Toshiba Personal Computer

Satellite M30-35 Series

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-455

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Toshiba Personal Computer Satellite M30-35 Series Maintenance Manual

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Disclaimer

The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the Satellite M30 Series at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Therefore, Toshiba assumes no liability for damages incurred directly or indirectly from errors, omissions, or discrepancies between any succeeding product and this manual.

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite M30-35 Series.

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

SAFETY PRECAUTIONS

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

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

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

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

NOTE: "Note" contains general information that relates to your safe maintenance service.

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

❑ Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

Chapter 1   Hardware Overview describes the Satellite M30 system unit and each FRU.

Chapter 2   Troubleshooting Procedures explains how to diagnose and resolve FRU problems.

Chapter 3   Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.

Chapter 4   Replacement Procedures describes the removal and replacement of the FRUs.

Appendices   The appendices describe the following:

- ❑ Handling the LCD module
- ❑ Board layout
- ❑ Pin assignments
- ❑ Keyboard scan/character codes
- ❑ Key layout
- ❑ Wiring diagrams
- ❑ BIOS Rewrite Procedures
- ❑ 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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1.1   Features

The Toshiba Satellite M30 Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features and benefits: The product configuration is BTO-compatible so that a system can be designed to suit a specific purpose.

❑ Microprocessor

The Satellite M30 computer is equipped with an Intel Banias Processor, which incorporates a math co-processor, a 64KB L1 cache memory and a 1MB L2 cache memory. The processor runs with one of the following speeds:

- Intel Banias Processor 1.40GHz (1.35V) / 1.20GHz (0.85V)
- Intel Banias Processor 1.50GHz (1.35V) / 1.20GHz (0.85V)
- Intel Banias Processor 1.60GHz (1.35V) / 1.20GHz (0.85V)
- Intel Banias Processor 1.70GHz (1.35V) / 1.20GHz (0.85V)

This processor operates at 1.35V-0.8V and 100MHz bus clock

❑ Chipset

The Satellite M30 is equipped with Intel Odem+, Intel ICH4-M and YEBISU-SS.

❑ Cache Memory

64KB primary cache (in CPU) and 1MB secondary cache (in CPU)

❑ GPU Controller

The computer has a nVIDIA NV34M controller. The internal VRAM is 32MB/64M, DDR200MHz.

❑ Memory

Two DDR SO-DIMM slots are available for installation of PC2700 compatible 256, 512MB and 1GB memory modules. The memory is expandable up to 2GB.

❑ Built-in HDD

The computer has a 40GB, 60GB or 80GB internal drive. 2.5 inch x 9.5mm height.

❑ USB FDD

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

❑ CD-RW/DVD Drive

This drive is a combination of DVD-ROM and CD-R/RW Drive. . It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. This drive reads CD-ROM at maximum 24-speed, reads DVD-ROM at maximum 8-speed writes CD-R at maximum 24-speed, and writes CD-RW at maximum 24-speed.

❑ DVD-R/RW Drive

A full-size DVD-R/-RW drive module lets you record data to rewritable CD/DVDs as well as run either 12 cm (4.72") or 8 cm (3.15") CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed, CD-ROMs at maximum 24 speed and CD-Rs at maximum 16 speed. It writes CD-R at up to 16 speed, CD-RW at up to 10 speed, DVD-R and DVD-RW at single speed.

❑ DVD Multi Drive

This drive is a combination of CD-R/RW, DVD-R/RW and DVD-RAM Drive. It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. This drive reads CD-ROM at maximum 24-speed, reads DVD-ROM at maximum 8-speed writes CD-R at maximum 16-speed, writes CD-RW at maximum 8-speed, writes DVD-R at maximum 2-speed, writes DVD-RW at maximum 1-speed,.and writes DVD-RAM at maximum 2-speed.

❑ Display

The display comes in the following three types:

- 15.4" WXGA-TFT color display, resolution 1280(H)×800(V), 16M colors

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

❑ 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® 2000/X P. It supports software that uses a 101- or 102-key enhanced keyboard.

❑ Touch pad

Touch pad is installed as a pointing device.

❑ Batteries

The computer has two batteries: a rechargeable Lithium-Ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory).

❑ Universal Serial Bus (USB2.0)

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

❑ IEEE 1394 port

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

❑ Parallel port

The parallel port enables connection of parallel printer or other parallel devices. (ECP compatible)

❑ External monitor port

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

❑ PC card slot

The PC card slot (PCMCIA) accommodates one 5mm Type II card. The slot support 16-bit PC cards and Card Bus PC cards. CardBus supports 32-bit PC cards.

❑ SD Card

An SD Card Slot can accommodate Secure Digital flash memory cards with various capacities. SD cards let you easily transfer data from devices, such as digital cameras and Personal Digital Assistants, that use SD Card flash-memory.

❑ Infrared port

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

❑ Sound system

The sound system is equipped with the following features:

- AC 97 Link
- Sound CODEC: STAC9750
- Stereo speakers
- Built-in Microphone (Mono)
- Volume control knob
- Stereo Headphone jack
- External microphone jack

❑ Video-out jack

The video jack enables to transfer NTSC or PAL data to external devices connected with S-Video cable.

❑ Internal modem

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

The internal modem provides capability for data and fax communication and supports V.90/92. For data reception it operates at 56,000bps and for data transmission it operates at 33,600bps. For fax transmission it operates at 14,400bps. It is also equipped with Speakerphone and TAM (Telephony Answering Machine) function. The speed of data transfer and fax depends on analog telephone line conditions. It has an RJ11 modem jack for connecting to a telephone line. Both of V.90 and V.92 is supported in USA and Canada. In other regions, only V.90 is available.

❑ Internal LAN

The computer is equipped with LAN circuits that support Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100 BASE-Tx). It also supports Wakeup on LAN (WOL) and Magic Packet.

❑ Mini PCI Card slot (1 slot)

Some computers in this series are equipped with a wireless LAN mini-PCI card that is compatible with other LAN systems based on Direct Sequence Spread Spectrum/Orthogonal Frequency Division Multiplexing radio technology that complies with the IEEE802.11 Standard (Revision A, B or G) and Turbo Mode. Revisions A and G support a data transfer rate up to 54 Mbit/s. Revision-B supports a data transfer rate up to 11 Mbit/s. Turbo Mode supports a data transfer rate up to 108 Mbit/s.

❑   Internet button

This button launches an Internet browser. If the computer's power is off, you can press this button to turn on the computer's power and launch the browser automatically in one step.

❑   TOSHIBA Console button

This button launches an application automatically. The default is TOSHIBA Console.

❑   S-Video out button

Pressing this button sets the display device to TV (Video out). Pressing it again returns to LCD.

The front of the computer is shown in figure 1-1 and the system unit configuration is shown in figure 1-2.
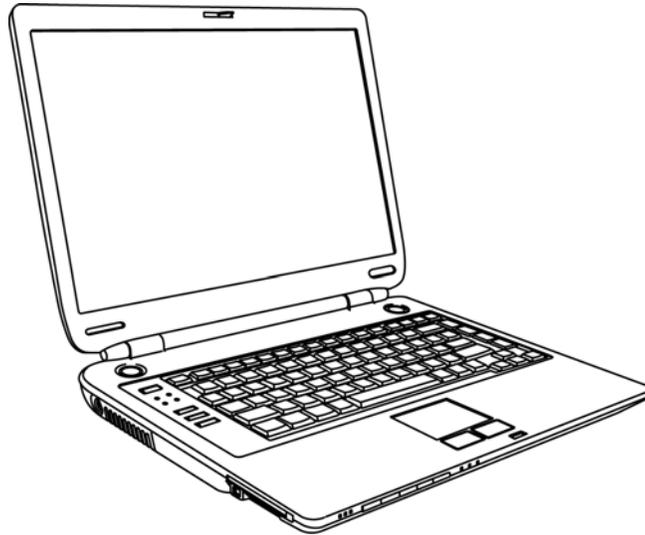
Figure 1-1 Front of the computer
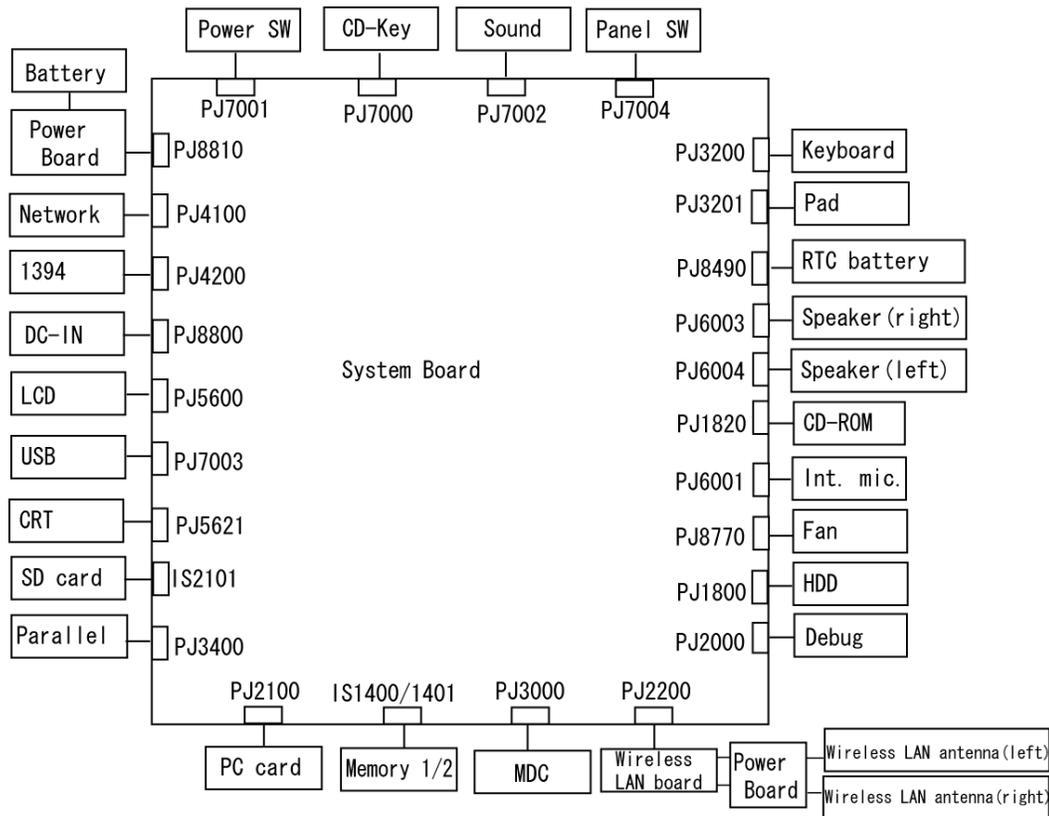
Figure 1-2   System unit configuration

1.2   System Unit Block Diagram

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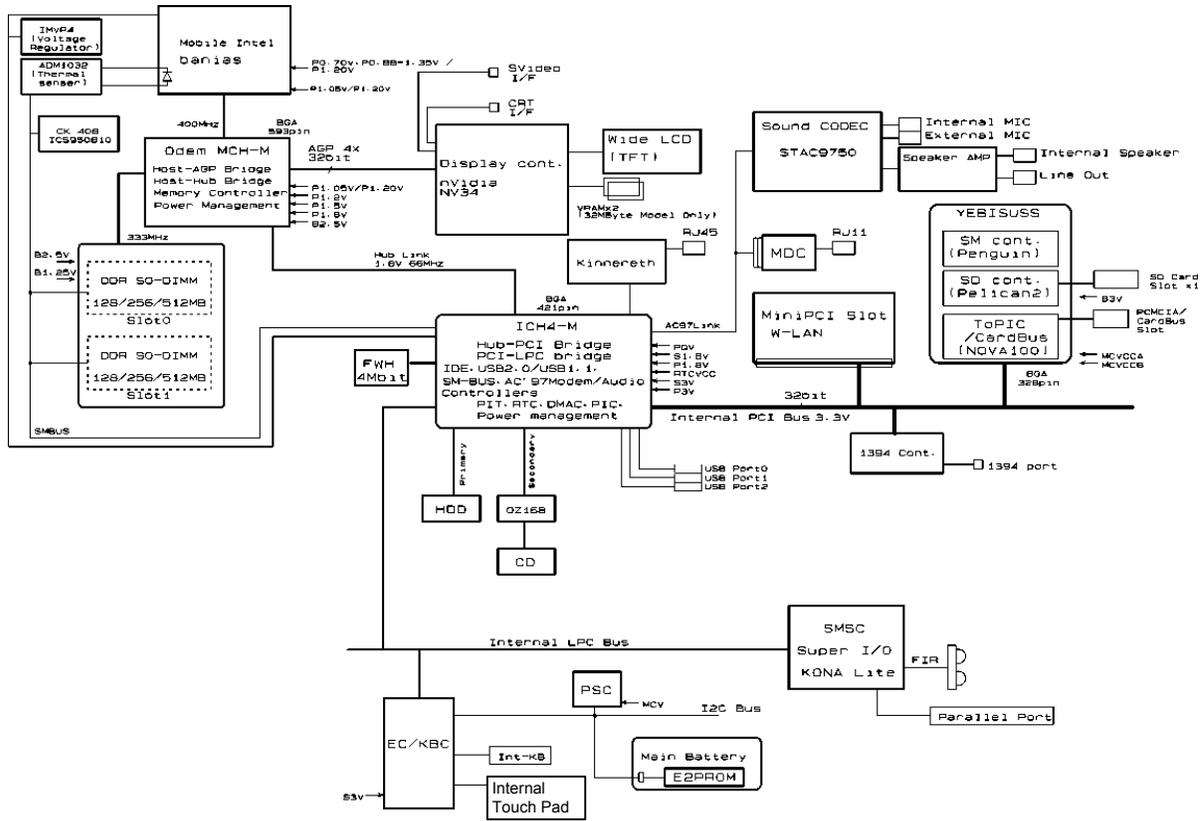
Figure 1-3   System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel Banias Processor 1.40GHz
  − Processor core speed: 1.40GHz (Performance Mode at 1.35V) and 1.20GHz (Battery Optimized Mode at 0.85V)
  − Processor bus speed: 400MHz
  − Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache, 4-way set associative
  − Integrated L2 cache memory: 1MB ECC protected cache data array, 8-way set associative
  − Integrated NDP

- Intel Banias Processor 1.50GHz
  − Processor core speed: 1.50GHz (Performance Mode at 1.35V) and 1.20GHz (Battery Optimized Mode at 0.85V)
  − Processor bus speed: 400MHz
  − Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache, 4-way set associative
  − Integrated L2 cache memory: 1MB ECC protected cache data array, 8-way set associative
  − Integrated NDP

- Intel Banias Processor 1.60GHz
  − Processor core speed: 1.60GHz (Performance Mode at 1.35V) and 1.20GHz (Battery Optimized Mode at 0.85V)
  − Processor bus speed: 400MHz
  − Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache, 4-way set associative
  − Integrated L2 cache memory: 1MB ECC protected cache data array, 8-way set associative
  − Integrated NDP

- Intel Banias Processor 1.70GHz
  − Processor core speed: 1.70GHz (Performance Mode at 1.35V) and 1.20GHz (Battery Optimized Mode at 0.85V)
  − Processor bus speed: 400MHz
  − Integrated L1 cache memory: 32KB instruction cache and 32KB write-back data cache, 4-way set associative
  − Integrated L2 cache memory: 1MB ECC protected cache data array, 8-way set associative
  − Integrated NDP

❑ Memory

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

- Supports DDR CL2/2.5
- Supports PC2700
    - 256MB: 256Mbit (16M × 16bit) chips × 8
    - 512MB: 512Mbit (32M × 8bit) chips × 16
    -          512Mbit (32M × 16bit) chips × 8
    - 1GB: 512Mbit (64M × 8 bit) chips × 16
- 200 pin, SO Dual In-line Memory Modules (SO-DIMM)
- 2.5 volt operation

❑ Intel Odem+ (North Bridge)

- One Intel RG82P4300M is used.
- Features:
    - Banias Processor System Bus Support
    - DRAM Controller supporting DDR333/DDR266/DDR200, 1GB max
    - Accelerated Graphics Port Interface: adheres to AGP2.0, AGP×4 mode
    - Hub Link Interface
    - 593-ball 37.5×37.5 mm FC-BGA package

❑ Intel ICH4-M (South Bridge)

- One Intel 82801LAM is used.
- This gate array has the following features:
    - Hub Link Interface
    - PCI Rev2.2 Interface (6 PCI REQ/GNT Pairs)
    - BusMaster IDE Controller (Ultra ATA 100/66/33)
    - USB 1.1/2.0 Controller 6 Prots (EHCI: Enhanced Host Controller)
    - I/O APIC (ACPI 1.06)
    - SMBus2.0 Controller
    - FWH Interface (BIOS)
    - LPC Interface (EC/KBC, Super I/O)
    - IRQ Controller
    - Serial Interrupt Controller
    - Power Management Controller
    - Deeper Sleep (C4) Support
    - Suspend/Resume Control
    - AC'97 2.2 Interface
    - Internal RTC
    - Internal LAN Controller (WfM2.0)
    - 421-ball 31×31mm BGA Package

❑ PC Card Controller Gate Array

  • One YEBISU-SS gate array is used.
  • This gate array has the following functions and components.
    – PCI interface (PCI Revision2.2)
    – CardBus/PC Card controller (Yenta2 Version2.2)
    – SD memory card controller (SDHC Ver.1.2)
    – SD IO card controller (Ver.1.0)
    – SmartMedia controller (SMHC Ver.01/SMIL1.0)
    – SIO (UART) controller (MS Debug Port Specification Ver.1.0)
    – Docking station interface
    – Q switch control, reset control
    – External device interface

❑ Firmware Hub (FWH)

  • One Intel 82802AB8 is used.
  • This gate array has the following features:
    – Intel platform compatibility
    – Firmware hub hardware interface mode
    – Industry-standard packages
    – Two configurable interfaces
    – 4Mbits of flash memory for platform code/data nonvolatile storage
    – Address/Address-Multiplexed (A/A Mux) interface/mode
    – Case temperature operating range
    – Vcc: 3.3V ± 0.3V
    – Vpp: 3.3V and 12V for fast programming (80 hours maximum)
    – 4Mbits of flash memory are used as shown below:
    – 64KB are used for VGA-BIOS.
    – 192KB are used for system BIOS.
    – 8KB are used for plug and play data area.
    – 8KB are used for password security.
    – 16KB are used for boot strap.
    – 64KB are used for ACPI P code.
    – 64KB are used for LOGO.
    – 64KB are reserved for LAN BIOS.
    – 32KB are reserved.

❑ GPU Controller

One nVIDIA NV34M chip is used. The GPU controller incorporates graphics accelerator, video accelerator.

- VRAM 32MB (4M $\times$ 32 $\times$ 2)/64MB (4M $\times$ 32 $\times$ 4) DDR200MHz
- AGP bus R2.0 x 4
- LCD Interface LVDS 2ch
- TV Encoder: S-Video 4pin connectorTvxpress2

❑ Sound Controller

AC-Link (in the South Bridge) and STAC975051T (Sigmatel made) are used.

- Amplifier, Internal microphone, internal stereo speakers, stereo headphone connector, external microphone connector and volume control knob are mounted.

❑ EC/KBC (Embedded Controller/Keyboard Controller)

One Mitsubishi M306K9FCLRP micon chip functions as both EC and KBC.

- EC
  This controller controls the following functions:
  - Power supply sequence
  - Thermal conditions
  - LEDs
  - Beep
  - Device ON/OFF
  - Fan speed
  - Universal I/O port
  - Docker Docking Sequence
  - Battery capacity check
  - Forced reset
  - Flash rewriting
  - EC interface
  - I2C communication
  - EC access
  - Slim Select Bay Control

- KBC
  This controller has the following functions:
  - Scan controller to check status of keyboard matrix
  - Interface controller between the keyboard scan controller and the system
  - Control of switching and simultaneous operation of the accupoint/external PS/2 mouse and of the internal keyboard/external PS/2 keyboard

❑ PSC (Power Supply Controller)

- One TMP87PM48U chip is used.
- This controller controls the power sources.

❑ Clock Generator

- One ICS950812CGT is used.
- This device generates the system clock.

❑ Modem Controller

- One built-in Askey-made 1456VQL4A(INT) modem card
- This controller has the following functions:
  - Digital line protection support
  - Ring wake up support
  - AC97 interface
  - Supports V.92 56k Modem/Fax.

❑ Internal LAN Controller

- One Kinnereth-R (82562EP) chip is used.
  - Supports 10/100Mbit Ethernet.
  - Supports LED and WOL.

❑ Wireless LAN

  - Mini-PCI Type III 1slot
  - Supports Kill SW.
  - Supports Wireless LAN through PCMCIA
  - 802.11b, 802.11a/b: Intel-made
  - 802.11b/g, 802.11a/b/g: Atheros-made

❑ Super I/O

- One LPC 47N227 chip is used.
  - This gate array has the following features:
  - Floppy Disk Controller
  - Serial Port Controller
  - Infrared Communications Controller
  - Parallel Port Controller

❑ IEEE1394

- One TSB43AB22 is used.

❑ Sensor

- Thermal Sensor: One ADM1032AR chip is used.
- LCD Sensor: One NRS-701-1015T is used.

1.3   3.5-inch Floppy Disk Drive (USB External)

The 3.5-inch USB FDD is a thin, high-performance reliable drive that supports 720KB and 1.44MB.

The FDD is shown in figure 1-4. The specifications for the FDD are listed in Table 1-1.
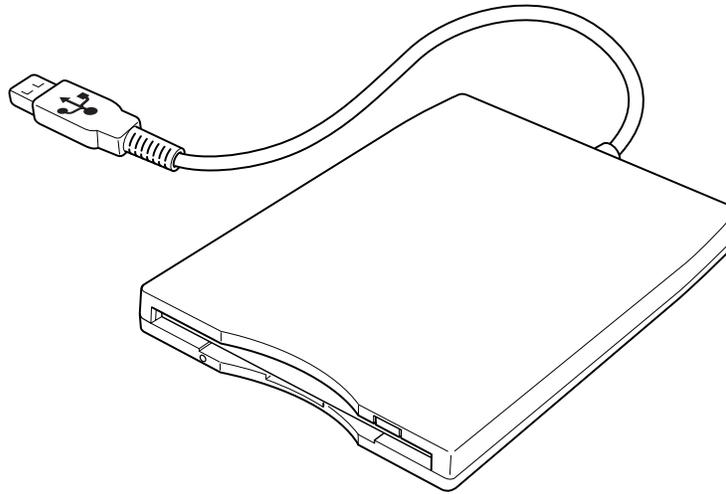
Figure 1-4 3.5-inch FDD (USB External)

Table 1-1 3.5-inch FDD specifications

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

1.4   2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable
2.5-inch magnetic disk and mini-Winchester type magnetic heads.
The computer supports a 40GB, 60GB and 80GB HDD.
The HDD is shown in figure 1-5. Specifications are listed in Table 1-2.
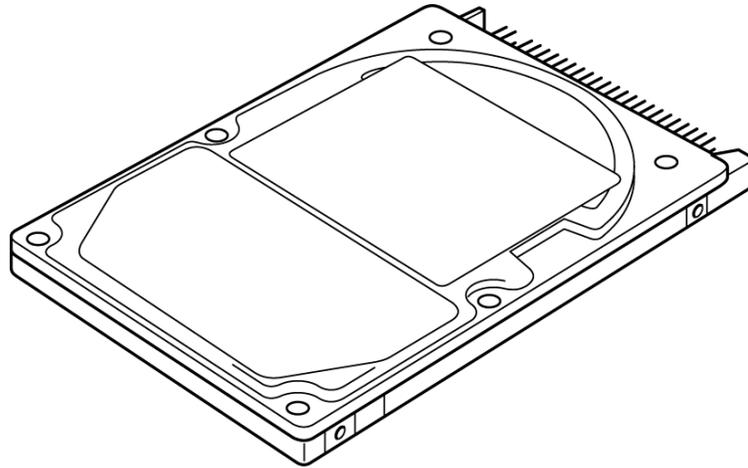
Figure 1-5   2.5-inch HDD

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

Parameter		Specifications		
		TOSHIBA HDD2182B	**TOSHIBA HDD2183**	**TOSHIBA HDD2184B**
Outline dimensions	Width (mm)	69.85		
	Height (mm)	9.5		
	Depth (mm)	100		
	Weight (g)	99 max.		102 max.

Parameter		Specifications		
		HITACHI G8C0000Z410	**HITACHI G8C0000Z610**	**HITACHI G8BC00013610**
Outline dimensions	Width (mm)	69.85±0.25	69.85±0.25	70 max
	Height (mm)	9.5±0.25	9.5±0.25	9.5±0.25
	Depth (mm)	100±0.25	100±0.25	100±0.45
	Weight (g)	95 max.	99 max.	95 max.

Parameter		Specifications		
		HITACHI GBC000Z810	**HITACHI GBC000014810**	**TOSHIBA HDD2188B**
Outline dimensions	Width (mm)	69.85±0.25	69.85±0.25	69.85
	Height (mm)	9.5±0.25	9.5±0.25	9.5
	Depth (mm)	100±0.25	100.2±0.25	100
	Weight (g)	99 max	102	99 max.

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

Parameter	Specifications		
	TOSHIBA HDD2182B	**TOSHIBA HDD2183**	**TOSHIBA HDD2184**
Storage size (formatted)	40GB	60GB	60GB
Speed (RPM)	4200		5400
Data transfer speed (Mb/sec)	154.3-298.0		202.9-373.3
Interface transfer rate (MB/s)	100 max. (Ultra DMA mode)		
Track density (Ktpi)	78.9		
Access Time Average seek (sec)	12		
Start time (sec)	4 typ.		4 typ. 10 max.

Parameter	Specifications		
	HITACHI G8C000Z410	**HITACHI G8C0000Z610**	**HITACHI G8BC00013610**
Storage size (formatted)	40GB	60GB	
Speed (RPM)	4200		5400
Data transfer speed (Mb/sec)	350 typ.		263.2-401.6
Interface transfer rate (MB/s)	100 max. (Ultra DMA mode)		
Track density (Ktpi)	96		85
Access Time Average seek (Read) Average seek (Write)	12 typ. 14 typ.		13 typ. -
Start time (sec)	5 (Power on)		5 typ (Power on)

Parameter	Specifications		
	HITACHI GBC000Z810	**HITACHI GBC00014810**	**TOSHIBA HDD2188B**
Storage size (formatted)	80GB		80GB
Speed (RPM)	4200	5400	4200
Data transfer speed	350 typ	450 max	175.0-341.78 (Mbits/s)
Interface transfer rate (MB/s)	100 max. (Ultra DMA mode)		
Track density (Ktpi)	96	96	88.1
Access Time (ms) Average seek (Read) Average seek (Write)	12 typ 14 typ	12 typ 14 typ	12 -
Start time (sec)	5 (Power on)	3.5 (Power on)	4

1.5   CD-RW/DVD-ROM Drive

This drive is a combination of DVD-ROM and CD-R/RW Drive. . It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. This drive reads CD-ROM at maximum 24-speed, reads DVD-ROM at maximum 8-speed writes CD-R at maximum 24-speed, and writes CD-RW at maximum 24-speed.

The CD-RW/DVD-ROM drive is shown in figure 1-6. Specifications are listed in Table 1-3.
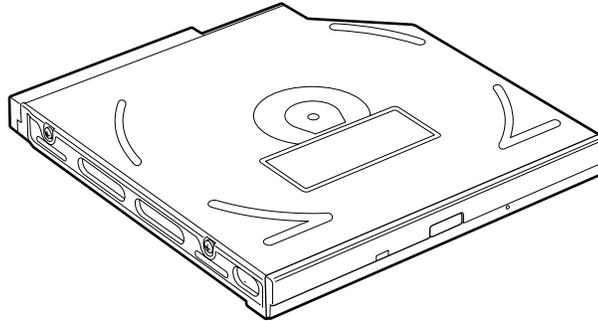
Figure 1-6   CD-RW/DVD-ROM drive

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

Item	Matushita G8CC0001C210		
	DVD-ROM mode	CD-ROM mode	CD-R/CD-RW (Write)
ATAPI Burst (MB/s)	33.3 (Ultra DMA mode 2) 16.6 (PIO Mode 0 to 4, Multi word DMA mode 0 to 2)		
Average Access time (ms)	180 typ	130 typ	
Data Buffer Capacity (MB)	2		
Supported Format	CD: CD-DA, CD-ROM, CD-RW, CD-R, CD-ROM XA, Photo CD, Video CD, CD-Extra, CD-text DVD: DVD-VIDEO, DVD-ROM, DVD-R (3.9G, 4.7G), DVD-RW, DVD-RAM (4.7G)		CD-R, CD-RW

1.6   DVD-R/RW

A full-size DVD-R/-RW drive module lets you record data to rewritable CD/DVDs as well as run either 12 cm (4.72") or 8 cm (3.15") CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed, CD-ROMs at maximum 24 speed and CD-Rs at maximum 16 speed. It writes CD-R at up to 16 speed, CD-RW at up to 10 speed, DVD-R and DVD-RW at single speed.

The CD-RW/DVD-ROM drive is shown in figure 1-7. Specifications are listed in Table 1-4.
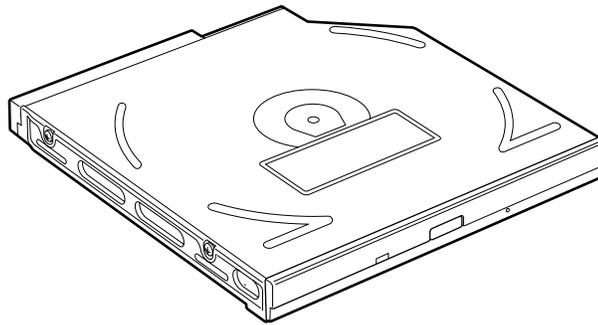
Figure 1-7   DVD-R/RW drive

Table -4 DVD-R/RW drive specifications

Item	Toshiba SD-R6112
ATAPI Burst (MB/sec)	33.3 (Ultra DMA mode 2)
	16.6 (PIO Mode 0 to 4, Multi word DMA mode 0 to 2)
Average access time (ms) DVD-ROM CD-ROM DVD-RAM	 115 105 170
Data buffer (MB)	2
Speed (Read) DVD-ROM DVD-RAM CD-ROM	 8x 1x 24x
Speed (Write) CD-R CD-RW DVD-R DVD-RW	 4x, 16x 4x,10x (High Speed) 1x, 2x 1x

Supported format (Read)	CD:
	
	     CD-DA, CD+(E)G, CD-MIDI,
	     CD-TEXT, CD-ROM,
	     CD-ROM XA, CD-I,
	     CD-I Bridge (Photo-CD, Video-CD)
	     Multisession CD (Photo-CD,
	      CD-EXTRA, CD-R, CD-RW,
	      Portfolio),
	      CD-R, CD-RW
	
	DVD :
	     DVD-ROM (DVD-5, DVD-9,
	      DVD-10, DVD-18)
	     DVD-R (Ver.1.0, Ver.2.1)
	     DVD-RW(Ver.1.0, Ver.1.1)
	     DVD-RAM(Ver.2.1)

1.7 DVD-Multi (CD-R/RW DVD-RAM/R/RW) Drive

This drive is a combination of CD-R/RW, DVD-R/RW and DVD-RAM Drive. It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. This drive reads CD-ROM at maximum 24-speed, reads DVD-ROM at maximum 8-speed writes CD-R at maximum 16-speed, writes CD-RW at maximum 8-speed, writes DVD-R at maximum 2-speed, writes DVD-RW at maximum 1-speed,.and writes DVD-RAM at maximum 2-speed.

The DVD multi drive is shown in Figure 1-8. Specifications for the DVD multi drive are described in table 1-5.
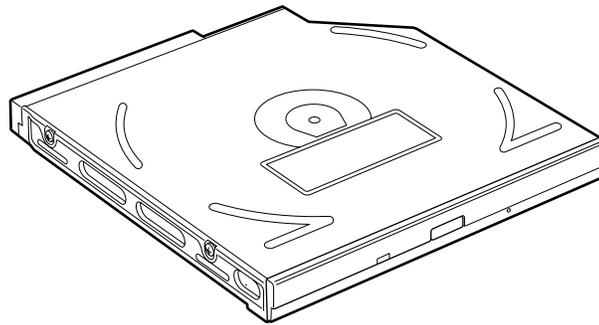
Figure 1-8 DVD-Multi drive

Table 1-5 DVD-Multi drive specifications (1/2)

Item	TEAC G8CC00013210	Matsushita G8CC00019210
ATAPI Burst (MB/sec)	33.3 (Ultra DMA mode 2)	
	16.6 (PIO Mode 0 to 4, Multi word DMA mode 0 to 2)	
Average access time (ms) DVD-ROM CD-ROM	 130 average. 110 average	 180 typ. (Random) 150 typ. (Random)
Data buffer (MB)	2	
Speed (Read) DVD-ROM DVD-Video CD-ROM CD-DA DVD-RW DVD-R/DVD-RW	 8x (CAV) 4x (CAV) 24x (CAV) 8x (CLV) 4x (CAV) 4x (CAV)	 8x max. 4 24x max. (CAV) 8 4 4

Table 1-5 DVD-Multi drive specifications (2/2)

Item	TEAC G8CC00013210	Matsushita G8CC00019210
Speed (Write) CD-R CD-RW DVD-R DVD-RW DVD-RAM	16x max.(ZCLV) 10x (CLV) 2x (CLV) 1x (CLV) 2x (ZLV)	16x (ZoneCLV) 8x (CLV) 2x (CLV) 1x (CLV) 2x (ZCLV) (4.7GB)

Supported format	CD: CD-DA
	      CD-ROM
	      CD-ROM XA Mode 2
	        (Form 1, Form2)
	      Photo-CD
	       (single/multi-session)
	      Enhanced CD
	      CD-TEXT
	DVD :DVD-ROM
	      DVD-R (General.
	       Authoring)
	      DVD-Video
	      DVD-RAM(4.7G,
	       2.6G)
		CD: CD-DA
		      CD-ROM
		      CD-R/W
		      CD-R
		      CD-ROMXA
		      CD-I Ready
		      Photo-CD
		      Video CD
		      Cd-Extra(CD+)
		      CD-TEXT
		DVD :DVD-ROM
		      DVD-R (3.9GB,
		       4.7GB)
		      DVD-RW(Ver. 1.1)
		      DVD-RAM(2.6G,
		       4.7GB,9.4GB)

1.8   Keyboard

The keyboard is mounted 85(US)/86(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-9 is a view of the keyboard.

