

Toshiba Personal Computer
QOSMIO F20
Maintenance Manual

TOSHIBA CORPORATION

File Number 960-526

[CONFIDENTIAL]

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Toshiba QOSMIO F20 Maintenance Manual

First edition May 2005

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
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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer QOSMIO F20.

NOTE: *Each model of QOSMIO F20 has a different configuration. For each model's configuration, refer to the parts list dedicated to it.*

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 QOSMIO F20 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

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the computer that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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Chapter 1

Hardware Overview

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1.1 Features

The QOSMIO F20 series are high performance all-in-one PCs running a Pentium-M/Celeron-M processor.

The features are listed below.

? Microprocessor

Microprocessor that is used depends on the model.

Intel® Pentium®-M 1.60/1.73/1.86/2.00/2.13GHz

Intel® Celeron®-M 1.40/1.50GHz

? Chipset

The QOSMIO F20 is equipped with Intel 915GM or 910GML (North Bridge for internal GPU model) (North Bridge for external GPU model is Intel 915PM), Intel ICH6-M (South Bridge) and Texas Instruments PCI7411 (Card Controller).

? Memory

Two DDR2-533 SO-DIMM slots. Memory modules can be installed to provide a maximum of 2GB (2048MB). Memory modules are available in 256MB, 512MB and 1,024MB sizes.

? VGA

VGA is incorporated in Intel 915GM or 910GML (North Bridge). The VRAM is maximum 64MB. For external GPU model, nVIDIA NV43M/44M is mounted as GPU. The VRAM is 64/128MB.

? HDD

Single P-ATA 40GB, 60GB, 80GB or 100GB internal drive. 2.5 inch x 9.5mm height.

? USB FDD

USB 3.5-inch FDD supports 720KB and 1.44MB.

? Display

LCD

Built-in 15.4-inch, WXGA (1,280 x 800 dots), 262,144 colors, amorphous silicon TFT color display. Clear Super View LCD.

External monitor

Supported via a RGB connector.

S-VIDEO output is supported. (Supporting NTSC and PAL)

? VIDEO-IN port

This port can be used as AV input port (for composite video data) and line-in port, which enables connection of a stereo device for audio input.

? TV-tuner

TV-tuner enables to watch or record TV programs on the PC.

According to the government regulation, it is not permitted to bring this PAL/SECAM TV tuner into Korea.

? Remote controller

A remote controller for watching TV is supplied.

? Keyboard

An-easy-to-use 85(US)/86(UK)-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft® Windows® XP. It supports software that uses a 101- or 102-key enhanced keyboard.

? Optical device

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

? Battery

A RTC battery is mounted inside the computer.

A main battery is a detachable lithium ion battery.

? USB (Universal Serial Bus)

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

? PC card slot

PC card slot accepts one Type II (5mm thick) card. The slot is equipped with an ejector. Supports ToPIC-100 (3.3V/CardBus).

? Bridge Media slot

One SD card/Memory stick (PRO)/xDPicture card/Multi media card slot. Data can be read and written by inserting each media to the slot.

? Sound system

This model has an external monaural microphone jack, stereo headphone jack and internal stereo speakers.

? Wireless LAN

A wireless LAN is equipped on the mini PCI slot.

? LAN/Modem

Jacks for LAN (RJ45) and Modem (RJ11) are separately mounted.

? IEEE 1394 port

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

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

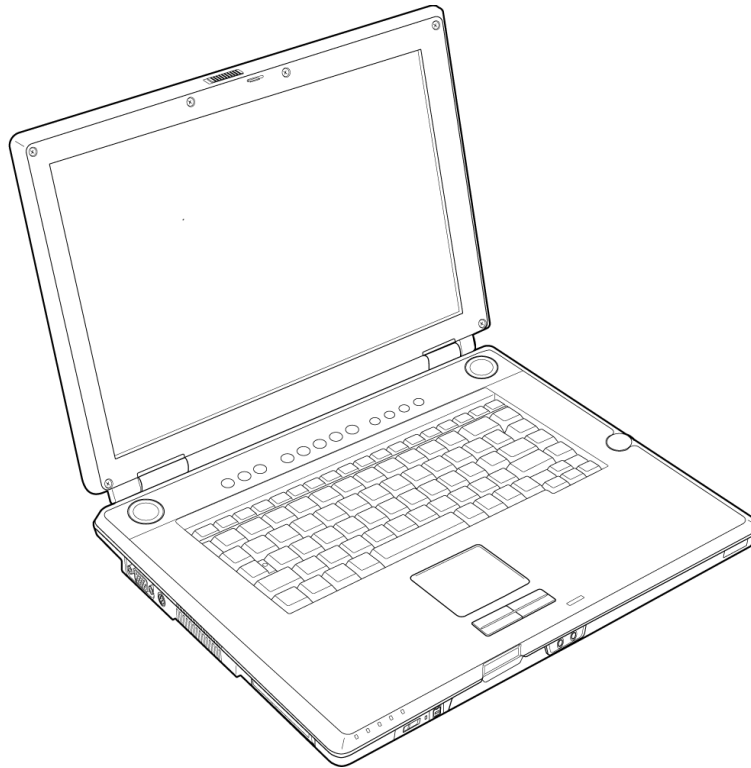
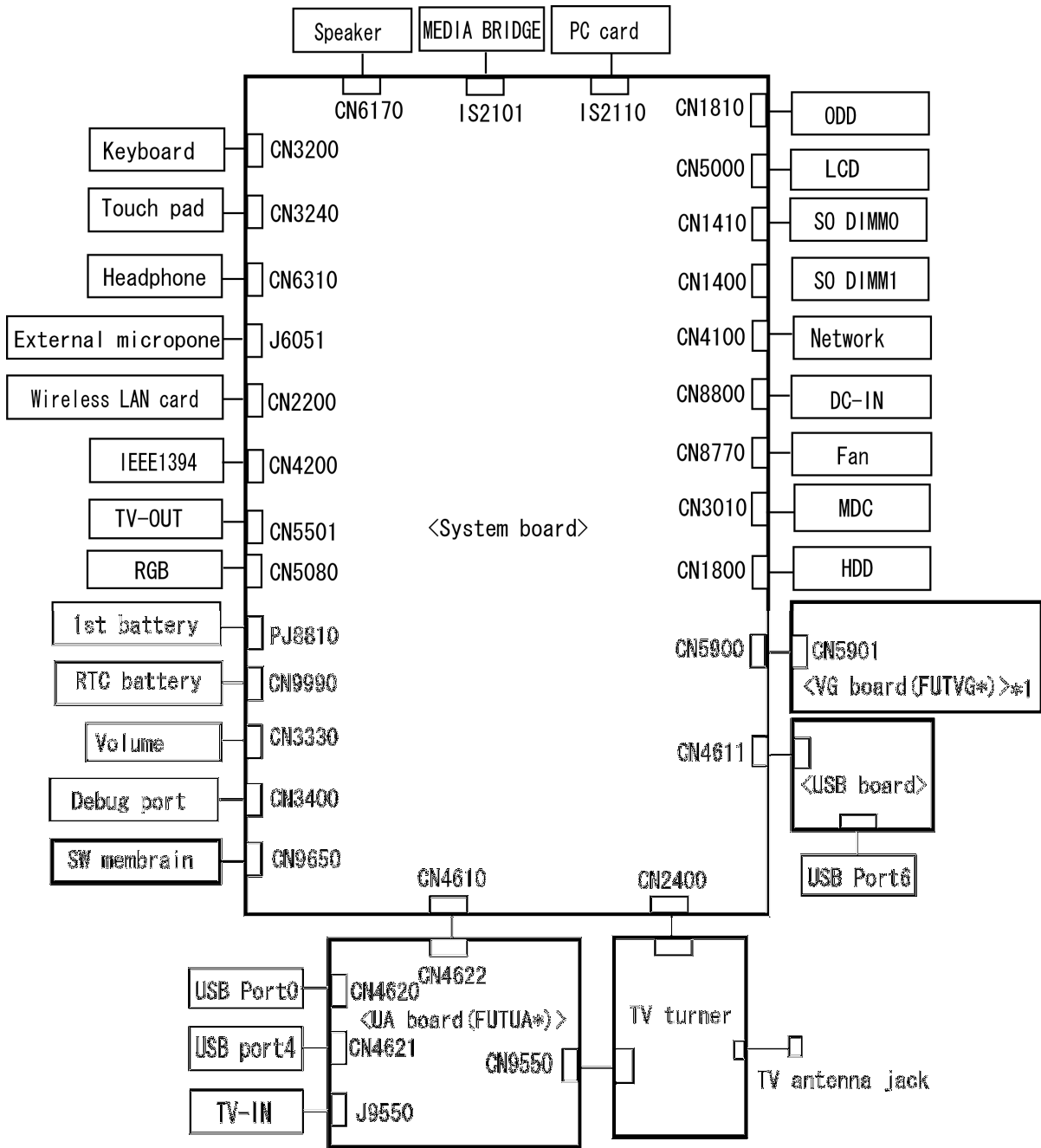


Figure 1-1 Front of the computer



*1: External GPU model only

Figure 1-2 System units configuration

1.2 System Block Diagram

Figure 1-3 shows the system block diagram.

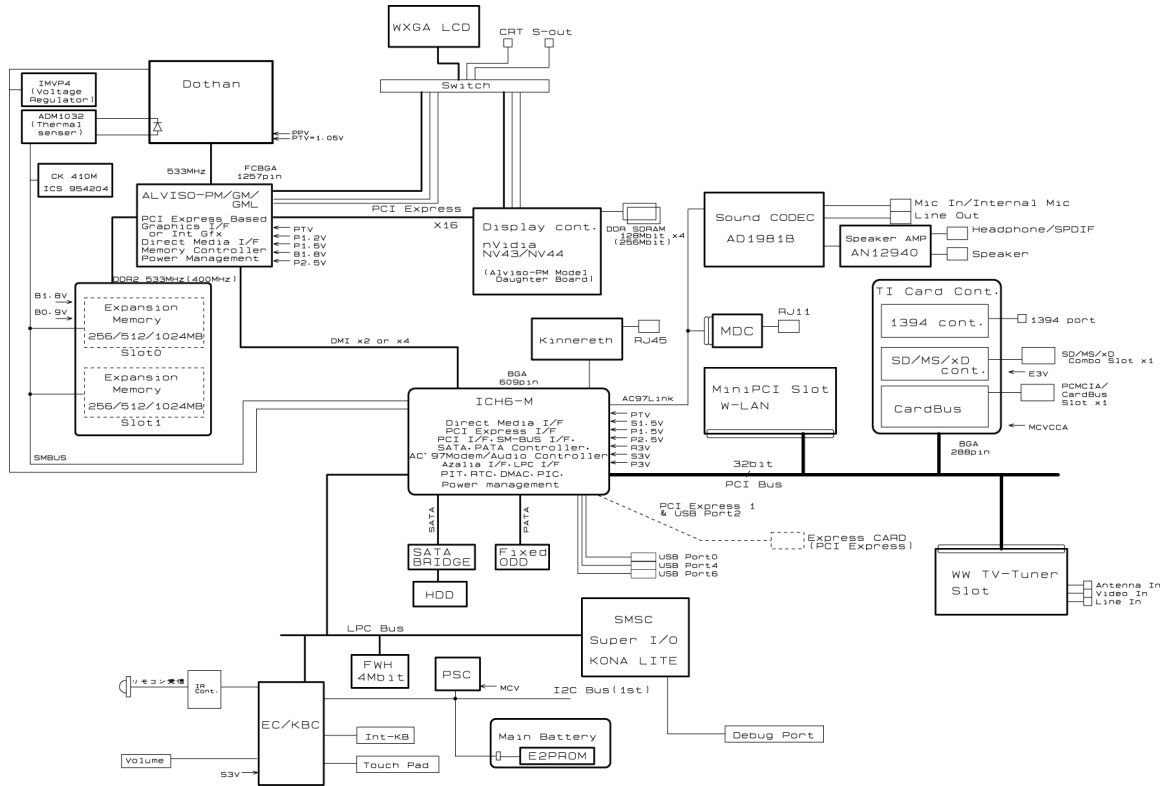


Figure 1-3 System block diagram

The PC contains the following components.

? CPU

Mobile Intel® Pentium®-M

Pentium-M 1.60GHz (Processor Number : 730)
1.73GHz (Processor Number : 740)
1.86GHz (Processor Number : 750)
2.00GHz (Processor Number : 760)
2.13GHz (Processor Number : 770)

L1 cache : 64KB (32KB Code + 32KB Data)

L2 cache : 2MB

Bus : 533MHz

Core voltage : 1.308 to 0.748V

Intel® Celeron®-M

Celeron -M 1.40GHz (Processor Number : 360)
1.50GHz (Processor Number : 370)

L1 cache : 64KB (32KB Code + 32KB Data)

L2 cache : 1MB

Bus : 400MHz

Core voltage : 1.356 to 1.200V

? Memory

Two memory slots are provided. Expansion up to 2GB (2,048MB) is available.

Memory

- ? DDR2-SDRAM
- ? DDR533 memory
- ? 1.8 volt operation
- ? FBGA

Memory Module

- ? 240 pin, SO Dual In-line Memory Module (SO-DIMM)
- ? PC3300 or PC4300
- ? 256MB/512MB/1GB

- ? Firmware Hub (FWH)
 - ? One STMicro M50FW040NB5G is used.
 - ? 4Mbits of flash memory are used.
- ? Chipset

This gate array has the following elements and functions.

- ? North Bridge (Intel 915GM/910GML (GMCH-M)) Internal GPU model
 - ? Intel Pentium-M (915GM)/Intel Celeron-M (915GM/910GML) Processor System Bus support
 - ? System memory interface
 - ? DDR333, DDR2-400 (915GM/910GML) /DDR2-533 (915GM) support 2GB max
 - ? PCI Express Graphic interface
 - ? DMI (Direct Media Interface)
 - ? Integrated Display Interface
 - ? 1,257-ball 37.5mm x 40.0mm FC-BGA Package
- ? North Bridge (Intel 915PM (GMCH-M)) External GPU model
 - ? Intel Pentium-M/Intel Celeron-M Processor System Bus support
 - ? System memory interface
 - ? DDR333, DDR2-400/DDR2-533 support 2GB max
 - ? PCI Express Graphic interface
 - ? DMI (Direct Media Interface)
 - ? 1,257-ball 37.5mm x 40.0mm FC-BGA Package
- ? South Bridge (Intel ICH6)
 - ? DMI (Direct Media Interface)
 - ? PCI Express 2 Interface (4ports)
 - ? PCI Bus Rev2.3 Interface (7 PCI REQ/GNT Pairs)
 - ? Integrated Serial ATA Host Controller (2ports, 150MB/S)
 - ? Integrated IDE Controller (Ultra ATA 100/66/33)
 - ? AC'97 2.3 Codec
 - ? USB 1.1/2.0 Controller 8 Ports (EHCI: Enhanced Host Controller)
 - ? Internal LAN Controller (WfM and IEEE 802.3)
 - ? Power Management Controller (ACPI 2.0)
 - ? SMBus2.0 Controller
 - ? FWH Interface (BIOS)
 - ? LPC Interface (EC/KBC, Super I/O)
 - ? IRQ Controller
 - ? Serial Interrupt Controller

- ? Suspend/Resume Control
- ? Internal RTC
- ? GPIO
- ? 609-ball, 31.0x31.0mm, BGA Package

- ? PC card controller (Texas Instruments-made PCI7411)
 - ? PCI Interface
 - ? CardBus/Ultra media Controller (1 socket)
 - ? SD/MMC, MemoryStick, xD card Controller
 - ? IEEE1394 Controller (2 plots)
 - ? 288-ball (16mmx16mmx1.4mm) BGA Package

- ? Other main system chips
 - ? Super I/O (SMSC-made LPC47N217-JV x1)
 - ? PSC (Toshiba-made TMP87PM48UG x1)
 - ? Clock Generator (ICS-made 954204BGLFTx1)
 - ? EC/KBC (RENESAS-made M306KAFCLRP x1)
 - ? AC97-CODEC (Analog Devices-made AD1981BJSTZ x1)
 - ? Audio AMP (Matsushita-made AN12941A-VF x1)

? Mini PCI card slot

Two mini PCI card slots are equipped. A wireless LAN module and a TV tuner module are installed on each slot.

- ? Wireless LAN module (Intel-made Calnexco 802.11b/g or 802.11a/b/g, or Askey-made Atheros 802.11b/g x 1)

2.4GHz DSSS wireless LAN card is equipped in the mini PCI card slot. Conformity with IEEE 802.11b/g or IEEE 802.11a/b/g. Transfer speed is maximum of 11Mbit/sec. Supports 128bit WEP.

- ? TV tuner module (Toshiba-made MCPJ11 x 1)

It is a capture module with built-in TV tuner function supporting worldwide broadcasting. It has also MPEG2 hardware encoding function. It encodes TV broadcasting signal and composite video, s-video and stereo audio signal to MPEG2 format in real time.

? LAN (Kinnereth x 1)

Controls LAN.

Supports 100Base-TX and 10Base-T.

- ? MODEM (Askey-made 1456VQL4A or Foxconn-made MRT60MB893.01 x 1)

Supported by MDC.

Uses secondary AC97 line.

Data and FAX transmission is available.

Supports ITU-TV.90.

The transfer speed of data receiving is 56kbps, of data sending is 33.6kbps and of FAX is 14.4kbps. Actual speed depends on the quality of the line used.

Connected to telephone line through RJ11 Modem jack.

1.3 2.5-inch Hard Disk Drive

A compact, high-capacity 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 and 1-2 list the dimensions and specifications.

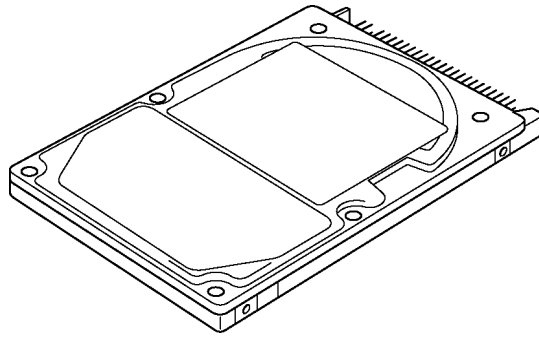


Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions (1/2)

Parameter		Standard value			
		TOSHIBA HDD2190BZK01	TOSHIBA HDD2189BZK01	TOSHIBA HDD2188BZK01	TOSHIBA HDD2A02BZK01
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100			
	Weight (g)	95		99 (MAX)	

Parameter		Standard value			
		TOSHIBA HDD2193VZK01	TOSHIBA HDD2194VZK01	TOSHIBA HDD2191VZK01	TOSHIBA HDD2D08BZK01
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100			
	Weight (g)	98 (MAX)	102 (MAX)	95	102 (MAX)

Table 1-1 2.5-inch HDD dimensions (2/2)

Parameter		Standard value		
		HITACHI-GST G8BC0001E411	HITACHI-GST G8BC0001N611	HITACHI-GST G8BC0001N811
Outline dimensions	Width (mm)	69.85±0.25		
	Height (mm)	9.5±0.2		
	Depth (mm)	100.2±0.25		
	Weight (g)	95 (MAX)	102	

Parameter		Standard value			
		HITACHI-GST G8BC0001N410	HITACHI-GST G8BC0001N610	HITACHI-GST G8BC0001N810	HITACHI-GST G8BC0001NA10
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	95	102		

Parameter		Standard value			
		FUJITSU G8BC0001X410	FUJITSU G8BC0001X610	FUJITSU G8BC0001X810	FUJITSU G8BC0001XA10
Outline dimensions	Width (mm)	70			
	Height (mm)	9.5			
	Depth (mm)	100.0			
	Weight (g)	96 (MAX)	100 (MAX)		

Parameter		Standard value			
		SEAGATE G8BC00021410	SEAGATE G8BC00021610	SEAGATE G8BC00021810	SEAGATE G8BC00021A10
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	98			

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

Parameter	Specification			
	TOSHIBA HDD2190BZK01	TOSHIBA HDD2189BZK01	TOSHIBA HDD2188BZK01	TOSHIBA HDD2A02BZK01
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	4,200			
Data transfer speed (Mbits/s)	175.0-341.7			170-373
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density (Kbpi)	735			759
Track density (Ktpi)	88.1			110 to 120
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	12			
Motor startup time (ms)	4			

Parameter	Specification			
	TOSHIBA HDD2193VZK01	TOSHIBA HDD2194VZK01	TOSHIBA HDD2191VZK01	TOSHIBA HDD2D08BZK01
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	5,400			
Data transfer speed (Mbits/s)	233-446	258-394	154.3-298.0	230.6-445.9
Interface transfer rate (MB/s)	100 (Ultra DMA mode)			
Storage density (Kbpi)	728	652	759	756
Track density (Ktpi)	88.8		110-120	110
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	12			
Motor startup time (ms)	4			

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

Parameter	Specification		
	HITACHI-GST G8BC0001E411	HITACHI-GST G8BC0001N611	HITACHI-GST G8BC0001N811
Storage size (formatted)	40GB	60GB	80GB
Speed (RPM)	4,200		
Data transfer speed (Mb/s)	372	493	
Interface transfer rate (MB/s)	100 (Ultra DMA mode)		
Storage density (Kbpi)	702	717	
Track density (Ktpi)	96	96.6	
Average random seek time (read) (ms)	12		
Average random seek time (write) (ms)	14		
Motor startup time (ms)	3.0	3.5	

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

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

Parameter	Specification			
	FUJITSU G8BC0001X410	FUJITSU G8BC0001X610	FUJITSU G8BC0001X810	FUJITSU G8BC0001XA10
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	4,200			
Data transfer speed (Mbits/s)	330.4			
Interface transfer rate (MB/s)	100 (Ultra DMA mode5)			
Storage density (Kbpi)	-			
Track density (Ktpi)	-			
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	-			
Motor startup time (ms)	3.5 (typ.)			

Parameter	Specification			
	SEAGATE G8BC00021410	SEAGATE G8BC00021610	SEAGATE G8BC00021810	SEAGATE G8BC00021A10
Storage size (formatted)	40GB	60GB	80GB	100GB
Speed (RPM)	5,400			
Data transfer speed (Mbits/s)	386			
Interface transfer rate (MB/s)	100			
Storage density (Kbpi)	703			
Track density (Ktpi)	115			
Average random seek time (read) (ms)	12.5			
Average random seek time (write) (ms)	14.5			
Motor startup time (ms)	3.5			

1.4 Optical Drive

This model equipped with the DVD-ROM & CD-R/RW drive or DVD super multi drive double layer as the optical drive.

1.4.1 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) CDs, CD-R/RW and DVDs. It is a high-performance drive that writes CD-R at maximum 24-speed and CD-RW at maximum 24-speed and reads DVD-ROM at maximum 8-speed and CD-ROM at maximum 24-speed.

The DVD-ROM & CD-R/RW drive is shown in Figure 1-5. The dimensions and specifications of the DVD-ROM & CD-R/RW are described in Table 1-3 and Table 1-4.

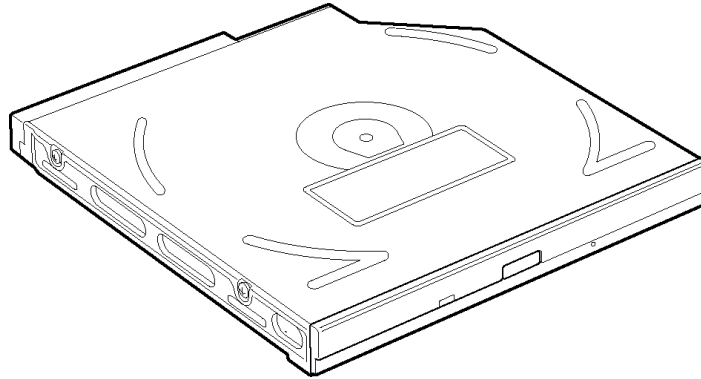


Figure 1-5 DVD-ROM & CD-R/RW drive

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

Parameter		Standard value		
Outline dimensions	Maker	MATSUSHITA (G8CC0002J520)	TEAC (G8CC0002K520)	TSST (G8CC0002L520)
	Width (mm)	128		
	Height (mm)	12.7 (excluding projections)		
	Depth (mm)	129	129.4	127.0
	Mass (g)	180?10	190	180

Table 1-4 DVD-ROM & CD-R/RW drive specifications (1/3)

Parameter		Standard value
		MATSUSHITA (G8CC0002J520)
Data transfer speed	Read	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write	CD-R 24X CAV CD-RW 4X CLV High Speed CD-RW MAX 10X CLV Ultra Speed CD-RW MAX 24X CAV
	ATAPI interface	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi word MODE2 supported) Ultra DMA mode 33.3 MB/s (Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	130 Typ.
	DVD-ROM	180 Typ.
Buffer memory		2MB
Supported disk format	CD	CD/CD-ROM (12cm, 8cm), CD-R, CD-RW, CD-DA, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-ROM, DVD-R, DVD-RW (Ver1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

Table 1-4 DVD-ROM & CD-R/RW drive specifications (2/3)

Parameter		Standard value
		TEAC (G8CC0002K520)
Data transfer speed	Read	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV CD-RW 24X CAV DVD-R/DVD-RW 8x CAV DVD+R/DVD+RW 8x CAV DVD-RAM 5x CAV (4.7GB)
	Write	CD-R 24x (CLV) MAX. CD-RW 4X (CLV) High Speed CD-RW 10X (CLV) MAX. Ultra speed CD-RW 24X (CLV)
	ATAPI interface	PIO mode 16.7 MB/s (PIO MODE0 to 4 supported) DMA mode 16.7 MB/s (Multi word MODE0 to 2 supported) Ultra DMA mode 33.3 MB/s
Access time (ms)	CD-ROM	90 (Random)
	DVD-ROM	110 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM Mode 1, CD-ROM XA Mode 2 (Form 1 and Form 2), Multi-session Photo CD, CD-I, Video CD, Enhanced CD, CD-TEXT
	DVD	DVD-ROM, DVD-R (General, Authoring), DVD-Video, DVD-RW, DVD-RAM (4.7GB/2.6GB), DVD+R/RW (Single/Multi-session, Packet)

Table 1-4 DVD-ROM & CD-R/RW drive specifications (3/3)

Parameter		Standard value
		TSST (G8CC0002L520)
Data transfer speed	Read	DVD-ROM Max. 8X CAV CD-ROM Max. 24X CAV CD-RW Max. 24X CAV DVD-RAM 4x CAV
	Write	CD-R 24x P-CAV CD-RW 4X CLV High Speed CD-RW 10X CLV Max. Ultra speed CD-RW 24X P-CAV
	ATAPI interface	PIO mode 16.7 MB/s (PIO MODE4 supported) DMA mode 16.7 MB/s (Multi word MODE2 supported) Ultra DMA mode 33.3 MB/s (Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	160 Max. (Random)
	DVD-ROM	190 Max. (Dual) (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM (Mode1 & 2), CD-ROM XA (Mode2 Form1 & 2), CD-I/FMV (Mode2 Form1 & 2, Ready, Bridge), CD-Extra/CD-Plus, Video CD
	DVD	DVD-ROM, DVD-Video, DVD-R (3.9G), DVD-R (4.4G (General, Authoring)), DVD+R (Version 1.0), DVD±RW, DVD-RAM

1.4.2 DVD super multi drive (double layer)

The DVD Super Multi drive supporting DVD+R Double layer accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD, CD-R/RW and DVD. It is a high-performance drive that reads DVD-ROM at maximum 8-speed and CD at maximum 24-speed (3,600 KB per second). Also, it writes CD-R at up to 24-speed, CD-RW at up to 16-speed, DVD-R and DVD+R at maximum 8-speed, DVD-RW and DVD+RW at maximum 4-speed, DVD-RAM at maximum 5-speed and DVD+R (double layer) at maximum 2.4-speed.

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 1-5, Table 1-6.

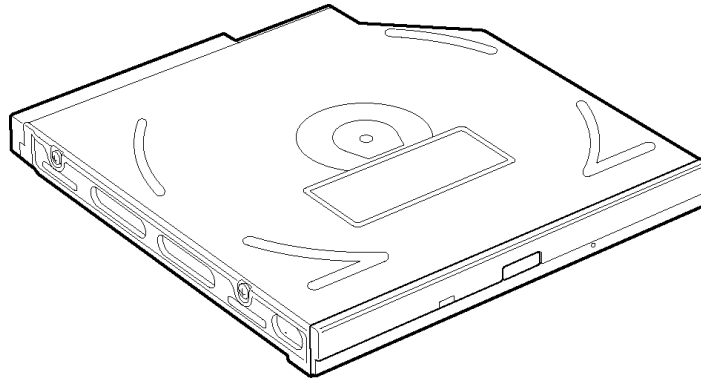


Figure 1-6 DVD Super Multi drive (double layer)

Table 1-5 DVD Super Multi drive (double layer) outline dimensions

Parameter		Standard value		
Outline dimensions	Maker	MATSUSHITA (G8CC0002F520)	TEAC (G8CC0002G520)	TSST (G8CC0002H520)
	Width (mm)	128		
	Height (mm)	12.7 (excluding projections)		
	Depth (mm)	129.0	129.4	126.1
	Mass (g)	190 ? 10	190	195(Typ.)

Table 1-6 DVD Super Multi drive (double layer) specifications (1/3)

Parameter		Drive Specification
		MATSUSHITA (G8CC0002F520)
Data transfer speed	Read	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write	CD-R MAX 24x ZCLV CD-RW 4X CLV High Speed CD-RW MAX 10X CLV Ultra Speed CD-RW MAX 10X CLV DVD-R MAX 8x ZCLV DVD-RW MAX 4x ZCLV DVD+R MAX 8x ZCLV DVD+R DL MAX 2.4x CLV DVD+RW MAX 4x ZCLV DVD-RAM 3-5x MAX ZCLV (4.7GB)
	ATAPI interface	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-ROM, DVD-R, DVD-RW (Ver1.1), DVD Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

Table 1-6 DVD Super Multi drive (double layer) specifications (2/3)

Parameter		Drive Specification
		TEAC (G8CC0002G520)
Data transfer speed	Read	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write	CD-R MAX 24X ZCLV CD-RW MAX 16X CLV DVD-R MAX 8X ZCLV DVD-RW MAX 4X ZCLV DVD+R MAX 8X ZCLV DVD+R DL 2.4x CLV DVD+RW MAX 4X ZCLV DVD-RAM 3X ZCLV
	ATAPI interface	PIO mode 16.6 MB/s (PIO MODE0 to 4 supported) DMA mode 16.6 MB/s (Multi-ward MODE0 to 2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE0 to 2 supported)
Access time (ms)	CD-ROM	130 (Random)
	DVD-ROM	130 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM Mode 1, CD-ROM XA Mode 2 (Form 1, Form 2), Multi-session Photo CD, CD-I, Video CD, Enhanced CD, CD-TEXT
	DVD	DVD-ROM, DVD-R (General, Authoring), DVD-Video, DVD-RW, DVD-RAM (4.7GB, 2.6GB/Read only), DVD+R, DVD+R (Double layer), DVD+RW

Table 1-6 DVD Super Multi drive (double layer) specifications (3/3)

Parameter		Drive Specification
		TSST (G8CC0002H520)
Data transfer speed	Read	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write	CD-R MAX 24X CAV CD-RW 4X CLV HSRW 10X CLV USRW 10X CLV DVD-R MAX 8X CAV DVD-RW MAX 4X PCAV DVD+R MAX 8X CAV DVD+RW MAX 4X PCAV DVD-RAM 2-3-5X ZCLV DVD+R DL 2.4X CLV
	ATAPI interface	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-ward MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	160 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multi-session CD (Photo-CD,CD-EXTRA, CD-R, CD-RW, Portfolio)
	DVD	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (Ver.1.0 for Authoring, Ver.2.0 & Ver.2.1 for General), DVD-RW (Ver.1.1 & Ver.1.2), DVD+R Part 1 Single Layer (4.7 GB Basic Format Spec.Ver.1.3), DVD+R Part 2 Double Layer (8.5 GB Basic Format Spec.Ver.1.0), DVD+RW (Ver.1.2), DVD-RAM (Ver.2.1 & Ver.2.2), Optional Spec. 5X-Speed DVD-RAM Rev.2.0

1.5 Keyboard

A keyboard which consists of 85(US)/86(UK) keys is mounted on the system unit. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-7 is a view of the keyboard.



Figure 1-7 Keyboard

See Appendix E for details of the keyboard layout.

1.6 TFT Color Display

The TFT color display is 15.4 inch and consists of LCD module and FL inverter boards.

1.6.1 LCD Module

The LCD module used for the TFT color display uses one backlight or two backlights as the light source and can display a maximum of 262,144 colors with 1,280 x 800 resolution.

Figure 1-8 shows a view of the LCD module and Table 1-7 lists the specifications.

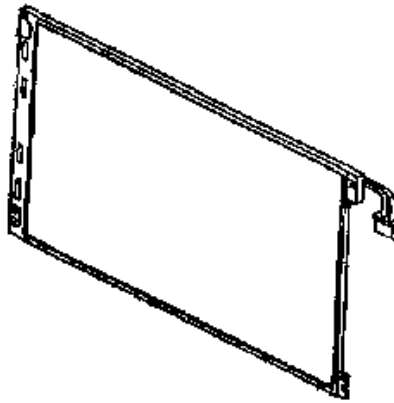


Figure 1-8 LCD module

Table 1-7 LCD module specifications

Item	Specifications (Two lamps)	
	Samsung (G33C0002A110)	
Number of Dots	1,280(W) x 800(H)	
Dot spacing (mm)	0.25875(H) x 0.25875(V)	
Display range (mm)	331.2(H) x 207.0(V)	

Item	Specifications (One lamp)	
	Samsung (G33C0002S110)	Chimei (G33C0002T110)
Number of Dots	1,280(W) x 800(H)	
Dot spacing (mm)	0.2588(H) x 0.2588(V)	
Display range (mm)	331.2(H) x 207.0(V)	

1.6.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.

Table 1-8 lists the FL inverter board specifications.

Table 1-8 FL inverter board specifications

Item		Specifications		
		G71C00011110 (One lamp)	G71C00011221 (One lamp)	G71C0004F410 (Two lamps)
Input	Voltage (V)	5 (DC)		
	Power (W)	7		18
Output	Voltage (V)	750 (rms)		900 (rms)
	Current (f=70KHz)(mA)	6 (rms)		7 (rms) (x 2 output)

1.7 Power Supply

The power supply supplies twenty-five different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges if 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 1-9 lists the power supply output rating.

Table 1-9 Power supply output rating (1/2)

Name	Voltage [V]	Power supplied (Yes/No)			Use
		Power OFF Suspend mode	Power OFF Boot mode	No Battery	
PPV	1.308-0.748	No	No	No	CPU
PTV	1.05	No	No	No	CPU, MCH/GMCH, ICH6-M
1R5-P1V	1.5	No	No	No	CPU, MCH/GMCH, ICH6-M, WW Tuner, (ExpressCard)
1R8-B1V	1.8	Yes	No	No	MCH/GMCH, DDR2-SDRAM
2R5-P2V	2.5	No	No	No	MCH/GMCH, ICH6-M
MR0R9-B0V	0.9	Yes	No	No	MCH/GMCH, DDR2-SDRAM
0R9-P0V	0.9	No	No	No	DDR2-SDRAM
ICH1R5-S1V	1.5	Yes	Yes	No	ICH6-M
ICH-S3V	3.3	Yes	Yes	No	ICH6-M
ICH-S5V	5	Yes	Yes	No	ICH6-M
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, SDRAM (SPD), ICH6-M, PCI7411, Mini-PCI, WW Tuner, FWH, AD1981B, Super I/O, GPU, (ExpressCard)
E3V	3.3	Yes	Yes/No	No	PCI7411, PC Card Power, IEEE1394, Mini-PCI, MDC, ICH6-M, (ExpressCard)

Table 1-9 Power supply output rating (2/2)

Name	Voltage [V]	Power supplied (Yes/No)			Use
		Power OFF Suspend mode	Power OFF Boot mode	No Battery	
FM-E3V	3.3	No	No	No	Media Bridge
S3V	3.3	Yes	Yes	No	ICH6-M, EC/KBC
P5V	5	No	No	No	CRT, ICH6-M, FL inverter, HDD, ODD, KB, PAD, Mini PCI
TUNER-P5V	5	No	No	No	WW Tuner
SND-P5V	5	No	No	No	AMP (AN12941)
A4R7-P4V	4.7	No	No	No	AD1981B, Amp(AN12941), Mic Amp, Line In, Line Out
E5V	5	Yes	Yes/No	No	PC-Card Power, USB Power
USB0PS-E5V	5	Yes	Yes/No	No	USB
USB1PS-E5V	5	Yes	Yes/No	No	USB
M5V	5	Yes	Yes	No	Temperature reset IC, LEDs
MCV	5	Yes	Yes	No	PSC
R3V	2.0 - 3.5	Yes	Yes	Yes	ICH6-M (RTC)
1R2-P1V	1.2	No	No	No	GPU
VG1R8-P1V	1.8	No	No	No	GPU
PGV	1.2	No	No	No	GPU

1.8 Batteries

The PC has the following two batteries.

- ? Main battery
- ? Real time clock (RTC) battery

Table 1-10 lists the specifications for these two batteries.

Table 1-10 Battery specifications

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0005H210	Lithium ion	10.8V	4,400 mAh
	G71C0005H110			
	G71C0003W210 (Option)			8,800 mAh
	G71C0003W110 (Option)			
Real time clock (RTC) battery	P71035009115	Nickel hydrogen	2.4V	15 mAh

1.8.1 Main Battery

The main battery is the primary power supply for the computer when the AC adapter is not connected. In Stand by mode, the main battery maintains the current status of the computer.

1.8.2 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 adaptor and battery are connected to the computer.

? 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. (See Table 1-11)

Table 1-11 Time required for charges of main battery

Condition		Charging Time
Normal charge	4,400mAh	About 4.0 to 11.5 hours or longer
	8,800mAh	About 9.0 to 21.5 hours or longer
Quick charge	4,400mAh	About 3.0 hours
	8,800mAh	About 4.5 hours

Charge is stopped in the following cases.

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

? Data preservation time

When turning off the power in being charged fully, the preservation time is as follows: (See Table 1-12)

Table 1-12 Data preservation time

Condition		preservation time
Standby	4,400mAh	About 4 days
	8,800mAh	About 9 days
Shutdown, Hibernation	4,400mAh	About 30 days
	8,800mAh	About 65 days

1.8.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory.

Table 1-13 lists the Time required for charges of RTC battery and data preservation time.

Table 1-13 Time required for charges of RTC battery

Condition	Time
Power ON (Lights Power LED)	More than 8 hours
Data preservation time (Full-charged)	About a month

1.9 AC Adapter

The AC adapter is used to charge the battery.

Table 1-14 lists the AC adapter specifications.

Table 1-14 AC adapter specifications

Parameter	Specification		
	G71C00043210	G71C00049210	G71C00024410
Power	75W (Peak 90W)		90W (Peak 105W)
Input voltage	AC 100 to 240V		
Input frequency	47Hz/63Hz		50Hz/60Hz
Input current	1.5A or less (100V) 1.125A or less (240V)		1.3A or less
Output voltage	DC 15V		
Output current	0A~ 5A (At constant voltage mode) 5A~ 6A (At surge load mode)		6.0A

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

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

The FRUs covered are:

- | | | |
|-----------------|------------------|------------------|
| 1. Power supply | 6. Touch pad | 11. Wireless LAN |
| 2. System Board | 7. Display | 12. Sound |
| 3. 3.5” USB FDD | 8. Optical Drive | 13. TV Tuner |
| 4. 2.5” HDD | 9. Modem | |
| 5. Keyboard | 10. LAN | |

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

NOTE: After replacing with a new system board, write the computer information to the new system board according to the section 3.3 “Setting of the hardware configuration”.

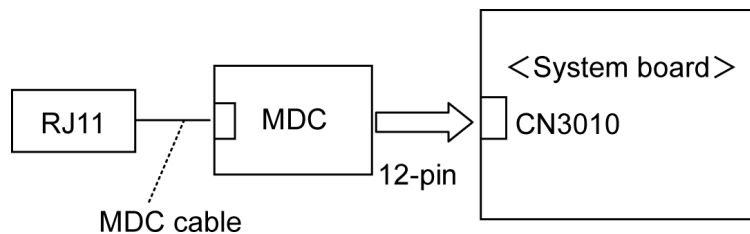
The following tools are necessary in addition to tools described in Chapter 3 for implementing the Diagnostics procedures:

1. Phillips screwdrivers
2. Toshiba MS-DOS system FD
3. Tester

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 line in the figures.
- (2) Pin connection is described as 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 troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

- ✍ Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- ✍ Verify with the customer that Toshiba Windows XP Home Edition or Windows XP Media Center Edition is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.
- ✍ Make sure all optional equipment is removed from the computer.

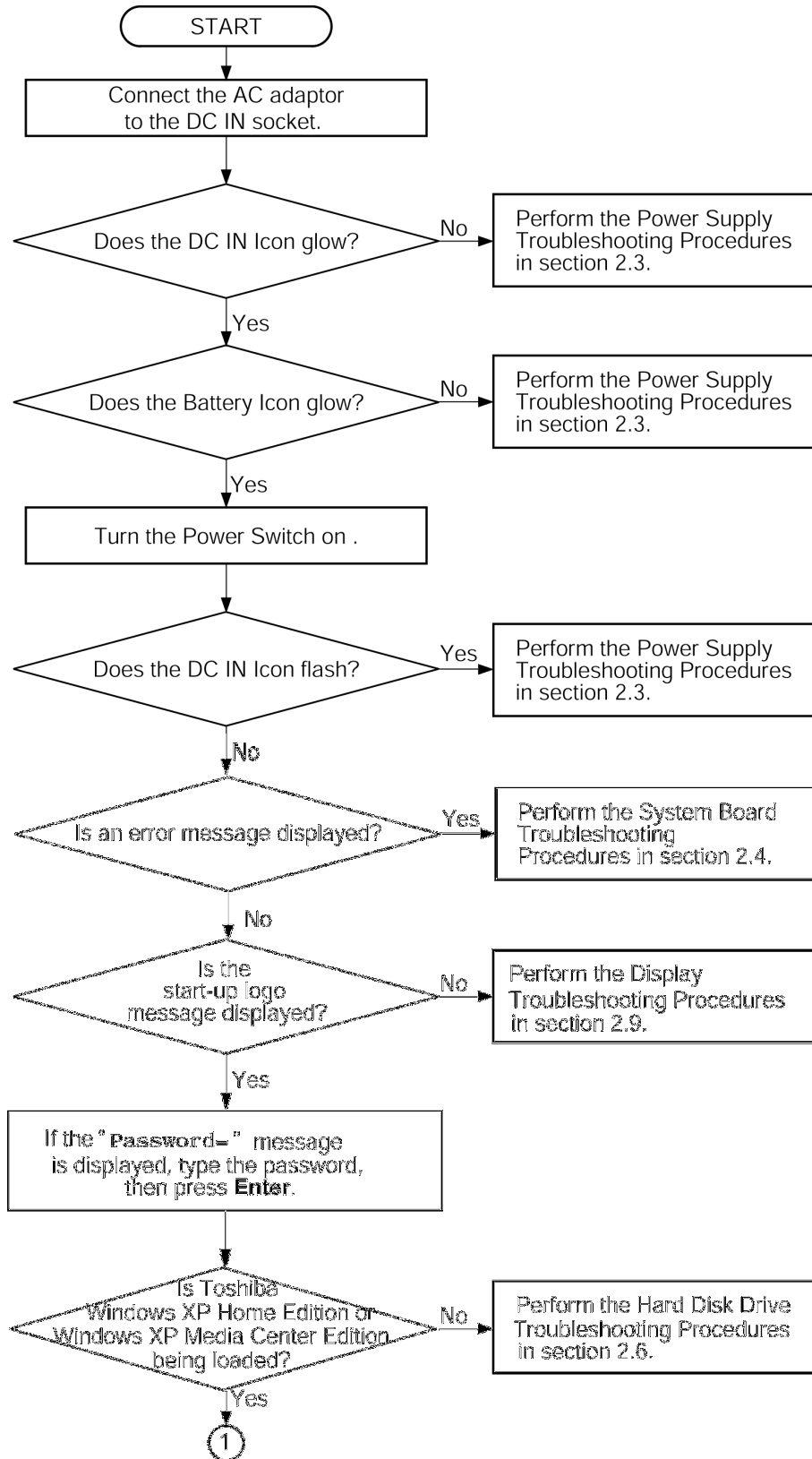


Figure 2-1 Troubleshooting flowchart (1/2)

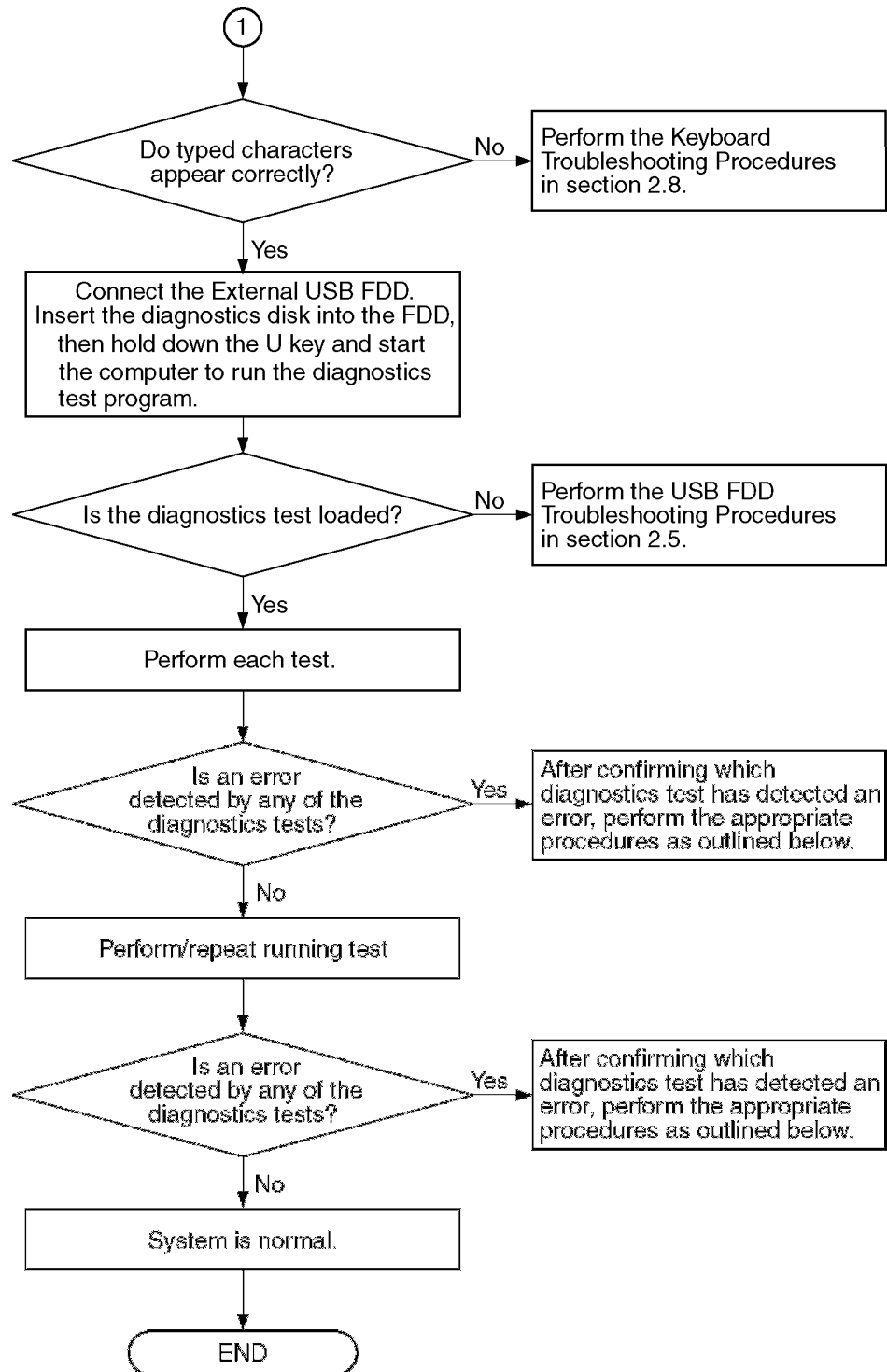


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, display test, printer test, Async test, expansion test, real timer test, NDP test or LAN/Modem/IEEE1394/Bluetooth test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the test for keyboard in ONLY ONE test program, perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the test for touch pad in ONLY ONE test program, perform the Touch pad Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the Modem test, perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the Sound test, perform the Sound Troubleshooting Procedures in Section 2.14.
12. If any trouble occurs on the TV tuner function, perform the TV tuner Troubleshooting Procedures in Section 2.15.



2.3 Power Supply Troubleshooting

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

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

Procedure 1 Power Status Check

The following icons indicate the power supply status:

-  Battery icon
-  DC IN icon

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

Table 2-1 Battery icon

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

Table 2-2 DC IN icon

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

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

When the icon is blinking, perform the following procedure.

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

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

- Check 1 If the DC IN icon blinks orange, go to Procedure 2.
- Check 2 If the DC IN icon does not light, go to Procedure 3.
- Check 3 If the battery icon does not light orange or green, go to Procedure 4.

