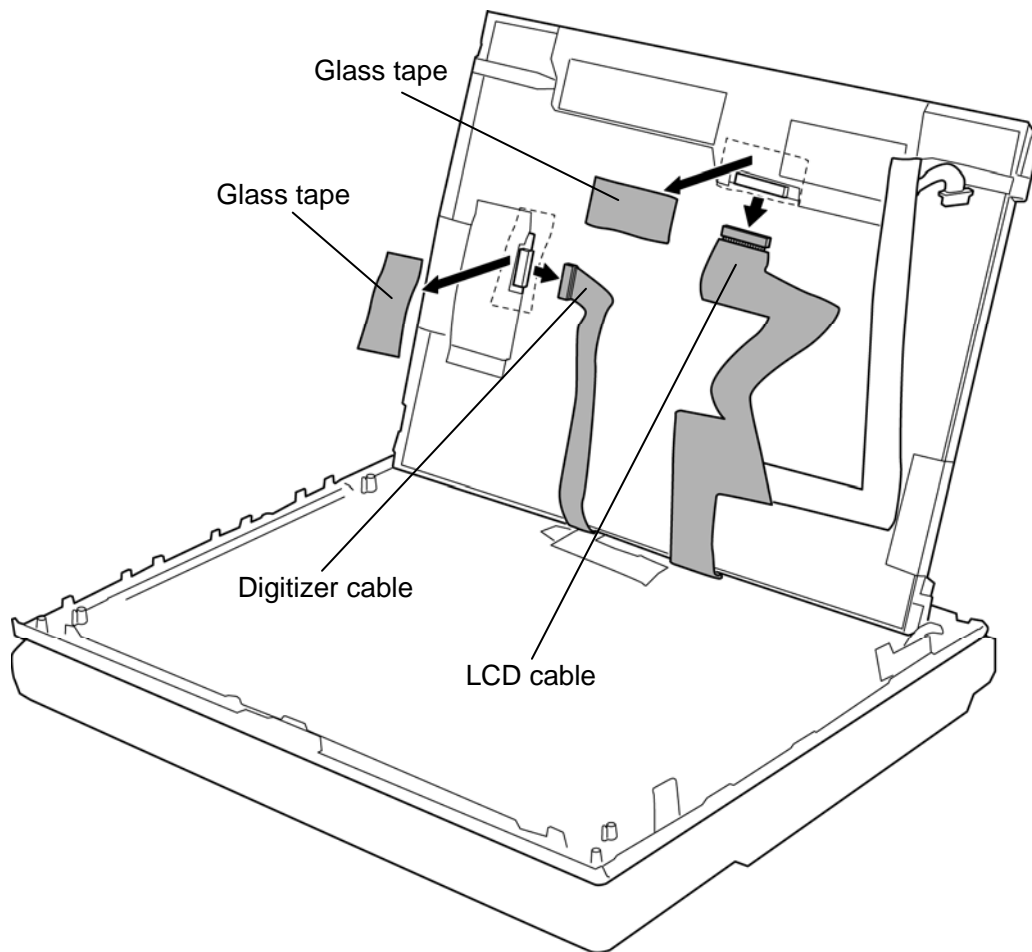
Figure 4-46 Removing the LCD unit (2)

Installing the LCD unit/FL inverter

The following describes the procedure for installing the LCD unit/FL inverter. (See Figure 4-43 to 4-46.)

1. Stand the LCD unit on the display cover and connect the **digitizer cable** and **LCD cable** on the back of the LCD unit.

2. Stick two **glass tapes** on each connector.

3. Install the **LCD unit** to the display cover and secure it with the following **screws**.

    - M2.0×4.0B   BIND screw   ×4

4. Stick the **FL inverter** to the slot.

CAUTION: The FL inverter is stuck to the cover with a double-sided tape. Once removing a FL inverter, be sure not reuse it. Use new one.

---

5. Stick one **insulator** on the FL inverter and insert one **insulator** under the LCD unit

6. Connect two **cables** to the connectors on the FL inverter.

7. Install the **LCD mask** to the display cover while securing the latches.

NOTE: When installing the LCD mask, wipe the LCD with a soft cloth and make the back of the LCD mask clean with an ionizer.

---

8. Secure the LCD mask with the following **screws** and stick the **mask seal**s (7 points).

    - M2.5×6.0B   FLAT HEAD screw   ×6
    - M2.0×6.0S   BIND screw   ×1

4.26 Digitizer

CAUTION: *Read following instructions before handling the Digitizer.*

Do not carry the LCD module by holding the FL cable in one's hand because it may result to cut the FL cable, and cause display function failure or lighting failure.

NO
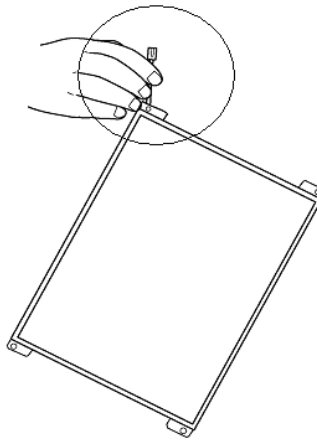
Do not carry the LCD module by holding the FL cable in one's hand.

Be careful to use the bezel guide.

There is a portion where the bezel is sticking out because of the digitizer guide. Do not press and rub the portion with bare hands or it may result cut your finger.

NO
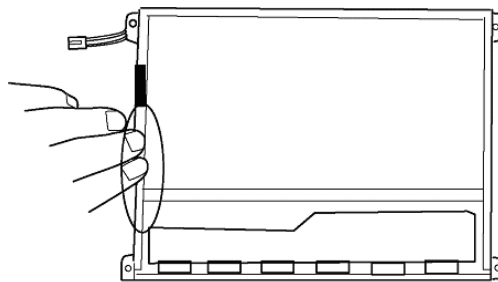
Be careful to use the bezel guide.

Do not make any scratches on the B/L and TAB by the edge of the digitizer when installing the digitizer because it may result to break the TAB or make scratches on the B/L and cause display function failure.
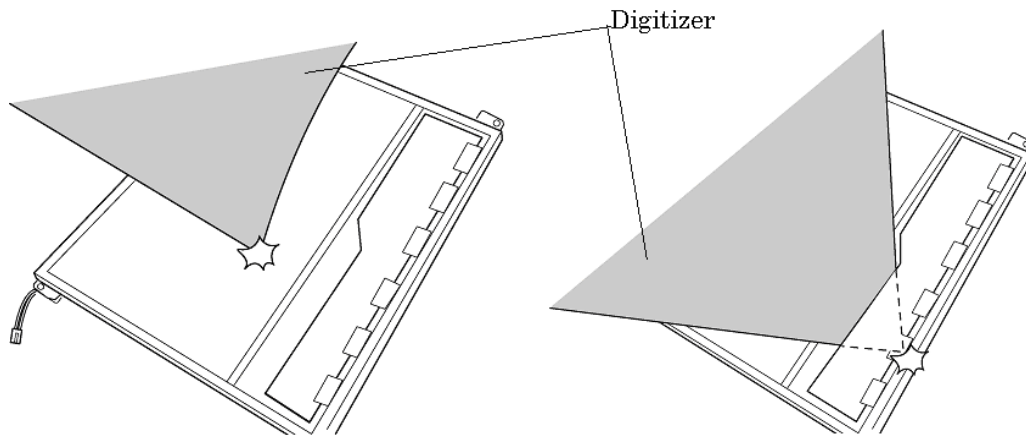
Do not hit the corner of the digitizer

Do not pull up the PCB hardly when installing the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.
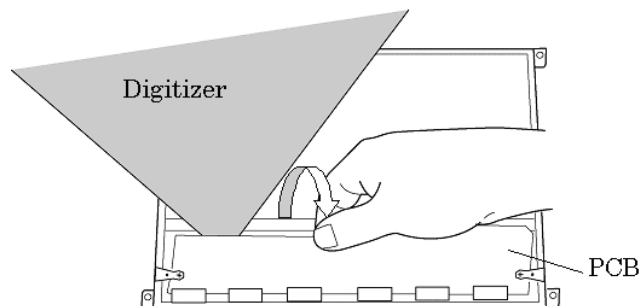
Do not pull up the PCB.

Make sure that three latches fit the digitizer securely.

If the latches are not locked securely, it may result to move the digitizer and give stress on the TAB or PCB and cause the display function failure.

Do not turn up the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.

NO

Digitizer

PCB

TAB
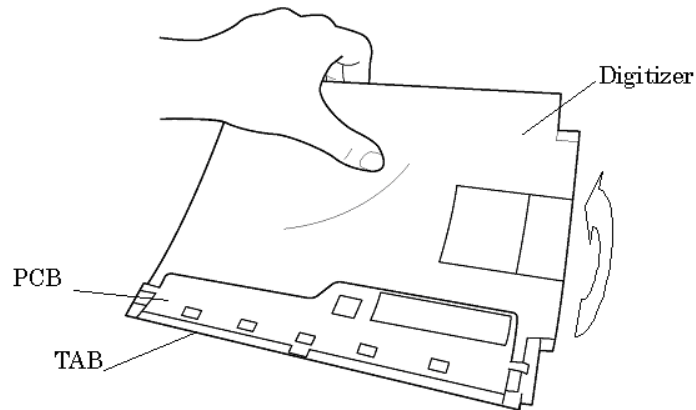
Do not turn up the digitizer to avoid the warp of the PCB.

Do not put any instrument on the LCD module because it may result to make scratch on the cell, polarization sheet or B/L and break the TAB and may cause the display function failure.

NO
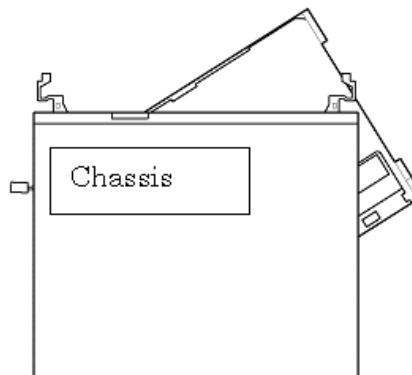
Chassis

Do not put the chassis on the LCD.
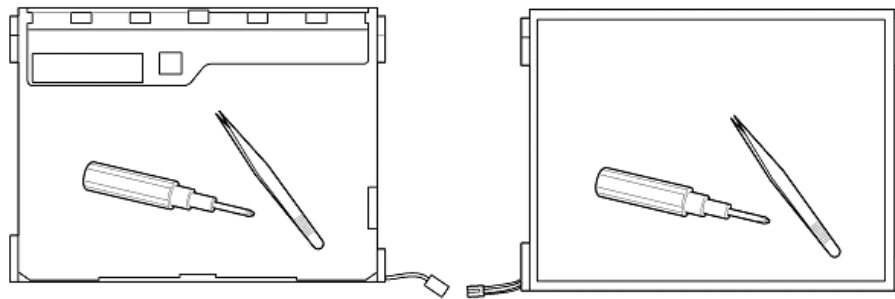
Do not put the instrument on the LCD.

Do not hold, press and rub the TAB because it may result to break the TAB and cause the display function failure.

NO

TAB

PCB
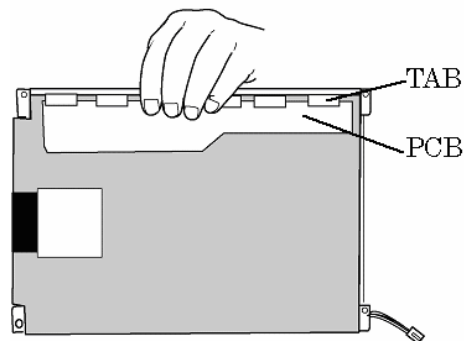
Do not hold the TAB.

TAB
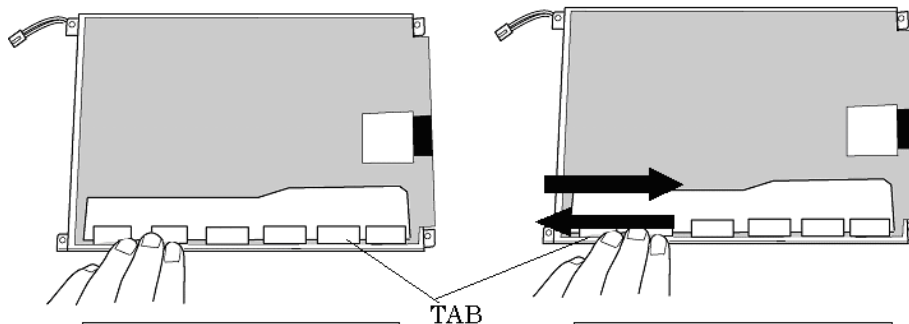
Do not press the TAB.

Do not rub the TAB.

Make sure to put the LCD module on the flat place. If the LCD module is put on the uneven place, it may result to break the TAB, make scratch on the B/L or polarization sheet and cause the display function failure.

NO

FL inverter

Do not put the LCD on the chassis when the LCD is not installed to the computer.

Do not put the LCD on the FL inverter.
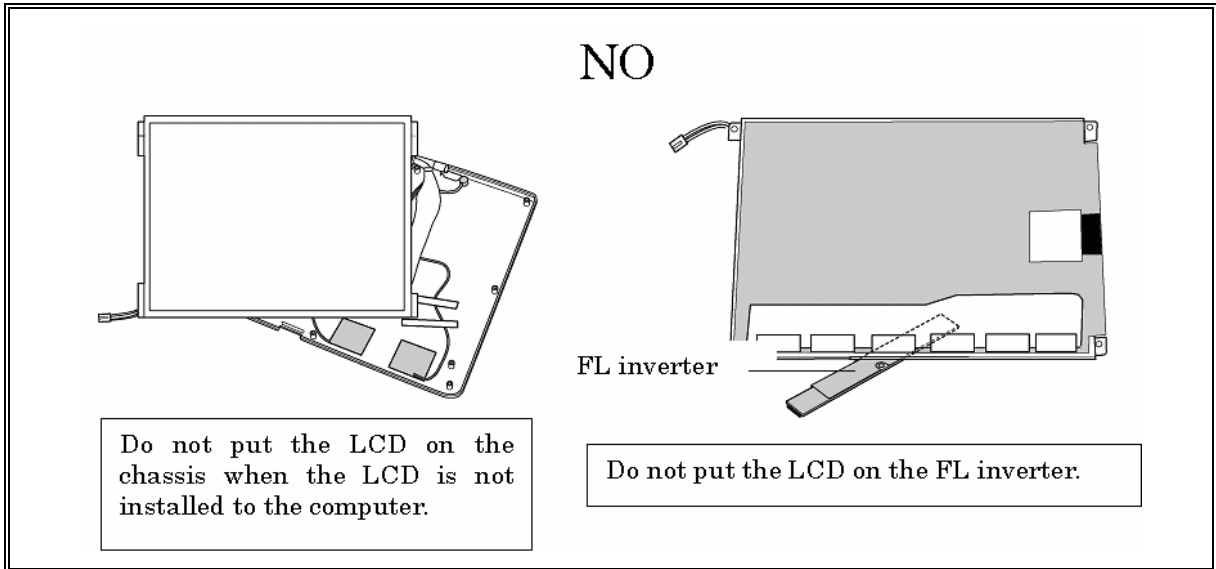
Removing the Digitizer

The following describes the procedure for removing the digitizer. (See Figure 4-47.)

1. Remove the following **screws** securing the digitizer.

   • M2.0×4.0B   BIND screw   ×2

2. Peel off two **glass tapes**.

3. Slide out the **digitizer** toward the arrow pointing.
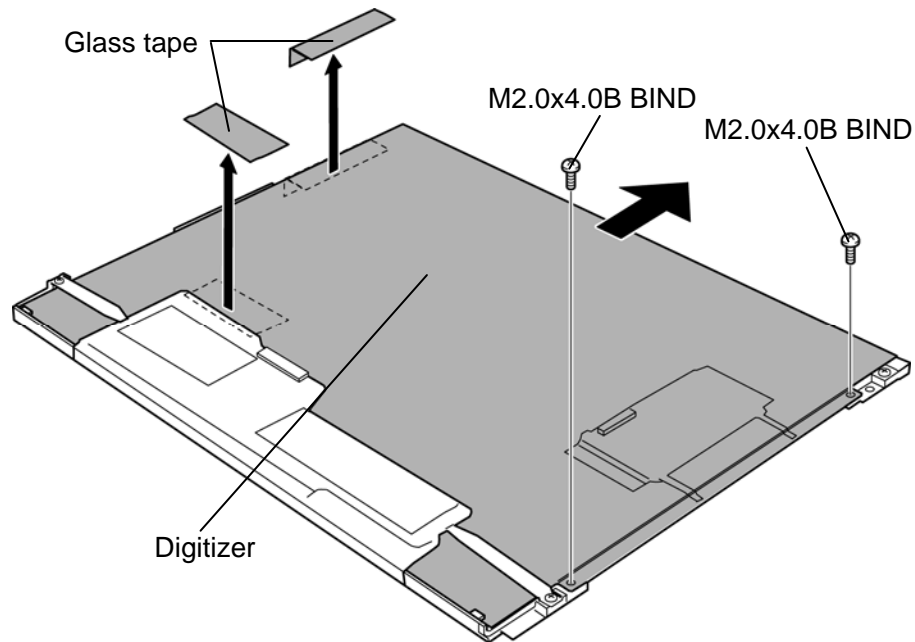
Figure 4-47 Removing the digitizer

Installing the digitizer

The following describes the procedure for installing the digitizer. (See Figure 4-47.)

1. Slide the **digitizer** into the back pocket of the LCD.

CAUTION: *When replacing the digitizer, fit the digitizer into the back of the LCD toward the arrow pointing.*
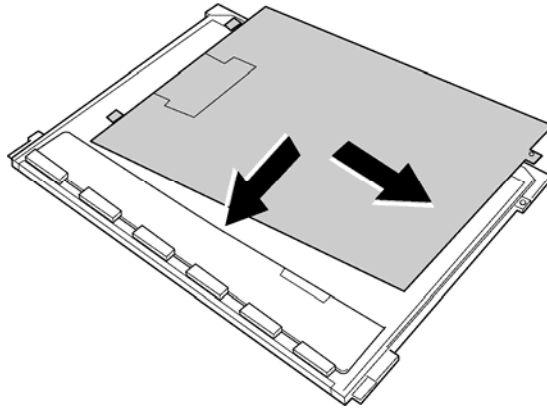
2. Stick two **glass tapes**.

3. Secure the digitizer with the following **screws**.

   • M2.0×4.0B   BIND screw   ×2

4.27 Fingerprint sensor board (NF board)

Removing the Fingerprint sensor board (NF board)

The following describes the procedure for removing the fingerprint sensor board (NF board). (See Figure 4-48.)

1. Remove the following **screw** and **fingerprint sensor board**.

   - M2.5×4.0B   FLAT HEAD screw   ×1

2. Disconnect the **fingerprint sensor cable** from the connector **CN9560** on the finger print sensor board.
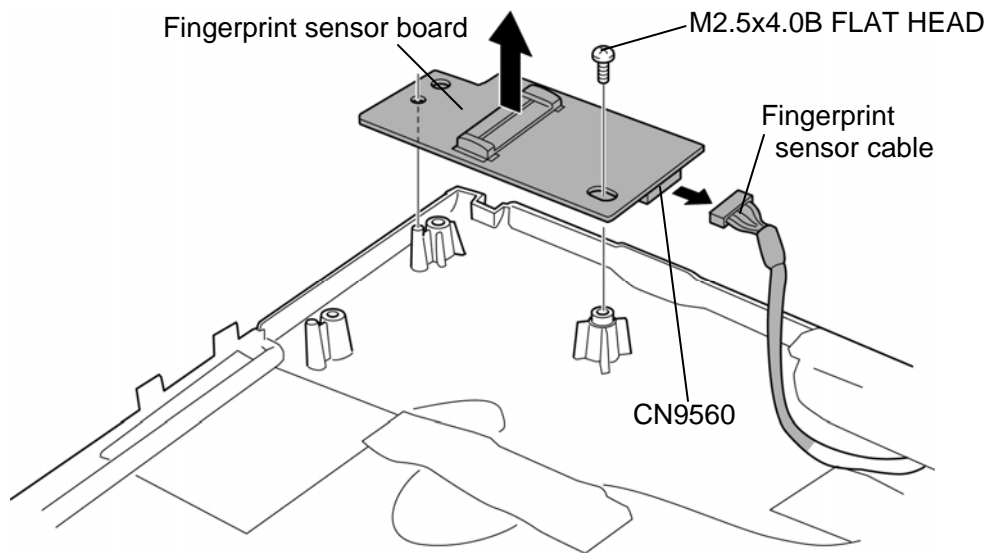
Figure 4-48 Removing the fingerprint sensor board

Installing the Fingerprint sensor board (NF board)

The following describes the procedure for installing the fingerprint sensor board (NF board). (See Figure 4-48.)

1. Connect the **fingerprint sensor cable** to the connector **CN9560** on the finger print sensor board.

2. Install the **fingerprint sensor board** and secure it with the following **screw**.

   - M2.5×4.0B   FLAT HEAD screw   ×1

4.28 Switch board (NW board)

Removing the Switch board (NW board)

The following describes the procedure for removing the switch board (NW board). (See Figure 4-49.)

1. Remove the following **screw** securing the switch board and pull up the **switch board**.

    - M2.5×4.0B   FLAT HEAD screw   ×1

2. Disconnect the **switch cable** from the connector **CN9550** on the switch board.
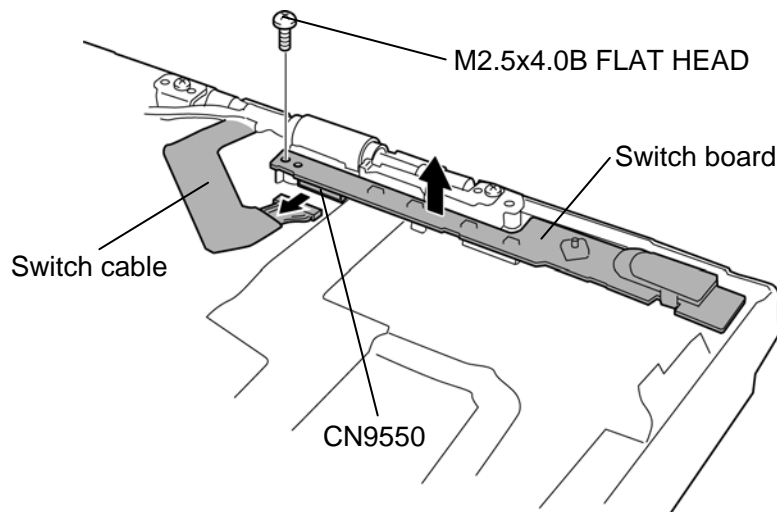
Figure 4-49 Removing the switch board

Installing the switch board (NW board)

The following describes the procedure for installing the switch board (NW board). (See Figure 4-49.)

1. Connect the **switch cable** to the connector **CN9550** on the switch board.

2. Install the **switch board** and secure it with the following **screw**.

    - M2.5×4.0B   FLAT HEAD screw   ×1

4.29 LCD latch assembly

Removing the LCD latch assembly

The following describes the procedure for removing the LCD latch assembly. (See Figure 4-50.)