See Appendix E about a layout of the keyboard.

Figure 1-9   Keyboard

1.9   TFT Color Display

The TFT color display consists of 15.4-inch WXGA LCD module and FL inverter board.

1.9.1   LCD Module

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

Figure 1-10 shows a view of the LCD module and Table 1-6 lists the specifications.
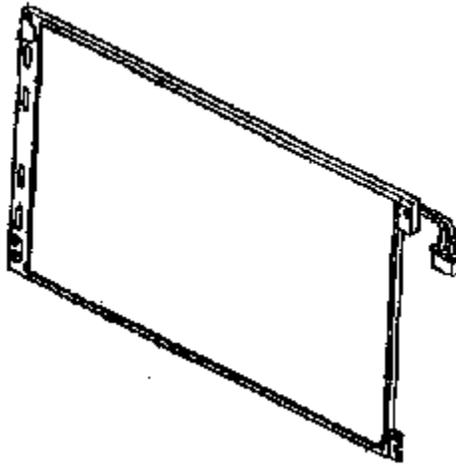
Figure 1-10   LCD module

Table 1-6   LCD module specifications (1/5)

Item	Specifications
	15.4-inch WXGA (G33C0001D110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.25875 (H) x 0.25875 (V)
Display range (mm)	331.2 (W) x 207(H)

Table 1-6   LCD module specifications (2/5)

Item	Specifications
	15.4-inch WXGA (G33C0001F110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.25875 (H) x 0.25875 (V)
Display range (mm)	332.16(H) x 207.6(V)

Table 1-6   LCD module specifications (3/5)

Item	Specifications
	15.4-inch WXGA (G33C0001H110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.2595 (H) x 0.2595 (V)
Display range (mm)	332.16 (W) x 207.6 (H)

Table 1-6   LCD module specifications (4/5)

Item	Specifications
	15.4-inch WXGA(CSV) (G33C0001E110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.25875 (H) x 0.25875 (V)
Display range (mm)	331.2 (W) x 207 (H)

Table 1-6   LCD module specifications (5/5)

Item	Specifications
	15.4-inch WXGA(CSV) (G33C0001G110)
Number of Dots	1,280 (W) x 800 (H)
Dot spacing (mm)	0.25875 (H) x 0.25875 (V)
Display range (mm)	331.2 (W) x 207 (H)

1.9.2   FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL. Table 1-7 lists the FL inverter board specifications.

Table 1-7   FL inverter board specifications

Item		Specifications
Input	Voltage (V)	DC 5
	Power (W)	7
Output	Voltage (V)	750
	Current (mA)	6.00
	Power (mA)	5W/7VA

1.10 Power Supply

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

1. Checks power input to determine:
    - Whether the AC adaptor is connected to the computer
    - Whether the battery pack is installed and supplying power

2. Checks power supply's internal controls:

    - Battery pack charging: start, stop and voltage supplied to the battery pack
    - Power supply system: Power supplied from a DC power source (AC adaptor)
    - Faulty power supply: Executes forced shutdown if needed
    - Logic: Power supply to various circuits
    - Charging current to PWM control IC for battery pack charging

3. Controls the following aspects of the logic system

    - Power supply to gate arrays
    - Power on/off

4. Indicates the following:

    - DC IN (sets LED to orange or blue)
    - Battery icon (sets LED to orange or blue)
    - Faulty power supply by low battery

5. Interface for the following:

    - BIOS via EC/KBC
    - Function mode of power supply

6. Detects the following:

    - Input voltage to logic system
    - Input voltage, overvoltage and input/output to battery pack
    - Battery pack's internal temperature
    - Input voltage to DC power supply (output from AC adaptor)

The power supply output rating is specified in Table 1-8.

Table 1-8   Power supply output rating (1/2)

Name	Voltage (V)	Use
PPV	1.468-0.748	CPU
MCH1R2-P1V	1.2	Odem
PTV	1.075	CPU, ADM1032, Odem, ICH4-M
2R5-B2V	2.5	Odem, SDRAM
2R5-P2V	2.5	NV34
1R25-B1V	1.25	SDRAM
PGV	1.2-1.5	NV34
LAN-E3V	3.3	ICH4-M, KINNERETH
S3V	3.3	ICH4-M, EC/KBC
B3V	3.3	YEBISU3S, PC Card ,MDC
P3V	3.3	Clock Generator, ICH4-M, FWH, mini-PCI, Super I/O,FIR, IEEE 1394, LCD, STAC9750
SD-P3V	3.3	SD
E5V	5	USB
CD-E5V	5	CD-ROM
B5V	5	PC Card
P5V	5	HDD, KB,LED, Parallel, LCD
SND-E5V	5	AN12940
1R8-P1V	1.8	Odem, ICH4-M
1R5-P1V	1.5	Odem, ICH4-M, NV34
1R5-S1V	1.5	ICH4-M
LAN1R5-E1V	1.5	ICH4-M

Table 1-8 Power supply board output rating (2/2)

Name	Voltage (V)	Use
S5V	5	OZ168
MCV	5	PSC
A4R7-P4V	4.7	STAC9750, MIC
CDA4R7-E4V	4.7	CD, Headphone
R3V	2.0-3.3	ICH4-M

1.11 Batteries

The computer has three types of batteries as follows:

❑   Main battery pack

❑   RTC battery

The battery specifications are listed in Table 1-9.

Table 1-9 Battery specifications

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion (6-cell)	10.8 V	4,400mAh
	Lithium-Ion (12 cell)	10.8 V	8,800mAh
RTC battery	Nickel-metal hydride	2.4 V	16

1.11.1   Main Battery

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

1.11.2   Battery Charging Control

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

Quick Battery Charge

When the AC adaptor is attached, there are two types of quick charge: quick charge 1 when the system is powered off and quick charge 2 when the system is powered on.

Table 1-10 Time required for quick charges

Status		Charging time
Quick charge 1 (Power off)	12 cell	About 3.4 hours
	6 cell	About 2.7 hours
Quick charge 2 (Power on)	12 cell	About 8.0 to 20.0 or longer
	6 cell	About 4.0 to 10.0 or longer

NOTE: The time required for quick charge 2 is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

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

1. The battery becomes fully charged.

2. The AC adaptor or battery is removed.

3. The battery or output voltage is abnormal.

❑ Detection of full charge

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

1. The current in the battery charging circuit drops under the predetermined limit.

2. The charging time exceeds the fixed limit.

1.11.3   RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-11 lists the charging time and data preservation period of the RTC battery.

Table 1-11 RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	8 hours
Data preservation period (full charge)	1 month

Chapter 2

Troubleshooting Procedures

Chapter 2   Contents

Figures

Tables

2.1   Troubleshooting

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

1. Power supply	5. Keyboard	9. LAN
2. System Board	6. Display	10. Wireless LAN
3. Floppy Disk Drive	7. Optical Drive	11. Sound components
4. Hard Disk Drive	8. Modem	12. SD Card Slot

The Diagnostics Disk operations are described in Chapter 3. Detailed *Replacement Procedures* are given in Chapter 4, *Replacement Procedures*.
The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk
2. Phillips screwdriver (2 mm)
3. LH-STIX screwdriver (in some models)
4. Toshiba MS-DOS system disk(s)
   (You must install the following onto the disk: SYS.COM, FORMAT.COM, FDISK.COM and FDISK.EXE)
5. Formatted work disk for floppy disk drive testing
6. Cleaning kit for floppy disk drive troubleshooting
7. Parallel port wraparound connector
8. PC card wraparound connector
9. Multimeter
10. External USB FDD
11. External USB keyboard and Mouse
12. Headphone
13. Microphone
14. USB test module and USB cable
15. TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)
16. CD-RW Media (RICOH-made x4 recommended)
17. DVD-ROM TSD-1 (TOSHIBA-EMI DVD Test Media)
18. Music CD
19. RJ11 connector checker
20. Speaker
21. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting
22. Antenna test cable

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. If the user has forgotten the system password, perform the following procedure at the appropriate step in the flowchart in Figure 2-1:

❑ Verify with the customer that Toshiba Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.

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

❑ Make sure the External USB floppy disk drive is empty.

START

Connect the AC adaptor
to the DC IN socket.

Does the DC IN Icon glow? — No → Perform the Power Supply Troubleshooting Procedures in section 2.3.

Yes

Does the Battery Icon glow? — No → Perform the Power Supply Troubleshooting Procedures in section 2.3.

Yes

Turn the Power Switch on .

Does the DC IN Icon flash? — Yes → Perform the Power Supply Troubleshooting Procedures in section 2.3.

No

Is the "**TOSHIBA**" logo message displayed? — No → Perform the Display Troubleshooting Procedures in section 2.8.

Yes

If the "**Password=**" is message is displayed, type the password, then press **enter**.

Is an error message displayed? — Yes → Perform the System Board Troubleshooting Procedures in section 2.4.

No

Is Toshiba Windows XP being loaded? — No → Perform the Hard Disk Drive Troubleshooting Procedures in section 2.6.

Yes

1

Figure 2-1 Troubleshooting flowchart (1/2)

①

```
Do typed characters          No    ┌──────────────────────────┐
appear correctly?    ─────────────► │ Perform the Keyboard     │
                                    │ Troubleshooting Procedures│
          │ Yes                     │ in section 2.7.          │
          ▼                         └──────────────────────────┘

┌──────────────────────────────┐         ┌──────────────────────────┐
│ Insert the diagnostics disk   │ ◄───────│ Connect the External USB FDD│
│ into the FDD, then hold down  │         └──────────────────────────┘
│ the U key and start the       │
│ computer to run the diagnostics│
│ test program.                 │
└──────────────────────────────┘
          │
          ▼
   Is the diagnostics test loaded?    No    ┌──────────────────────────┐
                              ──────────────► │ Perform the Floppy Disk  │
                                              │ Drive Troubleshooting    │
          │ Yes                               │ Procedures in section 2.5.│
          ▼                                   └──────────────────────────┘

┌──────────────────┐
│ Perform each test.│
└──────────────────┘
          │
          ▼
   Is an error detected by any of the    Yes   ┌──────────────────────────┐
   diagnostics tests?            ───────────────► │ After confirming which   │
                                                  │ diagnostics test has     │
          │ No                                    │ detected an error, perform│
          ▼                                       │ the appropriate procedures│
                                                  │ as outlined below.        │
┌──────────────────────────┐                     └──────────────────────────┘
│ Perform/repeat running test│
└──────────────────────────┘
          │
          ▼
   Is an error detected by any of the    Yes   ┌──────────────────────────┐
   diagnostics tests?            ───────────────► │ After confirming which   │
                                                  │ diagnostics test has     │
          │ No                                    │ detected an error, perform│
          ▼                                       │ the appropriate procedures│
                                                  │ as outlined below.        │
┌──────────────────┐                             └──────────────────────────┘
│ System is normal. │
└──────────────────┘
          │
          ▼
      ( END )
```

Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, real timer test, perform the System Board and Processor Module Troubleshooting Procedures in Section 2.4.

2. If an error is detected on the floppy disk test, perform the FDD Troubleshooting Procedures in Section 2.5.

3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.

4. If an error is detected on the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.

5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.

6. If an error is detected on the Optical Drive test, perform the Optical Drive Troubleshooting Procedures in Section 2.9.

7. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.

8. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.11.

9. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.12.

10. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.13.

11. If an error is detected on the SD card test, perform the SD card slot Troubleshooting Procedures in Section 2.14.

2.3   Power Supply Troubleshooting

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

> Procedure 1:   Icon Check
>
> Procedure 2:   Error Code Check
>
> Procedure 3:   Connection Check
>
> Procedure 4:   Charge Check
>
> Procedure 5:   Replacement Check

Procedure 1   Icon Check

The following Icons indicate the power supply status:

❑ Battery icon

❑ DC IN icon

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

Table 2-1 Battery Icon

Battery LED	Power supply status
Lights orange	Quick charge
Lights blue	Battery is fully charged and AC adapter is connected.
Blinks orange (even intervals)	The battery level becomes low while operating the computer on battery power.[*1]
Flashes orange	The power switch is pressed on when the battery level is low.[*2]
Doesn't light	Any condition other than those above

> *1 Low Battery Hibernation will be executed soon.
>
> *2 Low Battery Hibernation has already been executed.

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights blue	DC power is being supplied from the AC adapter.
Blinks orange	Power supply malfunction[3]
Doesn't light	Any condition other than those above

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

If the icon blinks, execute the followings:

1. Remove the battery and AC adapter to cut power supply to the computer.

2. Reinstall the battery and AC adapter.

If the LED still blinks, perform 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 blue, go to Procedure 3.

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

Procedure 2   Error Code Check

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

- ❑ Start   Off for 2 seconds

- ❑ Error code (8 bit)

    "1"   On for one second

    "0"   On for a half second

    Interval between data bits   Off for a half second

The error code begins with the least significant digit.

Example: Error code = 12h (Error codes are given in hexadecimal format.)
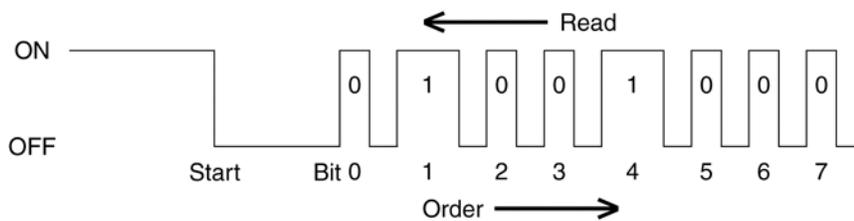
Check 1   Convert the DC IN icon blink pattern into the hexadecimal error code and
compare it to the tables below.

The error code begins with the least significant digit.

Error code

Table 2-3 Error code

Error code	Where Error occurs
1*h	DC Power (AC Adapter)
2*h	The 1st battery
4*h	S3V output (3.3V)
5*h	1R5-C1V output (1.51V)
6*h	1R8-C1V output (1.804V)
7*h	PPV output (CPU core voltage)
8*h	1R2-P1V output (1.21V)
9*h	E5V output (5.0V)
A*h	E3V output (3.3V)
B*h	2R5-P2V output (for VGA: 2.51V)
C*h	PGV output (for VGA core: 1.20V)
D*h	1R25-P1V output (1.251V)
E*h	2R5-B2V output (2.51V)

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

   ❑ DC IN

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5 V.
11h	Advanced Port Replicator output voltage is over 16.5 V.
12h	Current from the DC power supply is over the limit (7.00 A).
13h	Current from the DC power supply is over the limit (0.5 A), when there is no load.
14h	Current sensing IC is not normal, when there is no load.

   ❑ Main Battery

Error code	Meaning
20h	Over voltage has been detected.
21h	Main battery charge current is over 7.00 A.
22h	Main battery discharge current is over 0.5 A, when there is no load.
23h	Main battery charge current is over 4.3 A, when the AC adapter is not directly connected.
24h	Current sensing IC is not normal, when there is no load.
25h	Main battery charge current is over 0.3 A.

   ❑ S3V output

Error code	Meaning
40h	S3V voltage is 3.14 V or under, when the computer is powered on/off.
45h	S3V voltage is 3.14 V or under at power on.

   ❑ 1R5-C1V output

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

❑ 1R8-C1V output

Error code	Meaning
60h	1R8-C1V voltage is over 2.16 V, when the computer is powered on/off.
61h	1R8-C1V voltage is 1.53 V or under, when the computer is powered on.
62h	1R8-C1V voltage is 1.53 V or under, when the computer is booting up.
63h	1R8-C1V voltage is 1.53 V or under, when the computer is suspended.
64h	1R8-C1V voltage is not normal, when the computer is suspended.
65h	1R8-C1V voltage is 1.53V or under at power on.

❑ PPV output

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

❑ 1R2-P1V output

Error code	Meaning
80h	1R2-P1V voltage is over 1.44 V, when the computer is powered on/off.
81h	1R2-P1V voltage is 1.02 V or under, when the computer is powered on.
82h	1R2-P1V voltage is 1.02 V or under, when the computer is booting up.
83h	1R2-P1V voltage is 1.02 V or over, when the computer is powered off.
84h	1R2-P1V voltage is 1.02 V or under, when 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 4.50 V or under, when the computer is powered on.
92h	E5V voltage is 4.50 V or under, when the computer is booting up.
93h	E5V voltage is 4.50 V or over, when the computer is powered off.
94h	E5V voltage is 4.50 V or under, when the computer is suspended.

❑ E3V output

Error code	Meaning
A0h	E3V voltage is over 3.96 V, when the computer is powered on/off.
A1h	E3V voltage is 2.81 V or under, when the computer is powered on.
A2h	E3V voltage is 2 .81 V or under, when the computer is booting up.
A3h	E3V voltage is 2.81 V or over, when the computer is powered off.
A4h	E3V voltage is 2.81 V or under when the computer is suspended.

❑ 2R5-P2V output

Error code	Meaning
B0h	2R5-P2V voltage is over 3.00 V, when the computer is powered on/off.
B1h	2R5-P2V voltage is 2.125 V or under, when the computer is powered on.
B2h	2R5-P2V voltage is 2.125 V or under, when the computer is booting up.
B3h	2R5-P2V voltage is 2.125 V or over, when the computer is powered off.

❑ PGV output

Error code	Meaning
C0h	PGV voltage is over 1.62V, when the computer is powered on/off.
C1h	PGV voltage is 2.125 V or under, when the computer is powered on.
C2h	PGV voltage is 2.125 V or under, when the computer is booting up.
C3h	PGV voltage is 2.125 V or over, when the computer is powered off.
C4h	PGV voltage is 2.125 V or under when the computer is suspended.

❑ 1R25-P1V output

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

❑ 2R5-B2V output

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

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

         ❑ Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:

         ❑ Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

Check 3   In the case of error code 2Xh:

         ❑ Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:

         ❑ Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

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

Procedure 3   Connection Check

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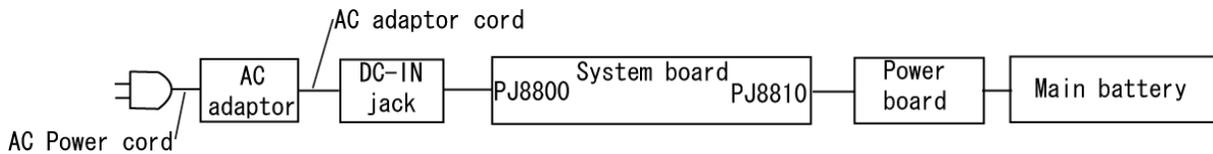
Any of the connectors may be disconnected. Perform Check 1.

Check 1   Disconnect the AC power cord from the wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2   Make sure the AC adaptor cord and AC power cord are firmly plugged into the PJ8800 DC IN 15 V socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.

Check 3   Make sure the DC IN input port where an AC adaptor's DC output plug is connected is firmly secured to the system board.
- If the DC IN input port is loose, go to Procedure 5.
- If it is not loose, go to Check 4.

Check 4   Use a multimeter to make sure the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.

Check 5   Connect a new AC adaptor or AC power cord.
- If the DC IN icon does not light, go to Procedure 5.
- If the battery icon does not light, go to Check 6.

Check 6   Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4   Charge Check

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

1. Reinstall the battery pack.

2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.

3. Run the Diagnostic test, go to System test and execute subtest 06 (Quick charge) described in Chapter 3.

4. When charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

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

Check 1   Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).

Check 2   Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.

Check 3   The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.

Check 4   The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.

Check 5   Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

Procedure 5   Replacement Check

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

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

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

2.4 System Board Troubleshooting

This section describes how to determine if the system board is defective or not. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Debugging port status 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 nothing is displayed, go to Procedure 2.

❑ If an operating system is properly loaded, go to Procedure 4.

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

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

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

```
(a)    0250: RTC battery is low
(b)    0251: CMOS checksum is inconsistent
(c)    0271: Check date and time settings
(d)    0290: ROM data is invalid
```

Check 2   If the following error message appears on the screen, press the **Continue** key as the message instructs. This error occurs, when consumption of battery or failure of system board loses the resumed data. Go to Procedure 3.

```
WARNING: RESUME FAILURE.
```

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 error message (5) appears, go to the Keyboard Troubleshooting Procedures in
            Section 2.7.

            If error message (1), (2), (3) or (4) appears, go to the HDD Troubleshooting
            Procedures in Section 2.6.

            If error message (7) appears, go to the FDD Troubleshooting Procedures in
            Section 2.5.

```
(1)  0201: Failure IDE#0
(2)  0202: Failure IDE#1
(3)  0203: Failure IDE#2
(4)  0204: Failure IDE#3
(5)  0212: Keyboard Controller Failed
(6)  0260: System timer error
(7)  02B0: Diskette drive A error
```

Procedure 2   Debugging Port Check on Boot Mode

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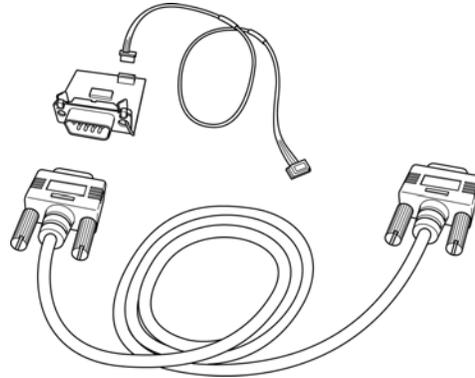
Figure 2-2 A set of tool for debug port test

The test procedures are follows;

1. Connect the debug test cable to the connector PJ2000 of the system board. For disassembling to connect the test cable, refer to Chapter 4.

2. Connect the debug port test cable and RS-232C cross-cable to the test board.

3. Connect the RS-232C cross-cable to the PC that displays the results.
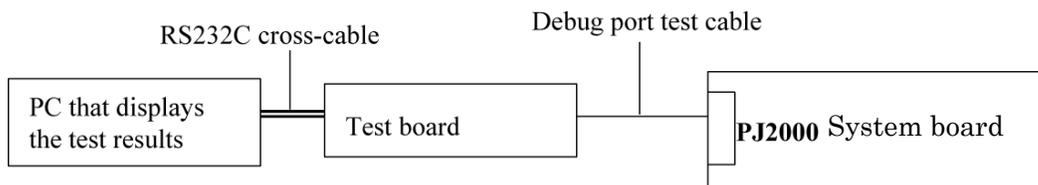
4. Boot the computer in MS-DOS mode.

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   Time (second) to   Contents of process
    status   process

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

7. When the D port status falls into any status in Table 2-4, execute Check 1.

Table 2-4 Debugging port boot mode status (1/7)

Debug Port	Description
0000h	
0080h	Initialize the chipset
0081h	Initialize the bridge
0082h	Initialize the CPU
0083h	Initialize system timer
0084h	Initialize system I/O
0085h	Check for BIOS changing
0087h	Go to BIOS
0088h	Initialize Multi Processor
0089h	Set segments to 4GB
008Ah	Initialize specific HW
008Bh	Initialize PIC and DMA
008Ch	Initialize Memory type
008Dh	Initialize Memory size
008Eh	Shadow Boot Block
0090h	System memory test
0091h	Initialize interrupt vectors
0094h	Output one beep
0095h	Initialize the boot device
0096h	Reset segments to 64KB
0097h	Boot BIOS change utility

Table 2-4 Debugging port boot mode status (2/7)

Debug Port	Description
0098h	Initialize USB Controller
0101h	
0102h	Verify Real Mode. If the CPU is in protected mode, turn on A20 and pulse the reset line, forcing a shutdown 0.
0103h	Disable Non-Maskable Interrupts.
0104h	Get CPU type from CPU registers and save it.
0106h	Initialize system hardware. Reset the DMA controllers, disable the videos, clear any pending interrupts from the real-time clock and set up port B register.
0107h	Disable system ROM shadow and start to execute ROM code from the flash part.
0108h	Initialize chip set registers to the initial values.
0109h	Set in-POST flag in CMOS that indicates we are in POST.
010Ah	Initialize CPU registers.
010Bh	
010Ch	Initialize cache.
010Eh	
010Fh	
0110h	
0111h	Load alternate registers with initial table values
0112h	Restore the contents of the CPU control word whenever the CPU is reset.
0113h	Reset PCI devices in early post
0114h	
0116h	Verify that the ROM BIOS checksums to zero
0117h	Initialize external cache before autosizing memory.
0118h	Initialize PIT(Programmable Interval Timer).
011Ah	Initialize DMA.
011Ch	Initialize interrupt controllers for some shutdowns.
011Fh	
0120h	Verify that DRAM refresh is operating by polling the refresh bit in PORTB.
0122h	
0124h	Set segment-register addressability to 4 GB
0128h	Determine DRAM size and configure the chipset accordingly. Before autosizing, all caches and all shadow RAM are disabled.

Table 2-4 Debugging port boot mode status (3/7)

Debug Port	Description
0129h	Initialize the POST Memory Manager
012Ah	Zero clear the first 512K of RAM
012Bh	
012Ch	Test 512K base address lines
012Eh	Test the first 4MB of RAM.
012Fh	Initialize external cache before shadowing.
0132h	Compute CPU speed.
0133h	Initialize the Phoenix Dispatch Manager
0134h	Test the CMOS RAM and RTC
0136h	Vector to proper shutdown routine.
0138h	Shadow the system BIOS.
013Ah	External cache is autosized and its configuration saved in memory.
013Bh	
013Ch	If CMOS is valid, load chipset registers with values from CMOS, otherwise load defaults.
013Dh	Load alternate registers with CMOS values.
013Fh	
0141h	
0142h	Initialize interrupt vectors 0 thru 77h to the BIOS general interrupt handler.
0145h	Initialize all motherboard devices.
0146h	Verify the ROM copyright notice
0148h	Verify that the equipment specified in the CMOS matches the hardware currently installed.
0149h	Initialize all PCI devices.
014Ah	Initialize video chip in system
014Bh	
014Ch	Shadow video BIOS ROM.
014Eh	Display copyright notice.
014Fh	Initialize MultiBoot. Allocate memory for old and new MultiBoot history tables.
0150h	Display CPU type and speed.
0151h	

0152h	

Table 2-4 Debugging port boot mode status (4/7)

Debug Port	Description
0154h	
0155h	
0157h	
0158h	Test for unexpected interrupts.
0159h	Initialize the POST display service.
015Ah	Display prompt "Press F2 for SETUP"
015Bh	Disable L1 cache during POST
015Ch	Test RAM between 512K and 640K.
0160h	Determine the amount of extended memory available.
0162h	
0164h	
0166h	
0167h	
0168h	
0169h	Initialize the handler for SMM.
016Ah	
016Ch	Display shadow message.
0170h	Display error messages on the screen.
0172h	Check status bits to see if configuration problems were detected. If so, Display error messages on the screen.
0176h	
017Ch	Initialize the hardware interrupt vectors from 08 to 0F and from 70h to 77H. Also set the interrupt vectors from 60h to 66H to zero.
017Dh	
017Eh	The Coprocessor initialization test.
0180h	
0181h	Run late device initialization routines.
0182h	
0183h	Configure Fisk Disk Controller.
0184h	

0185h	Configure all PnP ISA devices.
0186h	

Table 2-4 Debugging port boot mode status (5/7)

Debug Port	Description
0187h	Configure motherboard configurable devices.
0188h	Initialize timeouts, key buffer, and soft reset flag.
0189h	Enable non-maskable interrupts.
018Ah	Initialize Extended BIOS Data Area and initialize the mouse.
018Bh	
018Ch	Initialize the floppy disk and display an error message if failure was detected.
018Fh	
0190h	Initialize hard-disk controller.
0191h	Configure the local bus IDE timing register based on the drives attached to it.
0192h	
0193h	
0195h	Initialize CD-ROM drive.
0196h	Reset segment-register addressibility from 4GB to normal 64K by generating a Shutdown 8.
0197h	
0198h	Search for option ROMs.
0199h	Check support status for Self-Monitoring Analysis Reporting Technology (disk-failure warning).
019Bh	
019Ch	Perform late SMM initialization.
019Dh	Initialize Security Engine.
019Eh	Enable hardware interrupts.
019Fh	
01A0h	Verify that the system clock is interrupting.
01A2h	Setup Numlock indicator.
01A4h	
01A8h	Remove "Press F2" prompt from the screen.
01AAh	
01ACh	Enter SETUP.

| 01AEh | Clear CMOS flags for post. |

Table 2-4 Debugging port boot mode status (6/7)

Debug Port	Description
01B0h	Check for errors.
01B1h	
01B2h	Change status bits in CMOS and/or the BIOS data area to reflect the fact that POST is complete.
01B3h	
01B5h	Fade out logo screen.
01B6h	
01B7h	Initialize ACPI BIOS.
01B9h	Clear all screen graphics before booting.
01BAh	Initialize the SMBIOS header and sub-structures.
01BCh	Clear parity-error latch
01BDh	
01BEh	Clear the screen before booting.
01BFh	
01C1h	Initialize error handler
01C2h	Save the current boot type into CMOS
01C3h	Check the requested boot type
01C4h	Initializes (clears) the system error flags
01C5h	Mark the fact that we are no longer in POST
01C6h	
01C7h	
01C8h	
01C9h	Check (and do) if BIOS change is necessary
01CAh	
01CBh	
01CCh	Restore the memory configuration.
01CDh	
01CEh	
01D1h	Initialize BIOS stack area
01D3h	Clear memory
01D4h	Determines if the CPU supports the Extended CPUID function for Processor Name/Brand String.
01D6h	

Table 2-4 Debugging port boot mode status (7/7)

Debug Port	Description
01D7h	
01D8h	
20FFh	Try to boot with INT 19h.
03B0h	
05B1h	
05B2h	
05B3h	
05B4h	
05B5h	
06BFh	

Procedure 3   Diagnostic Test Program Execution Check

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

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

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

Procedure 4   Replacement Check

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

Check 1   Visually check for the following:

       a) Cracked or broken connector housing

       b) Damaged connector pins

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

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

2.5   FDD Troubleshooting

This section describes how to determine if the 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 operation details are given in Chapter 3, *Tests and Diagnostics*.

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

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

Procedure 2   Diagnostic Test Program Execution Check

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

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

Table 2-5 FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed on dual attach card
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	No FDD
80h	Time out error (Not ready)
EEh	Write buffer error
FFh	Data compare error

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

        FDD-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 3.5inch FDD is connected to the System Board via USB port.

Check 1   Make sure the USB cable is securely connected to the FDD. Also, make sure the
           USB cable of the FDD is securely connected to the system board.
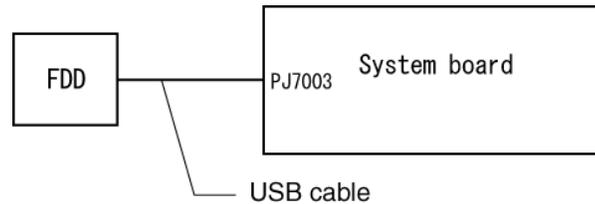
           If any of the connections are loose, reconnect firmly and repeat Procedure 2.

           If any connector is damaged, replace it with a new one and repeat Procedure 2.

           If there is still an error, go to Check 2.

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

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

2.6   HDD Troubleshooting

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

        Procedure 1:   Message Check

        Procedure 2:   Partition Check

        Procedure 3:   Format Check

        Procedure 4:   Diagnostic Test Program Execution Check

        Procedure 5:   Connector Check and Replacement Check

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

Procedure 1   Message Check

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

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

```
HDC ERROR (After 5 seconds this message will disappear.)
             or
IDE #0 ERROR (After 5 seconds this message will disappear.)
              or
IDE #1 ERROR (After 5 seconds this message will disappear.)
```

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

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

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

Procedure 2   Partition Check

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

Check 1   Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.

Check 2   Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.

Check 3   If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 3.

Check 4   Remove the FD and restart the computer. If the problem still exists, go to Procedure 3.

Procedure 3   Format Check

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

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

```
Format complete
```

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

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

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

```
Format complete
```

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

Procedure 4   Diagnostic Test Program Execution Check

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

If an error is detected during the HDD test, an error code and status will be displayed. Replace the HDD with a new one following the instructions in Chapter 4, *Replacement Procedures*. The error codes and statuses are listed in Table 2-6. If an error code is not generated and the problem still exists, go to Procedure 5.

Table 2-6 Hard disk drive error code and status

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

Procedure 5   Connector Check and Replacement Check

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

Check 1   Make sure the HDD is firmly connected to the system board.
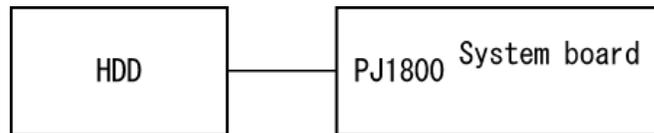
```
┌──────────────┐         ┌──────────────────────────┐
│              │         │                          │
│     HDD      │─────────│ PJ1800  System board     │
│              │         │                          │
└──────────────┘         └──────────────────────────┘
```

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

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

Check 3   The 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 and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector and Replacement Check

The keyboard, PAD I/F and PAD Switch may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

1. If the keyboard malfunctions, start with Check 1.

2. If the PAD switch malfunctions, start with Check 3.

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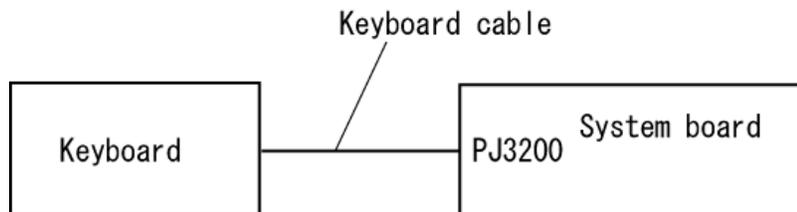
         If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

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 5.

Check 3   Make sure the PAD switch cable is firmly connected to the system board.
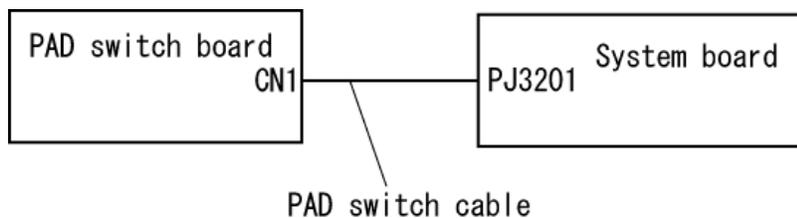
         If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 4.

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

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

2.8   Display Troubleshooting

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

Procedure 1:   External Monitor Check

Procedure 2:   Diagnostic Test Program Execution Check

Procedure 3:   Connector and Cable Check

Procedure 4:   Replacement Check

Procedure 1   External Monitor Check

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

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

If the external monitor appears to have the same problem as the internal 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. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 3.