NOTE: Use the supplied AC adapter G71C00043210 (two-pins for internal GPU model)/G71C00024410 (two-pins for external GPU model)/G71C00049210 (three-pins for internal GPU model).

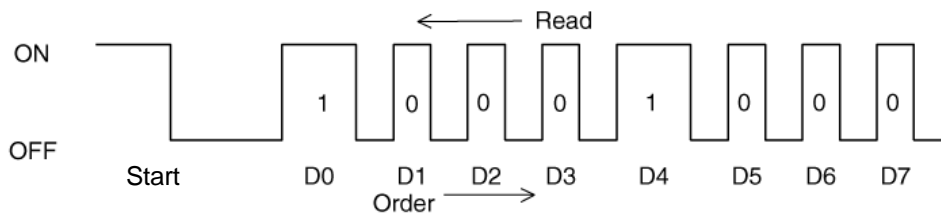
Procedure 2 Error Code Check

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

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

The error code begins with the least significant digit.

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



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

Table 2-3 Error code

Error code	Where error occurs
1*h	DC Power (AC Adapter)
2*h	Main battery
3*h	Second battery
4*h	S3V output
5*h	A-C3V output
6*h	A-C3V output
7*h	PPV output
8*h	PTV output
9*h	E5V output
A*h	1R5-P1V output
B*h	PTV/VG1R8-P1V output
C*h	PTV/PGV output
D*h	PTV output
E*h	1R8-B1V output
F*h	-

✎ DC power (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	Common Dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 8.0A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Abnormal current has been sensed.

✎ Main Battery

Error code	Meaning
21h	Main battery charge current is over 8.0A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 3.9A when AC adapter is not connected.
24h	Abnormal current has been sensed.
25h	Main battery charge current is over 0.3A.

✎ Second Battery

Error code	Meaning
31h	Second battery charge current is over 8.0A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.9A when AC adapter is not connected.
34h	Abnormal current has been sensed.
35h	Second battery charge current is over 0.3A.

✎ S3V output

Error code	Meaning
40h	S3V voltage is 2.81V or less when the computer is powered on/off.
45h	S3V voltage is 2.81V or less when the computer is booting up.(CV support)

✎ A-C3V output

Error code	Meaning
50h	A-C3V voltage is over 3.96V when the computer is powered on/off.
51h	A-C3V voltage is 2.81V or less when the computer is powered on.
52h	A-C3V voltage is 2.81V or less when the computer is booting up.
53h	A-C3V voltage is 2.81V or less while the computer is suspended.
54h	A-C3V voltage is abnormal while the computer is shutdown. (CV support)
55h	A-C3V voltage is 2.81V or less when the computer is booting up. (CV support)

✎ A-C3V output

Error code	Meaning
60h	A-C3V voltage is over 3.96V when the computer is powered on/off.
61h	A-C3V voltage is 2.81V or less when the computer is powered on.
62h	A-C3V voltage is 2.81V or less when the computer is booting up.
63h	A-C3V voltage is 2.81V or less while the computer is suspended.
64h	A-C3V voltage is abnormal while the computer is shutdown. (CV support)
65h	A-C3V voltage is 2.81V or less when the computer is booting up. (CV support)

✎ PPV output

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

✎ PTV output

Error code	Meaning
80h	PTV voltage is over 1.26 when the computer is powered on/off.
81h	PTV voltage is 0.68V or less when the computer is powered on.
82h	PTV voltage is 0.68V or less when the computer is booting up.
83h	PTV voltage is 0.68V or more when the computer is powered off.
84h	PTV voltage is 0.68V or less while the computer is suspended.

✎ E5V output

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

✎ 1R5-P1V output

Error code	Meaning
A0h	1R5-P1V voltage is over 1.80V when the computer is powered on/off.
A1h	1R5-P1V voltage is 1.275V or less when the computer is powered on.
A2h	1R5-P1V voltage is 1.275V or less when the computer is booting up.
A3h	1R5-P1V voltage is 1.275V or more when the computer is powered off.
A4h	1R5-P1V voltage is 1.275V or less when the computer is suspended.

✎ PTV/VG1R8-P1V output

Error code	Meaning
B0h	PTV/VG1R8-P1V voltage is over 2.16V when the computer is powered on/off.
B1h	PTV/VG1R8-P1V voltage is 0.68V or less when the computer is powered on.
B2h	PTV/VG1R8-P1V voltage is 0.68V or less when the computer is booting up.
B3h	PTV/VG1R8-P1V voltage is 0.68V or more when the computer is powered off.

✎ PTV/PGV output

Error code	Meaning
C0h	PTV/PGV voltage is over 1.62V when the computer is powered on/off.
C1h	PTV/PGV voltage is 0.68V or less when the computer is powered on.
C2h	PTV/PGV voltage is 0.68V or less when the computer is booting up.
C3h	PTV/PGV voltage is 0.68V or more when the computer is powered off.
C4h	PTV/PGV voltage is 0.68V or less while the computer is suspended.

✎ PTV output

Error code	Meaning
D0h	PTV voltage is over 1.26V when the computer is powered on/off.
D1h	PTV voltage is 0.68V or less when the computer is powered on.
D2h	PTV voltage is 0.68V or less when the computer is booting up.
D3h	PTV voltage is 0.68V or more when the computer is powered off.
D4h	PTV voltage is 0.68V or less while the computer is suspended.

✍ 1R8-B1V output

Error code	Meaning
E0h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
E1h	1R8-B1V voltage is 1.53V or less when the computer is powered on.
E2h	1R8-B1V voltage is 1.53V or less when the computer is booting up.
E3h	1R8-B1V voltage is 1.53V or more when the computer is powered off.
E4h	1R8-B1V voltage is 1.53V or less while the computer is suspended.

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

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

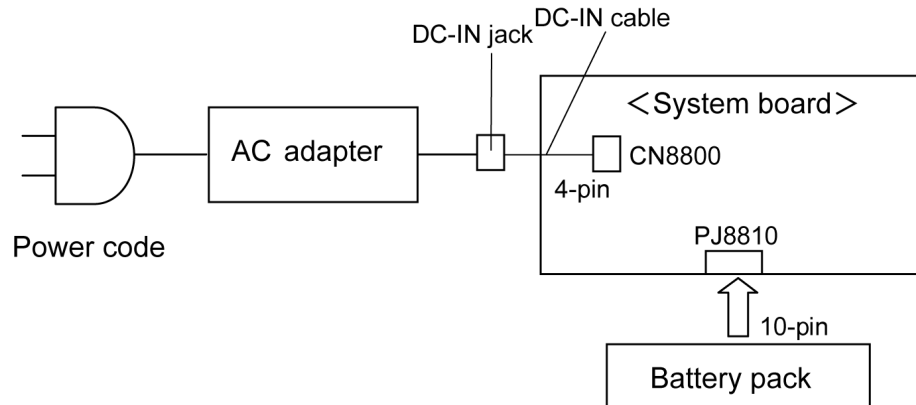
Check 3 In the case of error code 21h:

- ✍ Go to Procedure 3.

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

Procedure 3 Connection Check

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



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

- Check 1 Make sure the AC adapter and power cord are firmly plugged into the DC IN jack and wall outlet. If these cables are connected correctly, go to Check 2.
- Check 2 Make sure the DC-IN cable is firmly plugged to the connector CN8800 on the system board. If the cable is connected correctly, go to Check 3.
- Check 3 Replace the AC adapter and the AC power cord with new ones.
- ? If the DC IN icon does not light, go to Procedure 5.
 - ? If the battery icon does not light, go to Check 4.
- Check 4 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4 Charging Check

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

- Check 1 Make sure the AC adapter is firmly plugged into the DC IN socket.
- Check 2 Make sure the battery pack is properly installed. If the battery is properly installed, go to Check 3.
- Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack while connecting the battery pack and the AC adapter. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too high or low. Return the temperature to normal operating condition. If the battery pack is still not charged, go to Check 5.
- Check 5 Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 5.

Procedure 5 Replacement Check

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

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

- Check 1 Replace the AC adapter with a new one. If the AC adapter is still not functioning properly, 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 Check

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

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

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

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

If you press **F1** as the message instructs, the SETUP screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, perform Check 2.

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

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

WARNING: RESUME FAILURE.
PRESS ANY KEY TO CONTINUE.

If any other error message displays, perform Check 3.

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

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

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.

- (1) PIT ERROR
- (2) MEMORY REFRESH ERROR
- (3) TIMER CH. 2 OUT ERROR
- (4) CMOS CHECKSUM ERROR
- (5) CMOS BAD BATTERY ERROR
- (6) FIRST 64KB MEMORY ERROR
- (7) FIRST 64KB MEMORY PARITY ERROR
- (8) VRAM ERROR
- (9) SYSTEM MEMORY ERROR
- (10) SYSTEM MEMORY PARITY ERROR
- (11) EXTENDED MEMORY ERROR
- (12) EXTENDED MEMORY PARITY ERROR
- (13) DMA PAGE REGISTER ERROR
- (14) DMAC #1 ERROR
- (15) DMAC #2 ERROR
- (16) PIC #1 ERROR
- (17) PIC #2 ERROR
- (18) KBC ERROR
- (19) HDC ERROR
- (20) HDD #0 ERROR
- (21) HDD #1 ERROR
- (22) TIMER INTERRUPT ERROR
- (23) RTC UPDATE ERROR

Procedure 2 Debug Port Check

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

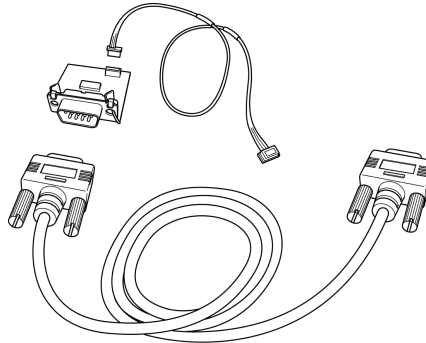
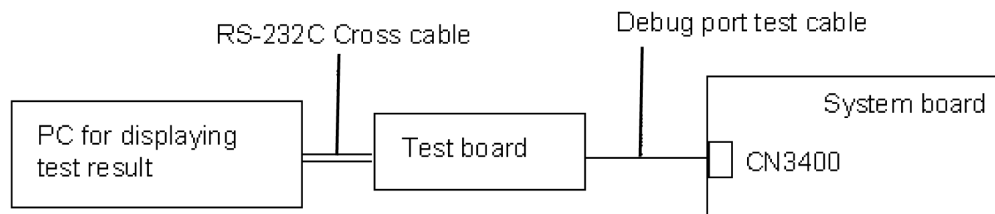


Figure 2-2 A set of tool for debug port test

The test procedures are follows:

1. Connect the debug test cable to the connector CN3400 on the system board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C cross-cable to the PC that displays the 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	Contents of process
Time (second) to process	

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

Table 2-4 Debug port (Boot mode) error status (1/9)

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 3 rd 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	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
F003h	Transits to System BIOS IRT.	
	BIOS rewrite process	Initialization of ICHM. D31
		DRAM configuration
		Permission of cache (L1 cache only)
		Memory clear
	Transition to real mode and copy of BIOS to RAM	

Table 2-4 Debug port (Boot mode) error status (2/9)

D port status	Inspection items	Details	
F004h/F005h	Saving key scan code		
	Setting TASK_1ms_TSC		
	Controlling fan		
	Initializing sound items (for BEEP)	Enabling system speaker	
		Releasing mute	
		Making the volume max. (for models whose volume can be controlled)	
	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)	
	Key input	Prohibition of USB	
		BEEP	
		Waiting for key input	
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset	
		Setting parameters for 2HD(1.44MB)	
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.	
		Setting of parameters for 2DD (720KB)	
		Retrieval of "CHGBIOSA.EXE" from the root directory. Calculation of directory start head and sector Read 1 sector of the root directory Retrieval of entry of "CHGBIOSA.EXE" / "CHGFIRMA.EXE" from the sector read.	
		Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" Key input when error occurred.	
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"			

Table 2-4 Debug port (Boot mode) error status (3/9)

D port status	Inspection items	Details
F100h	Prohibition of cache	
	Initialization of H/W (before DRAM recognition)	Initialization of MCHM
		Initialization of ICH6M.D31.Func0
		Initialization of ICH6M.D31.Func1
		Initialization of USB.Func0,1,2,7
		Initialization of ICH6M.D31.Func3
		Initialization of ICH6M.D31.Func5
		Initialization of Flute
Initialization of PIT channel 1	(Setting the refresh interval to "30?s")	
F101h	Checking DRAM type and size (at cold boot)	When unsupported memory connected, beeps and halts. When DRAM size = 0, halts.
	Testing the stack area of SM-RAM	When it can not be used, halts.
F102h	Configuring cache memory	
	Permission of L1/L2 cache memory	
	Checking the access of a CMOS (Only in Cold Boot)	When error detected, halts
	Examining the battery level of CMOS	
	Checksum check of CMOS	
	Initializing data in CMOS (1)	
	Setting up IRT status	(Setting of boot status and IRT busy flag, The rest bits are 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 2-4 Debug port (Boot mode) error status (4/9)

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	
F104h	SMRAM initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
F105h	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)

Table 2-4 Debug port (Boot mode) error status (5/9)

D port status	Inspection items	Details	
(F105h)		CPU clock measurement	
		Check of parameter block A	
		Permission of SMI except auto-off function	
		Control of excess of rated input power	
		Battery discharge current control (1CmA)	
		AC adapter rated over current control	
		Dividing procedures for time measuring by IRT	
		Setting for clock generator	
		CPU Initialization Micro code update Judging of CPU type Geyserville support check Setting of CPU clock to "high"	
		Graphics Aperture Size setting (except when VGA_BUS=0)	
F106h	Saving memory configuration to buffer		
	Reading of EC version		
	Update of flash ROM type		
	Judging of destination (Japan or except Japan) based on DMI data		
	CMOS default setting check	Sets default setting if bad battery or bad checksum (ROM, CMOS) is detected	
	ACPI table initialization (for execution of option ROM)		
	Initialization of devices which need initialization before PCI bus initialization		AC'97 control
			Initialization of temperature control information
			KBC initialization
			VGA display off, Reset control
			Sound initialization
			HC initialization, USB device connection recognition and initialization
			Control of built-in LAN permission/prohibition
	PIC initialization		
PIC test			
Password Initialization			

Table 2-4 Debug port (Boot mode) error status (6/9)

D port status	Inspection items	Details
F107h	PCI bus initialization (connection of DS Bus)	
	Initialization of LAN information	
	Check of WakeUp factor	
F108h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	H/W setting based on resource	
F109H	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		Configuration
Saving of VGA configuration result		
F10Ah	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W needed after PCI configuration	HDD initialization sequence start
	Enabling power off	
	Output code generation	
F10Bh	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10Ch	INIT_INT_VECTOR	(Initialization of vectors)

Table 2-4 Debug port (Boot mode) error status (7/9)

D port status	Inspection items	Details
F10Dh	INIT_NDP	(Initialization of NDP)
F10Eh	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)
F10Fh	INIT_DISPLAY (Waiting for VGA chip initialization completion, VGA BIOS initialization)	Waiting for VGA power-on
		Waiting for Display access completion
F110h	Calling VGA BIOS	
F111h/F112h	DISP_LOGO	Displaying logo
F113h	SYS_MEM_CHECK (boot mode)	Check of convention memory
F114h	EXT_MEM_CHECK (boot mode)	Check of exception in the protected mode
F115h	Check of exception in the protected mode DPORT=F116h when error occurs	
	INIT_SYS_MEM (reboot mode)	Initialization of conventional memory
F117h	CHK_DMA_PAGE (boot mode)	Check of DMA Page Register
F118h	CHECK_DMAC (boot mode)	Check of DMAC
F119h	INIT_DMAC (boot mode)	Initialization of DMAC
F11Ah		
F11Bh		
F11Ch	BOOT_PASSWORD (password check)	
		(In the case of "Reboot") Waiting for HDD initialization completion Check of key input during IRT (waiting for KBC initialization completion) ATA priority initialization

Table 2-4 Debug port (Boot mode) error status (8/9)

D port status	Inspection items	Details
(F11Ch)		(In the case of "Boot") Check of key input during IRT (waiting for KBC initialization completion) Input of password (waiting for HDD initialization completion)
F11Dh	EX_IO_ROM_CHECK	Check of option I/O ROM
F11Eh	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 before boot
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion
		Renewal of table for DMI
		Copying ACPI table to top of extension memory
		Waiting for completion of BIOS rewriting of PSC version
		Waiting for completion of setting clock generator When error occurred, halts at DPORT=F11FH
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side

Table 2-4 Debug port (Boot mode) error status (9/9)

D port status	Inspection items	Details
		Check of existence of target maintenance card Prohibition of unused PC card Setting Wakeup status data for ACPI HW initialization before Boot, Waiting for initialization completion Notifies the DVI connection status to VGA BIOS Setting of battery save mode Setting of date Waiting for Bluetooth initialization completion 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 Measure for chip set defective
F120h	Clear of IRT status	
	Update of check sum of Runtime side	
FFFFh	End	

Table 2-5 Debug port (Suspend mode) error status (1/3)

D port status	Inspection items	Details
F12Fh		
F130h	When powering-off request from OS is required, waits for the completion of dividing process because waiting in SUSPEND of Runtime returns the process to OS.	
	Forced execution of dividing (Permission of SMI for dividing)	
	Waiting for completion of dividing	
F131h	After prohibiting of all SMIs, permits I/O trap (EHCI) and external SMI.	
	Starts dividing to transmit periodically extension command (every 25 seconds) not to generate time-out of power-off.	
	Clears resume/power-off status.	
	Storing and initializing of special PCI configuration register	
	Prohibits clock control.	
	Judging of suspend process for boot or for resume	
	Branch to resume mode (DPORT=F132h) or boot mode(DPORT=F133h)	
F132h	Powering-off during resume process	Stops HC.
		Starts sequence for storing display system.
F133h	Resume error check in suspend mode.	Checks if during IRT processing.
		Checks if external option ROM is exist
	Execution of driver for suspend	
	Clear of data for Remote Lockout	
	Storing of USB register	
	Stop of HC	

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

LED Status	Test item	Contents
(F133h)	Storing CPU register	
	Permission of system area and memory cache (for high-speed operation)	
	Suspending of HDD	
	Storing KBC,SCC and MOUSE	
	Storing of PCI device	
	Storing of PIT	
	Starts sequence for storing display system	
	Storing of PIC	
	Storing of DMAC	
	Storing of system status command port	
	Storing of PCMCIA card	
	Storing of RTC	
	Storing of HW unique to system	
	Calculation of check sum (conventional memory)	
F134h		
F137h	Processing of VGA –off (boot mode)	
	Suspending of HDD (boot mode)	
	Transition to S5 of Bluetooth (boot mode)	
F138h	Processing for boot/ resume/suspend for PnP (Stores PnP resource information into Flash ROM.)	
	Processing for boot/ resume/suspend for password (Stores password information into Flash ROM.)	
F139h	Waiting for completion of suspending for HDD password	
F13Ah	Prohibition of PCI arbiter	
	Setting of Wakeup event	
	Power-off of PC card	
	Re-setting backup current	
	Forced off of fan	
	Checks whether off-process for resume is needed	

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

LED Status	Test item	Contents
(F13Ah)	Power LED control during suspending	
	Isolates built-in LAN	
	Makes the power of sound off	
F13Bh	Model-unique processing just before suspending	
	Waiting for completion of dividing for suspending	
	Stops dividing of extension command for power off	
F13Ch	Measure for USB over current	
	Calculation of check sum of PnP RAM area (Not work in suspending for boot)	
	Acquires how to turn the power off	
	Resets by EC (when required)	
	Makes not to send Eject Power Off command when turn the power off by the date check of alarm power on	
	Prohibition of all SMIs	
	Initializing of special register in suspending	
	Calculates the check sum of SMRAM and stores it in SMRAM	
F13Dh	Calculates the checksum of system BIOS in the IRT side (Checksum does not match during IRT)	
	Setting status of suspend completion	
	Prohibition of L1 & L2	
	Power off (Completion of BIOS process)	

Table 2-6 Debug port (Resume mode) error status (1/4)

LED Status	Test item	Contents
F100h	Refer to IRT	
F101h	Refer to IRT	
F102h	Refer to IRT	
F103h	Refer to IRT	
	Clears flag for SMI control.	
	Update of Resume counter	
F121h	Checks the WakeUp factors.	
	Rewriting of SMRAM BASE	
F122h	Initializing devices necessary for initialization before initializing PCI bus	Initializing of PIT
		Initializing of PIT channel 0 (Sets the interval of timer interruption to 55ms)
		Initializing of PIT channel 2 (Sets the sound generator frequency to 664Hz)
		Measuring CPU clock
		Check of parameter block A
		Permission of SMI other than auto-off function
		Control of excess of rated input power
		Control of battery discharging current (1CmA)
		Control of excess of rated current of AC adapter
		Dividing of process for measuring of IRT time
		Setting to clock generator
Initializing of CPU	Updating micro-code	
	Judging of CPU type	
	Check of Geyserville support	
	Sets the CPU clock to High.	
Setting of Graphics Aperture Size		
Recovery of PIC register		

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

LED Status	Test item	Contents
(F122h)	Initialization of devices necessary for initialization before initializing PCI bus 2	AC'97 control
		Initializing of temperature control information
		Initializing of KBC
		VGA display-off and Reset control Starting recovery of VGA
		Initializing of sound
		Acquires the multi-box status.
		Initializing of HC, recognizing of devices
		Control of permission/prohibition for built-in LAN
	Check of the checksum of conventional memory	Resume error DPORT = F174H
F123h	Initializing of PCI devices	
	Check of WakeUp factors after initializing PCI bus	
F124h	Waiting for initializing of devices which have to be initialized before setting HW by PnP resource	
	Recovery of each device (1)	Processing of RESUME for PnP
		Waiting for the completion of VGA power-down control (because the VGA configuration can not be seen)
		Processing of RESUME for PCI
		Recovery of PCMCIA card
		Error when an ATA card is pulled out Resume error DPORT = F17Bh
		Executing of dividing process of device detection of PC card
	Check of HDD pack connection	Resume error when HDD is mounted DPORT=F172h
Start of IDE device resume sequence		

Table 2-6 Debug port (Resume mode) error status s (3/4)

LED status	Test item	Contents
F125h	Recovery of user alarm setting and cancel of alarm power-on function (only one time)	
	Enable of power-off switch	
	Initializing EC and start of reading battery information	
	Recovery of each device(2)	Setting of setup items Initializing of DMAC
	Initializing of VGA BIOS in resume	Waiting for VGA power on
F126h	Call of VGA BIOS	
F127h/F128h	Processing of password for RESUME	
F129h	Recovery of each device(3)	Recovery of DMAC register PnP Resume processing
	Motor-off of disabled HDD	
F12Ah	Waiting for completion of KBC initializing (not in ACPI mode)	
	Waiting for completion of USB initializing	
	Recovery of USB register	
	Recovery of CPU register	
	Resetting NDP interruption	
	Recovery of system, status, command and port	
	Wakeup check	Notifies the device change status to the upper program
		Setting WAKEUP status data for ACPI
	Initializing HW just before booting or waiting for the completion	Notifies the DVI connection status to VGA BIOS
		Setting battery saving mode
		Setting of date
		Waiting for the completion of Bluetooth initializing
Renewal of Wakeup factor of DMI and SM-BIOS structure table		
Closing PCI device configuration area		
Cache control		

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

LED status	Test item	Contents
(F12Ah)		Renewal of parameter block A
		Process related to CPU Setting of CPU clock to SETUP designation
		Waiting for motor-off of disabled HDD
		Final decision of USB FDD information
		Post-process of PRE_BOOT_SETUP Clears PWRBTN_STS Enables Power Button Measures against chip set defective
	Waiting for the completion of recovery of VGA register	
	Recovery of PIT register	
	Recovery of PCI configuration register	
	Recovery of PIC MASK	
	Executing of driver for RESUME	
F12Bh	Checks if the power-off switch is pressed or not during resume processing (Suspends if pressed.)	
	Executes HOTKEY F1process when booting in instant security	
F12Ch	(Not in ACPI mode)	Clears key buffer
F12Dh	(In ACPI mode)	Clears IRT status.
F12Eh	(In ACPI mode)	Clears flag in Resume process
		Acquires Wake Up Vector address.
		Clears key buffer.
		Renewal of date/time
		ACPI mode on
	Recovery of write-protected status before.	
FFFFh	(In ACPI mode / not in ACPI mode)	Returning to the main process

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. Hard Disk test
7. Real Timer test
8. NDP test
9. Expansion test
10. CD-ROM/DVD-ROM test
11. Wireless LAN test
12. LAN/Modem/Bluetooth/IEEE1394 test
13. Sound test
14. Only one test

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

Procedure 4 Replacement Check

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

2.5 USB FDD Troubleshooting

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

Procedure 1: 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 into the USB floppy disk drive connected to the computer, 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 connected to the computer, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

Table 2-7 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.

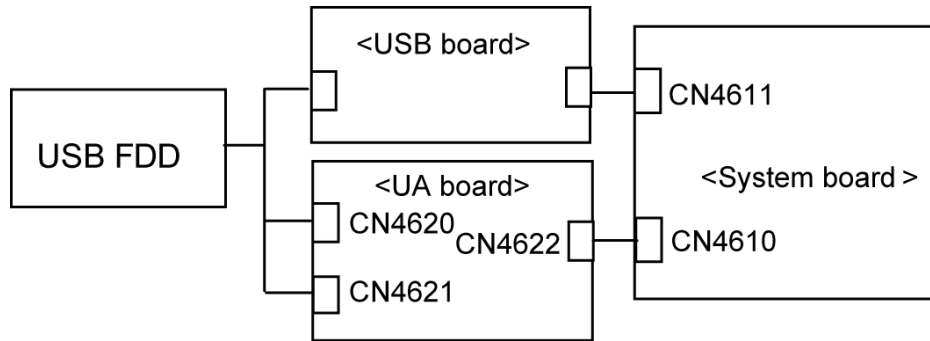
Write protected

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 is connected to the USB board or UA board via the USB port.

- Check 1 Make sure the following cables and connectors are firmly connected. The USB FDD can be connected to any of three USB ports. (Two ports are installed on the UA board and one is on the USB board.)



Also make sure the following points:

- ? There is no loose connection.
- ? There is no slantwise connection.
- ? Connectors are fully inserted.
- ? There is no damage on the cable.

If any of the connections are loose, reconnect firmly and repeat Procedure 2.

If any of connectors is broken, replace it with new one 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 USB FDD is still not functioning properly, perform Check 3.
- Check 3 The USB board may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform Check 4.
- Check 4 The UA board may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform Check 5.
- Check 5 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 hard disk will be erased when the 2.5" HDD troubleshooting procedures are executed. Copy the contents of the hard disk to floppy disks or other storage drive(s) for backup the data. 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 2.5" HDD is operating normally.

Procedure 2 Message Check

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

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 still appears on the display, perform Check 4.

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

Procedure 3 Format Check

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

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

Check 1 Format 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 HDD is formatted, set the 2.5" HDD partition using MS-DOS FDISK command.

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

Procedure 4 Diagnostic Test Program Execution Check

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

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

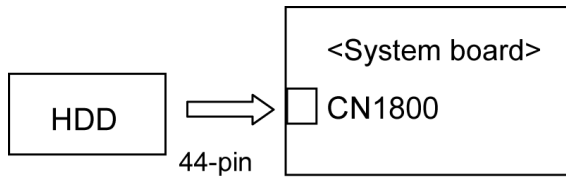
Table 2-8 2.5" Hard disk drive error code and status

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

Procedure 5 Connector Check and Replacement Check

The HDD is connected to the connector of the system board. The connecting portion may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks to check the connecting portion:

Check 1 Make sure the HDD and system board are firmly connected.



If their connection is loose, reconnect firmly and repeat Procedure 1. 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 following the instructions in Chapter 4, *Replacement Procedures* and check the operation. 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*.

2.7 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

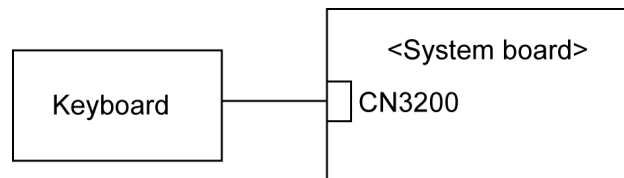
Execute the test for keyboard of ONLY ONE test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

The keyboard 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 securely connected to the system board.



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

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

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

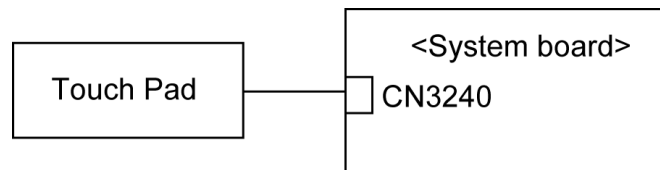
Execute the test for touch pad of ONLY ONE test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

The touch pad or touch pad flexible cable 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 touch pad flexible cable is firmly connected to the touch pad and the system board.



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

Check 2 The touch pad or touch pad flexible cable may be damaged. Replace the touch pad with a new one first following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, replace the touch pad flexible cable with a new one. 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*.

2.9 Display Troubleshooting

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

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check 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.

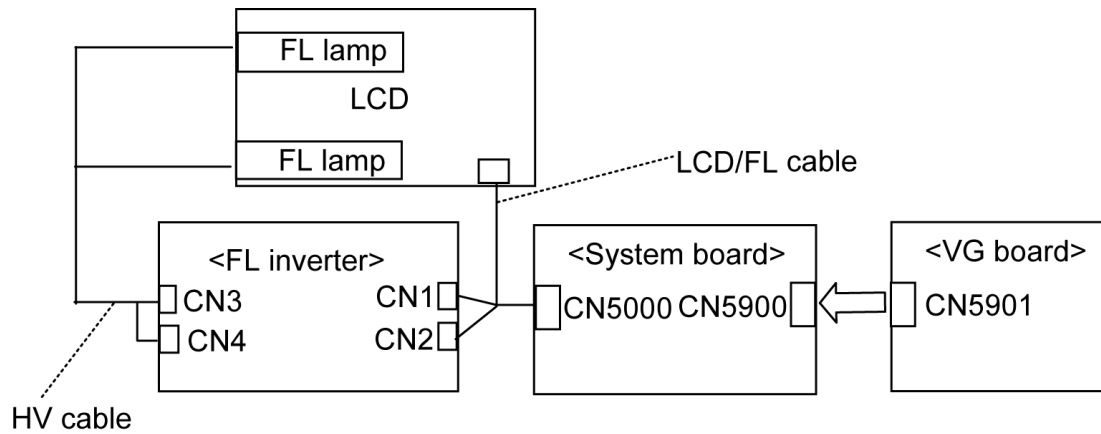
Procedure 2 Diagnostic Test Program Execution Check

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

Procedure 3 Connector Check and Cable Check

The LCD module is connected to the system board and VG board (external GPU model) by an LCD/FL cable. The FL inverter board is also connected to the system board by an LCD/FL cable. And the FL is connected to the FL inverter board by the HV cable. The connectors may be disconnected from the system board, VG board or FL inverter, or they may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*.

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



Procedure 4 Replacement Check

The FL lamp, FL inverter, LCD module, system board, VG board (external GPU model) and LCD/FL cable are connected to display 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:

If the FL lamp does not light, perform Check 1.

If characters or graphics on the internal display are not displayed clearly, perform Check 4.

If some screen functions do not work properly, perform Check 4.

If the FL lamp remains lit when the display is closed, perform Check 5.

- Check 1 Replace the FL lamp with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 2.
- Check 2 The LCD/FL cable may be defective or damaged. Replace the LCD/FL cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check 3.
- Check 3 The FL inverter may be defective or damaged. Replace the FL inverter board with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check 4.
- Check 4 The LCD module may be defective or damaged. Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check 6 (When the PC is an external GPU model, perform Check 5).
- Check 5 The VG board may be defective or damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedure*. If the problem still exists, perform Check 6.
- Check 6 The system board may be defective or damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedure*.

2.10 Optical Drive Troubleshooting

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 page 2-1.)

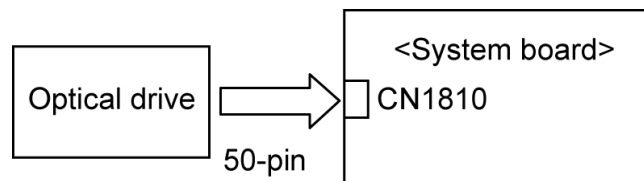
Execute the CD-ROM/DVD-ROM Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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 and the system board are firmly connected.



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 a new one following the instructions in Chapter 4, *Replacement Procedure*.

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

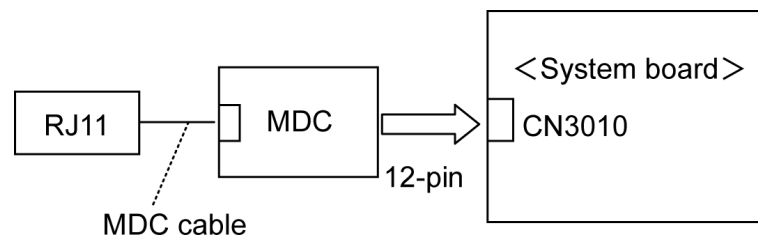
If any error is detected, perform Procedure 2.

Procedure 2 Connector Check and Replacement Check

An MDC (Modem Daughter Card) is used as the modem for this computer. The MDC is connected to the system board. If the modem malfunctions, these connections or boards may be bad or the MDC might be faulty.

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

Check 1 Make sure the following connections are firmly connected.



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

Check 2 The Modem jack (RJ11) may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

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

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

2.12 LAN Troubleshooting

To check if the computer's LAN is 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

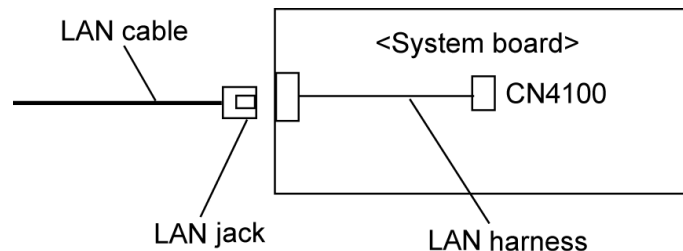
Execute the LAN Test in the LAN/Modem/Bluetooth/IEEE1394 Test Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

The LAN jack (RJ45 jack) is mounted on the system board. If the LAN malfunctions, the LAN cable, LAN harness or system board might be faulty.

Disassemble the computer following the steps described in Chapter 4.



- Check 1 Make sure the LAN cable is firmly connected to the LAN jack. If the connection is good but there is still an error, perform Check 2.
- Check 2 The LAN cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.
- Check 3 Make sure the LAN harness is firmly connected to the system board. If the connection is good but there is still an error, perform Check 4.
- Check 4 The LAN harness may be faulty. Replace it with a new one. If the problem still occurs, perform Check 5.
- Check 5 The system board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedure*.

2.13 Wireless LAN Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

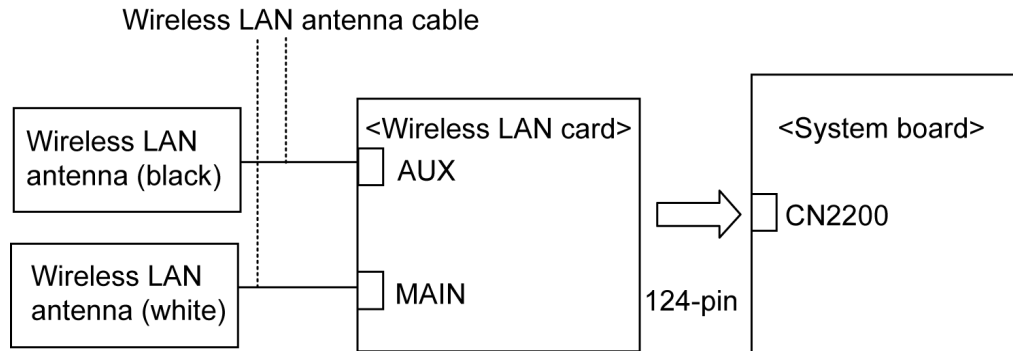
Before starting the test, make sure the wireless communication switch is set in the "ON" position.

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

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

Procedure 2 Antennas' Connection Check

The wireless LAN function-wiring diagram is shown below:



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

- Check 1 Make sure the wireless communication switch is “On”.
- If the switch is “Off”, turn it “On”. If there is still an error, perform Check 2.
- Check 2 Make sure the wireless LAN card is firmly connected to the CN2200 on the system board.
- If the wireless LAN card is disconnected, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.
- Check 3 Make sure that the wireless LAN antenna cables (black and white) are firmly connected to the connector on the wireless LAN card.
- If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

Procedure 3 Replacement Check

The wireless LAN card, wireless LAN antennas or system board may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then check the followings:

- Check 1 The wireless LAN card may be defective or damaged. Replace the wireless LAN card with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.

- Check 2 The wireless LAN antennas may be defective or damaged. Replace them with new ones following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

- Check3 Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.14 Sound Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

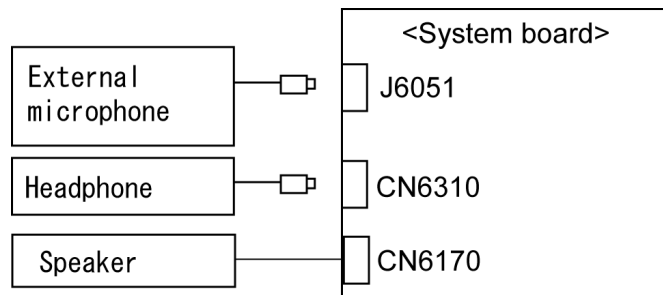
Procedure 1 Diagnostic Test Program Execution Check

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

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

Procedure 2 Connector Check

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



As the connection may be defective, disassemble the computer following the steps in Chapter 4, *Replacement Procedures* and check each connection.

If the problem still occurs, go to Procedure 3.

Procedure 3 Replacement Check

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

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

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

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

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

2.15 TV Tuner Troubleshooting

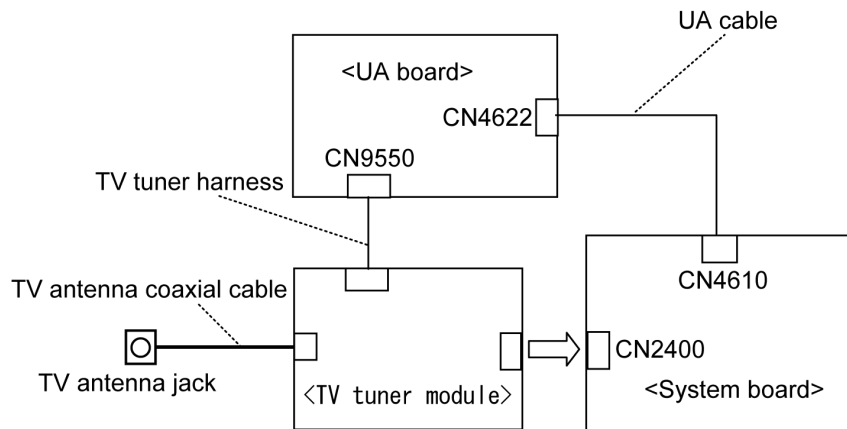
To check if the TV tuner is defective or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Connector Check and Replacement Check

Procedure 1 Connector Check and Replacement Check

The TV antenna, TV tuner module, UA board or system board may be disconnected or faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the following connector has been firmly connected.



If any connection is loose, reconnect it firmly. If there is still an error, perform Check 2.

- Check 2 The TV antenna coaxial cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.
- Check 3 The TV tuner module may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 4.
- Check 4 The UA board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.
- Check 5 Cables in the computer (TV tuner harness and UA cable) may be faulty. Replace them with new ones following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 6.
- Check 6 The system board may be faulty. Replace it with new one following the instructions in Chapter 4, *Replacement Procedures*.

Chapter 3

Tests and Diagnostics

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3.1 The Diagnostic Test

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

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

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

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

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

3.1.1 Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions:

- ✎ DIAGNOSTIC TEST
- ✎ ONLY ONE TEST
- ✎ HEAD CLEANING
- ✎ LOG UTILITIES
- ✎ RUNNING TEST
- ✎ FDD UTILITIES
- ✎ SYSTEM CONFIGURATION
- ✎ 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.

- ✍ The Diagnostic Disks (T&D for maintenance for Main, LAN/Modem/Bluetooth/IEEE1394, wireless LAN and Sound)
- ✍ A formatted working disk (Floppy disk test)
- ✍ USB FDD (for all tests)
- ✍ A USB test module (USB test)
- ✍ A USB cable (USB test)
- ✍ An external CRT monitor (Expansion test)
- ✍ A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
- ✍ A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
- ✍ A music CD (Sound test)
- ✍ A store-bought CD-RW media (CD-ROM/DVD-ROM test)
- ✍ A microphone (Sound test)
- ✍ Headphones (Sound test)
- ✍ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- ✍ An exclusive modem test jig (Nitto Electric Manufacture Co.,Ltd-made QE2000P01) (Modem test)
- ✍ A module cable and RJ11 connector checker (Modem test)
- ✍ A LAN wraparound connector (LAN test)
- ✍ PC card wraparound connector (Expansion test)
- ✍ A display with monitor ID function (Expansion test)
- ✍ RS-232C wraparound connector (Async test)
- ✍ A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)

3.1.2 H/W (Hardware) initial information setting tool

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

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

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

- ✍ The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

You will need the following equipment to perform this program.

- ✍ The Diagnostics Disk (Main T&D)

3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive.
2. Release the lock of the power switch and turn on the computer with pressing the **F12**. Select the FDD in the display for selecting booting unit. Then, press **Enter** and the following menu appears.

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

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

```
Enter a choice: 1
```

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

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

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

**NOTE:** After replacing with a new system board, write the computer information to the new system board according to the section 3.3 "Setting of the hardware configuration".

### 3.2.1 Diagnostics menu (T&D)

To execute this program, select 1-Repair Main (T&D) and press **Enter** in the startup menu, then the following menu appears.

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

```
DIAGNOSTICS MENU :
```

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

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

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

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

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

DIAGNOSTIC TEST MENU :

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

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

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

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

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

```

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

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

SUB-TEST MENU :

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

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

```

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

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

```

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

```

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

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

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

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

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

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

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                                1: Test end
                                2: Continue
                                3: Retry

```

These three selections have the following functions respectively:

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

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

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

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

3.2.2 H/W initial information setting tool

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

```

#####
#####      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 3.3.

3.2.3 Heatrun test program

Heatrun test starts executing the same subtests as RUNNING TEST.

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

3.3 Setting of the hardware configuration

To execute this program, select `2-Repair initial config set` in the startup menu, press **Enter** and follow the directions on the screen. The H/W initial information setting tool consists of following 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 micro code
- ? Setting of the EHSS
- ? Inputting and writing of DMI information

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

1. "Enter Model Name ?" is displayed. Input the computer's model name and press **Enter**. (e.g. Satellite)
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**.

Subtest 03 DMI information save

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

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

Subtest 04 DMI information recovery

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

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

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

Subtest 08 System configuration display

This subtest displays the information of the system configuration.

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

Press [Enter] key

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

Subtest 09 E2PROM test (MAC/GUID/DMI)

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

3.4 Heatrun Test

To execute this program, select 3-Repair heatrun (T&D) in the startup menu and press **Enter**.

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

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

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

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

Press any key to return to the startup menu.

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

3.5 Subtest Names

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

Table 3-1 Subtest names (1/2)

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

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER [Not supported]	01	Ripple pattern
		02	Function
		03	Wrap around
7	ASYNC [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 test
11	EXPANSION	01	PCMCIA wrap around [Not supported]
		02	RGB monitor ID
12	CD-ROM /DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	RW 1point W/R/C

3.6 System Test

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

Subtest 01 ROM checksum

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

Subtest 02 Fan ON/OFF

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

The following message will appear.

```
Fan number select (1;FAN#1(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 VGA fan, press **0** and **Enter**.

The following message will appear.

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

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

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

The following message will appear.

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

Make sure the fan rotates at low speed and the message of fan revolution for it changes. Then press **Enter**.

The following message will appear.

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

Make sure the fan rotates at high speed and the message of fan revolution for it changes. Then press **Enter**.

After a while, the fan rotating will stop.

Subtest 03 Geyserville

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

Subtest 04 Quick charge

This subtest checks the status for the quick charge.

Subtest 05 DMI read

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

```
*** DMI Data Display Ver X.XX ***
Model Name       : XXXXXXXXXXXX
Version Number   : XXXXXXXXXXXX
Serial Number    : XXXXXXXXX
Model Number     : XXXXXX-XXXXX
PCN/BND Number   : XXXXXXXXXXXX/XXX_____
UUID Number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Press [Enter] to EXIT
```

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

3.7 Memory Test

To execute the Memory Test, select **2** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Conventional memory

This subtest writes a constant data to conventional memory (0 to 640 KB), then reads the new data and compares the result with the original data.

Subtest 02 Protected Mode

NOTE: The CONFIG.SYS file must be configured without expanded memory manager programs such as EMM386.EXE, EMM386.SYS or QEMM386.SYS. Also, the HIMEM.SYS must be deleted from the CONFIG.SYS file.

This subtest writes constant data and address data (from 1MB to maximum MB), and reads the new data and compares the result with the original data.

Subtest 03 Protected Mode (Cache off)

This subtest executes the same test as the subtest 02 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 ? OK

Number of misses ? Number of hits ? Fail

Subtest 05 Stress

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

3.8 Keyboard Test

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

Subtest 01 Pressed key code display

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

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

3.9 Display Test

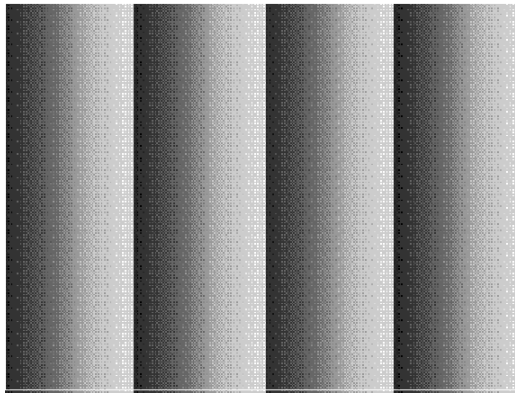
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

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

Subtest 02 Gradation for VGA

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



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

Subtest 03 Gradation for LCD

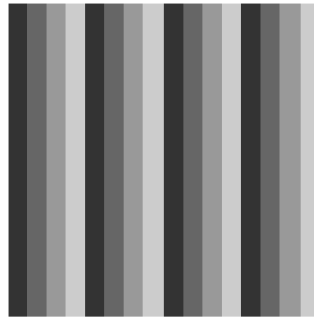
This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

Subtest 04 Gradation & 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 and the screen returns to the DISPLAY TEST menu.

3.10 Floppy Disk Test

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

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

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

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

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

```
FLOPPY DISK          XXXXXXXX
```

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

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

```
SUB-TEST MENU :
```

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

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

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

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

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

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

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

Subtest 01 Sequential read

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

Subtest 02 Sequential read/write

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

Subtest 03 Random address/data

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

Subtest 04 Write specified address

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

Subtest 05 Read specified address

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

3.11 Printer Test

CAUTION: Printer Test is not supported for this model.

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

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

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

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

Select the channel number (1-3) ?

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

Subtest 01 Ripple pattern

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

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

Subtest 02 Function

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

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

This subtest prints the various print types shown below:

```

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

```

Subtest 03 Wrap around

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

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

3.12 Async Test

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

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

Subtests 01 and 02 require the following data format:

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

Subtest 01 FIR/SIR Point to point (send)

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

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

Subtest 02 FIR/SIR Point to point (receive)

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

Subtest 03 Wrap around (on board)

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

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

3.13 Hard Disk Test

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

CAUTION: *The contents of the hard disk drive will be erased when the subtest 02, 03, 04, 06, 08 or 09 is executed. These subtests should not be executed except when absolutely necessary. If you execute these subtests, prepare other hard disk drive and use it for the tests.*

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

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

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

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

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

HARD DISK TEST XXXXXXXX

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

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

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

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

Subtest 01 Sequential read

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

Subtest 02 Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03 Random address/data

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

Subtest 04 Cross talk & peak shift

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

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

Subtest 05 Partial Read

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

Subtest 06 Write specified address

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

Subtest 07 Read specified address

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

Subtest 08 Sequential write

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

Subtest 09 W-R-C specified address

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

3.14 Real Timer Test

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

Subtest 01 Real time

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

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

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

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

```
Enter new date:
```

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

2. If the current date is not correct, input the correct date at the “Enter new date” prompt and press **Enter**.
3. The date is updated and the following messages will appear:

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

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

```
Enter new time:
```

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

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

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

Subtest 02 Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03 Real time carry

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

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

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

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

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

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

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

3.15 NDP Test

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

Subtest 01 NDP

This test checks the following functions of NDP:

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

3.16 Expansion Test

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

Subtest 01 PCMCIA wrap around

NOTE: PCMCIA wrap around 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 01, the following message will appear:
Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

Subtest 02 RGB monitor ID

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

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

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

3.17 CD-ROM/DVD-ROM Test

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

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

- | | | |
|------------|------------------------|--|
| Subtest 01 | Sequential read | This subtest is a sequential reading of one-block units (2K bytes) of all the logical addresses. |
| Subtest 02 | Read specified address | This subtest reads one-block data from a specified address. |
| Subtest 03 | Random address/data | This subtest reads one-block data and multi-block data from random addresses 200 times. |
| Subtest 04 | RW 1point W/R/C | This subtest writes, reads and compares data at one point on a CD/RW media. |

3.18 Error Code and Error Status Names

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

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

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

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

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

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

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

3.19 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

The contents of the HDC status register and HDC error status 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 HDC Error status contents

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

3.20 ONLY ONE TEST

3.20.1 Program Description

This program tests the unique functions of this model.

3.20.2 Operations

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

```
#####
#####          Only One Test Menu (XXXXXXXX)          #####
#####
*
* 1 ..... Pressed Key Display          *
* 2 ..... Touch Pad                    *
* 3 ..... GP Button                    *
* 4 ..... Kill Switch                  *
* 5 ..... USB                          *
* 6 ..... Remocon ( Remote control [Audio] ) *
* 7 ..... LED                          *
* 9 ..... Common Test                  *
*
*****
.... Press test number [1-9] ?
```

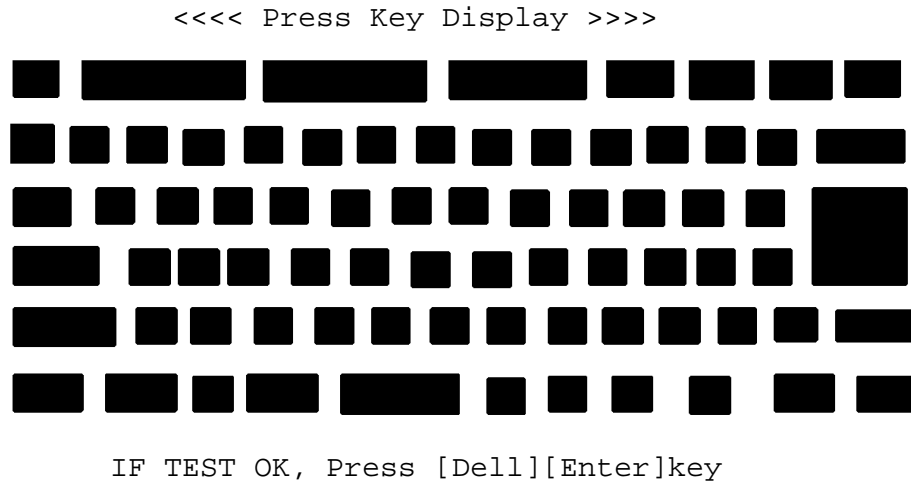
Select the subtest number you want to test and press **Enter**.

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.



NOTE: *The picture displayed on your computer may be slightly different from the figure shown above.*

Subtest 02 Touch Pad

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

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

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

```

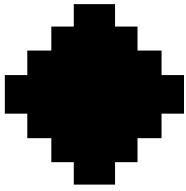

*** IPS (PAD) TEST PROGRAM (Vx.xx) ***

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

<BUTTON>
(1) (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```

```

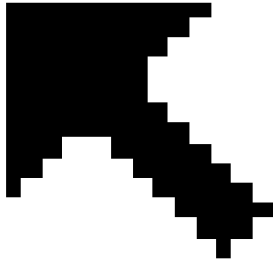

*** IPS (PAD) TEST PROGRAM (Vx.xx) ***

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

<BUTTON>
(1) (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```

Subtest 03 GP Button

This subtest checks if the front operation panel buttons (11 buttons) work properly.

The following message appears in the display.

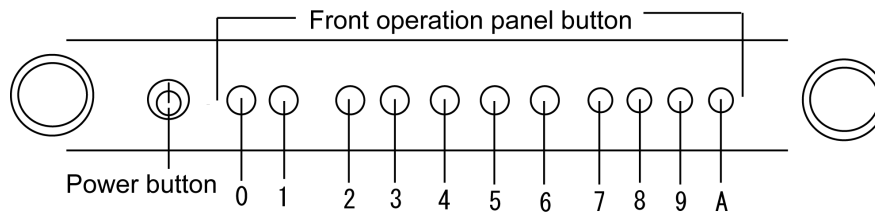
```

0 1 2 3 4 5 6 7 8 9 A
* * * * * * * * * *

```

Press Function button !

Press the front operation panel button from the left (the front operation panel button nearest to power button). The name of front operation panel buttons in the message is described as number (0-A) from the left side. (Refer to the following picture.)



Press the front operation panel button [0], and then the following message will appear in the display.