1. Remove the **LCD latch assembly** from the slot as shown in the following figure.
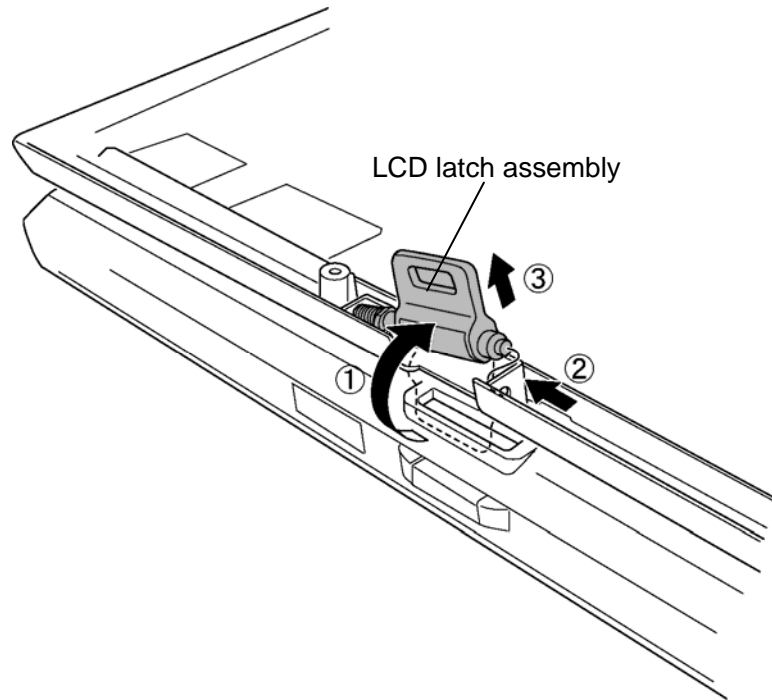
Figure 4-50 Removing the LCD latch assembly

Installing the LCD latch assembly

The following describes the procedure for installing the LCD latch assembly. (See Figure 4-50.)

1. Install the **LCD latch assembly** to the slot.

4.30 Hinge assembly

Removing the Hinge assembly

The following describes the procedure for removing the hinge assembly. (See Figure 4-51 and 4-52.)

1. Remove the following **screw** and **Harness holder**.

   - M2.5×6.0B   FLAT HEAD screw   ×1

2. Remove the following **screws** and **LCD harness earth spring**.

   - M2.5×6.0B   FLAT HEAD screw   ×1

3. Remove the following **screw**, **antenna cover S** and **antenna cover T** from the slot.

   - M2.0×6.0S   S-THIN HEAD screw   ×1
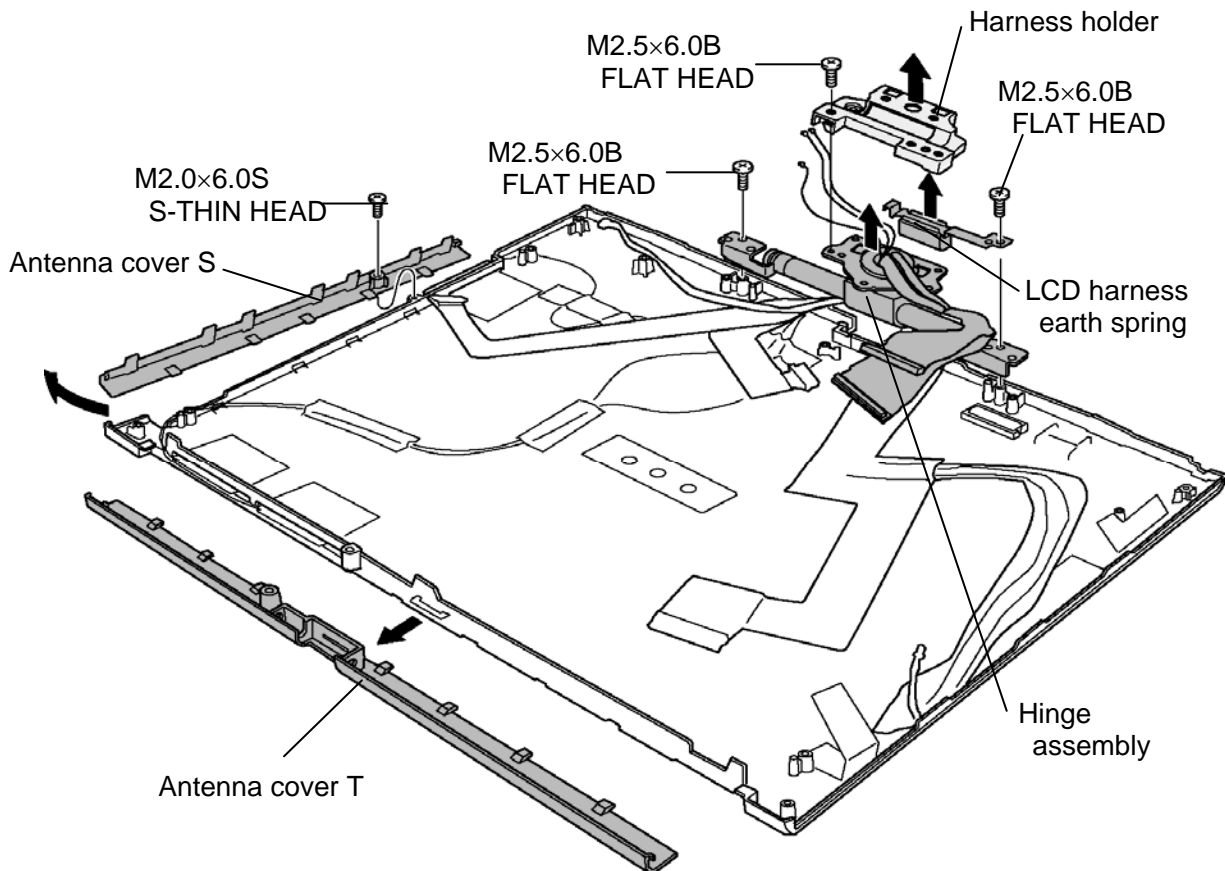
Figure 4-51 Removing the hinge assembly (1)

4. Peel off four **acetate tapes** and remove the **wireless LAN antennas** and **Bluetooth antenna**.

5. Remove the following **screw** and **hinge assembly** by lifting it up.

   - M2.5×6.0B   FLAT HEAD screw   ×1
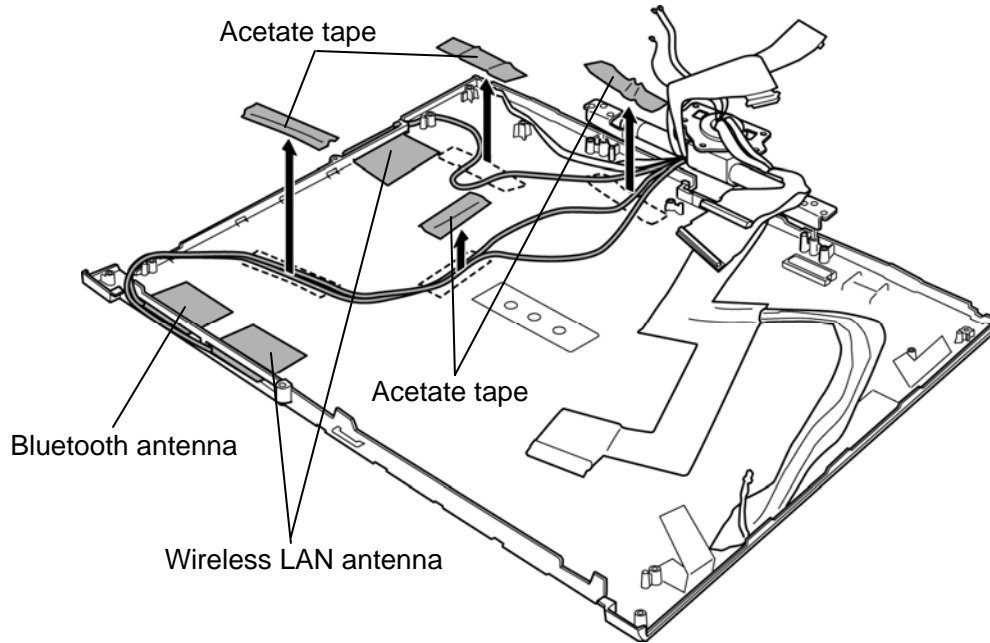
Figure 4-52 Removing the hinge assembly (2)

Installing the Hinge assembly

The following describes the procedure for installing the hinge assembly. (See Figure 4-51 and 4-52.)

1. Seat the **hinge assembly** in place and secure it with the following **screw**.

   - M2.5×6.0B   FLAT HEAD screw   ×1

2. Stick the **wireless LAN antennas** and **Bluetooth antenna** and arrange the wireless LAN antenna cables and Bluetooth antenna cable in place.

3. Install the **antenna cover S** and **antenna cover T** to the slot.

4. Secure the **antenna cover S** with the following **screw**.

   - M2.0×6.0S   S-THIN HEAD screw   ×1

5. Install the **LCD harness earth spring** and secure the **hinge assembly** and **LCD harness earth spring** with the following **screws**.

   - M2.5×6.0B   FLAT HEAD screw   ×1

6. Install the **Harness holder** and secure with the following **screw**.

   - M2.5×6.0B   FLAT HEAD screw   ×1

4.31 Fluorescent lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part No.	Supplier	Section
12.1-inch (XGA)	G33C00037110	TMD	4.31.1
12.1-inch (SXGA+)	G33C00019210	TMD	4.31.1

NOTE: - *When working with a LCD module, always use a flat, grounded table.*

  - *Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.*

  - *Use an anti-static or protective sheet.*

  - *When replacing the FL unit, cover with a finger protector or similar to prevent soiling or scratching the LCD panel.*

  - *Be careful when handling the lamp. Excessive force may break the lamp.*

  - *Be careful not to soil or deform the lamp reflector.*

  - *Make sure that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.*

4.31.1 Replacing the 12.1 Inch TMD Fluorescent lamp

The procedures for replacing Fluorescent of lamp of G33C00037110 and of G33C00019210 are the same.

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-53 to 4-64).

Disassembling Fluorescent lamp

Peeling off the tapes and insulation sheets

1. Turn the back of module up and place it on a flat surface that is free of foreign objects.
   Make sure no dirt on the face to protect the surface of the LCD module from damage.
   Put a protection sheet (e.g. soft cloth) on the face.

2. Remove insulation sheet (1) (with the tape on the insulation side attached).

CAUTION: 1. *Be careful not to damage the FPC, PCB, B/L reflection sheet.*

   2. *Do not remove the insulation sheet to reuse it.*

   3. *Do not damage the TAB and PCB when removing the double –sided tape of the insulation sheet.*

Insulation sheet with double side-tape

Insulation tape

①Insulation tape with double-sided tape

Bezel tape 2
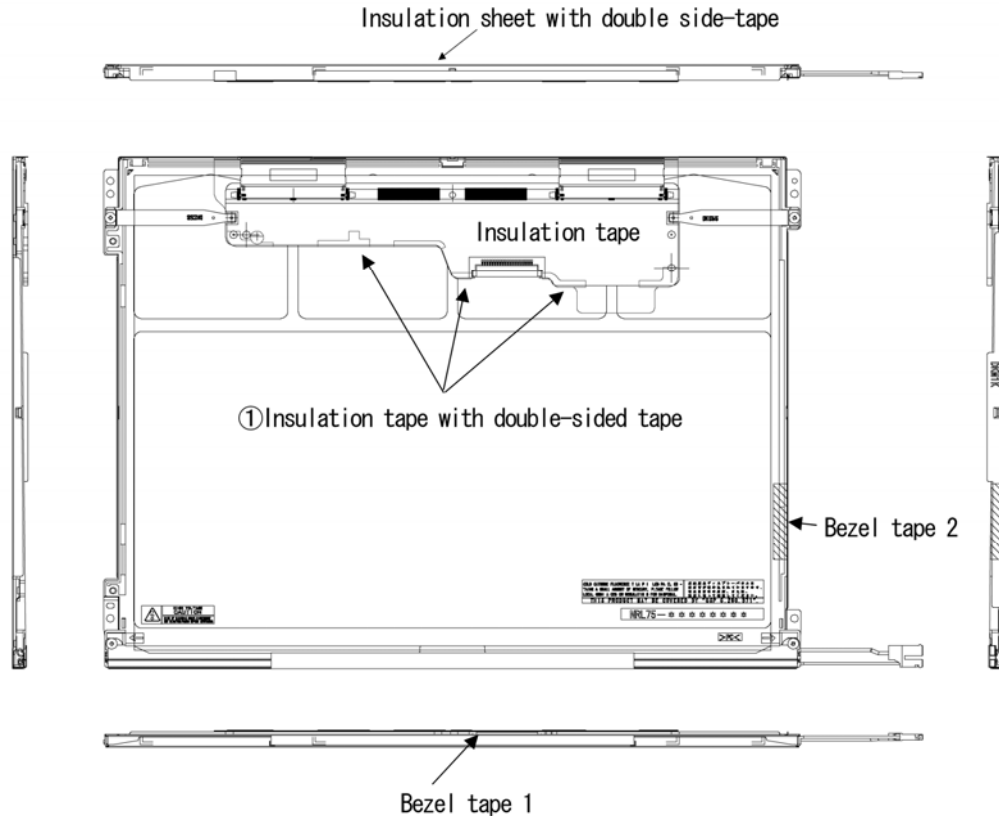
Bezel tape 1

Figure 4-53 Replacing 12.1 Inch TMD fluorescent lamp (1)

Removing the screws

1. Remove the bezel tape 2 and bezel tape 1.

2. Spread the insulation sheet.
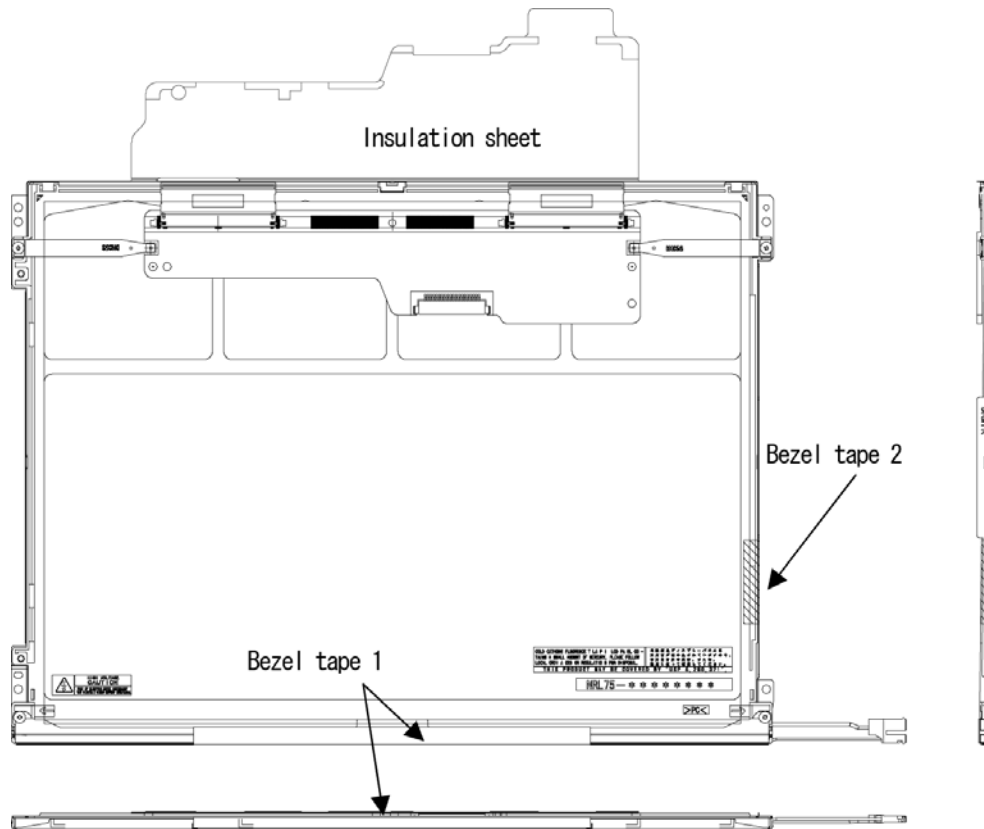
Figure 4-54 Replacing 12.1 Inch TMD fluorescent lamp (2)

3.   Remove one screw.

CAUTION: *To unfasten the screws, use an insert bit of point size 0 for Philips screwdrivers.*
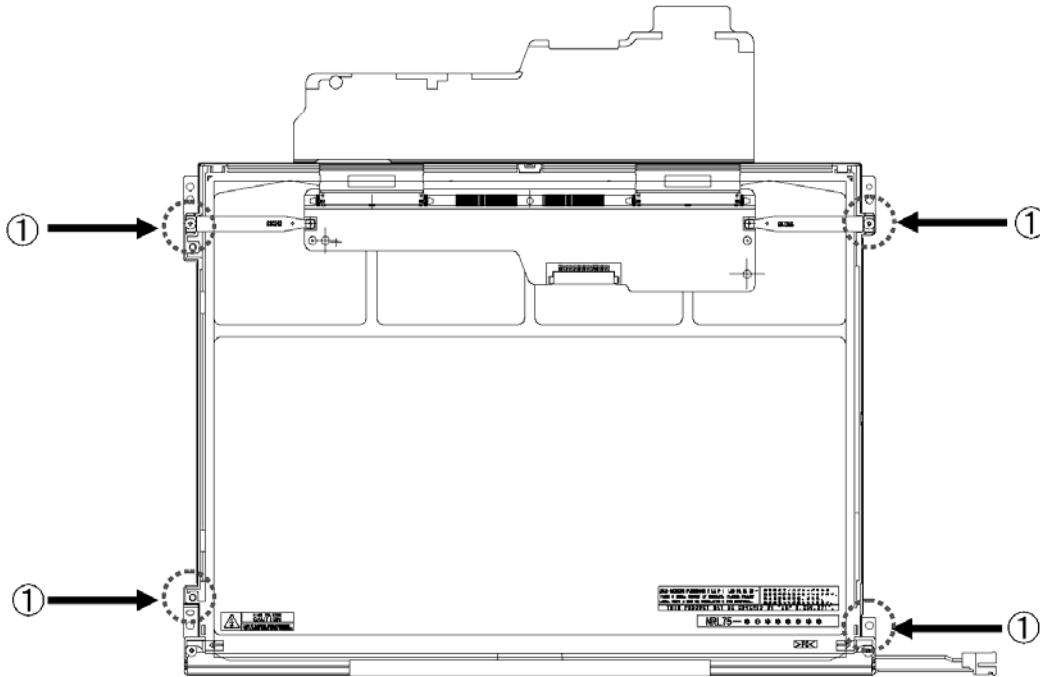
Figure 4-55 Replacing 12.1 Inch TMD fluorescent lamp (3)

Removing the bezel

1. Without removing the insulation tape, turn the face of module up.

2. Release the four latches of the bezel and frame (two positions on each side). With holding up the bezel from the lower side (FL lamp side), release the three latches on the top to remove the bezel from the cell. (The bezel is reused.)

CAUTION: *1. Do not damage the latches and FPC.*
           2. When removing the bezel, be careful not to deform the bezel.

Release the three latches on the top to remove the bezel from the cell.
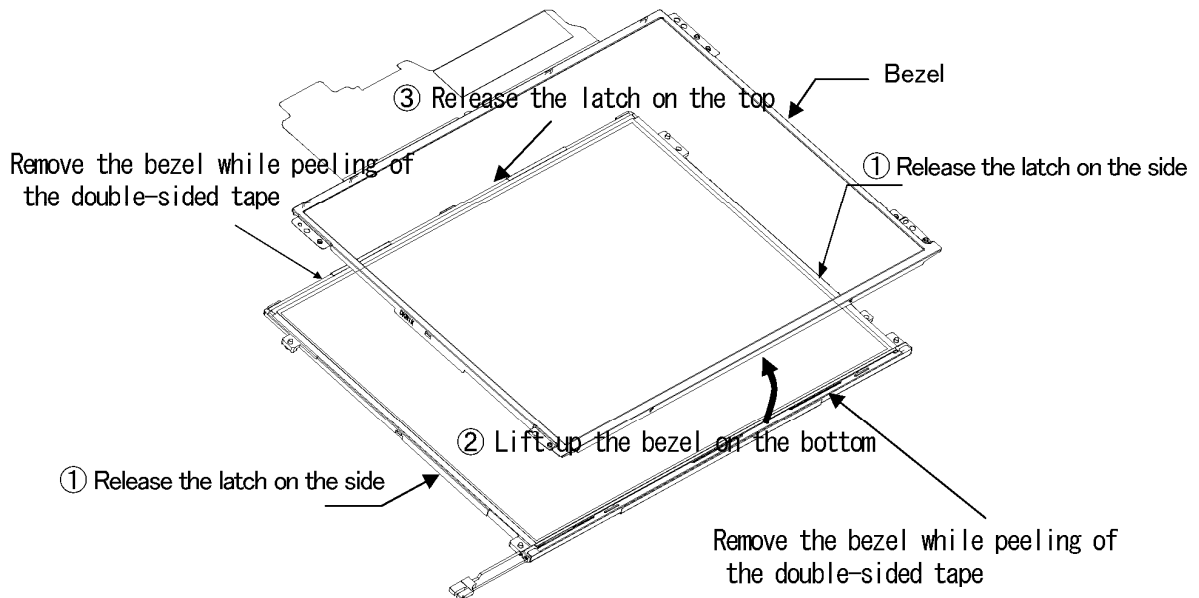
Figure 4-56 Replacing 12.1 Inch TMD fluorescent lamp (4)

Opening the PCB

1. Spread out the PCB horizontally.

CAUTION: Be careful not to damage the FPC.
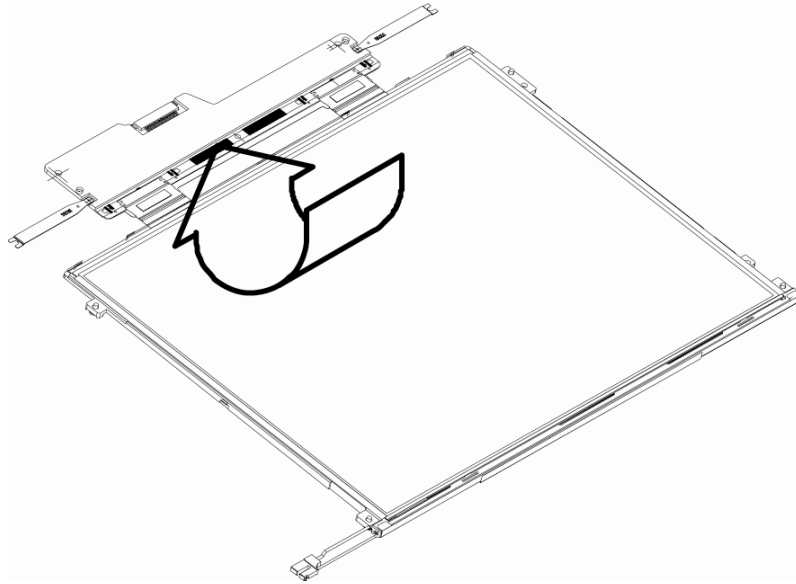
Figure 4-57 Replacing 12.1 Inch TMD fluorescent lamp (5)