Procedure 3   Connector and Cable Check

The LCD Module is connected to the system board 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 or the FL inverter board, 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.
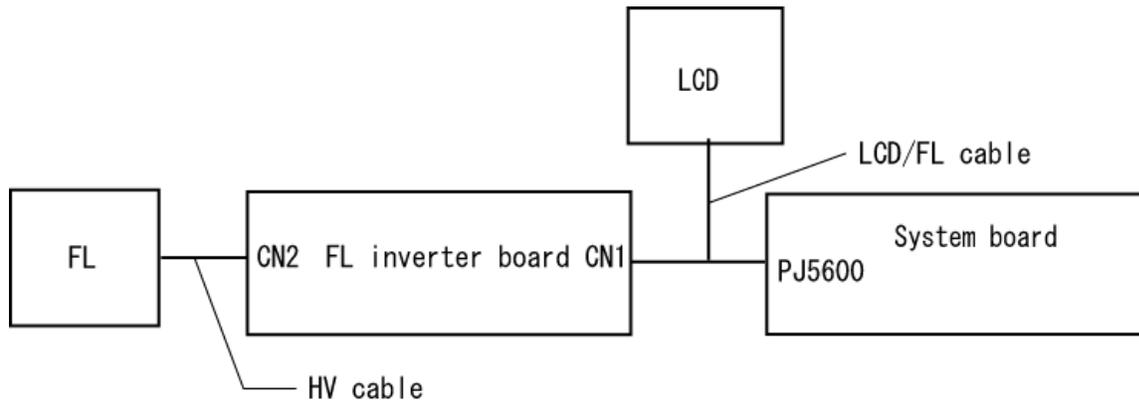
Procedure 4   Replacement Check

The FL, FL inverter board, LCD module, and system board 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 does not light, perform Check 1.

      If characters or graphics are not displayed clearly, perform Check 4.

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

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

Check 1   Replace the FL with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check2.

Check 2   The LCD/FL cable or HV cable may be defective or damaged. Replace the FL/LCD or HV cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check3.

Check 3   The FL inverter board 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 Check4.

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 5.

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

2.9   Optical Drive Troubleshooting

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

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

For the test, prepare a test CD-ROM, DVD-ROM, music CD and CD-RW Media.

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

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

Procedure 2   Connector Check and Replacement Check

The Optical Drive is connected to the system board. The connectors may be disconnected from the system board or may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

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

```
┌──────────────────────┐        ┌──────────────────────────┐
│                      │        │              System board │
│                      │        │                           │
│    Optical Drive     │────────│ PJ1820                    │
│                      │        │                           │
│                      │        │                           │
└──────────────────────┘        └──────────────────────────┘
```

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

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

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

2.10 Modem Troubleshooting

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

> Procedure 1: Diagnostic Test Program Execution Check
>
> Procedure 2: Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

The Sound/LAN/Modem test program is stored in the Diagnostics Disk.

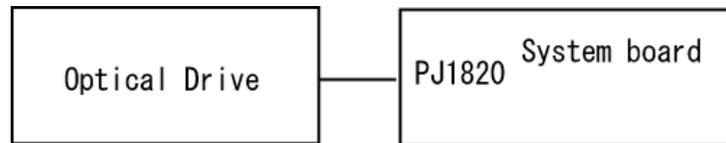For the test, prepare a test Sound/LAN/Modem.

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

If any errors occur while executing the Sound/LAN/Modem test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The Modem is installed as a modem daughter card (MDC). If the modem malfunctions, there may be a bad connection between the MDC and the System Board. Or the MDC, System Board or their connectors might be damaged.

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

Check 1   Make sure the MDC cable is firmly connected to the MDC and make sure the MDC is firmly connected to PJ3000 on the System Board.
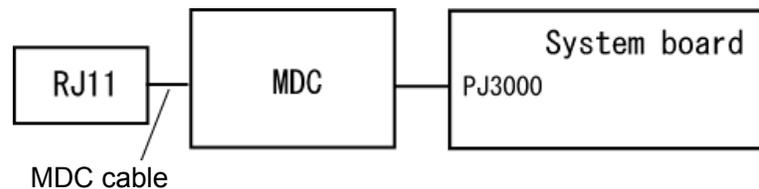
If a connector is disconnected, connect it firmly and repeat Procedure 1. If the Modem is still not functioning properly, perform Check 2.

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

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

2.11 LAN Troubleshooting

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

>Procedure 1:   Diagnostic Test Program Execution Check
>
>Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

The Sound/LAN/Modem test program is stored in the Diagnostics Disk.

For the test, prepare a test Sound/LAN/Modem.

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

If any errors occur while executing the Sound/LAN/Modem test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

A RJ45 jack with LAN cable is on the System Board. If the LAN malfunctions, the System Board might be damaged.

Disassemble the computer following the steps described in Chapter 4, Replacement Procedures.

```
+------------------------+        +----------+
| System board           |--------|  RJ-45   |
|             PJ4100      |        |  jack    |
+------------------------+        +----------+
```
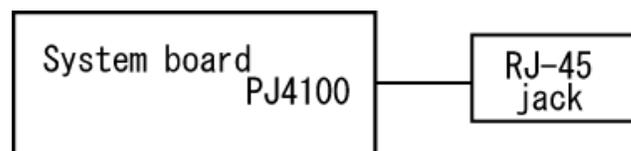
2.12 Wireless LAN Troubleshooting

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

        Procedure 1:   Transmitting-Receiving Check

        Procedure 2:   Antennas' Connection Check

        Procedure 3:   Antennas' Capability Check

        Procedure 4:   Replacement Check

Procedure 1   Transmitting-Receiving Check

Make sure the wireless communication switch on the front side of the computer is turned ON. If it is not, slide the switch toward the back of the computer to turn it on.

Check 1   Execute 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, *Wireless LAN Test Program*.

        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 wiring diagram is shown below:
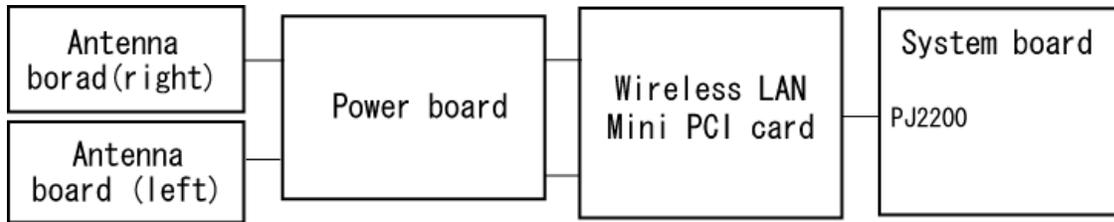
```
┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│   Antenna    │   │              │   │              │   │ System board │
│ borad(right) │───│              │   │ Wireless LAN │   │              │
├──────────────┤   │ Power board  │───│ Mini PCI card│───│ PJ2200       │
│   Antenna    │   │              │   │              │   │              │
│ board (left) │───│              │   │              │   │              │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
```

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

Check 1   Make sure the wireless communication switch is "On".

            If the switch is "Off", turn it "On". If the wireless LAN is still not functioning properly, perform Check 2.

Check 2   Make sure the wireless LAN board is firmly connected to PJ2200 on the system board.

            If the connector is disconnected, connect it firmly and perform Procedure 1. If the wireless LAN board is still not functioning properly, perform Check 3.

Check 3   Make sure the wireless LAN antenna cables (black and white) are firmly connected to the Wireless LAN card.

            If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN function is still not functioning properly, perform Check 3.

Check 4   Make sure the wireless LAN antenna cables (black and white) are firmly connected from the power board to the Wireless LAN card.

            If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN function is still not functioning properly, perform Procedure 3.

Procedure 3   Antenna Check

Check 1   Use an antenna test cable to check the antennas' connection. Follow the steps below:

1. Remove the wireless LAN slot cover and lift it off. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling.

2. Disconnect the wireless LAN antenna cables connected to the wireless LAN board.

3. Connect the end of the antenna test cable to the multimeter.

4. Connect the Main antenna cable to the antenna test cable. One clip is connected to the end of the white antenna cable. The other is connected to the opposite side of the antenna cable.

5. Determine the resistance. The cable passes the test when the resistance is 5Ω. Or less. If it is more than 5Ω, the antenna cable fails the test.

6. Change the antenna cable. Perform from step 3 to check the black antenna cable.
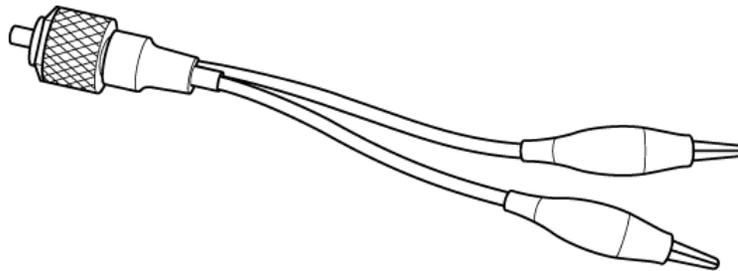
Figure 2-3 Antenna Test cable

NOTE:	1.	*The resistances determined with the steps above may not be stable with other machines because of "cable loss," which varies according to the length of the cable. The impedance of the antenna itself is about 0.5-0.8Ω.*
	2.	*The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.*

If the wireless LAN antenna cables pass the test, connect them to the wireless LAN board and cover the slot, then perform Procedure 1.

If the wireless LAN antenna cables do not pass the test, replace the wireless LAN antenna cables with new ones following the steps in Chapter 4, *Replacement Procedures*. If the wireless LAN is still not functioning properly, go to Procedure 4.

Procedure 4   Replacement Check

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

Check 1   Replace the wireless LAN board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check2.

Check 2   The power board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check3.

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

2.13 Sound Troubleshooting

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

      Procedure 1:   Diagnostic Test Program Execution Check

      Procedure 2:   Connector Check

      Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

The Sound/LAN/Modem test program is stored on the computer's diagnostic disk. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

If an error is detected, go to Procedure 2.

Procedure 2   Connector Check

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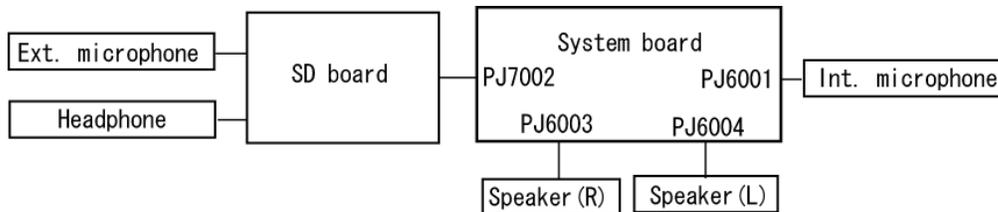
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

If the stereo speakers do not work correctly, perform Check 1.

If headphones do not work correctly, perform Check 2.

If sound recording does not work correctly, perform Check 3.

Check 1   If the stereo speakers do not work properly, the speaker cables may be disconnected. Make sure the speaker cables are firmly connected to PJ6003 or PJ6004 on the system board. If the stereo speakers are still not functioning properly, go to Procedure 3.

Check 2   If headphones do not work properly, the SD board may be disconnected or damaged. Make sure the connector on the SD board is firmly connected to PJ7002 on the system board. If the sound function still does not work properly, replace it with a new one. Go to Procedure 3.

Check 3   If the sound recording function does not work properly, the internal microphone cable or external microphone cable may be disconnected. Make sure the internal microphone cable is firmly connected to PJ6001 on the system board and the SD card is firmly connected to PJ7002 on the system board. If recording is still not functioning properly, go to Procedure 3.

Procedure 3   Replacement Check

Check 1   If the stereo speakers do not sound properly, they may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, go to Check 5.

Check 2   If headphones does sound properly, the headphone jack may be defective or damaged. Replace the SD board with a new one. If the headphone still does not work properly, go to Check 5.

Check 3   If the recording function does not work properly by the external microphone, the external microphone jack may be defective or damaged. Replace the SD board with a new one. If the recording function still does not work properly, go to Check 5.

Check 4   If the recording function does not work properly by the internal microphone, the internal microphone may be defective or damaged. Replace it with a new one. If the recording function still does not work properly, go to Check 5.

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

2.14 SD Card Slot Troubleshooting

To check if the SD card/Smart Media slot is good or no good, follow the troubleshooting procedures below as instructed.

> Procedure 1: Check on Windows
>
> Procedure 2: Connector/Replacement Check

Procedure 1   Check on Windows

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

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

Procedure 2   Connector/Replacement Check

The SD card is connected to IS2101 on the system board.
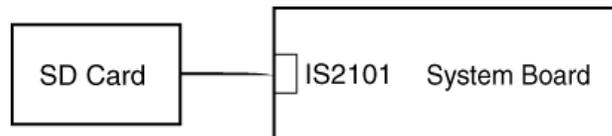
Check 1   The SD card and the system board may be disconnected. Make sure the SD card is firmly inserted to IS2101 on the system board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

Check 2   The SD card may be faulty. Replace it with a new one following the step in Chapter 4. If the problem continues, perform Check 3.

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

Chapter 3
Tests and Diagnostics

Chapter 3 Contents

Tables

3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. The Diagnostic Test Program is stored on the Diagnostic Disk. The Diagnostic Test program consists of eight programs that are grouped into the Service Program Module (DIAGNOSTIC TEST MENU).

> *NOTES: To start the diagnostics, follow these steps:*
>
> 1. *Check all cables for loose connections.*
> 2. *Exit any application you may be using and close Windows.*

The DIAGNOSTIC MENU consists of the following six functions.

- ❑ DIAGNOSTIC TEST
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ EXIT TO MS-DOS

The DIAGNOSTIC TEST MENU contains the following thirteen 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 TEST
- ❑ LAN TEST

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

- ❑ The Diagnostics Disk (all tests)
- ❑ A formatted working disk for the floppy disk drive test
- ❑ An external FDD attachment
- ❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- ❑ A cleaning kit to clean the DVD-ROM drive heads (Head Cleaning)
- ❑ A PC card wraparound connector for the I/O card test (Expansion test)
- ❑ A printer wraparound connector for the printer wraparound test (Printer test)
- ❑ A CD test media (TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190) and music CD) (CD-ROM test)
- ❑ A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1)
- ❑ External CRT (Display test)
- ❑ PS/2 or compatible keyboard (Keyboard test)
- ❑ PS/2 or compatible mouse (Keyboard test)
- ❑ Headphone (Sound test)
- ❑ CD-ROM drive (CD-ROM test)
- ❑ A microphone
- ❑ A modular cable and RJ11 connector checker
- ❑ A modular cable and RJ11 connector checker (LED)
- ❑ USB test module and USB cable
- ❑ LAN wraparound connector
- ❑ Music CD (CD-ROM/DVD-ROM test)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.17 through 3.27 for detailed information on the remaining Service Program Module functions.

3.2   Executing the Diagnostic Test

Toshiba MS-DOS is required to run the DIAGNOSTICS TEST PROGRAM. To start the DIAGNOSTIC TEST PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive and turn on the computer while pressing F key.
   (The Diagnostics Disk contains the MS-DOS boot files.)

NOTE: *To execute the CD-ROM or DVD-ROM test, make sure the CD-ROM and CD-ROM drive or DVD-ROM and DVD-ROM drive is installed in the computer.*

The following menu will appear:

```
TOSHIBA Personal Computer   xxxxxxx DIAGNOSTICS
Version X.XX (C) Copyright TOSHIBA Corp. XXXX

DIAGNOSTICS MENU :

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



                                   ↑↓↦ : Select items
                                   Enter: Specify
                                   Esc  : Exit
```

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

---

2. To execute the DIAGNOSTIC TEST MENU from the DIAGNOSTICS MENU, 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. XXXX

DIAGNOSTIC TEST MENU :

 1 - SYSTEM TEST
 2 - MEMORY TEST
 3 - KEYBOARD TEST
 4 - DISPLAY TEST
 5 - FLOPPY DISK TEST
 6 - PRINTER TEST
 7 - ASYNC TEST
 8 - HARD DISK TEST
 9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 -
13 - CD-ROM/DVD-ROM TEST
14 - LAN TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU

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

Refer to sections 3.4 through 3.16 for detailed descriptions of each Diagnostic Tests 1
through 14. Function 88 sets the floppy disk drive and hard disk drive error retry
count (0-255). To return to the Diagnostics Menu, set the highlight bar to Function 99
and press **Enter**.

3. Select the test you want to execute and press **Enter**. When SYSTEM TEST is
    selected, the following message will appear:

```
SYSTEM TEST              XXXXXXX   ┌─────────────────────────────┐
                                   │ XXX DIAGNOSTIC TEST VX.XX   │
                                   │ [Ctrl]+[Break] : test end   │
                                   │ [Ctrl]+[C]     : key stop   │
                                   └─────────────────────────────┘

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


SUB-TEST MENU :

01 - ROM checksum
02 -
03 -
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 -
10 - CPU Temperature
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.*

---

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

    ```
    TEST LOOP : YES/NO
    ```

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

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

5. The following message will appear:

    ```
    ERROR STOP : YES/NO
    ```

    Selecting **YES** 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.

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

    Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-2 in section 3.17 describes the error codes and error status for each error.

3.3   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
		04	Fan ON/OFF
		05	Geyserville
		06	Quick charge
		07	DMI read
		08	DMI write
		10	CPU Temperature
2	MEMORY	01	Conventional memory
		02	Protected Mode
		04	Cache memory
		05	L2 Cache memory
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		04	Touch Pad
		05	USB (Port 0, Port 1) test
		06	USB (Port 2) test
		07	Button test
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	01	Ripple pattern
		02	Function
		03	Wrap around
7	ASYNC	06	FIR/SIR Point to point (send)
		07	FIR/SIR Point to point (receive)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		06	Write specified address
		07	Read specified address
		09	Sequential write
		10	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
		03	RGB monitor ID
13	CD-ROM/DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	Playback music
		05	RW 1Point W/R/C
14	LAN	01	LAN MAC ADDRESS DISPLAY

3.4   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 04   Fan ON/OFF

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

The following message will appear. Make sure the fan does not rotate and press **Enter.**

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

The following message will appear. Make sure the fan rotates at low speed and press **Enter.**

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

The following message will appear. Make sure the fan rotates at high speed and press **Enter.**

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

Subtest 05   Geyserville

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

Subtest 06   Quick Charge

This subtest checks the status for the quick charge.

Subtest 07   DMI read

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

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

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

Press [Enter] to EXIT
```

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

Subtest 08   DMI write

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

1. "Enter Model Name ?" is displayed.

    Input the computer's model name and press **Enter**. (e.g. DynaBook)

2. "Enter Version Number ?" is displayed.

    Input the computer's version number and press **Enter**. (e.g. PC18070C313S)

3.   "Enter Serial Number ?" is displayed.

    Input the computer's serial number and press **Enter**. (e.g. 12345678)

4. "Enter Model Number ?" is displayed.

    Input the computer's sales model number and press **Enter**. (e.g. PP200-AAAAA)

5. "Enter Bundle Number ?" is displayed.

    Input the computer's PCN/Bundle number and press **Enter**. (e.g. PMSREQ3Q34H/S0123456789)

6. "Write data OK (Y/N) ?" is displayed.

    To write the DMI information to the Flash ROM, press **Y**, and then **Enter**.

7. "Create DMIINFO TXT (Y/N) ?" is displayed.

Press **Y,** then the DMI information (text data) is written to the Floppy disk, etc.

Subtest 10   CPU Temperature

This subtest checks the CPU temperature.

When the subtest starts, the following message appears on the display. Enter the ambient Celsius temperature.

```
EXT. TEMP =
```

When the temperature is entered, test program turns off the screen message. After 15 minutes, it measures the CPU temperature and judges the test result (OK or NG) based on the gap between the ambient temperature and the measured temperature (threshold value).

When any error occurs, an error log is written into "DIAGNOSTIC MENU: 5-LOG UTILITIES".

The meaning of "WD" or "RD" of the error log is as follows:

WD   : Reference value of CPU temperature rising (hexadecimal form).
RD   : Gap between the CPU temperature and the ambient temperature
         (hexadecimal form).

3.5   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 04   Cache Memory

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

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

Subtest 05   L2 Cache Memory

To test the L2 cache memory, a similar test to that for the cache memory is performed.

Subtest 06   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.

3.6   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 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.
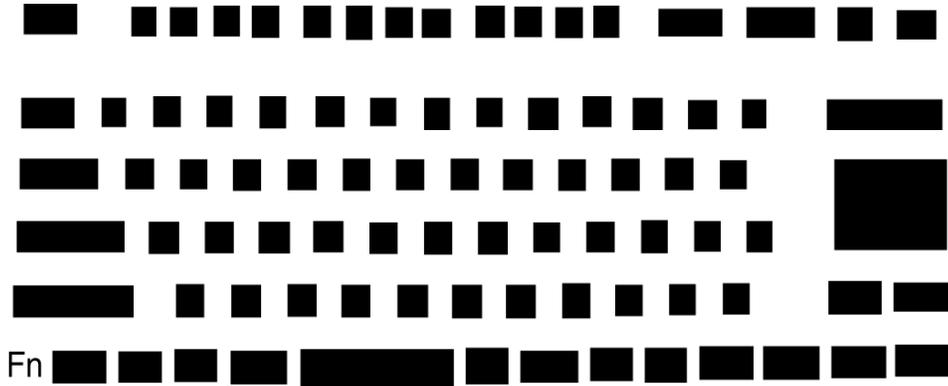
Subtest 02   Pressed key code display

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
```

Subtest 04   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. If two touch pad
switches are pressed at the same time, the subtest menu appears.
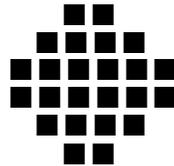
```
         *** IPS (PAD) TEST PROGRAM (Vx.xx) ***

          <POINTING>
                                      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 05   USB (Port 0, Port1) test

This subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to test and press **Enter**.

```
Test port number select (1:Port0, 2:Port1, 0:Port0&1) ?
```

If the test ends successfully, OK is displayed. If there is a problem with the USB port, an error message appears. Check the wraparound connection and repeat the test.

Subtest 06   USB (Port 2) test

This subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to test and press **Enter**.

```
Test port number select (1:Port2, 2:Port3, 0:Port2&3) ?
```

If the test ends successfully, OK is displayed. If there is a problem with the USB port, an error message appears. Check the wraparound connection and repeat the test.

Subtest 07   Button test

This subtest checks the IE, Mail and TV button.

1. The following message is displayed. Press **IE** button.
   ```
   Press [IE] Button
   ```

2. The following message is displayed. Press **Mail** button.
   ```
   Press [Mail] Button
   ```

3. The message is displayed. Press **TV** button.
   ```
   Press [TV] Button
   ```

## 3.7   **Display Test**

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

Subtest 01     VRAM read/write for VGA

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

Subtest 02     Gradation for VGA

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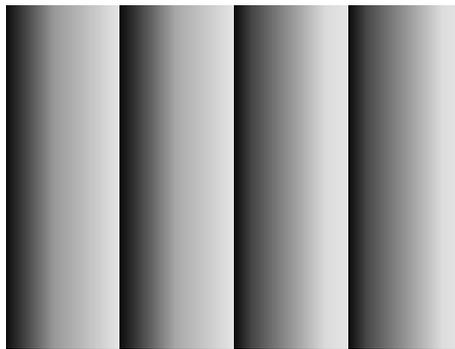


To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03     Gradation for LCD

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

Subtest 04      Gradation & Mode test for VGA

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

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

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

(Display example: Mode 12)

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

Subtest 05   All dot on/off for LCD

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

Subtest 06   "H" Pattern Display

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

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

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

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

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

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

3.8   Floppy Disk Test

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

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

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

    ```
    Media in drive#1 mode (0:2DD, 1:2D, 2:2D-2HD/2DD, 3:2HD) ?
    Test start track      (Enter:0/dd:00-79) ?
    ```

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

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


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

    SUB-TEST MENU :

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




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

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

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

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

3. 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.

3.9   Printer Test

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

> *NOTE*: *A Port Replicator and an IBM compatible printer must be connected to the
> system to execute this test.*

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

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

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

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

Subtest 01   Ripple Pattern

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

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

Subtest 02   Function

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

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

This subtest prints the various print types shown below:

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

Subtest 03   Wraparound

NOTE: To execute this subtest, a printer wraparound connector must be connected to the computer's printer port. The connector wiring diagram is described in Appendix F.

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.)

3.10 Async Test

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

Subtests 06 and 07 require the following data format:

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

Subtest 06   FIR/SIR Point to point (send)

> *NOTE:* *To execute subtests 06 and 07, 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 07   FIR/SIR Point to point (receive)

This subtest is used with subtest 06 described above. This subtest receives the data from the send side, then sends the received data through the FIR/SIR port.

3.11 Hard Disk Test

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

> *CAUTION:* *The contents of the hard disk will be erased when subtest 01, 02, 03, 04, 06, 07,09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.*
>
> *Check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the pre-installed software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.*
>
> *Refer to the operating system instructions.*

The following messages will appear after selecting the hard disk test from the DIAGNOSTIC TEST MENU.

```
Test drive number select      (1:HDD#1, 2:HDD#2, 0:HDD#1&2) ?
HDC F/W error retry           (1:yes, 2:no) ?

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

1. This message is used to select the error dump operation when a data compare error is detected. Select **yes** or **no**.

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

2. This message is used to select whether or not the HDD status is displayed on the screen. The HDD status is described in section 3.18. Select **yes** or **no**.

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

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

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

The first digit of the STATUS number indicates the drive being tested and the last
two digits indicate the error status code as explained in table 3-2 of the section 3.17.

Subtest 01   Sequential read

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

Subtest 02   Address uniqueness

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

               1. Forward sequential
               2. Reverse sequential
               3. Random

Subtest 03   Random address/data

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

Subtest 04   Cross talk & peak shift

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

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149249'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24924'	7 cylinder

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 09   Sequential write

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

Subtest 10   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.

3.12 Real Timer Test

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

Subtest 01   Real time

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

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

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

Enter new date:

PRESS [ENTER] KEY TO EXIT TEST
```

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

3. The following messages will appear:

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

Enter new time:

PRESS [ENTER] KEY TO EXIT TEST
```

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

To exit, press **Enter**.

Subtest 02   Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03   Real time carry

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

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

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

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

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

PRESS [Enter] KEY TO EXIT TEST
```

Press **Enter** to exit.

3.13 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

3.14 Expansion Test

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

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

Subtest 01   PCMCIA wrap around

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

❑ Address line

❑ REG#, CE#1, CE#2 line

❑ Data line

❑ Speaker line

❑ Wait line

❑ BSY#, BVD1 line

This subtest is executed in the following order:

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

NOTE: Select the subtest number01, The following message will appear:
*   Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?*

Subtest 03   RGB monitor ID

Connect a wraparound connector to CRT monitor for the test of ID acquisition. This subtest is executed by using VESA command.

3.15 CD-ROM/DVD-ROM Test

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

> *NOTE*: *For the subtest 01, 02 and 03, use the TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190) for CD-ROM and DVD-ROM TEST DISK TSD-1 for DVD-ROM. For the subtest 04, use a music CD on the market. For the subtest 05, 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   Playback Music (CD only)

   This subtest reads track data from a specified track and plays the sound.

> *CAUTION*: *When the CD-ROM test is executed, "ALL DEVICE" must be selected in the "SET-UP" of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.*

Subtest 05   RW 1Point W/R/C

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

3.16 LAN test

To execute the LAN test, select **14** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The LAN test contains one subtest.

Subtest 01   LAN MAC ADDRESS DISPLAY

This subtest reads MAC ADDRESS and displays it.

Press **Enter** to exit.

3.17 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	ROM Checksum Error
	02	Location ID Error
	03	Serial ID Write Error
Memory	01	Parity Error
	02	Protected Mode Not Changed
	14	Memory Read/Write Error
	DD	Cache Memory Error
	DE	2nd Cache Error
	DF	TAG-RAM Error
Keyboard	01	Mouse Interface Error
	02	IPS Interface Error
	03	Interface Error
	04	Retransmit Error
	05	Mouse Handler Not Support
	06	PS/2 Mouse & IPS Not Support
FDD	01	Bad Command Error
	02	Address Mark Not Found
	03	Write Protected
	04	Record Not Found
	06	Media Removed
	08	DMA Overrun Error
	09	DMA Boundary Error
	10	CRC Error
	20	FDC Error
	40	Seek Error
	60	Not Drive Error
	80	Time Out Error
	EE	Write Buffer Error
Printer	01	Time Out
	08	Fault
	10	Select Line
	20	Out Of Paper
	40	Power Off
	80	Busy Line

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

Device name	Error code	Error status name
ASYNC	01 02 04 08 10 20 40 50 60 70 80	DSR On Time Out CTS On Time Out RX-READY Time Out TX-FULL Time Out Parity Error Framing Error Overrun Error Underrun error Timer time out error CRC error Line Status Error
HDD	01 02 04 05 07 08 09 0A 0B 10 11 20 40 80 AA BB CC E0 EE DA	Bad Command Error Address Mark Not Found Record Not Found HDC Not Reset Error Drive Not Initialized HDC Overrun (DRQ) DMA Boundary Error Bad Sector Bad Track Error ECC Error ECC Recover Enable HDC Error Seek Error Time Out Error Drive Not Ready Undefined Error Write Fault Status Error Access Time Out Error No HDD
NDP	01 02 03 04 05 06	No Co-Processor Control Word Error Status Word Error Bus Error Addition Error Multiply Error

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

Device name	Error code	Error status name
Expansion	C1 C2 C3 C4 C5 C6 C7 C8 CB CD	Address Line Error REG# 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
CD/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 Additional Sense Boundary Error Corrected Data Error Drive Not Ready Seek Error Time Out Reset Error Address Error

3.18 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

Table 3-3 Hard disk controller status register contents

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

Table 3-4 Error register contents

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

3.19 Head Cleaning

3.19.1 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.

3.19.2 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.

3.20 Log Utilities

3.20.1 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.

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.

3.20.2 Operations

1. Selecting **5** and pressing **Enter** in the DIAGNOSTIC MENU, logs error information
   into RAM or onto a floppy disk. The error information is displayed in the following
   format:

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

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

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

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

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

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

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

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

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

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

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

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

3.21   Running Test

3.21.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02 and 04)
3. Display test (subtest 01)
4. FDD test (subtest 02)
5. HDD test (subtests 01 and 05)
6. Real timer test (subtest 02)
7. Printer test (subtest 03) if selected

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

3.21.2 Operations

> *CAUTION: Do not forget to load a work disk in the FDD. If a work disk is not loaded, an error will be generated during the FDD testing.*

1. Remove the diagnostics disk from the floppy disk drive and insert the formatted work disk.

2. Select **6** from the Diagnostic Menu and press **Enter,** the following message displays:

   ```
   Printer wrap around test (Y/N) ?
   ```

   Selecting **Y (yes)** executes the printer wraparound test. A printer wraparound connector must be connected to the parallel port of the computer to properly execute this test.

3. Select **Y** or **N** and press **Enter**. The following message will appear:

   ```
   Serial #A wrap around test (Y/N) ?
   ```

   Selecting **Y (yes)** executes the ASYNC wraparound test. An RS-232-C wraparound connector must be connected to the serial port of the computer to properly execute this test.

4. Select **Y** or **N** and press **Enter**.

5. This program is executed continuously. To terminate the program, press **Ctrl + Break.**

3.22   Floppy Disk Drive Utilities

3.22.1   Function Description

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

1. FORMAT

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

This program can format a 3.5-inch floppy disk in the following formats:

(a) 2D: Double-sided, double-density, 48/67.5 TPI, MFM mode, 512 bytes, 9 sectors/track.

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

(c) 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 the hard disk ID, serial number and other hard disk information.

3.22.2 Operations

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

    ```
    [ FDD UTILITIES ]

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

2. FORMAT program

    (a) Selecting FORMAT displays the following message:

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

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

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

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

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

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

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

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

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

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

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

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

3. COPY program

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

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

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

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

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

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

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

(d) The following message will appear.

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

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

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

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

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

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

4. DUMP program

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

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

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

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

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

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

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

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

(e) The following message will appear:

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

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

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

Track number ????
```

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

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

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

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

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

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

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

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

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

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

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

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #X]

ID code (h)              =  XXXX
No. of Cylinders      =  XXXX XXXX
Removable Cylinders      =  XXXX  XXXX
No. of Heads             =  XXXX XXXX
Unformat Bytes/Track     =  XXXX XXXX
Unformat Bytes/Sector    =  XXXX XXXX
Sectors/Track            =  XXXX XXXX
Gap Length               =  XXXX XXXX
Sync. Bytes              =  XXXX XXXX
Reserved (h)             =  XXXX
Serial No.               =  YYY...
Controller Type (h)      =  XXXX
Sector Buffers           =  XXXX XXXX
ECC Bytes                =  XXXX XXXX
Firmware Rev.            =  YYYYYY..
Model No.                =  YYYY...
Reserved (h)             =  XXXX
Double Word Capability   =  XXXX XXXX

Press [Enter] key
```

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

3.23 System Configuration

3.23.1 Function Description

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

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM version (1st ID, 2nd ID)
5. Boot ROM version
6. KBC version
7. PS Microprocessor Version (EC Version)
8. Total Memory Size
9. Battery code
10. Sound System
11. The number of printer ports
12. The number of ASYNC ports
13. The number of math co-processors
14. PCMCIA Slot
15. Modem/LAN Type
16. The number of floppy disk drives
17. The number of hard disk drives
18. The number of HWSC
19. The number of Wireless LAN
20. The number of Bluetooth
21. The number of IEEE1394
22. The number of USB2.0, FIR
23. Date/Time

3.23.2 Operations

Selecting **8** from the DIAGNOSTIC MENU and pressing **Enter** displays the following system configuration:

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

*  - Processor Type    = XXXXXX
*  - VGA Controller    = XXXXXX
*  - MS-DOS Version    = V7.XX
*  - BIOS ROM Version  = VX.XX 1st ID = XXH, 2nd ID = XXH
*  - BOOT ROM Version  = VX.XX
*  - KBC Version       = VX.XX
*  - PS Micon Version  = V1.XX ( EC Version = VX.XX )
*  - Total Memory Size = XXXXXXMB ( Conventional Memory = 00639KB )
*  - Battery Code      = XXXXX
*  - Sound System      = XXXXX
*  - X Printer Adapter   LPT1 = 0378  LPT2 = XXXX  LPT3 = XXXX
*  - X ASYNC Adapter     COM1 = 03F8  COM2 = XXXX  COM3 = XXXX
*  - X Math CO-Processor
*  - X PCMCIA Slot
*  - X MODEM / LAN
*  - X Floppy Disk Drive(s) Track = XX  Head = XX, Sector = XX
*  - X Hard Disk Drive(s)   #1 Sectors  = XXXXX, (XXXXX MB)
*  - X HWSC  = XXXXXXX      #2 Sectors  = XXXXX, (XXXXX MB)
*  - X Wireless LAN
*  - X Bluetooth
*  - X IEEE1394
*  - X USB2.0、FIR

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

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

3.24 Wireless LAN Test Program (Calexico)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

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

In this test, the following items are tested.