```

Press Function button ! OK

```

As the same way, press the specified front operation panel button and carry on the front operation panel button test.

If wrong key is pressed, following message will appear in the display.

```

Press Function button ! NG
Functionkeys = XXXX
Press any key !

```

When any key is pressed, message for pressing a front operation panel button will appear in the display again. Unless the right front operation panel button is pressed, this operation is repeated.

After checking all front operation panel buttons, the screen returns to the ONLY ONE TEST menu automatically.

Subtest 04 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 05 USB

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

This subtest checks if USB ports work properly.

The following menu appears in the display.

```
#####
#####          USB Port Select (XXXXXXXX)          #####
#####
*                                                       *
*   0 .....      Port 0                               *
*   1 .....      Port 1                               *
*   2 .....      Port 2                               *
*   9 .....      EXIT                                 *
*                                                       *
*****
.... 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 fail. NG message appears in the display if an error is found during the test. Confirm the connection of cable, and then execute the test again.

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

Subtest 06 Remocon (Remote control [Audio])

This subtest checks if AUDIO button of supplied remote controller works properly.

The following message appears in the display.

```
Press [Remote control Audio] button !
```

Press AUDIO button of the remote controller and return to the ONLY ONE TEST menu.

Subtest 07 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 [PowerSW-LED]= Blue
```

Check if the Power Switch LED lights in Blue.

Press any key and the 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.

3.21 Head Cleaning

3.21.1 Function Description

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

3.21.2 Operations

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

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

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

3.22 Log Utilities

3.22.1 Function Description

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

The error information is displayed in the following order:

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

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

3.23 Running Test

3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 06)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtests 01)

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

3.23.2 Operations

1. Select **6** from the Diagnostic Menu and press **Enter**, the following messages for selectable tests will appear in the display in order.

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

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

3.24 Floppy Disk Drive Utilities

3.24.1 Function Description

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

1. FORMAT

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

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

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

2. COPY

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

3. DUMP

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

4. HDD ID READ

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

3.24.2 Operations

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

```
[ FDD UTILITIES ]

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

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

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

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

- (c) Select a drive type 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 ] = XXXXXXXXXX
LBA number ?????????
```

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

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

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

3.25 System Configuration

3.25.1 Function Description

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

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

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

3.25.2 Operations

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

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

* - Processor Type      = XXXXXX-XXXXXXMHz      Code = XX      L2 Cache = XXXXXXKB
* - Chip set           = XXXXXX                    VRAM = XXXXMB
* - BIOS-ROM Version   = VX.XX      1st ID = XXH, 2nd ID = XXH
* - BOOT-ROM Version   = VX.XX
* - EC Total Version    = VX.XX
* - PS Micon Version    = VX.XX
* - SVP Par. Version    = VX.XX      (Panel=XXXXXXXXXX, Manu=XXXX, Prod=XXXX)
* - Micro code Revision = VX.XX      (Processor=XXXh)
* - Total Memory Size   = XXXXXXMB (Conventional Memory = XXXXKB)
* - Battery Code        = XXXXXXXXXXXXXXXX
* - HWSC                = XXXXXXXX
* - FSB                 = XXXXXXMHz (Voltage = XEh)
* - X Printer Adapter   LPT1 = XXXX   LPT2 = XXXX   LPT3 = XXXX
* - X ASYNC Adapter     COM1 = XXXX   COM2 = XXXX   COM3 = XXXX
* - X Math CO-Processor

* - X Floppy Disk Drive(s)  Track = XX   Head = XX, Sector = XX
* - X Hard Disk Drive(s)   #1 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]
                          #2 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]
* - ODD                   = XXXX XXXXXXXX XXXXXXXX [XXXXXXXXXXXXXXXX]
* - T&D Total Version      = VX.XX

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

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

3.26 Wireless LAN Test Program (Intel-made b/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 11b/g 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. When 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 to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Using a wrong wireless LAN card (Using unspecified card)
- ? Defective wireless LAN card

Check the connection and execute the subtest again.

Subtest02 MAC Address Check

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

```

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

```

Press any key to return to the test menu.

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

```

*****MAC CHECK*****
ERROR: MAC all 0
MAC = XXXXXXXXXXXX
*****
*****
*
* MAC Address Check : NG !!
*
*****

```

Press any key to return to the test menu.

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

- ? Bad of wireless LAN card
- ? Defective wireless LAN card
- ? Disappearance of MAC address data

Check the connection and execute the subtest again.

Subtest03 Antenna check & communication test of 11b mode

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

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

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

Turn on the responder machine before selecting subtest 03-05.

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 to 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 to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Bad connection of wireless LAN antenna cable (Main/Aux)

- ? Bad environment for wireless LAN communication (Interference/obstruction)
- ? Defective wireless LAN card

Check the connection and condition, and 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 to 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 to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Bad connection of wireless LAN antenna cable (Main)
- ? Bad environment for wireless LAN communication (Interference/obstruction)
- ? Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

Subtest05 All the tests of Calexico 11b/g Card

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

3.27 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 Calexico 11a/b/g Card       *
*      (SKU & MAC Check, 11a/b/g communication test)   *
*                                                       *
*****
```

SELECT TEST No.(1-6) :

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

Subtest01 SKU check of Module

This subtest displays SKU information on the wireless LAN card installed. When 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 to 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 to continue

```

Press any key to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Using a wrong wireless LAN card (Using unspecified card)
- ? Defective wireless LAN card

Check the connection and execute the subtest again.

Subtest02 MAC Address Check

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

```

*****MAC CHECK*****
MAC = XXXXXXXXXXXXX
*****
*
*   MAC Address Check : OK !!
*
*****

```

Press any key to return to the test menu.

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

```

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

```

Press any key to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Defective wireless LAN card
- ? Disappearance of MAC address data

Check the connection and execute the subtest again.

Subtest03 Antenna check & communication test of 11b mode

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

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

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

Turn on the responder machine before selecting subtest 03-06.

Setting the responder machine

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

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

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

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

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

*

*

```

*                               Aux Antenna Test : NG !!                               *
*                                                                                       *
*****

```

Press any key to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Bad connection of wireless LAN antenna cable (Main/Aux)
- ? Bad environment for wireless LAN communication (Interference/obstruction)
- ? Defective wireless LAN card

Check the connection and condition, and 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 to 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 to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Bad connection of wireless LAN antenna cable (Main)
- ? Bad environment for wireless LAN communication (Interference/obstruction)
- ? Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

Subtest05 Communication test of 11g mode

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

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

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

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

3.28 Wireless LAN Test Program (Askey-made)

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

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

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

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

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

Setting the responder machine

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

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

Setting the tester (DUT) machine

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

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

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

3. Take out the program disk 1 and insert program disk 2. Then, press **S** and **Enter**.

4. When the program disk 2 starts, following menu will appear in the display. To execute the subtest, press test number and **Enter**.

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

SELECT TEST No.(1-7) :
```

Subtest01 SKU check of Module

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

```
*****
*
*   Module   : Atheros MB44ag (RoW)                 *
*   G code   : G36C00010310                         *
*                                                    *
*****
```

Press any key to return to the test menu.

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

- ? Bad connection of wireless LAN card
- ? Using a wrong wireless LAN card (Using unspecified card)
- ? Defective wireless LAN card

Check the connection and execute the subtest again.

Subtest02 MAC Address Check

This subtest reads out the MAC address of the card installed and confirms if it is valid. When the MAC address is valid one, following message will appear in the display.

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

Press any key to 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

Check the connection and execute the subtest again.

Subtest03 Communication test of 11a mode (MB44ag)

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

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

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

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

Press any key to return to the test menu.

When a defective is found, open the log file (log.txt) and check the result.

Moreover, following typical cause is considered.

- ? Bad connection of wireless LAN card
- ? Bad connection of wireless LAN antenna cable (Main/Aux)
- ? Environment for wireless LAN communication (Interference/ obstruction)
- ? Defective wireless LAN card

Check the connection and condition, and execute the subtest again.

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

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

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

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

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

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

Subtest06 All the tests of MB43g Module

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

Subtest07 All the tests of MB44ag Module

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

3.29 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.

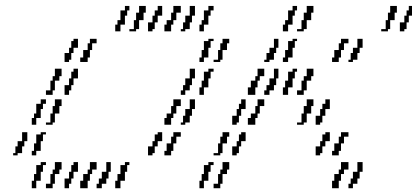
The following message will appear:

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

LOOPBACK TEST

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

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



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

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

Subtest02 (GbE)

CAUTION: Gigabit Ethernet (GbE) test is not supported for this model.

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

The following message will appear:

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



NOTE: The menu displayed on 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 Electric Manufacture Co.,Ltd)” 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 on 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 of the LED of the connection checker is orange, press **Y**. Otherwise, press **N**.

3.29.3 Bluetooth test

CAUTION: *Bluetooth test is not supported for this model.*

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          #####
#####
*
*  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       AAAAAA   S       S
P       A   A   S   S   S   S
P       A   A   SSSSS   SSSSS

```

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

```

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

My BD_ADDR = XXXXXXXXXXXX [h]

FFFFFF      A      III  L
F           A A      I  L
F           A  A      I  L
FFFFFF  A      A      I  L
F           AAAAAA    I  L
F           A      A      I  L
F           A      A      III LLLLLL
    
```

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 Communications test (DUT mode)

Subtest T Communications test (TEST mode)

This subtest checks the Bluetooth communication functions. Set the responder machine to DUT mode and tester machine to TEST mode.

Insert a floppy disk containing the test program into the responder machine and turn on the power. The Bluetooth test menu will appear.

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

When the test begins, the machine displays BD_ADDR of the DUT. The progress bar appears when the preparation 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 = XXXXXXXXXXXXX [h]
+-----+

      CCCC      OOO  M      M PPPPPP  L      EEEEEEE TTTTTTTT EEEEEEE 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      EEEEEEE  T      EEEEEEE 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 EEEEEEE  T      EEEEEEE DDDDD

                                Testing is finished

A>_

```

If the DUT machine has any problem or **S** of the DUT machine is pressed before connection to tester machine, the following message “INCOMPLETE” is displayed.

```

-----
-
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      EEEEEEE TTTTTTTT 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      EEEEEEE  T      EEEEEEE
I  N      NN  C  C  O  O  M      M P      L      E          T      E
III  N      N  CCCC      OOO  M      M P      LLLLLLL EEEEEEE  T      EEEEEEE

                                Testing is finished

```

A>

If any problem is detected during the test, the message **FAIL** is displayed on the tester machine with 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.

Table 3-8 Common error code

Error code	Meaning
0x30	BT Control Status should be "Disable", but it is "Enable".
0x31	BT Control Status should be "Enable", but it is "Disable".
0x32	Power Status should be "OFF", but it is "ON".
0x33	Power Status should be "ON", but it is "OFF".
0x34	USB I/F Status should be "Attach", but it is "Detach".
0x35	USB I/F Status should be "Detach", but it is "Attach".
0x36	Wake-up Status should be non-"Assert", but it is "Assort".
0x37	Wake-up Status should be "Assert", but it is non-"Assort".
0x38	Switch Status should be "OFF", but it is "ON".
0x39	Switch Status should be "ON", but it is "OFF".
0x3a	Module dose not exist.
0x3b	Module exists. (not error)
0x3c	Command Line is wrong.
0x3d	Side band access driver is not resident.
0x3e	Bluetooth driver for DOS is not resident.
0x3f	Get Status function of Side band access driver is not normal.
0x40	No reply to inquiry
0x41	Device Descriptor can not be acquired. USB I/F is not normal.
0x42	Sideband reset timeout occurs.
0x43	Descriptor type is wrong.
0x44	Descriptor is acquired in spite of Detach condition.
0x45	Configuration file open is not normal.
0x46	Contents of Configuration file are wrong.
0x47	BD_ADDR is wrong (00)
0x48	BD_ADDR is wrong (FF)
0x49	BD_ADDR is wrong (bit0=1)
0x4a	BD_ADDR is wrong (bit1=1)
0x4b	BD_ADDR is wrong (address defined as an error)
0x4c	Suspended during Hard ware switch confirmation.
0x4d	RSSI value is less than the standard value.
0x4e	Holts
0x4f	(reserved)

** Number 0x30 to 0x40 are common error codes of the test program.

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 responder 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 tester 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 tester 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 USB 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".
```

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

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

Subtest02 Sine Wave

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

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

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

Subtest03 Line IN recording & play

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

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

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

3.30.2 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). The 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  xxxxxxxx DIAGNOSTIC TEST VX.XX
                                         [Ctrl]+[Break] : test end
                                         [Ctrl]+[C]   : key stop
```

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

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

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

Subtest01 Japanese Narration

When selecting 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 to stop the narration. Then the test returns to the CD Sound (Standard) test menu.

Subtest02 English Narration

When selecting this subtest, narration in English starts.

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

Subtest03 Test Tone A

<p>CAUTION: <i>Before starting subtest03, be sure to set the sound at proper volume.</i></p>

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

The test returns 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.

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

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

```

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

```

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

```

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

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

```

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

```

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

NOTE: When the CD-ROM test is executed, [All Devices] must be selected in the "Device Config.=" of the BIOS SETUP. If the [All Devices] 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
4. Password
5. Boot Priority
 - (a) Boot Priority
 - (b) Network Boot Protocol
6. Display
 - (a) Power On Display
 - (b) LCD Display Stretch
 - (c) TV Type
7. Others
 - (a) Dynamic CPU Frequency Mode
 - (b) Execute-Disable Bit Capability
 - (c) Auto Power On
 - (d) Diagnostic Mode
8. Configuration
9. Drives I/O
 - (a) Built-in HDD
 - (b) CD-ROM
10. PCI Bus
11. Peripheral
 - (a) Internal Pointing Device
12. LEGACY EMULATION
 - (a) USB KB/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation
13. PCI LAN

3.31.2 Accessing the SETUP Program

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

```

                                SYSTEM SETUP (1/2)                                ACPI BIOS version = X.XX
----- MEMORY -----
Total                = XXXX MB

----- SYSTEM DATE/TIME -----
Date (MM-DD-YY)     = XX-XX-XXXX
Time (HH:MM:SS)     = XX:XX:XX

----- BATTERY -----
Battery Save Mode = Full Power
PCI Express Link ASPM = Auto

----- PASSWORD -----
Not Registered

----- BOOT PRIORITY -----
Boot Priority = HDD→FDD→CD-ROM→LAN
Network Boot Protocol = PXE

----- Display -----
Power On Display    = Auto-Selected
LCD Display Stretch = Enabled
TV Type             = NTSC (JAPAN)

----- OTHERS -----
Dynamic CPU Frequency Mode *1
                    = Dynamically Switchable
Execute-Disable Bit Capability
                    = Available
Auto Power On      = Disabled
Diagnostic Mode    = Disabled
    
```

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

```

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

----- CONFIGURATION -----
Device Config. = Setup by OS

----- PERIPHERAL -----
Internal Pointing Device = Enabled

----- DRIVERS I/O -----
Built-in HDD
    = Primary IDE (1F0H/IRQ14)
CD-ROM
    = Secondary IDE (170H/IRQ15)

----- LEGACY EMULATION -----
USB KB/Mouse Legacy Emulation    = Enabled
USB-FDD Legacy Emulation         = Enabled

----- PCI BUS -----
PCI BUS = IRQ10, IRQ11

----- 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

NOTE: *1 This message appears only on the Pentium model.

Moving Within the SETUP Menu and Changing Values

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

Accepting Changes and Exiting the SETUP Window

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

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

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

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

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

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

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

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

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

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

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

SETUP Options

The SETUP screen is divided into 13 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

You can set the date and time. To set the date and time, press **Space bar** or **Back Space**. To switch System Date and System Time, press ? or ??

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
Display Auto off	= 30Min (*1)
HDD Auto off	= 30Min (*1)
LCD Brightness	= Bright (*2)
	= Super-Bright (*3)
Cooling Method	= Maximum Performance

Low Power The following shows low power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= Low
CPU Sleep Mode	= Enabled
Display Auto Off	= 03Min (*1)
HDD Auto Off	= 03Min (*1)
LCD Brightness	= Bright (*3)
	= Semi-Bright (*2)
Cooling Method	= Battery Optimized

NOTE: (*1) This message appears only on the Pentium model.

Display of the LCD Brightness will be changed in the condition below:

(*2) Operating the battery

(*3) Using the AC adapter

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

Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

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

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

CPU Sleep Mode

Use this option to enable or disable the CPU sleep function. When the CPU sleep function is enabled, the machine saves power consumption while waiting the next processing.

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel's illumination off

if you make no entry (including no operation of a mouse or touch pad) for the set period of time. This option appears only on the Pentium model.

Disabled Disables display automatic power off.

xx Min. Automatically turns off the power to the LCD panel's illumination if the panel is not used for the duration set. The duration **xx** can be set to **1, 3, 5, 10, 15, 20** or **30** minutes.

HDD Auto Off

Use this option to set the duration of the HDD automatic power off function. This option appears only on the Pentium model.

xx Min. Automatically turns off the power to the hard disk drive if it is not used for the duration set. The duration **xx** can be set to **1, 3, 5, 10, 15, 20** or **30** minutes.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.
Bright Full brightness for high visibility.
Semi-Bright Less than full brightness for saving power.

CPU Cooling Method

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

NOTE: Too hot condition may cause defect on the CPU. When the hot condition continues, the power is automatically turned off in hibernation 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. (Default)
Disabled Disables the power saving function and gives priority to the performance.

Enabled

Saves power consumption, when the PCI Express device is not used.

4. Password

This option sets or resets the user password for power on and instant security (**Fn+F1**).

Registered The user password has been registered.

Not registered The user password has not been registered.

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

5. Boot Priority

(a) Boot Priority

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

FDD? HDD? CD-ROM? LAN: The computer looks for bootable files in the following order: FDD, HDD, CD-ROM (*1) and LAN.

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

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

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

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

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

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

(b) Network Boot Protocol

Use this option to set the starting method via a network.

PXE Sets to PXE protocol. (Default)

RPL Sets to RPL protocol.

6. Display

This group of options configures the computer's display.

(a) Power On Display

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

Auto-Selected Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)

LCD+AnalogRGB Selects both the internal LCD and the external monitor for simultaneous display.

NOTE: When starting the computer in Resume mode, the last configuration is enabled. When data does not appear on the display after starting in Resume mode, pressing **Fn+F5**. Pressing **Fn+F5** changes the display setting as follows in order: the internal LCD, the external display, both the internal LCD and the external display.

You cannot select TV display in HW Setup. To display on a TV screen, use **Fn+F5**.

When an external monitor, which does not support SVGA mode is connected and "LCD+AnalogRGB" is selected, the external display is not displayed.

(b) LCD Display Stretch

When LCD Display Stretch is enabled, it is possible to stretch the picture in small resolution mode.

Enabled Enables the LCD display stretch feature. (Default)

Disabled Disables the LCD display stretch feature.

(c) TV Type

This option allows you to select the type of TV.

NTSC (Japan) TV in Japanese system

NTSC (US) TV in the U.S. system

PAL TV in Europe and China system

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) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings. This option appears only on the Pentium model.

Dynamically Switchable

Enables Pentium-M processor featuring Intel SpeedStep technology. (Default)

Always High

Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.

Always Low

Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its default speed.

(b) 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

Enables the Execute-Disable Bit Capability.

Not Available

Disables the Execute-Disable Bit Capability. (Default)

(c) Auto Power On

This option displays setting for Auto Power On.

Disabled

Indicates auto power on is not set. (Default)

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

Set the parameters for the Auto Power On (automatic power on) function in the "OPTIONS" window. To set the time, use **Space bar** 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.

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

(d) Diagnostic Mode

This option enables/disables the HW Diagnostic test function.

- | | |
|-----------------|---|
| Disabled | Disables the HW Diagnostic test function. (Default) |
| Enabled | Enables the HW Diagnostic test function. |

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: When using installed OS, selecting “Setup by OS” is recommended. But when executing test programs, 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 cannot be changed. |
|---------------------|-------------------------|

CD-ROM

This 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. 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.

12. 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.

13. 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.

Chapter 4

Replacement Procedures

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4.1 Overview

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

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

The tilt stand can be removed without any other FRUs removed.

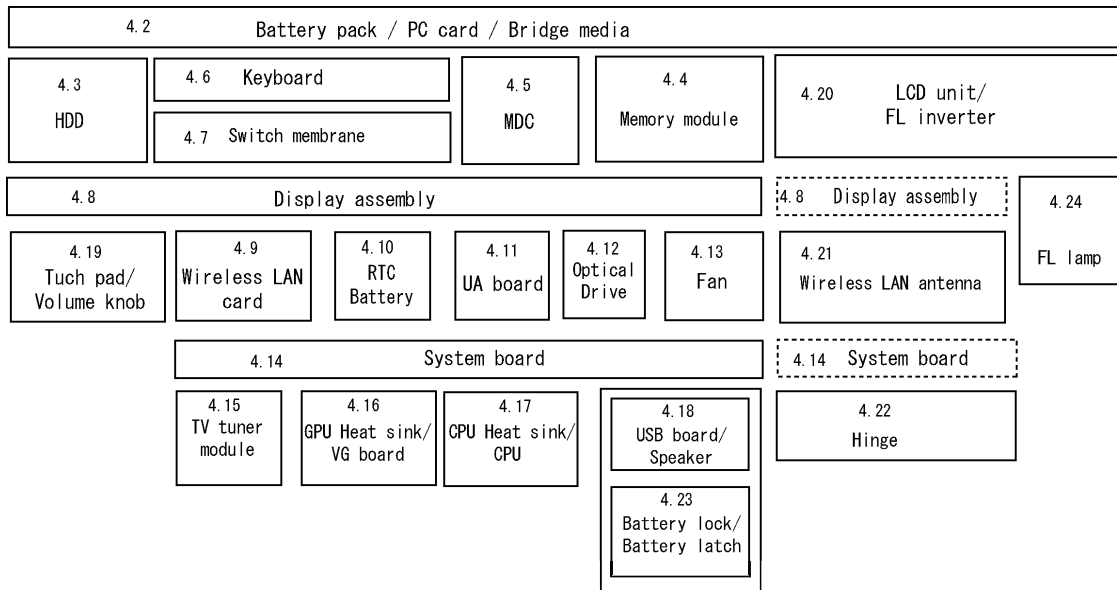
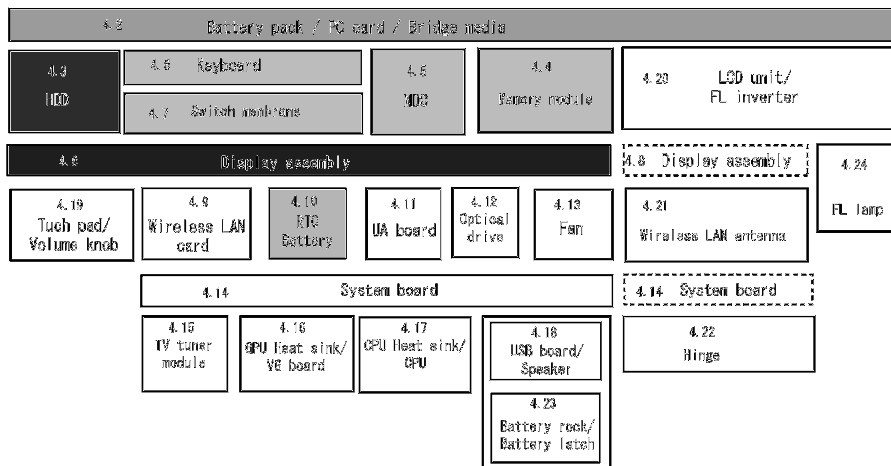


Chart notion

This chart shows the order of disassembling computer to remove the object parts.

In the case of removing the fan, the parts of 4.2 to 4.8 which are right above the 4.10 RTC battery.



Safety Precautions

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

- DANGER:**
- 1. In the case of the battery, always use authentic parts or equivalent parts approved by Toshiba. Other batteries may have different specifications that are incompatible with the computer and may result in fire or explosion.
Due to the risk of alkali fluid leaks, never attempt to heat or disassemble the battery. Similarly, due to the risk of explosion, never expose the battery to flame.*
 - 2. Some parts including the power supply and FL inverter generate high voltages. If you need to turn on the power while disassembling the computer, do not touch any connectors or other components due to the risk of electric shock. Also, do not disassemble individual parts when performing routine maintenance.*

- WARNING:**
- 1. To prevent electric shock, turn off the power unplug the AC adapter from the power source.*
 - 2. As the battery installed to the computer is typically already charged, the risk of electric shock remains even when the AC adapter is unplugged from the socket. To prevent electric shock, always take off any metal jewelry or accessories such as necklaces, bracelets or rings before working on the computer. Never work with wet or moist hands.*
 - 3. Take care not to injury yourself on any edges or corners.*

- CAUTION:**
- 1. Confirm that replacement parts have compatible specifications before replacing on the computer. Never use incorrect parts as these may cause faults on the computer.*
 - 2. To prevent internal damage such as short circuits or burning, do not allow any screws, paper clips, or other metal objects to fall into the computer. When removing screws, always replace with the same size screw. Ensure that all screws are fully tightened. Loose screws may result in short circuits leading to overheating, smoke or flame.*
 - 3. To prevent electric shock, check that you have disconnected all cables from a part before removing the part.*
 - 4. When connecting to the AC power supply, use only an AC adapter and cable approved by Toshiba.*
 - 5. To prevent electric shock, ensure that all replacement parts are compatible with the computer and that all cables and connectors are securely connected.*

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 “4.2.1 Battery Pack”.

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

Disassembly Procedure

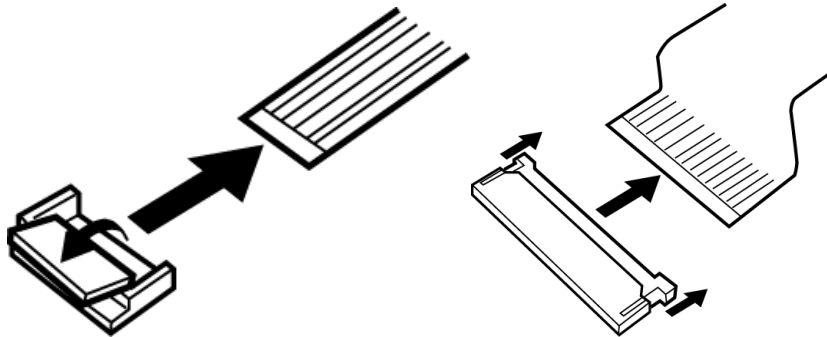
Three main types of cable connector are used.

- ? Pressure plate connector
- ? Spring 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.

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



Spring connector

Pressure plate 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)
- ? Tweezers (for lifting screws)
- ? Wireless LAN cable remover
- ? ESD mats (lay on work table or floor)
- ? An ESD wrist strap and heel grounder
- ? Anti-static carpet or flooring

Screw Tightening Torque

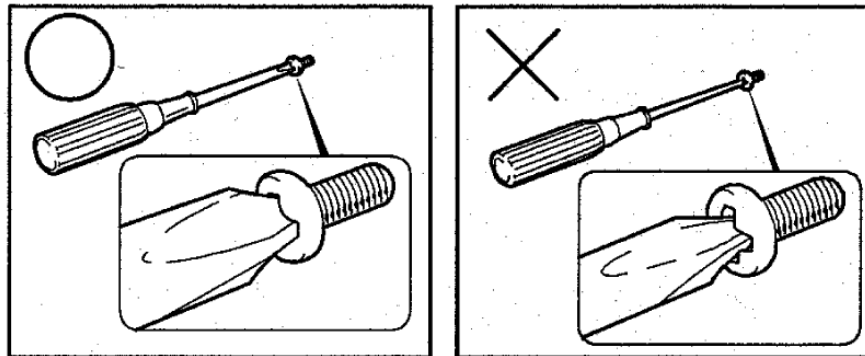
Use the following torque when tightening screws.

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)	0.156N·m (1.6?0.2 kgf ·cm)
? M2.5 (2.5mm)	0.284 N·m(2.9?0.4 kgf ·cm)
? M3.0 (3mm)	0.46 N·m (4.7?0.7 kgf ·cm)

NOTE: To prevent damage to *THIN HEAD* screws, 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, 2.8 mm and so on.

Screw Notation

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

Format:

Screw shape + Screw length (mm)

Screw shape ()

B: Bind screw (BIND)

F: Flat head bind screw (FLAT HEAD)

S: Super thin head screw (S-THIN HEAD/U-THIN HEAD)

T: Tapping screw (TAPPING)

U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm bind screw

* (): Description in this manual.

4.2 Battery pack/PC card/Bridge Media

4.2.1 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** by moving it to the arrow direction.
5. Slide the **battery latch** to the arrow direction and remove the **battery pack**.

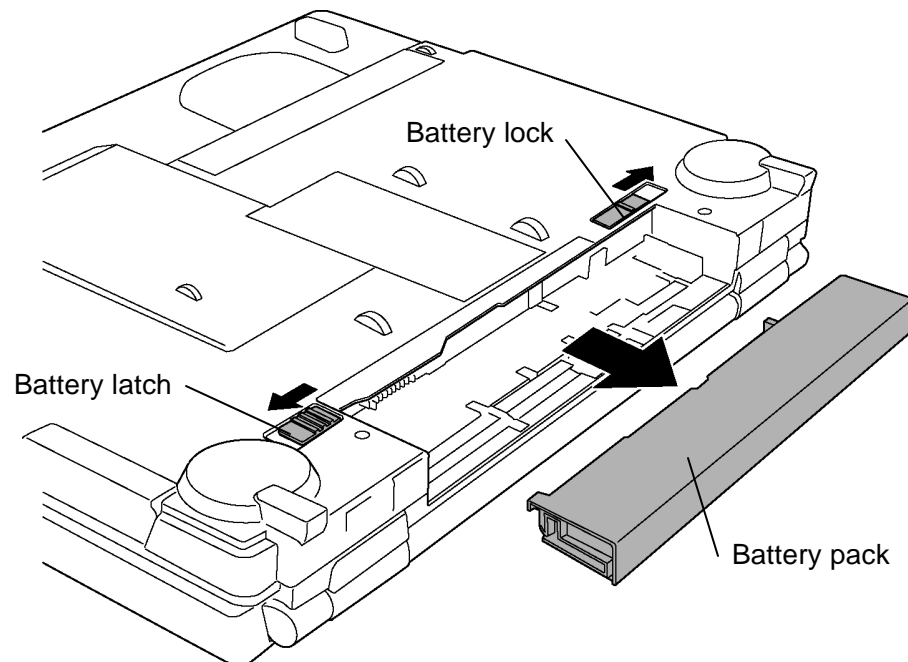


Figure 4-1 Removing the battery pack

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: *The lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used battery 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 **battery pack** into the slot all the way to the end.

NOTE: *Make sure that the battery pack is securely in place and the battery lock is in the lock position.*

4.2.2 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 face up.
2. Push the **eject button**. It will pop out when you release it. Then press once more the eject button to eject the PC card.
3. Grasp the **PC card** and remove it.

NOTE: If the PC card is not inserted all the way, the eject button may not pop out. Be sure to push the PC card firmly and press the eject button again.

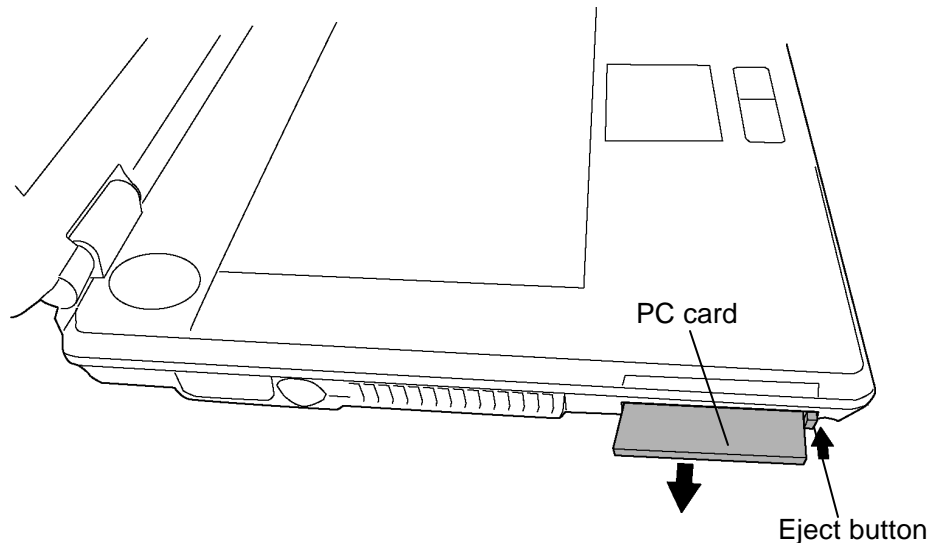


Figure 4-2 Removing the PC card

Installing the PC card

The following describes the procedure for inserting the PC card (See Figure 4-2).

1. Make sure the **eject button** does not stick out.
2. Insert the **PC card** and press it until it is securely connected.

4.2.3 Bridge Media (SD Card / Memory Stick / xDPicture Card/Multi Media Card)

Removing the Bridge media

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 each Bridge Media manual or the manuals of the computer system you are using.

1. Push a **Bridge media**. It will pop out partly when you release, so pull out the card.

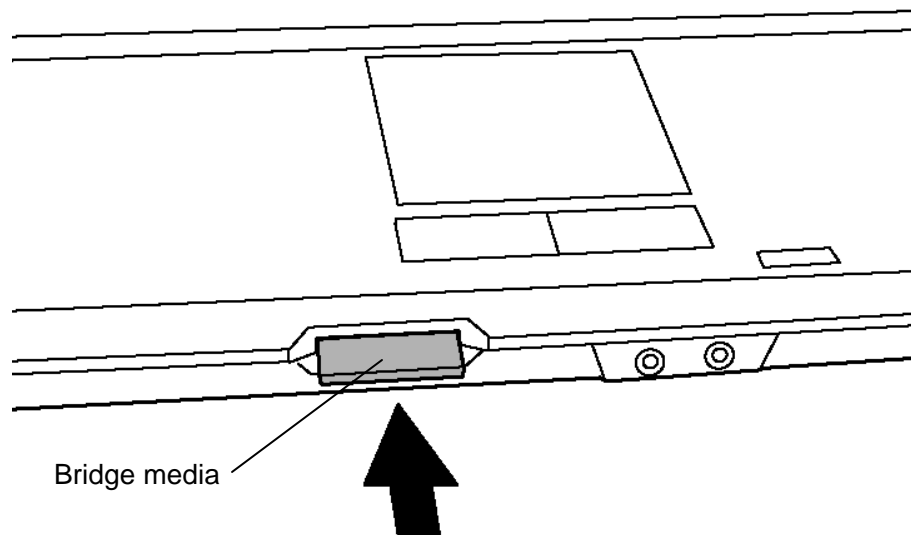


Figure 4-3 Removing the bridge media

Installing the Bridge media

The following describes the procedure for inserting the bridge media (See Figure 4-3).

1. Insert a **bridge media** and press it until it is securely connected.

4.3 HDD

Removing the HDD

The following describes the procedure for removing the HDD (See Figure 4-4, 4-5 and 4-6).

CAUTION: Be careful not to drop or leave screws in the PC.

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. Remove the following **screw** fixing the HDD slot cover and remove the **HDD slot cover**.

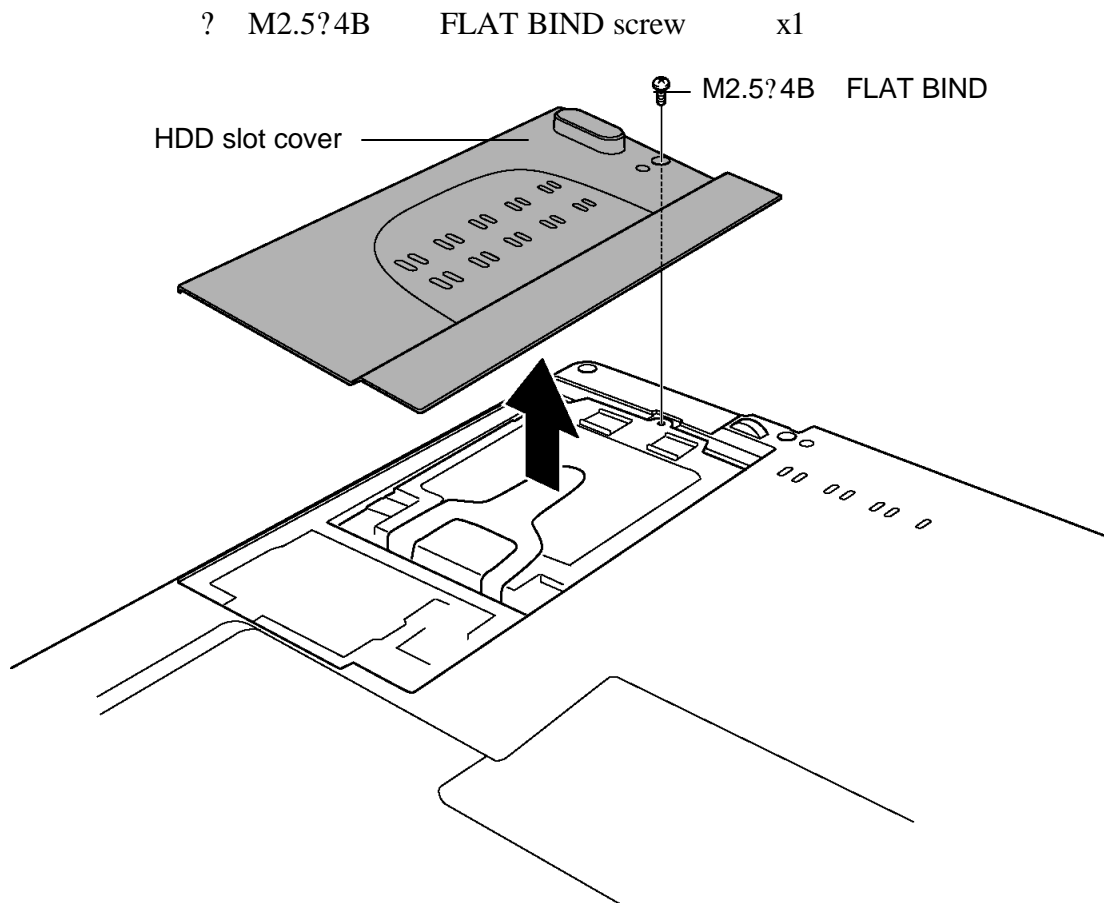


Figure 4-4 Removing the HDD slot cover

3. Hold the **HDD tab** and slide the **HDD assembly** in the direction of the arrow and take out the HDD assembly from the HDD connector.

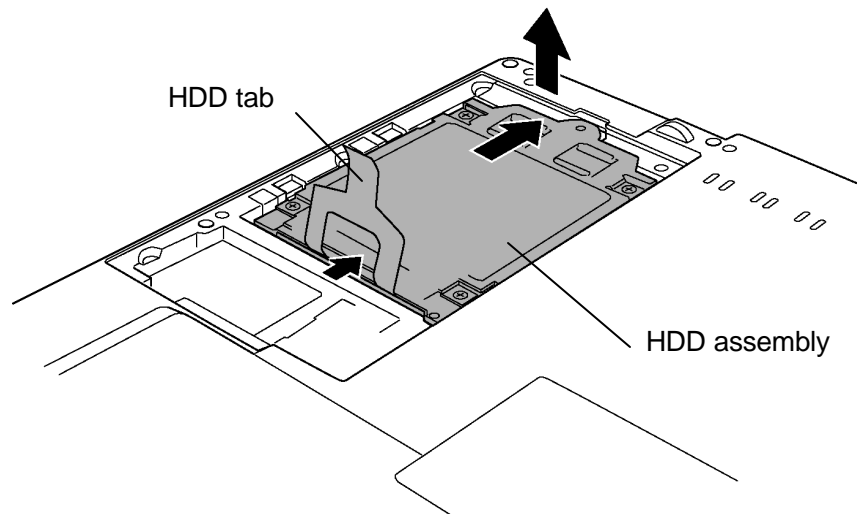


Figure 4-5 Removing the HDD assembly

4. Remove the following **screws** fixing the **HDD assembly**.

? M3?4S FLAT BIND x4

5. Detach the **HDD holder** from the **HDD**.

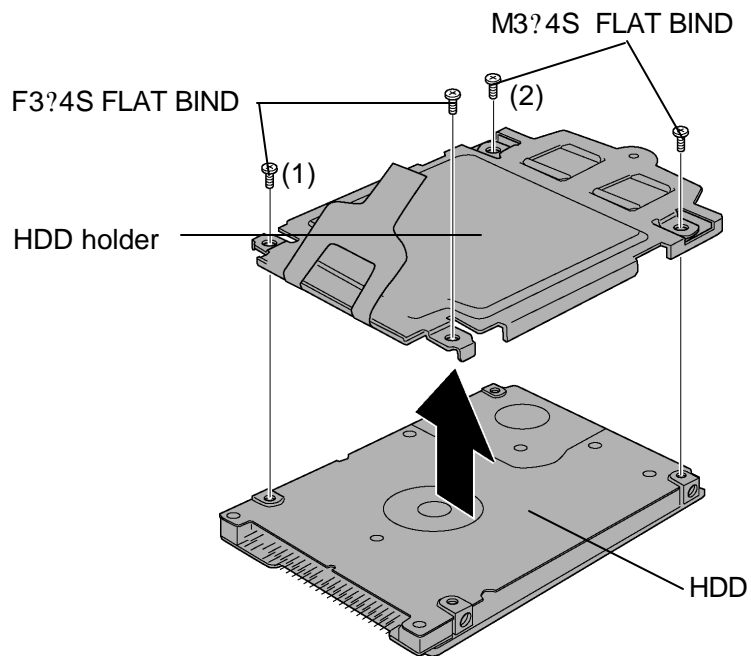


Figure 4-6 Removing the HDD

Installing the HDD

The following describes the procedure for installing the HDD (See Figure 4-4, 4-5 and 4-6).

1. Install the **HDD** to the **HDD holder** and secure them with the following **screws**.

? M3?4S FLAT BIND x4

NOTE: 1. Although they are 3mm head screws, screw torque must be set in 0.284 N·m (2.9?0.4 kgf·cm) for four screws securing the HDD holder.
2. Tighten the screw in the order of (1) and (2).

2. Insert the **HDD assembly** into the HDD slot and slide it carefully to the connector **CN1800** on the system board.
3. Install the **HDD slot cover** and secure it with the following **screw**.

? M2.5?4B FLAT BIND x1

4.4 Memory module

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

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

Never press hard or bend the memory module.

Removing the memory module

To remove the memory module, confirm that the computer is turned off in boot mode (Not in standby mode or hibernation mode). Then perform the following procedure (See Figure 4-7).

1. Loosen the **screw (with an e-ring)** fixing the **memory slot cover**.
2. Remove the **memory slot cover**.
3. Open the left and right **latches** and remove the **memory module**.

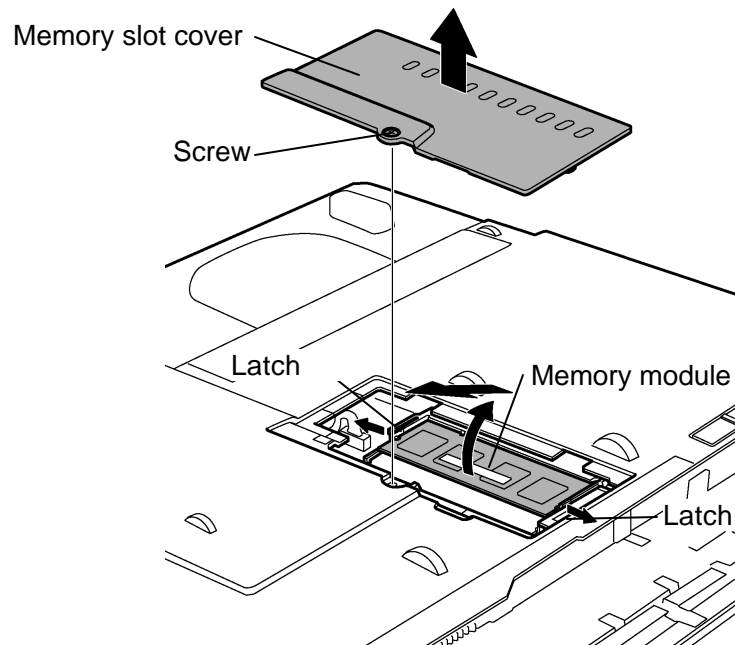


Figure 4-7 Removing the memory module

Installing the memory module

To install the memory module, confirm that the computer is turned off in boot mode (Not in standby mode or hibernation mode). Then perform the following procedure (See Figure 4-7).

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

CAUTION: 1. *The power must be turned off when you insert the memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

2. *Never press hard or bend the memory module.*

3. *When installing a memory module, always install it to Slot A (near to the system board) first.*

4. *After installing a memory module, make sure the right and left latches are surely latched.*

2. Install the **memory slot cover** and secure it with the **screw (with an e-ring)**.
3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.
4. If the memory is not detected, check that it is connected correctly.

4.5 MDC

Removing the MDC

The following describes the procedure for removing the MDC (See Figure 4-8).

1. Remove the following **screws** fixing the MDC and pull the **MDC** straight up from the connector **CN3010** on the system board.