Removing the cell with PCB

1. Remove the cell with PCB from the backlight unit as shown bellow.

2. Completely remove the double-sided tape remaining on the reverse side of the cell.

CAUTION: 1. *A portion of the upper side of cell is adhered to the frame with the double-sided tape. Remove the cell gently, taking care not to damage it.*
    2. *Do not remove the ray-shield tape on the upper, lower, right and left of face and back of cell.*
    3. *Be careful not to damage the FPC.*

Remove the cell while peeling off the double-sided tape.
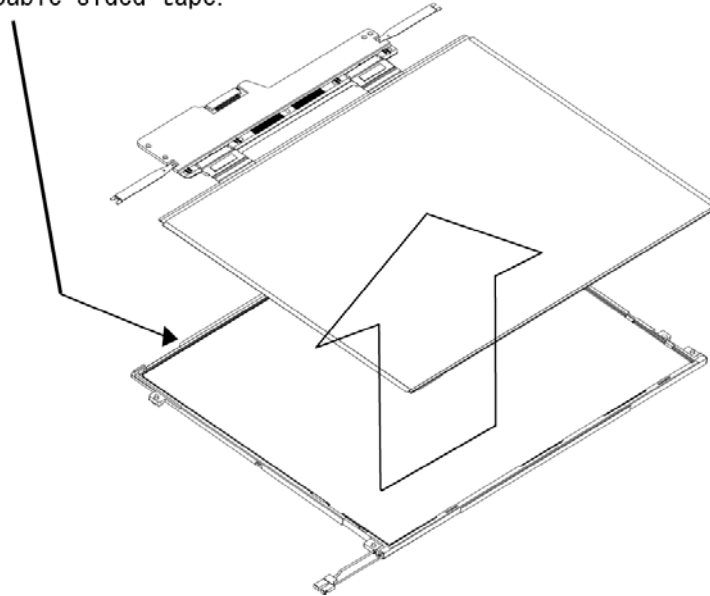
Figure 4-58 Replacing 12.1 Inch TMD fluorescent lamp (6)

Assembling Fluorescent lamp

Check of the backlight replaced

1. Check the following items.
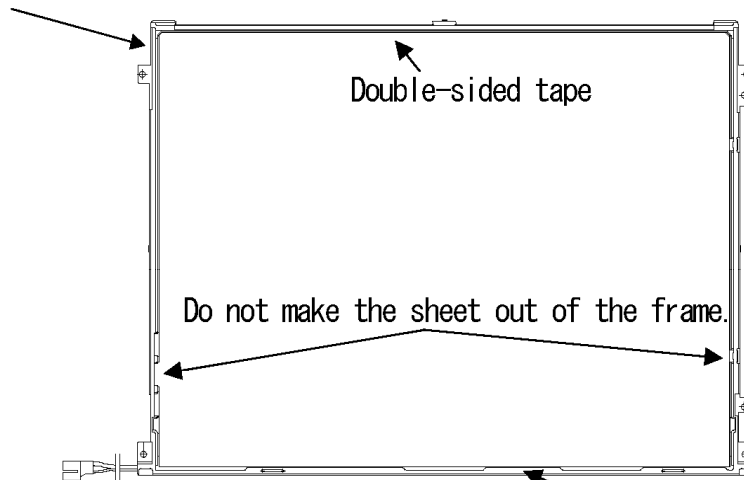
Figure 4-59 Replacing 12.1 Inch TMD fluorescent lamp (7)

Assembling the cell with PCB

1. Remove the separator from the double-sided tape on the backlight unit.

2. Turn the backlight on.

3. Check that the backlight is free of dust, foreign objects, or damage. Perform this check also for the reverse side of the cell. Then install the cell with PCB in the backlight unit.

CAUTION: *1. Align the top left corner of the cell with the corresponding corner of the backlight unit.*
2. Be careful not to damage the TAB.
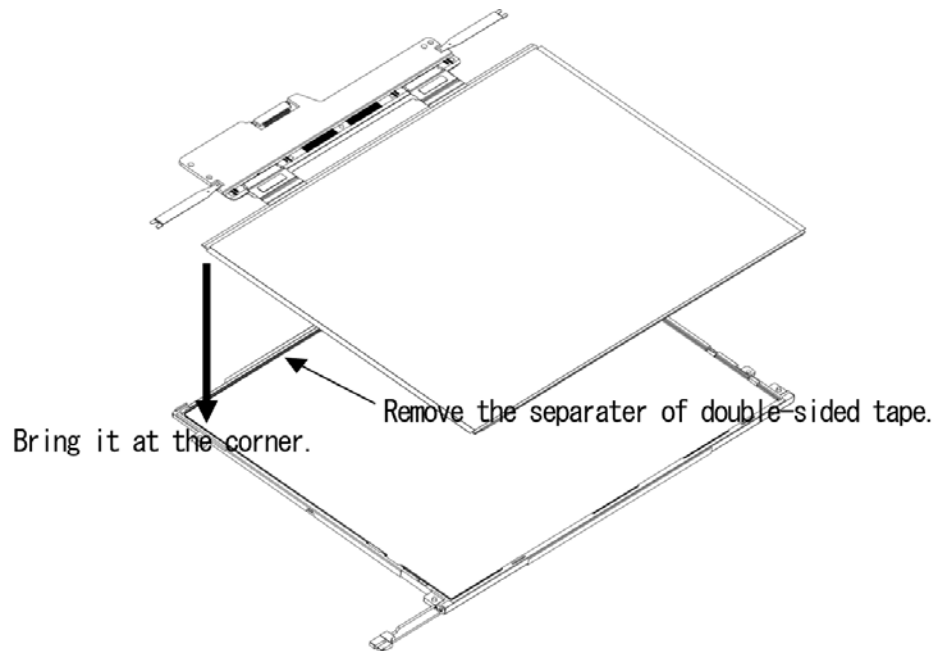
Figure 4- 60 Replacing 12.1 Inch TMD fluorescent lamp (8)

Folding the FPC/PCB

1. Fold down the FPC (PCB) toward the reverse side of the backlight unit.

CAUTION: *Be careful not to damage the TAB.*
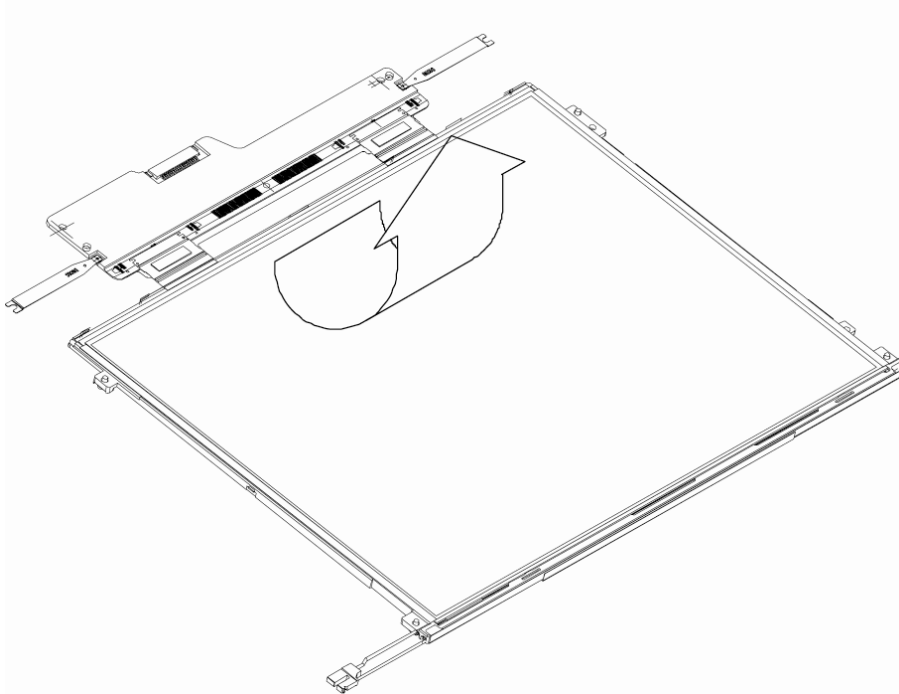
Figure 4-61 Replacing 12.1 Inch TMD fluorescent lamp (9)

Setting the bezel

1. Fit the bezel into the frame from the TAB side. ((1) in the bellow figure)

2. Set two latches on the side. ((2) in the bellow figure)

3. Set the latches on the bottom side. ((3) in the bellow figure)

CAUTION: *Be careful not to damage the cell, FPC and B/L.*
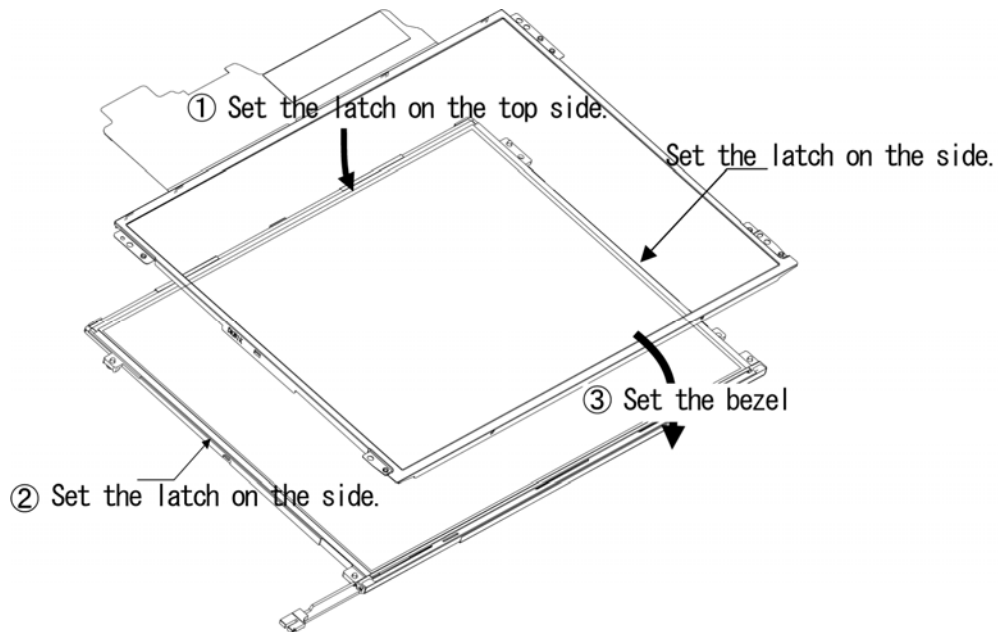
Figure 4-62 Replacing 12.1 Inch TMD fluorescent lamp (10)

Fasten screws of the PCB and bezel

1. Fasten four screws. ((1) in the bellow figure)

CAUTION: *1. The tightening torque must be 0.147 N m (1.5kgf ·cm) for all the screws.*
             2. Use an insert bit of point size 0 for the Philips screwdrivers.
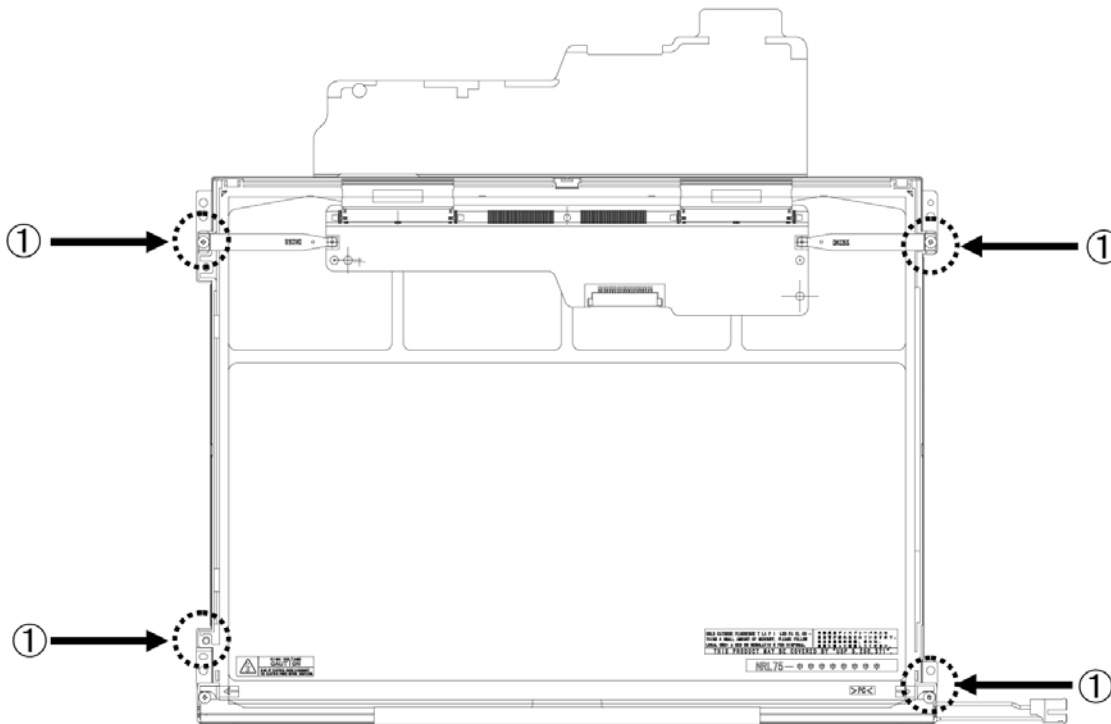
Figure 4-63 Replacing 12.1 Inch TMD fluorescent lamp (11)

Attaching the tapes and insulation sheet

1. Attach the double-sided tape of insulation sheet (1).

2. Attach one bezel tape (2).

2. Attach two bezel tapes (3).

CAUTION: *When attaching tape and insulation sheet, be careful not to damage the PCB, cell and B/L.*

---

① Insulation tape with double-sided tape

Bezel tape 2

Bezel tape 1

Bezel tape 1
② Stick it inside the line of bezel
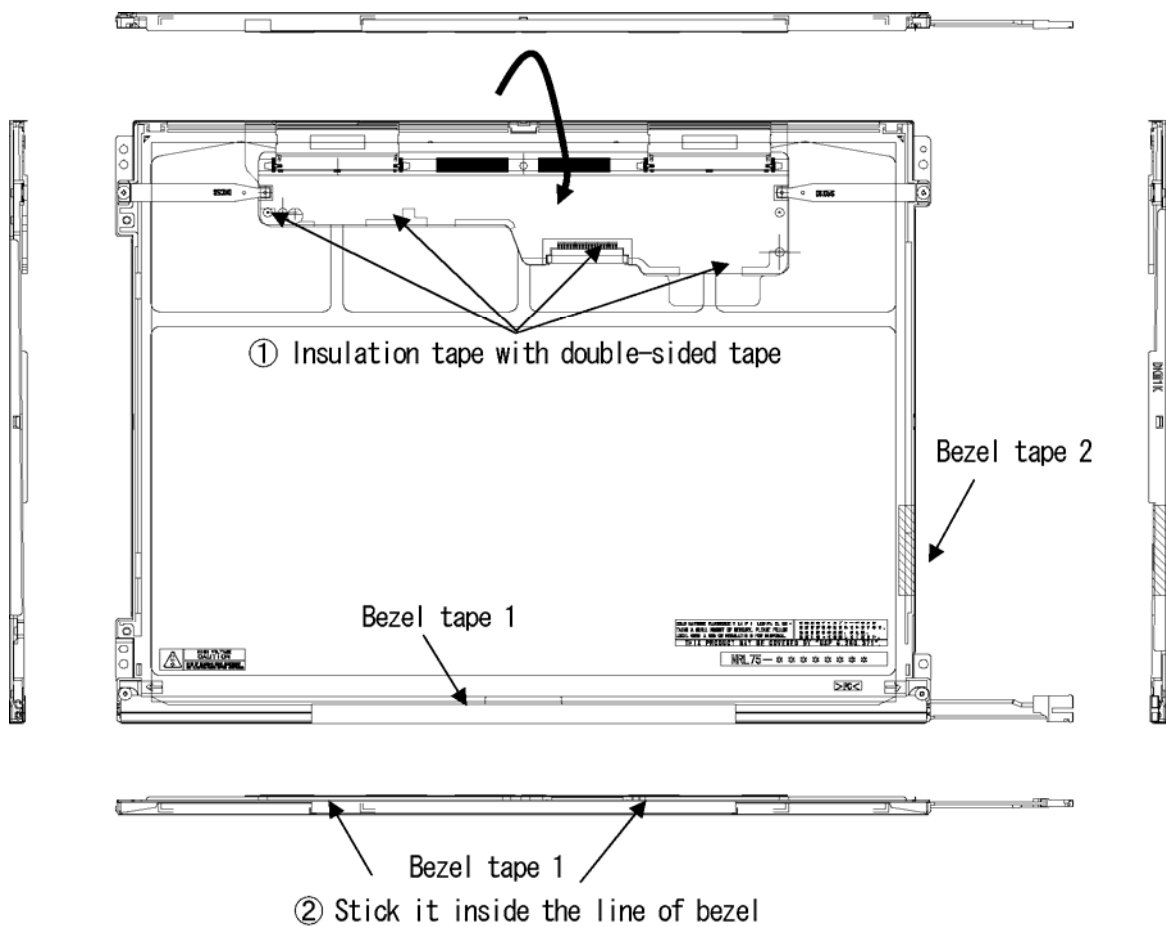
Figure 4-64 Replacing 12.1 Inch TMD fluorescent lamp (12)

Appendices

Appendix   Contents

NF board (FAPNF*)

NP board (FAPNP*)

NW board (FAPNW*)

Figures

Tables

System board (FAPNS*)

NF board (FAPNF*)

NP board (FAPNP*)

NW board (FAPNW*)

Appendix A   Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.
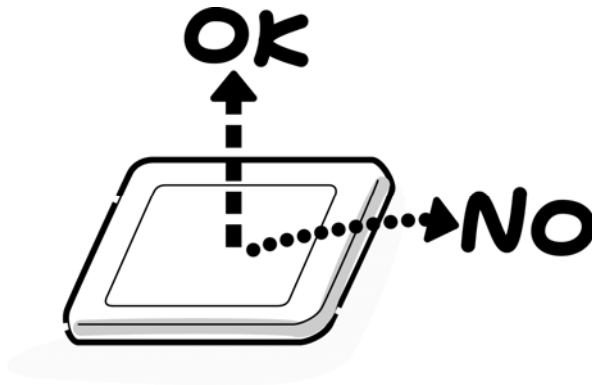
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

    Also, the panel's polarized surface is easily scarred, so be careful when handling it.

3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

    If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.

4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.

5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.
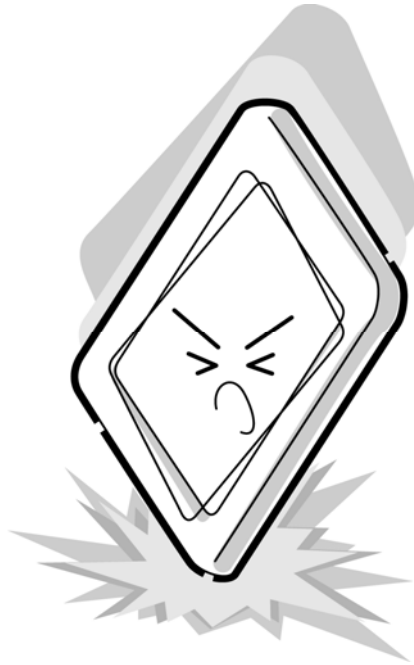
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
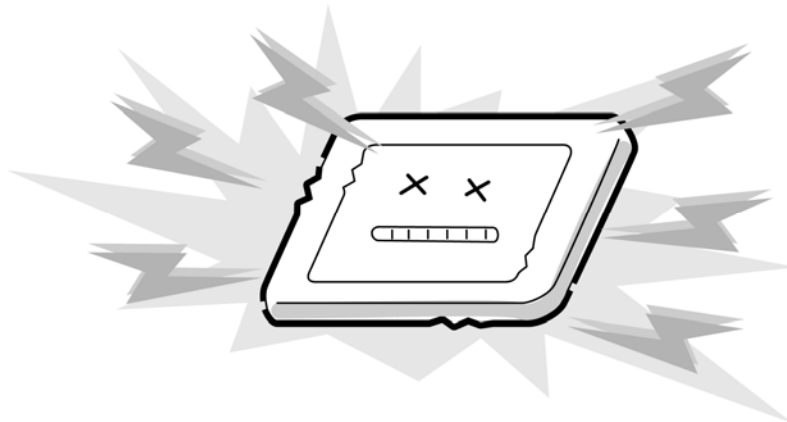
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
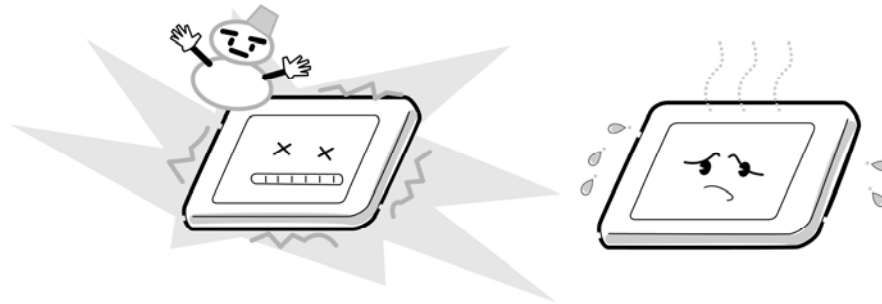
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
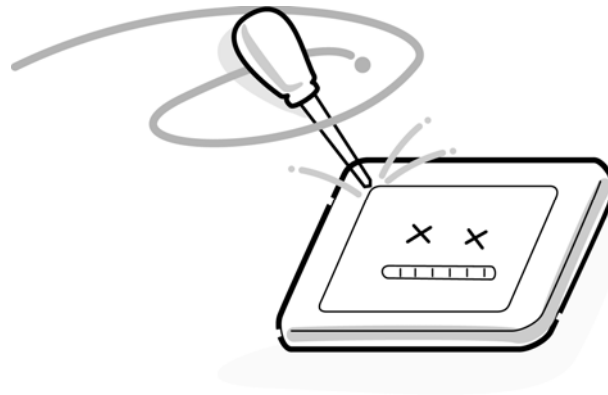
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
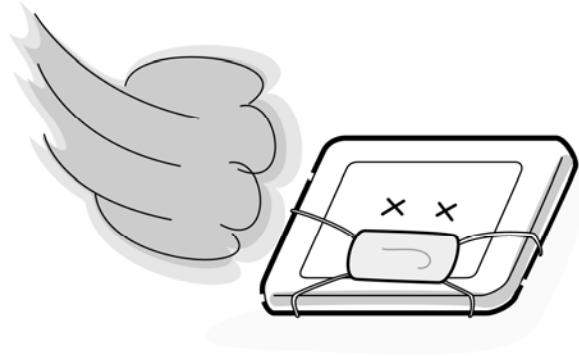
Appendix B   Board Layout