      (1)   Communication test (Main antenna, Aux antenna)

      (2)   MAC address Check

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

> *NOTE*: *Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.) Release the write-protection of the floppy disk for the test.*

Setting the responder machine

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

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

Setting the target machine

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

When the machine has passed the test, "OK !" message will appear on the target machine.

Press any key to exit the test.

When an error is detected during the test, "NG !" massage will appear. Press any key to display the NG item (Main antenna, Aux. antenna or MAC address check). The following message appears.

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

3.25 Wireless LAN Test Program (Atheros 11b/g or 11a/b/g)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

> ***NOTE:*** *Use another computer (with Atheros 11b/g or 11a/b/g wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform this test.*
>
> *When conducting this test, make sure that any wireless network device using 2.4GHz band other than IEEE 802.11b, such as Bluetooth, is not used nearby.*

In this test, the following items are tested:

 * Test PC side
  (1) SKU (destination code) check
  (2) Mac Address check
  (3) Communication test (11a mode) (only for 11a/b/g card)
  (4) Communication test (11g mode)
  (5) Communication test (11b mode)

This program conducts the above test items continuously and displays results for each item during the test. However, only the last result for the whole test shall be checked. (The message "OK" or "NG" is displayed.)

When an "NG" item is detected during the test, the message "NG" is displayed on the screen and the test stops.

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

> ***NOTE:*** *Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)*

Setting the responder machine

> ***NOTE:*** *Release the write-protection of the floppy disk for the test.*

Insert a floppy disk containing the test program into the floppy disk drive of the responder machine and turn on the responder machine. The Wireless LAN test menu will appear.

```
################################################################
####      Atheros WLAN sub system repair test  VX.XX      ####
################################################################
*                                                              *
*      1 .....Test PC [Initiator]                              *
*                                                              *
*      0 .....[Responder]                                      *
*                                                              *
****************************************************************

....Press test number [1,0] ?
```

Press **0** and **Enter** in the responder machine. After a while, the following messages will appear. The latter message is updated ever 3 seconds.

```
Waiting for transmitter to ring the bell in 11a mode.

Input or output error (EIO) : rxDatBegin : nothing receive within
3000millisecs(waitTime)
```

The responder machine is ready for the test.

Setting the tester machine

> ***NOTE:*** *Release the write-protection of the floppy disk for the test.*

Insert a floppy disk containing the test program into the floppy disk drive of the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

```
################################################################
####      Atheros WLAN sub system repair test  VX.XX      ####
################################################################
*                                                              *
*      1 .....Test PC [Initiator]                              *
*                                                              *
*      0 .....[Responder]                                      *
*                                                              *
****************************************************************

....Press test number [1,0] ?
```

Press **1** and **Enter** in the tester machine. After a while, the following message will appear:

```
---------------------------------------------
-                                           -
-      mac address check OK !!              -
-                                           -
-      ...Press any key !!                  -
-                                           -
---------------------------------------------
```

To proceed the test, press any key.

When the tester machine has passed the test, "OK" message will appear in the tester machine.

Press **Enter** to return to the main menu.

When the tester machine has not passed the test, "NG" message will appear in the tester machine. Pressing **Enter** on the screen shows the following message.

```
************************************************************
*                                                          *
*      8.02 11a Tx Test AUX Antenna NG                     *
*                                                          *
************************************************************
```

Then the test returns to the main menu automatically.

3.26 Sound/LAN/Modem Test Program

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

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

```
###################################################################
#########    XXXXXX DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)#####
###################################################################
*                                                                 *
*   1 ............   ( Microphoned recording & play )             *
*                                                                 *
*   2 ............   ( LAN )                                      *
*                                                                 *
*   3 ............   ( Modem )                                    *
*******************************************************************
.... Press test number[1-3] ?
```

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

NOTE: *The system is capable of producing high volume sound, so when you use the headphones be careful to set the volume low and adjust it as necessary. Using the headphones at full volume could damage your ears.*

To execute a subtest continuously, select the test number and press **Enter.** To exit the Sound/LAN/Modem test, remove the test program disk from the USB FDD and turn off the power.

Subtest 01   Microphoned recording & play

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

This subtest checks the function of the CODEC A/D D/A converter. Both the microphone and headphone terminals can be checked at the same time.

Before executing this subtest, connect an external microphone to the computer. If necessary, connect a headphone to the computer to check whether the headphone jack of the computer is working properly.

When the subtest is selected, the following message appears.

```
....Press test number[1-3] ? pause
Press any key to continue...
```

Press any key. Then the sound is recorded for three seconds from the microphone. (The message similar to the one below appears.)

```
....Press test number[1-3] ? call micrec
DOS/4GW Protected Mode Run-time Version 2.01a
Copyright © Tenberry Software, Inc. 1996
STACWAVE Version 3.01
Build date: Dec 31 2002 at 13:22:33.
Found PCI Audio Device, vendor ID: 0x8086 device ID: 0x24c5
Recognized AC97 CODEC, vendorID1: 0x8384 vendorID2: 0x7650
RECORDING "mic.wav", channels: 1 bps 8 rate: 48000 Hz
DONE RECORDING.
Writing "mic.wav".
```

When the recording is completed, the computer plays back the sound recorded automatically. (The message similar to the one below appears.)

```
DOS/4GW Protected Mode Run-time Version 2.01a
Copyright © Tenberry Software, Inc. 1996
STACWAVE Version 3.01
Build date: Dec 31 2002 at 13:22:33.
Loading "mic.wav"
Found PCI Audio Device, vendor ID: 0x8086 device ID: 0x24c5
Recognized AC97 CODEC, vendorID1: 0x8384 vendorID2: 0x7650
Playing "mic.wav", channels: 1 bps 8 rate: 48000 Hz
```

When this subtest is completed, the screen returns to the main menu automatically.

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

Subtest 02   LAN

This subtest checks the operation of mini-PCI I/F by the loopback in the chip. Select **3** to execute and press **Enter**. The following message will appear:

```
[LAN transmit & receive test !]
                        COMPLETED  Repeat count  =     00000
                                   Error count   =     00000
LOOPBACK TEST
100Mbps Auto-negotiation TxRx Test
 Destination Address      = xxxxxxxxxxxx
 Source Address           = xxxxxxxxxxxx
   ** 100Base-TX Full-Duplex **
   < TRANSMIT >
   < RECEIVE >
```
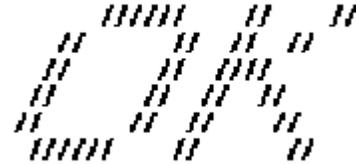
```
  ///// // //
 //  // // //
 //  // // //
 //  // // //
 //  // // //
 /////  // //
```

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

Check that the message "OK" appears.

Subtest 03   Modem

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

Select **4** to execute and press **Enter**. The 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
* Modem Sound Test             :(Operator's Check!!)
```

After a few seconds, the following message will appear:

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

If you hear the modem sound from the speakers, press **Y**, otherwise, press **N**.

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

After you press **Y** or **N**, the RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

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

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

3.27 IEEE1394 test program

This section describes how to perform the IEEE1394 test with the test program.

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

Toshiba MS-DOS is required to run the DIAGNOSTICS TEST PROGRAM. To start the DIAGNOSTIC TEST PROGRAM, follow these steps:

  (a) Insert the Diagnostics disk in the floppy disk drive and turn on the computer.
      (The Diagnostics Disk contains the MS-DOS boot files.)

The following menu will appear:

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

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

Subtest 01   Transmit & Receive test

            This program checks the data transporting between responder machine and target machine.

Subtest 02   Responder set

            This program initializes the machine responder.

Subtest 03   1394 GUID Display

            This program checks the GUID.

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1　General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card and optional SD card, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.

```
4.2  Battery Pack
4.3  PC card    4.4 SD card                          4.24 Display mask

4.5  HDD                   4.6 Optical drive          4.25 FL inverter
4.7  Memory module/MDC     4.8 Wireless LAN board     4.26 LCD module
                                                      4.27 Sensor/
4.9  Keyboard                                              Switch Board

4.10 Switch cover ASSY/Switch membrane               4.29 Fluorescent Lamp

4.11 Display assembly

4.12 TouchPad button   4.13 microphone   4.14 Touch pad
4.15 RTC battery   4.16 Sound board/Touch Pad holder
4.17 CD-key assembly

4.18 System board

4.19 CPU   4.20 Speaker

4.21 Fan    4.23 RGB board/Power board
4.22 USB board/DC-in jack/Network jack

4.28 LCD cable/Wireless LAN Antenna/Hinge
```

How to See the Chart

Two examples of referring to the chart are shown below.

•**Removing the Display assembly**

4.2 Battery to 4.10 Switch cover ASSY/Switch membrane must be removed.

```
                                                      4.24 Display mask

                                                      4.25 FL inverter
                                                      4.26 LCD module
                                                      4.27 Sensor/
                                                           Switch Board

                                                      4.29 Fluorescent Lamp

4.11 Display assembly

4.12 TouchPad button   4.13 microphone   4.14 Touch pad
4.15 RTC battery   4.16 Sound board/Touch Pad holder
4.17 CD-key assembly