? M2?4B S-THIN HEAD x2

2. Turn over the MDC and remove the **Modem cable** from the MDC.

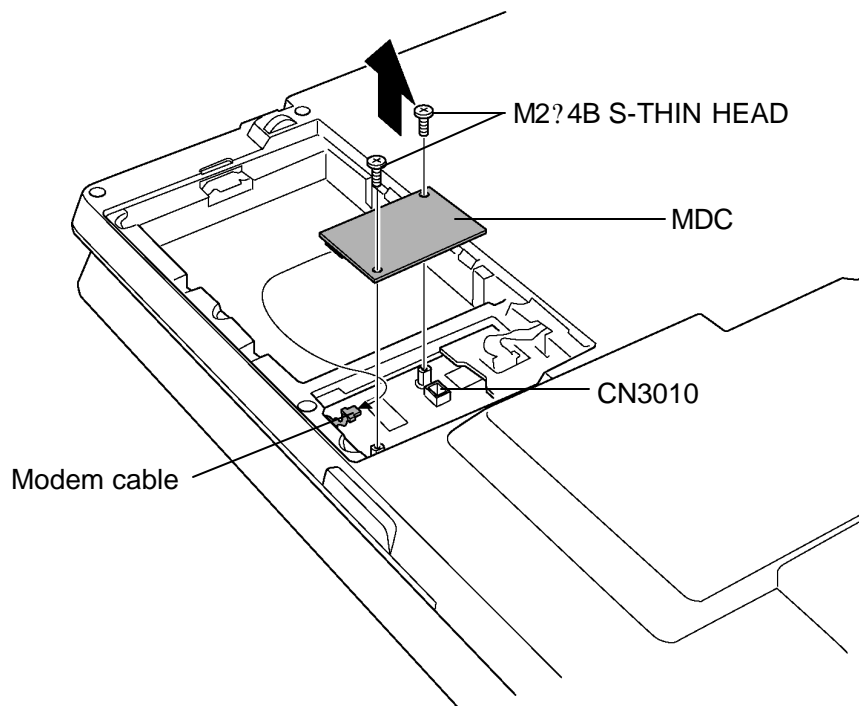


Figure 4-8 Removing the MDC

Installing the MDC

The following describes the procedure for installing the MDC (See Figure 4-8).

1. Connect the **Modem cable** to the **MDC**.
2. Connect the **MDC** to the connector **CN3010** on the system board.
3. Secure the MDC with the following **screws**.

? M2?4B S-THIN HEAD x2

4.6 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard (See Figure 4-9 to 4-11).

CAUTION: As the keytop may fall out, when handling the keyboard always hold it by the frame and do not touch the keytop.

1. Turn the computer face up and open the display.
2. Insert your finger into the spaces between the **speaker cover** and the computer. Then, lift up the **speaker cover** to unlatch and remove it.

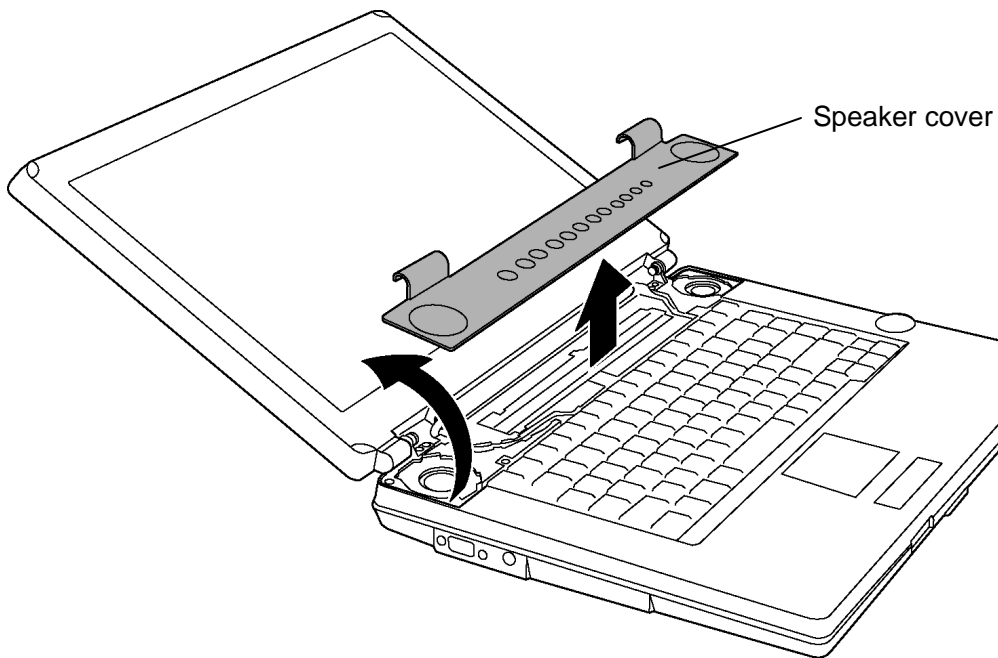


Figure 4-9 Removing the speaker cover

3. Remove the following **screws** fixing the keyboard.

? M2.5?4B FLAT BIND x2

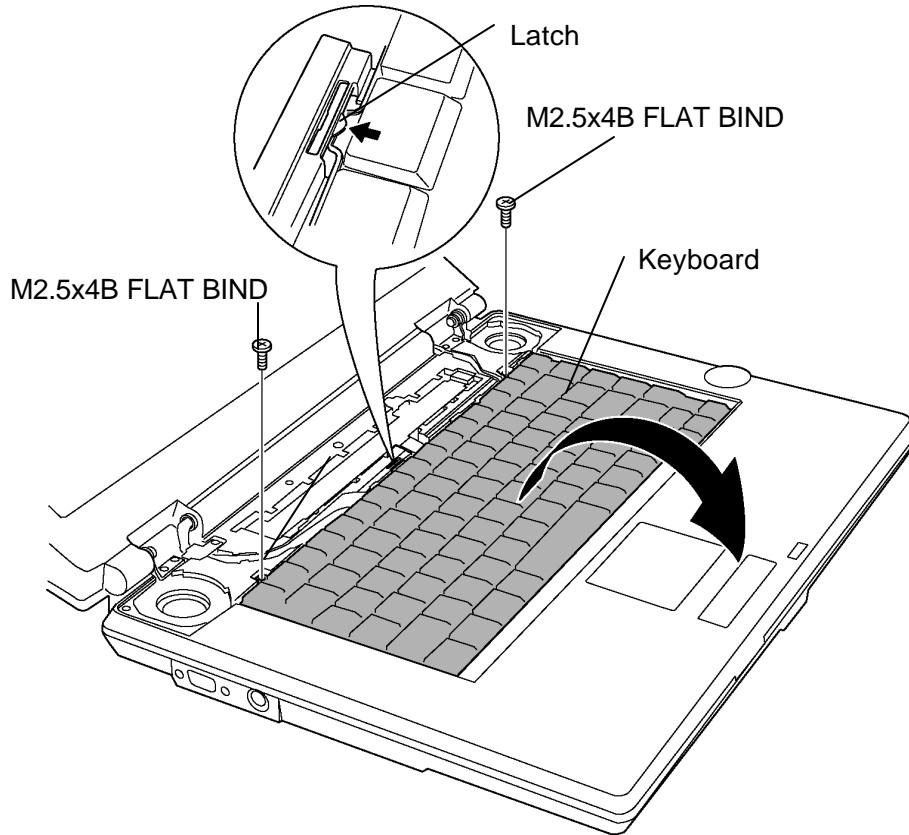


Figure 4-10 Removing the keyboard

4. Push the latch to release the keyboard and lift the upper side of the **keyboard** and turn it face down on the palm rest.

5. Remove the following **screws** fixing the **keyboard support plate**.

? M2.5?6B FLAT BIND screw x1

6. Remove the **keyboard support plate**.

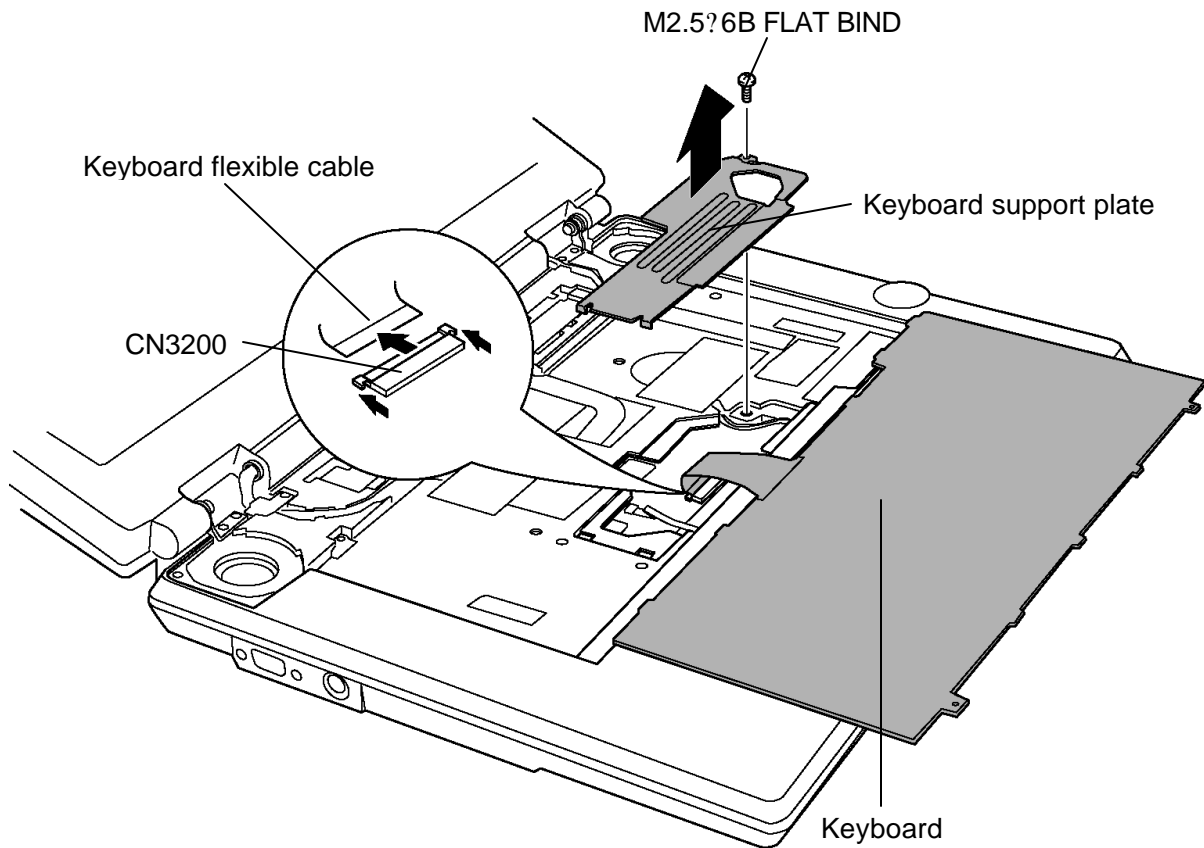


Figure 4-11 Removing the keyboard support plate

7. Disconnect the **keyboard flexible cable** from the connector **CN3200** on the system board.

8. Remove the **keyboard**.

Installing the keyboard

The following describes the procedure for installing the keyboard (See Figure 4-9 to 4-11).

1. Turn the **keyboard** upside down and place it on the palm rest as its face down. Connect the **keyboard flexible cable** to the connector **CN3200** on the system board.
2. Install the **keyboard support plate** from the left side (opposite to the screw hole) and secure it with the following **screw**.

? M2.5?6B FLAT BIND x1

3. Turn the **keyboard** face up and put it on the computer. Make sure that there is no space between the keyboard and the computer.
4. Secure the **keyboard** with the following **screws**.

? M2.5?4B FLAT BIND x2

5. Install the **speaker cover**, pressing it.

4.7 Switch membrane

Removing the switch membrane

The following describes the procedure for removing the switch membrane (See Figure 4-12).

1. Disconnect the **switch membrane cable** from the connector **CN9650** on the system board.
2. Remove the following **screw** fixing the membrane switch.

? M2.5x4B FLAT BIND x1

3. Slide the **switch membrane** to the arrow direction and remove it.

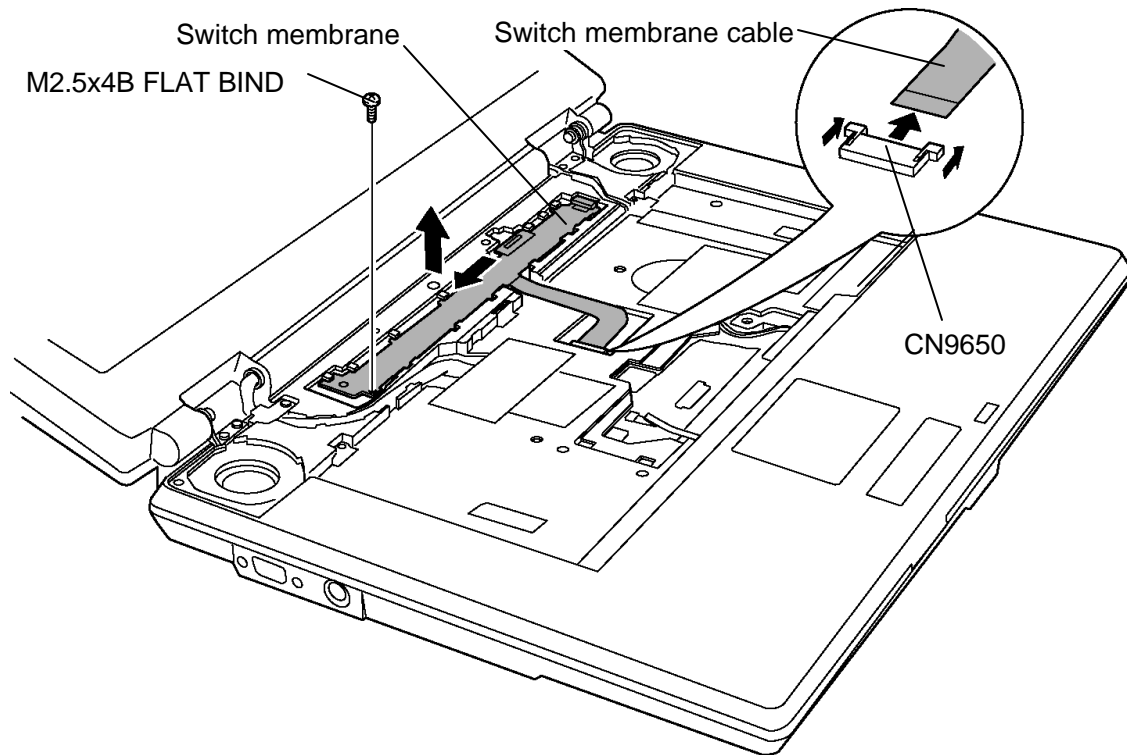


Figure 4-12 Removing the switch membrane

Installing the switch membrane

The following describes the procedure for installing the switch membrane (See Figure 4-12).

1. Slide the **switch membrane** to install and secure it with the following **screw**.

? M2.5x4B FLAT BIND screw x1

2. Connect the **switch membrane cable** to the connector **CN9650** on the system board.

4.8 Display assembly

Removing the display assembly

The following describes the procedure for removing the display assembly (See Figure 4-13 to 4-19).

1. Close the display and turn the computer upside down.
2. Remove the following screws from the bottom of the computer.

? M2.5? 12B	FLAT BIND screw	x11 (“12” in the figure)
? M2.5? 6B	FLAT BIND screw	x7 (“6” in the figure)
? M2.5? 4B	FLAT BIND screw	x4 (“4” in the figure)

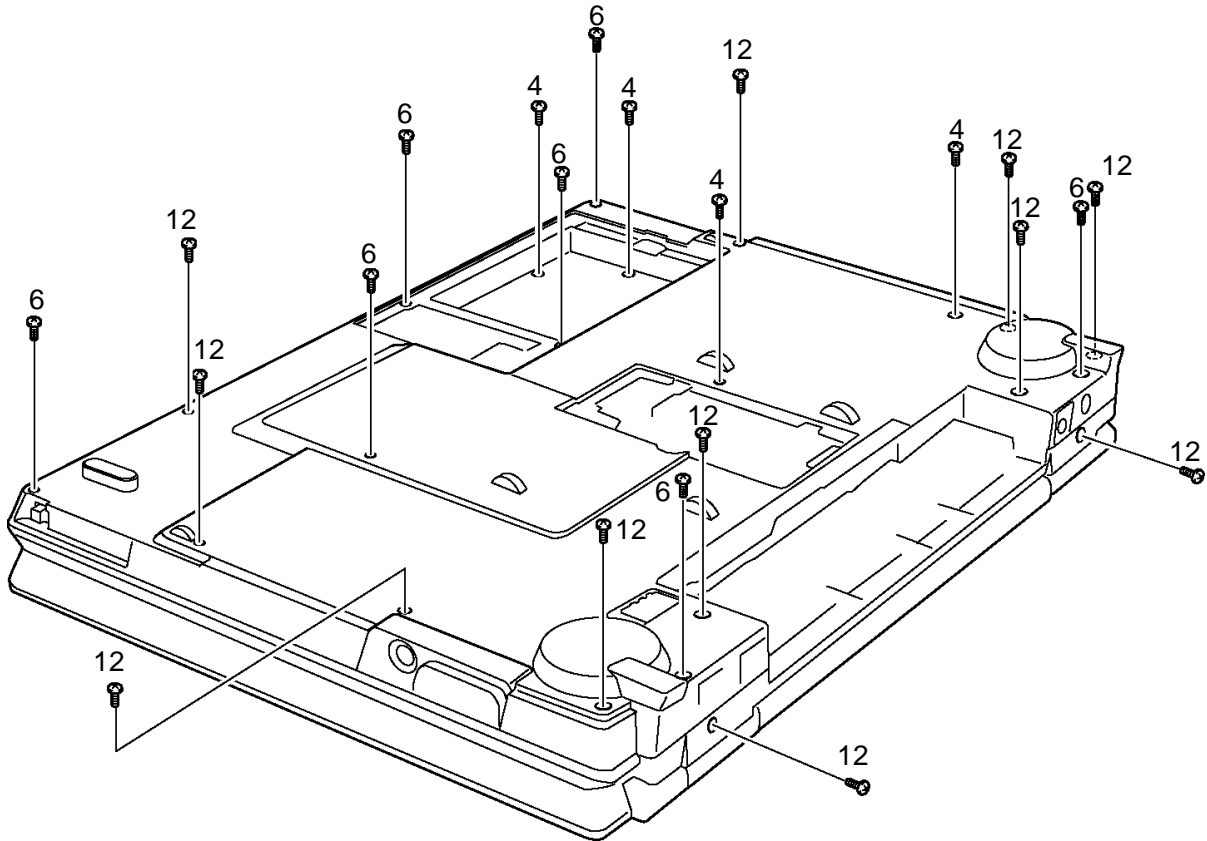


Figure 4-13 Removing the screws (bottom)

3. Disconnect the **speaker cable** from **CN6170** and the **USB board cable** from **CN4611** on the system board.

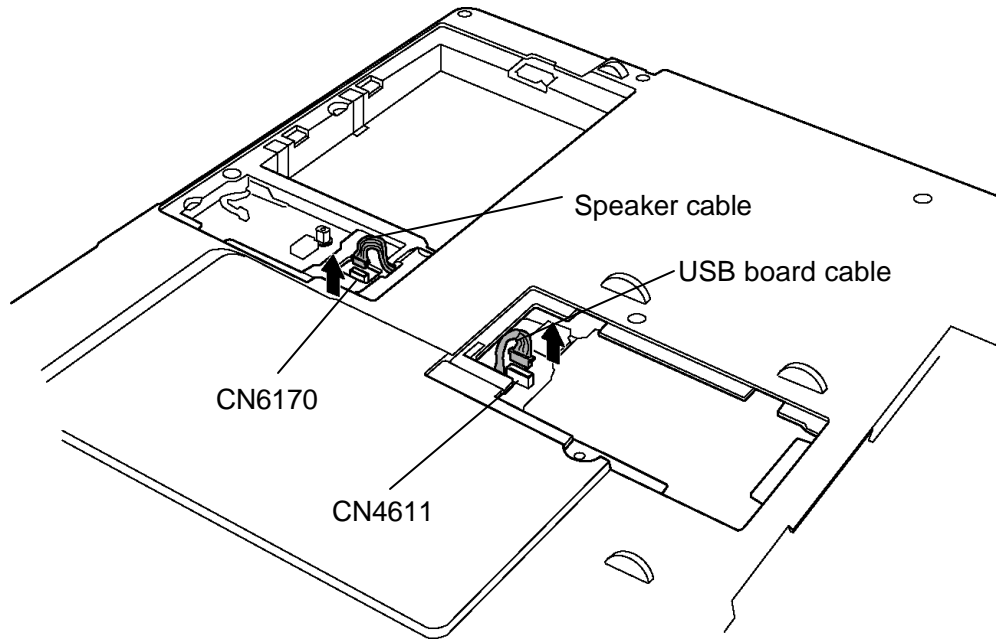


Figure 4-14 Removing the cables (bottom)

4. Turn over the computer and open the display and remove **four insulators** and **one glass tape**.

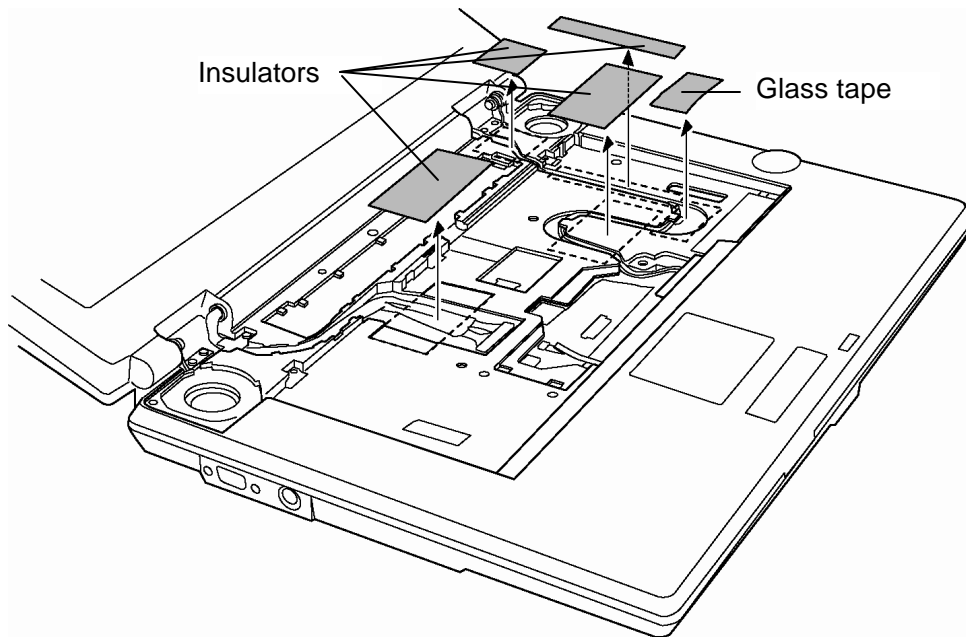


Figure 4-15 Removing the insulators and glass tape

5. Disconnect the **Tach pad cable** from **CN3240**, the **Volume cable** from **CN3330** and the **LCD cable** from **CN5000** on the system board.
6. Remove the following screw and **LCD cable holder**.

? M2.5?4B FLAT BIND x1

7. Remove the following screws fixing the display assembly.

? M2.5?6B FLAT BIND x3

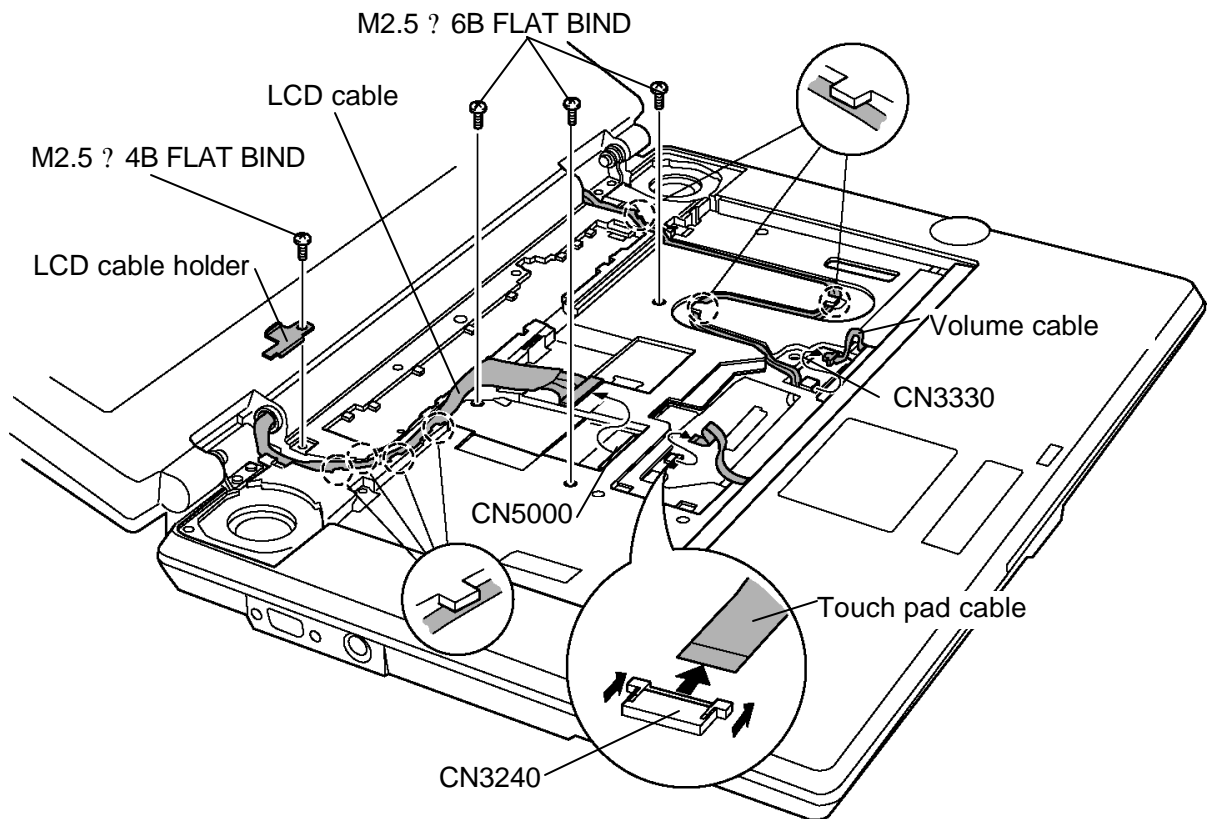


Figure 4-16 Removing the screws and cables

8. Remove the **display assembly** from the **base assembly** while releasing the latches and place the display next to the base assembly.

CAUTION: As the wireless LAN antenna cable is still connected to the wireless LAN card, be careful not to break the antenna cable.

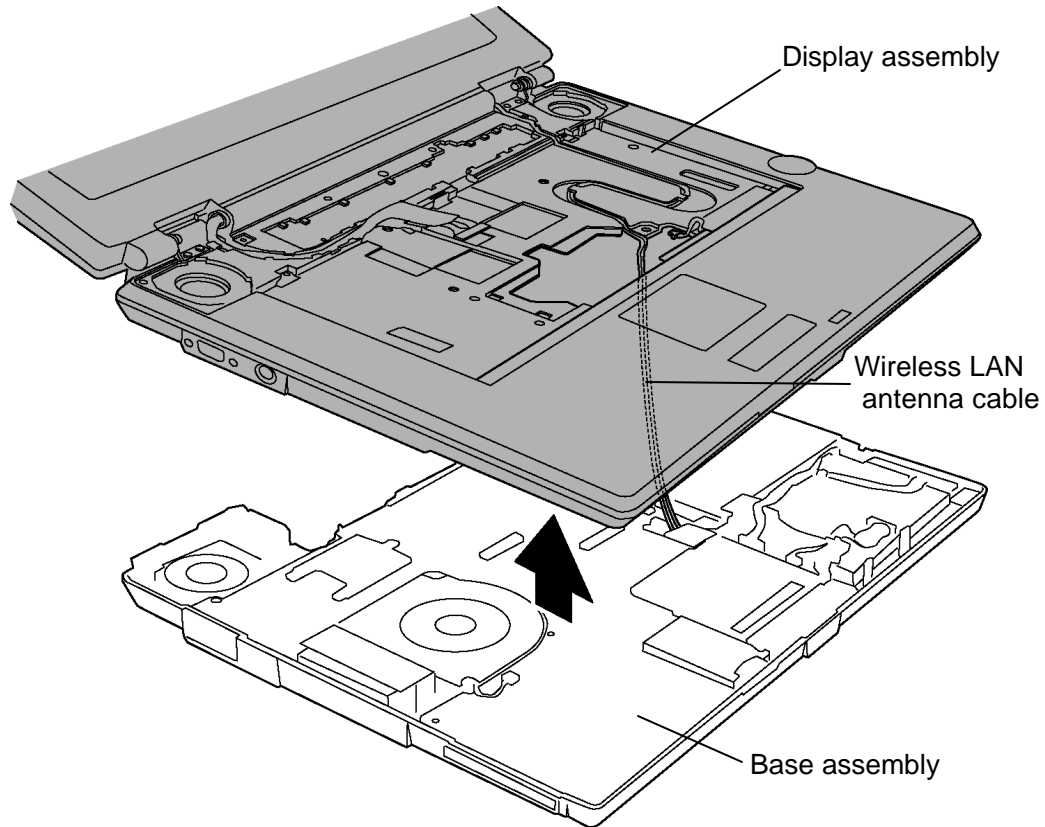


Figure 4-17 Removing the display assembly

9. Disconnect the **UA board cable** from the connector **CN4610** on the system board.
10. Remove the following **screws** and remove the **wireless LAN card cover**.

? M2x4B S-THIN HEAD x1

or

? L.H. stick x1

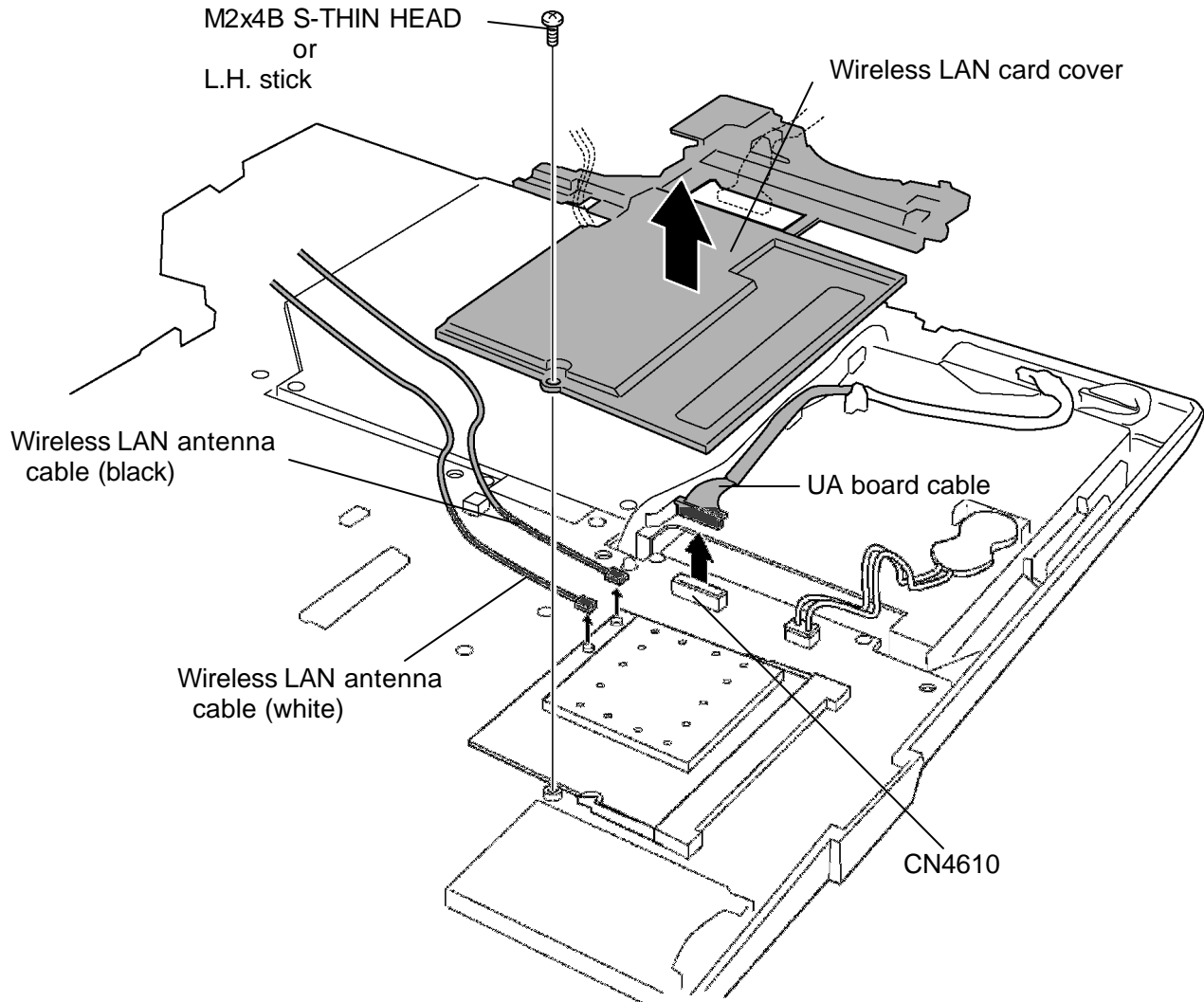


Figure 4-18 Removing the wireless LAN antenna

11. Disconnect the **wireless LAN antenna cables** (black and white).

12. Remove the following screws to separate the **display** from the **middle frame**.

? M2.5?6B FLAT BIND x4

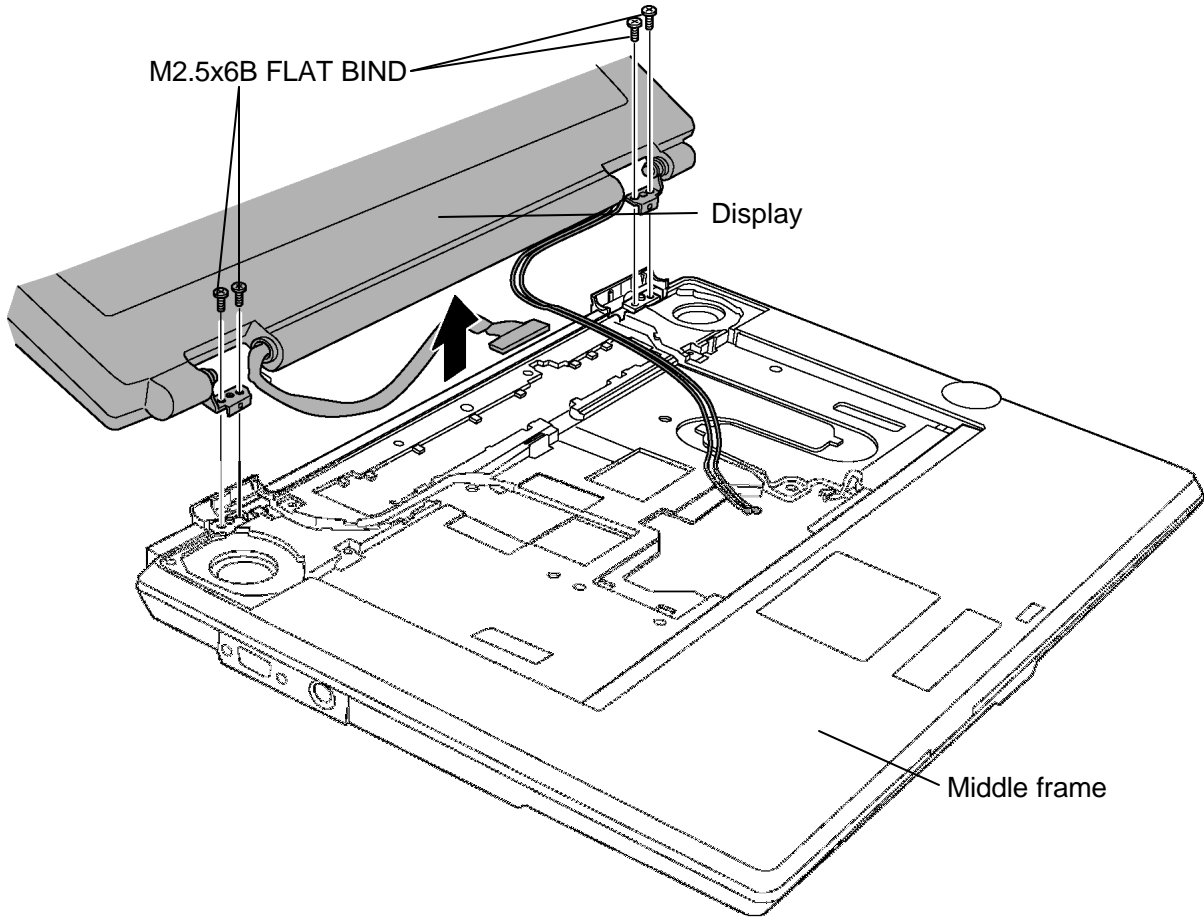


Figure 4-19 Removing the display

Installing the display assembly

The following describes the procedure for installing the display assembly (See Figure 4-13 to 4-19).

1. Set the **display** to the **middle frame** and fix it with the following **screws** from the back.

? M2.5?12B FLAT BIND x2 (Fig4-13)

2. Fix the **display** with the following **screws** on the face.

? M2.5?6B FLAT BIND x4 (Fig4-19)

NOTE: Make sure there is no cable caught between the display assembly and base assembly.

3. Connect the LCD cable to the connector **CN5000** on the system board.

4. Connect the **wireless LAN antenna cables** to the terminals.

5. Install the **wireless LAN card cover** with the following **screw**.

? M2?4B S-THIN HEAD x1

or

? L.H. stick x1

6. Pass the **wireless LAN antenna cables** on the guide of the wireless LAN card cover.

7. Connect the **UA board cable** to the **CN4610** on the system board.

8. Install the display assembly to the base assembly and secure it with the following **screws**.

? M2.5?6B FLAT BIND x3

NOTE: Make sure there is no cable caught between the display assembly and base assembly.

9. Pass the **wireless LAN antenna cables** through the guide on the middle frame from the wireless LAN card side and fix them with the insulators. The excess part of the cables should be kept under the frame of upper side of the slot.

10. Connect the **touch pad cable** to the connector **CN3240** and the **volume cable** to the connector **CN3330** on the system board.

11. Install the **LCD cable holder** with the following **screw**.

? M2.5?4B FLAT BIND x1

12. Stick **four insulators** and a **glass tape** to fix cables.

13. Close the display, turn the computer upside down and secure the display assembly with the following **screws**.

? M2.5?12B FLAT BIND screw x9 (“12” in the figure)

? M2.5?6B FLAT BIND screw x7 (“6” in the figure)

? M2.5?4B FLAT BIND screw x4 (“4” in the figure)

NOTE: *Be sure to apply lock tight to the screws with the mark of lock tight on it.*

14. Connect the **USB board cable** to the connector **CN4611** and the **speaker cable** to the connector **CN6170** on the system board.

4.9 Wireless LAN card

Removing the wireless LAN card

The following describes the procedure for removing the wireless LAN card (See Figure 4-20).

1. Open the left and right latches holding the **wireless LAN card** and remove it.

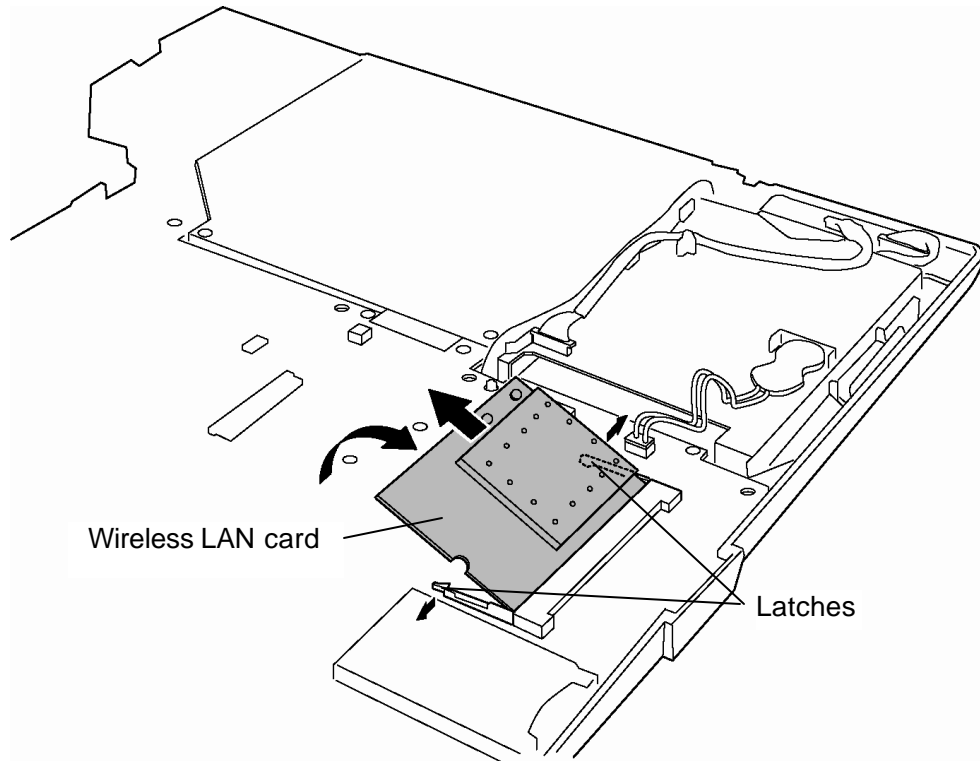


Figure 4-20 Removing the wireless LAN card

Installing the wireless LAN card

The following describes the procedure for installing the wireless LAN card (See Figure 4-20).

1. Insert the **wireless LAN card** terminals slantwise into the connector **CN2200** on the system board and press the wireless LAN card until it is securely in place.

4.10 RTC battery

Removing the RTC battery

The following describes the procedure for removing the RTC battery (See Figure 4-21).

1. Disconnect the RTC battery harness from the connector **CN9990** on the system board.
2. Remove the **RTC battery**. (The RTC battery is adhered with double-sided tape.)

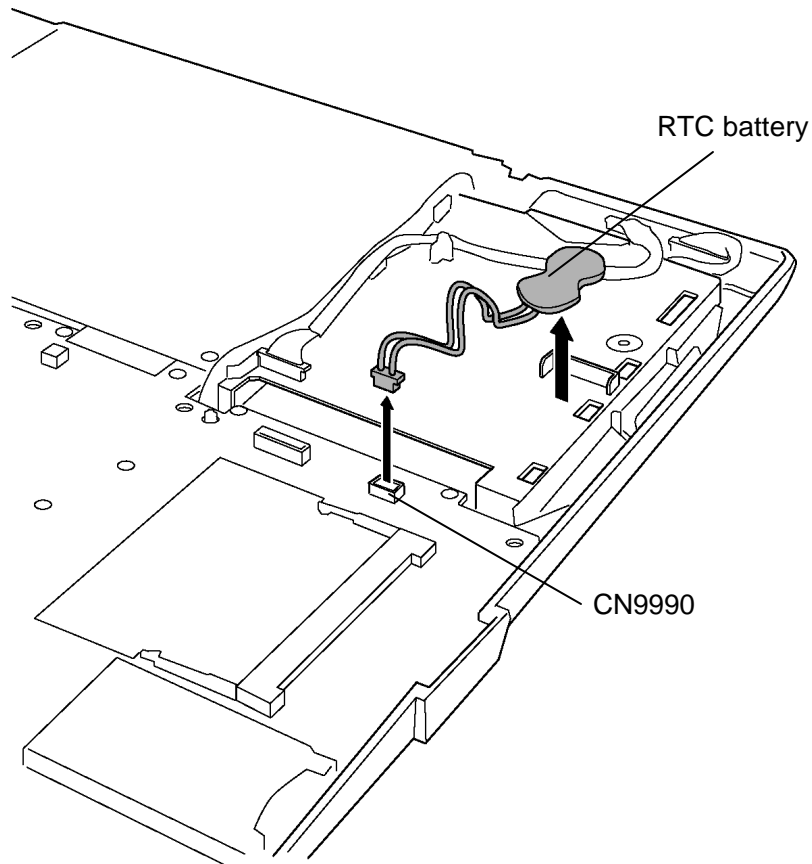


Figure 4-21 Removing the RTC battery

Installing the RTC battery

The following describes the procedure for installing the RTC battery (See Figure 4-21).

1. Install (adhere) the **RTC battery** on the slot.
2. Connect the RTC battery harness to the connector **CN9990** on the system board.

4.11 UA board

Removing the UA board

The following describes the procedure for removing the UA board (See Figure 4-22).

1. Take out the **UA board cable** from the guide and disconnect it from the connector **CN4622** on the UA board.
2. Take out the **TV tuner cable** from the guide and disconnect it from the connector **CN9550** on the UA board.
3. Remove the following **screws** and **UA board** from the slot.

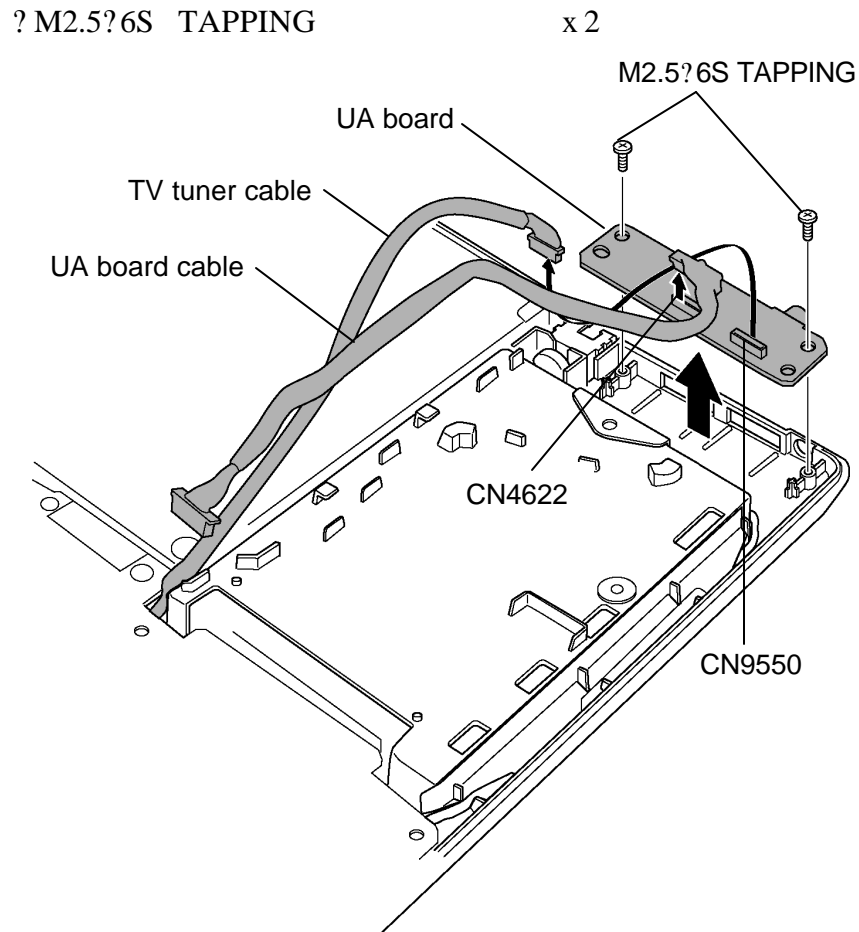


Figure 4-22 Removing the UA board

Installing the UA board

The following describes the procedure for installing the UA board (See Figure 4-22 and 4-23).

1. Install **UA board** into the slot and secure it with the following **screws**.

? M2.5?6S TAPPING x2

2. Pass the **UA board cable** through the **guides** and connect it to the connector **CN4622** on the UA board.
3. Pass the **TV tuner cable** through the **guides** and connect it to the connector **CN9550** on the UA board.

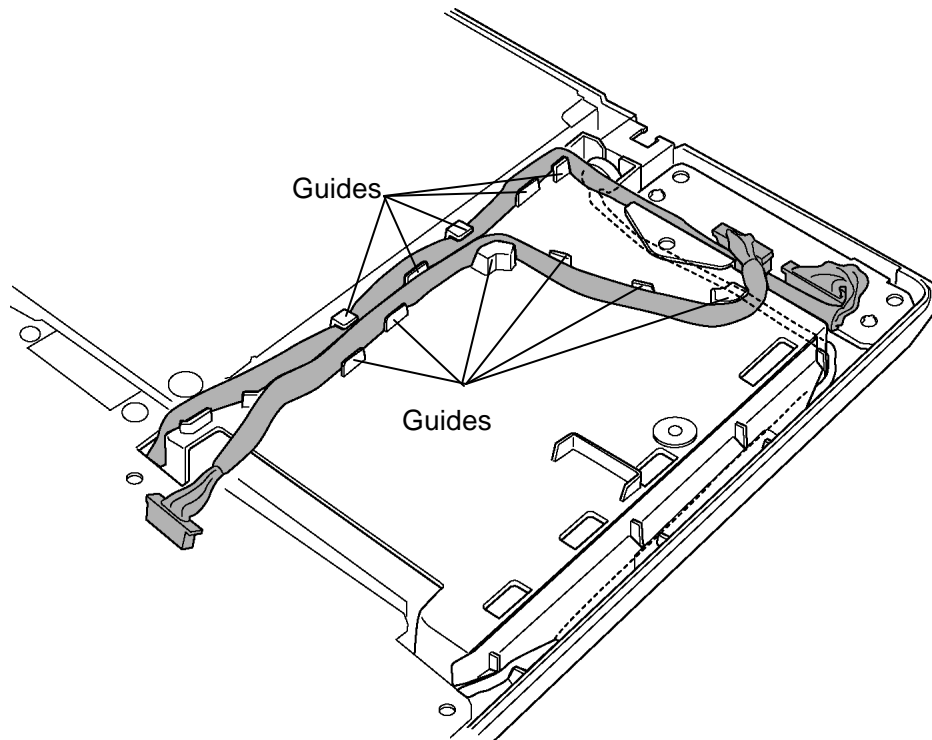


Figure 4-23 Passing the cable

4.12 Optical drive

NOTE: Do not apply excessive force to the top of an optical drive.