B.1   System Board Front View
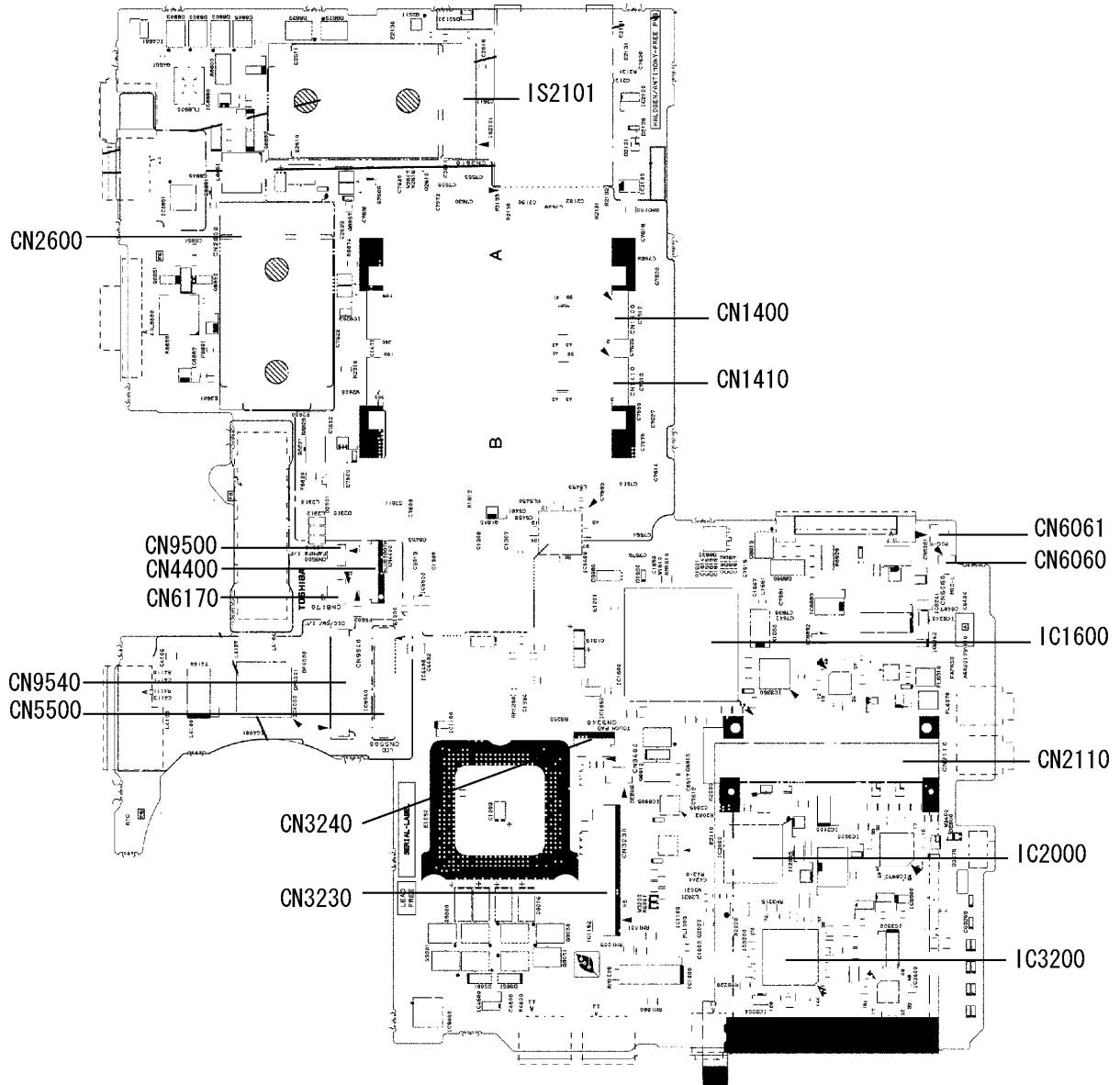
Figure B-1 System board layout (front)

Table B-1 System board ICs and connectors (front)

Number	Part's name
IS2101	Bridge media connector
CN1400	Memory connector (A)
CN1410	Memory connector (B)
CN2600	Wireless LAN I/F connector
CN9500	NP board I/F connector
CN4400	Bluetooth module I/F connector
CN6170	Speaker connector
CN9540	Digitizer I/F connector
CN5500	LCD I/F connector
CN3230	Keyboard connector
CN3240	Touch pad connector
IC2000	Card controller
CN2110	PC card I/F connector
IC3200	EC/KBC
IC1600	ICH7-M
CN6060	Internal Microphone I/F connector (Left)
CN6061	Internal Microphone I/F connector (Right)

B.2   System board Back View
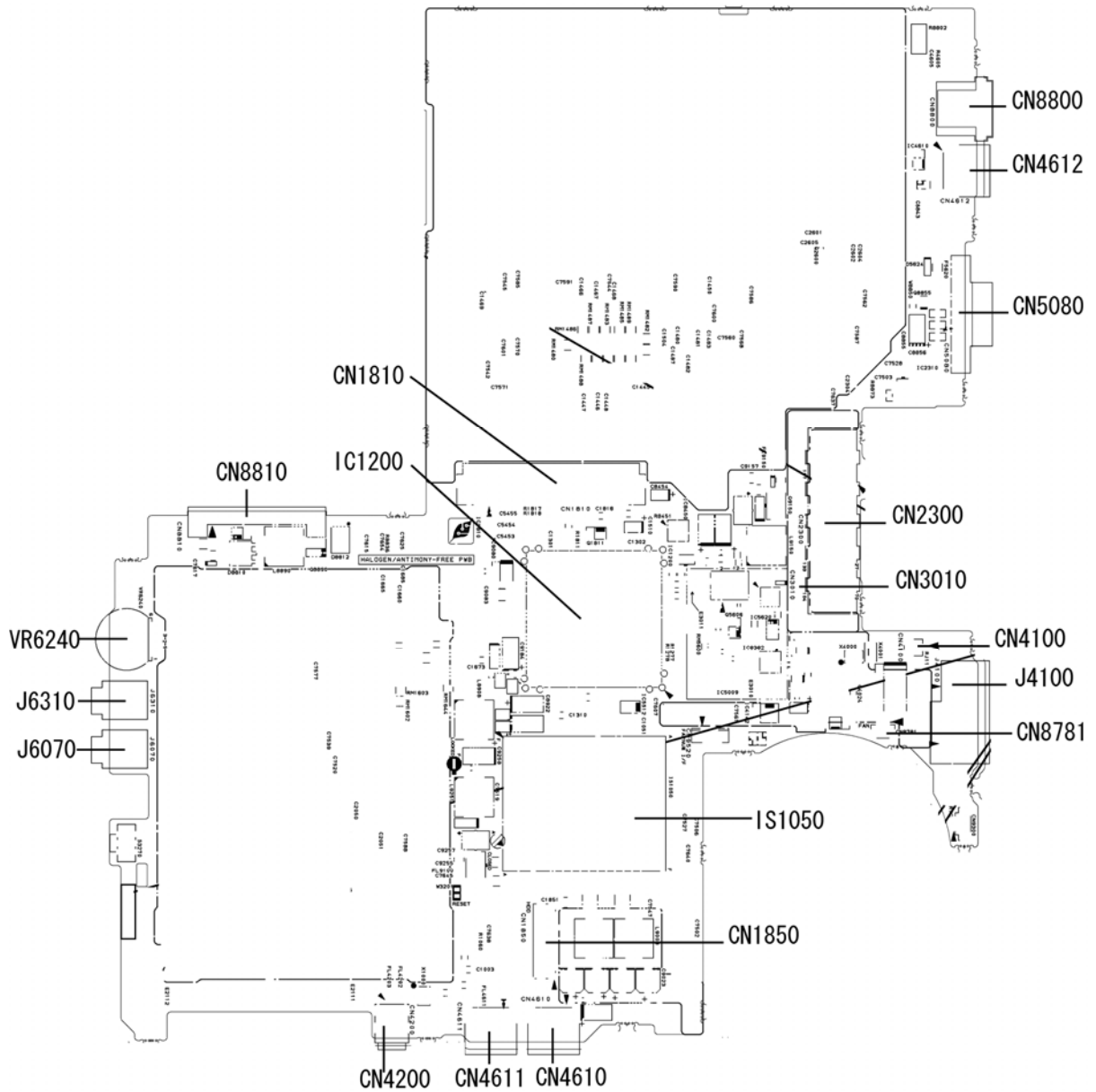
Figure B-2 System board layout (back)

Table B-2 System board ICs and connectors (back)

Number	Name
CN8800	DC-IN jack
CN4612	USB port 0
CN5080	RGB connector
CN1810	ODD connector
CN8810	Battery connector
IC1200	AlvisioPM
CN2300	Port replicator I/F connector
CN3010	MDC connector
VR6240	Sound volume
J6310	Headphone jack
J6070	External microphone jack
CN4100	Modem relay connector
CN4200	1394 connector
CN4611	USB port 4
CN4610	USB port 6
CN1850	HDD I/F connector
CN8781	Fan connector
J4100	Network jack
IS1050	CPU

B.3   NP Board Front and Back View

<Front layout>

<Back layout>
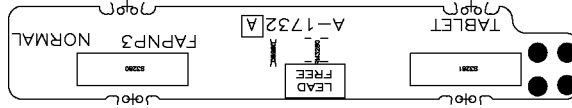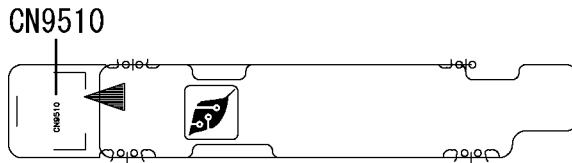
CN9510

Figure B-3 NP board layout

Table B-3 NP board connector

Number	Name
CN9510	System board I/F connector

B.4 NW Board Front and Back View

<Front layout>

<Back layout>
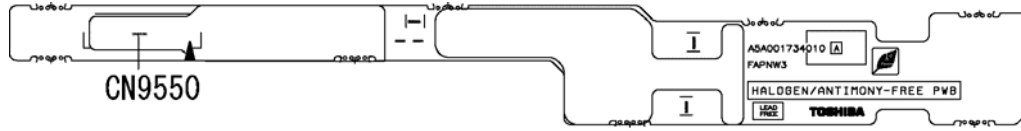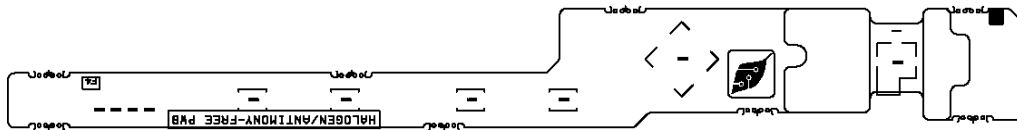
Figure B-4 NW board layout

Table B-4 NW board connector

Number	Name
CN9550	Digitizer connector I/F connector

B.5 NF Board Front and Back View

<Front layout>

CN9560

<Back layout>
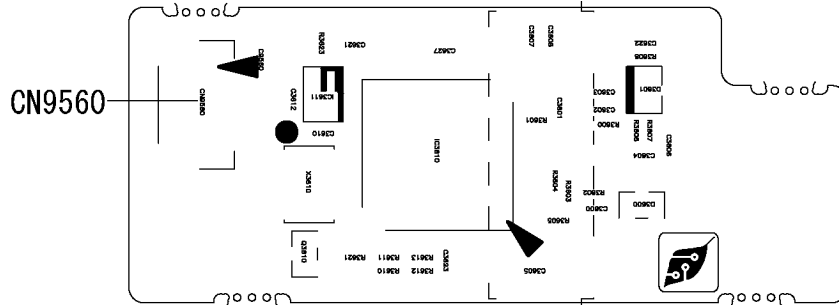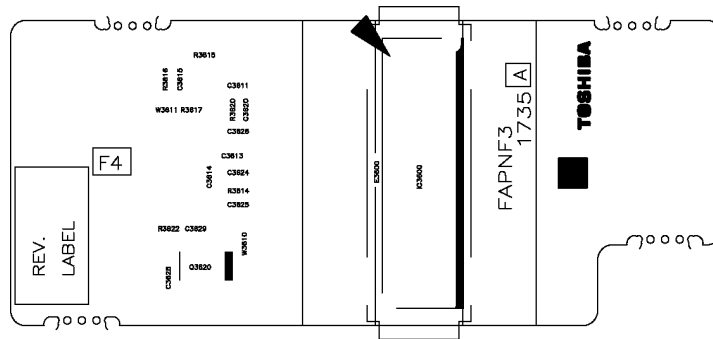
Figure B-5 NF board layout

Table B-5 NF board connector

Number	Name
CN9560	Digitizer connector I/F connector

Appendix C   Pin Assignment

System board (FAPNS*)

C.1   CN1410 Memory B connector (200-pin)

Table C-1 Memory B connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR0R9-B0V	I	2	GND	-
3	GND	-	4	BDQ05-B1P	I/O
5	BDQ07-B1P	I/O	6	BDQ04-B1P	I/O
7	BDQ06-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ01-B1P	I/O
15	GND	-	16	BDQ00-B1P	I/O
17	BDQ03-B1P	I/O	18	GND	-
19	BDQ02-B1P	I/O	20	BDQ12-B1P	I/O
21	GND	-	22	BDQ13-B1P	I/O
23	BDQ11-B1P	I/O	24	GND	-
25	BDQ08-B1P	I/O	26	BDM0-B1P	I
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	I
31	BDQS1-B1P	I/O	32	MCK3-B1N	I
33	GND	-	34	GND	-
35	BDQ09-B1P	I/O	36	BDQ15-B1P	I/O
37	BDQ14-B1P	I/O	38	BDQ10-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ16-B1P	I/O	44	BDQ21-B1P	I/O
45	BDQ18-B1P	I/O	46	BDQ17-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	N.C.	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I
53	GND	-	54	GND	-
55	BDQ23-B1P	I/O	56	BDQ19-B1P	I/O

Table C-1 Memory B connector (200-pin)(2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
57	BDQ22-B1P	I/O	58	BDQ20-B1P	I/O
59	GND	-	60	GND	-
61	BDQ30-B1P	I/O	62	BDQ24-B1P	I/O
63	BDQ28-B1P	I/O	64	BDQ25-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	BDQS3-B1N	I/O
69	N.C.	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ26-B1P	I/O	74	BDQ29-B1P	I/O
75	BDQ27-B1P	I/O	76	BDQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	I	80	MCKE3-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	BBS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	BMA12-B1P	I	90	BMA11-B1P	I
91	BMA09-B1P	I	92	BMA07-B1P	I
93	BMA08-B1P	I	94	BMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	BMA05-B1P	I	98	BMA04-B1P	I
99	BMA03-B1P	I	100	BMA02-B1P	I
101	BMA01-B1P	I	102	BMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	BMA10-B1P	I	106	BBS1-B1P	I
107	BBS0-B1P	I	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	BCAS-B1N	I	114	MODT2-B1P	I
115	MCS3-B1N	I	116	BMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT3-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	BDQ32-B1P	I/O	124	BDQ36-B1P	I/O
125	BDQ33-B1P	I/O	126	BDQ37-B1P	I/O
127	GND	-	128	GND	-

Table C-1 Memory B connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
129	BDQS4-B1N	I/O	130	BDM4-B1P	I
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ38-B1P	I/O
135	BDQ34-B1P	I/O	136	BDQ39-B1P	I/O
137	BDQ35-B1P	I/O	138	GND	-
139	GND	-	140	BDQ44-B1P	I/O
141	BDQ40-B1P	I/O	142	BDQ45-B1P	I/O
143	BDQ41-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BMD5-B1P	I	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ43-B1P	I/O	152	BDQ46-B1P	I/O
153	BDQ42-B1P	I/O	154	BDQ47-B1P	I/O
155	GND	-	156	GND	-
157	BDQ48-B1P	I/O	158	BDQ52-B1N	I/O
159	BDQ54-B1P	I/O	160	BDQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK4-B1P	I
165	GND	-	166	MCK4-B1N	I
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	BDQ51-B1P	I/O	174	BDQ50-B1P	I/O
175	BDQ55-B1P	I/O	176	BDQ49-B1P	I/O
177	GND	-	178	GND	-
179	BDQ57-B1P	I/O	180	BDQ56-B1P	I/O
181	BDQ60-B1P	I/O	182	BDQ61-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	I	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ58-B1P	I/O	190	GND	-
191	BDQ59-B1P	I/O	192	BDQ62-B1P	I/O
193	GND	-	194	BDQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	P3V	I
1T	GND	-	2T	GND	-

C.2   CN1400 Memory A connector (200-pin)

Table C-2   Memory A connector (200-pin)(1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-BOV	I	2	GND	-
3	GND	-	4	ADQ04-B1P	I/O
5	ADQ00-B1P	I/O	6	ADQ05-B1P	I/O
7	ADQ01-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ02-B1P	I/O
15	GND	-	16	ADQ07-B1P	I/O
17	ADQ03-B1P	I/O	18	GND	-
19	ADQ06-B1P	I/O	20	ADQ12-B1P	I/O
21	GND	-	22	ADQ13-B1P	I/O
23	ADQ08-B1P	I/O	24	GND	-
25	ADQ09-B1P	I/O	26	ADM0-B1P	I
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK0-B1P	I
31	ADQS1-B1P	I/O	32	MCK0-B1N	I
33	GND	-	34	GND	-
35	ADQ15-B1P	I/O	36	ADQ10-B1P	I/O
37	ADQ14-B1P	I/O	38	ADQ11-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ16-B1P	I/O	44	ADQ20-B1P	I/O
45	ADQ17-B1P	I/O	46	ADQ21-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	N.C.	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ22-B1P	I/O	58	ADQ18-B1P	I/O
59	GND	-	60	GND	-
61	ADQ24-B1P	I/O	62	ADQ29-B1P	I/O
63	ADQ25-B1P	I/O	64	ADQ28-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	ADQS3-B1N	I/O

Table C-2 Memory A connector (200-pin)(2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	N.C.	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ27-B1P	I/O	74	ADQ30-B1P	I/O
75	ADQ26-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	I	80	MCKE1-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	ABS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	AMA12-B1P	I	90	AMA11-B1P	I
91	AMA09-B1P	I	92	AMA07-B1P	I
93	AMA08-B1P	I	94	AMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	AMA05-B1P	I	98	AMA04-B1P	I
99	AMA03-B1P	I	100	AMA02-B1P	I
101	AMA01-B1P	I	102	AMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	AMA10-B1P	I	106	ABS1-B1P	I
107	ABS0-B1P	I	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	ACAS-B1N	I	114	MODT0-B1P	I
115	MCS1-B1N	I	116	AMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT1-B1P	I	120	NC	-
121	GND	-	122	GND	-
123	ADQ32-B1P	I/O	124	ADQ36-B1P	I/O
125	ADQ33-B1P	I/O	126	ADQ37-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	I
131	ADQS4-B1P	I/O	132	GND	-
133	GND	-	134	ADQ38-B1P	I/O
135	ADQ34-B1P	I/O	136	ADQ35-B1P	I/O
137	ADQ39-B1P	I/O	138	GND	-
139	GND	-	140	ADQ40-B1P	I/O

Table C-2 Memory A connector (200-pin)(3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
141	ADQ45-B1P	I/O	142	ADQ44-B1P	I/O
143	ADQ41-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	AMD5-B1P	I	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ42-B1P	I/O	152	ADQ46-B1P	I/O
153	ADQ43-B1P	I/O	154	ADQ47-B1P	I/O
155	GND	-	156	GND	-
157	ADQ48-B1P	I/O	158	ADQ52-B1N	I/O
159	ADQ49-B1P	I/O	160	ADQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK1-B1P	I
165	GND	-	166	MCK1-B1N	I
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	ADQ55-B1P	I/O	174	ADQ54-B1P	I/O
175	ADQ51-B1P	I/O	176	ADQ50-B1P	I/O
177	GND	-	178	GND	-
179	ADQ56-B1P	I/O	180	ADQ60-B1P	I/O
181	ADQ57-B1P	I/O	182	ADQ61-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	I	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ58-B1P	I/O	190	GND	-
191	ADQ59-B1P	I/O	192	ADQ62-B1P	I/O
193	GND	-	194	ADQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	GND	-
1T	GND	-	2T	GND	-

C.3 CN1810 Select bay I/F connector (72-pin)

Table C-3 Select bay I/F connector (72-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	37	PDDACK	I
2	GND	-	38	PDA1-P3P	I
3	GND	-	39	PDA2-P3P	I
4	GND	-	40	PDA0-P3P	I
5	IDRSTB-P5N	I	41	PDCS3-P3N	I
6	GND	-	42	PDCS1-P3N	I
7	PDD07-P3P	I/O	43	GND	-
8	PDD06-P3P	I/O	44	GND	-
9	PDD09-P3P	I/O	45	NC	-
10	PDD05-P3P	I/O	46	NC	-
11	PDD10-P3P	I/O	47	GND	-
12	GND	-	48	GND	-
13	GND	-	49	ZSATT2-P1P	O
14	PDD04-P3P	I/O	50	GND	-
15	PDD08-P3P	I/O	51	ZSATT2-P1N	O
16	PDD03-P3P	I/O	52	GND	-
17	PDD11-P3P	I/O	53	GND	-
18	PDD02-P3P	I/O	54	GND	-
19	PDD12-P3P	I/O	55	ZSATR2-P1N	I
20	GND	-	56	GND	-
21	GND	-	57	ZSATR2-P1P	I
22	GND	-	58	GND	-
23	PDD13-P3P	I/O	59	GND	-
24	PDD01-P3P	I/O	60	MBSTS2-S3N	I
25	PDD14-P3P	I/O	61	MBSTS1-S3N	I
26	PDD00-P3P	I/O	62	MBSTS0-S3N	I
27	PDD15-P3P	I/O	63	NC	-
28	GND	-	64	NC	-
29	GND	-	65	SB-P3V	-
30	PDIOW-P3N	I	66	SB-P3V	-
31	PDDREQ-P3P	O	67	SB-P3V	-
32	PIORDY-P3P	O	68	SB-P3V	-
33	PDIOR-P3N	I	69	SB-P3V	-
34	GND	-	70	SB-P3V	-
35	GND	-	71	GND	-
36	IDEIRQ-P3P	I	72	SB-P5V	-

C.4   CN1850 SATA I/F connector (10-pin)

Table C-4 SATA I/F connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZSATT0-P3P	O	2	ZSATT0-P3N	O
3	GND	-	4	ZSATR0-P3N	I
5	ZSATR0-P3P	I	6	GND	-
7	P3V	-	8	GND	-
9	P5V	-	10	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.5   CN2110 PC card I/F connector (70-pin)

Table C-5 PC card I/F connector (70-pin)) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ACAD00-EYP	I/O
3	ACAD01-PYP	I/O	4	ACAD03-PYP	I/O
5	ACAD05-PYP	I/O	6	ACAD07-PYP	I/O
7	ACCBEO-PYN	I/O	8	ACAD09-PYP	I/O
9	ACAD11-PYP	I/O	10	ACAD12-PYP	I/O
11	ACAD14-PYP	I/O	12	ACCBE1-PYN	I/O
13	ACPAR-PYP	I/O	14	ACPERR-PYN	I/O
15	ACGNT-PYN	I/O	16	ACINT-PYN	I/O
17	MCVCCA-PYV	I/O	18	MCVPPA-PYV	I/O
19	ACCLK-PYP	I/O	20	ACIRDY-PYN	I/O
21	ACCBE2-PYN	I/O	22	ACAD18-PYP	I/O
23	ACAD20-PYP	I/O	24	ACAD21-PYP	I/O
25	ACAD22-PYP	I/O	26	ACAD23-PYP	I/O
27	ACAD24-PYP	I/O	28	ACAD25-PYP	I/O
29	ACAD26-PYP	I/O	30	ACAD27-PYP	I/O
31	ACAD29-PYP	I/O	32	ACD02-PYP	I/O
33	ACCLKR-PYN	I/O	34	GND	-