4.18 System board

4.19 CPU   4.20 Speaker

4.21 Fan    4.23 RGB board/Power board
4.22 USB board/DC-in jack/Network jack

4.28 LCD cable/Wireless LAN Antenna/Hinge
```

Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

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

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

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

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

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

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

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

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

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

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

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

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.

2. Use only the correct and approved tools.

3. Make sure the working environment is free from the following elements whether you are using or storing the computer.

    *   Dust and contaminates
    *   Static electricity
    *   Extreme heat, cold and humidity

4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.

5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.

6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.

7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.

8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.

9. The computer contains many sharp edges and corners, so be careful not to injure yourself.

10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnector.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.

- Make sure all cables and connectors are securely fastened.

- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.

- Check that all latches are closed securely in place.

- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 point size 0 Phillips screwdriver to remove and replace screws.

- One M2.5/M3 point size 1 Phillips screwdriver to remove and replace screws.

- One 4 mm flat-blade screwdriver.

- Tweezers, to lift out screws that you cannot grasp with your fingers.

- ESD mats for the floor and the table you are working on.

- An ESD wrist strap or heel grounder.

- Anti-static carpeting or flooring.

- Air ionizers in highly static sensitive areas.

- Antenna coaxial cable disconnector

Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

> *CAUTION:*   *Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.*

> *NOTE:*   *Toshiba recommends that you use an electric screwdriver for quick and easy operations.*

- M2   0.17 N·m   (1.7 kgf·cm)

- M2.5   0.30 N·m   (3.0 kgf·cm)

- M3   0.57 N·m   (5.6 kgf·cm)

> *NOTE:*   *The computer contains several flat head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.*

Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- ❑   Even number length screw: brown

- ❑   Odd number length screw: white

- ❑   Special length screw: blue

 Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.

Marking of Screws on the Computer Body

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

Kind of screws	Symbol
❑ BIND screw	B
❑ FLAT HEAD screw	F
❑ SUPER FLAT HEAD screw	S
❑ TAPPING screw	T
❑ Other screws (Unique screws, STUD, etc.)	U

Examples:

- ❑   6 mm BIND screw   B6

- ❑   12 mm BIND screw   B12

- ❑   5 mm FLAT HEAD screw   F5

- ❑   (Indicates the screwed length in round number regardless the length of the stud.)

4.2   Battery Pack

Removing the Battery Pack

To remove the battery pack, follow the steps below and refer to figure 4-1.

CAUTION: *When handling battery packs, be careful not to short circuit the terminals.*
Also do not drop, hit or apply impact; do not scratch, break, twist or bend
the battery pack.

---

1. Turn off the computer.

2. Disconnect the AC cable and other external devices from the computer.

3. Turn the computer face down.

4. Release the **battery lock** while sliding the **battery latch**, pull out the **battery pack** to the arrow direction in the figure below.

NOTE: *For environmental reasons, do not throw away a spent battery pack. Collect the*
spent battery packs.
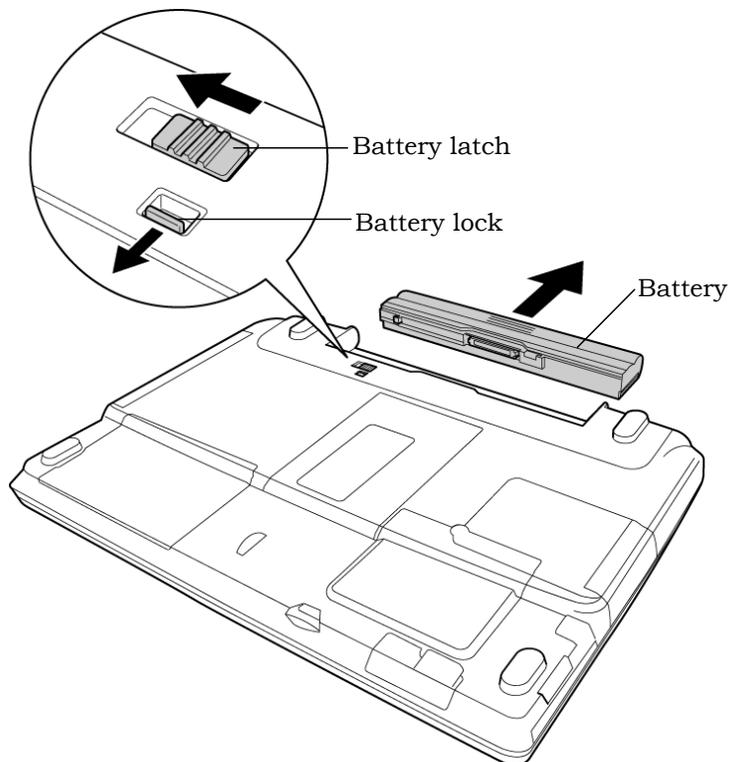
Figure 4-1   Removing the Battery pack

Installing the Battery Pack

To install the battery pack, follow the steps below and refer to figure 4-1.

CAUTION: *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba as replacements.*

NOTE: *Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.*

1. Push **the battery pack** into the battery slot. Make sure the battery pack is installed securely.

2. Slide the **battery lock** into the lock position.

4.3   PC Card

Removing the PC Card

To remove the PC card, follow the steps below and refer to figure 4-2.

> *CAUTION:* *Before you remove a PC card, refer to the card's documentation and your operating system documentation for proper procedures and precautions.*

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 pull it out.

PC card
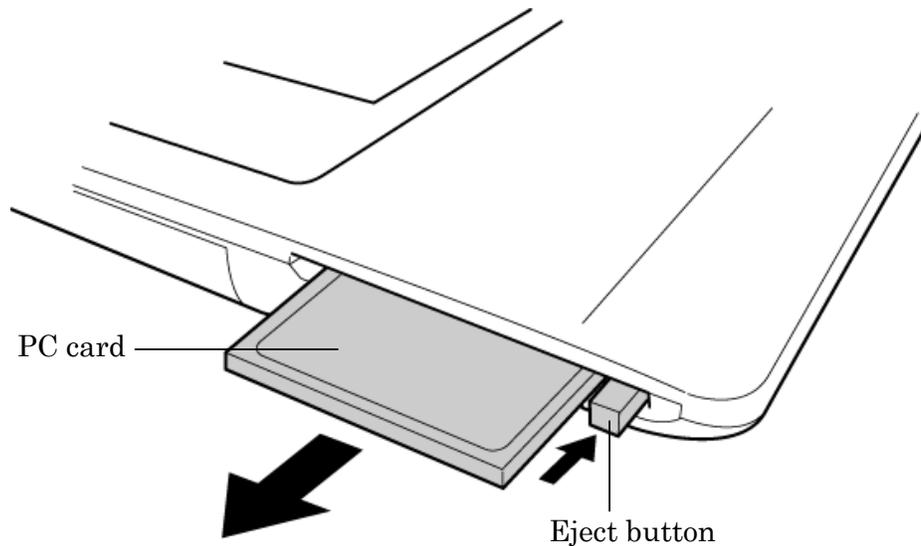
Eject button

Figure 4-2   Removing the PC card

Installing the PC Card

To install the PC card, follow the steps below and refer to figure 4-2.

    1. Make sure the **eject button** does not stick out.

    2. Insert the **PC card** and press it until it is securely connected.

4.4   SD Card

Removing the SD Card

To remove the SD card, follow the steps below and refer to figure 4-3.

CAUTION: *Before you remove the SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.*

1. Turn the computer face up.

2. Push the **SD card**. It will pop out partly when you release, so pull out the card.
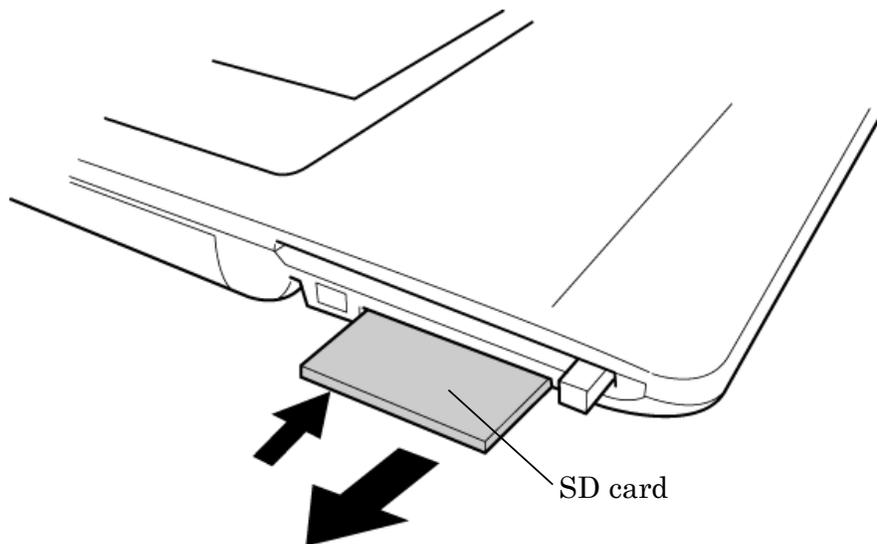
Figure 4-3 Removing the SD card

Installing the SD Card

To install the SD card, follow the steps below and refer to figure 4-3.

1. Insert the **SD card** and press it until it is securely connected.

4.5 HDD

CAUTION: *When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.*
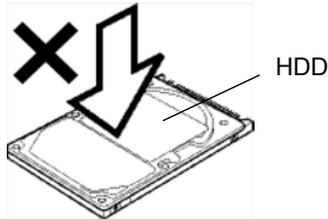
Removing the HDD

To remove the HDD, follow the steps below and refer to figures 4-4 and 4-5.

1. Turn the computer upside down.

2. Remove the following **screw** securing the HDD cover. Remove the **HDD cover** by lifting up.

   - M2.5×10B   FLAT HEAD screw   ×1
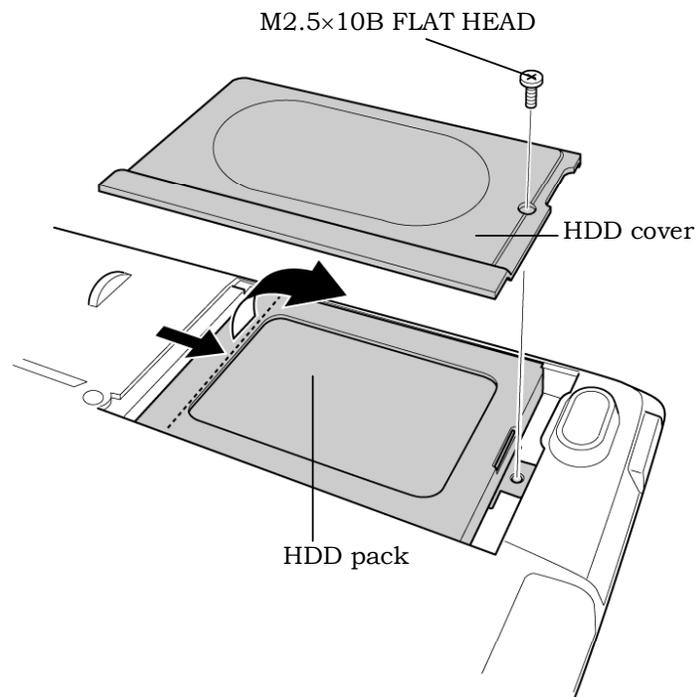
Figure 4-4   Removing the HDD cover

3. Push the tab of the **HDD pack** to the direction of the arrow and remove the HDD pack. Be careful not to damage the connector.

NOTE: *The following steps describe how to disassemble the HDD pack; however, do not disassemble if the HDD is working properly.*

---

4. Remove the following **screws**.

    - M3×4S   FLAT HEAD screw   ×4

5. Remove the **HDD bracket**.

CAUTION: *Do not apply pressure to the top or bottom of the HDD.*

---

6. Remove the **HDD** from the **aluminum laminate**.
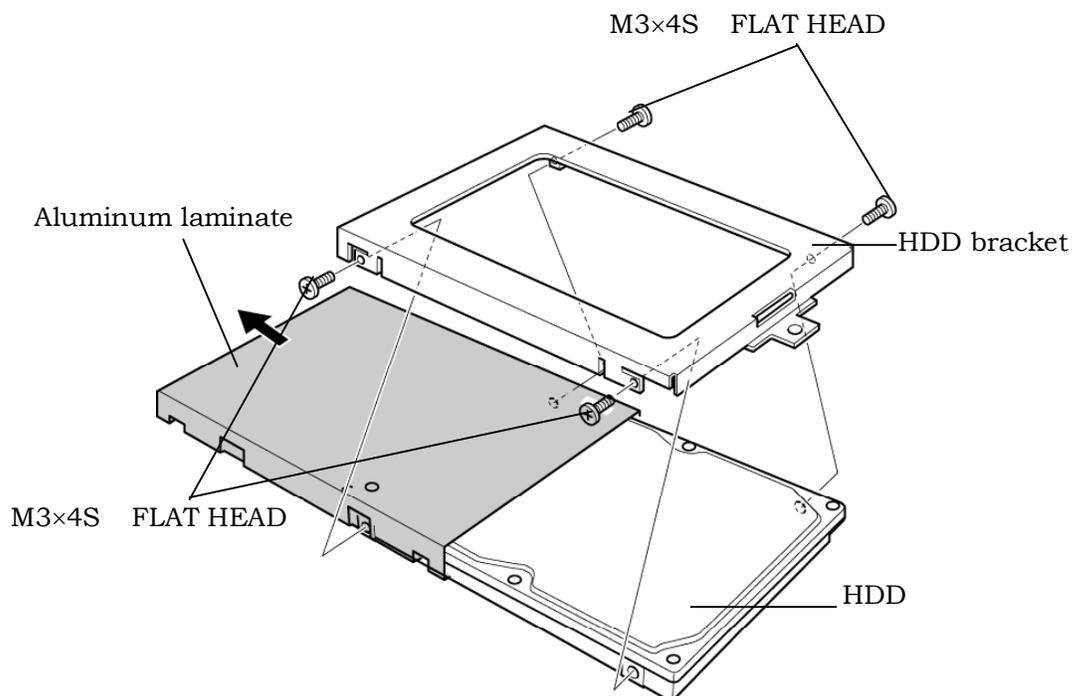
Figure 4-5   Removing the HDD bracket and HDD

Installing the HDD

To install the HDD, follow the steps below and refer to figures 4-4 and 4-5.

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

1. Install the **HDD** to the **aluminum laminate**.

2. Place the **HDD** in the bracket.

3. Secure the HDD to the HDD bracket with the following **screws**.

    - M3×4S   FLAT HEAD screw   ×4

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

4. Hold the **HDD pack** and place it in the slot. Slide the HDD pack to the connector of the computer to connect. Press to ensure a firm connection.

5. Seat the **HDD cover** and secure it with the following **screw**.

    - M2.5×10B   FLAT HEAD screw   ×1

4.6   Optical Drive

Removing the Optical Drive

To remove the optical drive, follow the steps below and refer to figures 4-6 and 4-7.

> *CAUTION:*   *Do not apply excessive force to the top of an optical drive.*

1. Remove the following screws securing the **optical drive**.

   - M2.5×4B   FLAT HEAD screw   ×2

2. Slide the optical drive outward to disconnect it from the connector **PJ1820** on the system board.
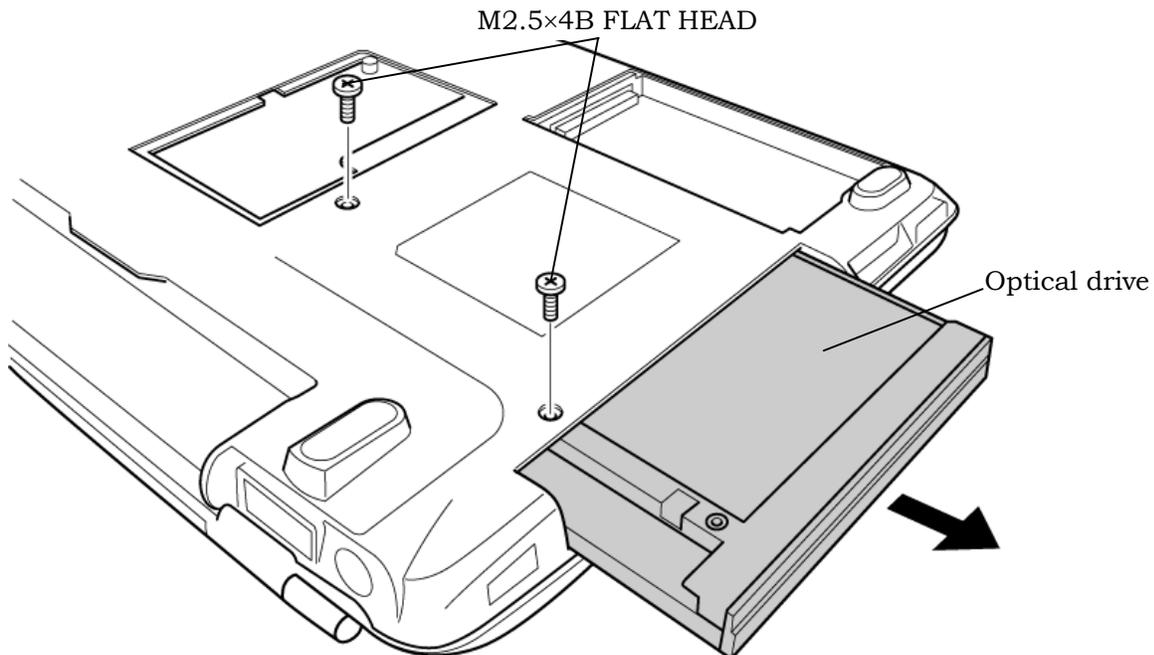
Figure 4-6   Removing the optical drive

3. Remove the following **screws** securing the **plastic frame**.

- M2×3C   S-FLAT HEAD screw   ×4
- Stepping screw   ×1

Optical Drive

Stepping screw

M2×3C S-FLAT HEAD

M2×3C S-FLAT HEAD
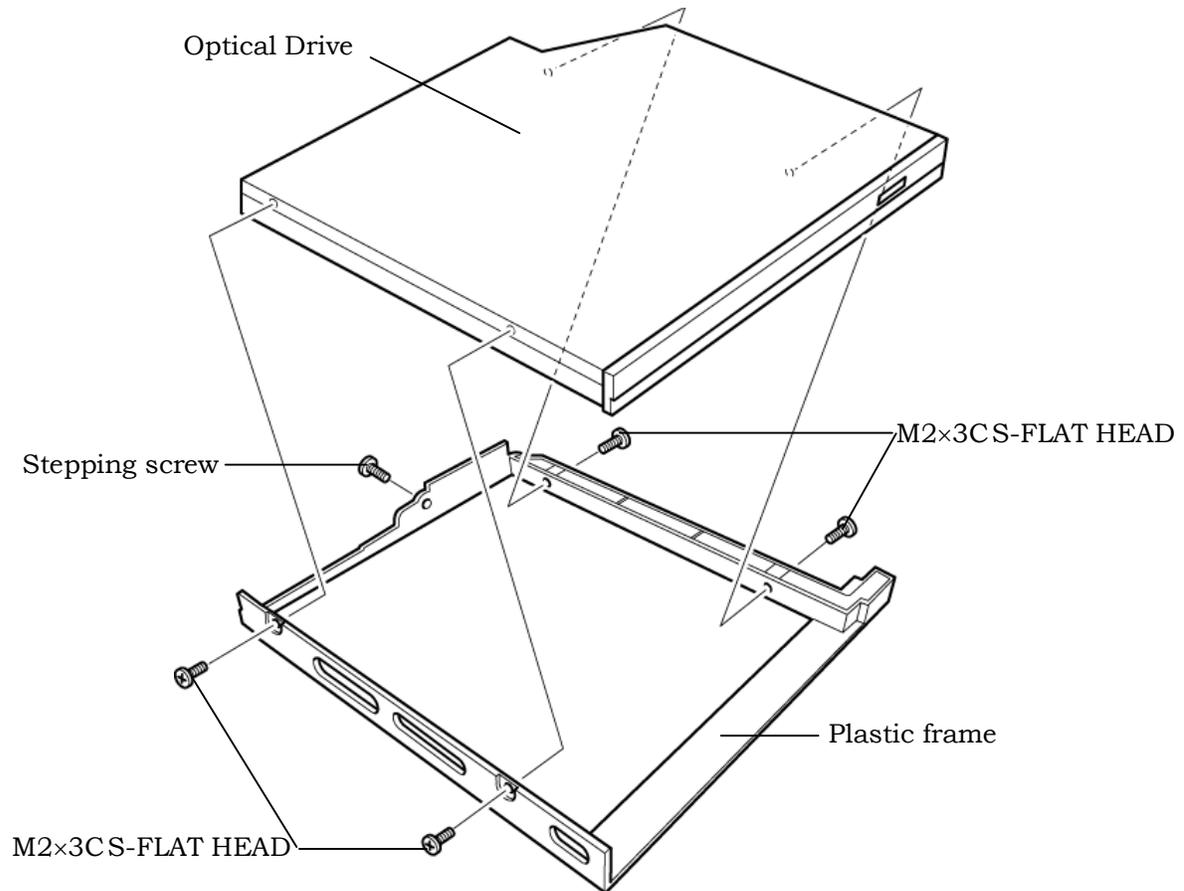
Plastic frame

Figure 4-7   Disassembling the optical drivel

Installing the Optical drive

To install the optical drive, follow the steps below and refer to figures 4-6 and 4-7.

1. Seat the **plastic frame** on the side of the optical drive, and secure it with the
    following s**crews**.

    *   M2×3C   S-FLAT HEAD screw   ×4

    *   Stepping screw   ×1

2. Slide the **optical drive** into the slot to connect it to the connector **PJ1820** on the
    system board.

3. Secure the optical drive with the following **screws**.

    *   M2.5×4B   FLAT HEAD screw   ×2

4.7   Memory module/ Modem Daughter Card

> *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.*

4.7.1 Memory module

Removing the memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedures (See Figure 4-8).

1.   Turn the computer upside down.

2.   Loosen the **screw** (e-ring) fixing the **memory slot cover**.

3.   Remove the **memory slot cover**.

4.   Open the left and right **latches** and remove the **memory module**.
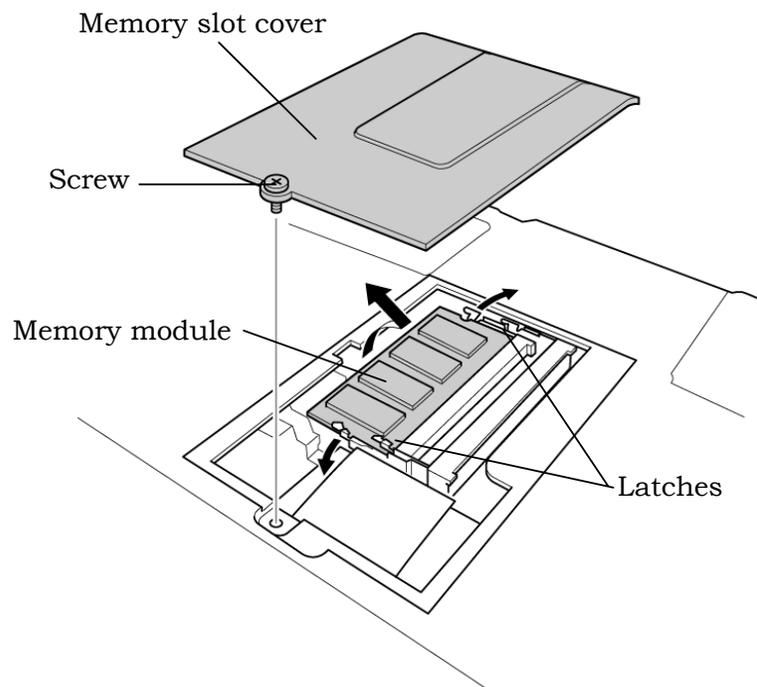
Figure 4-8 Removing the memory module

Installing the memory module

To install the memory module, confirm that the computer is in boot mode. Then follow the steps below and refer to figures 4-8.

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

CAUTION: *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.*

                Never press hard or bend the memory module.

---

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

4.7.2 Modem Daughter Card

Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to figure 4-9.

1. Remove the following **screws** securing the modem daughter card.

    - M2×4B   BIND screw   ×2

2. Lift up the **modem daughter card** to disconnect it from the connector **PJ3000** on the system board.

4. Disconnect the **modem cable** from **CN1** on the modem daughter card.
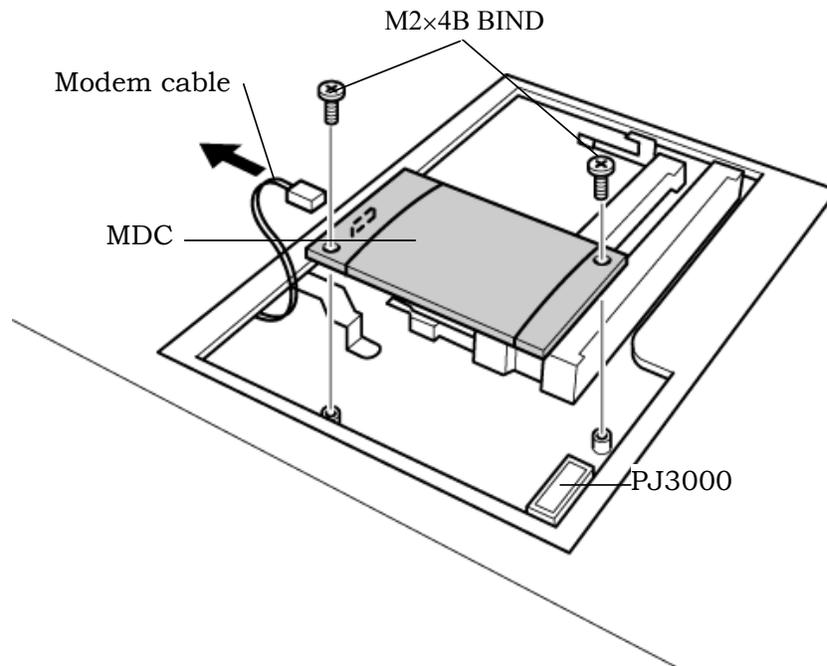
Figure 4-9   Removing the modem daughter card

Installing the Modem Daughter Card

To install the modem daughter card, follow the steps below and refer to figures 4-9.

1. Connect the **modem cable** to **CN1** on the modem daughter card.

2. Connect the **modem daughter card** to the connector **PJ3000** on the system board.

> *CAUTION:* *Be careful not to damage the card or connector.*

3. Secure the modem daughter card with the following **screws**.

    * M2×4B   BIND screw   ×2

4. Place the **memory slot cover** and secure it with the **screw** (e-ring).

4.8   Wireless LAN board

> ***CAUTION:*** *The power must be turned off when you remove the wireless LAN board. Removing the wireless LAN board with the power on risks damaging the card or the computer itself.*
>
> *Never press hard or bend the wireless LAN board.*

Removing the wireless LAN board

To remove the wireless LAN board, follow the steps below and refer to figure 4-10.

1. Turn the computer upside down.

2. Loosen the **screw** fixing the **wireless LAN board cover**.

    - M2×4B   BIND screw   ×1
            Or
    - M2×4   LH STICK screw   ×1

3. Peel off the **glass tape** and disconnect the two **wireless LAN antenna cables** (black and white) from the wireless LAN board.

4. Open the left and right latches holding the **wireless LAN board** and remove it.
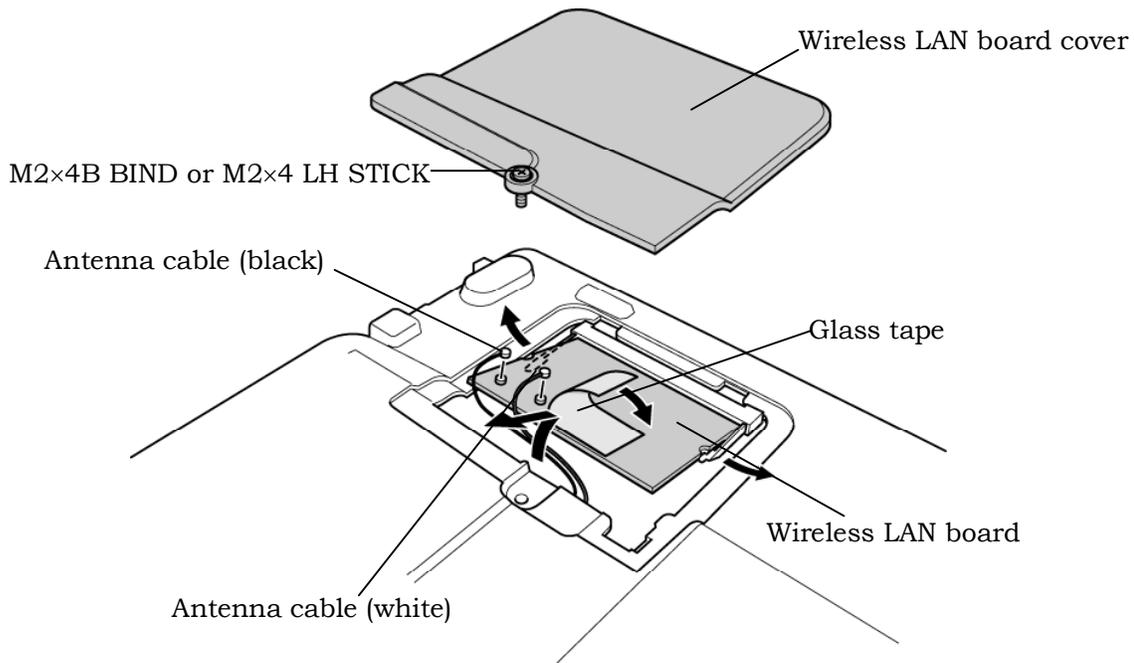
Figure 4-10   Removing the wireless LAN board

Installing the wireless LAN board

To install the wireless LAN board, follow the steps below and refer to figure 4-10.

1. Insert the **wireless LAN board** terminals slantwise into the connector on the computer and press the wireless LAN board until it is securely in place.

2. Connect the **wireless LAN cables** (black and white) to the terminals on the wireless LAN board and fix them with the **glass tape**.

3. Place the **wireless LAN board cover** and secure it with the following **screw**.

    *   M2×4B   BIND screw   ×1

                 Or

    *   M2×4   LH STICK screw   ×1

4.9   Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to figures 4-11 to 4-12.

1. Turn the computer face up and open the display panel.

2. Insert your finger into the latches between the keyboard brace and the computer, and lift up the **keyboard brace** to unlatch and remove it.

3. Remove the following **screw** securing the keyboard and keyboard hold plates. Then remove the **keyboard hold plate**.

    - M2×4B   BIND screw   ×1
                    Or
    - M2×4   LH STICK screw   ×1
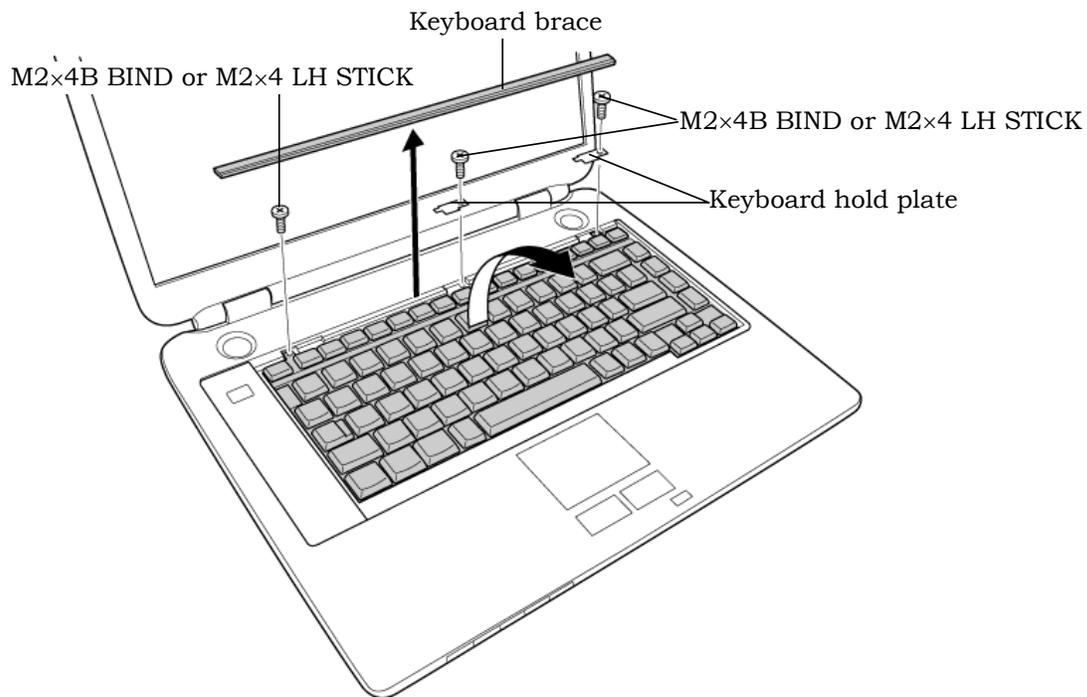
Figure 4-11   Removing the keyboard brace and keyboard hold plate