Removing the optical drive

The following describes the procedure for removing the optical drive (See Figure 4-24 and 4-25).

1. Pull out the **optical drive assembly** towards the arrow direction to disconnect it from the connector **CN1810** on the system board.

NOTE: When it is difficult to pull out the optical drive assembly, insert your finger into the slot and push out the optical drive assembly.

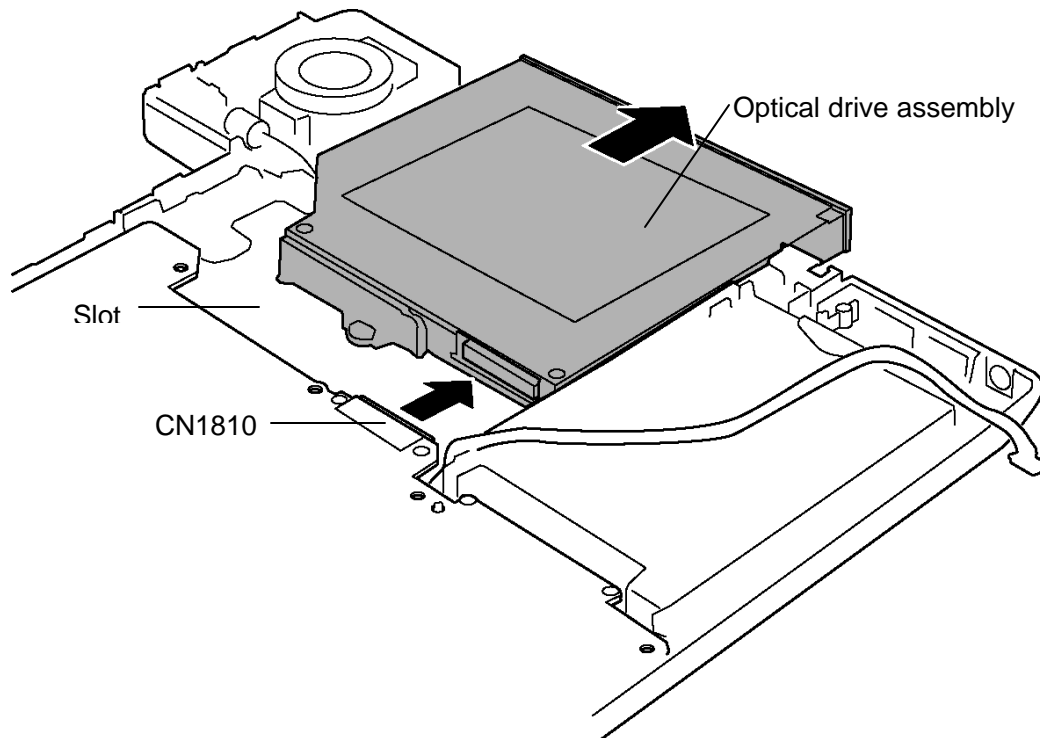


Figure 4-24 Removing the optical drive assembly

- Remove the following **screws** and **side bracket** from the optical drive.

?	M2?3C	S-THIN HEAD	x2
?	M2?3.2	Stepping screw	x1

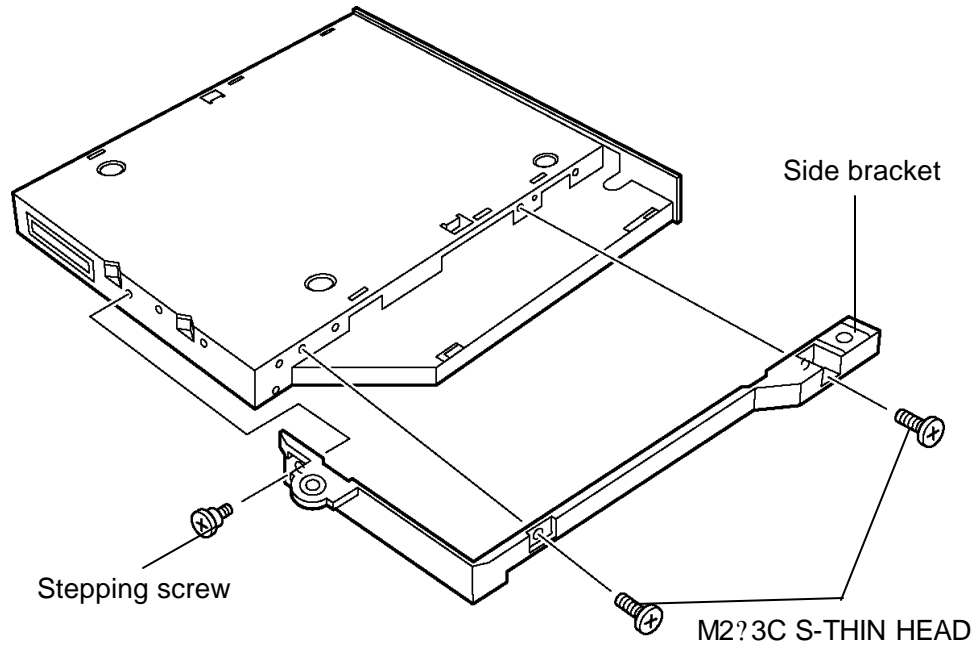


Figure 4-25 Disassembling the side bracket

Installing the optical drive

The following describes the procedure for installing the optical drive (See Figure 4-24 and 4-25).

- Attach the **side bracket** to the optical drive and secure it with the following **screws**.

?	M2?3C	S-THIN HEAD	x2
?	M2?3.2	Stepping screw	x1

- Insert the **optical drive assembly** into the slot for the drive and connect it to the connector **CN1810** on the system board.

4.13 Fan

Removing the fan

The following describes the procedure for removing the fan (See Figure 4-26).

1. Disconnect the **fan cable** from the **CN8770** on the system board.
2. Remove the following **screws** and **fan**.

? M2.5?6S TAPPING x2

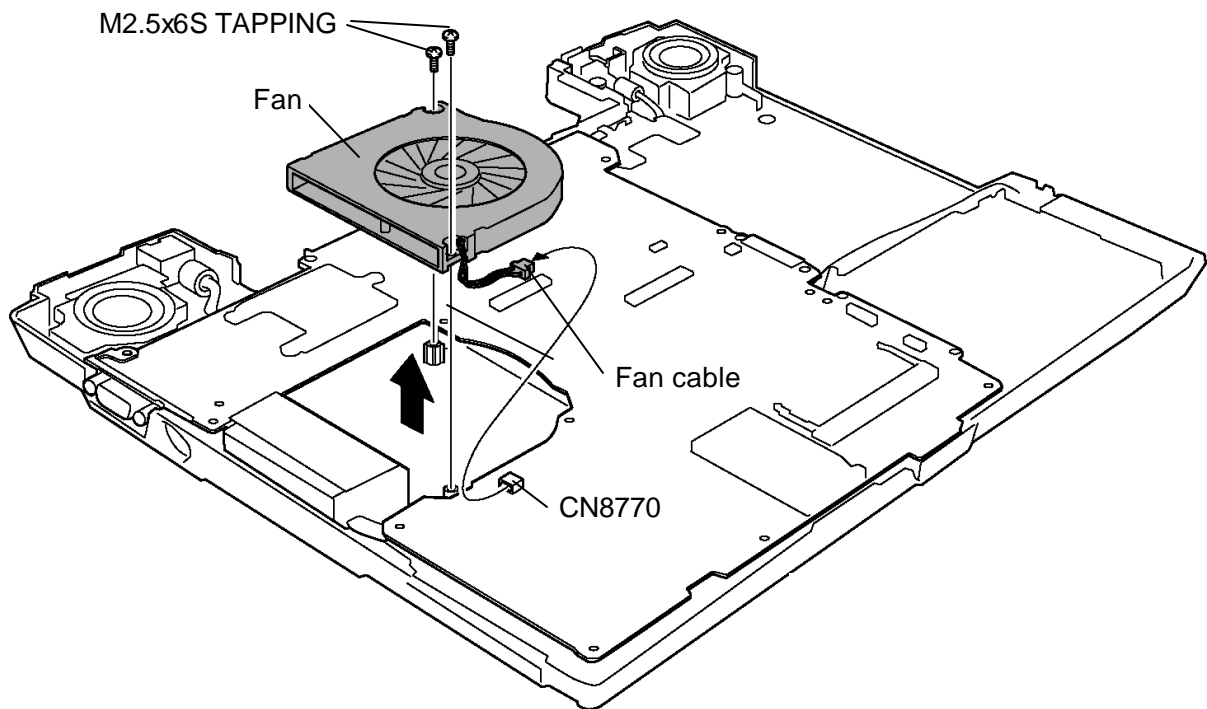


Figure 4-26 Removing the fan

Installing the fan

The following describes the procedure for installing the fan (See Figure 4-26).

1. Install the **fan** and secure it with the following **screws**.

? M2.5?6S TAPPING x2

2. Connect the **fan cable** to the connector **CN8770** on the system board.

4.14 System board

CAUTION: 1. When handling the system board, always hold by the edges. Do not touch the printed circuit face.

2. If replacing with a new system board, write the computer information to the new system board according to the section 3.3 “Setting of the hardware configuration”. Also update with the latest BIOS as described in Appendix G “BIOS Rewrite Procedures”.

Removing the system board

The following describes the procedure for removing the system board (See Figure 4-27 to 4-29).

1. Take out the **Modem jack** from the slot.
2. Peel the **insulator** up and take out the **Modem cable**.

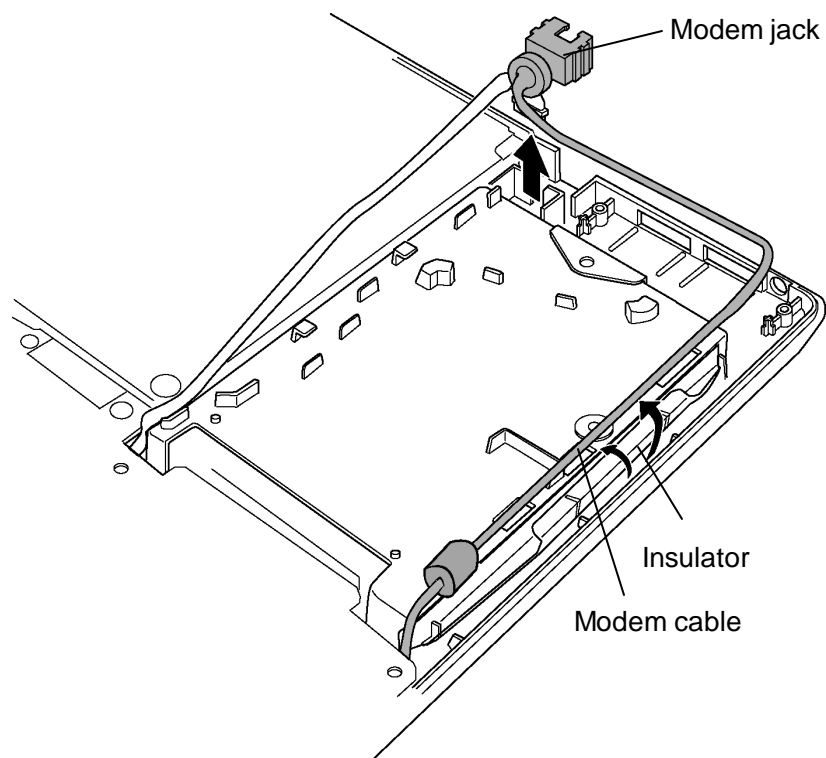


Figure 4-27 Removing the Modem jack

3. Remove the following **screw** securing the system board.

? M2.5?6S TAPPING x1

4. Remove the **DC-IN jack**, **LAN jack** from each slot and the **TV antenna coaxial cable** from the TV antenna terminal.

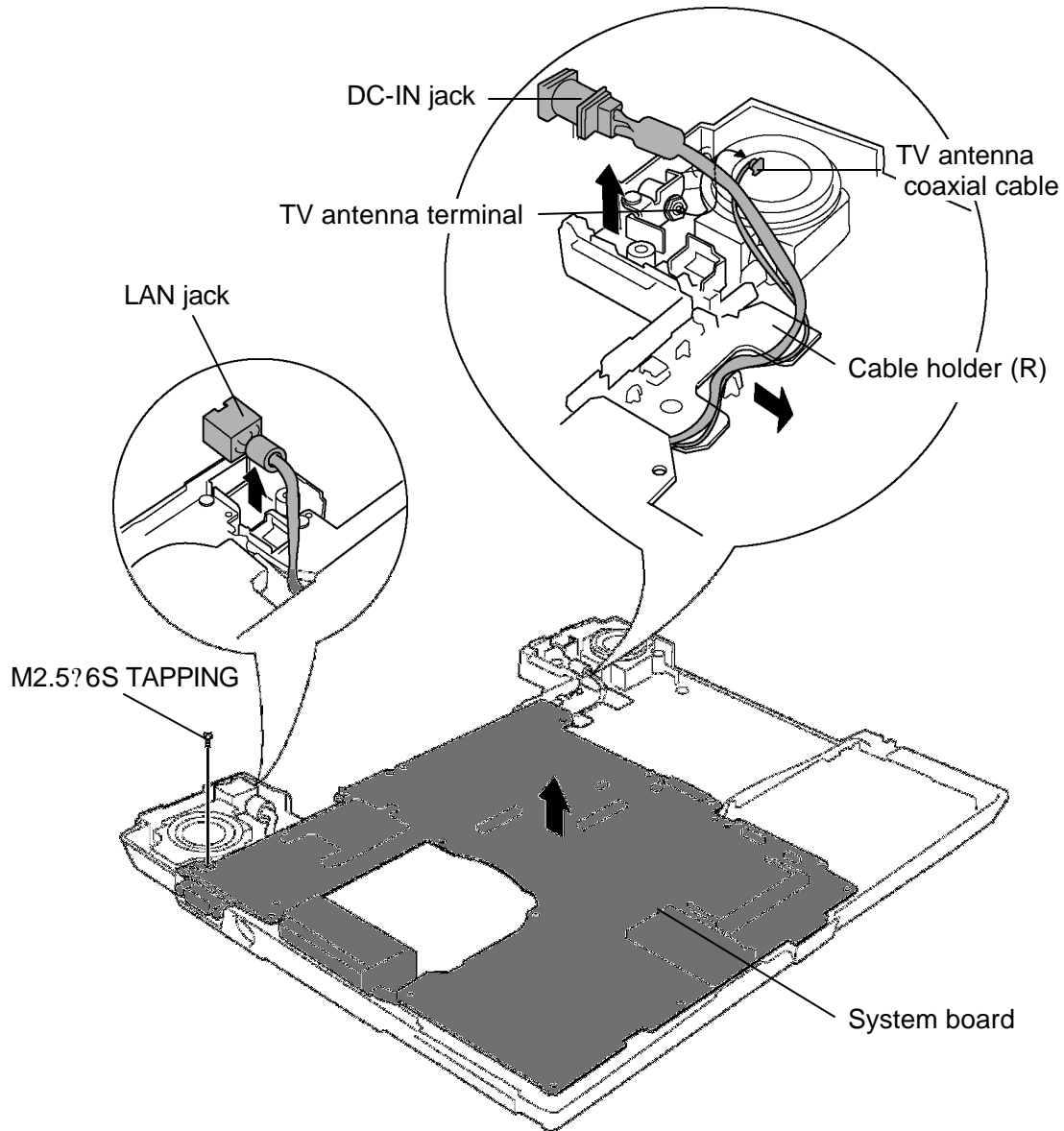


Figure 4-28 Removing the system board

5. Remove the **system board** with DC-IN jack, LAN jack and TV antenna coaxial cable. Take out the DC-IN cable under the **Cable holder (R)**.

CAUTION: When removing the system board, do not damage I/O ports.

6. Turn over the system board and disconnect the **LAN cable** from the connector **CN4100** on the system board.
7. Peel off the **insulator**. Take out the **DC-IN cable** and **TV antenna coaxial cable** from the slot. Remove the DC-IN cable from the connector **CN8800**.

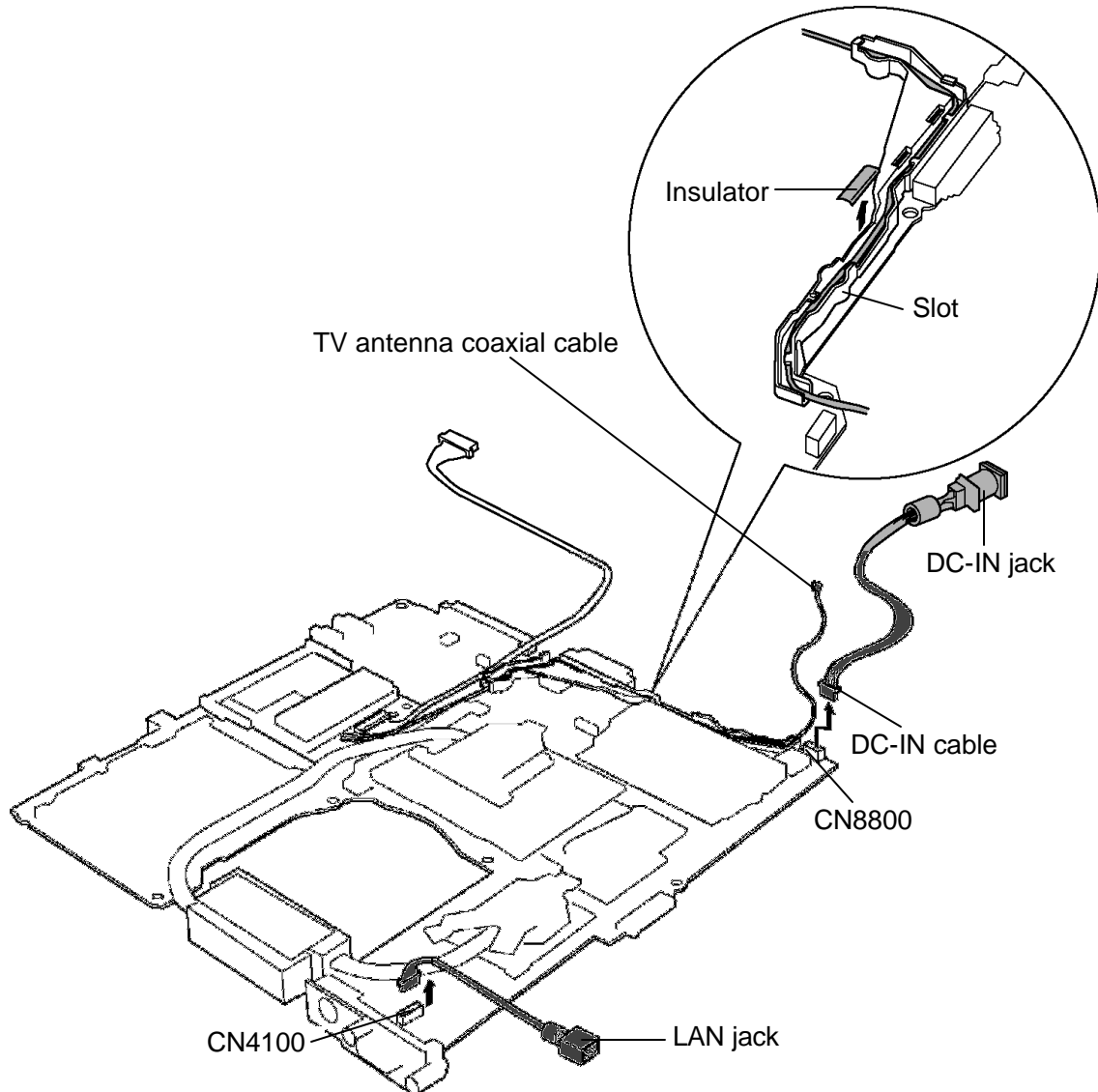


Figure 4-29 Removing DC-IN jack and LAN jack

Installing the system board

The following describes the procedure for installing the system board (See Figure 4-27 to 4-30).

1. Connect the **DC-IN cable** and **LAN cable** to the system board. Pass the DC-IN cable through the slot with the **TV antenna coaxial cable**.
2. Turn over the computer and install the **LAN jack** into the slot of the base assembly.
3. Pass the **DC-IN cable** and **TV antenna coaxial cable** under the cable holder (R). Install the DC-IN jack into the slot and connect the TV antenna coaxial cable to the **TV tuner terminal**.

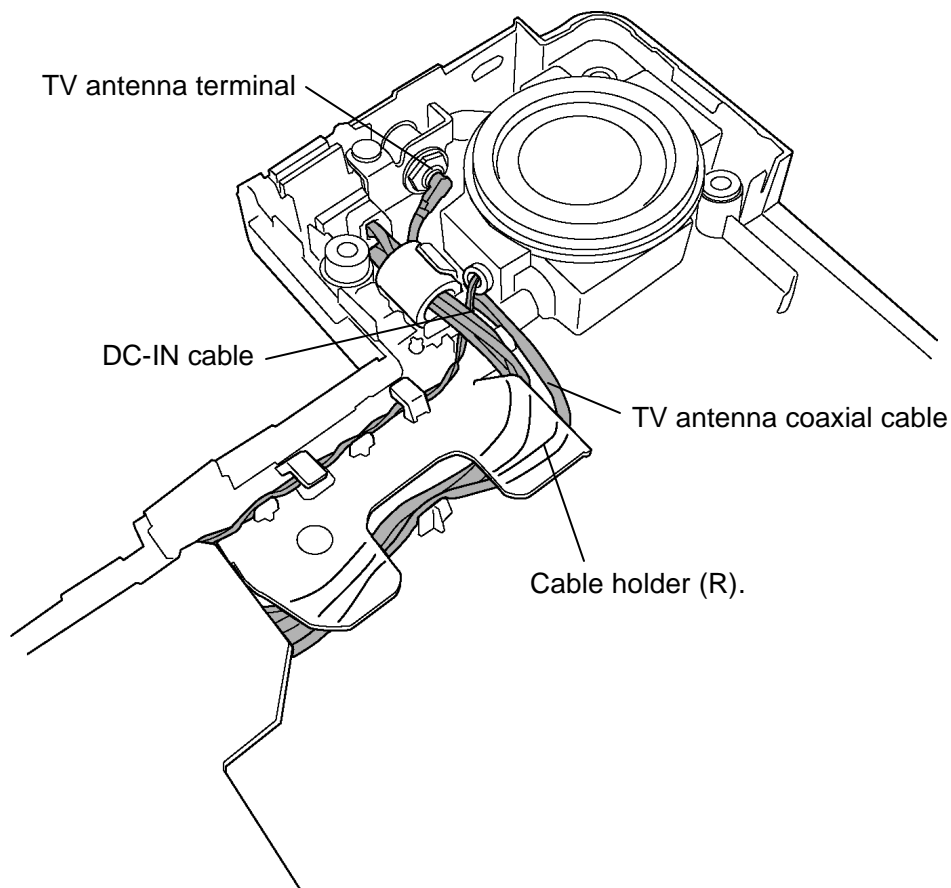


Figure 4-30 Passing of the cables

4. Pass the **Modem cable** under the insulator.
5. Install the **Modem jack** in the slot.
6. Secure the **system board** with the following screw.

? M2.5?6S TAPPING x1

4.15 TV tuner module

Removing the TV tuner module

The following describes the procedure for removing the TV tuner module (See Figure 4-31).

1. Disconnect the **TV tuner cable** from the connector on the TV tuner module.
2. Disconnect the **TV antenna coaxial cable** from the connector on the TV tuner module.
3. Remove the following **screws** securing the TV tuner module.
 - ? M2x4B S-THIN HEAD x2
4. Open the left and right **latches** holding the **TV tuner module** and remove it.

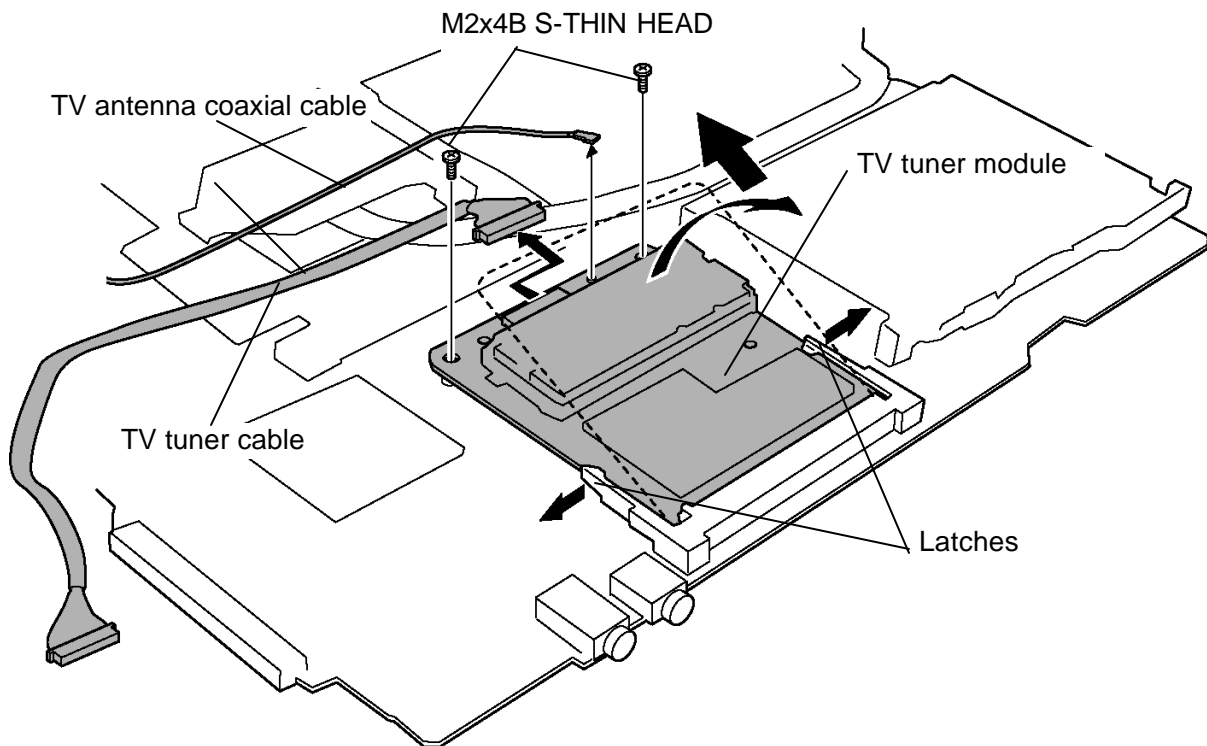


Figure 4-31 Removing the TV tuner module

Installing the TV tuner module

The following describes the procedure for installing the TV tuner module (See Figure 4-31).

1. Insert the **TV tuner module** terminals slantwise into the connector **CN2400** on the system board and secure it with the following screws.

? M2?4B S-THIN HEAD x2

2. Connect the **TV antenna coaxial cable** to the connector on the TV tuner module.
3. Connect the **TV tuner cable** to the connector on the TV tuner module.

4.16 GPU heat sink/VG board

Removing the GPU heat sink/VG board

The following describes the procedure for removing the GPU heat sink and VG board (See Figure 4-32 and 4-33).

1. After removing the following screws, remove the **GPU heat sink**.

? M2x4B S-THIN HEAD x3

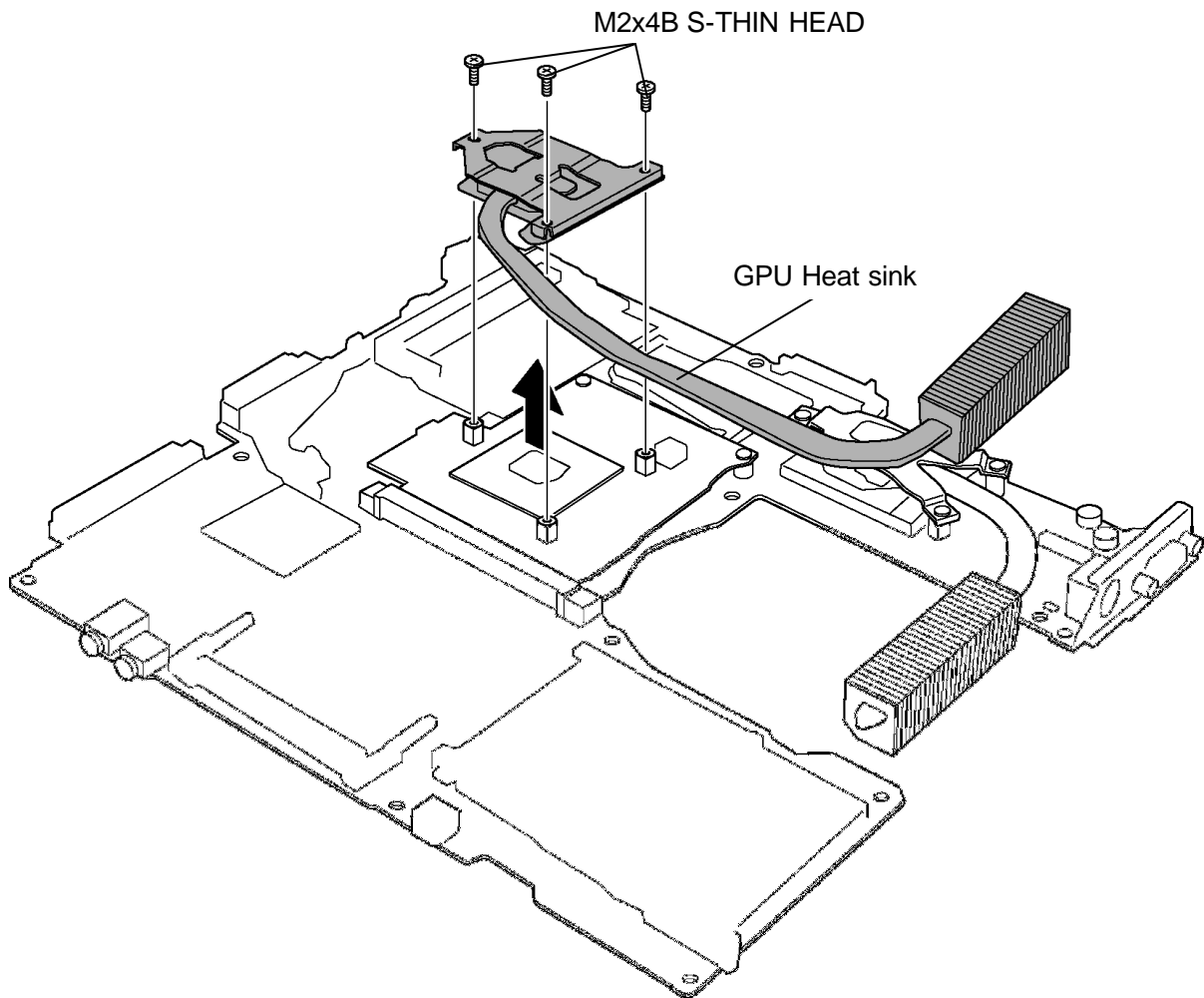


Figure 4-32 Removing the GPU heat sink

- Remove the following **screws** and **VG board** from the connector.

? M2x4B S-THIN HEAD x2

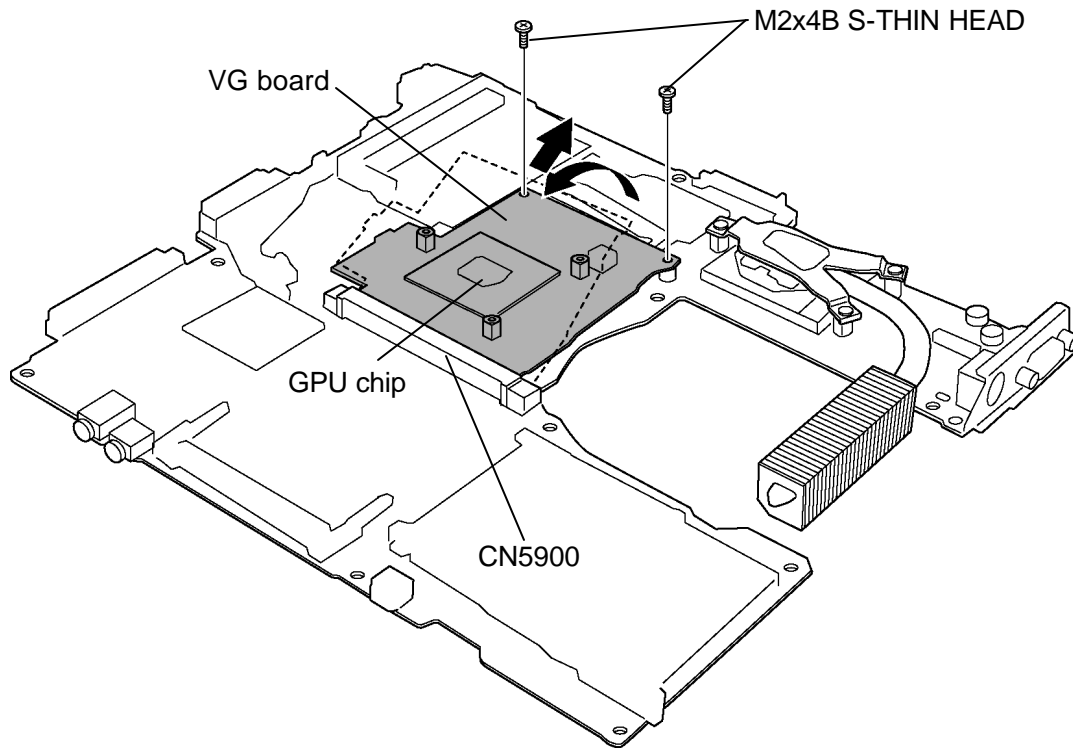


Figure 4-33 Removing the VG board

Installing the GPU heat sink/VG board

The following describes the procedure for installing the GPU heat sink and VG board (See Figure 4-32 to 4-33).

- Inset the **VG board** slantingly into the connector **CN5900** with the GPU chip up on the system board.
- Push down the VG board and secure it with the following **screws**.

? M2x4B S-THIN HEAD x2

- When grease is attached on the surface of GPU chip, wipe it with cloth. Using a special applicator, apply silicon grease so that the GPU chip is completely covered.
- Install the **GPU heat sink** with the following **screws**.

? M2x4B S-THIN HEAD x3

4.17 CPU heat sink/CPU

Removing the CPU heat sink/CPU

The following describes the procedure for removing the CPU heat sink and CPU (See Figure 4-34 and 4-35).

1. After removing the following screws, remove the **CPU heat sink holder** and **CPU heat sink**.

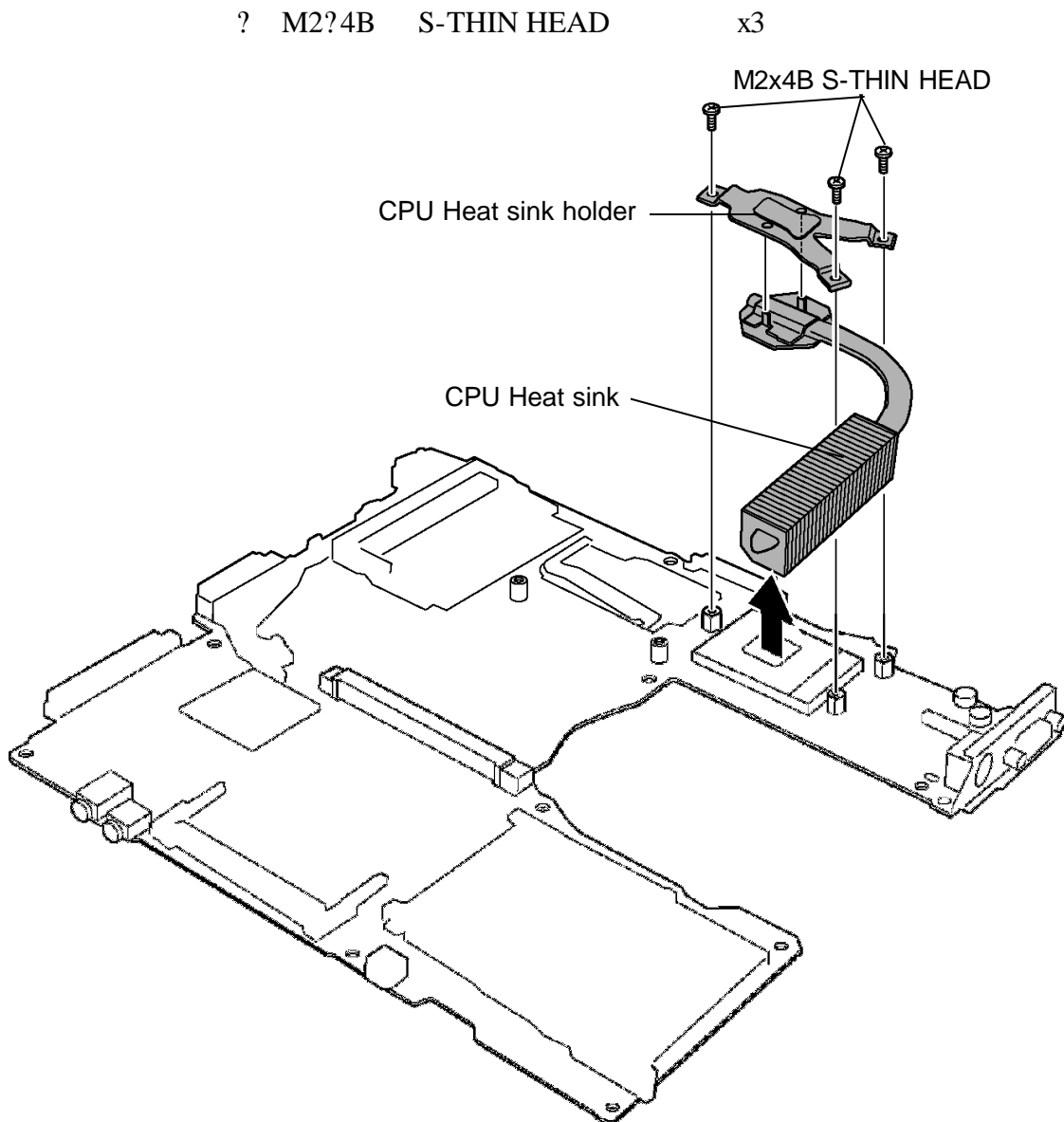


Figure 4-34 Removing the CPU heat sink

2. Unlock the **CPU** by rotating the **cam** on the CPU socket 180 degrees to the counterclockwise with a flat-blade screwdriver.
3. Remove the **CPU**.

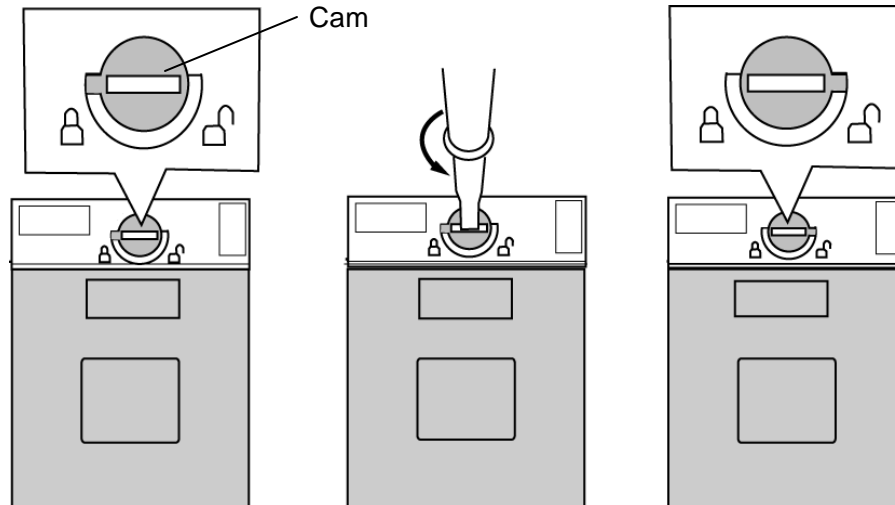


Figure 4-35 Removing the CPU

Installing the heat sink/CPU

The following describes the procedure for installing the heat sink and CPU (See Figure 4-34 to 4-36).

1. Check that the mark of cam is in the unlocking position.
2. Attach the **CPU** to the correct position in the **CPU socket**.
3. Fix the **CPU** by rotating the **cam** 180 degrees to the clockwise with a flat-blade screwdriver.
4. If there is already silicon grease on the CPU, 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.

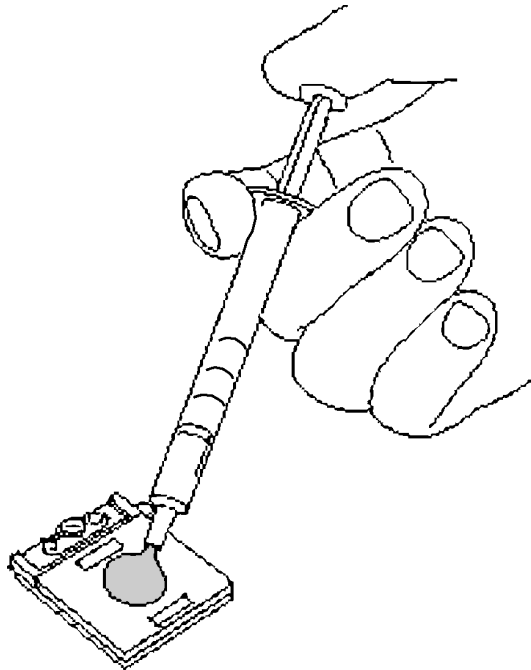


Figure 4-36 Applying silicon grease

5. Install the **CPU heat sink** and **CPU heat sink holder** and secure them with the following **screws** in the order of numbers marked on the heat sink holder.

? M2?4B S-THIN HEAD x3

4.18 USB board/Speaker

Removing the USB board/Speaker

The following describes the procedure for removing the USB board and Speaker (See Figure 4-37 to 4-39).

1. Remove the following **screw** and the **USB board**.

? M2.5?6S TAPPING x1

2. Remove the following **screw** and the **Cable holder (L)**.

? M2.5?6S TAPPING x1

3. Remove the **Speaker (L)** from the slot of the base assembly

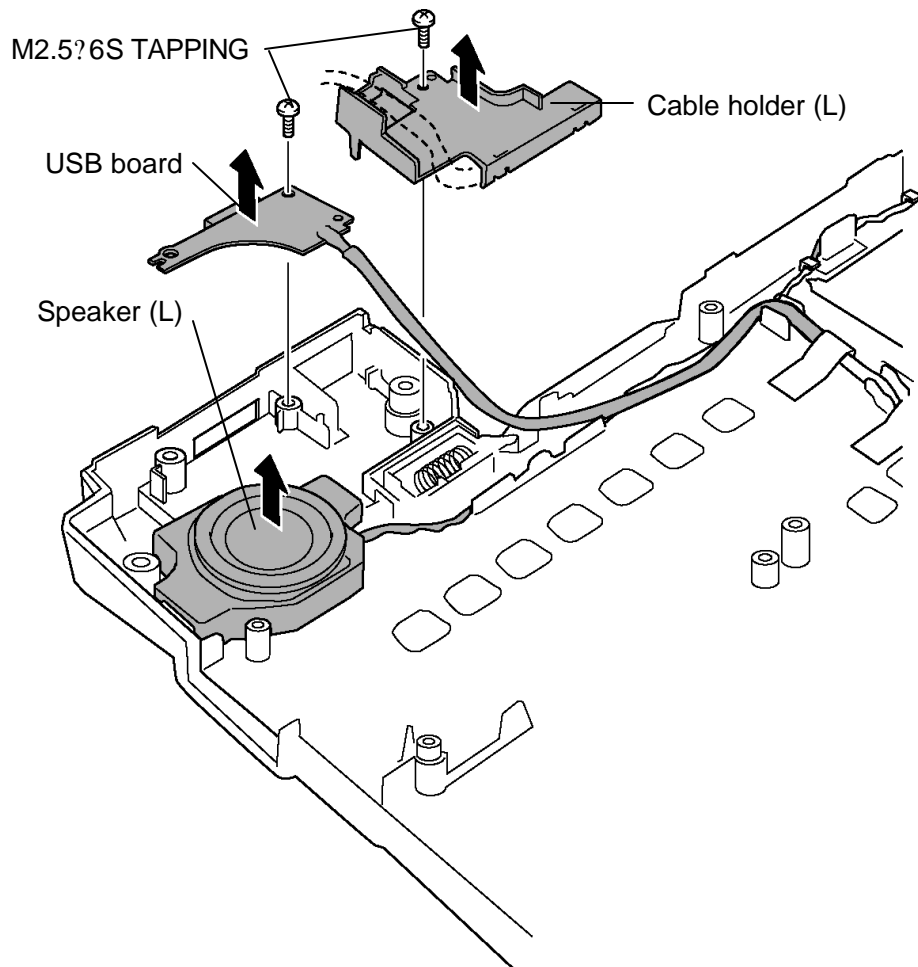


Figure 4-37 Removing the USB board/Speaker (L)

4. Peel off two **glass tapes** and peel (open) one **insulator** fixing the USB board cable and the speaker cable.

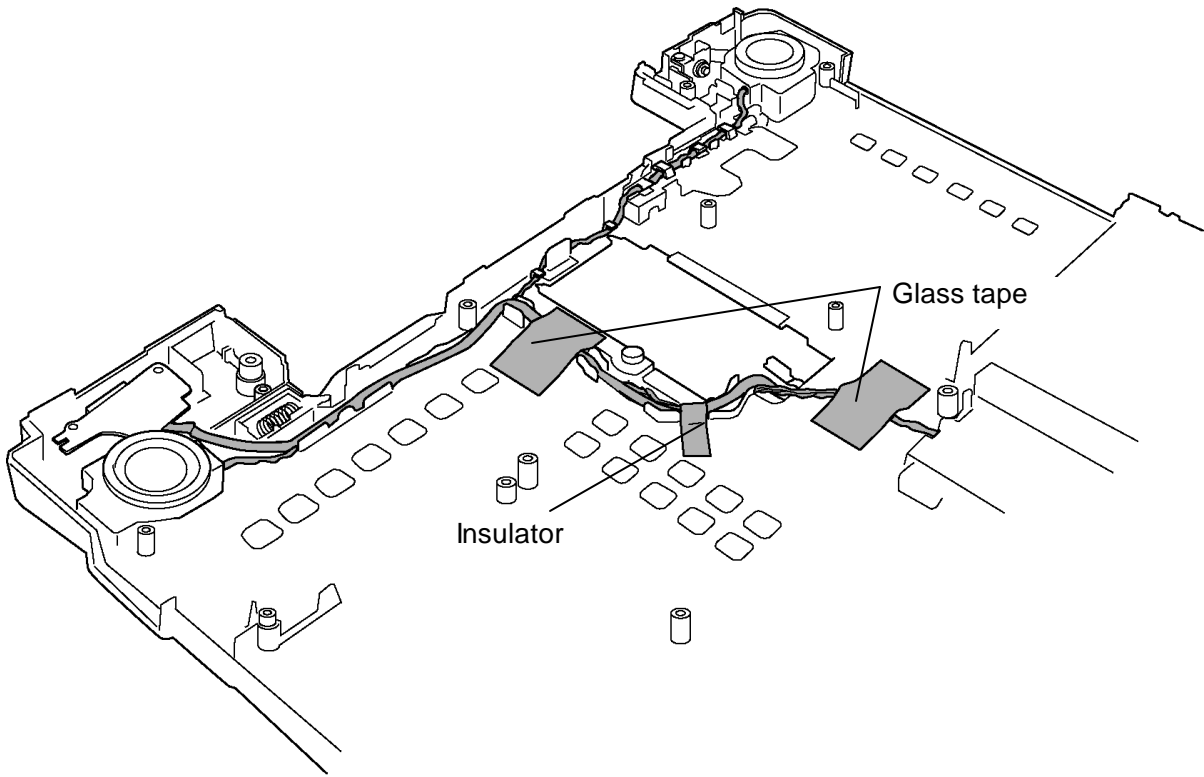


Figure 4-38 Removing the insulator and glass tape

5. Take out the speaker cable from the guide of the cable holder (R) and remove the **Speaker (R)** from the slot of the base assembly.
6. Remove the following screws and **Cable holder (R)**.