Table C-5 PC card I/F connector (70-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
35	GND	-	36	ACCD1-P3N	I/O
37	ACAD02-PYP	I/O	38	ACAD04-PYP	I/O
39	ACAD06-PYP	I/O	40	ACD14-PYP	I/O
41	ACAD08-PYP	I/O	42	ACAD10-PYP	I/O
43	ACVS1-P3P	I/O	44	ACAD13-PYP	I/O
45	ACAD15-PYP	I/O	46	ACAD16-PYP	I/O
47	ACA18-PYP	I/O	48	ACLOCK-PYN	I/O
49	ACSTOP-PYN	I/O	50	ACDEVS-PYN	I/O
51	MCVCCA-PYV	I	52	MCVPPA-PYV	I/O
53	ACTRDY-PYN	I/O	54	ACFRAM-PYN	I/O
55	ACAD17-PYP	I/O	56	ACAD19-PYP	I/O
57	ACVS2-P3P	I/O	58	ACRST-PYN	I/O
59	ACSERR-PYN	I/O	60	ACREQ-PYN	I/O
61	ACCBE3-PYN	I/O	62	ACAUDI-PYP	O
63	ACSTSC-PYP	O	64	ACAD28-PYP	I/O
65	ACAD30-PYP	I/O	66	ACAD31-PYP	I/O
67	ACCD2-P3N	O	68	GND	-
69	GND	-	70	GND	-

C.6   IS2101   Bridge Media I/F connector (42-pin)

Table C-6   Bridge Media I/F connector (42-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MSDAT2-P3P	I/O	2	MSDAT3-P3P	I/O
3	MSBS-P3P	I/O	4	GND	-
5	GND	-	6	FM-P3V	I
7	MSCLK-P3P	I/O	8	MSDAT3-P3P	I/O
9	MSCD-P3N	O	10	MSDAT2-P3P	I/O
11	MSSDIO-P3P	I/O	12	MSDAT1-P3P	I/O
13	MSBS-P3P	I/O	14	GND	-
15	FM-P3V	I	16	MSCLK-P3P	I/O
17	GND	-	18	MSSDIO-P3P	I/O
19	MSSDAT1-P3P	I/O	20	SM-P3V	I
21	SDAT3-P3P	I/O	22	SDAT2-P3P	I/O
23	SDAT1-P3P	I/O	24	SDAT0-P3P	I/O
25	MSDAT3-P3P	I/O	26	MSDAT2-P3P	I/O
27	MSDAT1-P3P	I/O	28	MSSDIO-P3P	I/O
29	GND	-	30	MSCLK-P3P	I/O
31	XDWE-P3N	I	32	SDCMD-P3P	I/O
33	SMCLE-P3P	I/O	34	XDCE-P3N	I
35	XDRE-P3N	I	36	SMRDY-P3P	I
37	MXDCD-P3N	I	38	GND	-
39	GND	-	40	SDCD-P3N	O
41	GND	-	42	SDWP-P3P	O

C.7   CN2300   Docking I/F connector (140-pin)

Table C-7 Docking I/F connector (140-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	GND	-	A2	GND	-
A3	DSKDC	-	A4	PVBAT2	-
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	GND	-
5	BT2VD	-	6	BT2VD	-
7	PSCL-S5P	I/O	8	PSDA-S5P	I/O
9	GND	-	10	ZUSBDC-E3P	I/O
11	ZUSBDC-E3N	I/O	12	GND	-
13	GND	-	14	NC	-
15	NC	-	16	GND	-
17	NC	-	18	NC	-
19	GND	-	20	GND	-
21	GND	-	22	ZDVTX2-P3P	O
23	ZDVTX2-P3N	O	24	GND	-
25	ZDVTX1-P3N	O	26	ZDVTX1-P3P	O
27	GND	-	28	DVIDET-S3N	I
29	VOID	-	30	VOID	-
31	VOID	-	32	VOID	-
33	VOID	-	34	VOID	-
35	VOID	-	36	DCOUT	-
37	DCOUT	-	38	NC	-
39	NC	-	40	DBT20V-S5N	O
41	BTMP2	-	42	GND	-
43	CDCHG2-S5P	I	44	GND	-
45	DPCONF-S5P	I	46	GND	-
47	GND	-	48	XDVCLK-P3N	O
49	GND	-	50	GND	-
51	NC	-	52	NC	-
53	GND	-	54	ZDVTX0-P3P	-
55	ZDVTX0-P3N	O	56	GND	-
57	GND	-	58	GND	-
59	GND	-	60	DVISCL-P5P	I/O
61	DVISDA-P5P	I/O	62	LAN-E3V	-
63	EJCTRQ-S3N	I/O	64	VOID	-

Table C-7 Docking I/F connector (140-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
65	VOID	-	66	VOID	-
67	ZBIDDP-EXP	I/O	68	ZBIDON-EXN	I/O
69	ZBIDCN-EXP	I/O	70	ZBIDCP-EXP	
71	DCOUT	-	72	DCOUT	-
73	PWRSW-S3N	I	74	DDCON-P5P	O
75	NC	-	76	NC	-
77	GND	-	78	GND	-
79	DILSON-S3P	O	80	NC	-
81	GND	-	82	GND	-
83	GND	-	84	GND	-
85	NC	-	86	GND	-
87	NC	-	88	GND	-
89	GND	-	90	DBLUE-PXP	O
91	GND	-	92	DRED-PXP	O
93	GND	-	94	GND	-
95	IDSDA-P3P	I/O	96	IDSCL-P3P	I/O
97	GND	-	98	ACT-E3N	I
99	VOID	-	100	VOID	-
101	VOID	-	102	ZBIDBN-EXN	O
103	ZBIDBP-EXP	O	104	ZBIDAN-EXN	I
105	ZBIDAP-EXP	I	106	DCOUT	-
107	DCOUT	-	108	EJCTRQ-S3N	I
109	M5V	-	110	NC	-
111	NC	-	112	GND	-
113	DHSYNC-P3P	I/O	114	DVSYNC-P3P	I/O
115	GND	-	116	GND	-
117	NC	-	118	NC	-
119	GND	-	120	GND	-
121	GND	-	122	NC	-
123	NC	-	124	GND	-
125	GND	-	126	DGREEN-PXP	O
127	GND	-	128	GND	-
129	GND	-	130	DSSCL-S5P	I/O
131	GND	-	132	GND	-
133	DOCDT2-S3N	I	134	VOID	-
135	VOID	-	136	VOID	-
137	VOID	-	138	VOID	-
139	VOID	-	140	VOID	-

C.8   CN2600 PCI-Express mini card (WLAN) I/F connector (52-pin)

Table C-8 PCI-Express mini card (WLAN) I/F connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	O	2	P3V	-
3	WCHDAT-P3P	O	4	GND	-
5	WCHCLK-P3P	O	6	1R5-P1V	-
7	MPEXRQ-P3N	I	8	NC	-
9	GND	-	10	NC	-
11	XPEWL-P3N	O	12	NC	-
13	XPEWL-P3P	O	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	(WLRFON-S3N)	O
21	GND	-	22	PLTRS1-E3N	-
23	ZPERWL-P1N	I	24	E3V	-
25	ZPERWL-P1P	I	26	GND	-
27	GND	-	28	1R5-P1V	-
29	GND	-	30	SMBCK0-P3P	O
31	ZPETWL-P1N	O	32	SMBDA0-P3P	O
33	ZPETWL-P1P	O	34	GND	-
35	GND	-	36	NC	-
37	NC	-	38	NC	-
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	1R5-P1V	-
49	NC	-	50	GND	-
51	NC	-	52	P3V	-
1T	GND	-	2T	GND	-

C.9   CN2610 PCI-Express mini card (3G) I/F connector (52-pin)

Table C-9 PCI-Express mini card (3G) I/F connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	O	2	P3V	-
3	NC	-	4	GND	-
5	NC	-	6	1R5-P1V	-
7	NC	-	8	UIMPWR-P3V	I
9	GND	-	10	UIMDAT-P3P	I/O
11	NC	-	12	UIMCLK-P3P	I
13	NC	-	14	UIMRST-P3P	I
15	UIM-GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	(3GRFON-S3N)	O
21	GND	-	22	PLTRS1-E3N	-
23	NC	-	24	E3V	-
25	NC	-	26	GND	-
27	GND	-	28	1R5-P1V	-
29	GND	-	30	SMBCK0-P3P	O
31	NC	-	32	SMBDA0-P3P	O
33	NC	-	34	GND	-
35	GND	-	36	ZUSB3G-E3N	I/O
37	NC	-	38	ZUSB3G-E3P	I/O
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	1R5-P1V	-
49	NC	-	50	GND	-
51	NC	-	52	P3V	-
1T	GND	-	2T	GND	-

C.10 CN3010 MDC I/F connector (12-pin)

Table C-10 MDC I/F connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	ACZOT1-P3P	I/O	4	NC	-
5	GND	-	6	E3V	-
7	ACZSY1-P3P	O	8	GND	-
9	ACZIN1-E3P	I/O	10	GND	-
11	ACZRS1-E3N	O	12	XAZBC1-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.11 CN3230 Keyboard connector (34-pin)

Table C-11 Keyboard connector (34-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	KBSC15-S3N	O	8	KBSC14-S3N	O
9	KBRT07-S3N	O	10	KBRT06-S3N	O
11	KBSC13-S3N	O	12	KBSC12-S3N	O
13	KBRT05-S3N	O	14	KBRT04-S3N	O
15	KBSC11-S3N	O	16	KBSC10-S3N	O
17	KBRT03-S3N	O	18	KBRT02-S3N	O
19	KBRT01-S3N	O	20	KBSC09-S3N	O
21	KBSC08-S3N	O	22	KBSC07-S3N	O
23	KBRT00-S3N	O	24	KBSC06-S3N	O
25	KBSC05-S3N	O	26	KBSC04-S3N	O
27	KBSC03-S3N	O	28	KBSC02-S3N	O
29	KBSC01-S3N	O	30	KBSC00-S3N	O
31	P5V	I	32	CAPLED-P5N	I
33	ARWLED-P5N	I	34	NUMLED-P5N	I
1T	GND	-	2T	GND	-

C.12 CN3240 PAD connector (8-pin)

Table C-12 PAD connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	GND	-	4	NC	-
5	IPDCLK-P5P	I/O	6	IPDDAT-P5P	I/O
7	P5V	-	8	P5V	-

C.13 CN3400 Debugging connector (4-pin)

Table C-13 Debugging connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P3V	-	2	DBGRX-P3P	O
3	DBGTX-P3P	I	4	GND	-

C.14 J4100 Network I/F connector (14-pin)

Table C-14 Network I/F connector (14-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	ZBIDAP-EXP	I/O	A2	ZBIDAN-EXN	I/O
A3	ZBIDBP-EXP	I/O	A4	ZBIDCP-EXP	I/O
A5	ZBIDCN-EXP	I/O	A6	ZBIDBN-EXN	I/O
A7	ZBIDDP-EXP	I/O	A8	ZBIDDN-EXN	-
A9	LNK-E3N	I	A10	(LAN-E3V)	-
A11	ACT-E3N	I	A12	(LAN-E3V)	-
B1	MDMTIP-P3P	I/O	B2	MDMRNG-B3P	I/O
1T	GND	-	2T	GND	-

C.15 CN4200 IEEE1394 connector (4-pin)

Table C-15 IEEE1394 connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZTPB0-P3N	I/O	2	ZTPB0-P3P	I/O
3	ZTPA0-P3N	I/O	4	ZTPA0-P3P	I/O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.16 CN4400 Bluetooth connector (20-pin)

Table C-16 Bluetooth connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BT-P3V	-	2	NC	-
3	WCHDAT-P3P	O	4	ZUSBBT-E3N	I/O
5	ZUSBBT-E3P	I/O	6	NC	-
7	WCHCLK-P3P	O	8	(GND)	-
9	NC	-	10	GND.	-
11	NC	-	12	NC	-
13	BTRST-S3N	O	14	NC	-
15	NC	-	16	NC	-
17	NC	-	18	BTMDL-P3N	I
19	NC	-	20	GND	-
1T			2T		

C.17 CN4610 USB connector (Port 6) (4-pin)

Table C-17 USB connector (Port 6) (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB0PS-E5V	-	2	ZUSBP6-E3N	I/O
3	ZUSBP6-E3P	I/O	4	GND	-

C.18 CN4611 USB connector (Port 4) (4-pin)

Table C-18 USB connector (Port 4) (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP4-E3N	I/O
3	ZUSBP4-E3P	I/O	4	GND	-

C.19 CN4612 USB connector (Port 0) (6-pin)

Table C-19 USB connector (Port 0) (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	USBPEN-E3N +ZUSBP0-E3N	I/O
3	ZUSBP0-E3P	I/O	4	GND	-
5	GND	-	6	GND	-

C.20 CN5500 LCD connector (40-pin)

Table C-20 LCD connector (40-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BRT2DA-S3P	O	2	(FL-P5V)	-
3	BRT10-P5P	O	4	FL-P5V	-
5	FL-P5V	-	6	FL-P5V	-
7	GND	-	8	GND	-
9	GND	-	10	GND	-
11	GND	-	12	PNL0-P3V	-
13	PNL0-P3V	-	14	PNL0-P3P	I
15	GND	-	16	GND	-
17	ZTXDB0-PYN	O	18	ZTXDB0-PYP	O
19	GND	-	20	ZTXDB1-PYN	O
21	ZTXDB1-PYP	O	22	GND	-
23	ZTXDB2-PYN	O	24	ZTXDB2-PYP	O
25	GND	-	26	ZTXDB3-PYN	O
27	ZTXDB3-PYP	O	28	GND	-
29	ZTXDA0-PYN	O	30	ZTXDA0-PYP	O
31	GND	-	32	ZTXDA1-PYN	O
33	ZTXDA1-PYP	O	34	GND	-
35	ZTXDA2-PYN	O	36	ZTXDA2-PYP	O
37	GND	-	38	XTXCKA-PYN	O
39	XTXCKA-PYP	O	40	GND	-

C.21 CN5080 RGB connector (15-pin)

Table C-21 RGB connector (15-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRED-PXP	O	2	MGREEN-PXP	O
3	MBLUE-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	-	10	GND	-
11	NC	-	12	CRTSDA-P5P	I/O
13	MHSYNC-P5P	O	14	MVSYNC-P5P	O
15	CRTSCL-P5P	I/O			
1T	GND	-	2T	GND	-

C.22 CN6060 Internal microphone (left) connector (2-pin)

Table C-22 Internal microphone (left) connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(IMICL-PXP)	O	2	A-GND	-

C.23 CN6061 Internal microphone (right) connector (2-pin)

Table C-23 Internal microphone (right) connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(IMICR-PXP)	O	2	A-GND	-

C.24 J6070 External microphone connector (6-pin)

Table C-24 External microphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(A-GND)	-	4	A-GND	I
2	(MICIN)	O	5	(A4R7-P4V)	I
3	(MICBIS-P2V)	O	6	(MICBIS-P2V)	O

C.25 CN6170 Speaker connector (4-pin)

Table C-25 Speaker connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTR-PXN	O	2	SPOTR-PXP	O
3	SPOTL-PXP	O	4	SPOTL-PXN	O

C.26 J6310 Headphone connector (6-pin)

Table C-26 Headphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(A-GND)	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	(A4R7-P4V)	-
5	A-GND	-	6	N.C.	-

C.27 CN8800 DC-IN connector (4-pin)

Table C-27 DC-IN connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PVDC	I	2	(GND)	-
3	PVDC	I	4	(GND)	-

C.28 CN8810 1st battery connector (10-pin)

Table C-28 1st battery connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(PVBL1)	O	2	BTMP1	
3	(DCHG)	I	4	(M5V)	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT1OV-S5N	O
9	GND	-	10	GND	-

C.29 CN9300 RTC battery connector (3-pin)

Table C-29 RTC battery connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	(R3V)	I	2	N.C.	-
3	GND	-			
1T	GND	-	2T	GND	-

C.30 CN8781 Fan connector (4-pin)

Table C-30 Fan connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	FANG-P3P	I
3	GND	-	4	(FPWM-S3P)	O

C.31 CN9500 PN board I/F connector (3-pin)

Table C-31 PN board I/F connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF-S3N	I	2	TPLOFF-S3V	I
3	GND	-			

C.32 CN9520 NU board I/F connector (10-pin)

Table C-32 NU board I/F connector (10-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	UIMPWR-P3V	O	2	NC	-
3	UIMRST-P3V	O	4	UIMCLK-P3P	O
5	UIMDAT-P3P	I/O	6	NC	-
7	NC	-	8	UIM-GND	-
9	GND	-	10	GND	-
1T	GND	-	2T	GND	-

C.33 CN9540 Digitizer switch I/F connector (41-pin)

Table C-33 Digitizer switch I/F connector (41-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	22	GND	-
2	GND	-	23	GND	-
3	GND	-	24	GND	-
4	P3V	-	25	GPBTNA-S3N	I
5	FGSPON-S3N	O	26	GPBTNB-S3N	I
6	GND	-	27	PWRSW-S3N	I
7	ZUSBFS-E3N	I/O	28	GND	-
8	ZUSBFS-E3N	I/O	29	KBRT00-S3N	I
9	GND	-	30	KBRT01-S3N	I
10	GND	-	31	KBRT02-S3N	I
11	GND	-	32	KBRT03-S3N	I
12	GND	-	33	KBRT04-S3N	I
13	GND	-	34	KBRT05-S3N	I
14	DGDTR-P3N	O	35	KBRT06-S3N	I
15	DGRTS-P3N	O	36	GND	-
16	DGRXD-P3P	I	37	KBSC16-S3N	I
17	DGTXD-P3P	O	38	GND	-
18	(GRD)	I	39	GND	-
19	DBGEN-P3N + PLTRS1-E3N	O	40	GND	-
20	P3V	-	41	GND	-
21	GND	-			
1T	GND	-	2T	GND	-

NF board (FAPNF*)

C.34 CN9560 System board I/F connector (6-pin)

Table C-34 System board I/F connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	Power P3V	-	2	FGSPON-S3N	I
3	GND	-	4	ZUSBFS-E3N	I/O
5	ZUSBFS-E3P	I/O	6	GND	-
1T	GND	-	2T	GND	-

NP board (FAPNP*)

C.35 CN9510 System board I/F connector (3-pin)

Table C-35 System board I/F connector (3-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF-S3N	O	2	TPLOFF-S3V	O
3	GND	-			

NW board (FAPNW*)

C.36 CN9550 System board I/F connector (15-pin)

Table C-36 System board I/F connector (15-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GPBTNA-S3N	O
3	GPBTNB-S3N	O	4	PWRSW-S3N	O
5	GND	-	6	KBRT00-S3N	O
7	KBRT01-S3N	O	8	KBRT02-S3N	O
9	KBRT03-S3N	O	10	KBRT04-S3N	O
11	KBRT05-S3N	O	12	KBRT06-S3N	O
13	GND	-	14	KBSC16-S3N	O
15	GND	-			

Appendix D   Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break		Note
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 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break		Note
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	
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	**Break**	**Make**	**Break**		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0 11		
75	Ins	E0 52	E0 D2	E0 70	E0 F0 70		*1
76	Del	E0 53	E0 D3	E0 71	E0 F0 71		*1
79	←	E0 4B	E0 CB	E0 6B	E0 F0 6B		*1
80+	Home	E0 47	E0 C7	E0 6C	E0 F0 6C		*1 *3
81+	End	E0 4F	E0 CF	E0 69	E0 F0 69		*1 *3
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
202	Fn	—		—		—		—			*4
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F	*1
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F	*1

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.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1								Code set 2							
		Make				Break				Make				Break			
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80+	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81+	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	E0	12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1								Code set 2								
		Make				Break				Make				Break				
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80+	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81+	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1				Code set 2			
		Make		Break		Make		Break	
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
80+	Home (Pause)	E1 1D 45 E1 9D C5		-		E1 14 77 E1 F0 14 F0 77		-	
81+	End (Break)	E0 46 E0 C6		-		E0 7E E0 F0 7E		-	
121	ARROW	45		C5		77		F0	77
122	NUMERIC	45		C5		77		F0	77
123	Scrl	46		C5		7E		F0	7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2			Note
			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		*1

Note:

1. * Combination with **Shift** key makes different codes.