4. Lift the upper side of the **keyboard** out and turn it's face down on the palm rest.

5. Remove the following **screw** securing the **keyboard support plate** and remove the keyboard support plate.

   - M2.5×8B   FLAT HEAD screw   ×1
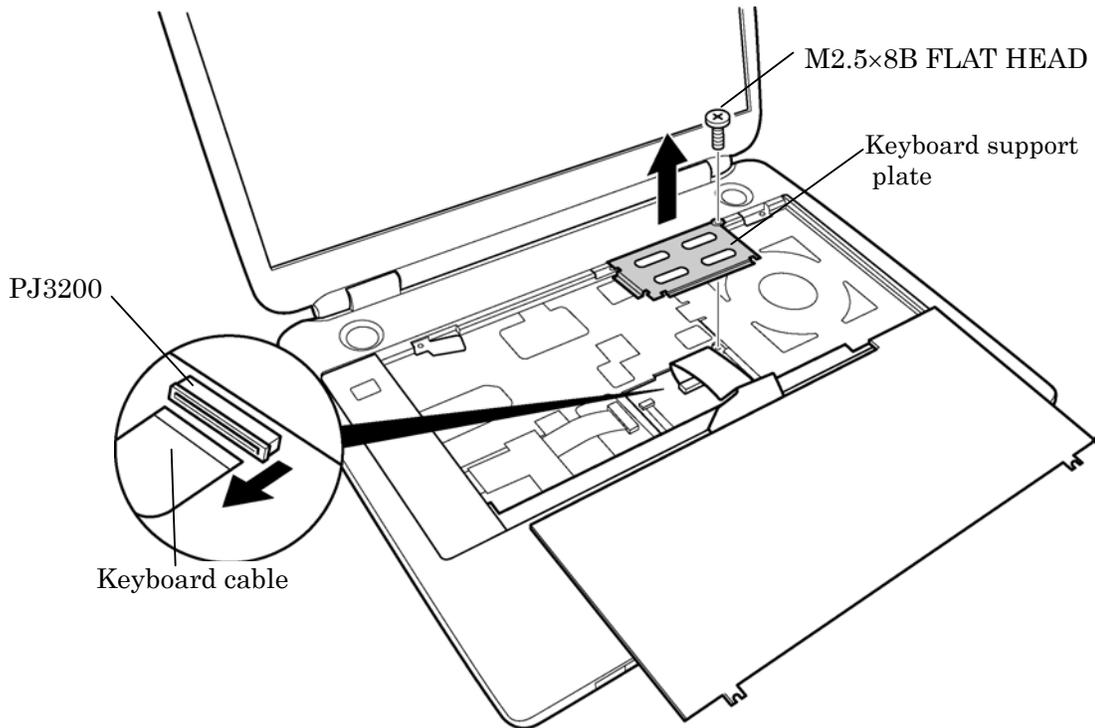
Figure 4-12   Removing the keyboard support plate

7. Disconnect the **keyboard cable** from the connector **PJ3200** on the system board, and remove the keyboard.

Installing the Keyboard

To install the keyboard, follow the steps below and refer to figures 4-11 to 4-12.

1. Place the keyboard face down on the palm rest.

2. Connect the **keyboard cable** to the connector **PJ3200** on the system board.

3. Place the **keyboard support plate** and secure it with the following **screw**.

   - M2.5×8B FLAT HEAD screw   ×1

4. Turn the keyboard face up and put it on the computer. Make sure that there is no gap between the keyboard and the computer.

5. Place the **keyboard hold plates** on the keyboard. Then secure the **keyboard hold plates** and the **keyboard** with the following **screws**.

   - M2×4B   BIND screw   ×2
                Or
   - M2×4   LH STICK screw   ×2

6. Install the **keyboard brace** by pressing it from the topside.

4.10 Switch cover ASSY/Switch membrane

Removing the Switch cover ASSY/Switch membrane

To remove the Switch cover ASSY/Switch membrane, follow the steps below and refer to figure 4-13 and 4-14.

1. Remove the **switch cover ASSY** by lifting the left side up, while releasing the latches.
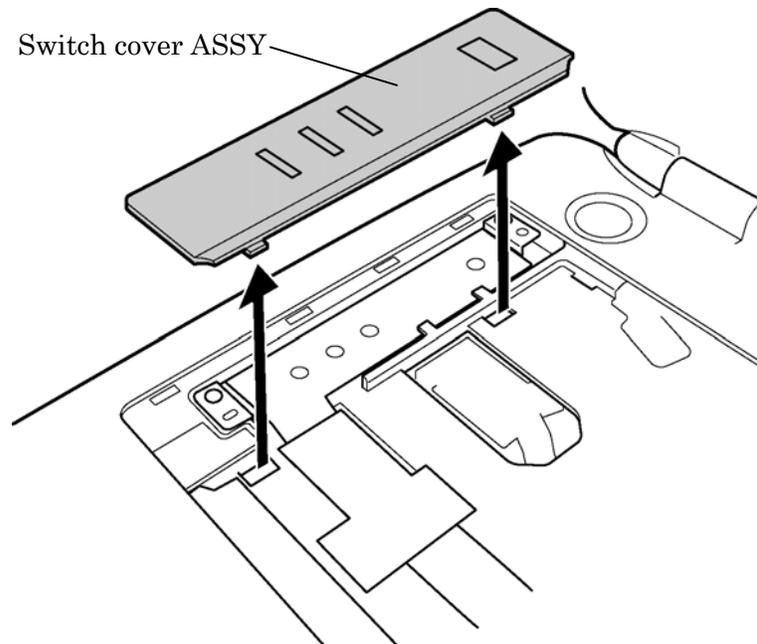
Figure 4-13   Removing the switch cover ASSY

2. Pull up the **insulator**.

3. Disconnect the **switch membrane cable** from the connector **PJ7001** on the system board.

4. Remove the following **screws** fixing the **switch membrane**.

    *   M2.5×4B FLAT HEAD screen   ×2

5. Remove the **switch membrane** by lifting up the left side of the switch membrane.
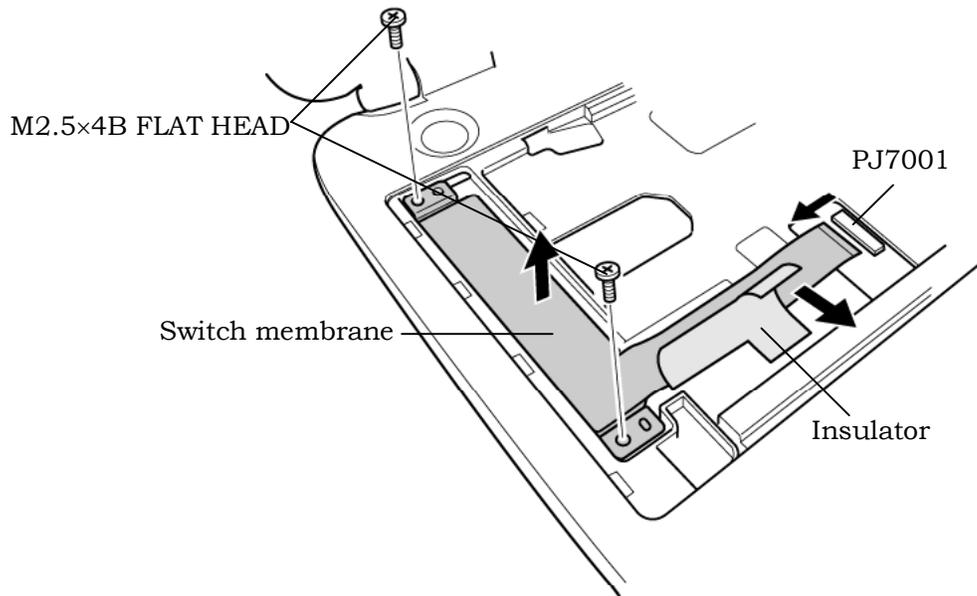
Figure 4-14   Removing the switch membrane

Installing the Switch cover ASSY/Switch membrane

To install the Switch cover ASSY/Switch membrane, follow the steps below and refer to figure 4-13 and 4-14.

1. Place the **switch membrane** with the right side under the guides and secure it with the following **screws**.

    - M2.5×4B FLAT HEAD screw   ×2

2. Connect the **switch membrane cable** to the connector **PJ7001** on the system board.

3. Stick the **insulator** to fix the switch membrane.

4. Install the **switch cover ASSY** and engage the right-side latches.

4.11 Display Assembly

Removing the Display Assembly

To remove the display assembly, follow the steps below and refer to figures
4-15 to 4-17.

1. Turn the computer face down, and remove the following **screws**.

    - M2.5×16B   FLAT HEAD screw   ×8 ("16" in the figure below)
    - M2.5×10B   FLAT HEAD screw   ×8 ("10" in the figure below)
    - M2×6B   BIND screw   ×2 ("6" in the figure below)
    - M2×4B   S-FLAT HEAD screw   ×1 ("4" in the figure below)
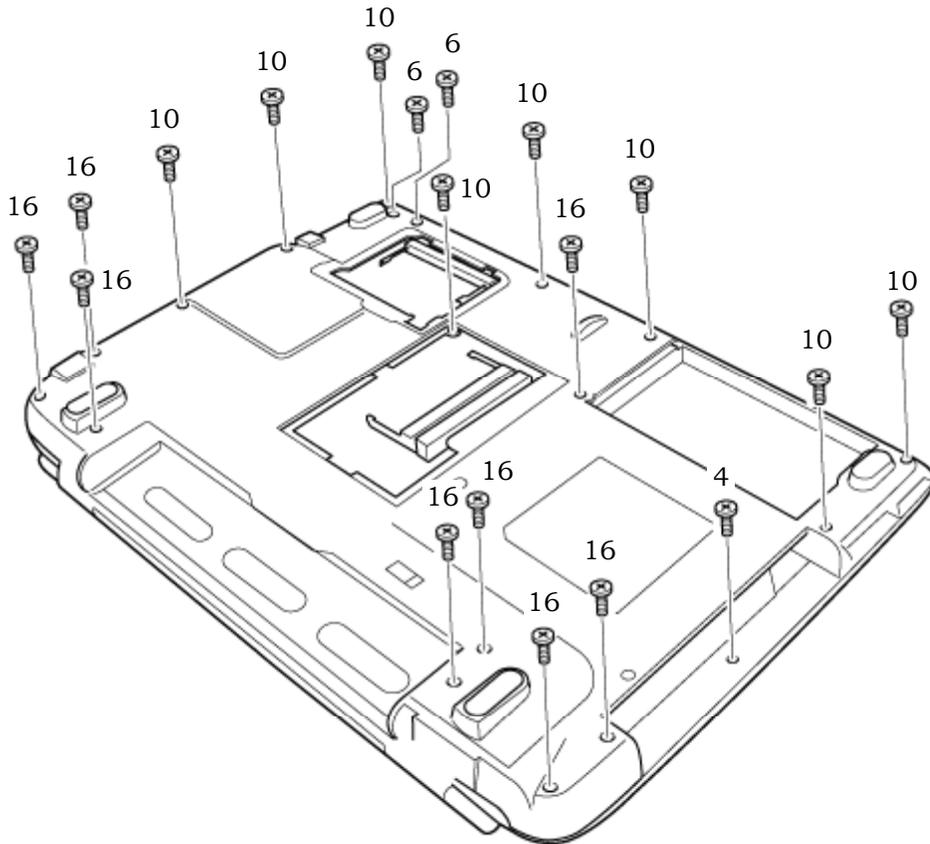
Figure 4-15   Removing the display assembly (1)

2. Turn the computer face up and open the display panel.

3. Remove the following **screws** securing the display assembly.

    - M2.5×6B FLAT HEAD screw   ×3
    - M2.5×8B FLAT HEAD screw   ×1

4. Disconnect the **LCD cable** from the connector **PJ5600** on the system board.

5. Disconnect the two **wireless LAN cables** from the connectors, white and black on the power board.

6. Disconnect the **internal microphone cable** from the connector **PJ6001** on the system board.

7. Disconnect the **panel switch cable** from the connector **PJ7004** on the system board.
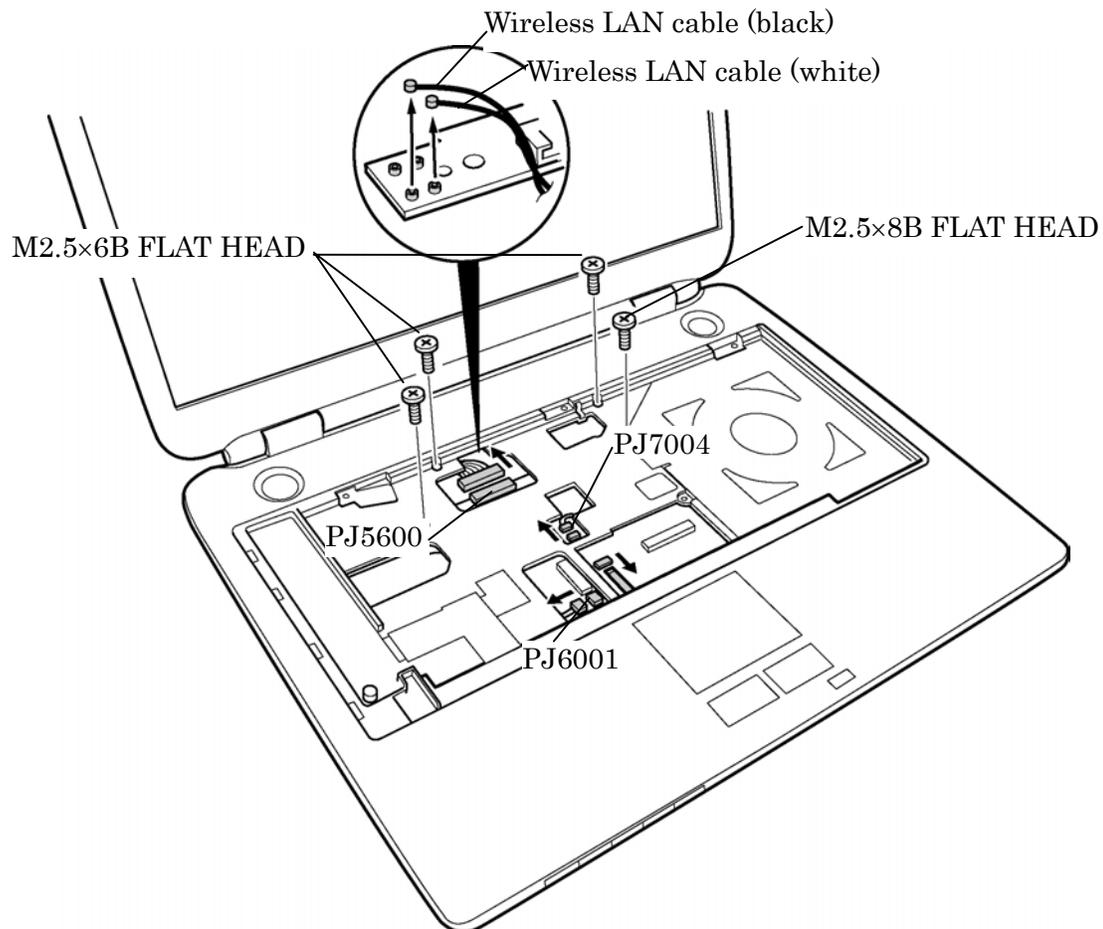
Figure 4-16   Removing the display assembly (2)

8. Remove the **display assembly** from the base assembly.
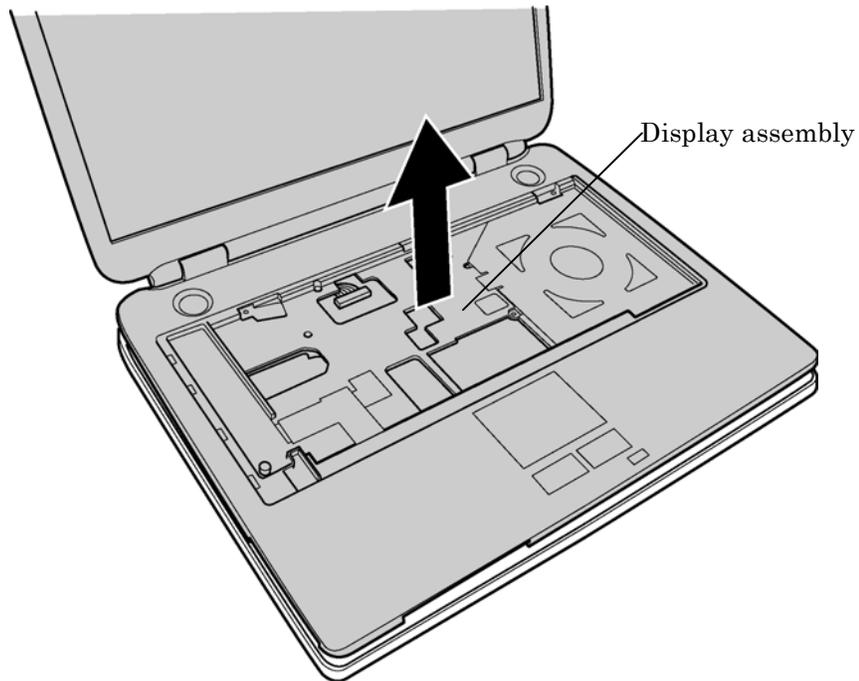
Display assembly

Figure 4-17   Removing the display assembly (3)

NOTE: When removing the display assembly, be careful not to damage any cables.

Installing the Display Assembly

To install the display assembly, follow the steps below and refer to figures 4-15 to 4-17.

1. Install the **display assembly** on the base assembly.

NOTE: *When installing the display assembly, be careful not to pinch or damage any cables.*

---

2. Press along the edges of the display assembly to secure the latches.

3. Connect the **panel switch cable** to the connector **PJ7004** on the system board.

4. Connect the **internal microphone cable** to the connector **PJ6001** on the system board.

5. Connect the **LCD cable** to the connector **PJ5600** on the system board.

6. Connect the two **wireless LAN cables** to the connectors, white and black on the power board.

7. Secure the display assembly with the following **screws**.

    - M2.5×6B FLAT HEAD screw   ×3
    - M2.5×8B FLAT HEAD screw   ×1

8. Turn the computer face down and secure the display assembly with the following **screws**.

    - M2.5×16B   FLAT HEAD screw   ×8
    - M2.5×10B   FLAT HEAD screw   ×8
    - M2×6B   BIND screw   ×2
    - M2×4B   S-FLAT HEAD screw   ×1

4.12 Touch Pad Button

Removing the Touch Pad Button

To remove the touch pad button, follow the steps below and refer to figure 4-18.

1. Remove the following **screws** fixing the touch pad button.

   - M2.5×4   Tapping screw   ×3

2. Remove the **touch pad button**.
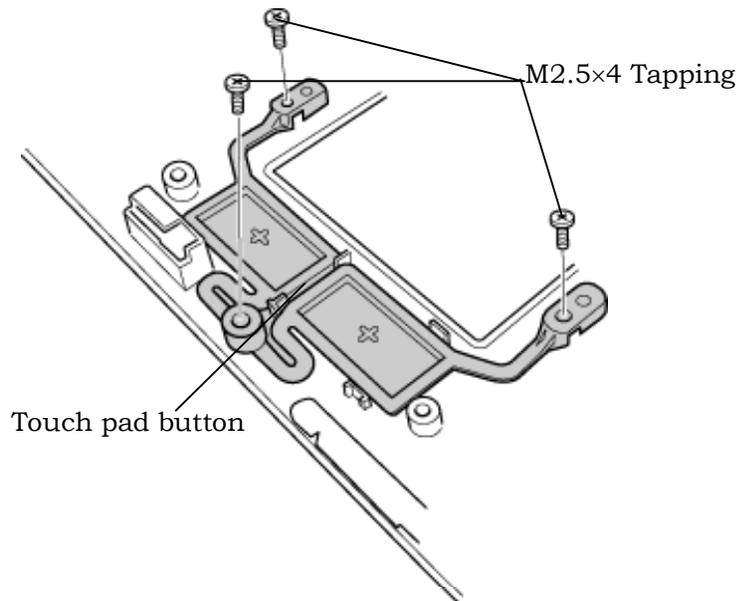
Figure 4-18   Removing the touch pad button

Installing the Touch Pad Button

To installing the touch pad button, follow the steps below and refer to figure 4-18.

1. Install the **touch pad button** and fix it with the following **screws**.

   - M2.5×4   Tapping screw   ×3

4.13 Microphone

Removing the Microphone

To remove the Microphone, follow the steps below and refer to figures 4-19 and 20.

1. Remove the **microphon**e from the guide.
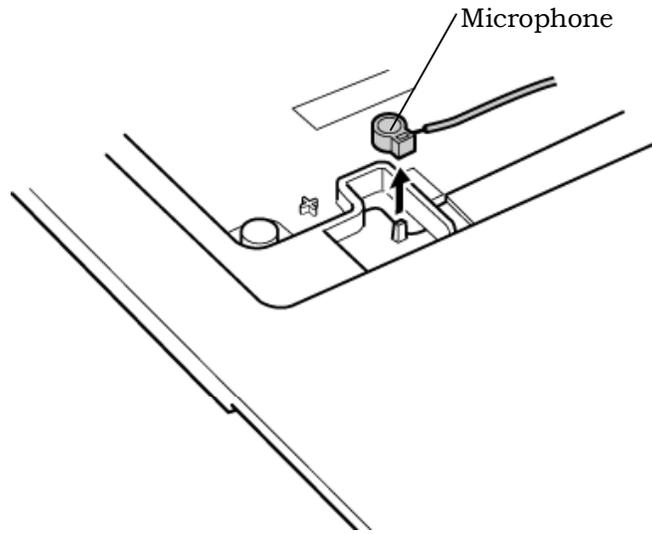
Figure 4-19   Removing the microphone

2. Peel the **insulator** on the back and remove the microphone cable from the guide.

3. Remove the **microphone** (with cable) through the hole to the front.
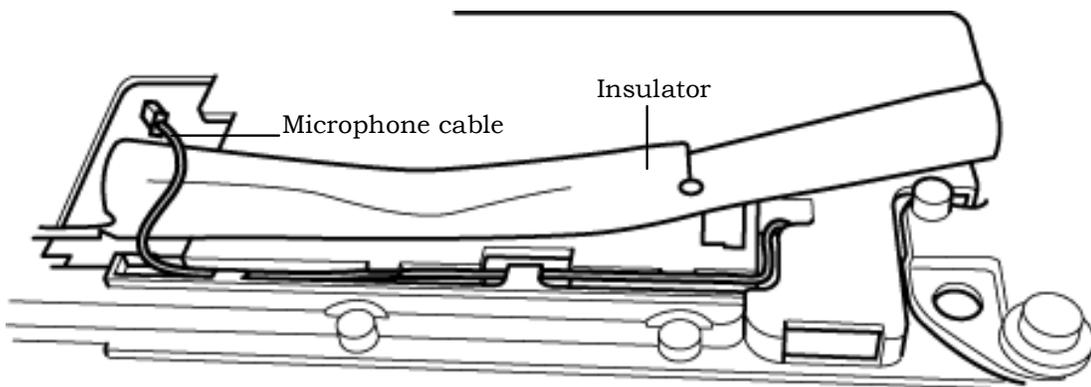
Figure 4-20   Removing the microphone cable

Installing the Microphone

To install the Microphone, follow the steps below and refer to figures 4-19 and 20.

1. Pass the **microphone cable** from the front to the back.

2. Set the **microphone**, putting the hole in the guide.

3. Pass the **microphone cable** through the slot with guides.

4.14 Touch Pad

Removing the Touch Pad

To remove the touch pad, follow the steps below and refer to figures 4-21.

1. Disconnect the **touch pad flexible cable** from the connector **PJ3201** on the system board.

2. Remove the following **screws** securing the touch pad.

   - M2.5×8B   FLAT HEAD screw   ×1
   - M2.5×4B   FLAT HEAD screw   ×1

3. Remove the **touch pad**.
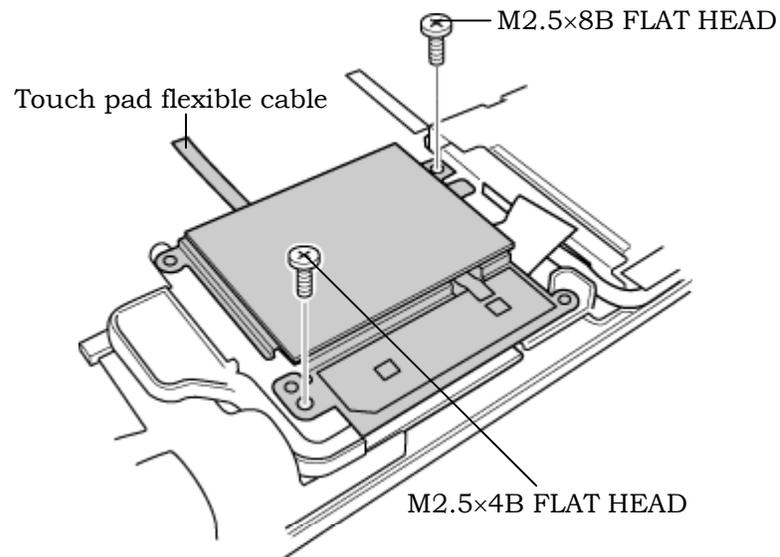
Figure 4-21   Removing the touch pad

4. Disconnect the **touch pad flexible cable** from the connector on the touch pad.

Installing the Touch Pad

To install the touch pad, follow the steps below and refer to figures 4-21.

1. Connect the **touch pad flexible cable** to the connector on the touch pad.

2. Install the **touch pad** and secure it with the following **screws**.

    *   M2.5×8B   FLAT HEAD screw   ×1
    *   M2.5×4B   FLAT HEAD screw   ×1

3. Connect the **touch pad flexible cable** to the connector **PJ3201** on the system board.

4.15 RTC Battery

WARNING: *When replacing the RTC battery, be sure to use genuine batteries or replacement batteries authorized by Toshiba. Installing the wrong battery could cause a battery explosion or other damage.*

If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.

Check for any of the following signs of damage:

1)   Electrolyte leakage

- *Corrosion (greenish color) on the battery connector or cable*
- *Corrosion on the computer's battery connector*
- *White powder on any part of the battery*
- *White powder in the battery tray*
- *Clear liquid on the battery*
- *Clear liquid in the battery tray*
- *Clear liquid on any board near the battery*

2)   Damage to the connection cable

3)   Damage to the connector housing

If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC Battery

To remove the RTC battery, follow the steps below and refer to figure 4-22.

1. Peel off the **insulator**.

2. Disconnect the **RTC battery cable** from the connector **PJ8490** on the system board.

3. Remove the **RTC battery**.
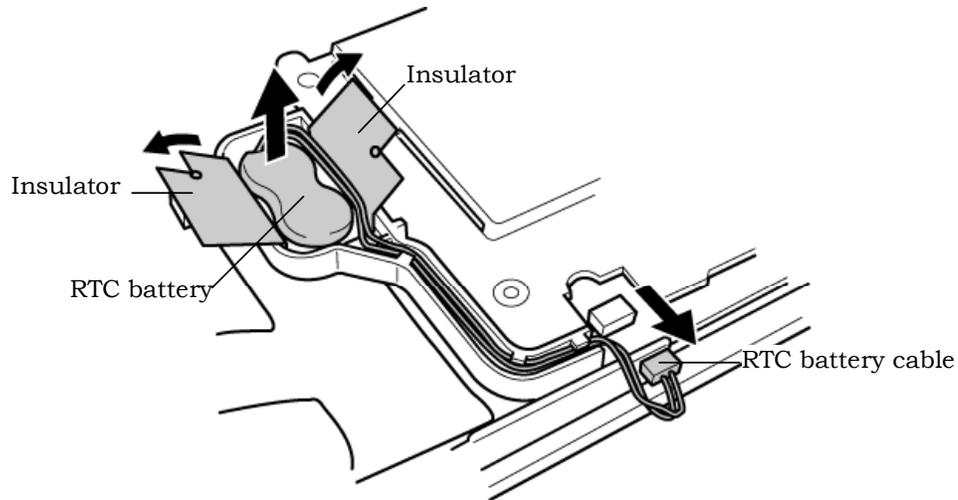
Figure 4-22   Removing the RTC battery

Installing the RTC Battery

To install the RTC battery, follow the steps below and refer to figure 4-22.

1. Place the **RTC battery** into the slot.

2. Pass the RTC battery cable through the battery guide and connect the **RTC battery cable** to the connector **PJ8490** on the system board.

3. Fix the **RTC battery** with the **insulator**.

4.16 Sound Board/Touch Pad holder

4.16.1 Sound Board

Removing the Sound Board

To remove the sound board, follow the steps below and refer to figure 4-23.

1. Remove the following **screw** and the **sound board**.

   - M2.5×6B   FLAT HEAD screw   ×1

2. Disconnect the **sound board I/F cable** from the connector on the sound board.

3. Peel the **insulator**.
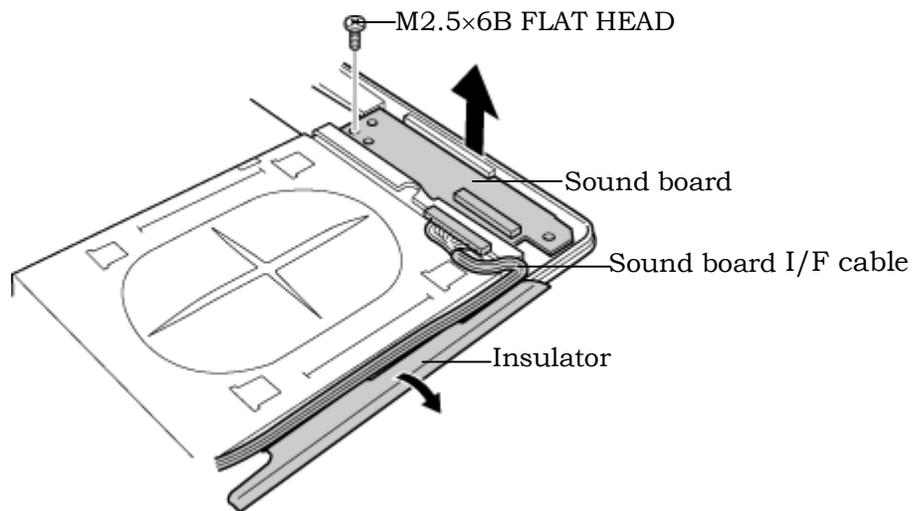
Figure 4-23   Removing the sound board

Installing the Sound Board

To install the sound board, follow the steps below and refer to figure 4-23.

1. Connect the **sound board I/F cable** to the connector on the sound board and secure it with the **insulator**.

2. Install the **sound board** from the side with jacks and secure it with the following **screw**.

    - M2.5×6B   FLAT HEAD screw   ×1

4.16.2 Touch Pad holder

Removing the Touch Pad holder

To remove the touch pad holder, follow the steps below and refer to figures 4-24.

1. Disconnect the **sound board I/F cable** from the connector **PJ7002** on the system board.

2. Remove the **touch pad holder** from the system board.
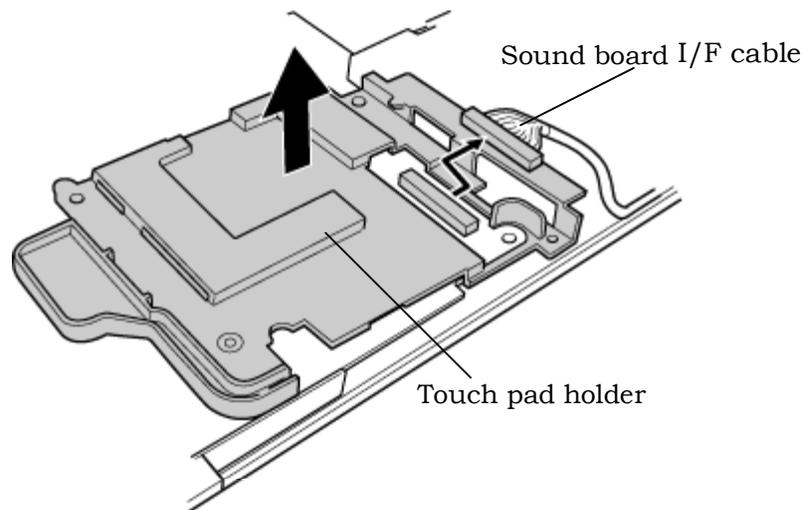
Figure 4-24   Removing the touch pad holder

Installing the Touch Pad holder

To install the touch pad holder, follow the steps below and refer to figures 4-24.

1. Install the **touch pad holder** on the system board.

2. Connect the **sound board I/F cable** to the connector **PJ7002** on the system board.

4.17 CD-Key assembly

Removing the CD-Key assembly

To remove the CD-key assembly, follow the steps below and refer to figures 4-25.

1. Disconnect the **CD-key flexible cable** from the connector **PJ7000** on the system board.

2. Remove the following **screw** and the **CD-key assembly**.

   - M2×4B   BIND screw   ×1
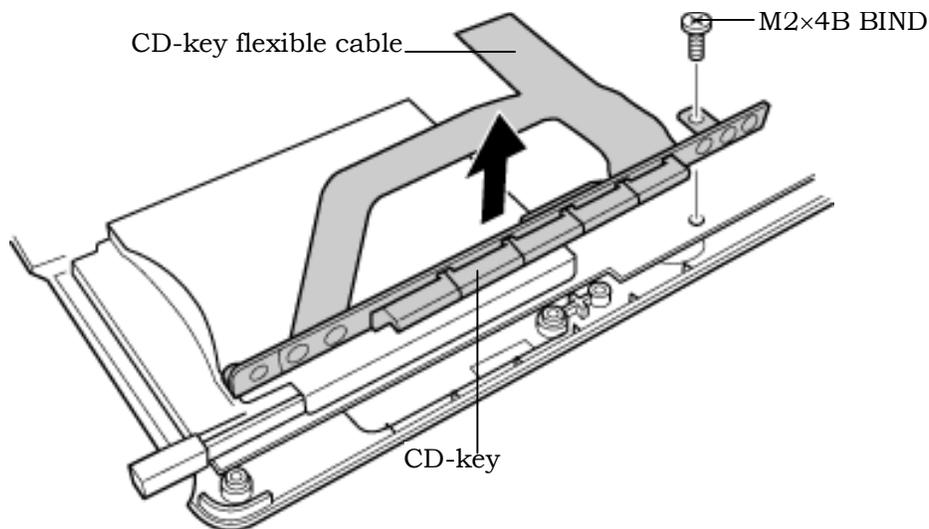
Figure 4-25   Removing the CD-key assembly

Installing the CD-Key assembly

To install the CD-key assembly, follow the steps below and refer to figures 4-25.

1. Place the **CD-key assembly** and secure it with the following **screw**.

   - M2×4B   BIND screw   ×1

2. Connect the **CD-key flexible cable** to the connector **PJ7000** on the system board.

4.18 System Board

Removing the System Board

To remove the system board, follow the steps below and refer to figures 4-26 and 4-27.

1. Peel off the **glass tape** and disconnect the **RGB cable** from the connector **PJ5621** on the system board.

2. Disconnect the **speaker cables** from the connectors **PJ6003** (red) and **PJ6004** (blue) on the system board.

3. Disconnect the **USB cable** from the connector **PJ7003** on the system board.

4. Peel off the **glass tapes** and disconnect the **battery cable** from the connector **PJ8810** and the **network cable** from the connector **PJ4100**on the system board.

5. Disconnect the **fan cable** from the connector **PJ8770** on the system board and the **power cable** from the connector **CN3** on the power board.

6. Peel off the **glass tape** and disconnect the **USB cable** from the connector **PJ7005** on the system board.(VRAM64 only)
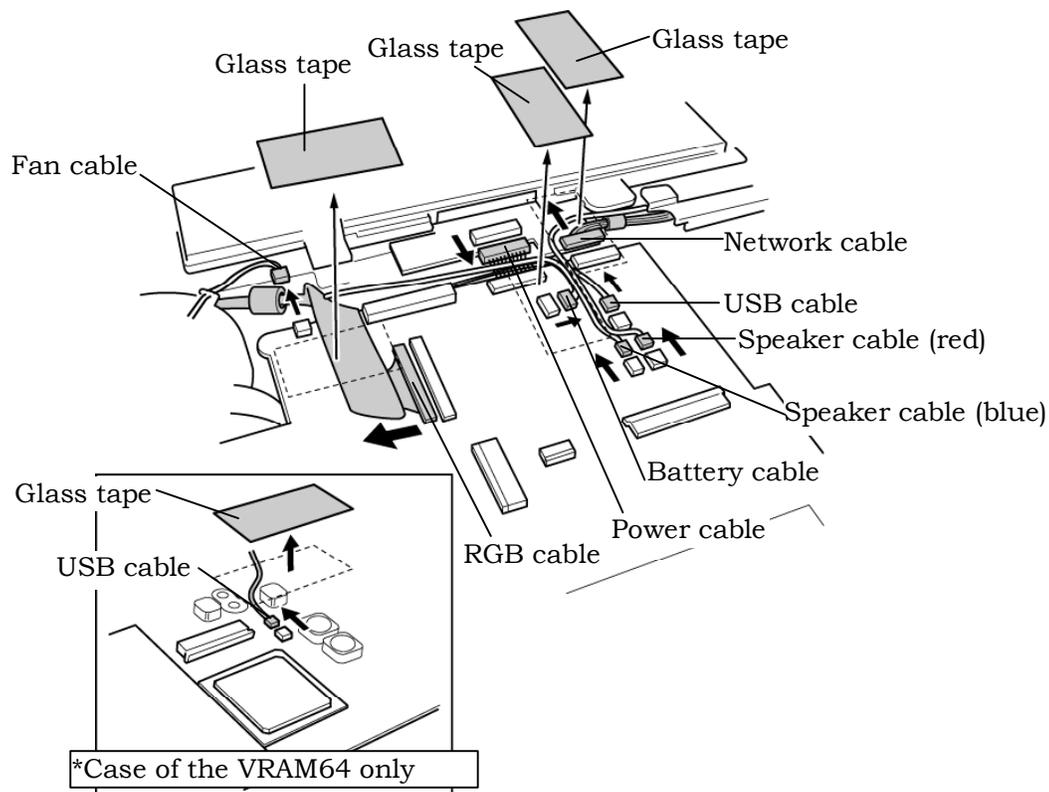
Figure 4-26   Removing the system board (1)

7. Remove the following **screws** securing the system board.

- M2.5×6B FLAT HEAD screw   ×1

8. Lift up the right side of the **system board** and remove it.
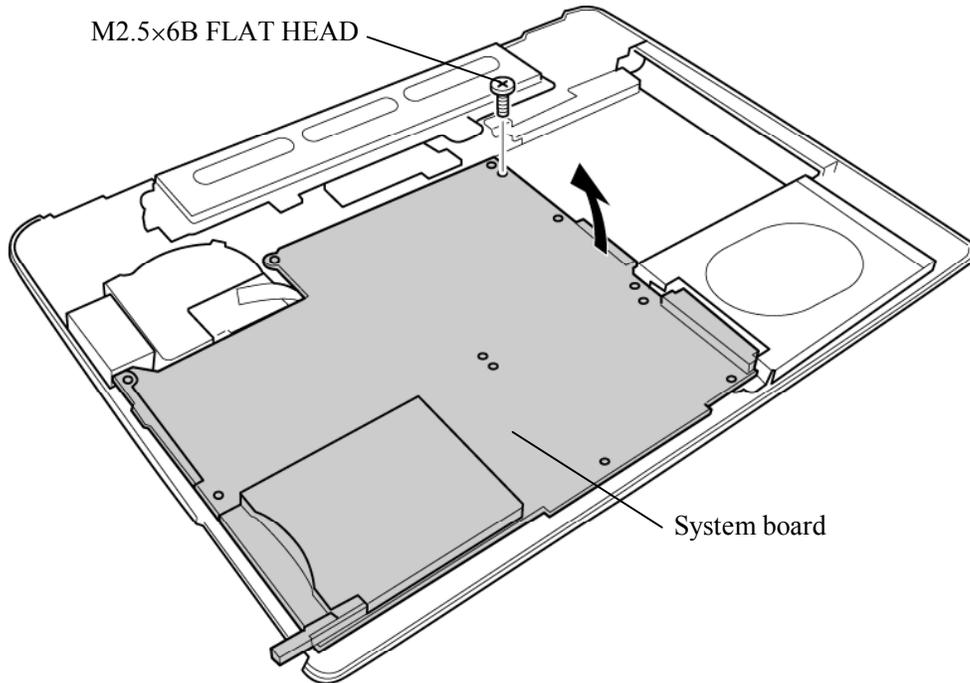
Figure 4-27   Removing the system board (2)

Installing the System Board

To install the system board, follow the steps below and refer to figures 4-26 and 27.

1. Install the **system board** from the left side.

NOTE: *When installing the system board, be careful not to pinch or damage the USB cable, RGB cable, battery cable speaker cable, network cable, fan cable or power cable.*

---

2. Secure the system board with the following **screws**.

   - M2.5×6B   FLAT HEAD screw   ×1

3. Connect the **USB cable** to the connector **PJ7005** on the system board and stick the **glass tape**.(VRAM64 only)

4. Connect the **fan cable** to the connector **PJ8770** on the system board.