? M2.5?6S TAPPING x2

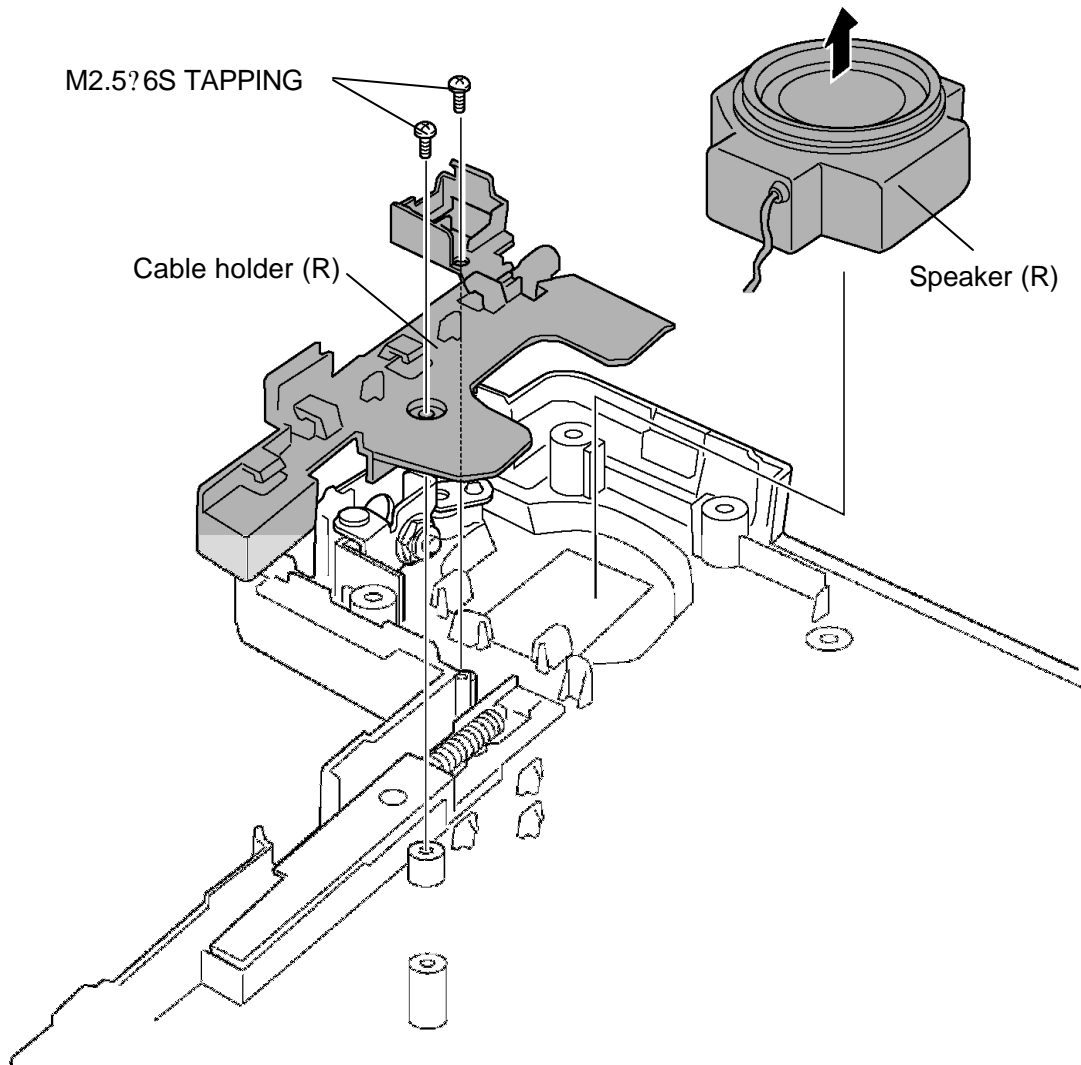


Figure 4-39 Removing the speaker(R)

Installing the USB board/Speaker

The following describes the procedure for installing the USB board/Speaker (See Figure 4-37 to 4-39).

1. Install the **Cable holder (R)** on the base assembly and secure it with the following **screws**.

? M2.5?6S TAPPING x2

2. Install the **Speaker (R)** on the slot of the base assembly and pass the Speaker (R) cable through the guide of Cable holder (R) and the guide of base assembly.

3. Install the **Speaker (L)** in the slot of the base assembly.

4. Pass the Speaker cable (L) and USB board cable through the guide of base assembly.

5. Install the **Cable holder (L)** with the following **screw**.

? M2.5?6S TAPPING x1

6. Pass the USB board cable above the Cable holder (L) and secure the **USB board** with the following **screw**.

? M2.5?6S TAPPING x1

4.19 Touch pad/Volume knob

4.19.1 Touch pad

Removing the touch pad

The following describes the procedure for removing the touch pad (See Figure 4-40).

1. Remove the following **screws** and **touch pad**.

? M2.5?3B U-THIN HEAD x6

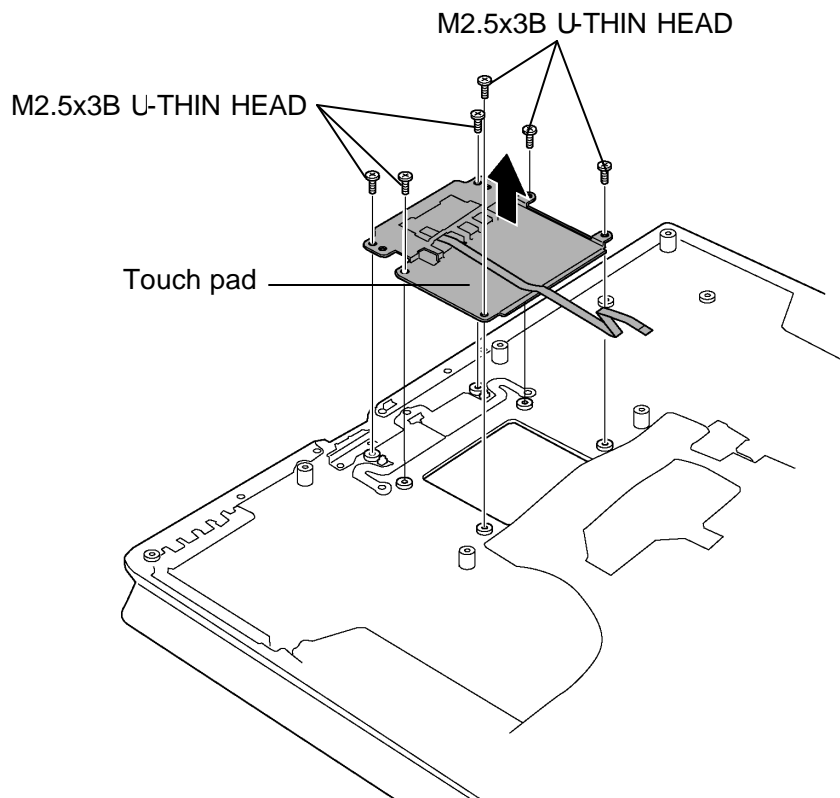


Figure 4-40 Removing the touch pad

Installing the touch pad

The following describes the procedure for installing the touch pad (See Figure 4-40).

1. Install the **touch pad** and secure it with the following **screws**.

? M2.5?3B U-THIN HEAD x6

4.19.2 Volume knob

Removing the volume knob

The following describes the procedure for removing the volume knob (See Figure 4-41).

1. Remove the following **screws** and the **volume cover**.

? M2.5?3B U-THIN HEAD x2

2. Peel off the **insulator** and take out the volume board cable from the slot.
3. Remove the **volume board**.
4. Release the latches of volume knob, pushing the latch inside. Push down **the volume knob** to remove.

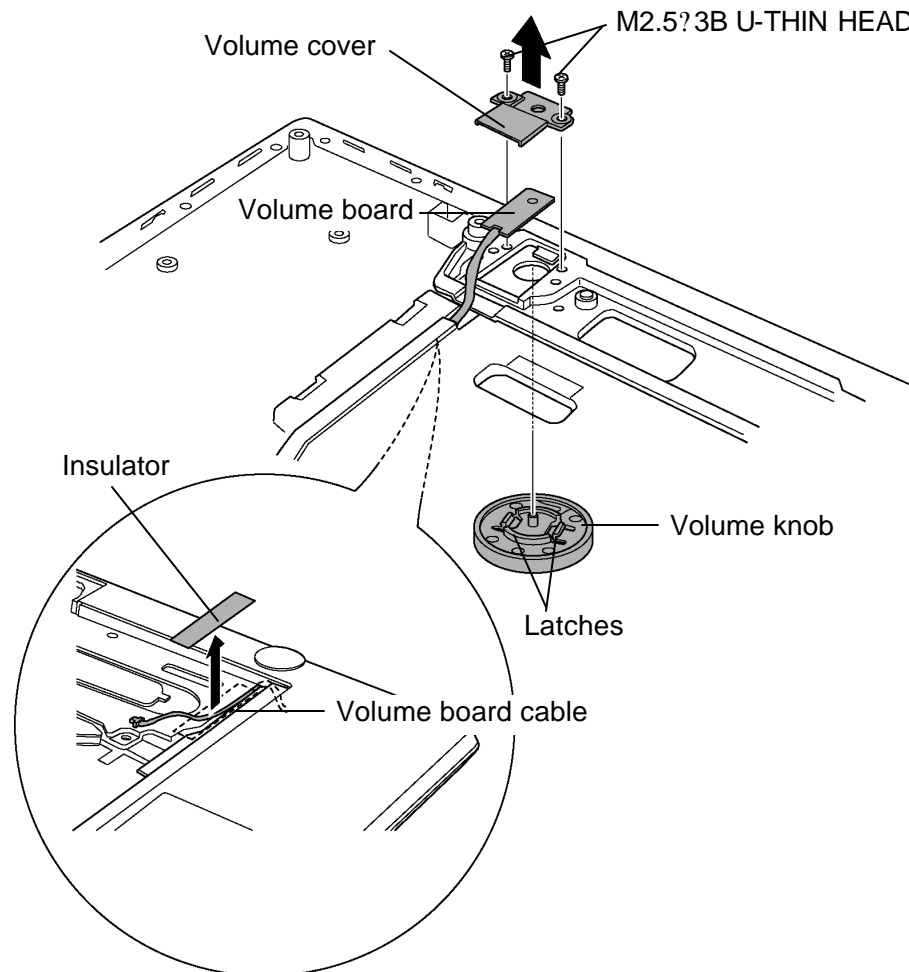


Figure 4-41 Removing the volume knob

Installing the volume knob

The following describes the procedure for installing the volume knob (See Figure 4-41).

1. Insert the **volume knob** in the hole.
2. Insert the connector side of **volume board cable** in the hole and place the **volume board** in the slot.
3. Install the **volume cover** and secure it with the following **screws**.

? M2.5?3B U-THIN HEAD x2

4. Pass the volume board cable in the slot and stick **insulator** on it.

4.20 LCD unit/FL inverter

Removing the LCD unit/FL inverter

The following describes the procedure for removing the LCD unit and FL inverter (See Figure 4-42 to 4-47).

1. Peel off six **rubber cushions** and remove the following **screws** securing the display mask.

? M2.5?6B FLAT BIND x6

2. Insert your fingers between the edge of the display mask and the LCD unit, and remove the **display mask** while unlatching the display mask.

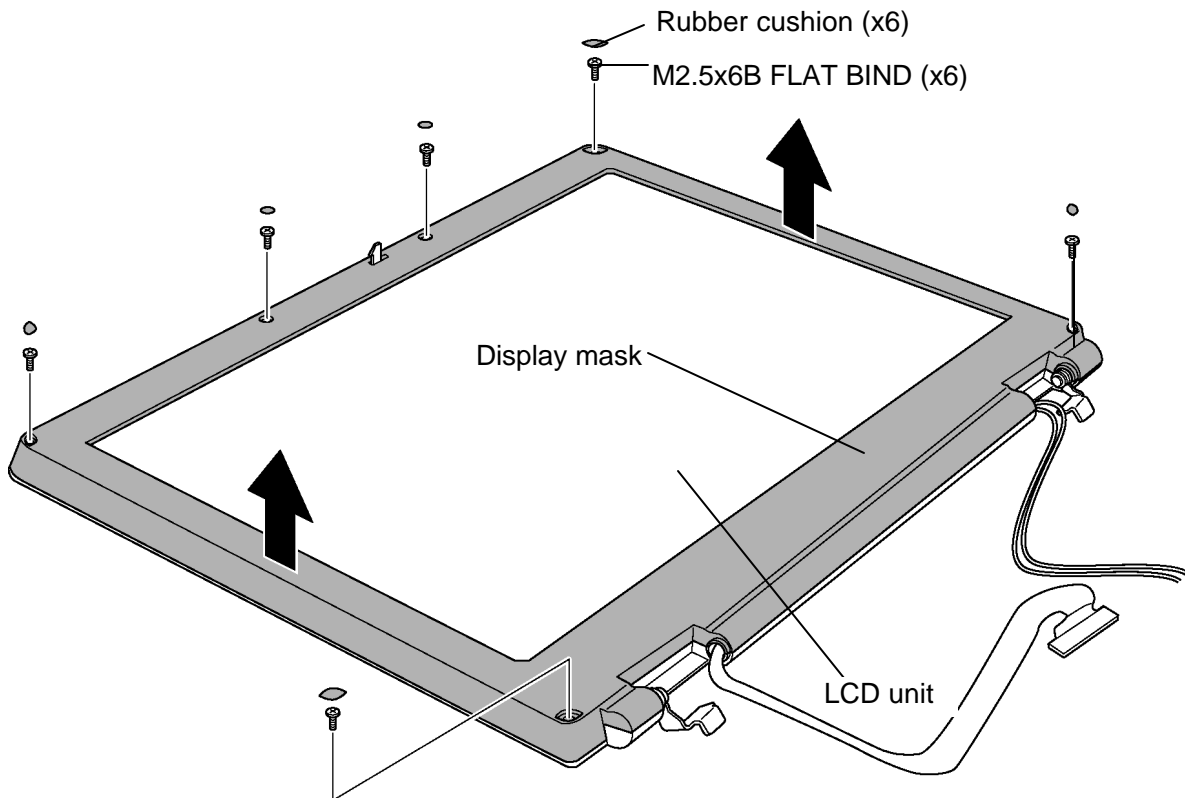


Figure 4-42 Removing the display mask

3. Remove the following **screw** and **LCD cable holder**.

? M2.5?6S TAPPING x1

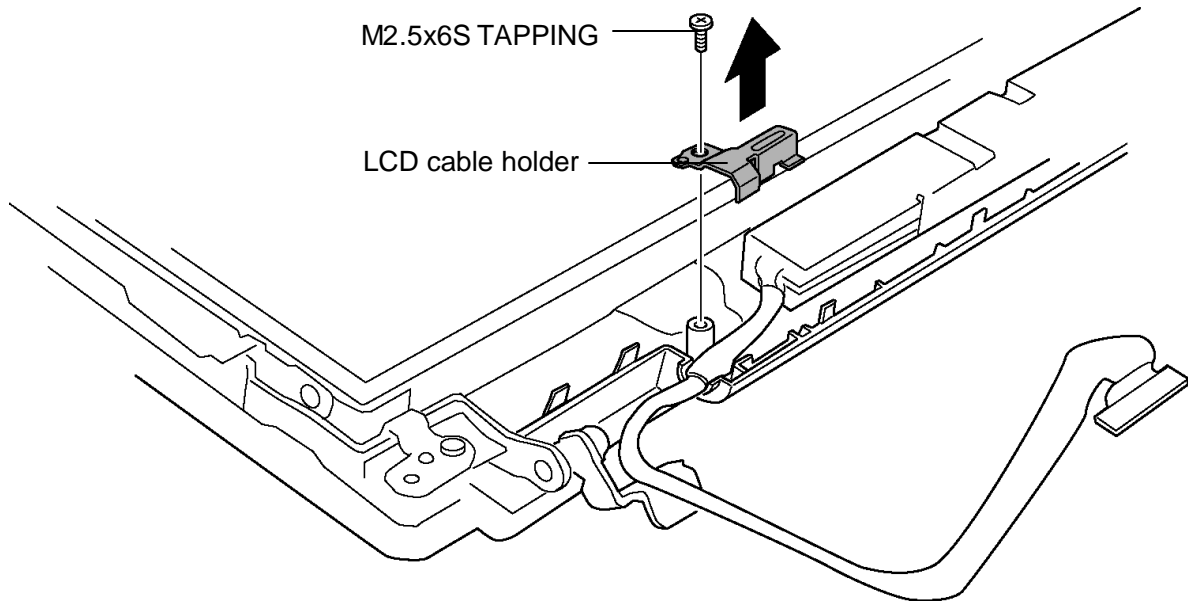


Figure 4-43 Removing the LCD cable holder

4. Pull off one **insulator** from the FL inverter and take out the other one under the LCD unit.
5. Remove the following **screw** and the **FL inverter**:

? M2x6S BIND x1
6. Disconnect the **LCD harness** and **HV harness** from the connectors on the FL inverter.

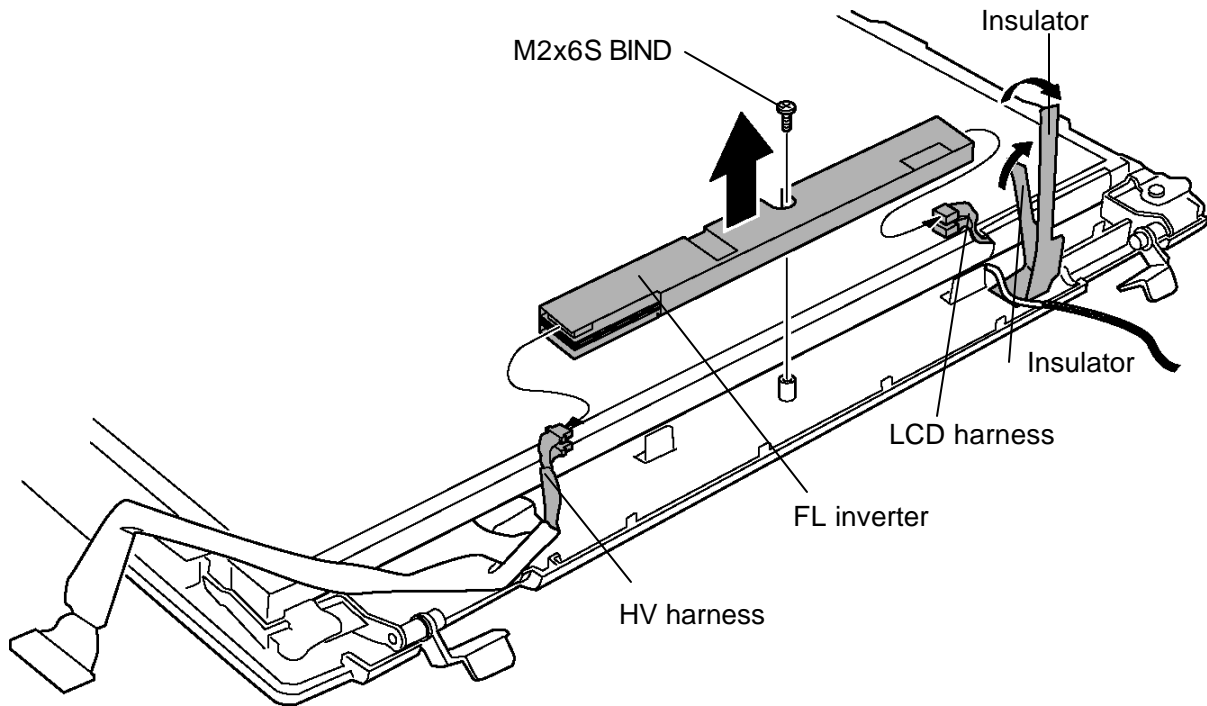


Figure 4-44 Removing the FL inverter

7. Remove the following **screws** fixing the LCD unit.

? M2x6S BIND x4

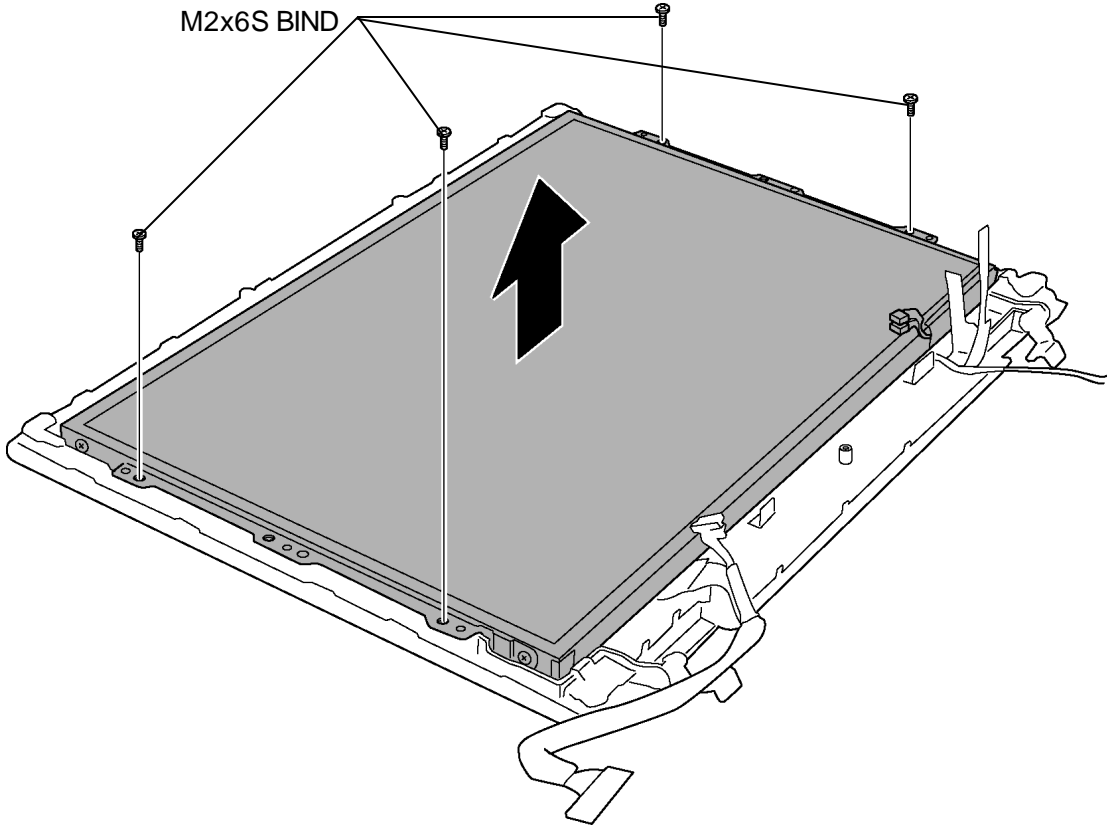


Figure 4-45 Removing the screws

8. With the bottom edge of the LCD unit on the display cover, lift only the top edge of the LCD unit. After peeling off the **aluminum tape**, disconnect the **LCD cable** from the connector on the back of the LCD unit. Remove the **LCD unit**.

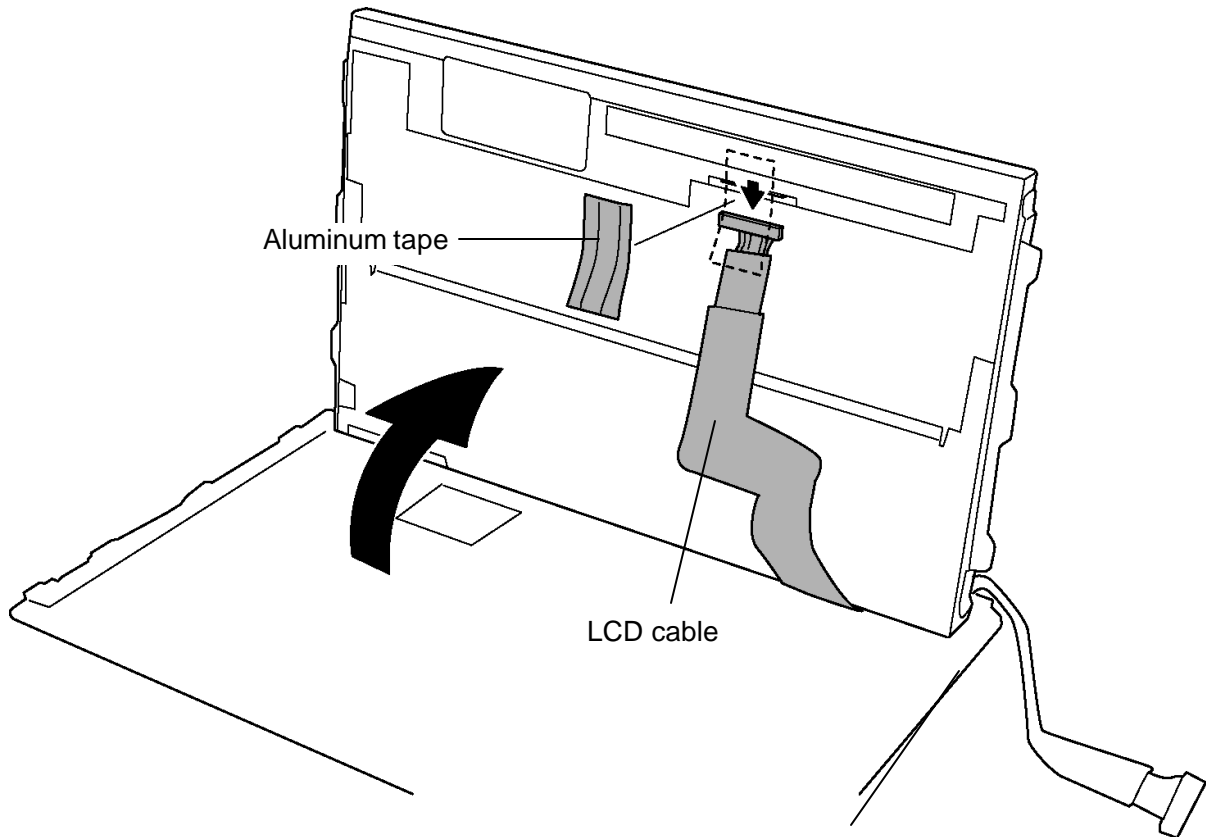


Figure 4-46 Removing the LCD unit

9. Remove the following **screws** and right and left **LCD supports** from the LCD unit.

? M2x3S S-THIN HEAD x4

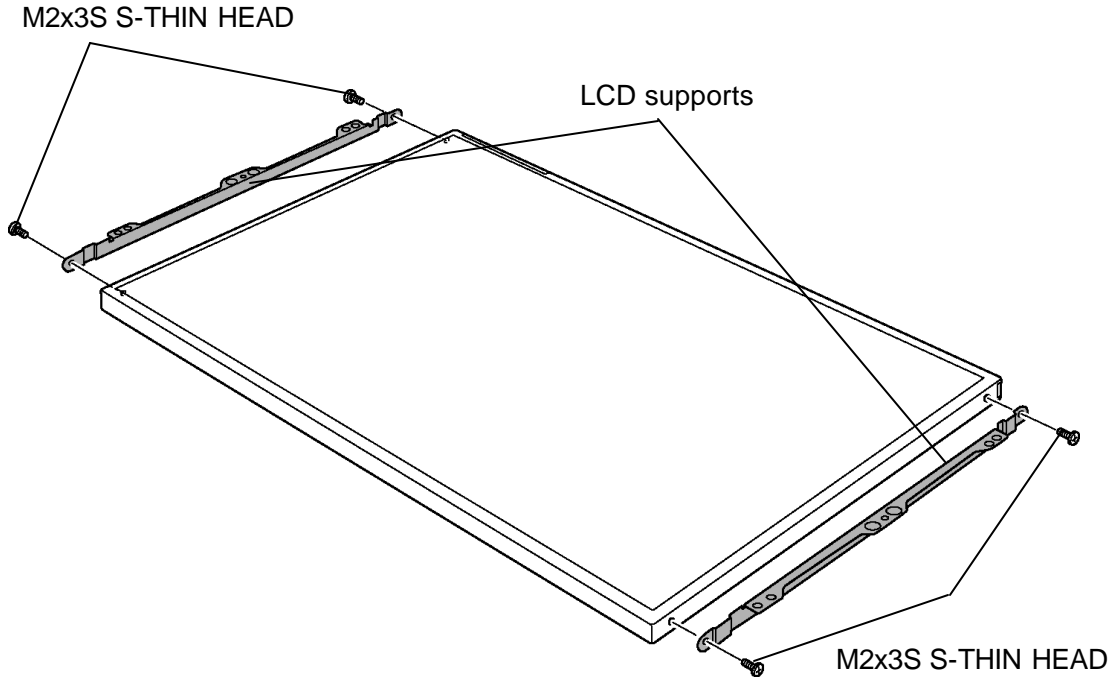


Figure 4-47 Removing the LCD supports

Installing the LCD unit/FL Inverter

The following describes the procedure for installing the LCD unit and FL inverter (See Figure 4-42 to 4-47).

1. Secure the **LCD supports** (left and right) to the LCD unit with the following **screws**.

? M2?3S S-THIN HEAD x4

2. Install the **LDC harness** and secure the **LCD cable holder** with the following **screw**.

? M2.5?6S TAPPING x1

3. Stand the **LCD unit** on the display cover and connect the LCD harness to the connector on the back of LCD.

4. Stick the **aluminum tape** on the connector of LCD harness.

5. Secure the LCD unit with the following **screws**.

? M2x6S BIND x4

6. Connect **LCD harnesses** to the connector CN1 and CN2 of the FL inverter.

CAUTION: Be careful not to connect the LCD harnesses to the wrong connectors.

7. Connect **HV harnesses** to the connector CN3 and CN4 of the FL inverter.

8. Install the **FL inverter** with the following **screw**.

? M2?6S BIND x1

9. Stick one **insulator** on the FL inverter and insert one **insulator** under the LCD unit.

10. Install the **display mask** and lock the latches.

NOTE: When installing the display mask, ensure that there is no gap between the display mask and the display cover.

11. Secure the **display mask** with the following **screws** and stick six **rubber cushions** on the front.

? M2.5?6B FLAT BIND x6

4.21 Wireless LAN antenna

Removing the wireless LAN antenna

The following describes the procedure for removing the wireless LAN antenna (See Figure 4-48).

1. Peel off six **acetate tapes** and the **wireless LAN antennas** from the display cover.

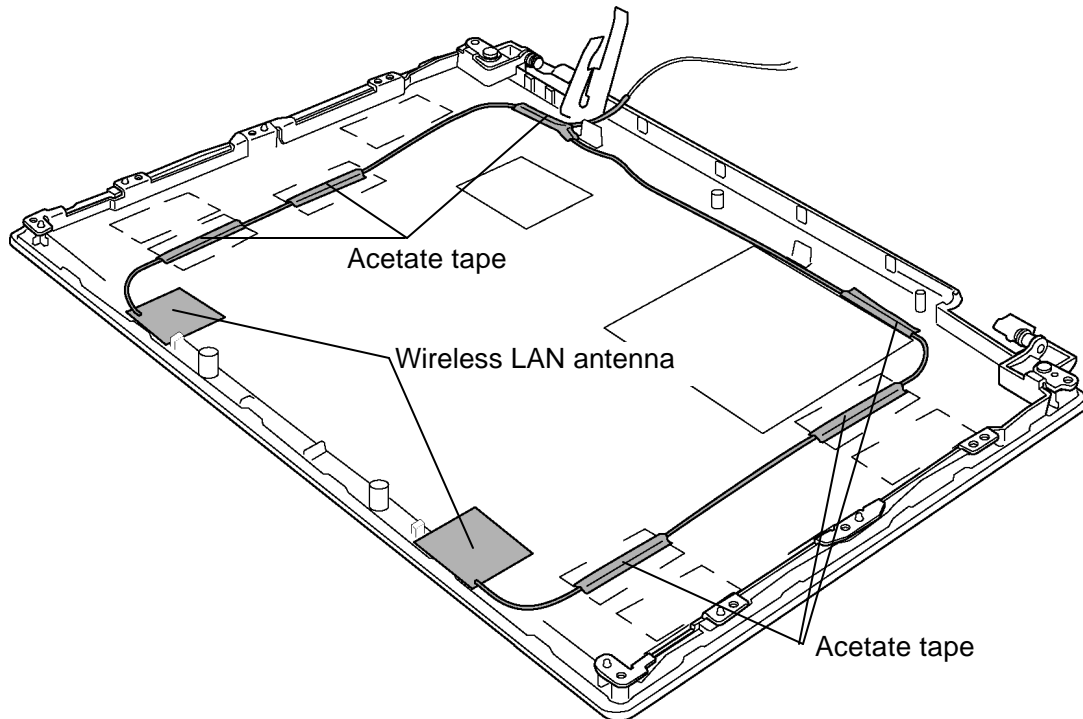


Figure 4-48 Removing the wireless LAN antennas

Installing the wireless LAN antenna

The following describes the procedure for installing the wireless LAN antenna (See Figure 4-48).

1. Stick the **wireless LAN antennas** in position on the display cover.
2. Arrange the **wireless LAN antenna cables** according to the inside of the guideline the on the display cover and fix them with six **acetate tapes**.

4.22 Hinge

4.22.1 Hinge on the middle frame

Removing the Hinge on the middle frame

The following describes the procedure for removing hinge on the middle frame (See Figure 4-49).

1. Remove the following **screws** and the **hinge** (right in the figure) on the middle frame.

? M2.5x6S TAPPING x2

2. Turn up the **insulator**, peel off the **aluminum tape** and remove the following **screws** and the **hinge** (left in the figure) on the middle frame.

? M2.5x6S TAPPING x2

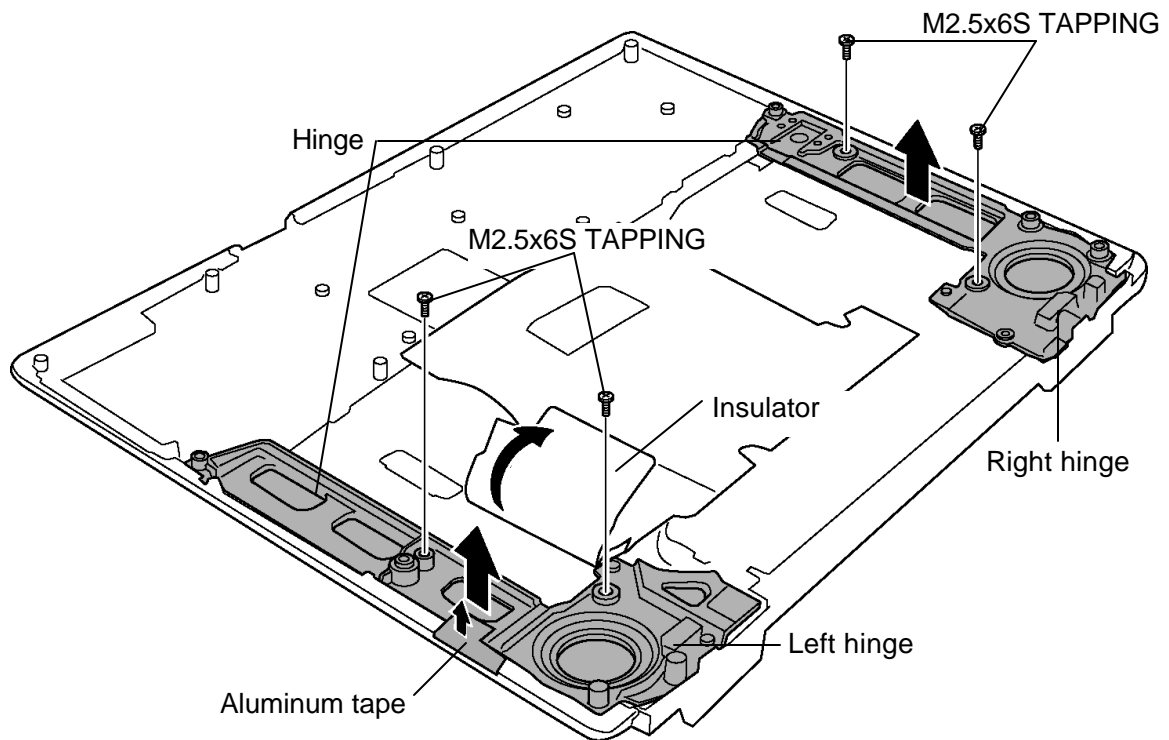


Figure 4-49 Removing the hinges on the middle frame

Installing the Hinge on the middle frame

The following describes the procedure for installing hinge on the middle frame (See Figure 4-49).

1. Turn up the **insulator** and install the **hinge** (left in the figure) on the middle frame.
2. Secure the hinge with the following **screws** and stick the **aluminum tape** in place.

? M2.5?6S TAPPING x2

3. Install the **hinge** (right in the figure) on the middle frame and secure it with the following **screws**.

? M2.5?6S TAPPING x2

4.22.2 Hinge on the display cover

Removing the Hinge on the display cover

The following describes the procedure for removing hinge on the display cover (See Figure 4-50).

1. Remove the following **screws** and right and left **hinges** on the display cover.

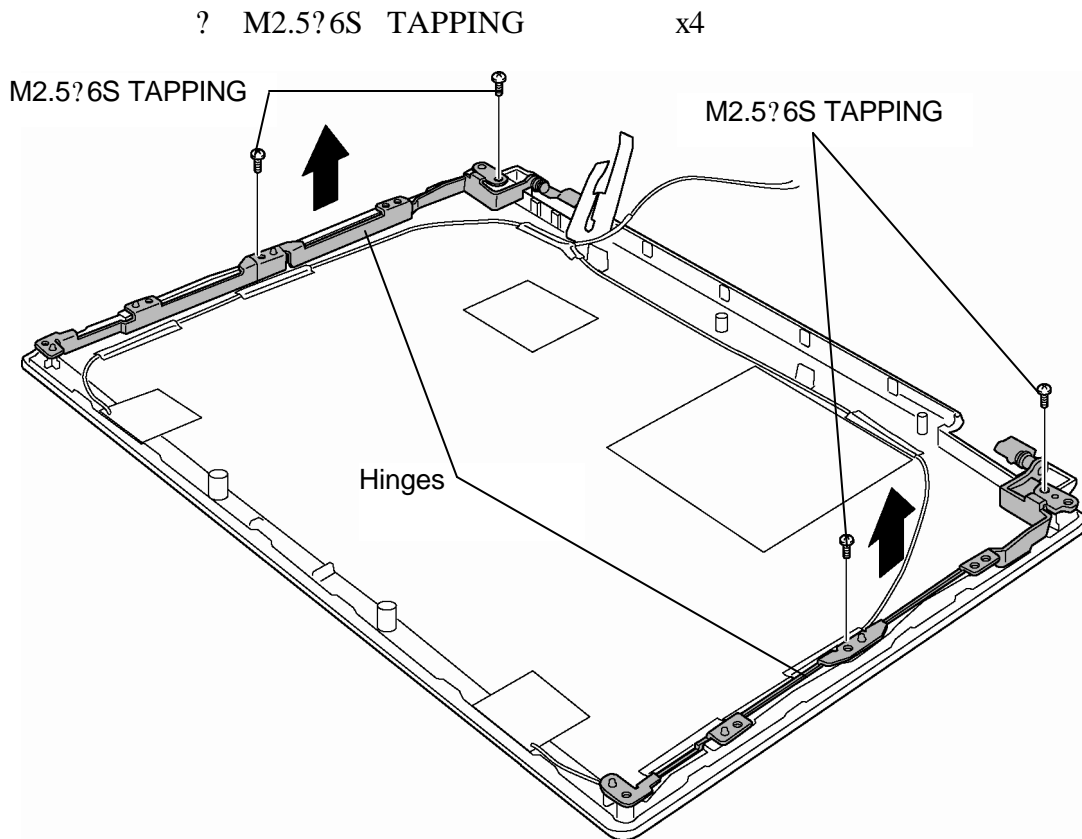


Figure 4-50 Removing the hinges on the middle frame

Installing the Hinge on the display cover

The following describes the procedure for installing hinge on the display cover (See Figure 4-50).

1. Install the right and left **hinges** on the display cover according to the guides and secure them with the following **screws**.

? M2.5?6S TAPPING x4

4.23 Battery lock / Battery latch

Removing the battery lock / Battery latch

The following describes the procedure for removing the Battery lock / Battery latch (See Figure 4-51).

1. Release the **latch** of the slider of the **Battery latch assembly** and separate the Battery latch assembly.
2. Remove the **spring** from the Battery latch.
3. Release the **latch** of the slider of the **Battery lock assembly** and separate the Battery lock assembly.
4. Remove the **spring** from the Battery lock.

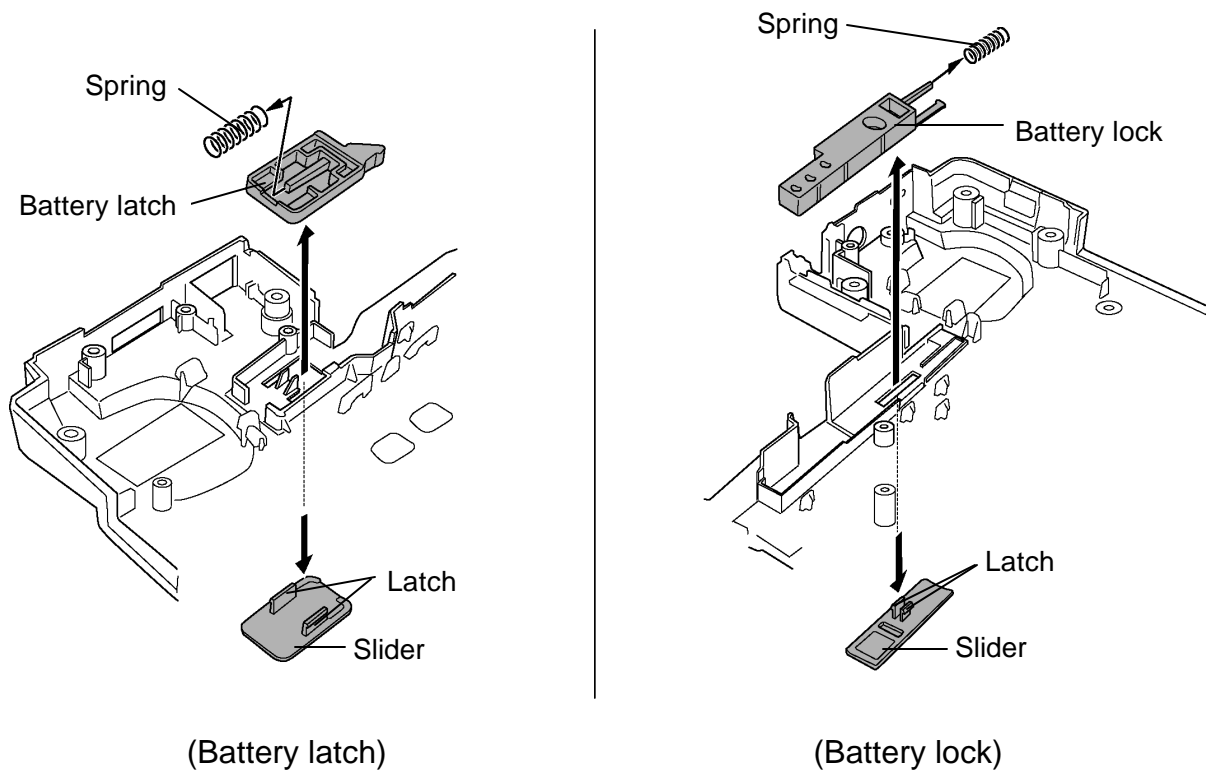


Figure 4-51 Removing the Battery lock / Battery latch

Installing the Battery lock / Battery latch

The following describes the procedure for installing the Battery lock / Battery latch (See Figure 4-51).

1. Set the **spring** to the Battery lock.
2. Lock the latches to the Battery lock from the bottom and assemble the **Battery lock assembly**.
3. Set the **spring** to the Battery latch.
4. Lock the latches to the Battery latch from the bottom and assemble the **Battery latch assembly**.

4.24 Fluorescent lamp

This system uses the following LCD module.

Type	lamps	Part No.	Supplier	Section
15.4 inch (W-XGA)	2	G33C0002A110	Samsung	4.24.1
15.4 inch (W-XGA)	1	G33C0002S110	Samsung	4.24.2
	1	G33C0002T110	Chemei	4.24.3

- 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 dirtying or scratching the LCD panel.
 - Take care when handling the lamp. Excessive force may break the lamp.
 - Ensure always that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.

4.24.1 Replacing the 15.4-inch 2-lamp (W-XGA) Samsung fluorescent lamp

Removing the 15.4-inch 2-lamp (W-XGA) Samsung fluorescent lamp

To remove the 15.4-inch W-XGA Samsung Fluorescent Lamp, follow the steps below and refer to Figures 4-52 to 4-56.

The fluorescent lamp is assembled in the backlight unit. To replace the fluorescent lamp, replace the backlight unit.

1. Turn the LCD module face down, and remove the PCB cover.

CAUTION: Be careful not to damage the COF and ICs when removing the PCB cover.

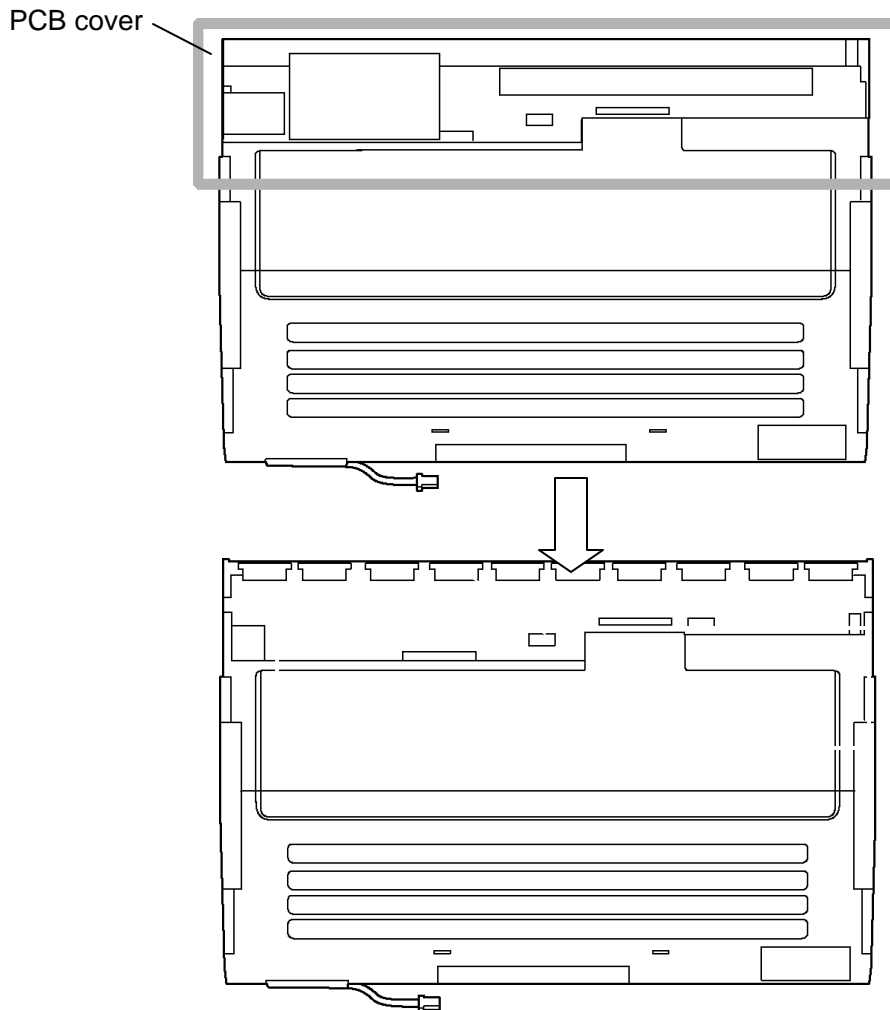


Figure 4-52 Replacing Samsung fluorescent lamp (W-XGA 2-lamp) (1)

2. Remove aluminum tapes stuck on the right and left sides.

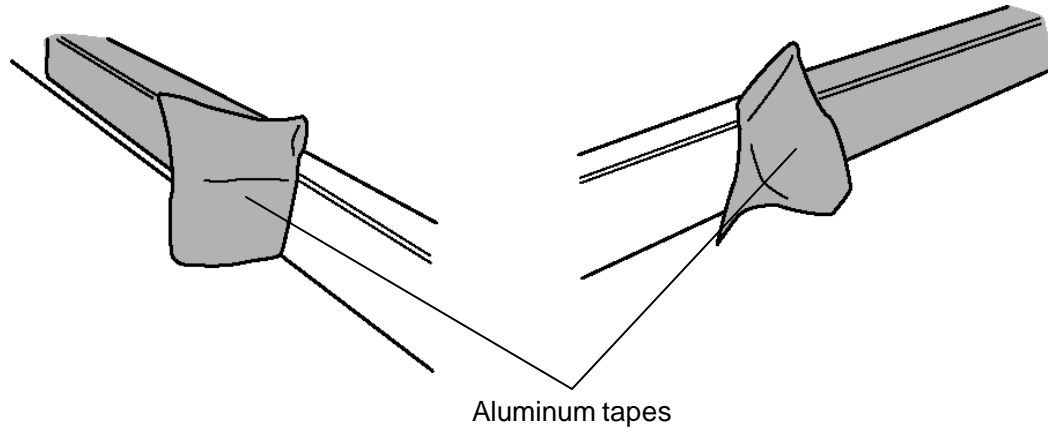


Figure 4-53 Replacing Samsung fluorescent lamp (W-XGA 2-lamp) (2)

3. Remove the lamp wire tape and the aluminum tape stuck on the bottom.

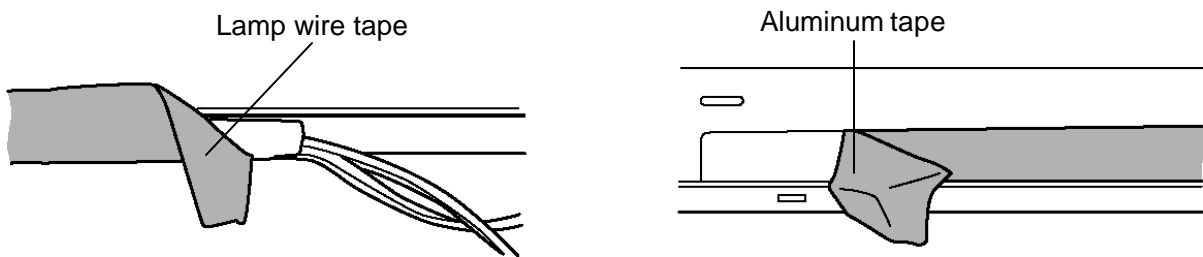


Figure 4-54 Replacing Samsung fluorescent lamp (W-XGA 2-lamp) (3)

4. Unlatch the hooks on the bottom first and then the hooks on the right and left sides to remove the top chassis from the middle frame.