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	

Appendix E   Key Layout
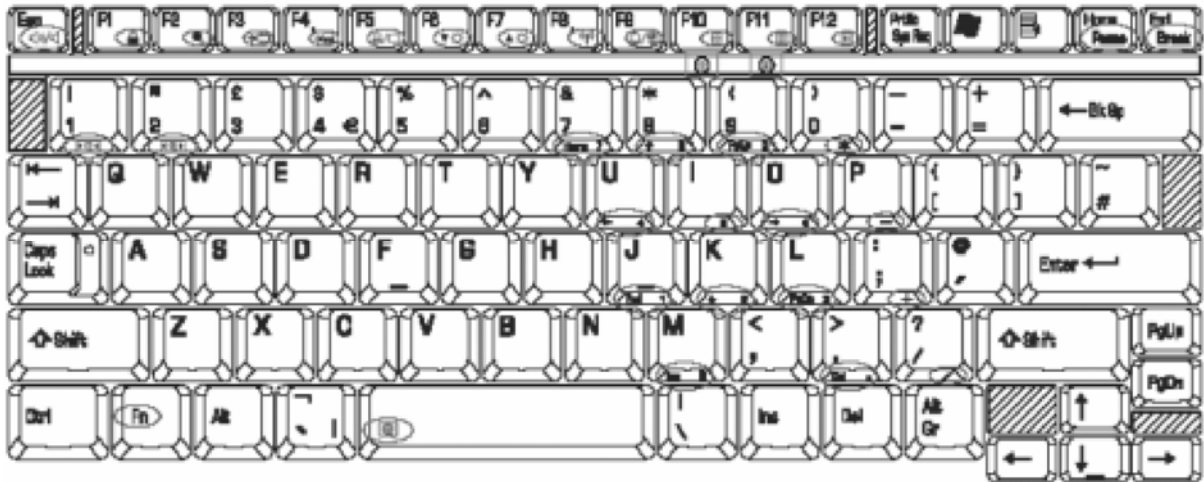
Figure E-1 Key layout (UK)
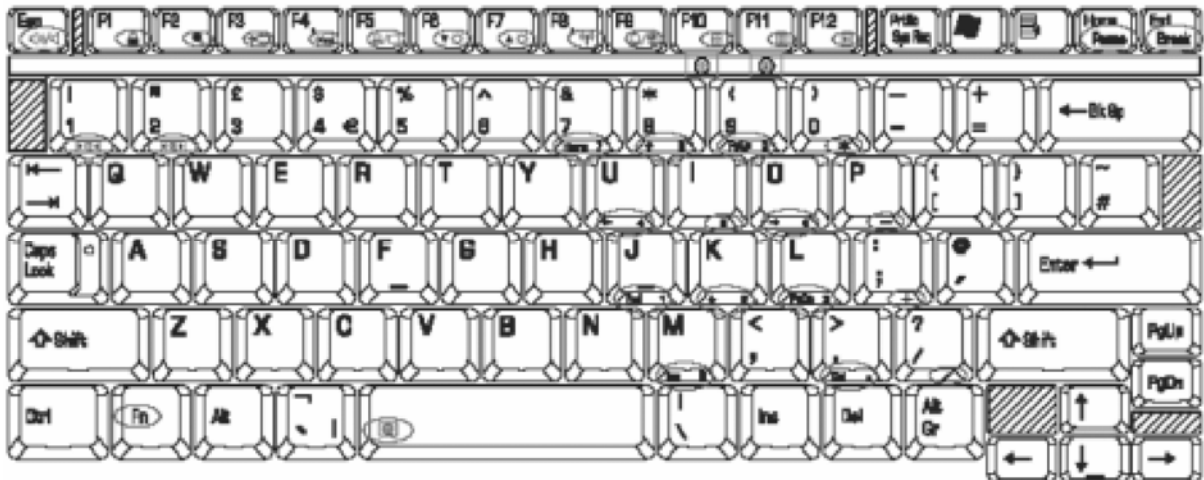
Figure E-2 Key layout (US)
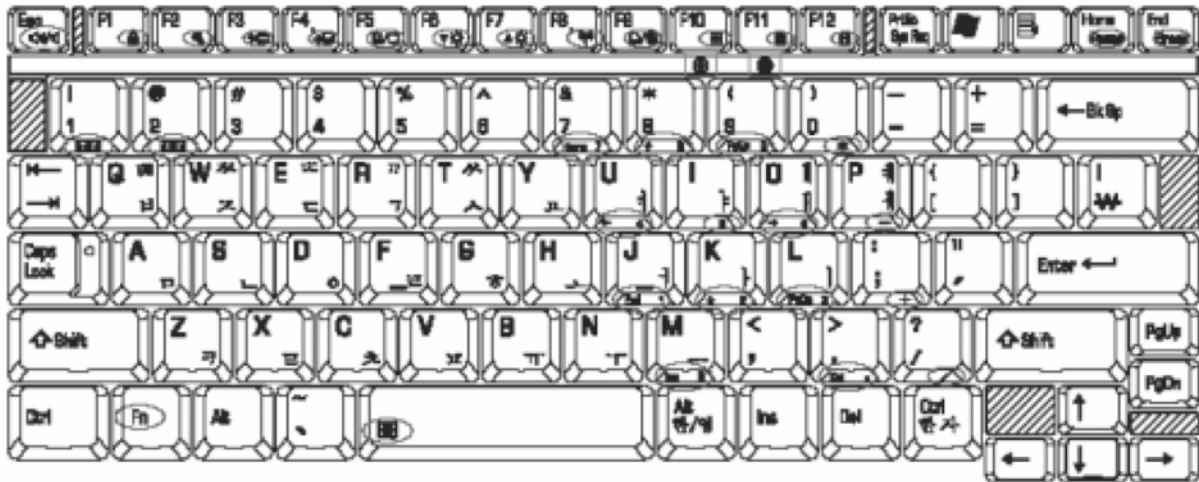
Figure E-3 Key layout (KO)
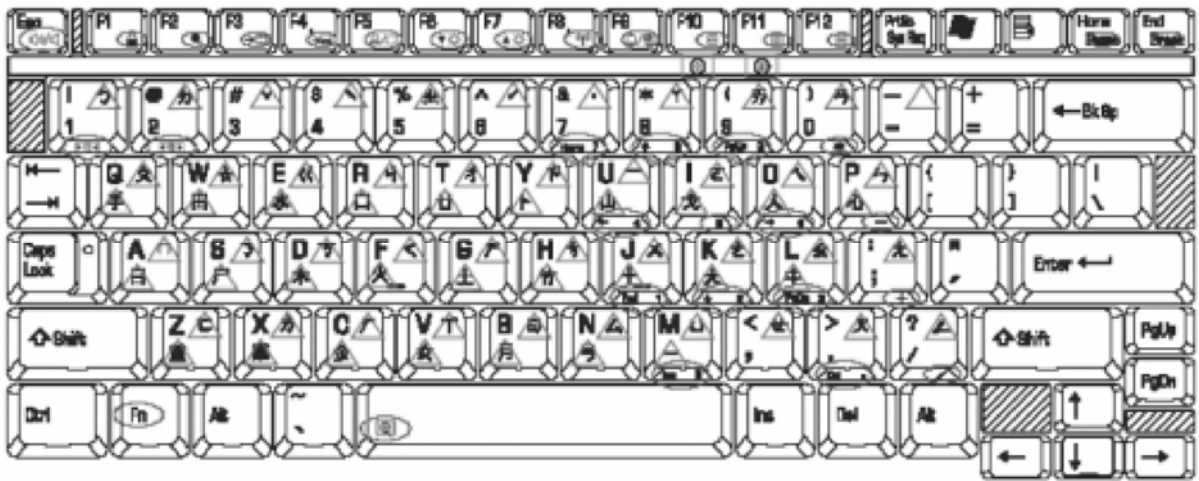
Figure E-4 Key layout (TC)

Appendix F   Wiring Diagrams

F.1 RGB Monitor Wraparound connector

```
(1) RED     ─────────────────────────────  RED     (1)
(2) GREEN   ─────────────────────────────  GREEN   (2)
(3) BLUE    ─────────────────────────────  BLUE    (3)
(4) NC      ─────────────────────────────  NC      (4)
(5) GND     ─────────────────────────────  GND     (5)
(6) GND     ─────────────────────────────  GND     (6)
(7) GND     ─────────────────────────────  GND     (7)
(8) GND     ─────────────────────────────  GND     (8)
(9) 5V      ─────────────────────────────  5V      (9)
(10) GND    ─────────────────────────────  GND     (10)
(11) NC     ─────────────────────────────  NC      (11)
(12) SDA    ─────────────────────────────  SDA     (12)
(13) HSYNC  ─────────────────────────────  HSYNC   (13)
(14) VSYNC  ─────────────────────────────  VSYNC   (14)
(15) SDL    ─────────────────────────────  SCL     (15)
```

Figure F-1 RGB Monitor Wraparound connector

F.2 LAN Loopback Connector

```
(1) BIBAP (TX+) ───────────────────── (3) BIDBP (RX+)

(2) BIDAN (TX-) ───────────────────── (6) BIDBN (RX-)
```
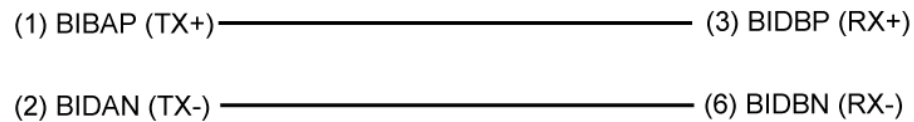
Figure F-2 LAN loopback Connector

Appendix G   BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

❑   BIOS 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) until a beep sounds.
     The BIOS rewriting will start.

6.   When the process is completed, eject the BIOS rewriting disk and the system is reset.

Appendix H   EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

❑ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

> *NOTE:* 1. *Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.*
>
> 2. *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 until a beep sounds. The EC/KBC rewriting will start.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I   Reliability

The following table shows MTBF (Mean Time between Failures).

Table I-1 MTBF

MTBF	Time (hours)
System	5,862

Appendix J   Maintenance of TOSHIBA RAID

J.1 Outline of Maintenance (Repair) of TOSHIBA RAID
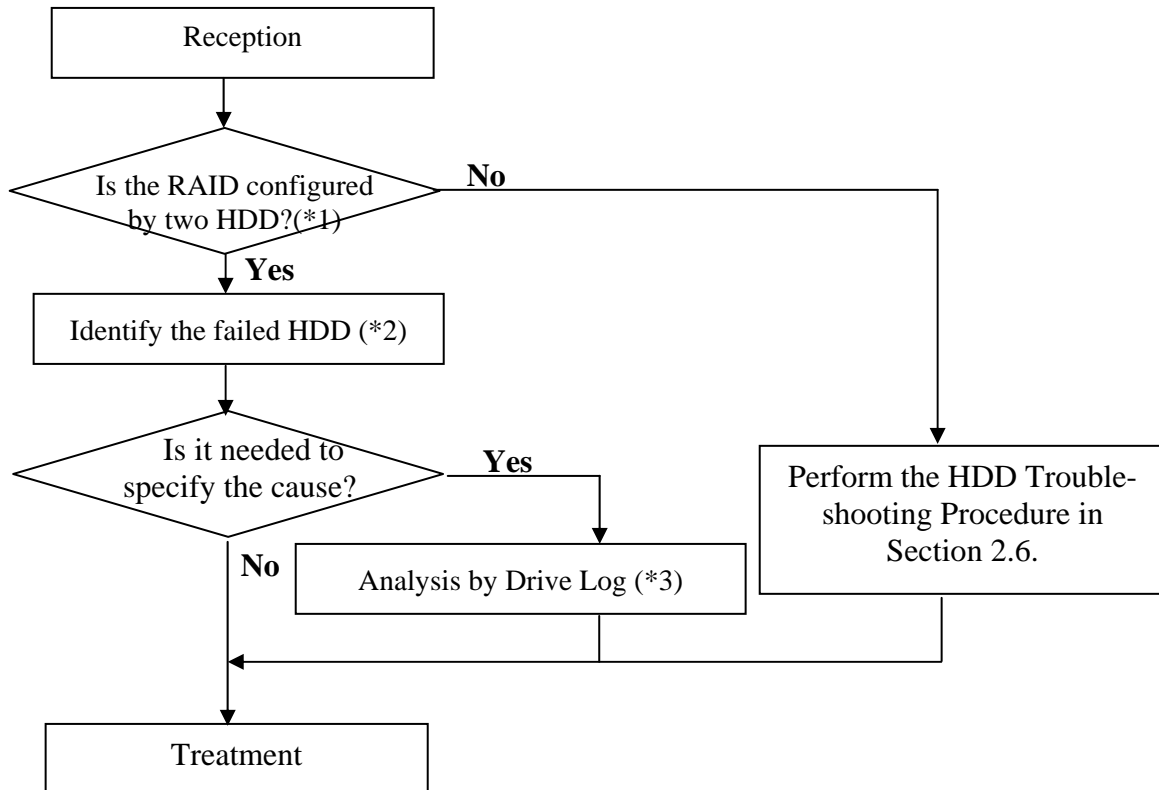
Follow the below procedures to repair TOSHIBA RAID

Figure J-1   Flowchart of repairing TOSHIBA RAID

*1: Refer to "Check of RAID configuration" in Section 3.3 in Chapter 3.

*2: Refer to "Identifying failed HDD" in Section 3.3.3 of Chapter 3.

*3: Refer to "Analysis and handling by Drive Log" in section J.2.

J.2 Analysis and handling by Drive Log

Follow the below procedures to analyze.

```
┌──────────────────────────┐
│ Boot the independent     │
│ utility and check the    │
│ Physical Drive status.   │
└──────────────────────────┘
            │
            ▼
      ◇ (1) Which port of          Port 1
        HDD failed? ◇ ──────────────────────┐
            │                                │
          Port 0                             ▼
            │                        ◇ (3) Does operation    No
            ▼                          miss cause it? ◇ ──────────┐
┌──────────────────────────┐              │                      │
│ (2) If necessary, analyze│            Yes                      ▼
│  the Drive Log and       │              │          ┌──────────────────────────┐
│  identify the cause of   │              ▼          │ (2) If necessary, analyze │
│  failure.                │   ┌────────────────────┐│  the Drive Log and        │
└──────────────────────────┘   │ (4) Change the     ││  identify the cause of    │
            │                   │  status of the     ││  failure.                 │
            ▼                   │  failed HDD to     │└──────────────────────────┘
┌──────────────────────────┐   │  "OFFLINE".        │              │
│ Replace the second HDD   │   └────────────────────┘              ▼
│ with new (good) one.     │              │          ┌──────────────────────────┐
└──────────────────────────┘              │          │ Replace the second HDD    │
            │                             │          │ with new (good) one.      │
            ▼                             │          └──────────────────────────┘
┌──────────────────────────┐             │                        │
│ Replace the built-in HDD │             │                        │
│ with the second HDD      │             │                        │
│ removed.                 │             │                        │
└──────────────────────────┘             │                        │
            │                            │                        │
            ▼◄───────────────────────────┴────────────────────────┘
┌──────────────────────────┐
│           End            │
└──────────────────────────┘
```
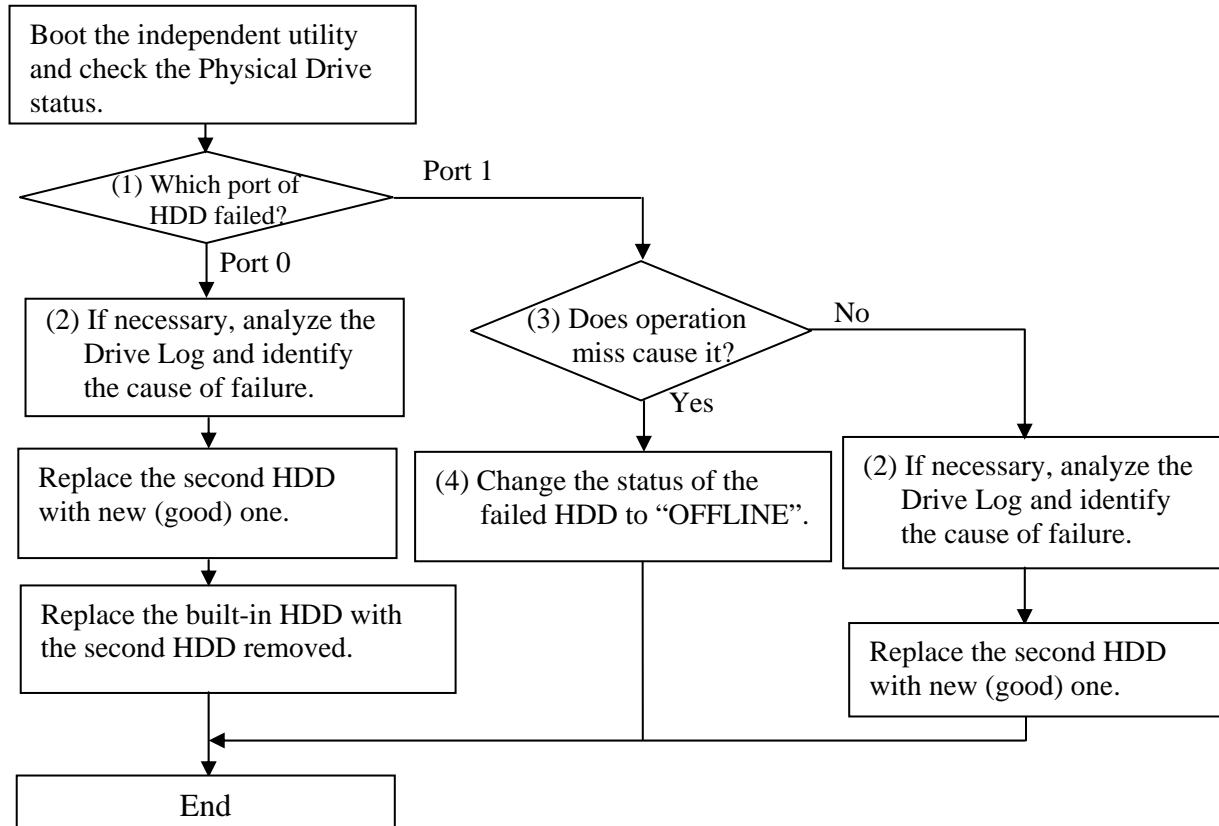
Figure J-2 Flowchart of Analysis and handling by Drive Log

How to identify the cause of failure

(1) When "Fail" or "NODRIVE" is displayed.

According to "Operation of Independent utility", boot the independent utility to display the Drive Log.

To identify the failure cause of Port 0, analyze the Drive Log of [REDUNDANT] side of Port 1.

To identify the failure cause of Port 1, analyze the Drive Log of [REDUNDANT] side of Port 0.
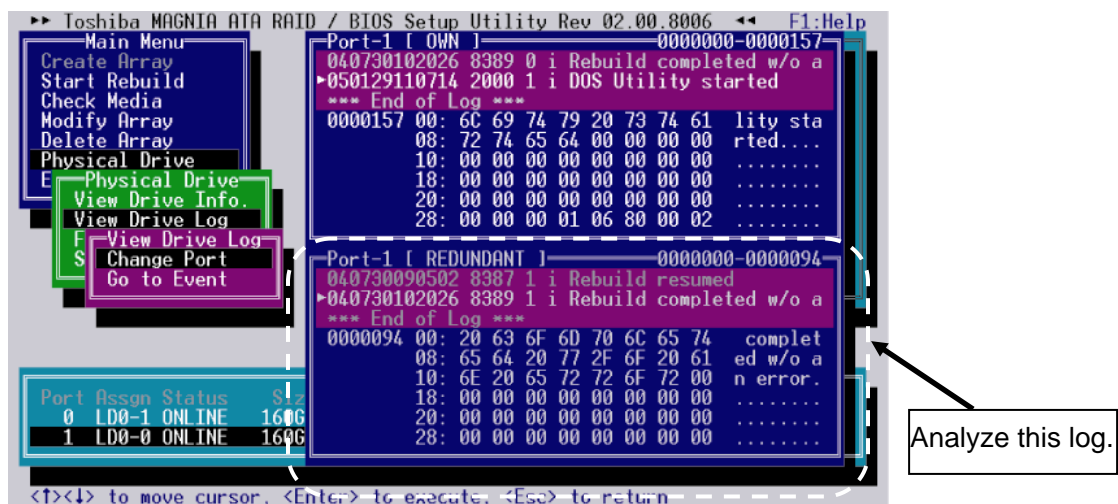
1. Find the log of message of "Fail this drive" last generated, using **[PgUp]** and **[PgDn]** keys.
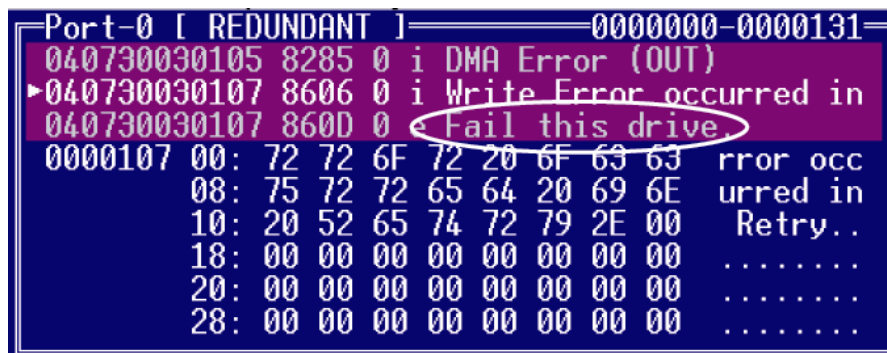
2. Analyze the detailed date of the message of right before of "xxx Error (IN)", "xxx Error (OUT)" (for example, "DMA Error (IN)", "DMA Error (OUT)") right before the log of "Fail this drive" message and identify the cause.

DMA Error (IN)

DMA Error (OUT)

Command : Indicates Command code caused an error. The following list indicates the
command

Table J-1 List of Command (1/2)

Protocol	Command	Devices not implementing the PACKET Command feature set	Devices implementing the PACKET Command feature set	Command code
ND	NOP	O	M	00h
ND	CFA REQUEST EXTENDED ERROR	O	N	03h
DR	DEVICE RESET	O	M	08h
PI	READ SECTOR(S)	M	N	20h
PI	READ SECTOR(S) EXT	O	N	24h
DM	READ DMA EXT	O	N	25h
DMO	READ DMA QUEUED EXT	O	N	26h
ND	READ NATIVE MAX ADDRESS EXT	O	N	27h
PI	READ MULTIPLE EXT	O	N	29h
PI	READ LOG EXT	O	O	2Fh
PO	WRITE SECTOR (S)	M	N	30h
PO	WRITE SECTOR (S) EXT	O	N	34h
DM	WRITE DMA EXT	O	N	35h
DMO	READ DMA QUEUED EXT	O	N	36h
ND	SET MAX ADDRESS EXT	O	N	37h
PO	CFA WRITE SECTORS W/OUT ERASE	O	N	38h
PO	WRITE MULTIPLE EXT	O	N	39h
PO	WRITE LOG EXT	O	O	3Fh
ND	READ VERIFY SECOTR(S)	M	N	40h
ND	READ VERIFY SECOTR(S) EXT	O	N	42h
ND	SEEK	M	N	70h
PI	CFA TRANSLATE SECTOR	O	N	87h
DD	EXECUTE DEVICE DIAGNOSTIC	M	M	90h
PO	DOWNLOAD MICROCODE	O	N	92h
P	PACKET	N	M	A0h
PI	IDENTIFY PACKET DEVICE	N	M	A1h
P	SERVICE	O	O	A2h
ND	SMART DISABLE OPERATIONS	O	N	B0h
ND	SMART ENABLE/DISABLE AUTOSAVE	O	N	B0h
ND	SMART ENABLE OPERATIONS	O	N	B0h
ND	SMART EXECUTE OFF LINE	O	N	B0h
PI	SMART READ DATA	O	N	B0h
PI	SMART READ LOG SECTOR	O	N	B0h
ND	SMART RETURNS STATUS	O	N	B0h
PO	SMART WRITE LOG SECTOR	O	N	B0h
ND	DEVICE CONFIGURATION FREEZE	O	O	B1h
PI	DEVICE CONFIGURATION IDENTIFY	O	O	B1h
ND	DEVICE CONFIGURATION RESTORE	O	O	B1h
PO	DEVICE CONFIGURATION SET	O	O	B1h
ND	CFA ERASE SECTORS	O	N	C0h
PI	READ MULTIPLE	M	N	C4h
PO	WRITE MULTIPLE	M	N	C5h
ND	SET MULTIPLE MODE	M	N	C6h
DMO	READ DMA QUEUED	O	N	C7h

Table J-1 List of Command (2/2)

Protocol	Command	Devices not implementing the PACKET Command feature set	Devices implementing the PACKET Command feature set	Command code
DM	READ DMA	M	N	C8h
DM	WRITE DMA	M	N	Cah
DMO	WRITE DMA QUEUED	O	N	CCh
PO	CFA WRITE MULTIPLE W/OUT ERASE	O	N	CDh
ND	CHECK MEDIA CARD TYPE	O	N	D1h
ND	GET MEDIA STATUS	O	O	DAh
ND	MEDIA LOCK	O	N	DEh
ND	MEDIA UNLOCK	O	N	DFh
ND	STANDBY IMMEDIATE	M	M	E0h
ND	IDLE IMMEDIATE	M	M	E1h
ND	STANDBY	M	O	E2h
ND	IDLE	M	O	E3h
PI	READ BUFFER	O	N	E4h
ND	CHECK POWER MODE	M	M	E5h
ND	SLEEP	M	M	E6h
ND	FLUSH CACHE	M	O	E7h
PO	WRITE BUFFER	O	N	E8h
ND	FLUSH CACHE EXT	O	N	Eah
PI	IDENTIFY DEVICE	M	N	EC0
ND	MEDIA EJECT	O	N	EDh
ND	SET FEATURES	M	M	Efh
PO	SECURITY SET PASSWORD	O	O	F1h
PO	SECURITY UNLOCK	O	O	F2h
ND	SECURITY ERASE PREPARE	O	O	F3h
PO	SECURITY ERASE UNIT	O	O	F4h
ND	SECURITY FREEZE LOCK	O	O	F5h
PO	SECURITY DISABLE PASSWORD	O	O	F6h
ND	READ NATIVE MAX ADDRESS	O	O	F8h
ND	SET MAX ADDRESS	O	O	F9h

LBA (Logical Block Address): First sector address caused an error.