5. Connect the **RGB cable** to the connector **PJ5621** on the system board and stick the **glass tape**.

6. Connect the **battery cable** to the connector **PJ8810** on the system board.

7. Connect the **power cable** to the connector **CN3** on the power board.

8. Connect the **USB cable** to the connector **PJ7003** on the system board.

9. Connect the **speaker cables** to the connectors **PJ6003** and **PJ6004** on the system board.

10. Connect the **network cable** to the connector **PJ4100** on the system board and stick the **glass tapes**.

4.19 CPU

Removing the CPU

To remove the CPU, follow the steps below and refer to figures 4-28 and 4-29.

CAUTION: *1) The CPU can become very hot during operation. Be sure to let it cool before starting repair work.*

                 2) When you remove the CPU, wipe the grease off of the bottom of the fin and top of the CPU. Apply new grease when installing.

---

1. Remove the following **screws** securing the CPU holder, in the reverse order of the number marked on the holder.

   - M2×4B   BIND screw   ×3

2. Remove the **CPU holder**.

3. Remove the **fin**.

CAUTION: *Silicon grease is applied between the fin and the CPU. When removing the fin, be careful not to damage the CPU under the fin.*
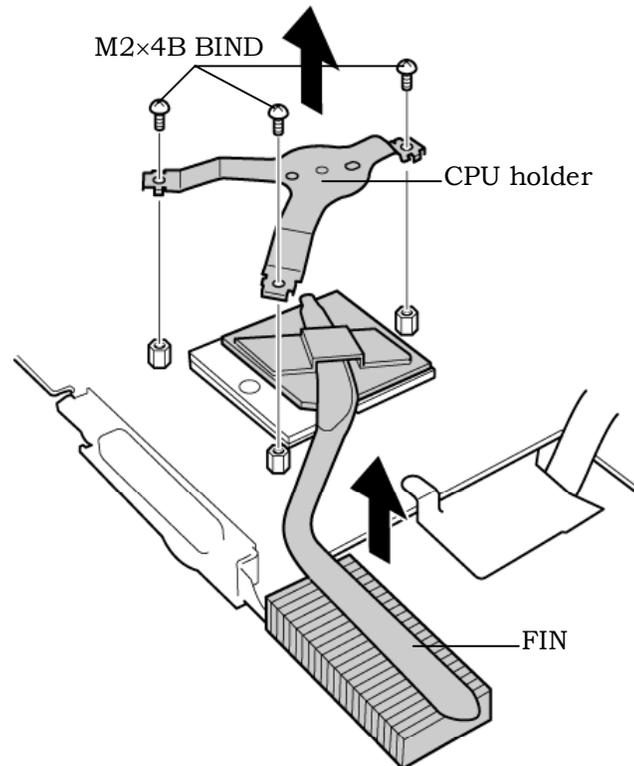
Figure4-28   Removing the CPU holder and fin

4. Unlock the **CPU** by rotating the **cam** on the CPU socket 180 degrees counterclockwise with a flat-blade screwdriver (in the order shown in the figure below).

5. Remove the **CPU.**
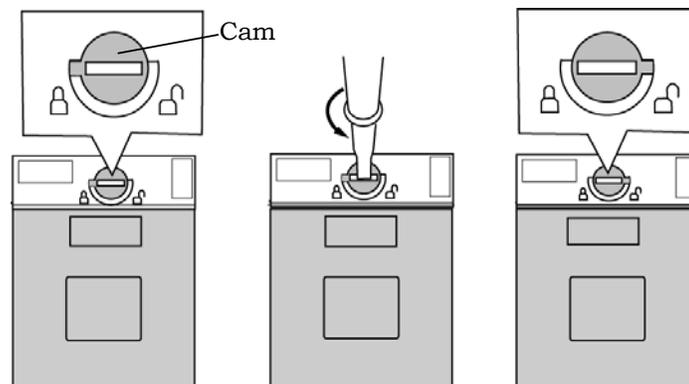
Figure 4-29   Unlocking the CPU

Installing the CPU

To install the CPU, follow the steps below and refer to figures 4-28 to 4-30.

1. Make sure the cam is in the open position.

2. Seat the **CPU** in the CPU socket. Make sure the position is exact to avoid damaging pins on the CPU.

3. Fix the **CPU** by rotating the **cam** 180 degrees clockwise with a flat-blade screwdriver.

4. Apply new **grease** on the CPU using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip. When silicon grease is already applied to the CPU, wipe them off with a close in advance.

> *CAUTION:* *When installing the CPU, apply new grease on the top of the CPU chip.*
> *When installing the fin, make sure the bottom of the fin covers the top of the*
> *CPU.*
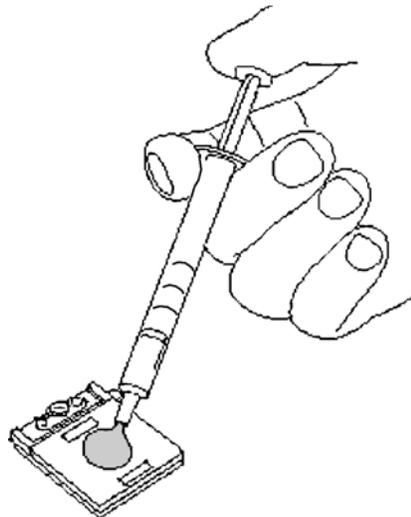
Figure 4-30   Applying new grease

5. Install the **fin**.

6. Place the **CPU holder** and secure it with the following **screws** in the order of the number marked on the holder.

   - M2×4B   BIND screw   ×3

4.20 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to figures 4-31 and 4-32.

1. Remove the following **screws** and peel the **insulator**.

    *   M2.5×6B   FLAT HEAD screw   ×4
    *   M2.5×4B   FLAT HEAD screw   ×1 (upper left side)
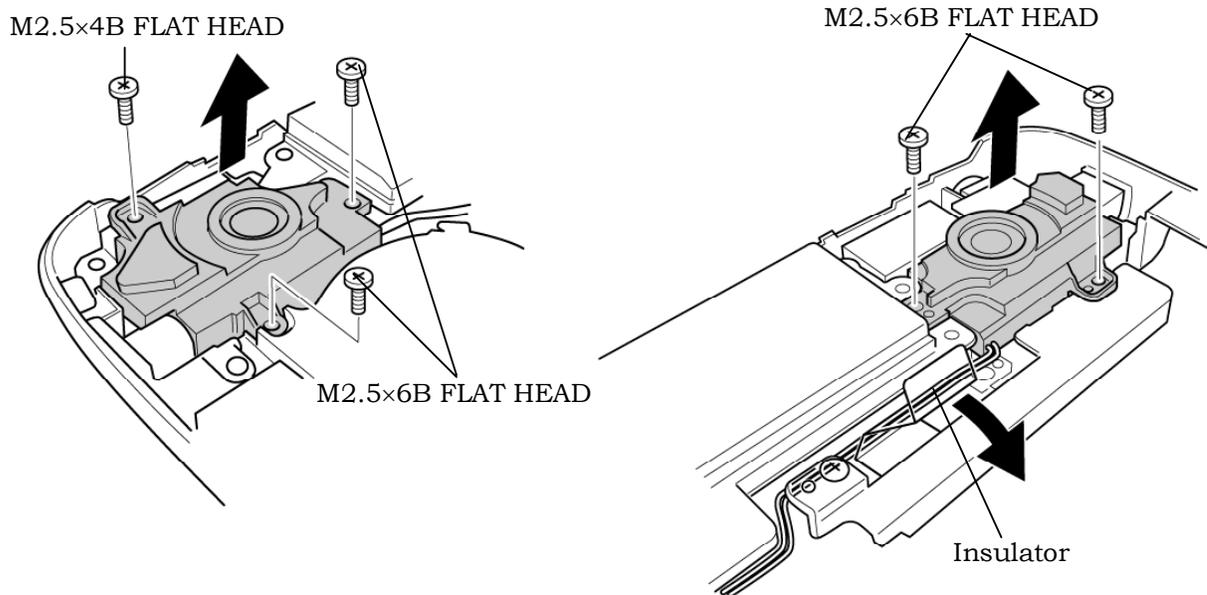
Figure 4-31   Removing the speakers

2. Remove the following **screw** and **cable holder**.

    • M2.5×4B   FLAT HEAD screw   ×1
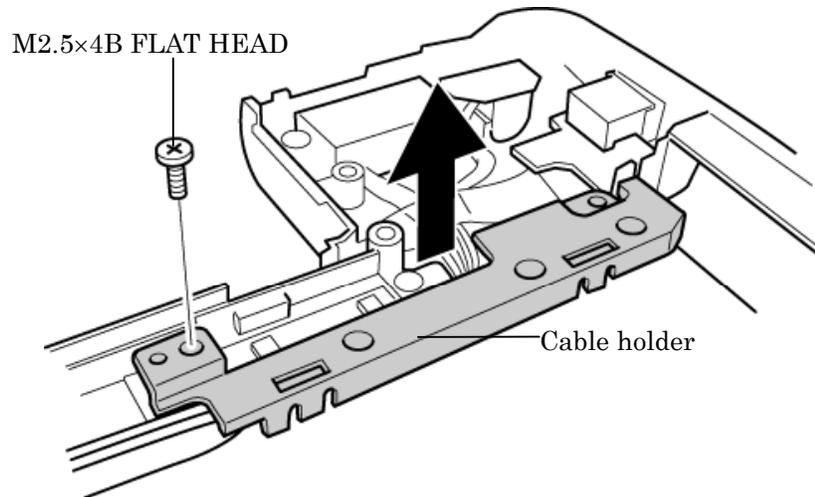
Figure 4-32   Removing the cable holder

3. Remove both the **speakers**.

Installing the Speaker

To install the speaker, follow the steps below and refer to figures 4-31 to 4-32.

1. Set both the **speakers**.

2. Install the cable holder and secure it with the following **screw**.

    • M2.5×4B   FLAT HEAD screw   ×1

3. Secure the following **screws** and stick the **insulator** to fix the speakers.

    • M2.5×6B   FLAT HEAD screw   ×4
    • M2.5×4B   FLAT HEAD screw   ×1 (upper left side)

4.21 Fan

Removing the Fan

To remove the fan, follow the steps below and refer to figure 4-33.

1. Remove the following **screws** securing the fan.

    - M2.5×6B FLAT HEAD screw   ×1 (lower right side)

2. Remove the **fan**.

M2.5×6B FLAT HEAD

Fan
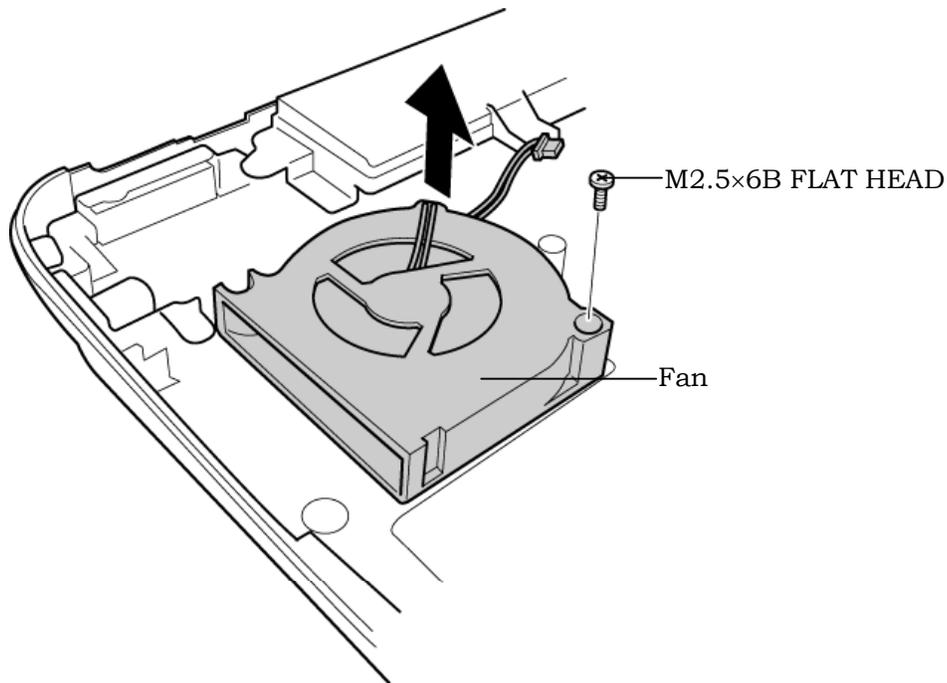
Figure4-33   Removing the fan

Installing the Fan

To install the fan, follow the steps below and refer to figure 4-33.

1. Place the **fan**.

2. Secure the fan with the following **screw**.

    - M2.5×6B FLAT HEAD screw   ×1

4.22 USB Board/DC-IN jack/Network jack

Removing the USB Board/DC-IN jack/Network jack

To remove the USB board/DC-IN jack/network jack, follow the steps below and refer to figure 4-34.

1. Remove the following **screw** securing the USB board.

   - M2.5×4B FLAT HEAD screw   ×1

2. Disconnect the **USB cable** from the connector **CN1** on the USB board.

3. Peel off the **acetate tape** and remove the **network jack** from the slot.

4. Disconnect the **DC-IN jack cable** from the connector **CN1** on the power board and remove the **DC-IN jack**.
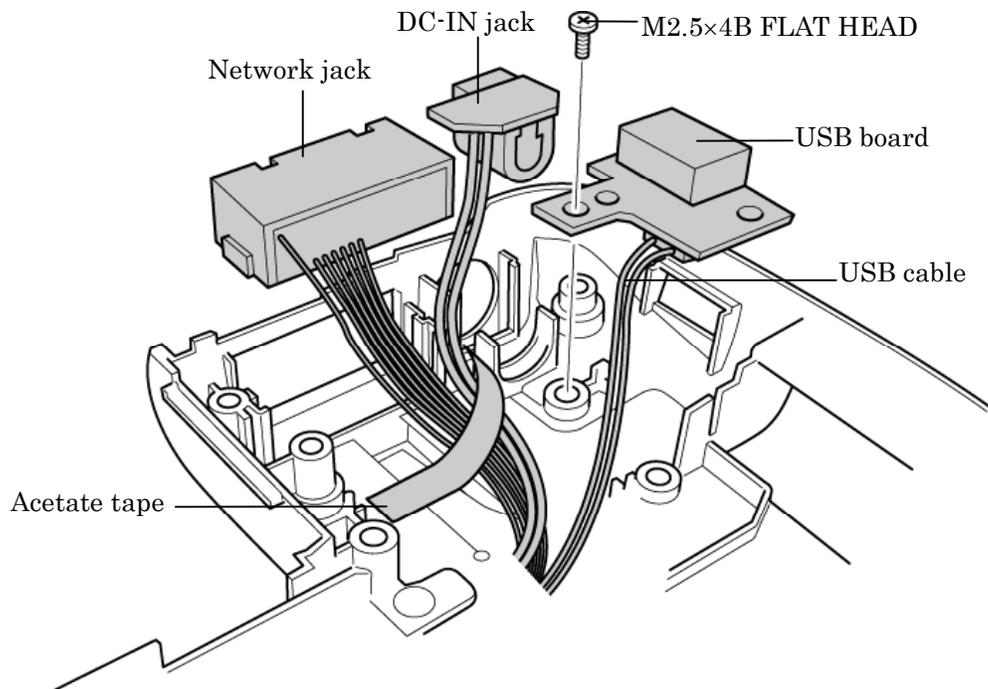
Figure 4-34   Removing the USB board/DC-IN jack/network jack

Installing the USB Board/DC-IN jack/Network jack

To install the USB board/DC-IN jack/network jack, follow the steps below and refer to the figure 4-34.

1. Connect the **DC-IN jack cable** to the connector **CN1** on the power board and Install the **DC-IN jack**.

2. Install the **network jack** to the slot and stick the **acetate tape**.

3. Connect the **USB cable** to the connector **CN1** on the USB board.

4. Place the **USB board** into the slot and secure it with the following **screw**.

   - M2.5×4B FLAT HEAD screw   ×1

4.23   RGB board/Power board

Removing the RGB board/Power board

To remove the RGB board/Power board, follow the steps below and refer to figures 4-35 to 4-37.

1. Remove the following **screws** and **battery plate**.

    - M2.5×6   Tapping screw   ×3
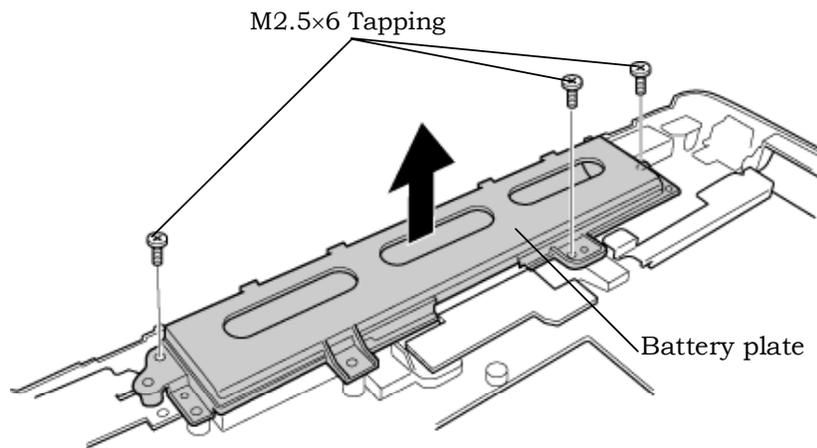
Figure 4-35   Removing the battery plate

2. Remove the following **screw** and **RGB board**.

    - M2.5×6   Tapping screw   ×1

3. Disconnect the **RGB cable** from the connector **CN3** on the RGB board.
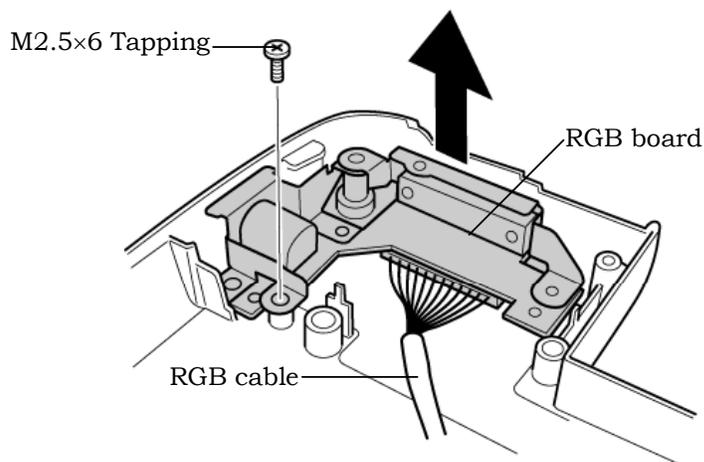
Figure 4-36   Removing the RGB board

4. Remove the following **screws** and **power board**.

   - M2.5×6   Tapping screw   ×2
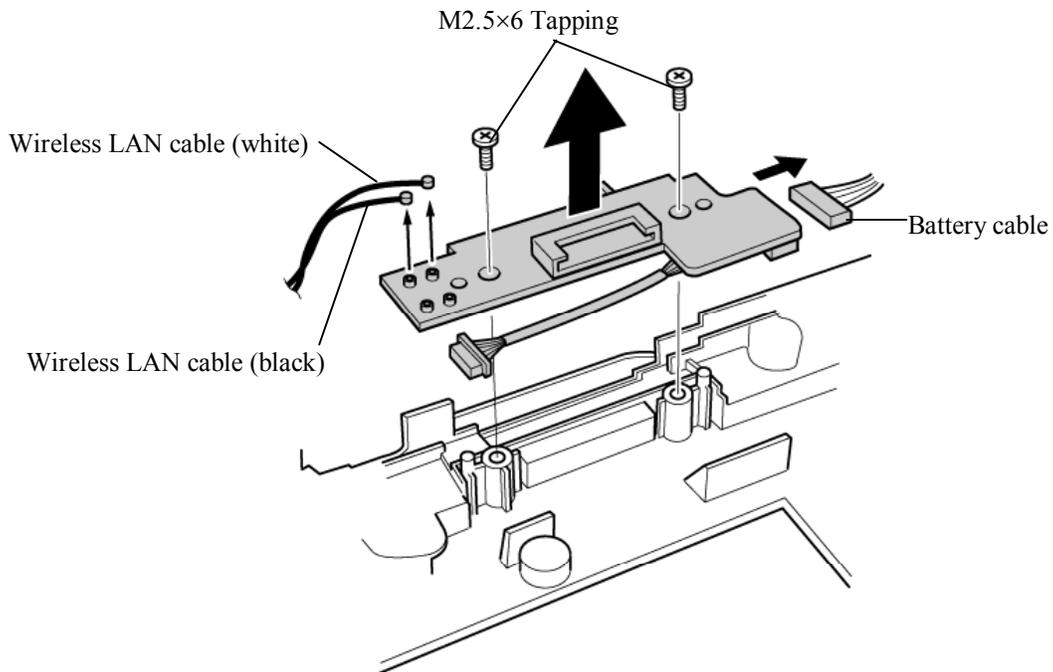
Figure 4-37   Removing the power board

5. Disconnect the **wireless LAN cables** from the connectors **CN6** (white) and **CN8** (black) on the power board.

6. Disconnect the **battery cable** from the connector **CN4** on the power board.

Installing the RGB board/Power board

To install the RGB board/Power board, follow the steps below and refer to figures 4-35 to 4-37.

1. Connect the **battery cable** to the connector **CN4** on the power board.

2. Connect the **wireless LAN cables** to the connectors **CN6** (white) and **CN8** (black) on the power board.

3. Place the **power board** and secure it with the following **screws**.

   • M2.5×6　Tapping screw　　×2

4. Connect the **RGB cable** to the connector **CN3** on the RGB board.

5. Place the **RGB board** and secure it with the following **screws**.

   • M2.5×6　Tapping screw　　×1

6. Place the **battery plate** and secure it with the following **screws**.

   • M2.5×6　Tapping screw　　×3

4.24   Display Mask

Removing the Display Mask

To remove the display mask, follow the steps below and refer to figures 4-38.

1. Remove the two **mask seals** at the lower part of the display mask.

2. Remove the four **rubber masks** at the top of the display mask.

3. Remove the following **screws** securing the display mask.

    *   M2.5×6B   FLAT HEAD screw   ×2
    *   M2×4B   S-FLAT HEAD screw   ×3

4. Release the latches on the display mask and remove the **display mask**.
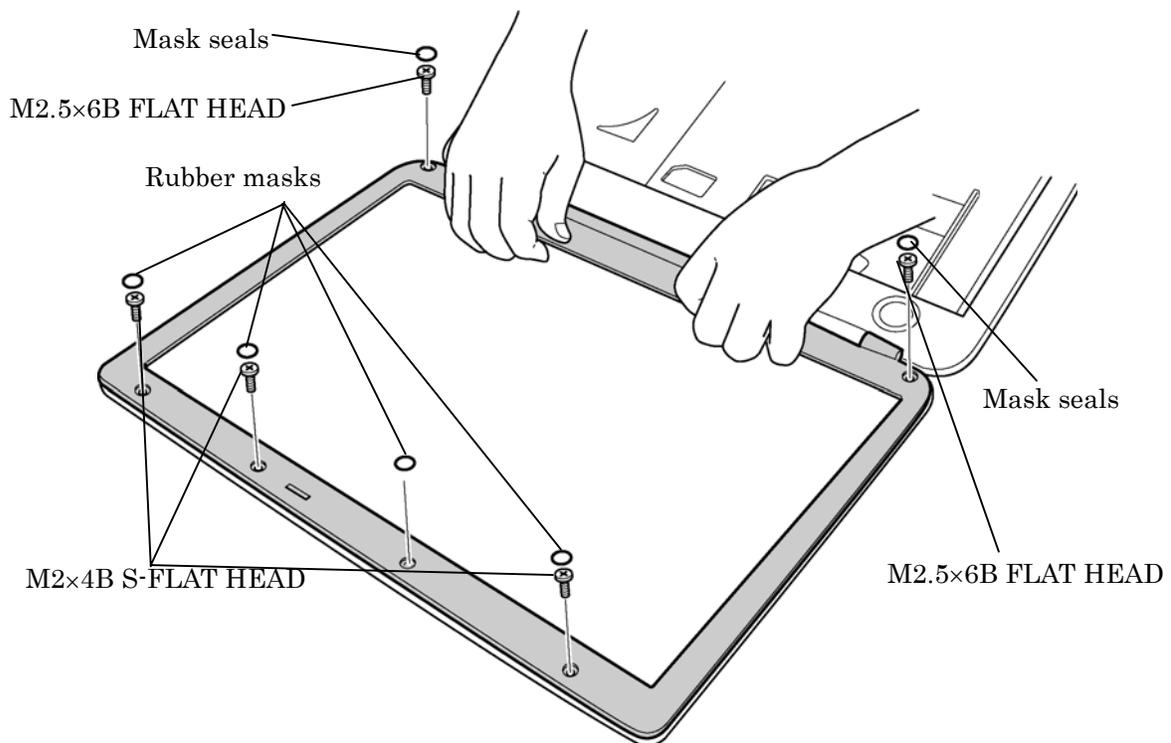
Figure 4-38   Removing the display mask

Installing the Display Mask

To install the display mask, follow the steps below and refer to figures 4-38.

1. Place the **display mask** on the LCD module.

2. Engage the latches of the display mask.

3. Secure the display mask with the following **screws**.

    *   M2.5×6B   FLAT HEAD screw   ×2
    *   M2×4B   S-FLAT HEAD screw   ×3

4. Stick the four **rubber masks** at the top of the display mask.

5. Stick the two **mask seals** at the lower part of the display mask.

4.25   FL Inverter

Removing the FL Inverter

To remove the FL inverter, follow the steps below and refer to figure 4-39.

1. Remove the following **screw** securing the FL inverter.

    - M2×4B   S-FLAT HEAD screw   ×1

2. Peel the **insulator** on the FL inverter.

3. Disconnect the **FL cable** under the insulator from the FL inverter.

4. Disconnect the **HV cable** from the FL inverter.

5. Remove the **FL inverter**.
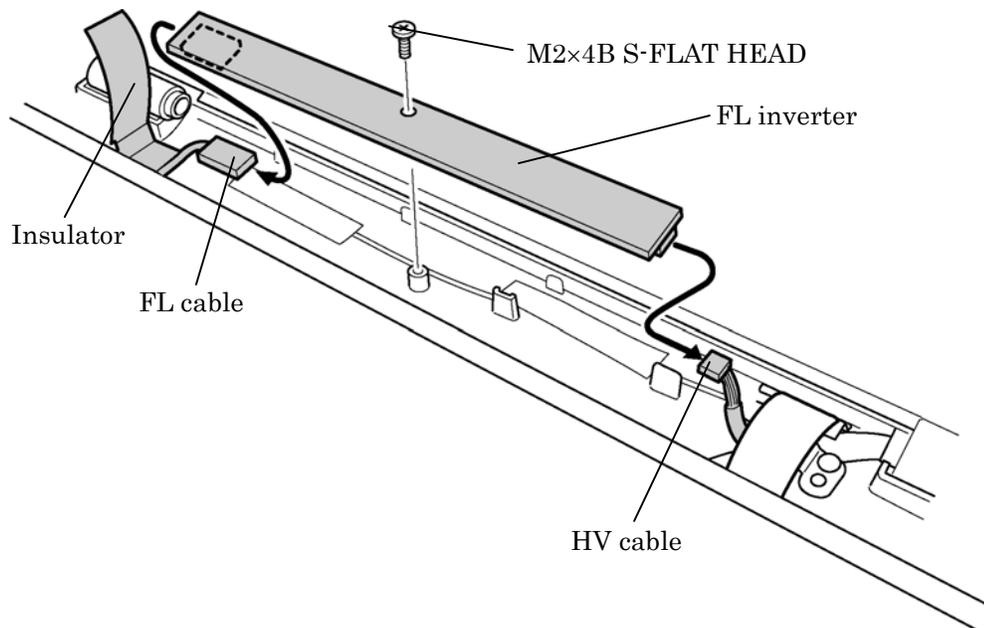
Figure 4-39   Removing the FL inverter

Installing the FL Inverter

To install the FL inverter, follow the steps below and refer to figure 4-39.

1. Connect the **FL cable** and the **HV cable** to the FL inverter.

2. Seat the **FL inverter** and stick the **insulator** on the FL inverter of the FL cable side.

3. Secure the FL inverter with the following **screw**.

   - M2×4B   S-FLAT HEAD screw   ×1

4.26 LCD Module

NOTE: *1) Be careful not to apply pressure to the ICs along the edge of LCD module.*
The ICs are easily damaged.

2) For environmental reasons, do not throw away a malfunctioning LCD module
(or FL). Please follow local ordinances or regulations for its disposal.

Removing the LCD Module

To remove the LCD Module, follow the steps below and refer to figures 4-40 and 4-41.

1. Remove the four **mask seals** on the sides of the LCD module.

2. Remove the following **screws** securing the LCD module.

    • M2×4B   S-FLAT HEAD screw   ×4

3. With the bottom edge of the LCD unit on the display cover, lift the top edge of the
    LCD unit.

4. Remove the **copper tape** securing the LCD cable.

5. Disconnect the **LCD cable** from the connector on the back of the LCD and remove the **LCD module**.

CAUTION: When removing the LCD cable, be careful not to damage the connector.

M2×4B S-FLAT HEAD

Mask seal

Mask seal

M2×4B S-FLAT HEAD

Mask seal

LCD cable

Copper tape
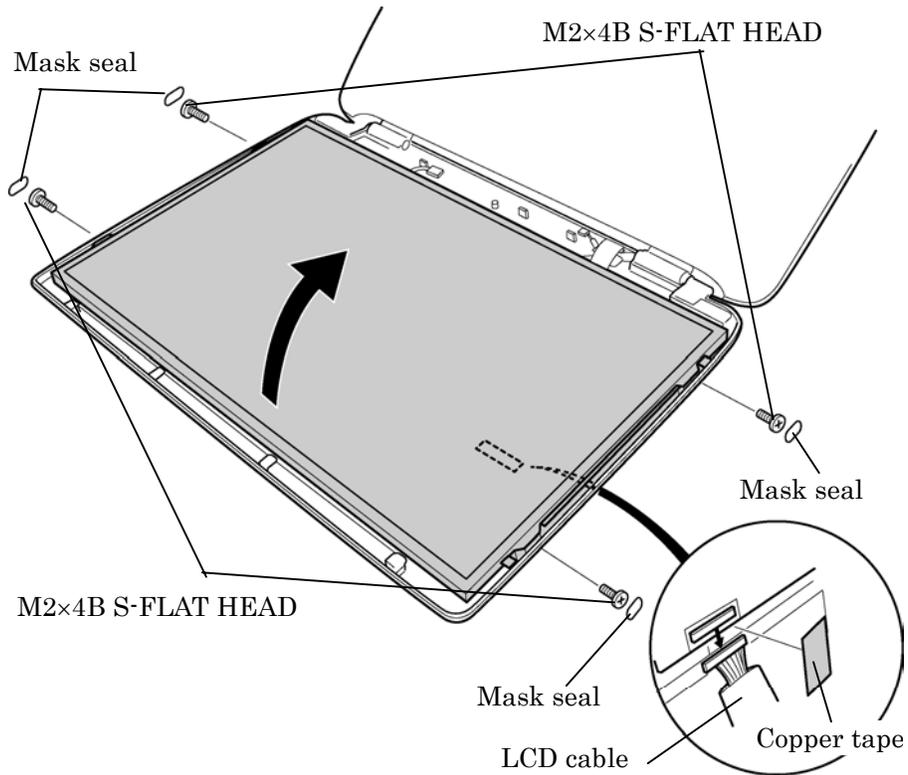
Figure 4-40   Removing the LCD module (1)

6. Remove the following **screws** securing the two **metal braces** to the LCD module.

   - M2×3C   S-FLAT HEAD screw   ×4
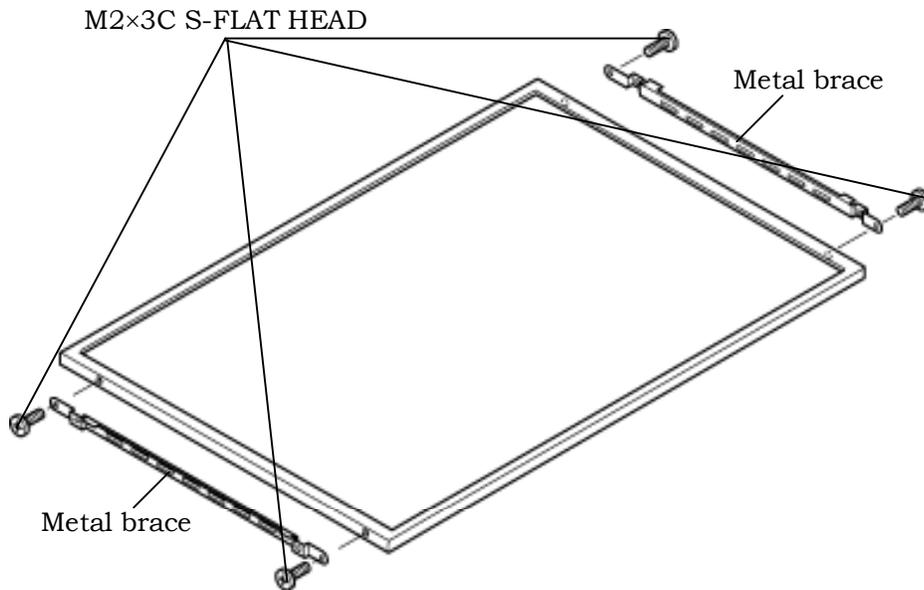
Figure 4-41   Removing the LCD module (2)

Installing the LCD Module

To install the LCD module, follow the steps below and refer to figures 4-40 and 4-41.

1. Secure the two **metal braces** to the LCD module with the following **screws**.

    - M2×3C   S-FLAT HEAD screw   ×4

2. Set the **LCD module** on the display cover.

3. Connect the **LCD cable** to the connector on the back of the **LCD module**. Stick the **copper tape** on the LCD cable.

4. Seat the **LCD module** and secure it with the following **screws**.

    - M2×4B   S-FLAT HEAD screw   ×4

5. Stick the four **mask seals** on the sides of the LCD module.

4.27 Sensor/Switch Board

Removing the Sensor/Switch Board

To remove the sensor/switch board, make sure the computer is in boot mode and powered off, follow the steps below and refer to figure 4-42.

1. Remove the following **screws** securing the sensor/switch board.

    - M2×4B   S-FLAT HEAD screw   ×1

2. Remove the **sensor/switch board**.
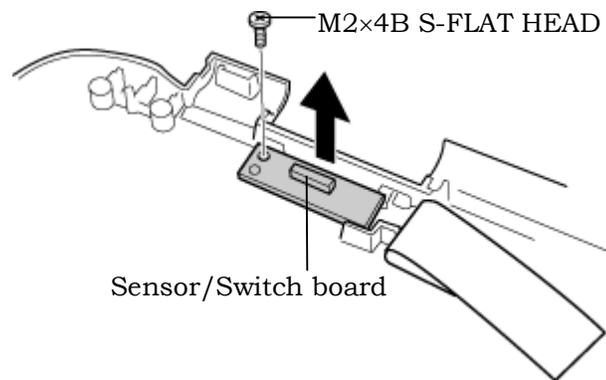
Figure 4-42   Removing the sensor/switch board

3. Pull out the **sensor/switch board cable**.

Installing the Sensor/Switch Board

To install the sensor/switch board, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figure 4-42.

1. Place the **sensor/switch board** in the slot and secure it with the following **screw**.

    - M2×4B   S-FLAT HEAD screw   ×1

2. Pass the sensor/switch board cable through the hole under the hinge cover.

3. Arrange the **sensor/switch board cable** along with the guides.

4.28 LCD cable/Wireless LAN Antenna/Hinge

Removing the LCD cable/Wireless LAN Antenna

To remove the LCD cable/wireless LAN antenna, follow the steps below and refer to figures 4-43 to 4-49.

1. Remove the following **screw** and **LCD cable holder** on the back.

    - M2.5×5B   FLAT HEAD screw   ×1
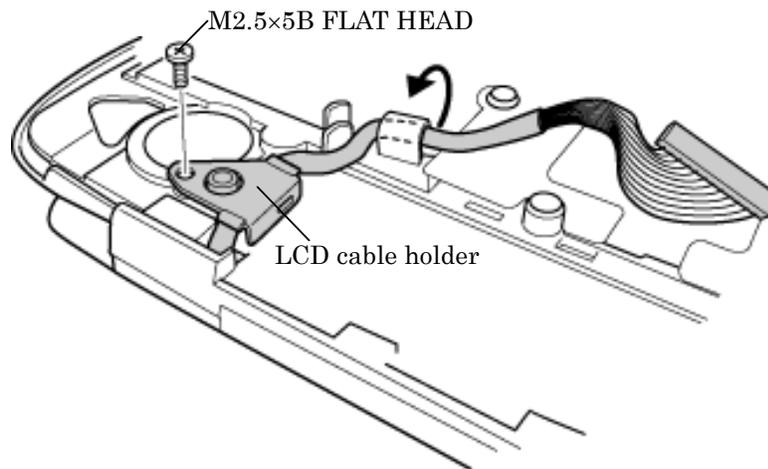
Figure 4-43   Removing the LCD cable holder

2. Peel the **insulator** and remove the following **screw** and **cable holder** on the front.

    - M2.5×4B   FLAT HEAD screw   ×1
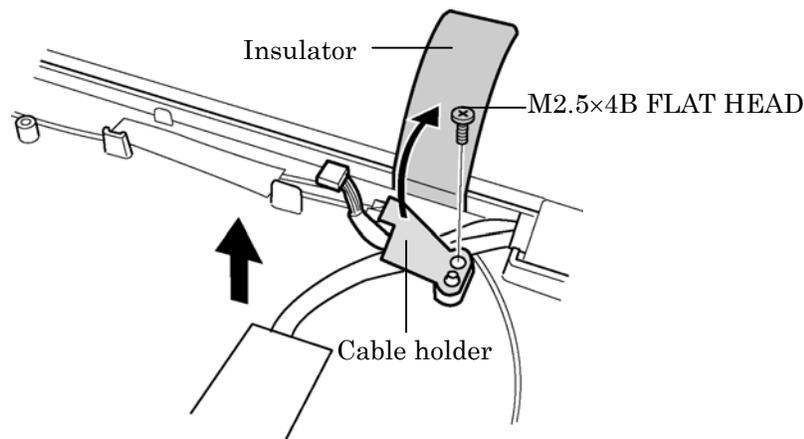
Figure 4-44   Removing the cable holder

3. Peel off the four **acetate tapes** fixing the wireless LAN antenna cable.

4. Peel off the three **copper sheets** and the **gasket** fixing the wireless LAN antenna.

5. Peel off both the **wireless LAN antennas** and pull out the cables through the hole under the hinge cap.
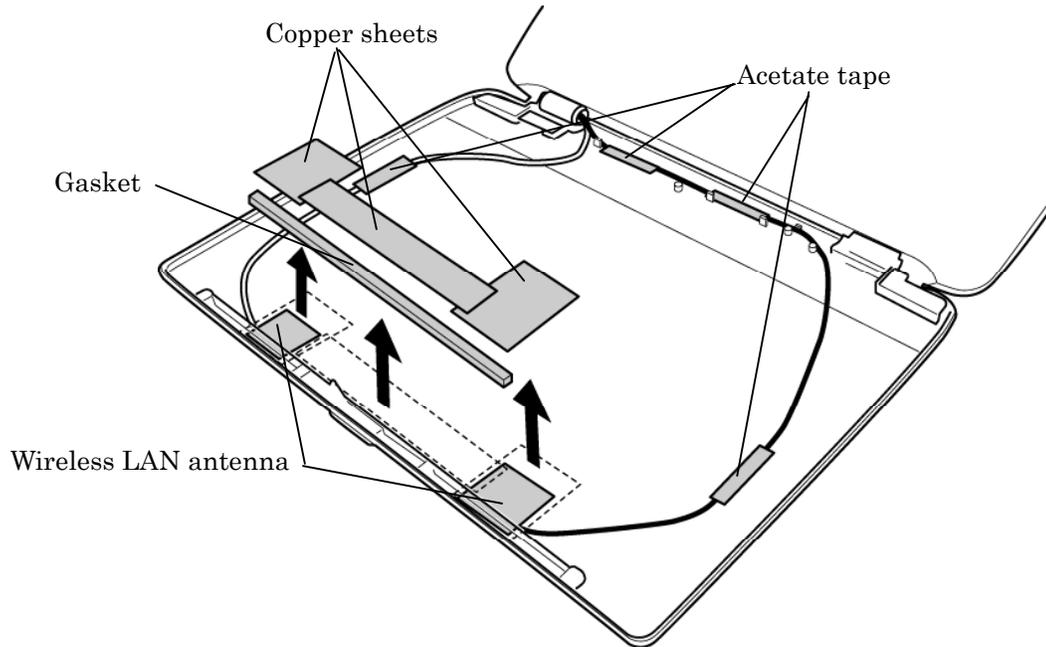
Figure 4-45   Removing the wireless LAN antenna

6. Remove the **hinge caps**.

7. Remove the following **screws** fixing the hinges on the display cover.

   - M2.5×4B   FLAT HEAD screw   ×2
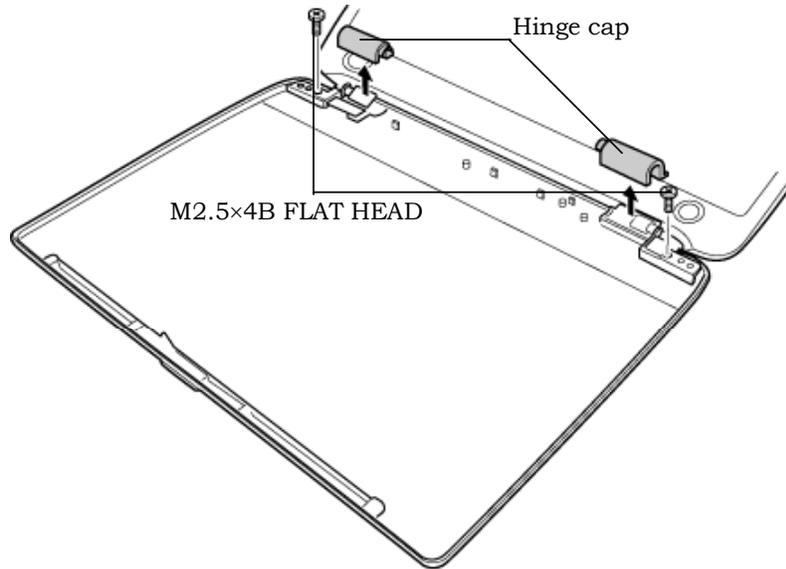
Figure 4-46   Removing the hinge cap

8. Remove the following **screws** and **hinge** (on the LCD cable side).