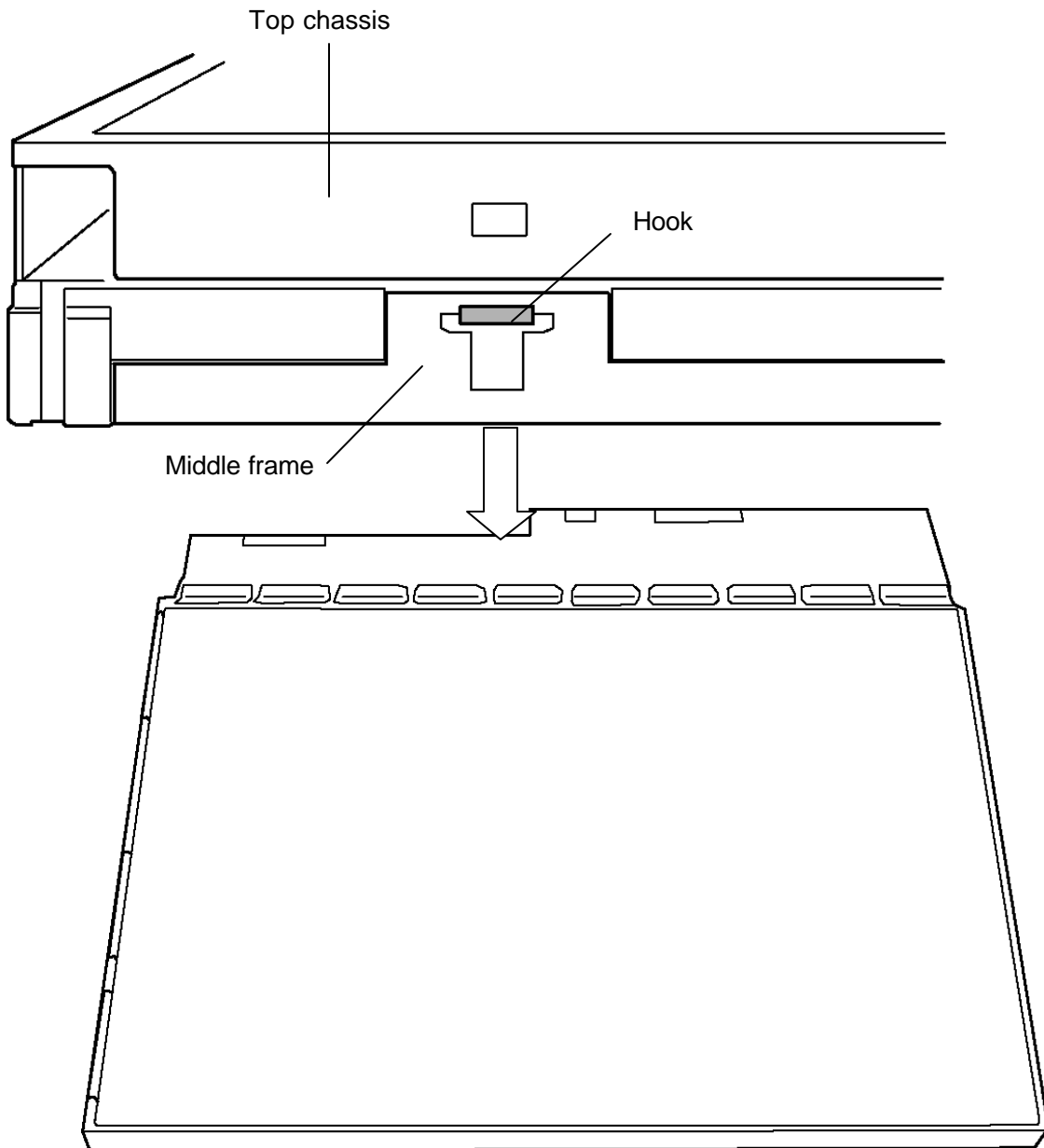


Figure 4-55 Replacing Samsung fluorescent lamp (W-XGA 2-lamp) (4)

5. Remove the panel assembly from the backlight unit.

CAUTION: Be careful not to damage the COF and ICs when removing the panel assembly.

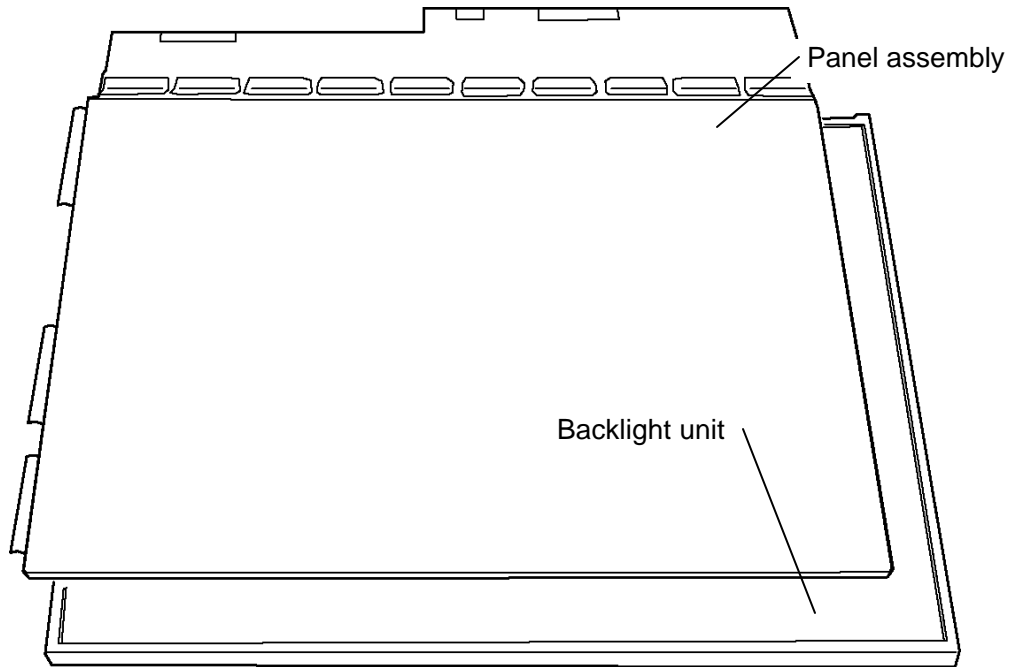


Figure 4-56 Replacing Samsung fluorescent lamp (W-XGA 2-lamp) (5)

Assembling the 15.4-inch 2-lamp (W-XGA) Samsung fluorescent lamp

The assembly procedure is the reverse of the above disassembly procedure.

4.24.2 Replacing the 15.4-inch 1-lamp (W-XGA) Samsung fluorescent lamp

Removing the 15.4-inch 1-lamp (W-XGA) Samsung fluorescent lamp

To remove the 15.4-inch W-XGA Samsung Fluorescent Lamp, follow the steps below and refer to Figures 4-57 to 4-61.

The fluorescent lamp is assembled in the backlight unit. To replace the fluorescent lamp, replace the backlight unit.

1. Turn the LCD module face down, and remove the PCB cover.

CAUTION: Handle with care not to damage COF of S/D and G/D ICs.

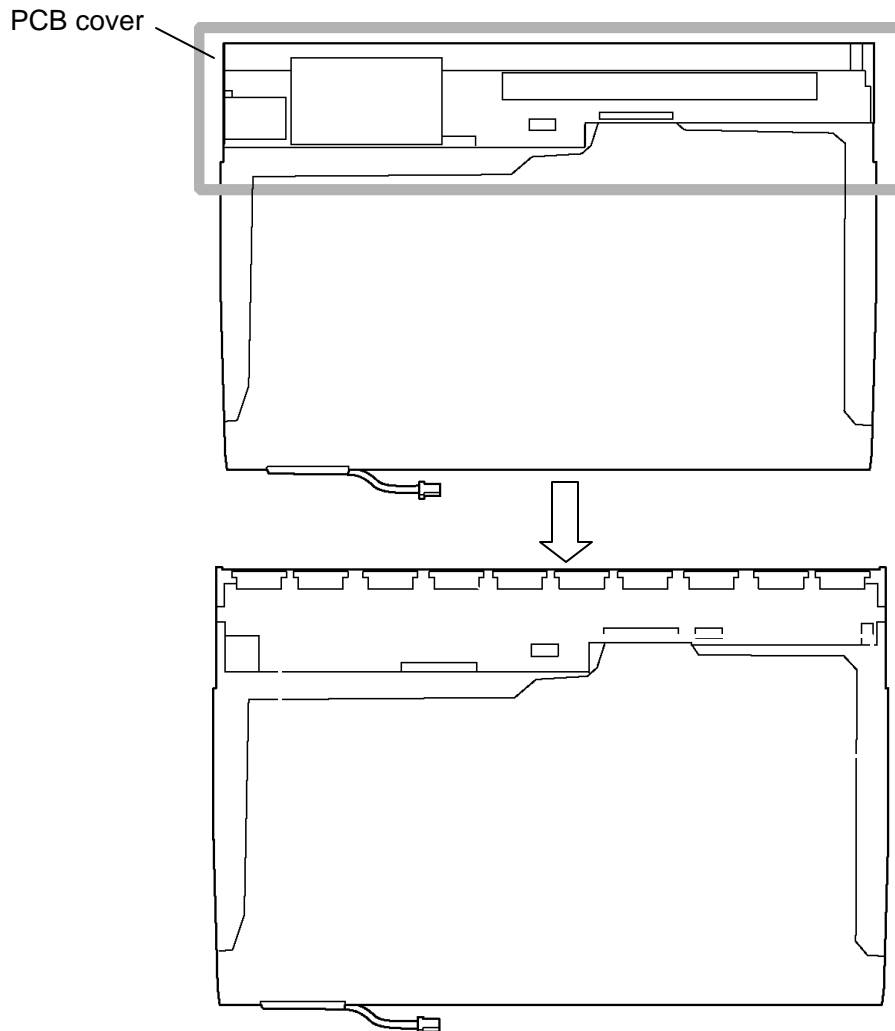


Figure 4-57 Replacing Samsung fluorescent lamp (W-XGA 1-lamp) (1)

2. Remove white tapes stuck on the right and left sides.

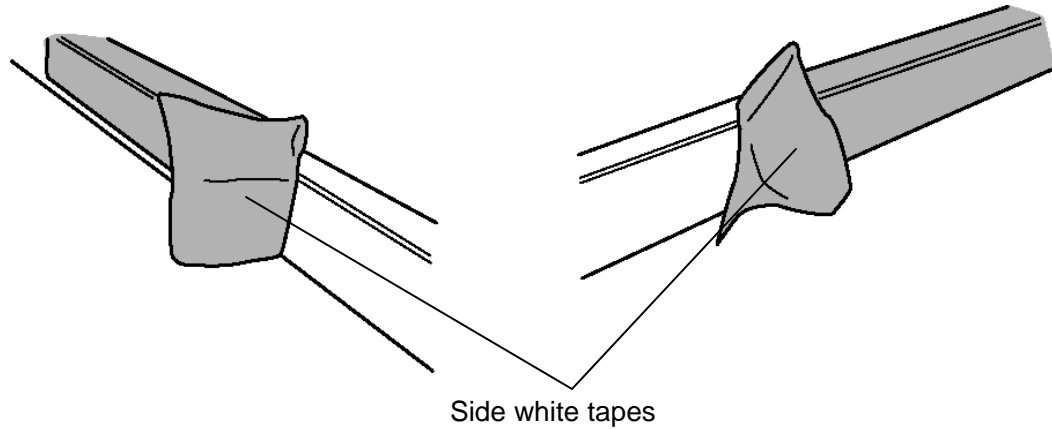


Figure 4-58 Replacing Samsung fluorescent lamp (W-XGA 1-lamp) (2)

3. Remove the lamp wire tape and the aluminum tape stuck on the bottom.

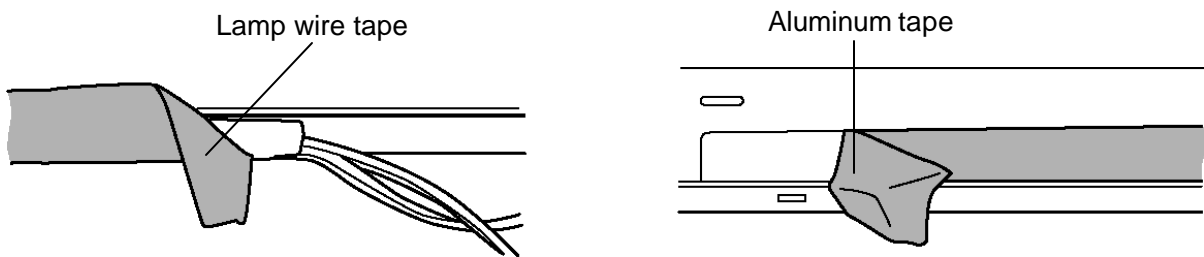


Figure 4-59 Replacing Samsung fluorescent lamp (W-XGA 1-lamp) (3)

4. Unlatch the hooks on the bottom first and then the hooks on the right and left sides to remove the top chassis from the mold frame.

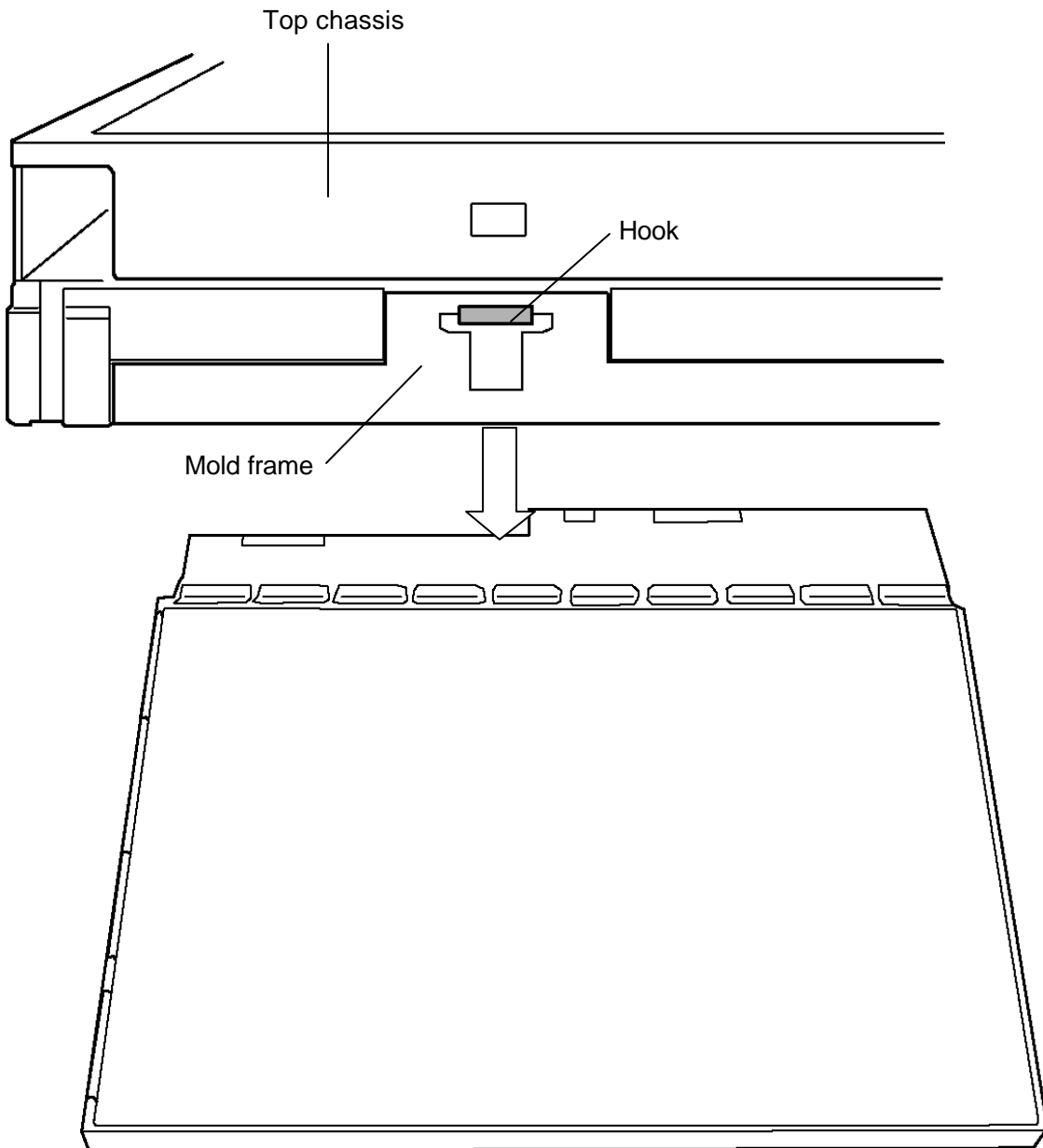


Figure 4-60 Replacing Samsung fluorescent lamp (W-XGA 1-lamp) (4)

5. Remove the panel assembly from the backlight unit.

CAUTION: Handle with care not to damage the COF of S/D and G/D ICs.

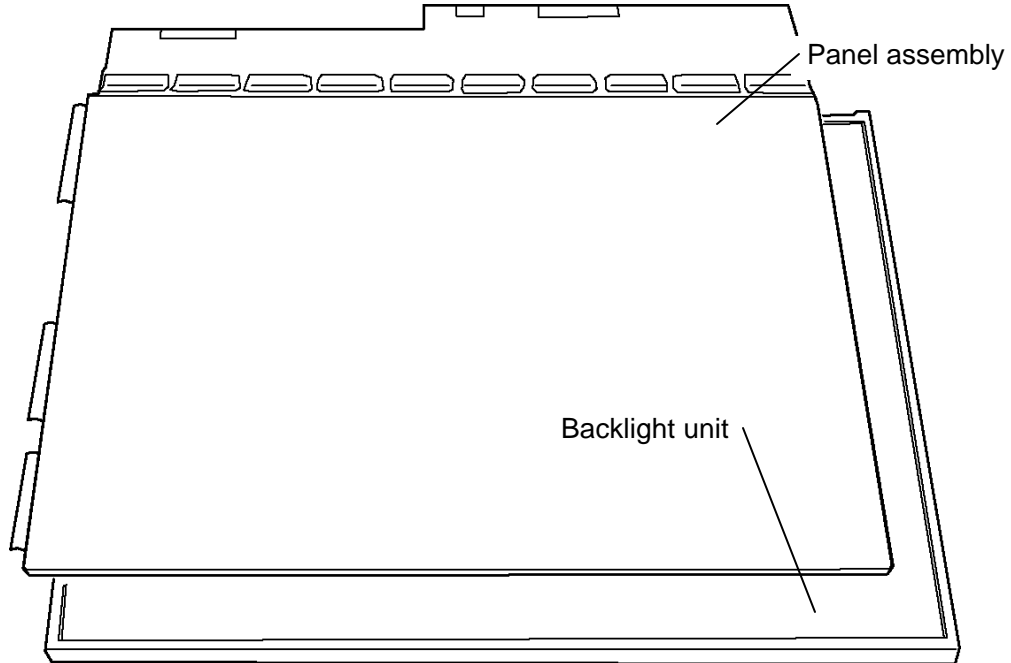


Figure 4-61 Replacing Samsung fluorescent lamp (W-XGA 1-lamp) (5)

Assembling the 15.4-inch 1-lamp (W-XGA) Samsung fluorescent lamp

The assembly procedure is the reverse of the above disassembly procedure.

4.24.3 Replacing the 15.4-inch 1-lamp (W-XGA) Chemei fluorescent lamp

Removing the 15.4-inch 1-lamp (W-XGA) Chemei fluorescent lamp

To remove the 15.4-inch W-XGA Chemei Fluorescent Lamp, follow the steps below and refer to Figures 4-62 to 4-66.

The fluorescent lamp is assembled in the backlight unit. To replace the fluorescent lamp, replace the backlight unit.

1. Peel off tapes.

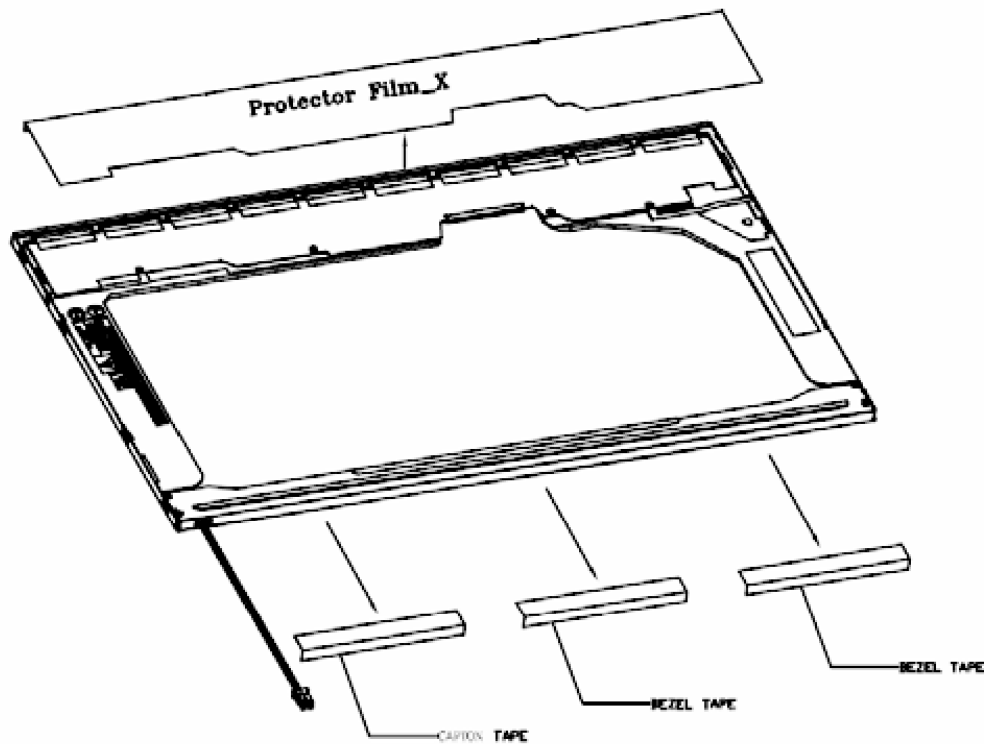


Figure 4-62 Replacing Chemei fluorescent lamp (W-XGA 1-lamp) (1)

2. Remove screws fixing the bezel
3. Remove the bezel from the LCD unit.

CAUTION: Remove the bezel from the side (Z portion) of FL lamp.

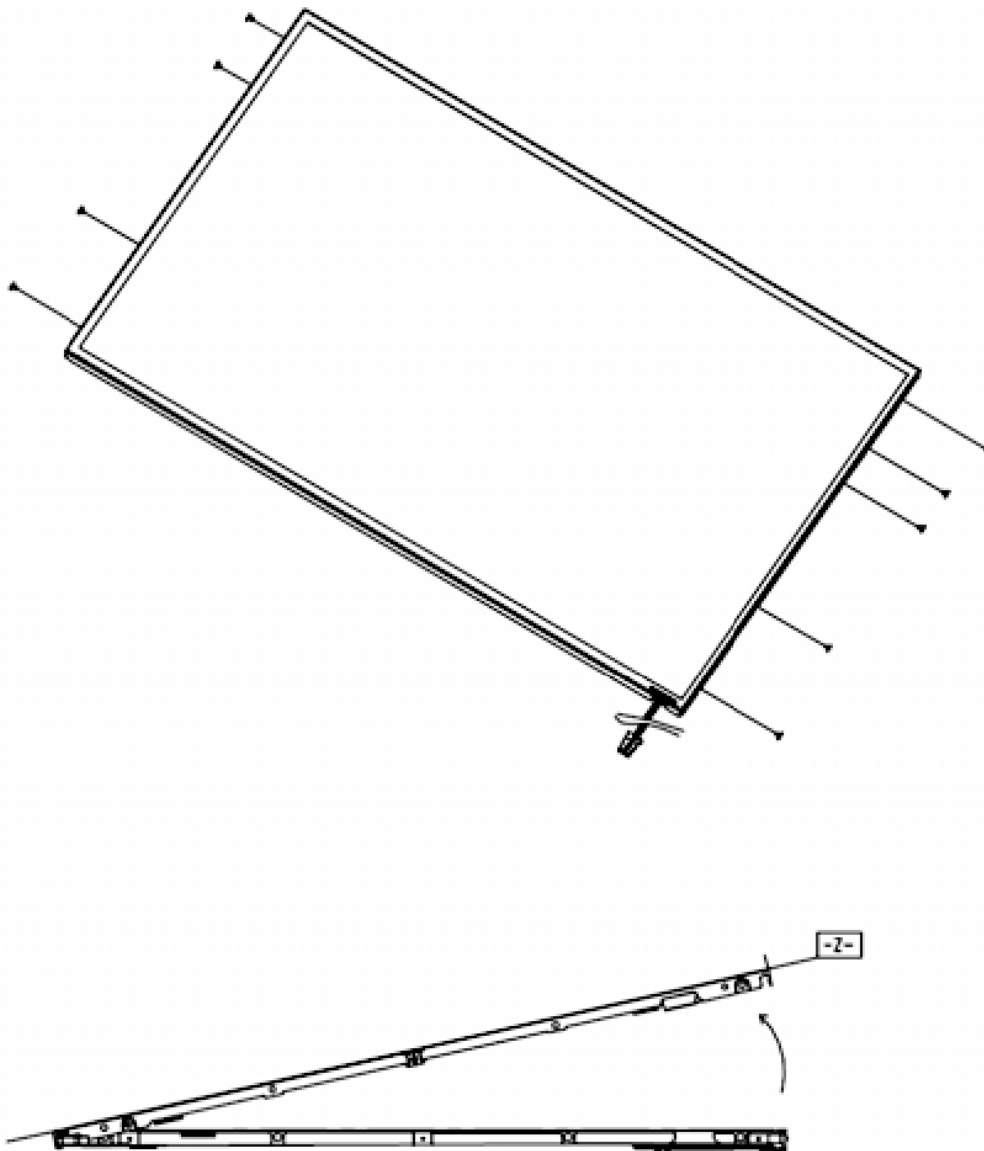


Figure 4-63 Replacing Chemei fluorescent lamp (W-XGA 1-lamp) (2)

4. Remove screws fixing the PCB.

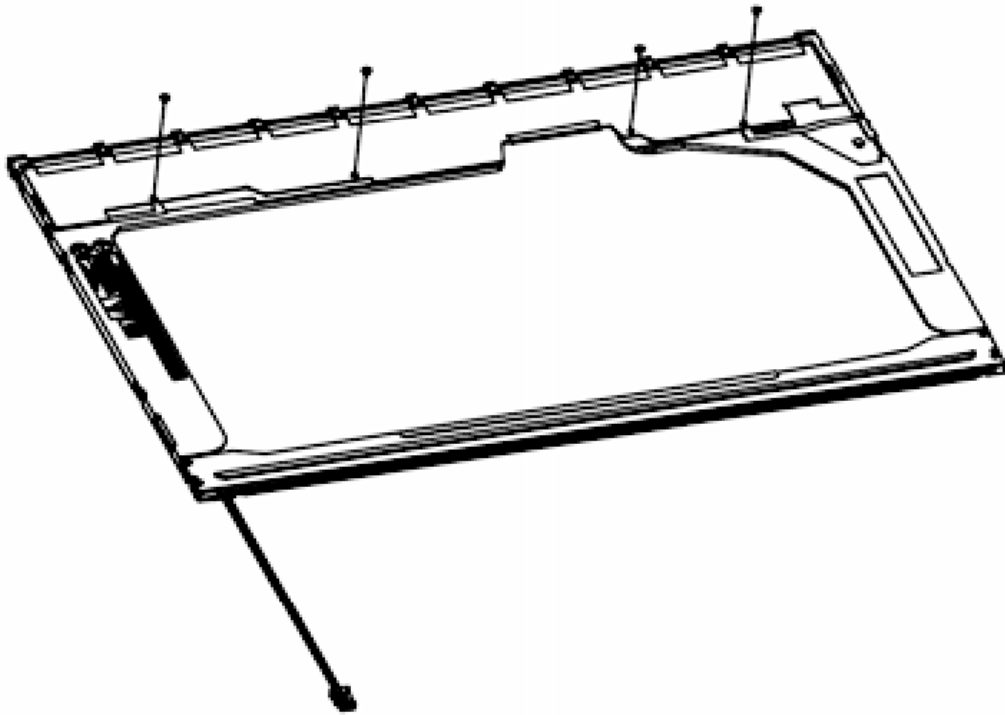


Figure 4-64 Replacing Chemei fluorescent lamp (W-XGA 1-lamp) (3)

5. Open the PCB and turn the display side up.
6. Remove the cell (part of LC and glass).

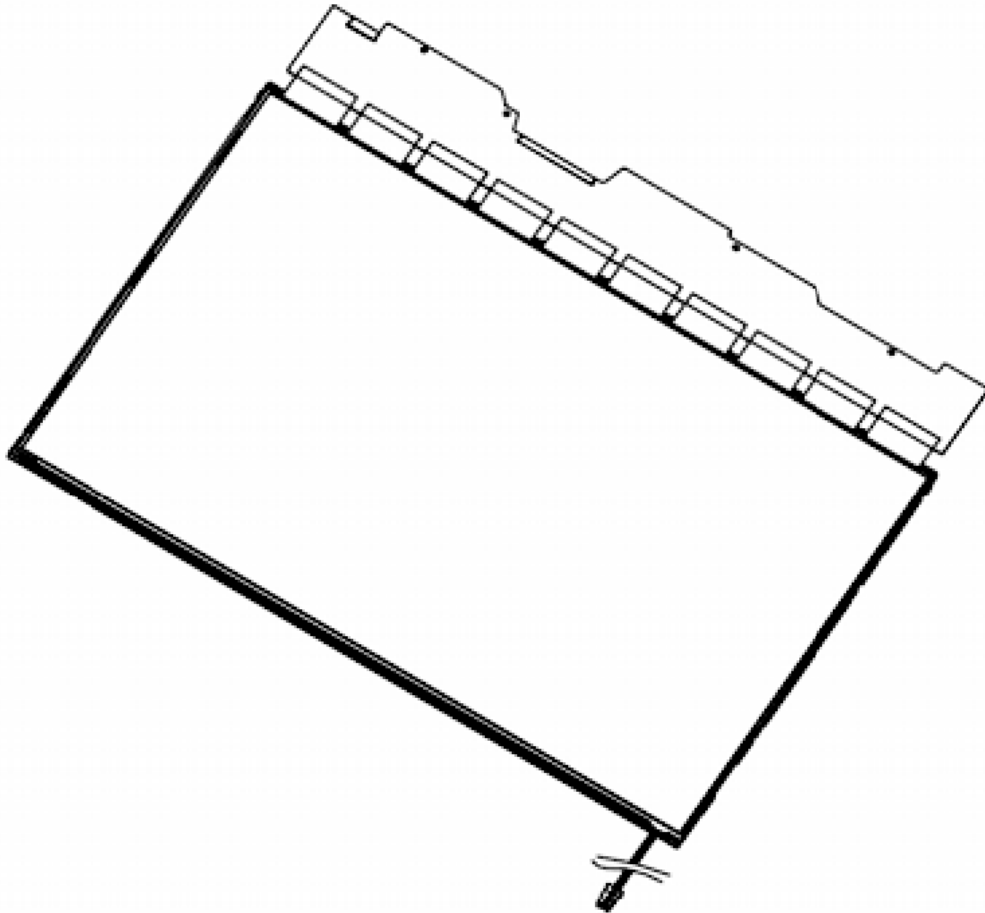


Figure 4-65 Replacing Chemi fluorescent lamp (W-XGA 1-lamp) (4)

7. Remove the spacer (1).
8. Remove (2) to (6) from the plastic chassis.
9. Remove the screw (9).
10. Peel off the double-sided tape (10) and remove the FL lamp.

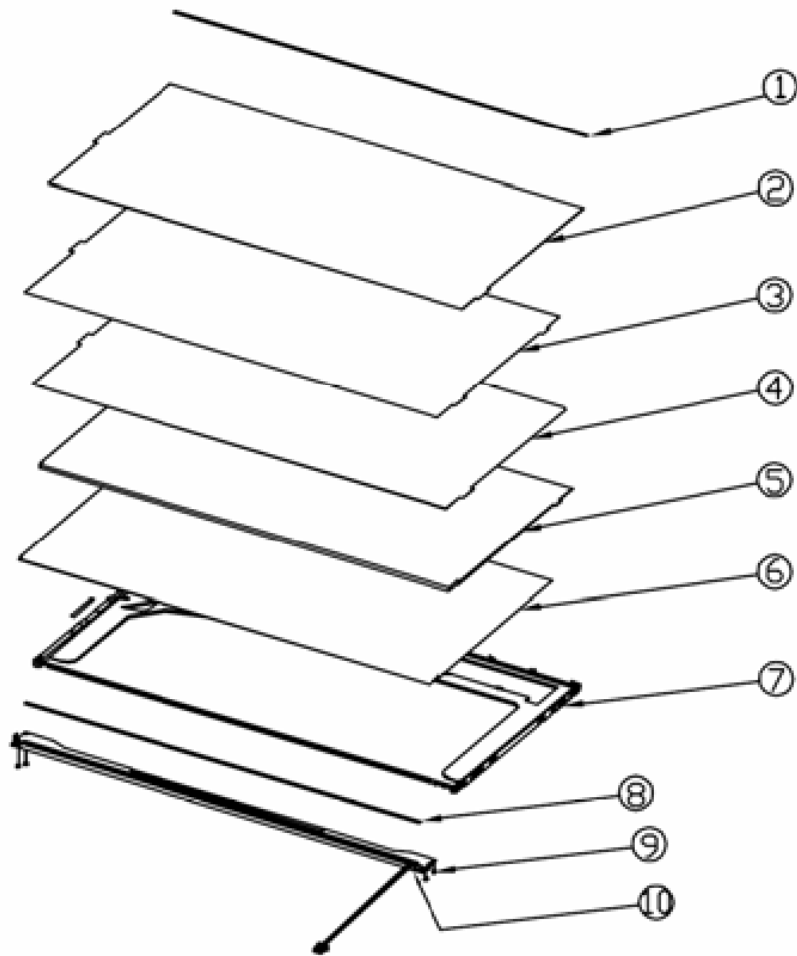


Figure 4-66 Replacing Chemei fluorescent lamp (W-XGA 1-lamp) (5)

Assembling the 15.4-inch 1-lamp (W-XGA) Chemei fluorescent lamp

The assembly procedure is the reverse of the above disassembly procedure.

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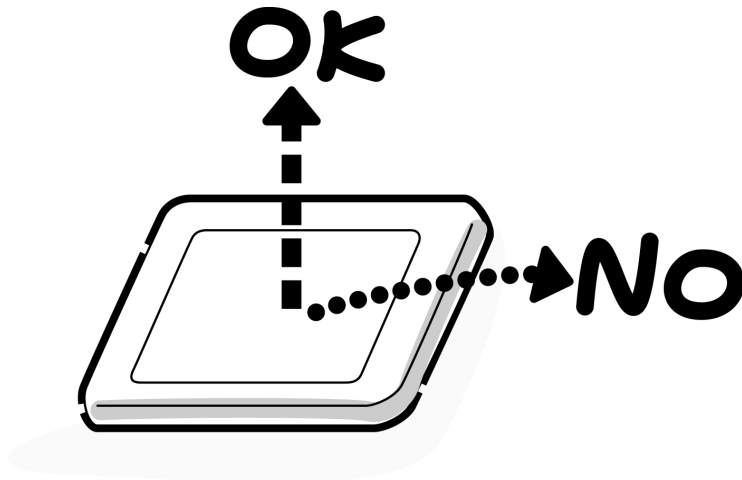
Table I-1 MTBFI-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



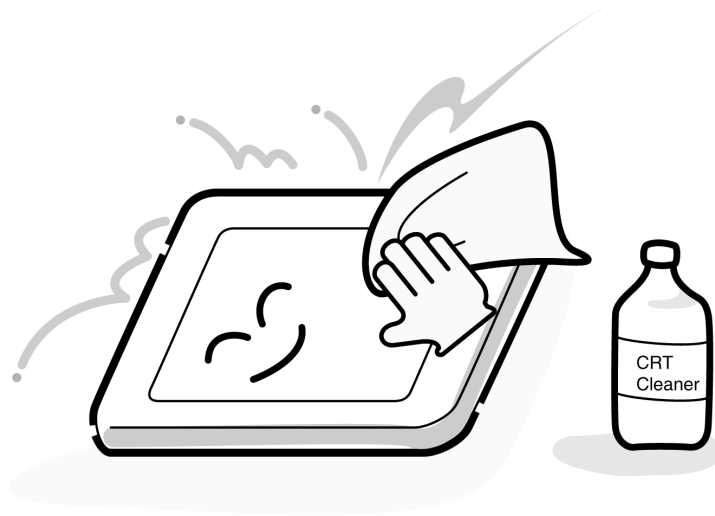
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

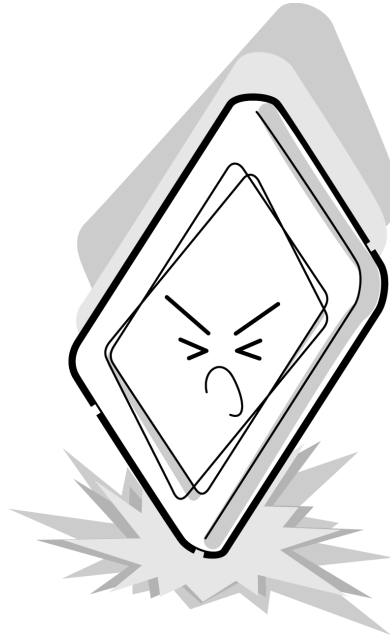
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



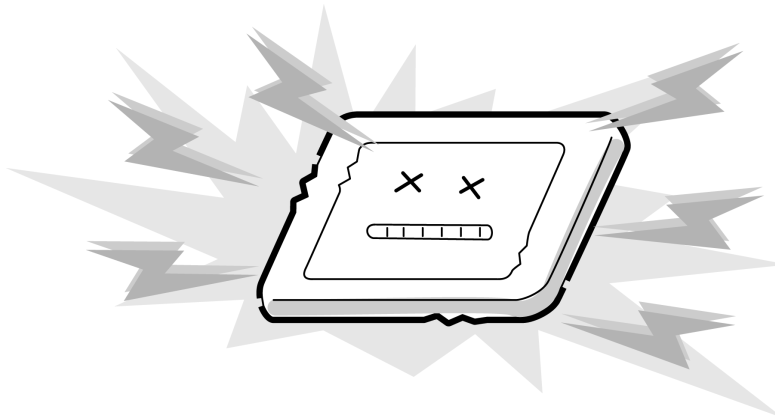
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



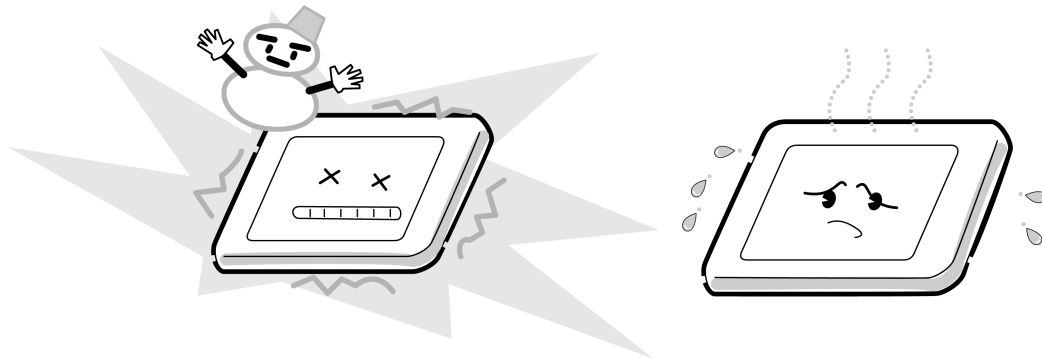
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



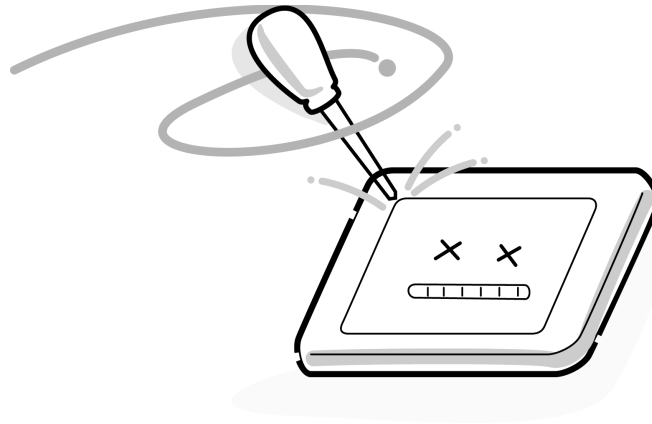
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.