Sector Count: Number of sectors transmitted from the address indicated by LBA.

STATUS: Status of command. The lowest bit becomes "1", when an error occurs.

Error: Content of error. It indicates that an error occurs when the object bit is "1".

Bit7:ICRC

Indicates that a CRC error occurs on the transmission bus (SATA) between Host and HDD.

Bit6:UNC

Indicates that an uncorrectable (media) error occurs.

Bit2:ABRT

Indicate that the command aborts.

(2) Check if it is caused by an operation miss or is a failure.

To check if the cause of failure of Port1 is an operation miss or not, analyze the Drive Log of Port0.

1. In [REDUNDANT] of Port-0, find a log of "Fail this drive" message by **PgUp** and **PgDn** key.

2. If no message of "Fail this drive" message, it is judged that the second HDD is removed without the operation of removal by TOSHIBA RAID console and installed again.

(3) How to change the status to OFF LINE

Release the status of "Fail", using the menu of [Force OFFLINE]. This HDD is not necessary to be repaired.

J.3 Operation of Independent utility

J.3.1 Outline of Independent utility

This is a utility to display Drive Log of TOSHIBA RAID.

(1)Drive Log

TOSHIBA RAID can store about 7,000 logs of Drive Log.

TOSHIBA RAID make Drive Log redundant and store it. The drive has own log and other drive's log.

In TOSHIBA RAID, the log of own drive is called "Own Log" and the redundant log of other drive's drive is called "Redundant Log". Each port has "Own Log" and "Redundant Log". As shown in the following figure, the Port 0 has "Own Log" of Port0 and "Redundant Log" of Port1. The Port1 has "Own Log" of Port1 and "Redundant Log" of Port0.
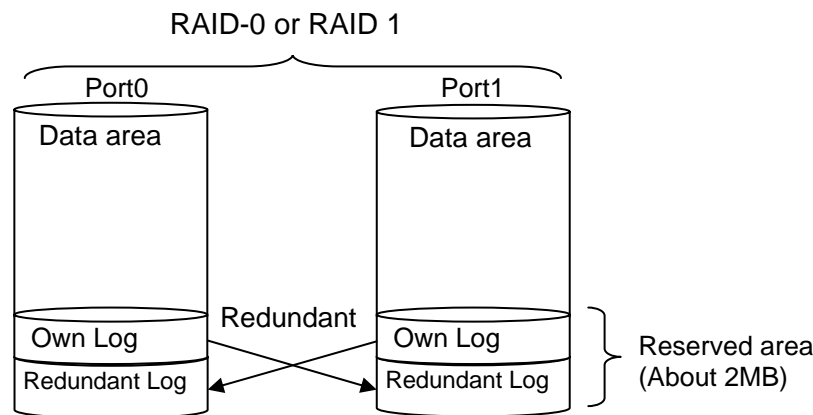

Figure J-3 Drive Log

(2) Information of Drive Log

TOSHIBA RAID writes the log when any change in RAID array or an error occurs. So, seeing the log can trace the history of the array or error information. In TOSHIBA RAID, about 7,000 logs can be stored and the past logs can be referred in detail.

J.3.2 How to operate the Independent Utility

(1) Booting PC

Connected the USB FDD to the PC to be repaired. Insert the FD storing the program of the Independent Utility in the FDD and boot the PC from the FD. The following display appears.

```
►► Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030 ◄◄   F1:Help
┌─Main Menu─────────┐                    ┌────────Logical Drive──────┐
│ Create Array      │                    │              LD0     LD1  │
│ Start Rebuild     │             Status                             │
│ Check Media       │             RAID Level                         │
│ Modify Array      │             # of Drive                         │
│ Delete Array      │             RAID ID                            │
│ Physical Drive    │             Capacity                           │
│ Exit              │             Stripe Size                        │
└───────────────────┘             Write Cache                        │
                                  Degrade Bootup                      │
                                  MBR Protection                      │
                                  S.M.A.R.T.                          │
                                  Last MC                             │

                        ┌─────────────Physical Drive─────────────────┐
          Port Assgn Status    Size Model              Rev    Progress
            0        OFFLINE  120GB ST3120023A          3.30
            1        OFFLINE   40GB ST340016A           3.19

<↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

In the Independent Utility, the cursor is moved by with ↑ key and ↓ key. Press **Enter** key to execute the option selected. Press **Esc** key to return to the previous menu.

Pressing **F1** key displays Help. Press **Esc** key to exit.

(2) Display of Logical/Physical Drive

Logical Drive

The status of RAID array is displayed in Logical Drive by array. The displayed items are follows.

Table J-2 Displayed item in Logical Drive

	Explanation
Status (Status of array)	Displays the status of array. The contents are follows. -OPTIMAL：The array works normally. -DEGRADE：The array is degraded. -CRITICAL：The array is failed. It can not be used.
RAID Level	Displays the RAID level.
# of Drive	Displays the number of physical drives incorporated in the array.
RAID ID	Displays peculiar ID by array.
Capacity	Displays the capacity of array.
Stripe Size	Item that is not set item.
Write Cache	Displays the setting of drive write cache. "Enable" or "Disable" is displayed. The default is "Enable". This option is displayed in RAID-1 (Mirroring).
Degrade Bootup	Displays if boot OS or not when the array is degraded. "Yes" (Boot up) or "No" (Not boot up) is displayed. The default is "Yes". This option is displayed in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable" (Protect) or "Disable" (Not protect) can be selected. The default is "Disable". When OS is installed by SetupInstructor, it is set automatically to "Enable". When OS is installed manually, it is set to "Enable". If necessary, change the setting.
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".
Last MC	Displays the date when checking of media or rebuilding of array executed last. It displays "00/00/00" right after making new array or when the rebuild limit is changed.

Physical Drive

In Physical Drive, the condition of RAID array is displayed by array. The following items are displayed.

Table J-3 Items displayed in Physical Drive

	Explanation
Port	Displays the port number of Serial ATA connected to the drive.
Assign	Displays the array number and drive number of array that the drive is incorporated. The display format is LD [Array number] [Drive number]. For example, [LD0-1] means the disk drive 1 of Array 0.
Status	Displays the drive status. The followings are displayed. -ONLINE: The drive is working normally. -OFFLINE: The drive is not configured as array and is not used. -FAIL: The drive is failed and dose not work. -REBUILDING: The drive is been rebuilding by data of normal drive or the rebuilding is suspended. -UNKNOWN: There is controversy in the RAID information of other drive and the status is not decided. It is displayed when this drive was removed and used in the past. When this drive has been found good one, setting to OFFLINE is possible by executing [Force Offline].
Size	Displays the capacity of drive.
Model	Displays the model number of drive.
Rev	Displays the firmware revision of drive.
Progress	Displays the progress of rebuilding and Check media.

(3) Explanation of Main Menu

The Independent Utility has following Main Menu.

Table J-4   Item of Main Menu displayed

	Explanation
Create Array	Builds RAID array.
Start Rebuild	Rebuilds RAID-1. While the rebuild is suspended, the message of "Resume Rebuild" is displayed.
Check Media	Checks if any error in drives configuring array. This is available for the RAID-1 in the "Optimal" condition.
Modify Array	Changes the setting of array.
Delete Array	Delete array.
Physical Drive	Changes the setting of physical drive.
Exit	Exits from the utility.

CAUTION: *Do not use the following item of the Independent Utility for maintenance.*

     [Create Array]
     This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

     [Start Rebuild (Resume Rebuild)]
     This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

     [Modify Array]
     This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

     [Check Media]
     This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

     [Delete Array]
     This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.
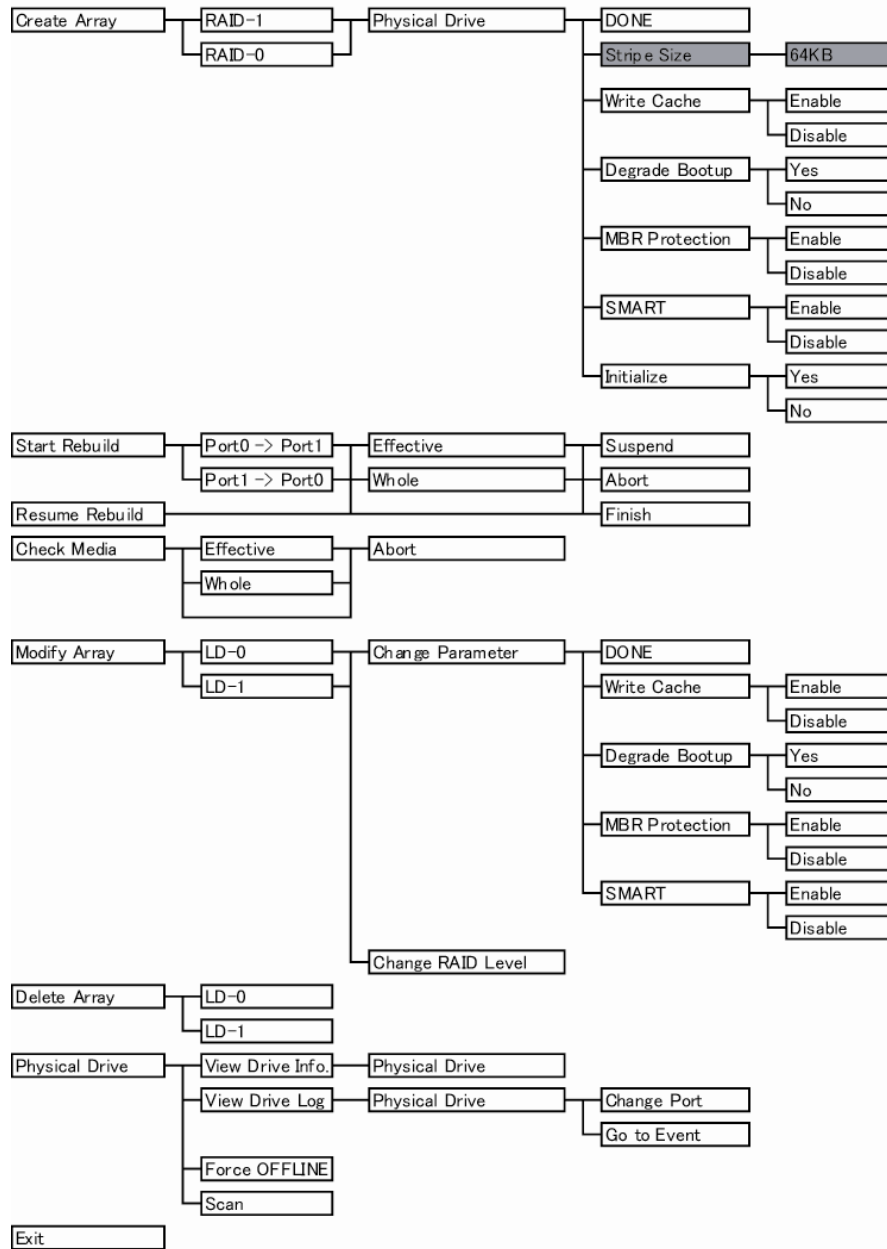
The tree of Independent Menu is as follows.

Figure J-4 Tree of menu of Independent Utility

Create Array

This section explains how to select option and build array. The [Create Array] option can be selected only when there is a drive not assigned. To build array, follow the procedure below.

1. Put the cursor on [Create Array] in [Main Menu] and press **Enter** key.

2. Select RAID level. Put the cursor on [RAID-1] or [RAID-0] and press **Enter** key.

3. Put the cursor on the drive to be incorporated in [Physical Drive] and press **[Space]** key to select a drive. When a drive selected, the status of [Physical Drive] changes to "ON LINE". When selecting plural, repeat the same operation.

4. After selecting a drive, press **Enter** key.

5. The [RAID Parameter] is displayed. The setting of parameter in the following table can be made.
   Put the cursor on the item to be set and press **Enter** key. Put the cursor on the value to be set and press **Enter** key.

Table J-5 Item of parameter set

Option	Explanation
DONE	When this option is selected after completing of setting in [Create Array] menu, building of RAID is decided.
Stripe Size	Designates the size of segment written in each disk of RAID-0 (Striping). The Stripe Size is only 64KB. This parameter can be set only in the RAID-0 configured by two drives.
Write Cache	Displays the setting of Write Cache of drive. This can select "Enable (use)" or "Disable (not use)". The default is "Enable (use)".
Degrade Bootup	Displays if boot up OS or not When the array is degraded. "Yes (boot up)" or "No (not boot up)" is selected. The default is "Yes (boot up)". This option can be selected in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable (protect)" or "Disable (not protect)" is selected. The default is "Disable (not protect)".
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".
Initialize	Initialize the MBR of array. Normally, it is done when the array is made newly. For details, refer to " Initializing array". Initializing sets the rebuild limit to 10GB.

After completing the detailed setting, array is initialized. Put the cursor on "Initialize" and press **Enter** key. Put the cursor on the "Yes" and press **Enter** key. If the array is initialized, date of array is lost. Selecting "No" dose not initialize.

6. Put the cursor on the "DONE" and press **Enter** key. Pressing "OK" in [Confirmation] store the change.

CAUTION: When the array is initialized, the data of drive is lost.
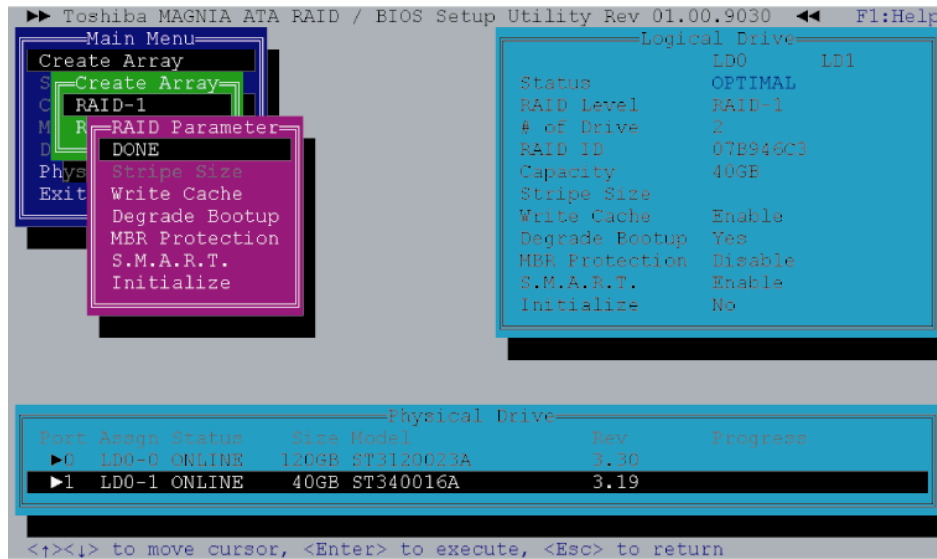
Start Rebuild

Selecting of this option starts rebuilding. [Start Rebuild] is displayed only in the RAID-1 condition of with "OFFLINE" drive that has same or more size of capacity as the array in the condition of "Optimal" or "Degraded".
During halt of rebuilding, [Resume Rebuild] is displayed instead of [Start Rebuild].
The procedure to rebuild drives is as follows.

1. Put the cursor to the [Start Rebuild] in the main menu of Indent Utility and press **Enter** key.

2. Select the direction to rebuild in [Rebuild Direction] menu and press **Enter** key. When the array is "Degraded", the choice is only is one.

3. When [Rebuild Range] menu is displayed, the range to be rebuilt is designated. When [Effective] is selected, rebuild limit becomes valid and it rebuilds up to the rebuild limit. When [Whole] is selected, it rebuilds maximum capacity of array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

4. Put the cursor on "OK" in [Confirmation] and press **Enter** key. The rebuild starts.

CAUTION: *When the rebuild starts, the data of drive rebuilt is lost.*

---
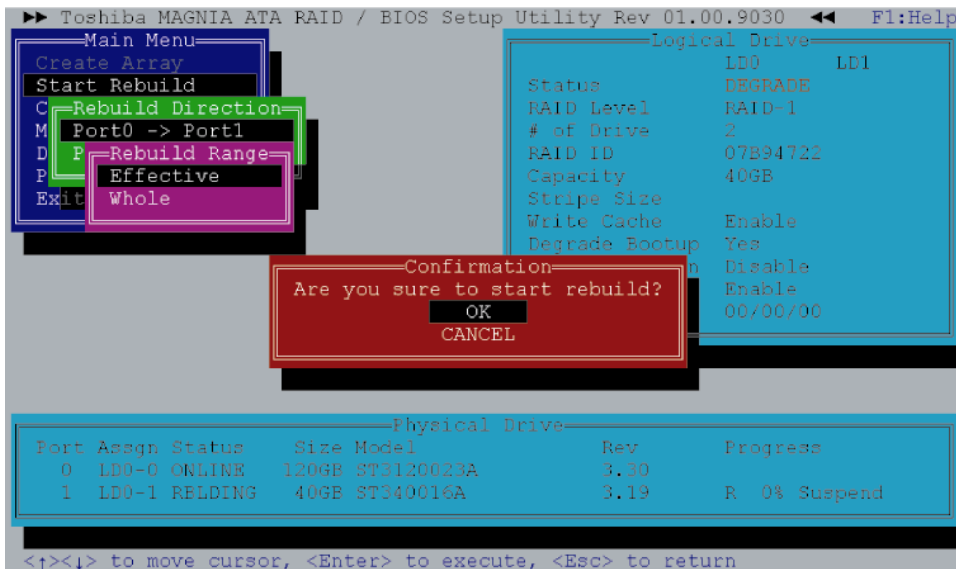
5. During rebuilding, [Status] of [Physical Drive] becomes "Rebuilding" and the progress rate, expected remaining time and the number of errors are displayed. During rebuilding, the [Rebuilding] dialog to select [Suspend] or [Abort] is displayed. It may take time depending on the drive capacity.

6. To suspend the rebuilding, put the cursor on [Suspend] (when aborting, on the [Abort]) and press **Enter** key. When [Confirmation] is displayed, put the cursor on [OK] and press **Enter** key. During being suspended, [Suspend] is displayed in [Progress] of [Physical Drive].

7. When "Rebuild Limit" is set and [Rebuild Range] is set to [Whole], only [Finish] is can be selected after exceeding the Rebuild Limit. When [Finish] is selected and "OK" is selected in [Confirmation], the rebuilding is completed at the time. When OS is booted after exceeding the Rebuild Limit, the rebuild is completed.
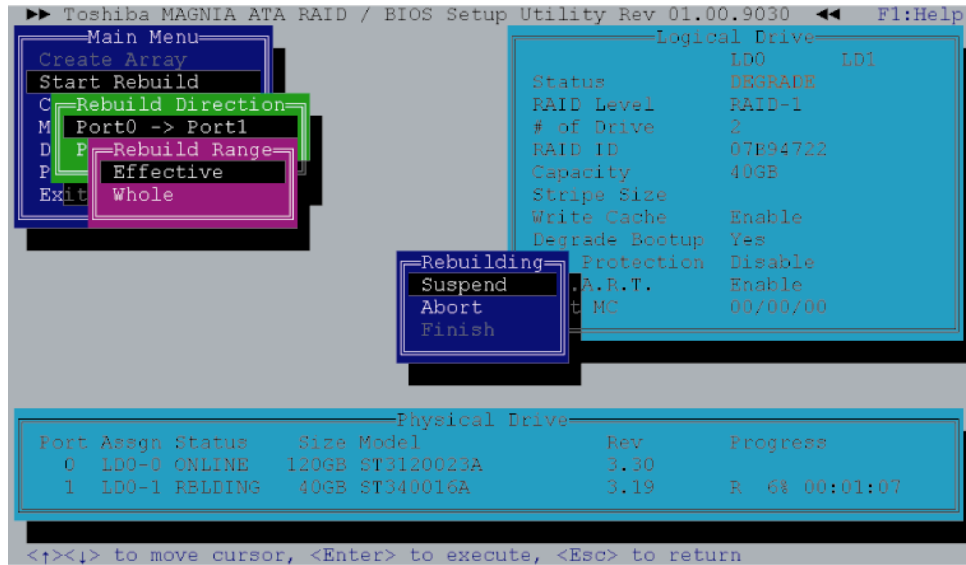
8. When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

Resume Rebuild

During being suspended,[Resume Rebuild] is displayed in [Main Menu]. To start rebuilding suspended, follow the procedure below.

1. Put the cursor to the [Resume Rebuild] in the main menu of Indent Utility and press **Enter** key.

2. When [Rebuild Range] menu is displayed, the range to be rebuilt is designated. When [Effective] is selected, rebuild limit becomes valid and it rebuilds up to the rebuild limit. When [Whole] is selected, it rebuilds maximum capacity of array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

3. Put the cursor on "OK" in [Confirmation] and press **Enter** key. The rebuild starts.

4. During rebuilding, [Status] of [Physical Drive] becomes [REBILDING] and the progress rate, expected remaining time and the number of errors are displayed. During rebuilding, the [Rebuilding] dialog to select [Suspend] or [Abort] is displayed. It may take time depending on the drive capacity.

5. To suspend the rebuilding, put the cursor on [Suspend] (when aborting, on the [Abort]) and press **Enter** key. When [Confirmation] is displayed, put the cursor on [OK] and press **Enter** key.

6. When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

7. When "Rebuild Limit" is set and [Rebuild Range] is set to [Whole], only [Finish] is can be selected after exceeding the Rebuild Limit. When [Finish] is selected and "OK" is selected in [Confirmation], the rebuilding is completed at the time. When OS is booted after exceeding the Rebuild Limit, the rebuild is completed.
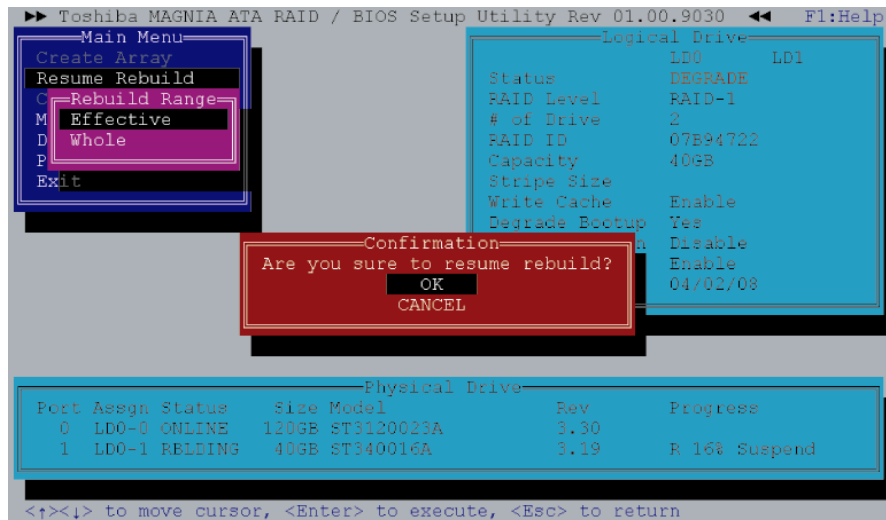

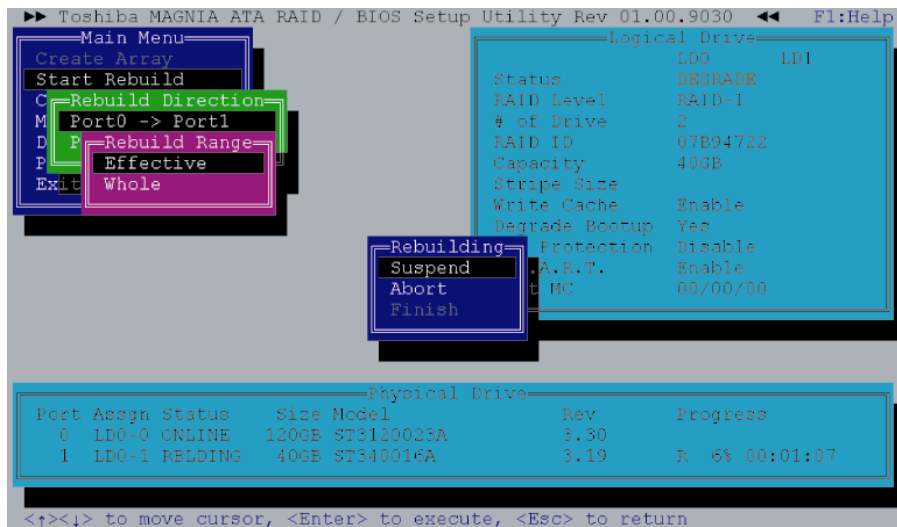When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

Check Media

This option can check if there is an error in the HDD of array. The Check Media can be done only in RAID-1. To execute Check Media, follow the procedure below.

1. Put the cursor to the [Check Media] in [Main Menu] and press **Enter** key.

2. When [Check Range] is displayed, designate the range to be checked. When [Effective] is limited, it makes the rebuild limit effective and execute [Check Media] up to the rebuild limit. When [Whole] is selected, execute [Check Media] up to the maximum capacitor of RAID array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

3. To start the Check Media, put the cursor to the [Confirmation] and press **Enter** key. When an error is detected, it automatically correct.

4. During [Check Media], the progress rate, expected remaining time and the number of errors are displayed in [Progress] of [Physical Drive], [Check Media] may take time depending on the drive capacity.
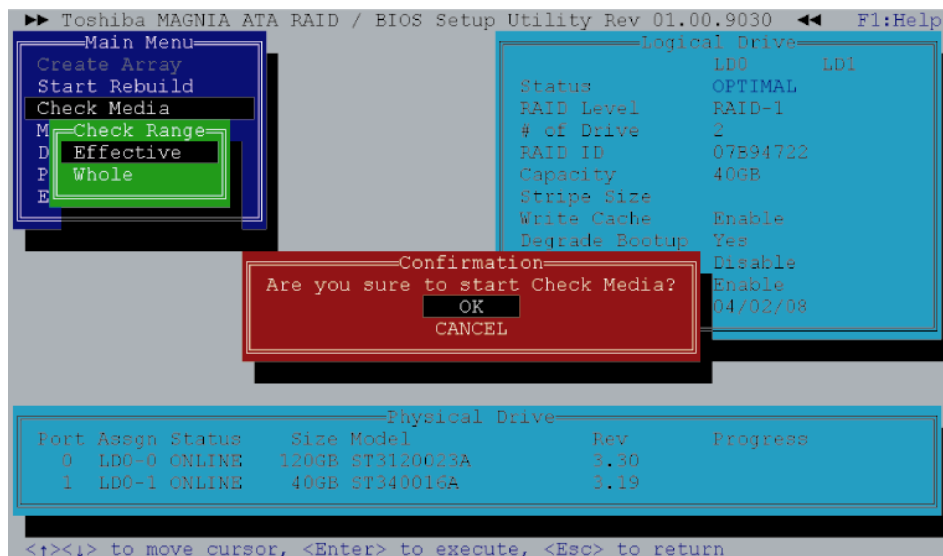
5. When [Check Media] is completed, put the cursor on [OK] and press **Enter** key to return to the menu of Independent Utility.

The date when the [Check Media] was done last is displayed in [Last MC] of [Logical Drive]. [Last MC] is renewed when rebuilding is done. When "Rebuild Limit" is changed or right after building RAID array, the value of [Last MC] becomes [00/00/00].

Modify Array

This option changes the setting of array.
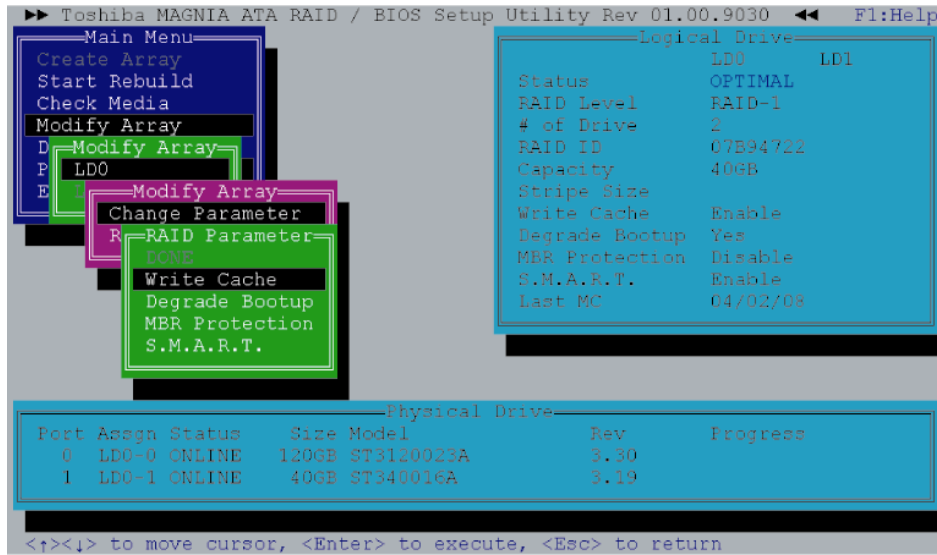
Change Parameter

Select [Change Parameter] in [Modify Array] menu. The following items can be set.

Table J-6 Item of array

Option	Explanation
Write Cache	Displays the setting of drive write cache. "Enable (use)" or "Disable (not use)" is displayed. The default is "Enable (use)".
Degrade Bootup	Displays if boot OS or not when the array is degraded. "Yes" (Boot up) or "No" (Not boot up) is displayed. The default is "Yes". This option is displayed in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable" (Protect) or "Disable" (Not protect) can be selected. The default is "Disable".
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".

Change RAID Level

To change RAID level, select [Modify Array] menu. When changing RAID-1 (Mirroring) to RAID-0 (Striping), refer "Changing RAID-1 to RAID-0". When changing RAID-0 to RAID-1, refer "Changing RAID-0 to RAID-1".

Changing RAID-1 to RAID-0 working by one drive

When changing RAID-1 array working by two drives to RAID-0 working by one drive, follow the procedure below.

1. Select [Modify Array] in [Main Menu].

2. In [Modify Array], select array [LDx] that you want to change.

3. In [Modify Array], select [RAID-1 -> RAID-0].

4. In [Physical Drive] select one drive, which is used as RAID-0, and press **Space** key

5. After selecting a drive, press **Enter** key. When [Confirmation] is displayed, select "OK" to store the setting.

Changing RAID-0 working by one drive to RAID-1

To change RAID-1 working by one drive to RAID-1 working by two drives, follow the procedure below.

1. Select [Modify Array] in [Main Menu].

2. In [Modify Array], select array [LDx] that you want to change.

3. In [Modify Array], select [RAID-0 -> RAID-1].

4. Select a drive in the condition of [OFFLINE] in [Physical Drive], which is expanded as RAID-1 with **Space** key. After selecting drive, [Status] changes to [REBUILDING]. The capacity of drive that is newly added must be same/more as/than original drive. The drive in the condition of [Fail] can not be incorporated.

5. After selecting a drive, press **Enter** key. When [Confirmation] is displayed, select "OK" to store the setting.

6. Select [Resume Rebuild] in [Main Menu], or select [Exit] to exit from Independent Utility. When automatic rebuilding is set in OS, rebuilding starts automatically after booting OS.

7. During rebuilding, the progress is displayed in [Physical Drive]. Suspending or aborting is possible.

8. When the rebuilding is completed, message is displayed, the select "OK".

Delete Array

Selects [Delete Array] of Setup Utility and delete array. Put the cursor on the array you want to delete and press **Enter** key.
When [Confirmation] is displayed, select "OK" to store the setting.
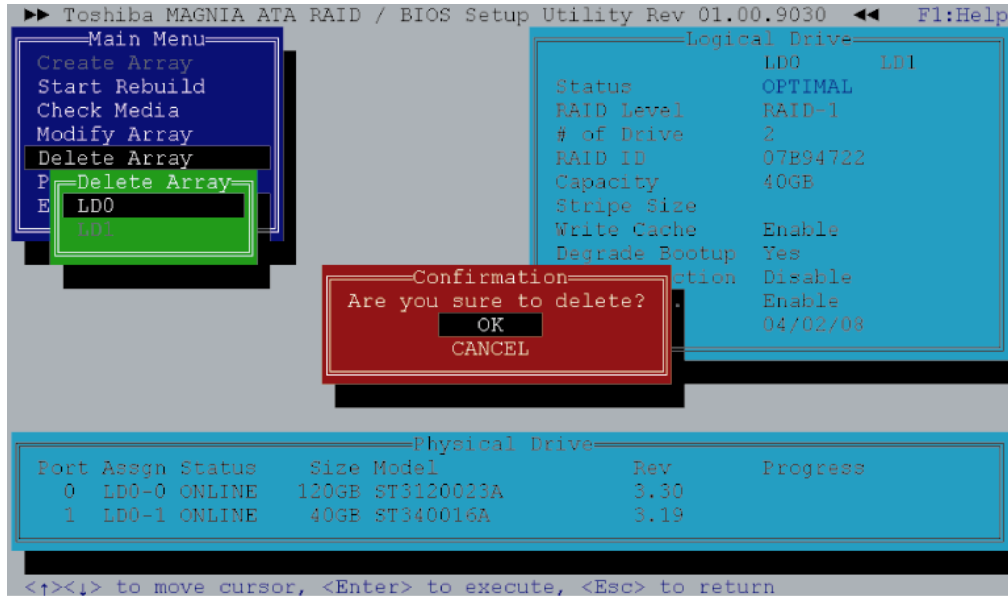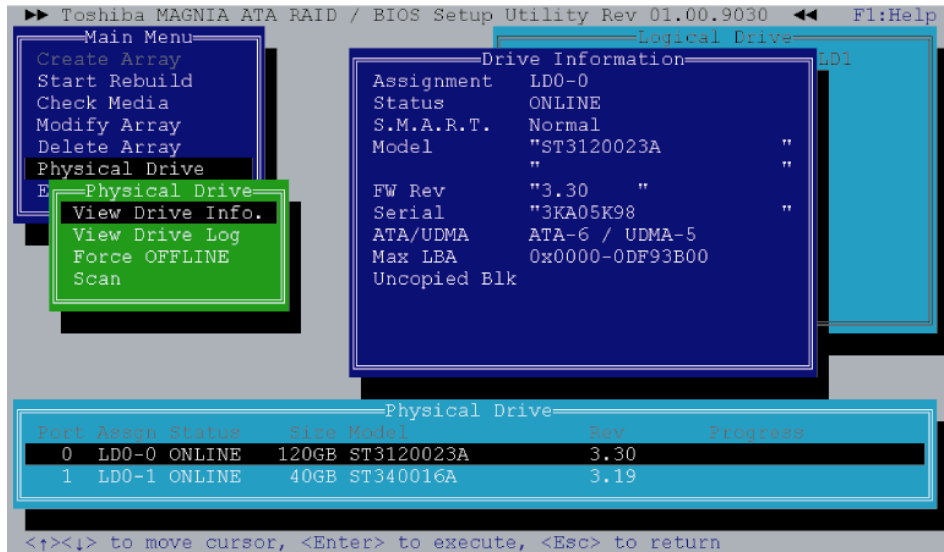
Physical Drive

Select [Physical Drive] in Setup Utility to set physical drive.

View Drive Info.

Select this option in [Physical Drive] to display information of physical drive. Select the drive that you want to display in [Physical Drive] at the lower of display and press **Enter** key. In the server with fault lamp (lamp displaying disk condition), the fault lamp of corresponded drive blinks while [Drive Information] display appears. Press **Esc** key to close the display. The following information is displayed.

Table J-7 Items set in View Drive Info.

Option	Explanation
Assignment	Displays Array number and drive number of array incorporated. The display format is LD [Array number] [Drive number]. For example, [LD0-1] means Disk drive 1 of array 0.
Status	Displays the drive status. The followings are displayed. -ONLINE: The drive is working normally. -OFFLINE : The drive is not configured as array and is not used. -FAIL: The drive is failed and dose not work. -REBUILDING: The rebuilding is suspended. -UNKNOWN: There is controversy in the RAID information of other drive and the status is not decided. It is displayed when this drive was removed and used in the past. When this drive has been found good one, setting to OFFLINE is possible by executing [Force Offline].
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable". When the level reach to worming level, [Alert] is displayed. When [S.M.A.R.T.] is set to [Disable], [Normal] is displayed.
Model	Displays Model number of drive.
FW Rev	Displays the firmware revision of drive.
Serial	Displays the serial number of drive.
ATA/UDMA	Displays ATA standard and transmission mode that the drive corresponds to.
Max LBA	Displays the total number of sectors of drive in hexadecimal mode. (1 sector = 512B)
Uncopied Blk	In rebuilding, display the address of area that can not be used because of error in the original drive. When an error has been displayed in [Uncopied Blk], check if any error in the file system in the Windows scan disk. It is not necessary to check all the sectors. When any error is detected, any file is damaged. It is recommended to back up the data and rebuild RAID and restore.