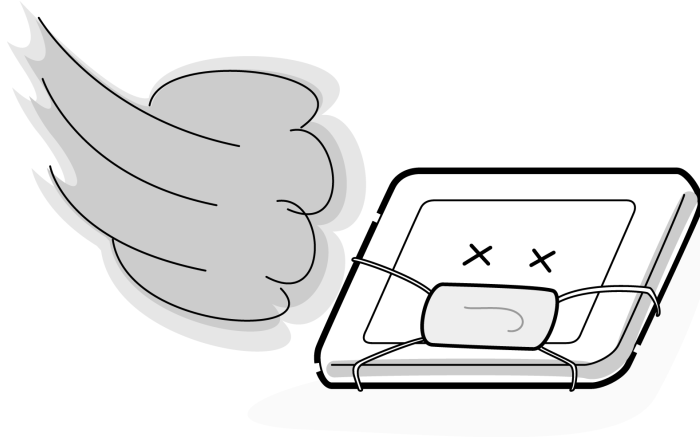


Table B-1 System board ICs and connectors (front)

Mark	Number	Name
(A)	CN3240	PAD I/F connector
(B)	IS2520	Express card connector
(C)	IS2101	MEDIA BRIDGE I/F connector
(D)	CN2200	Mini PCI I/F connector
(E)	CN9990	RTC battery connector
(F)	CN4610	UA board I/F connector
(G)	CN3200	Keyboard I/F connector
(H)	CN3400	Debugging port (D port)
(I)	CN9650	Switch membrane connector
(J)	IC3200	EC/KBC
(K)	CN5000	LCD I/F connector
(L)	CN8770	Fan connector

B.2 System Board (FUTSY*) Back

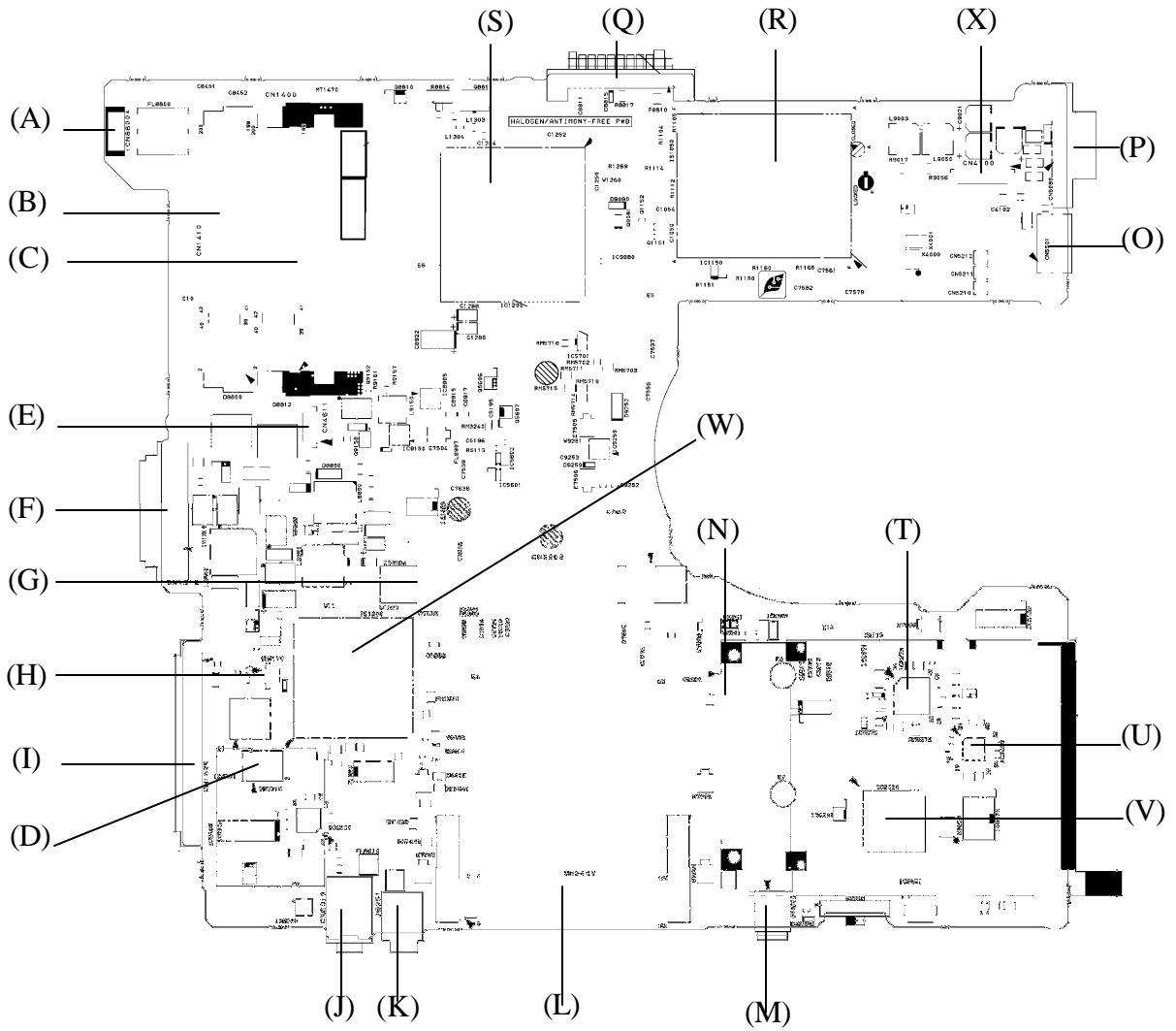


Figure B-2 System board layout (back)

Table B-2 System board ICs and connectors (back)

Mark	Number	Name
(A)	CN8800	DC IN connector
(B)	CN1410	SO-DIMM0 connector
(C)	CN1400	SO-DIMM1 connector
(D)	CN3010	MDC I/F connector
(E)	CN4611	USB board I/F connector
(F)	CN1810	ODD connector
(G)	CN5900	VG board I/F connector
(H)	CN6170	Speaker connector
(I)	CN1800	HDD I/F connector
(J)	CN6310	Headphone connector
(K)	J6051	External microphone connector
(L)	CN2400	TV tuner I/F connector
(M)	CN4200	IEEE1394 I/F connector
(N)	IS2110	PC card connector
(O)	CN5501	S-Video OUT connector
(P)	CN5080	RGB connector
(Q)	PJ8810	Main battery connector
(R)	IS1050	CPU socket
(S)	IC1200	GMCH
(T)	IC8972	PSC
(U)	IC3400	Super IO
(V)	IC2000	PC card controller
(W)	IC1600	ICH6-M
(X)	CN4100	LAN I/F connector

B.3 UA Board (FUTUA*)

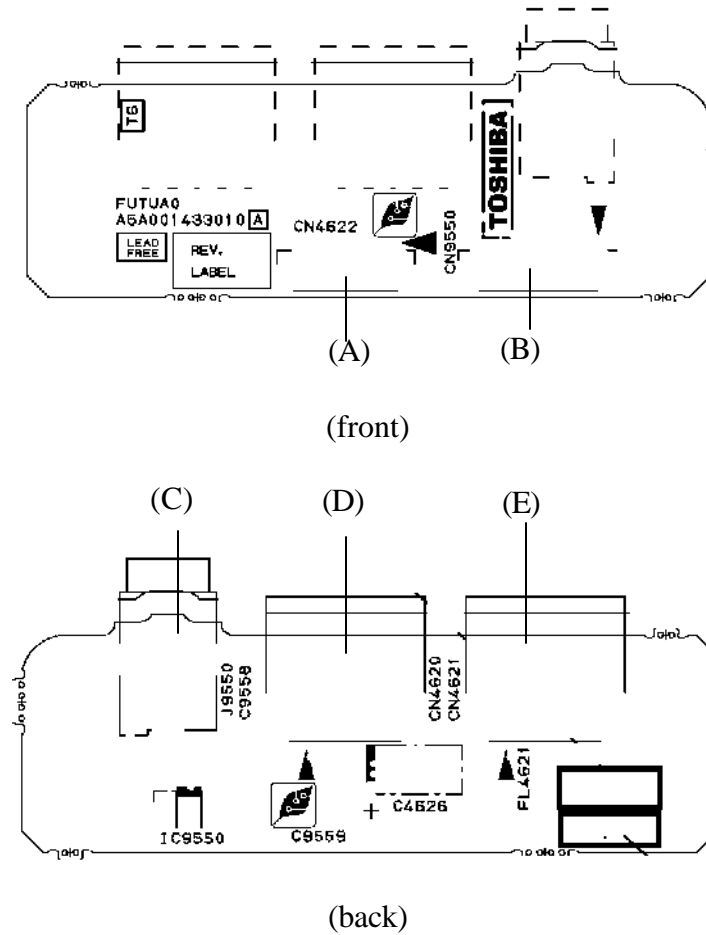


Figure B-3 UA board layout

Table B-3 UA board connectors

Mark	Number	Name
(A)	CN4622	System board I/F connector
(B)	CN9550	TV tuner I/F connector
(C)	J9550	TV-IN connector
(D)	CN4620	USB Port0 connector
(E)	CN4621	USB Port4 connector

B.4 VG Board (FUTVG*)

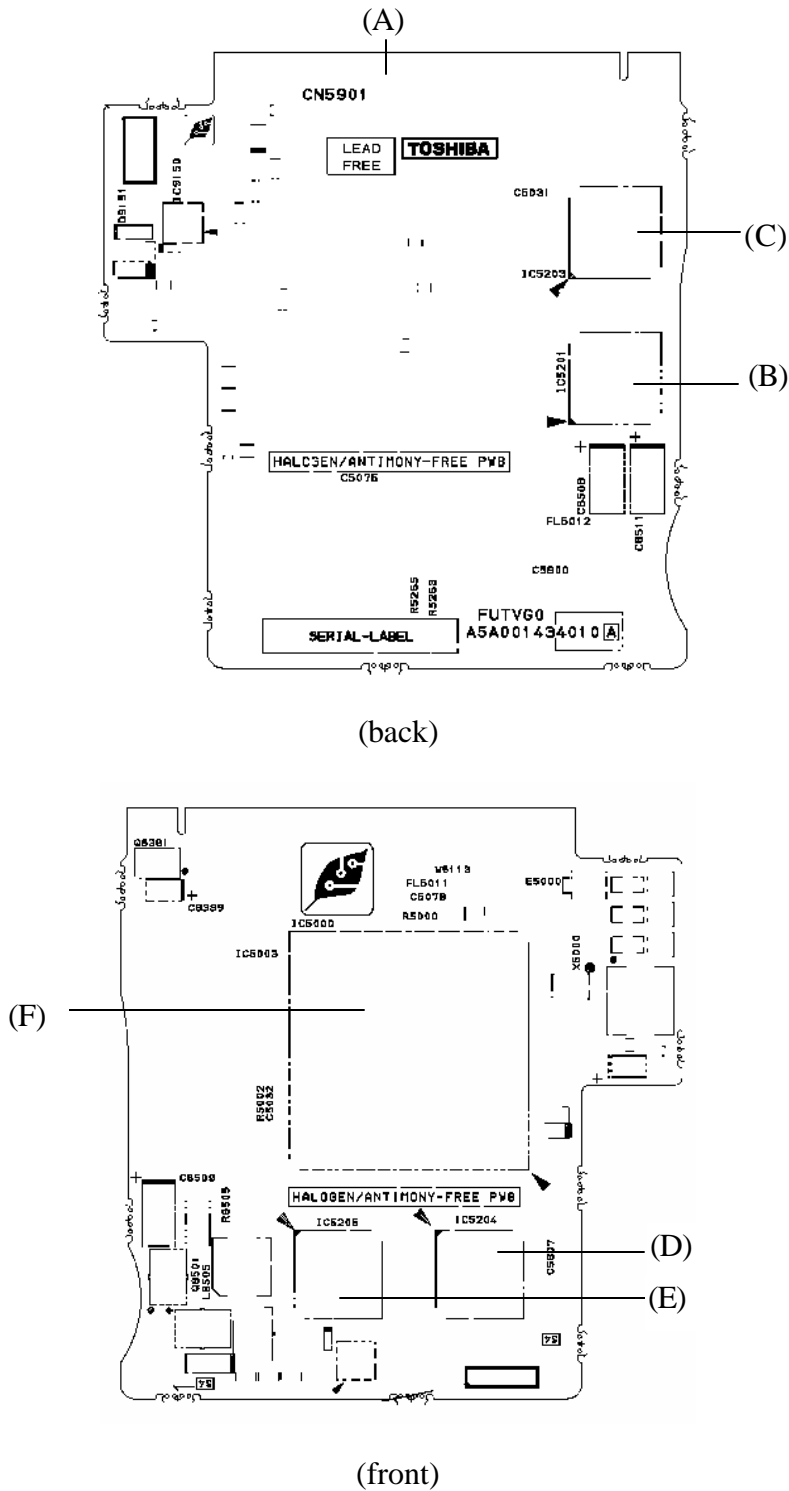


Figure B-4 VG board layout

Table B-4 VG board ICs and connectors

Mark	Number	Name
(A)	CN5901	System board I/F connector
(B)	IC5201	SDRAM
(C)	IC5203	SDRAM
(D)	IC5204	SDRAM
(E)	IC5206	SDRAM
(F)	IC5000	GPU

Appendix C

Appendix C Pin Assignment

System Board (FUTSY*)

C.1 CN1410 SO-DIMM0 connector (200-pin)

Table C-1 SO-DIMM0 connector (200-pin) (1/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MRREF-B0V	-	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/O
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	BDM1-B1P	I/O
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	O
31	BDQS1-B1P	I/O	32	MCK3-B1N	O
33	2R5-B2V	-	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	-	46	BDQ17-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	NC	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I/O
53	GND	-	54	GND	-

Table C-1 SO-DIMM0 connector (200-pin) (2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
55	BDQ23-B1P	I/O	56	BDQ19-B1P	I/O
57	BDQ22-B1P	I/O	58	BDQ20-B1P	I/O
59	GND	-	60	GND	-
61	BDQ30-B1P	I/O	62	ADQ24-B1P	I/O
63	BDQ28-B1P	I/O	64	BDQ25-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I/O	68	BDQS3-B1N	I/O
69	NC	-	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	O	80	MCKE3-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	BBS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	BMA12-B1P	O	90	BMA11-B1P	O
91	BMA09-B1P	O	92	BMA07-B1P	O
93	BMA08-B1P	O	94	BMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	BMA05-B1P	O	98	BMA04-B1P	O
99	BMA03-B1P	O	100	BMA02-B1P	O
101	BMA01-B1P	O	102	BMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	BMA10-B1P	O	106	BBS1-B1P	O
107	BBS0-B1P	O	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	BCAS-B1N	O	114	MODT2-B1P	O
115	MCS3-B1N	O	116	BMA13-B1P	I/O

Table C-1 SO-DIMM0 connector (200-pin) (3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT3-B1P	O	120	NC	-
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	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	O
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ38-B1P	I/O
135	BDQ34-B1P	I/O	136	ADQ39-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	BDM5-B1P	O	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-B1P	I/O
159	BDQ54-B1P	I/O	160	BDQ53-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK4-B1P	O
165	GND	-	166	MCK4-B1N	O
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6-B1P	O
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

Table C-1 SO-DIMM0 connector (200-pin) (4/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	O	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	ADQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCL2-P3P	I/O	198	GND	-
199	P3V	-	200	P3V	-
1T	GND	-	2T	GND	-

C.2 CN1400 SO-DIMM1 connector (200-pin)*Table C-2 SO-DIMM1 connector (200-pin) (1/4)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MRREF-B0V	-	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/O
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	ADM1-B1P	I/O
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK0-B1P	O
31	ADQS1-B1P	I/O	32	MCK0-B1N	O
33	GND	-	34	GND	-
35	ADQ14-B1P	I/O	36	ADQ10-B1P	I/O
37	ADQ15-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	-	46	ADQ21-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	NC	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I/O
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ22-B1P	I/O	58	ADQ18-B1P	I/O

Table C-2 SO-DIMM1 connector (200-pin) (2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	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	ADM3-B1P	I/O	68	ADQS3-B1N	I/O
69	NC	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ27-B1P	I/O	74	ADQ30-B1P	I/O
75	BDQ26-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	O	80	MCKE1-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	ABS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	AMA12-B1P	O	90	AMA11-B1P	O
91	AMA09-B1P	O	92	AMA07-B1P	O
93	AMA08-B1P	O	94	AMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	AMA05-B1P	O	98	AMA04-B1P	O
99	AMA03-B1P	O	100	AMA02-B1P	O
101	AMA01-B1P	O	102	AMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	AMA10-B1P	O	106	ABS1-B1P	O
107	ABS0-B1P	O	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	ACAS-B1N	O	114	MODT0-B1P	O
115	MCS1-B1N	O	116	AMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT1-B1P	O	120	NC	-
121	GND	-	122	GND	-

Table C-2 SO-DIMM1 connector (200-pin) (3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
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	O
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
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	ADM5-B1P	O	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-B1P	I/O
159	ADQ49-B1P	I/O	160	ADQ53-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK1-B1P	O
165	GND	-	166	MCK1-B1N	O
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	ADM6-B1P	O
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	O	186	ADQS7-B1N	I/O

Table C-2 SO-DIMM1 connector (200-pin) (4/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	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	SMBCL2-P3P	I/O	198	GND	-
199	P3V	-	200	GND	-
1T	GND	-	2T	GND	-

C.3 CN1810 CD-ROM I/F connector (50-pin)*Table C-3 CD-ROM I/F connector (50-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	CAUDL-PXP	I	2	CAUDR-PXP	I
3	GND	-	4	N.C.	-
5	(PLTRS1+RSTI DB)	O	6	PDD08-P3P	I/O
7	PDD07-P3P	I/O	8	SDD09-P3P	I/O
9	PDD06-P3P	I/O	10	PDD10-P3P	I/O
11	PDD05-P3P	I/O	12	PDD11-P3P	I/O
13	PDD04-P3P	I/O	14	PDD12-P3P	I/O
15	PDD03-P3P	I/O	16	PDD13-P3P	I/O
17	PDD02-P3P	I/O	18	PDD14-P3P	I/O
19	PDD01-P3P	I/O	20	PDD15-P3P	I/O
21	PDD00-P3P	I/O	22	PDDREQ-P3P	I/O
23	GND	-	24	PDIOR-P3N	I
25	PDIOW-P3N	I	26	GND	-
27	PIORDY -P3P	O	28	PDDACK-P3N	I
29	IDEIRQ-P3P	O	30	N.C.	-
31	PDA1-P3P	I	32	N.C.	-
33	PDA0-P3P	I	34	PDA2-P3P	I
35	PDCS1-P3N	I	36	PDCS3-P3N	I
37	N.C.	-	38	P5V	-
39	P5V	-	40	P5V	-
41	P5V	-	42	P5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	N.C.	-	48	GND	-
49	N.C.	-	50	N.C.	-

C.4 CN1800 HDD I/F connector (44-pin)

Table C-4 HDD I/F connector (44-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	GND	-
3	P5V	-	4	GND	-
5	GND	-	6	N.C.	-
7	SODCS3-P3P	O	8	SODCS1-P3N	I
9	SODA2-P3P	O	10	SODA0-P3P	O
11	N.C.	-	12	SODA1-P3P	O
13	N.C.	-	14	SOIRQ-P3P	I
15	GND	-	16	SODACK-P3N	I
17	GND	-	18	SOIORY-P3P	I
19	GND	-	20	SODIOR-P3N	I
21	GND	-	22	SODIOW-P3N	I
23	GND	-	24	SODREQ-P3P	I
25	N.C.	-	26	GND	-
27	SODD15-P3P	I/O	28	SODD00-P3P	I/O
29	SODD14-P3P	I/O	30	SODD01-P3P	I/O
31	SODD13-P3P	I/O	32	SODD02-P3P	I/O
33	SODD12-P3P	I/O	34	SODD03-P3P	I/O
35	SODD11-P3P	I/O	36	SODD04-P3P	I/O
37	SODD10-P3P	I/O	38	SODD05-P3P	I/O
39	SODD09-P3P	I/O	40	SODD06-P3P	I/O
41	SODD08-P3P	I/O	42	SODD07-P3P	I/O
43	GND	-	44	SORST-P3N	I

C.5 IS2110 PC card I/F connector (68-pin)*Table C-5 PC card I/F connector (68-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	ACAD00-EYP	I/O
3	ACAD01-EYP	I/O	4	ACAD03-EYP	I/O
5	ACAD05-EYP	I/O	6	ACAD07-EYP	I/O
7	ACCBEO-EYN	I/O	8	ACAD09-EYP	I/O
9	ACAD11-EYP	I/O	10	ACAD12-EYP	I/O
11	ACAD14-EYP	I/O	12	ACCB E1-EYN	I/O
13	ACPAR-EYP	I/O	14	ACPERR-EYN	I/O
15	ACGNT-EYN	I/O	16	ACINT-EYN	I/O
17	MCVCCA-EYV	I/O	18	MCVPPA-EYV	I/O
19	ACCLK-EYP	I/O	20	ACIRDY-EYN	I/O
21	ACCB E2-EYN	I/O	22	ACAD18-EYP	I/O
23	ACAD20-EYP	I/O	24	ACAD21-EYP	I/O
25	ACAD22-EYP	I/O	26	ACAD23-EYP	I/O
27	ACAD24-EYP	I/O	28	ACAD25-EYP	I/O
29	ACAD26-EYP	I/O	30	ACAD27-EYP	I/O
31	ACAD29-EYP	I/O	32	ACD02-EYP	I/O
33	ACCLKR-EYN	I/O	34	GND	-
35	GND	-	36	ACCD1-E3N	I/O
37	ACAD02-EYP	I/O	38	ACAD04-EYP	I/O
39	ACAD06-EYP	I/O	40	ACD14-EYP	I/O
41	ACAD08-EYP	I/O	42	ACAD10-EYP	I/O
43	ACVS1-E3P	I/O	44	ACAD13-EYP	I/O
45	ACAD15-EYP	I/O	46	ACAD16-EYP	I/O
47	ACA18-EYP	I/O	48	ACLOCK-EYN	I/O
49	ACSTOP-EYN	I/O	50	ACDEVS-EYN	I/O
51	MCVCCA-EYV	I	52	MCVPPA-EYV	I/O
53	ACTRDY-EYN	I/O	54	ACFRAM-EYN	I/O
55	ACAD17-EYP	I/O	56	ACAD19-EYP	I/O
57	ACVS2-E3P	I/O	58	ACRST-EYN	I/O
59	ACSERR-EYN	I/O	60	ACREQ-EYN	I/O
61	ACCB E3-EYN	I/O	62	ACAUDI-EYP	O
63	ACSTSC-EYP	O	64	ACAD28-EYP	I/O
65	ACAD30-EYP	I/O	66	ACAD31-EYP	I/O
67	ACCD2-E3N	O	68	GND	-
1T	GND	-	2T	GND	-

C.6 IS2101 MEDIA BRIDGE I/F connector (42-pin)

Table C-6 MEDIA BRIDGE I/F connector (42-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MSDAT2-E3P	I/O	2	MSDAT3-E3P	I/O
3	MSBS-E3P	I/O	4	GND	-
5	GND	-	6	FM-E3V	-
7	MSCLK-E3P	I/O	8	MSDAT3-E3P	I/O
9	MSCD-E3N	O	10	MSDAT2-E3P	I/O
11	MSSDIO-E3P	I/O	12	MSDAT1-E3P	I/O
13	MSBS-E3P	I/O	14	GND	-
15	FM-E3V	-	16	MSCLK-E3P	I/O
17	GND	-	18	MSSDIO-E3P	I/O
19	MSDAT1-E3P	I/O	20	FM-E3V	-
21	SDAT3-E3P	I/O	22	SDAT2-E3P	I/O
23	SDAT1-E3P	I/O	24	SDAT0-E3P	I/O
25	MSDAT3-E3P	I/O	26	MSDAT2-E3P	I/O
27	MSDAT1-E3P	I/O	28	MSSDIO-E3P	I/O
29	GND	-	30	MSCLK-E3P	I/O
31	XDWE-E3N	I	32	SDCMD-E3P	I/O
33	SMCLE-E3P	I/O	34	XDCE-E3N	I
35	XDRE-E3N	I	36	SMRDY-E3P	I
37	SMCD-E3N	I	38	GND	-
39	GND	-	40	SDCD-E3N	O
41	GND	-	42	SDWP-E3P	O

C.7 CN2200 Mini PCI I/F connector (124-pin)*Table C-7 Mini PCI I/F connector (124-pin) (1/2)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	(WLON-S3N)	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIRQF-P3N	I	18	P5V	I
19	P3V	I	20	PIRQG-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	E3V	I
25	X33MPC-P3P	I	26	PCIRS1-P3N	O
27	GND	-	28	P3V	I
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	I	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	O
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD21-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O

Table C-7 Mini PCI I/F connector (124-pin) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	I	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TDRY-P3N	I/O
67	SERR-P3N	I/O	68	STOP-P3N	I/O
69	GND	-	70	P3V	I
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	I
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	I	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	N.C.	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	E3V	I
1T	GND	-	2T	GND	-

C.8 CN2400 WW Tuner I/F connector (124-pin)*Table C-8 WW Tuner I/F connector (124-pin) (1/2)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TA-P5V	-	2	TA-P5V	-
3	TA-P5V	-	4	TA-P5V	-
5	TA-P5V	-	6	TA-P5V	-
7	N.C.	-	8	N.C.	-
9	TA-GND	-	10	TA-GND	-
11	TA-GND	-	12	TA-GND	-
13	TA-GND	-	14	TA-GND	-
15	GND	-	16	N.C.	-
17	N.C.	-	18	TA-P5V	-
19	P3V	I	20	PIRQD-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	N.C.	-
25	X33MPC-P3P	I	26	PCIRS1-P3N	O
27	GND	-	28	T-P3V	I
29	PREQ1-P3N	I	30	PGNT1-P3N	O
31	P3V	I	32	GND	-
33	AD31-P3P	I/O	34	N.C.	-
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	T-P3V P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	TIDSEL-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O

Table C-8 WW Tuner I/F connector (124-pin) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	I	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TDRY-P3N	I/O
67	SERR-P3N	I/O	68	STOP-P3N	I/O
69	GND	-	70	T-P3V P3V	I
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	T-P3V P3V	I
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	I	98	P5V	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	TMPTUN-GND	-
103	N.C.	-	104	(TMPTUN-SXP)	-
105	1R5-P1V	-	106	(TMPMPG-SXP)	-
107	1R5-P1V	-	108	1R5-P1V	-
109	1R5-P1V	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	GND	-
117	GND	-	118	GND	-
119	GND	-	120	GND	-
121	N.C.	-	122	TADCEN	-
123	P5V	-	124	N.C.	-
1T	GND	-	2T	GND	-

C.9 CN3010 MDC I/F connector (12-pin)*Table C-9 MDC I/F connector (12-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	N.C.	-
3	M97OT2-P3P	I/O	4	N.C.	-
5	GND	-	6	E3V	-
7	M97SY2-P3P	I	8	GND	-
9	M97IN2-E3P	O	10	GND	-
11	M97RS2-S3N	I	12	X97BC2-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.10 CN3200 Keyboard connector (34-pin)

Table C-10 Keyboard connector (34-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	I
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	O
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	O
17	KBRT02-S3N	O	18	KBRT03-S3N	O
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	O	22	KBRT05-S3N	O
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	O	26	KBRT07-S3N	O
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	N.C.	-	30	N.C.	-
31	N.C.	-	32	N.C.	-
33	N.C.	-	34	P5V	I
1T	GND	-	2Y	GND	-

C.11 CN3240 PAD connector (4-pin)

Table C-11 PAD connector (4-pin))

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P5V	-	2	IPDDAT-P5P	I/O
3	IPDCLK-P5P	I/O	4	GND	-
1T	GND	-	2T	GND	-

C.12 CN3330 Volume I/F connector (3-pin)*Table C-12 Volume I/F connector (3-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(ROTENA)	I	2	GND	-
3	(ROTENB)	I			

C.13 CN3400 Debugging port connector (4-pin)*Table C-13 Debugging port connector (4-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P3V	-	2	DBGRX-P3P	I
3	DBGTX-P3P	O	4	GND	-

C.14 CN4100 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
1	ACT -P3N	O	2	LNK-P3N	O
3	Pulled up by P3V	-	4	Pulled up by P3V	I
5	N.C.	-	6	N.C.	-
7	(RJ45-8)	-	8	(RJ45-7)	-
9	(RJ45-6)	-	10	(RJ45-5)	-
11	(TDP -P3P)	O	12	(TDN-P3P)	-
13	(RDP-P3P)	I	14	(RDN-P3P)	I

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	TPB0-E3N	I/O	2	TPB0-E3P	I/O
3	TPA0-E3N	I/O	4	TPA0-E3P	I/O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.16 CN4610 UA board I/F connector (10-pin)

Table C-16 UA board I/F connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	USBP0-S3N	I/O	4	USBP0-S3P	I/O
5	USBOPS-E5V	-	6	USBOPS-E5V	-
7	USBP4-S3N	I/O	8	USBP4-S3P	I/O
9	GND	-	10	GND	-

C.17 CN4611 USB connector (Port6) (8-pin)

Table C-17 USB connector (Port6) (8-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USBOPS-E5V	-	2	USBOPS-E5V	-
3	USBP&-S3N	I/O	4	USBP6-S3P	I/O
5	GND	-	6	GND	-
7	GND	-	8	N.C.	-

C.18 CN5000 LCD connector (41-pin)*Table C-18 LCD connector (41-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TXCLA-PYP	O	2	TXCLA-PYN	O
3	GND	-	4	TXDA0-PYP	O
5	TXDA0-PYN		6	TXDA1-PYP	O
7	TXDA1-PYN	O	8	TXDA2-PYP	O
9	TXDA2-PYP	O	10	GND	-
11	TXCK1-P3P	O	12	TXCK1-P3N	I
13	GND	-	14	TXDT4-P3P	O
15	TXDT4-P3N	O	16	TXDT5-P3P	O
17	TXDT5-P3N	O	18	TXDT6-P3P	O
19	TXDT6-P3N	O	20	GND	-
21	GND	-	22	LCD_SCL-P3P	I/O
23	DDC P3V	-	24	PNL-P3V	-
25	PNL-P3V		26	LCD_SDA -P3P	I/O
27	FL-GND	-	28	FL-GND	-
29	FL-GND	-	30	FL-GND	-
31	FL-GND	-	32	FL-GND	-
33	BRT0-P5P	O	34	BRT1-P5P	O
35	BRT2DA-S3P	O	36	GND	-
37	GND	-	38	GND	-
39	GND	-	40	GND	-
41	GND	-			
1T	GND	-	2T	GND	-

C.19 CN5080 RGB I/F connector (15-pin)

Table C-19 RGB I/F connector (15-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SYSRED-PXP	I	2	SYSGREEN-PXP	I
3	SYSBLUE-PXP	I	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	-	10	GND	-
11	N.C	-	12	(ALDSDA-P2P)	I/O
13	(HSYNC-P3P)	O	14	(VSYNC-P3P)	O
15	(ALDSCL-P2P)	I/O			

C.20 CN5501 S-VIDEO I/F connector (4-pin)

Table C-20 S-VIDEO I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	LUMINA-PYP	O	4	CHROMA-PYP	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.21 CN5900 GFX I/F connector (230-pin)

Table C-21 GFX I/F connector (230-pin) (1/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVT-EFV	-	2	1R5-P1V	-
3	PVT-EFV	-	4	1R5-P1V	-
5	PVT-EFV	-	6	1R5-P1V	-
7	PVT-EFV	-	8	1R5-P1V	-
9	PVT-EFV	-	10	1R5-P1V	-
11	PVT-EFV	-	12	1R5-P1V	-
13	PVT-EFV	-	14	(L1INE1-PXP)	-
15	PVT-EFV	-	16	GND	-
17	N.C.	-	18	GND	-
19	(L1INE2-PXP)	-	20	GND	-
21	(L1INE3-PXP)	-	22	GND	-
23	PGN	-	24	GND	-
25	GND	-	26	GND	-
27	TXCK1-P3N	I	28	TXCK0-P3N	I
29	TXCK1-P3P	I	30	TXCK1-P3P	I
31	GND	-	32	GND	-
33	TXCK4-P3N	I	34	TXDT0-P3P	I
35	TXCK4-P3P	I	36	TXDT0-P3N	I
37	TXCK5-P3N	I	38	TXDT1-P3P	I
39	TXCK5-P3P	I	40	TXDT1-P3N	I
41	GND	-	42	GND	-
43	TXCK6-P3N	I	44	TXDT2-P3P	I
45	TXCK6-P3P	I	46	TXDT2-P3N	I
47	(TXDT7-P3N)	-	48	(TXDT3-P3P)	-
49	(TXDT7-P3P)	-	50	(TXDT3-P3N)	-
51	GND	-	52	GND	-
53	GND	-	54	GND	-
55	PEGC15-P1N	I	56	PEGC15-P1N	O
57	PEGC15-P1P	I	58	PEGC15-P1P	O

Table C-21 GFX I/F connector (230-pin) (2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
59	GND	-	60	GND	
61	PEGC14-P1N	I	62	PECG14-P1N	O
63	PEGC14-P1P	I	64	PECG14-P1P	O
65	GND	-	66	GND	-
67	PEGC13-P1N	I	68	PECG13-P1N	O
69	PEGC13-P1P	I	70	PECG13-P1P	O
71	GND	-	72	GND	-
73	PEGC12-P1N	I	74	PECG12-P1N	O
75	PEGC12-P1P	I	76	PECG12-P1P	O
77	GND	-	78	GND	-
79	PEGC11-P1N	I	80	PECG11-P1N	O
81	PEGC11-P1P	I	82	PECG11-P1P	O
83	GND	-	84	GND	-
85	PEGC10-P1N	I	86	PECG10-P1N	O
87	PEGC10-P1P	I	88	PECG10-P1P	O
89	GND	-	90	GND	-
91	PEGC09-P1N	I	92	PECG09-P1N	O
93	PEGC09-P1P	I	94	PECG09-P1P	O
95	GND	-	96	GND	-
97	PEGC08-P1N	I	98	PECG08-P1N	O
99	PEGC08-P1P	I	100	PECG08-P1P	O
101	GND	-	102	GND	-
103	PEGC07-P1N	I	104	PECG07-P1N	O
105	PEGC07-P1P	I	106	PECG07-P1P	O
107	GND	-	108	GND	-
109	PEGC06-P1N	I	110	PECG06-P1N	O
111	PEGC06-P1P	I	112	PECG06-P1P	O
113	GND	-	114	GND	-
115	PEGC05-P1N	I	116	PECG05-P1N	O
117	PEGC05-P1P	I	118	PECG05-P1P	O
119	GND	-	120	GND	-
121	PEGC04-P1N	I	122	PECG04-P1N	O

Table C-21 GFX I/F connector (230-pin) (3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
123	PEGC04-P1P	I	124	PECG04-P1P	O
125	GND	-	126	GND	-
127	PEGC03-P1N	I	128	PECG03-P1N	O
129	PEGC03-P1P		130	PECG03-P1P	O
131	GND	-	132	GND	-
133	PEGC02-P1N	I	134	PECG02-P1N	O
135	PEGC02-P1P	I	136	PECG02-P1P	O
137	GND	-	138	GND	-
139	PEGC01-P1N	I	140	PECG01-P1N	O
141	PEGC01-P1P	I	142	PECG01-P1P	O
143	GND	-	144	GND	
145	PEGC00-P1N	I	146	PECG00-P1N	O
147	PEGC00-P1P	I	148	PECG00-P1P	O
149	GND	-	150	GND	
151	XPEPEG-P3N	O	152	NVARED-PXP	I
153	XPEPEG-P3P	O	154	A-GND	-
155	GND		156	NVAGRUN-PXP	I
157	RSTVGA-P3N		158	A-GND	-
159	(PDNVGA-P3N)	-	160	NVABLU-PXP	I
161	(DVIDET-S3N)	-	162	A-GND	-
163	GND		164	AHSYNC-P3P	I/O
165	GND		166	AVSYNC-P3P	I/O
167	(DVATX0-P3P)	-	168	A-GND	-
169	(DVATX0-P3N)	-	170	(NVBRED-PXP)	-
171	GND		172	A-GND	-
173	(DVATX1-P3P)	-	174	(NVBGRN-PXP)	-
175	(DVATX1-P3N)	-	176	A-GND	-
177	GND	-	178	(NVBBLU)	-
179	(DVATX2-P3P)	-	180	GND	-

Table C-21 GFX I/F connector (230-pin) (4/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
181	(DVATX2-P3N)	-	182	TSDA-P3P	I/O
183	GND		184	TSCL-P3P	I/O
185	(DVACK-P3P)	-	186	GALERT-P3P	I
187	(DVACK-P3N)	-	188	G THERM-P3P	I
189	GND		190	GPUHOT-S5V	O
191	NVASCL-P3P	I/O	192	GND	-
193	NVASDA-P3P	I/O	194	SVSCL-P3P	I/O
195	(NVBSCL-P3P)		196	SVSDA-P3P	I/O
197	(NVBSDA-P3P)		198	SVRST-S3N	O
199	NVCSCCL-P3P	I/O	200	VDMDD-S3P	O
201	NVCSDA-P3P	I/O	202	SVRXPDP-S3N	O
203	GND	-	204	SVTXPC-S3N	O
205	LCDVEN-P3P	I	206	A-GND	-
207	FLVEN-P3P	I	208	(COMP-IN)	-
209	GND		210	A-GND	-
211	GPON-E3P	O	212	(LUMA-IN)	-
213	VG1R8-P1V	I	214	A-GND	-
215	PVON-S5P	I	216	(CROM-IN)	-
217	10-EAV	-	218	P3V	-
219	(ID2)	-	220	P3V	-
221	E5V	-	222	P3V	-
223	(ID1)	-	224	P3V	-
225	M5V	-	226	P3V	-
227	(ID0)	-	228	P3V	-
229	P5V	-	230	P3V	-

C.22 J6051 External microphone connector (6-pin)*Table C-22 External microphone connector (6-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	A-GND	-	2	(MICIN)	I
3	(VREF1)	-	4	N.C.	-
5	N.C.	O	6	(VREF1)	-

C.23 CN6170 Speaker connector (4-pin)*Table C-23 Speaker connector (4-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SPOTL-PXN	O	2	SPOTL-PXP	O
3	SPOTR-PXP	O	4	SPOTR-PXN	O

C.24 CN6310 Headphone connector (9-pin)*Table C-24 Headphone connector (9-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(A4R7-P4V)	-	2	HEADL-PXP	I
3	HEADR-PXP	I	4	A-GND	-
5	SPDJIN-P3P	I	6	N.C.	-
7	DOUT-P3P	O	8	SPD3V-P3V	-
9	GND	-			

C.25 CN8800 DC-IN connector (4-pin)*Table C-25 DC-IN connector (4-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(PVL)	I	2	(PVL)	I
3	GND	-	4	GND	-

C.26 PJ8810 Main battery connector (10-pin)*Table C-26 Main 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	DBT10V-S5N	O
9	GND	-	10	GND	-

C.27 CN8770 FAN connector (3-pin)*Table C-27 FAN connector (3-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(P5V)	O	2	GND	-
3	FANG0-P3P	I			

C.28 CN9990 RTC battery connector (3-pin)*Table C-28 RTC battery connector (3-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(R3V)	I	2	N.C.	-
3	GND	-			
1T	GND	-	2T	GND	-

C.29 CN9650 SW FPC I/F connector (20-pin)*Table C-29 SW FPC I/F connector (20-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PNLOFF-S3N	I	2	GNBTNE-S3N	I
3	GNBTND-S3P	I	4	GNBTNC-S3N	I
5	GNBTNB-S3N	I	6	GNBTNA-S3N	I
7	GND	-	8	GND	-
9	KBSC16-S3N	O	10	N.C.	-
11	KBRT00-S3N	O	12	KBRT01-S3N	O
13	KBRT02-S3N	O	14	KBRT03-S3N	O
15	CDBTN-S3N	I	16	TVBTN-S3N	I
17	PWRSW-S3N	I	18	N.C.	-
19	GND	-	20	(P5V)	-
1T	GND	-	2T	GND	-

UA Board (FUTUA*)

C.30 CN4622 System board I/F connector (Port0/4) (10-pin)

Table C-30 System board I/F connector (Port0/4) (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	USBP0-S3N	I/O	4	USBP0-S3P	I/O
5	USBOPS-E5V	-	6	USBOPS-E5V	-
7	USBP4-S3N	I/O	8	USBP4-S3P	I/O
9	GND	-	10	GND	-

C.31 CN4620 USB Port0 I/F connector 1 (4-pin)

Table C-31 USB Port0 I/F connector 1 (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USBOPS-E5V	-	2	USBP0-S3N	I/O
3	USBP0-S3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.32 CN4621 USB Port4 I/F connector 2 (4-pin)

Table C-32 USB Port0 I/F connector 2 (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USBOPS-E5V	-	2	USBP4-S3N	I/O
3	USBP4-S3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.33 J9550 TV-in connector (5-pin)*Table C-33 TV-in connector (5-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	R	I	2	TV-GND	-
3	CVBB	-	4	L	I
5	TV-GND	-			

C.34 CN9550 S-Video OUT connector (12-pin)*Table C-34 S-Video OUT connector (12-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	F-GND	-	2	F-GND	-
3	CVBB	-	4	TV-GND	-
5	N.C.	-	6	TVA-P3V	-
7	N.C.		8	TV-GND	-
9	R	O	10	TV-GND	-
11	L	O	12	TV-GND	-

VG Board (FUTVG*)

C.35 CN5901 PCI-EX I/F connector (230-pin)

Table C-35 PCI-EX I/F connector (230-pin)(1/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVT-EFV	-	2	1R5-P1V	-
3	PVT-EFV	-	4	1R5-P1V	-
5	PVT-EFV	-	6	1R5-P1V	-
7	PVT-EFV	-	8	1R5-P1V	-
9	PVT-EFV	-	10	1R5-P1V	-
11	PVT-EFV	-	12	1R5-P1V	-
13	PVT-EFV	-	14	(L1INE1-PXP)	-
15	PVT-EFV	-	16	GND	-
17	N.C.	-	18	GND	-
19	(L1INE2-PXP)	-	20	GND	-
21	(L1INE3-PXP)	-	22	GND	-
23	PGN	-	24	GND	-
25	GND	-	26	GND	-
27	TXCK1-P3N	O	28	TXCK0-P3N	O
29	TXCK1-P3P	O	30	TXCK1-P3P	O
31	GND	-	32	GND	-
33	TXCK4-P3N	O	34	TXDT0-P3P	O
35	TXCK4-P3P	O	36	TXDT0-P3N	O
37	TXCK5-P3N	O	38	TXDT1-P3P	O
39	TXCK5-P3P	O	40	TXDT1-P3N	O
41	GND	-	42	GND	-
43	TXCK6-P3N	O	44	TXDT2-P3P	O
45	TXCK6-P3P	O	46	TXDT2-P3N	O
47	(TXDT7-P3N)	-	48	(TXDT3-P3P)	-
49	(TXDT7-P3P)	-	50	(TXDT3-P3N)	-
51	GND	-	52	GND	-
53	GND	-	54	GND	-
55	PEGC15-P1N	O	56	PEGC15-P1N	I

Table C-35 PCI-EX I/F connector (230-pin)(2/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
57	PEGC15-P1P	O	58	PECG15-P1P	I
59	GND	-	60	GND	
61	PEGC14-P1N	O	62	PECG14-P1N	I
63	PEGC14-P1P	O	64	PECG14-P1P	I
65	GND	-	66	GND	-
67	PEGC13-P1N	O	68	PECG13-P1N	I
69	PEGC13-P1P	O	70	PECG13-P1P	I
71	GND	-	72	GND	-
73	PEGC12-P1N	O	74	PECG12-P1N	I
75	PEGC12-P1P	O	76	PECG12-P1P	I
77	GND	-	78	GND	-
79	PEGC11-P1N	O	80	PECG11-P1N	I
81	PEGC11-P1P	O	82	PECG11-P1P	I
83	GND	-	84	GND	-
85	PEGC10-P1N	O	86	PECG10-P1N	I
87	PEGC10-P1P	O	88	PECG10-P1P	I
89	GND	-	90	GND	-
91	PEGC09-P1N	O	92	PECG09-P1N	I
93	PEGC09-P1P	O	94	PECG09-P1P	I
95	GND	-	96	GND	-
97	PEGC08-P1N	O	98	PECG08-P1N	I
99	PEGC08-P1P	O	100	PECG08-P1P	I
101	GND	-	102	GND	-
103	PEGC07-P1N	O	104	PECG07-P1N	I
105	PEGC07-P1P	O	106	PECG07-P1P	I
107	GND	-	108	GND	-
109	PEGC06-P1N	O	110	PECG06-P1N	I
111	PEGC06-P1P	O	112	PECG06-P1P	I
113	GND	-	114	GND	-
115	PEGC05-P1N	O	116	PECG05-P1N	I
117	PEGC05-P1P	O	118	PECG05-P1P	I
119	GND	-	120	GND	-

Table C-35 PCI-EX I/F connector (230-pin)(3/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
121	PEGC04-P1N	O	122	PECG04-P1N	I
123	PEGC04-P1P	O	124	PECG04-P1P	I
125	GND	-	126	GND	-
127	PEGC03-P1N	O	128	PECG03-P1N	I
129	PEGC03-P1P	O	130	PECG03-P1P	I
131	GND	-	132	GND	-
133	PEGC02-P1N	O	134	PECG02-P1N	I
135	PEGC02-P1P	O	136	PECG02-P1P	I
137	GND	-	138	GND	-
139	PEGC01-P1N	O	140	PECG01-P1N	I
141	PEGC01-P1P	O	142	PECG01-P1P	I
143	GND	-	144	GND	-
145	PEGC00-P1N	O	146	PECG00-P1N	I
147	PEGC00-P1P	O	148	PECG00-P1P	I
149	GND	-	150	GND	-
151	XPEPEG-P3N	I	152	NVARED-PXP	O
153	XPEPEG-P3P	I	154	A-GND	-
155	GND	-	156	NVAGRUN-PXP	O
157	RSTVGA-P3N	-	158	A-GND	-
159	(PDNVGA-P3N)	-	160	NVABLU-PXP	O
161	(DVIDET-S3N)	-	162	A-GND	-
163	GND	-	164	AHSYNC-P3P	I/O
165	GND	-	166	AVSYNC-P3P	I/O
167	(DVATX0-P3P)	-	168	A-GND	-
169	(DVATX0-P3N)	-	170	(NVBRED-PXP)	-
171	GND	-	172	A-GND	-
173	(DVATX1-P3P)	-	174	(NVBGRN-PXP)	-
175	(DVATX1-P3N)	-	176	A-GND	-
177	GND	-	178	(NVBBLU)	-

Table C-35 PCI-EX I/F connector (230-pin) (4/4)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
179	(DVATX2-P3P)	-	180	GND	-
181	(DVATX2-P3N)	-	182	TSDA-P3P	I/O
183	GND	-	184	TSCL-P3P	I/O
185	(DVACK-P3P)	-	186	GALERT-P3P	O
187	(DVACK-P3N)	-	188	G THERM-P3P	O
189	GND	-	190	GPUHOT-S5V	I
191	NVASCL-P3P	I/O	192	GND	-
193	NVASDA-P3P	I/O	194	(SVSCL-P3P)	-
195	(NVBSCL-P3P)	-	196	(SVSDA-P3P)	-
197	(NVBSDA-P3P)	-	198	(SVRST-S3N)	-
199	NVCSCCL-P3P	I/O	200	(VDMDD-S3P)	-
201	NVCSDA-P3P	I/O	202	(SVRXPDS3N)	-
203	GND	-	204	(SVTXPCS3N)	-
205	LCDVEN-P3P	O	206	A-GND	-
207	FLVEN-P3P	O	208	(COMP-IN)	-
209	GND	-	210	A-GND	-
211	GPON-E3P	I	212	(LUMA-IN)	-
213	VG1R8-P1V	O	214	A-GND	-
215	PVON-S5P	O	216	(CROM-IN)	-
217	10-EAV	-	218	(P3V)	-
219	(ID2)	-	220	(P3V)	-
221	E5V	-	222	P3V	-
223	(ID1)	-	224	P3V	-
225	M5V	-	226	P3V	-
227	(ID0)	-	228	P3V	-
229	P5V	-	230	P3V	-

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
29	\	2B	AB	5D	F0 5D	*5
30	Caps Lock	3A	BA	58	F0 58	
31	A	1E	9E	1C	F0 1C	
32	S	1F	9F	1B	F0 1B	
33	D	20	A0	23	F0 23	
34	F	21	A1	2B	F0 2B	
35	G	22	A2	34	F0 34	
36	H	23	A3	33	F0 33	
37	J	24	A4	3B	F0 3B	*2
38	K	25	A5	42	F0 42	*2
39	L	26	A6	4B	F0 4B	*2
40	; :	27	A7	4C	F0 4C	*2
41	' "	28	A8	52	F0 52	
43	Enter	1C	9C	5A	F0 5A	*3
44	Shift (L)	2A	AA	12	F0 12	
45	No.102 key	56	D6	61	F0 61	
46	Z	2C	AC	1A	F0 1A	
47	X	2D	AD	22	F0 22	
48	C	2E	AE	21	F0 21	
49	V	2F	AF	2A	F0 2A	
50	B	30	B0	32	F0 32	
51	N	31	B1	31	F0 31	
52	M	32	B2	3A	F0 3A	*2
53	, <	33	B3	41	F0 41	*2
54	. >	34	B4	49	F0 49	*2
55	/ ?	35	B5	4A	F0 4A	*2
57	Shift (R)	36	B6	59	F0 59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
58	Ctrl	1D		9D		14		F0	14	*3
60	Alt (L)	38		B8		11		F0	11	*3
61	Space	39		B9		29		F0	29	
62	ALT (R)	E0 38		E0 B8		E0 11		E0 F0	11	
75	Ins	E0 52		E0 D2		E0 70		E0 F0	70	*1
76	Del	E0 53		E0 D3		E0 71		E0 F0	71	*1
79	? ?	E0 4B		E0 CB		E0 6B		E0 F0	6B	*1
80	Home	E0 47		E0 C7		E0 6C		E0 F0	6C	*1
81	End	E0 4F		E0 CF		E0 69		E0 F0	69	*1
83	??	E0 48		E0 C8		E0 75		E0 F0	75	*1
84	??	E0 50		E0 D0		E0 72		E0 F0	72	*1
85	PgUp	E0 49		E0 C9		E0 7D		E0 F0	7D	*1
86	PgDn	E0 51		E0 D1		E0 7A		E0 F0	7A	*1
89	? ?	E0 4D		E0 CD		E0 74		E0 F0	74	*1
110	Esc	01		81		76		F0	76	
112	F1	3B		BB		05		F0	05	
113	F2	3C		BC		06		F0	06	
114	F3	3D		BD		04		F0	04	
115	F4	3E		BE		0C		F0	0C	
116	F5	3F		BF		03		F0	03	
117	F6	40		C0		0B		F0	0B	
118	F7	41		C1		83		F0	83	
119	F8	42		C2		0A		F0	0A	
120	F9	43		C3		01		F0	01	
121	F10	44		C4		09		F0	09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57	D7	78	F0	78			*3	
123	F12	58	D8	07	F0	07			*3	
124	PrintSc	*6	*6	*6	*6				*6	
126	Pause	*7	*7	*7	*7				*7	
202	Fn	—	—	—	—				*4	
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combined with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12				
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12				
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12				
79	? ?	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12				
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12				
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12				
83	??	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12				
84	??	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12				
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12				
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12				
89	? ?	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12				
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12				
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12				

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A	E0 52	E0 D2	E0 AA	E0 12	E0 70	E0 F0	70 E0 F0 12
76	DEL	E0 2A	E0 53	E0 D3	E0 AA	E0 12	E0 71	E0 F0	71 E0 F0 12
79	? ?	E0 2A	E0 4B	E0 CB	E0 AA	E0 12	E0 6B	E0 F0	6B E0 F0 12
80	Home	E0 2A	E0 47	E0 C7	E0 AA	E0 12	E0 6C	E0 F0	6C E0 F0 12
81	End	E0 2A	E0 4F	E0 CF	E0 AA	E0 12	E0 69	E0 F0	69 E0 F0 12
83	??	E0 2A	E0 48	E0 C8	E0 AA	E0 12	E0 75	E0 F0	75 E0 F0 12
84	??	E0 2A	E0 50	E0 D0	E0 AA	E0 12	E0 72	E0 F0	72 E0 F0 12
85	PgUp	E0 2A	E0 49	E0 C9	E0 AA	E0 12	E0 7D	E0 F0	7D E0 F0 12
86	PgDn	E0 2A	E0 51	E0 D1	E0 AA	E0 12	E0 7A	E0 F0	7A E0 F0 12
89	? ?	E0 2A	E0 4D	E0 CD	E0 AA	E0 12	E0 74	E0 F0	74 E0 F0 12
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
09	8	(8)	E0 48	E0 C8	E0 75	E0 F0	E0 75			
10	9	(9)	E0 49	E0 C9	E0 7D	E0 F0	E0 7D			
11	0	(*)	E0 37	E0 B7	E0 7C	E0 F0	E0 7C			
23	U	(4)	E0 4B	E0 CB	E0 6B	E0 F0	E0 6B			
24	I	(5)	E0 4C	E0 CC	E0 73	E0 F0	E0 73			
25	O	(6)	E0 4D	E0 CD	E0 74	E0 F0	E0 74			
26	P	(-)	E0 4A	E0 CA	E0 7B	E0 F0	E0 7B			
37	J	(1)	E0 4F	E0 CF	E0 69	E0 F0	E0 69			
38	K	(2)	E0 50	E0 D0	E0 72	E0 F0	E0 72			
39	L	(3)	E0 51	E0 D1	E0 7A	E0 F0	E0 7A			
40	;	(+)	E0 4E	E0 CE	E0 79	E0 F0	E0 79			
52	M	(0)	E0 52	E0 D2	E0 70	E0 F0	E0 70			
54	.	(.)	E0 53	E0 D3	E0 71	E0 F0	E0 71			
55	/	(/)	E0 35	E0 B5	E0 4A	E0 F0	E0 4A			

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2					
		Make		Break		Make		Break			
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0	E0 7C	E0 F0	12
	Ctrl ?	E0 37		E0 B7		E0 7C		E0 F0	E0 7C		
	Shift ?	E0 37		E0 B7		E0 7C		E0 F0	E0 7C		
	Alt ?		54	D4		84		F0	B4		

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

*: This key generates only make codes.

Appendix F Wiring Diagrams

F.1 LAN Loopback Connector

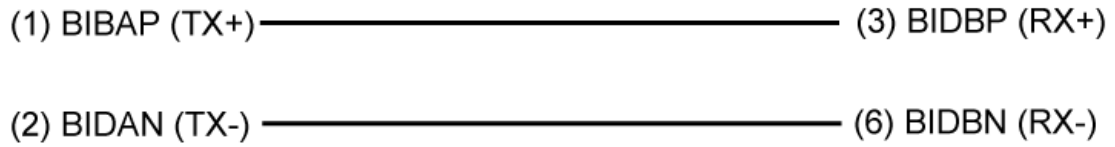


Figure F-1 LAN loopback connector

Appendix G BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

- ✎ BIOS/EC/KBC rewriting disk

Rewriting the BIOS

NOTE: 1. Connect the AC adapter to the computer when you rewrite the BIOS.

2. Do not turn off the power while you are rewriting the BIOS.
If the rewrite fails, it might be impossible to start up the computer.

3. If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been erased. In this case, insert the BIOS/EC/KBC 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 cables and cards.
4. Connect an external FDD and insert the BIOS/EC/KBC rewriting disk into the external FDD.
5. Turn on the power while holding down the No. 01 key.

For example



(Keep holding down the key until a message appears on the screen.)

The BIOS rewriting starts.

6. When the process is completed, a beep sounds. Eject the BIOS/EC/KBC rewriting disk and the system is automatically restart.

Appendix H EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

- ✍ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
 2. Connect the AC 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 contents of the EC/KBC have been erased. In this case, insert the EC/KBC rewriting disk, and the EC/KBC will be rewritten.
 5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cables and cards.
4. Connect an external FDD and insert the EC/KBC rewriting disk into the external FDD.
5. Turn on the power while holding down the Tab key. (Keep holding down the key until a message appears on the screen.) The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, a beep sounds and the system is automatically turned off.

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures) in maximum configuration.

Table I-1 MTBF

Component	Time (hours)
System	5,841