```
►► Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030  ◄◄   F1:Help
══Main Menu══                              ══════Logical Drive══════
Create Array                    ══Drive Information══            LD1
Start Rebuild           Assignment    LD0-0
Check Media             Status        ONLINE
Modify Array            S.M.A.R.T.    Normal
Delete Array            Model         "ST3120023A         "
Physical Drive                        "                   "
E ══Physical Drive══     FW Rev        "3.30    "
  View Drive Info.      Serial        "3KA05K98           "
  View Drive Log        ATA/UDMA      ATA-6 / UDMA-5
  Force OFFLINE         Max LBA       0x0000-0DF93B00
  Scan                  Uncopied Blk



                        ══════Physical Drive══════
  Port Assgn Status    Size Model            Rev      Progress
   0  LD0-0 ONLINE   120GB ST3120023A        3.30
   1  LD0-1 ONLINE    40GB ST340016A         3.19

<↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

View Drive Log

Select this option in [Physical Drive] menu and select the drive that you want to display the log. At the beginning, the latest log is displayed. The 7,168 logs from the latest is recorded in detail. For the older log, only ID is recorded. The options and functions of key in [View Drive Log] are as follows.

Table J-8 Function of option and key

Option	Explanation
Change Port	Changes log's port displayed and port's own log or redundant log.
Go to Event	Inputting the log number in this number moves to the log of the number.

Key	Function
[PageUp]	Scrolls upward one by one.
[PageDown]	Scrolls downward one by one.
[Home]	Jumps to oldest log in the latest 7,168 logs.
[End]	Jumps to the latest log.
[Ctrl] + [Home]	Jumps to the oldest log that is older than 7,168 logs and the identification ID is recorded.
[Tab]	Switches [OWN] window and [REDUNDANT] window.

```
▶▶ Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030  ◀◀   F1:Help
  ▄▄▄▄Main Menu▄▄▄▄         ▄Port-0 [ OWN ]▄▄▄▄▄▄▄▄▄▄▄▄▄0000000-0000026▄
 ►Create Array              040208192110 2389 0 i Rebuild completed w/o a
  Start Rebuild            ►040208192111 2001 i Rescanned by DOS Utilit
  Check Media              *** End of Log ***
  Modify Array             0000026 00: 65 64 20 62 79 20 44 4F  ed by DO
  Delete Array                     08: 53 20 55 74 69 6C 69 74  S Utilit
  Physical Drive                   10: 79 00 00 00 00 00 00 00  y.......
 E▄Physical Drive▄                 18: 00 00 00 00 00 00 00 00  ........
  View Drive Info.                 20: 00 00 00 00 00 00 00 00  ........
  View Drive Log                   28: 00 00 00 00 30 90 00 01  ....0...
 F▄View Drive Log▄
 S Change Port             ▄Port-0 [ REDUNDANT ]▄▄▄▄▄▄▄▄0000000-0000020▄
  G▄Change Port▄            040208192023 2387 1 i Rebuild resumed
   Port-0                  ►040208192110 2389 1 i Rebuild completed w/o a
  P▄Change Log▄            *** End of Log ***
    Own                    0000020 00: 20 63 6F 6D 70 6C 65 74   complet
    Redundant                      08: 65 64 20 77 2F 6F 20 61  ed w/o a
                                   10: 6E 20 65 72 72 6F 72 00  n error.
  Port Assig Status  Siz            18: 00 00 00 00 00 00 00 00  ........
   0  LD0-0 ONLINE  120G            20: 00 00 00 00 00 00 00 00  ........
   1  LD0-1 ONLINE   40G            28: 00 00 00 00 00 00 00 00  ........

 <↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

Execute the following procedures to see the drive log in the independent utility.

1. Put on the cursor on [Physical Drive] in [Main Menu] and press **Enter** key.

2. Put on the cursor on [View Drive Log] and press **Enter** key.

3. Select drive that you want to display the log in [Physical Drive] at the lower of display with a cursor key and press **Enter** key.

4. The drive log is displayed. Press **PageUp** or **PageDown** key to scroll the drive log upward or downward.

5. To change log displayed, put the cursor on [Change Port] and press **Enter** key.

6. Select Drive log port to be displayed and [Own/Redundant]. For Example, [Own] log means the drive log of Port-0 own, [Redundant] log of Port-0 means the backup copy of the drive log of Port-1.

7. To switch the upper and lower of drive log frame, press **Tab** key. The selected frame is displayed more lightly than the other frame.

8. To move to the drive log wit arbitrary log number, put the cursor on the [Go to Event] and press **Enter** key. Next, input the log number you want to move to and press **Enter** key.

The 7,168 logs from the latest is recorded in detail. For the older than that, only identification ID is recorded.
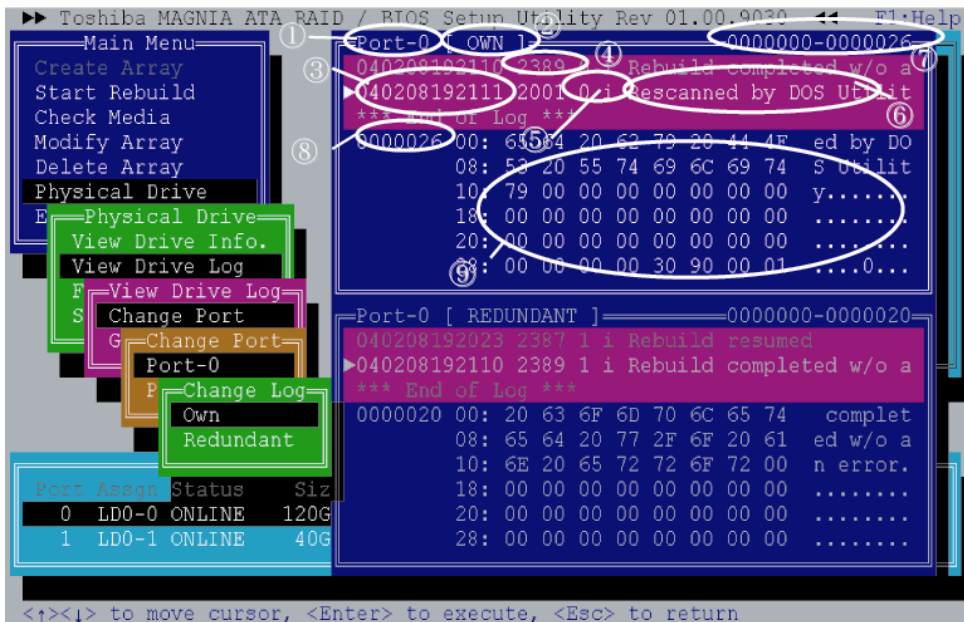
The following is displayed.

Table J-9 Content of Drive Log display

No.	Option	Explanation
1	Port	Displays the port number of log displayed.
2	Own/Redundant	Displays if the displayed log is a log of own port (Own) or a copy of other port log (Redundant).
3	Time	Displays the time when the log is recorded in six digits. The format is [Year Month Day Hour Minute Second].
4	ID	Displays identification ID of log.
5	Port and Degree of importance	The number displays the port that the drive is connected when the log is recorded. The alphabet displays the degree of importance. [j] means information, [W] means warning and [e] means a error.
6	Message	Displays the content of log. When the log is too much and it can not displayed in the area, the remaining is displayed in [Detail] area.
7	Range of log	Displays the range of log number stored. In this case, it means that logs with the number of 0 to 26 are stored.
8	Log number	Displays the log number that is being displayed.
9	Detail	Displays the detailed contents and codes of log. When the number of logs is 7,168 or more, the details of old log is not displayed.

[View Drive Log] menu is as follows

Table J-10 Content of View Drive Log menu

Option	Explanation
Change Port	Changes the display of the own log and redundant log. At the beginning, the Port-0's own log and the redundant log are displayed.
Go to Event	When this option selected, it moves to the log with designated number.

The key function in [View Drive Log] key is as follows.

Table J-11 Function of key in View Drive Log

Key	Function
[PageUp]	Scrolls upward step one by one.
[PageDown]	Scrolls downward step one by one.
[Home]	Jumps to the oldest log in the latest 7,168 logs.
[End]	Jumps to the latest log.
[Ctrl] + [Home]	Jumps to the oldest log that is older than 7,168 logs and the identification ID is recorded.
[Tab]	Switches [OWN] window and [REDUNDANT] window.

Force OFFLINE

Selecting this option in [Physical Drive] menu of Setup Utility can set the physical drive to offline by force. Follow the procedure below.

1. Select [Physical Drive] in [Main Menu].

2. Select [Force OFFLINE] in [Physical Drive].

3. Select the drive that you want to set it to offline with **Space** key in [Physical Drive] and press **Enter** key.

4. Selecting "OK" in [Confirmation] stores the setting.

Scan

When [Scan] in [Physical Drive] menu is selected, it scans physical drive. This is used to recognize the drive after replacing failed drive.

Exit

When this option is selected, the utility is finished. When [Confirmation] is displayed, select "OK".