   - M2×4B   S-FLAT HEAD screw   ×1
   - M2.5×5B   FLAT HEAD screw   ×1
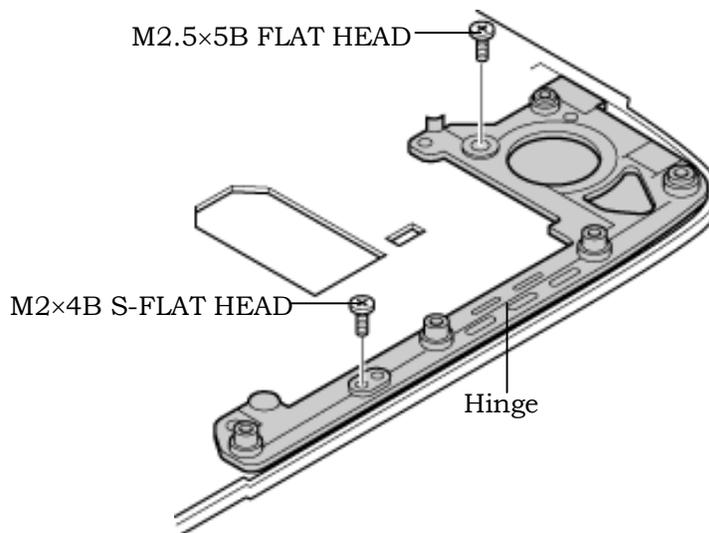
Figure 4-47   Removing the hinge (LCD cable side)

9. Pull out the **LCD cable**.

10. Remove the following **screws** and **circle plate**.

- M2×4B   S-FLAT HEAD screw   ×2
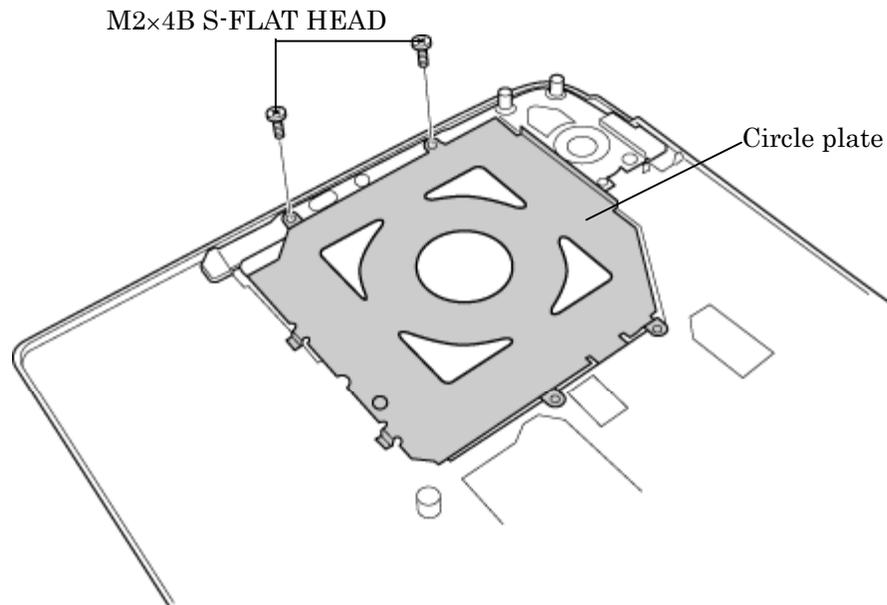
Figure 4-48 Removing the circle plate

11. Remove the following **screws** and **hinge** (on the other side).

- M2×4B   S-FLAT HEAD screw   ×1
- M2.5×5B   FLAT HEAD screw   ×1
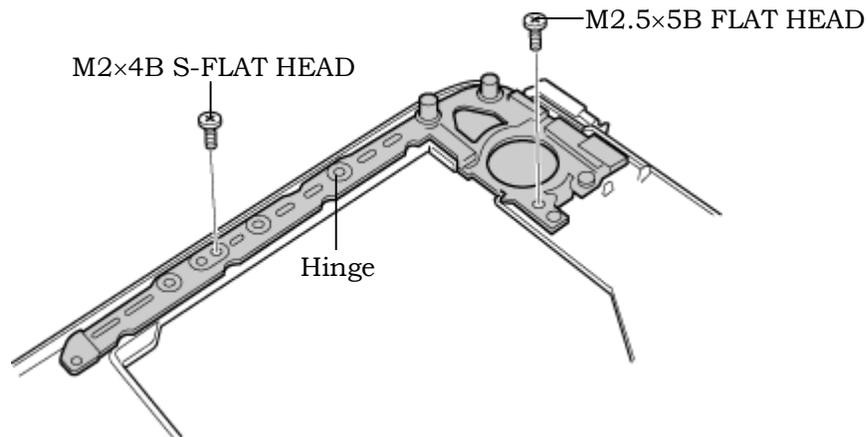
Figure 4-49 Removing the hinge

Installing the LCD cable/Wireless LAN Antenna

To install the wireless LAN antenna/Bluetooth antenna/display cover/speaker, follow the steps below and refer to figures 4-43 to 4-50.

1. Pass the **LCD cable** through the slot and guide.

2. Set the **hinge** (on the opposite side of the LCD cable) and secure it with the following **screws**.

    *   M2×4B   S-FLAT HEAD screw   ×1
    *   M2.5×5B   FLAT HEAD screw   ×1

3. Place the **circle plate** and secure it with the following **screws**.

    *   M2×4B   S-FLAT HEAD screw   ×2

4. Set the **hinge** (LCD cable side) and secure it with the following **screws**.

    *   M2×4B   S-FLAT HEAD screw   ×1
    *   M2.5×5B   FLAT HEAD screw   ×1

5. Secure the **hinges** on the display cover with the following **screws**.

    *   M2.5×4B   FLAT HEAD screw   ×2

6. Install the **hinge cap** (on the LCD cable side).

7. Pass the **wireless LAN antenna cables** through the hole to the back.

8. Arrange the **wireless LAN antenna cables** along the guides on the back and fix them with two acetate tapes.

9. Secure the **wireless LAN antenna cables** with the four **acetate tapes**.

10. Secure the **wireless LAN antenna** with the three **copper sheets** and the **gasket**.
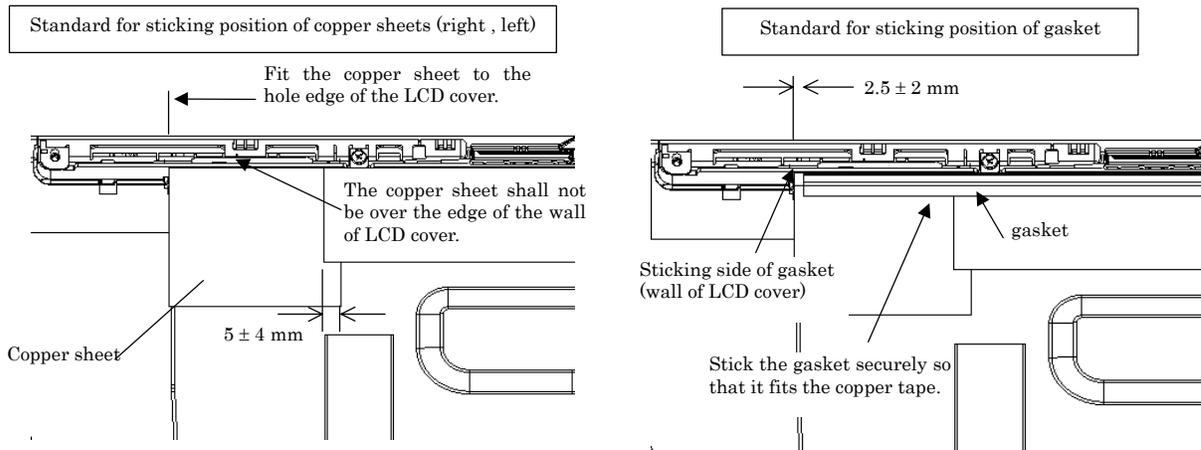
Figure 4-50   Sticking the copper sheets and gasket

11. Set the **LCD cable holder** on the back and secure it with the following **screw**.

  • M2.5×5B   FLAT HEAD screw   ×1

12. Set the **Cable holder** on the front and secure it with the following **screw** and the **insulator**.

  • M2.5×4B   FLAT HEAD screw   ×1

12. Place the **hinge caps**.

4.29 Fluorescent Lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part No.	Supplier	Section	Page
15.4-inch WXGA	G33C0001H110	TMD	4.29.1	4-76
	G33C0001F110	LG.Philips	4.29.2	4-88
	G33C0001D110	Samsung	4.29.3	4-95
15.4-inch WXGA (CSV)	G33C0001G110	LG.Philips	4.29.2	4-88
	G33C0001E110	Samsung	4.29.3	4-95

NOTE: - *When working with a LCD module, always use a flat, grounded table.*

- *Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.*

- *Use an anti-static or protective sheet.*

- *When replacing the FL unit, cover with a finger protector or similar to prevent soiling or scratching the LCD panel.*

- *Be careful when handling the lamp. Excessive force may break the lamp.*

- *Be careful not to soil or deform the lamp reflector.*

- *Make sure that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.*

4.29.1 Replacing the 15.4-inch WXGA TMD Fluorescent Lamp

CAUTION: When replacing the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign substance into the module.

Disassembling the 15.4-inch WXGA TMD Fluorescent Lamp

To disassemble the 15.4-inch WXGA TMD fluorescent lamp, follow the steps below and refer to figures 4-51 to 4-55.

1. Removing tapes and insulation sheets from LCD module

    1) Place the LCD module face down on a flat table that has no alien substance on it. Make sure there is no dust on the desk to avoid scratching the surface of the LCD module. Place a protective sheet (such as soft cloth) on the surface.

    2) Remove the fixing tape for the FL cable, two tapes at the side of lamp, X-PCB insulation sheet and Y-PCB insulation sheet from the LCD module in order as shown in the figure below.

NOTE: 1) *Be careful not to give any damage to the TAB.*
         2) *The X-PCB insulation sheet should be left attached to the bezel, as it will be recycled.*
         3) *The Y-PCB insulation sheet shall not be disposed after removed, as it will be recycled.*
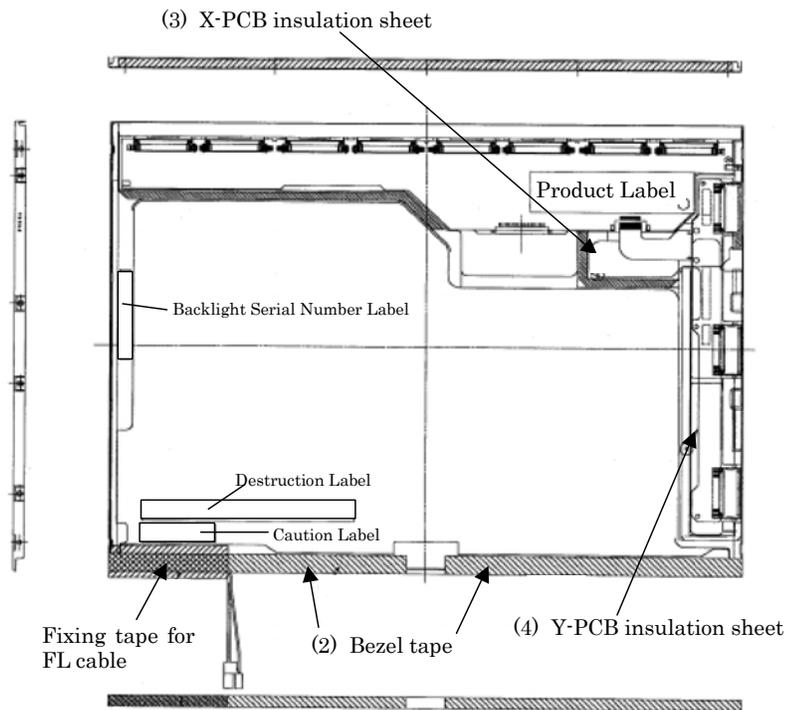
Figure 4-51 Replacing TMD fluorescent lamp (WXGA) (1)

2. Removing screws

     1) Spread out the insulation sheet without detaching from the side of bezel.

     2) Remove the screws (left side, right side) in order as shown in the figure below.

NOTE: Use a Philips screwdriver with type 0 bit to remove the screws.
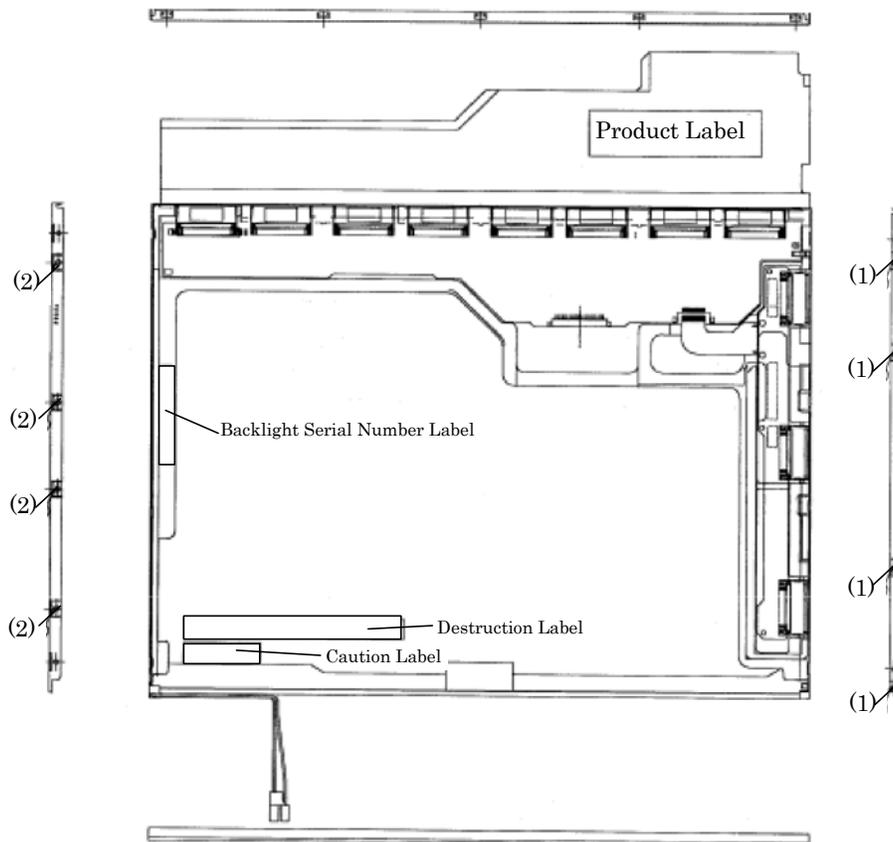
Figure 4-52   Replacing TMD fluorescent lamp (WXGA) (2)

3. Removing bezel

    1) Turn the LCD module face up with the insulation sheets on it.

    2) Release the latches of the bezel and frame. (five points on upper side, two points lower side)

    3) Remove the double-sided adhesive tape on the bottom of the side of bezel, and remove the bezel.

> *NOTE:* 1) *Be careful not to damage the TAB when releasing the upper latches.*
>   2) *When removing the bezel, be sure to remove the double-sided adhesive tapes on the lower side of bezel slowly so as not to break the cell. Be careful not to deform the bezel.*
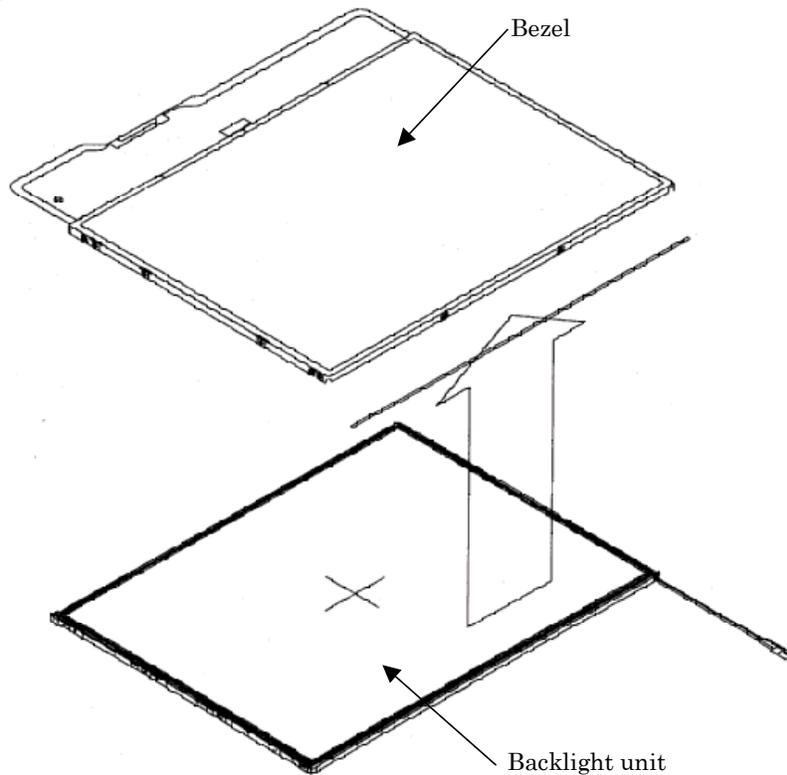
Figure 4-53   Replacing TMD fluorescent lamp (WXGA) (3)

4. Spreading out PCB

1) Spread out the X-PCB and Y-PCB horizontally in order.

NOTE: *Be careful not to damage the TAB.*

(1) Spread out the X-
PCB from the back.

(2) Spread out the Y-
PCB from the back.
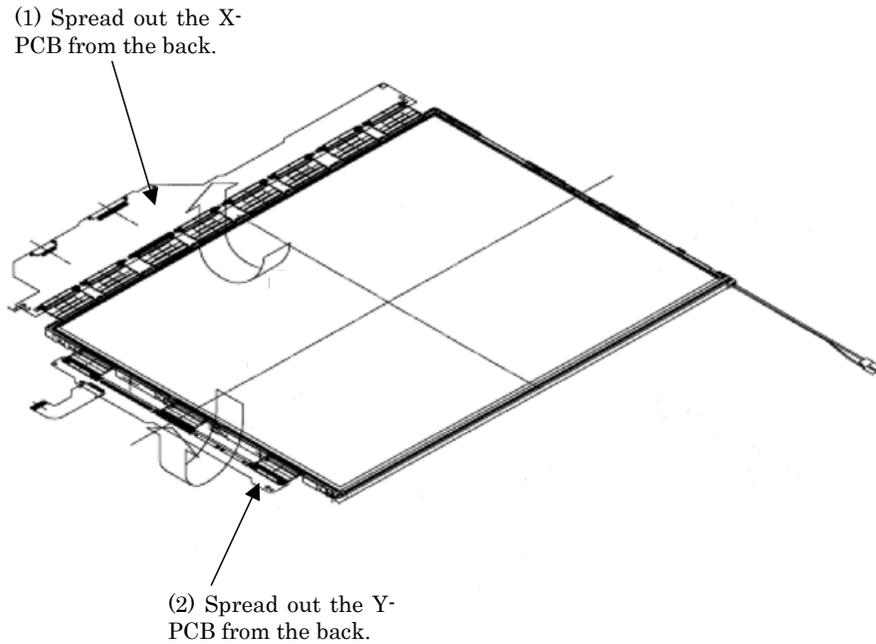
Figure 4-54 Replacing TMD fluorescent lamp (WXGA) (4)

5. Removing PCB-ASSY cell

    1) Remove the PCB-ASSY cell from the backlight unit.

    2) Remove the double-sided adhesive tape from the back of the cell.

> *NOTE:* 1) *Remove the tape slowly not to break the cell. The cell and frame are glued by double-sided adhesive tape.*
>   2) *Be careful not to remove the light shielding tapes from the upper left and right sides of the cell.*

PCB-ASSY cell

Remove the cell by peeling off the double-sided adhesive tape.
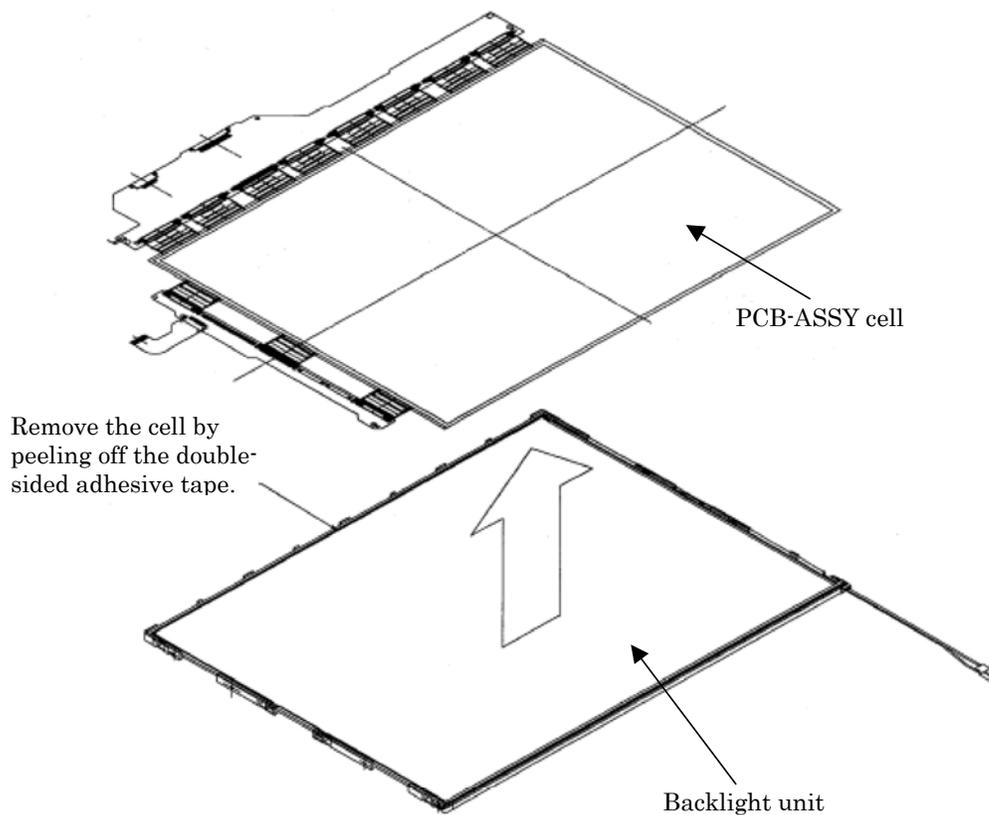
Backlight unit

Figure 4-55   Replacing TMD fluorescent lamp (WXGA) (5)

Assembling the 15.4-inch WXGA TMD Fluorescent Lamp

To assemble the 15.4-inch WXGA TMD fluorescent lamp, follow the steps below and refer to figures 4-56 to 4-61.

1. Checking backlight

    1) Check the following items shown in the figure below.
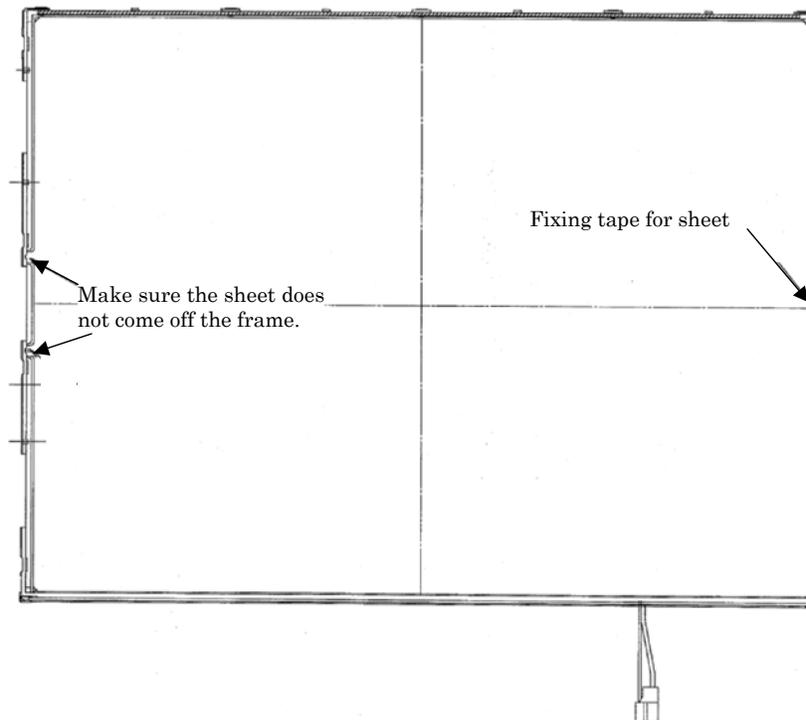
Figure 4-56 Replacing TMD fluorescent lamp (WXGA) (6)

2. Assembling PCB-ASSY cell

   1) Remove the release paper of the double-sided tape at the upper of the
       backlight unit.

   2) Light up the backlight.

   3) Make sure there is no dust, alien substance or scratch on the backlight. Then
       make sure there is nothing wrong with the back of cell, install the PCB-ASSY
       cell to the backlight unit.

NOTE: *1)* *When installing the PCB-ASSY cell, fit it to the left bottom corner of*
            the backlight unit.
        2) *Be careful not to damage the TAB.*
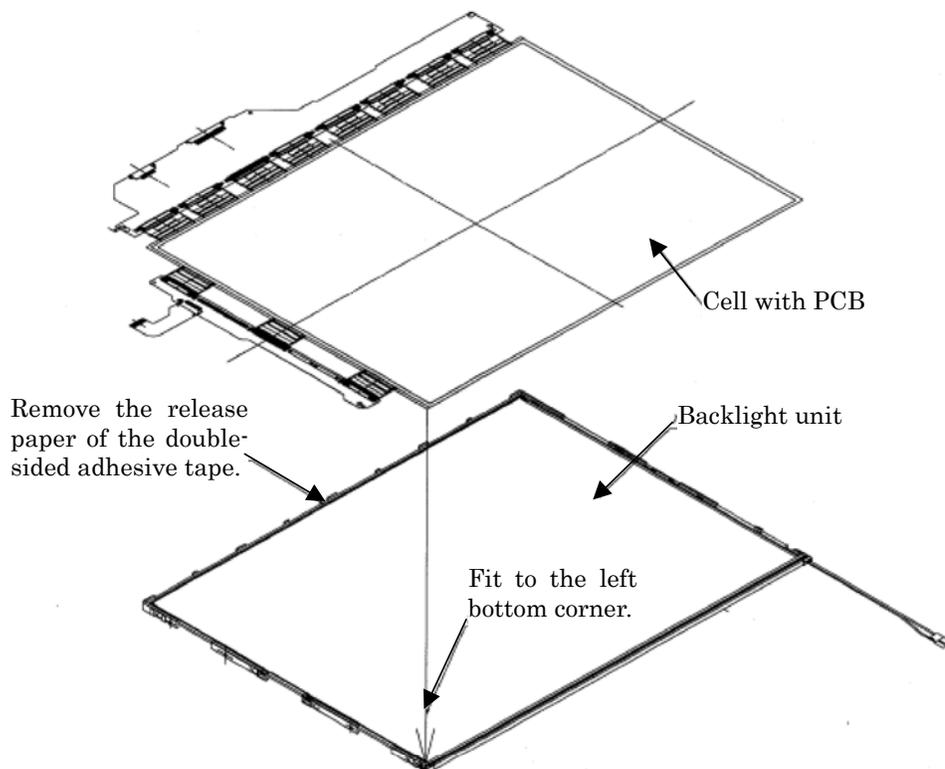
Figure 4-57 Replacing TMD fluorescent lamp (WXGA) (7)

3. Folding and temporary fixing of TAB/PCB

    1) Fold the X-TAB (X-PCB) and Y-TAB (Y-PCB) to the back of backlight unit.

    2) Hook the X-PCB on the three latches on the back of frame.

NOTE: *Be careful not to damage the TAB.*

---

(1) Fold the X-PCB to the back.

(2) Fold the Y-PCB to the back.

The PCB shall be hooked on the three latches of the frame.

Insert the FPC into the connector.

The PCB shall not be installed over the frame.
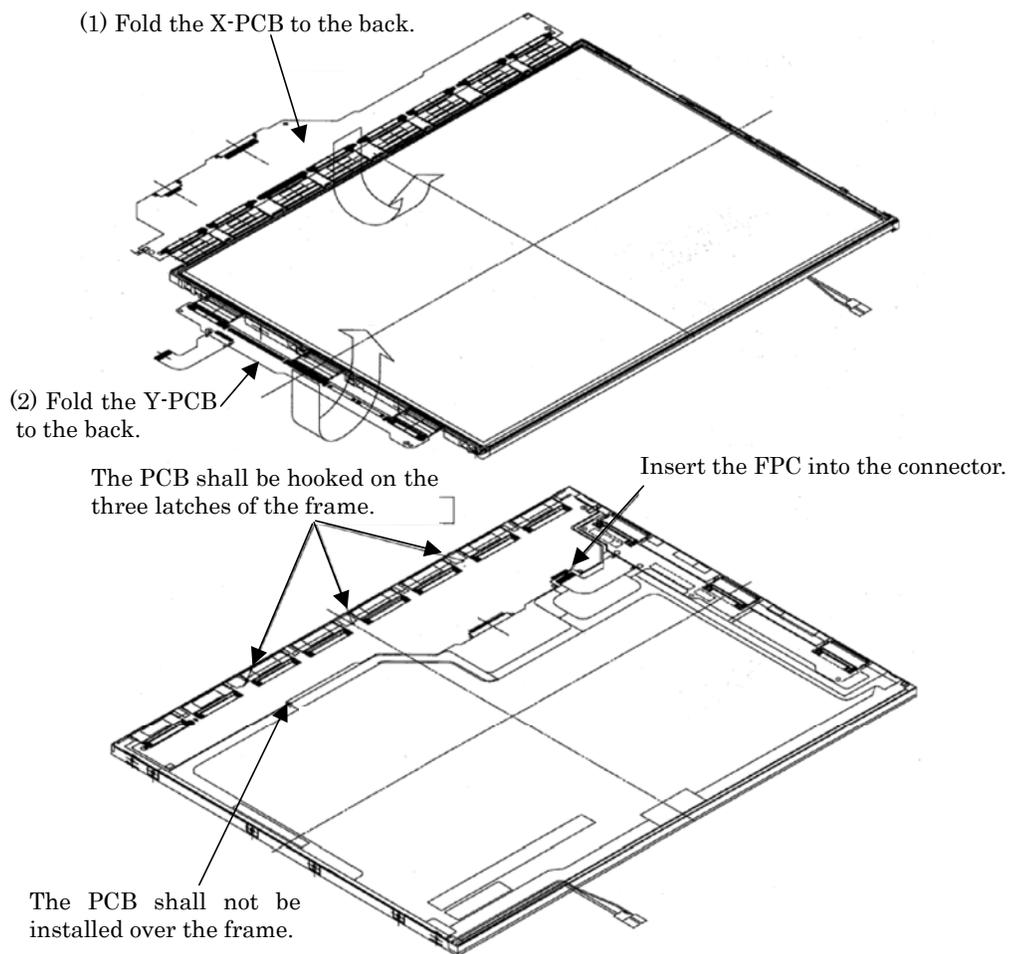
Figure 4-58   Replacing TMD fluorescent lamp (WXGA) (8)

4. Setting bezel

1) Hook the bezel on the five latches of the frame from the upper side.

NOTE: 1) *Make sure the GND-CU on the left side and lamp reflector shall be*
inside the bezel.
2) *Be careful not to damage the TAB.*
3) *Make sure the five latches of the upper side of bezel are hooked on.*

(1) Install the bezel from the TAB side. Be careful not to damage the TAB. Hook the bezel on the five latches.

Make sure the gum projection for protecting the cable is not outside th ebezel.

The cable shall not be outside the bezel.

Make sure the fold of reflector is not outside the bezel.

(2) Align the bezel with the lamp side of the backlight unit.

Make sure the gum projection for protecting the cable is not outside th ebezel.
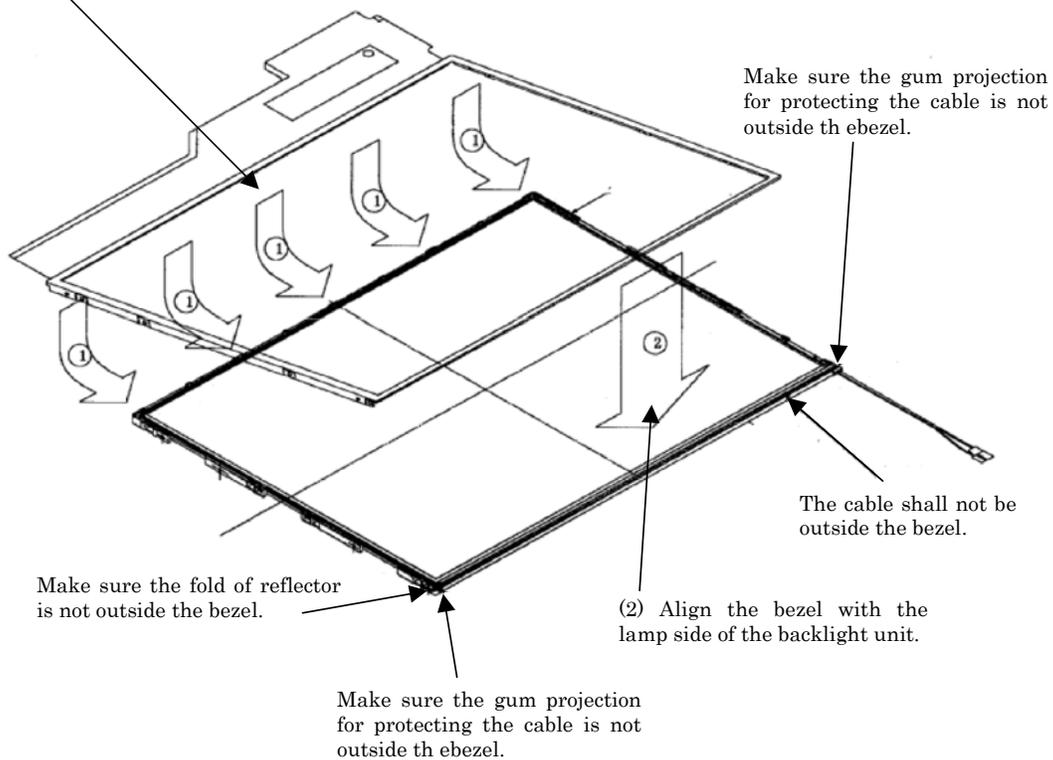
Figure 4-59 Replacing TMD fluorescent lamp (WXGA) (9)

5. Fixing PCBs and bezel with screws

   1) Tighten the left side with the screws in order shown in the figure below.

   2) Tighten the right side with the screws in order shown in the figure below.

NOTE: 1) *Tighten the screws in order. Make sure there is no floating of screw.*
          2) *The screw tightening torque shall be 0.147mN•m (1.5kgf•cm).*
          3) *Use a Philips screwdriver with type 0 bit.*
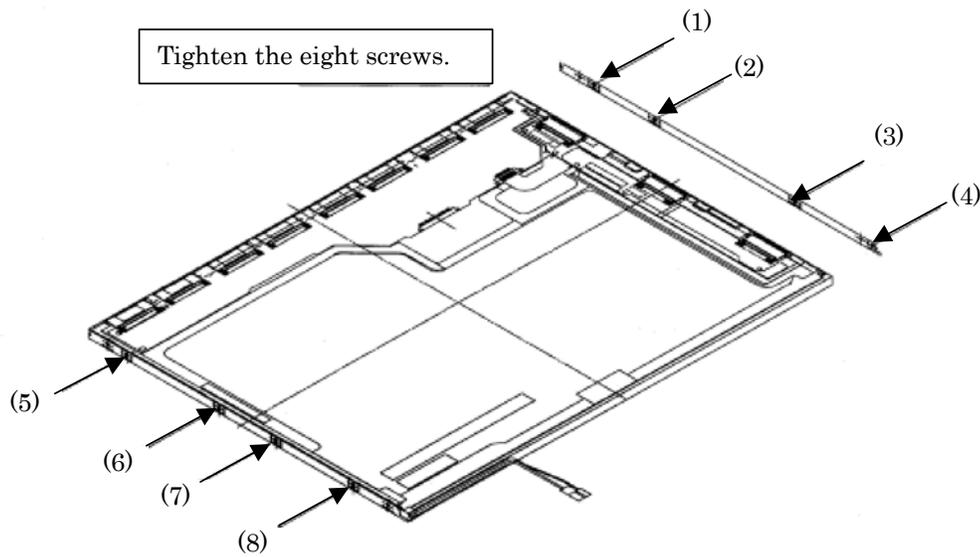
Figure 4-60 Replacing TMD fluorescent lamp (WXGA) (10)

6. Sticking tapes and insulation sheets

    1) Stick the Y-PCB insulation sheet and X-PCB insulation sheet in order.

    2) Stick the two bezel tapes on the lower side (lamp side).

    3) Stick the fixing tape for FL cable.

NOTE: Be careful not to damage to the TAB or the pulling-out part of lamp cable when sticking the tapes and insulation sheets.

Stick the X-PCB insulation sheet.

Stick the insulation sheet without any flexure.

Stick the Y-PCB insulation sheet.

Stick the insulation sheet without any flexure.

Bezel tape

Standard for sticking bezel tape. Stick the tape between the mark-off lines.

Stick the bezel tape while pressing not to cause floating of bezel.

Standard for fixing tape for FL cable.

Fixing tape for FL cable

Standard for sticking bezel tape. Stick the tape between the mark-off lines.

Standard for sticking bezel tape. Stick the tape between the mark-off lines.

Figure 4-61 Replacing TMD fluorescent lamp (WXGA) (11)

4.29.2 Replacing the 15.4-inch WXGA LG.Philips Fluorescent Lamp

Disassembly of outside tape / Cover shield

To disassemble the 15.4-inch WXGA LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-62 to 4-65.

1. Disassembly of Tape adhesive used for B/L Wire fixing

   CAUTION: Pressure or stress should not be given on B/L Wire.

2. Disassembly of Tape adhesive used for B/L Wire fixing

   CAUTION: Pressure or stress should not be given on Gate COF.

3. Disassembly of Cover shield (S)

   CAUTION: Pressure or stress should not be given on Source PCB. Usage of gloves with anti-electric discharge coating is recommended, to eliminate possible damage on circuits occurred by ESC.

4. Disassembly of Tape shield and Tape Adhesive used for Top case fixing

   CAUTION: Pressure or stress should not be given on Top case during this process.
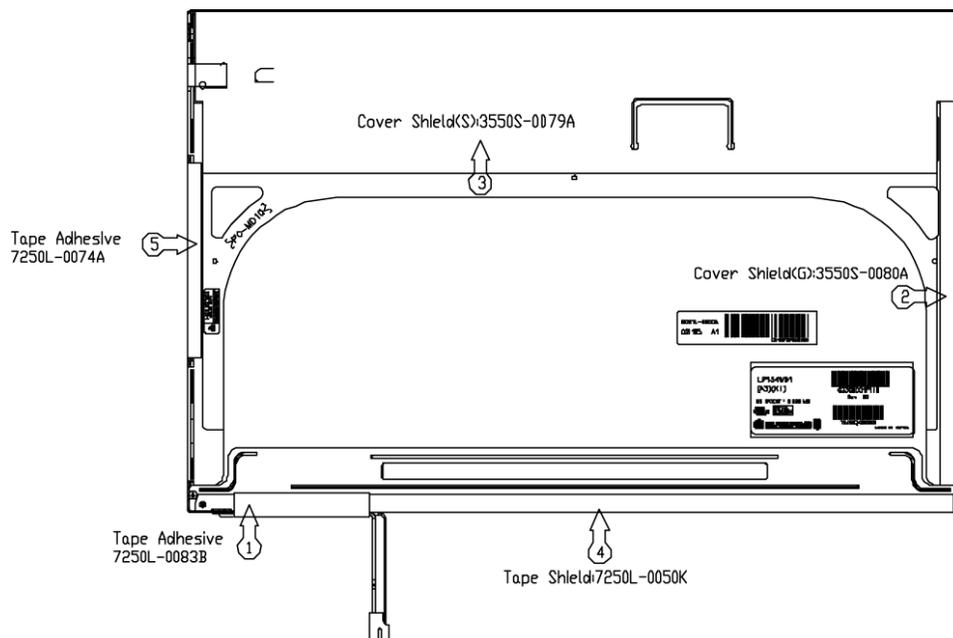
Figure 4-62 Replacing LG.Philips fluorescent lamp (WXGA) (1)

Disassembly of Top case

1. Disassembly of Top Case

> *CAUTION: Pressure or stress should not be given on Top Case and Gate COF.*
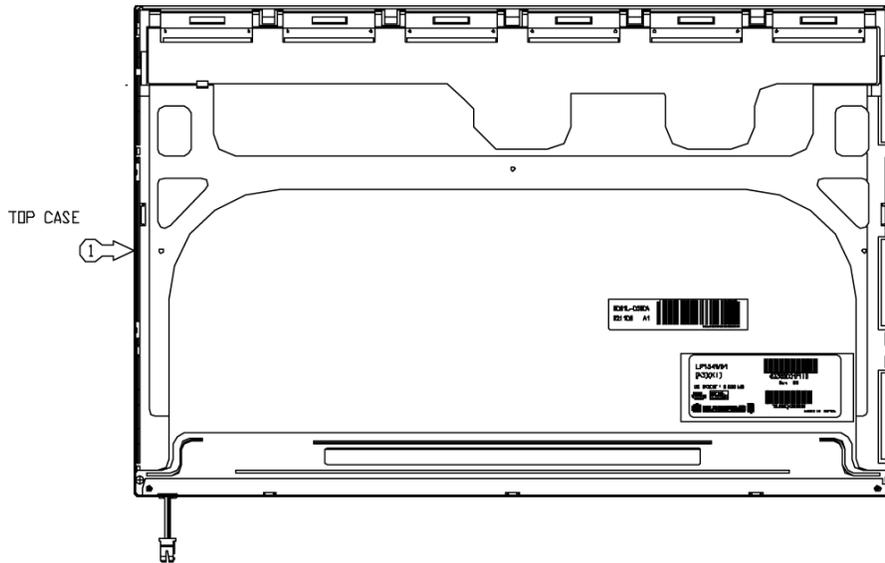
Figure 4-63 Replacing LG.Philips fluorescent lamp (WXGA) (2)

Disassembly of Source PCB and Gate PCB

1. Disassembly of Source PCB

> **CAUTION**: *Pressure or stress should not be given on PCB and TCP during removing double tape.*

2. Disassembly of Gate PCB

> **CAUTION**: *Pressure or stress should not be given on PCB and TCP during removing double tape.*
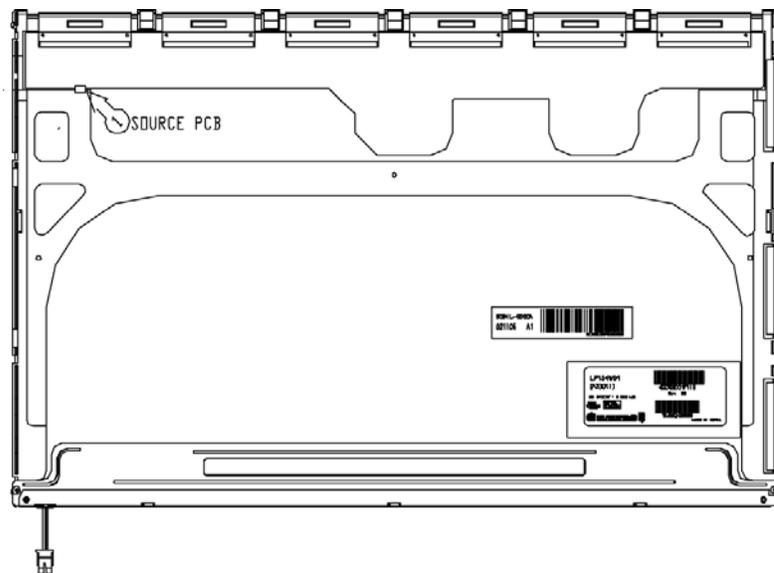
Figure 4-64 Replacing LG.Philips fluorescent lamp (WXGA) (3)

Disassembly of Board Ass'y, Tape Adhesive, Light guide,Cover Ass'y bottom (L)

1. Disassembly of Board Ass'y

> *CAUTION: This process should be made in Clean room with no scratch nor particle on Polarizer and B/L Ass'y.*

2. Disassembly of Tape Adhesive used for Sheets fixing (5Point).

3. Disassembly of Sheets, Light guide

> *CAUTION: No penetration of foreign body is indispensable with no scratch on the surface of each sheet.*

4. Disassembly of Screw and Cover bottom

> *CAUTION: Maximum value of torque with Screw should be below 3.0kgf·cm pressure or stress should not be given on Lamp Housing during detaching double tape.*

5. Disassembly of Lamp Ass'y

> *CAUTION: Pressure or stress should not be given on Lamp Ass'y during detaching double tape.*

Figure 4-65 Replacing LG. LG.Philips fluorescent lamp (WXGA) (4)

Assembly of Cover bottom, Sheets, Light guide, Tape Adhesive, Double Tape and Board Ass'y.

To assemble the 15.4-inch WXGA LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-66 to 4-69.

1. Detach a protect film from Double Tape at the Lamp Ass'y.

2. Attach the Lamp Ass'y to the Support Main.

3. Detach a protect film from Double Tape at the inside of Cover Bottom.

4. Assemble the Cover Bottom and Screw to the Support Main.

> **CAUTION**: *Maximum value of torque with Screw should be below 3.0kgf·cm.*

5. Assembly of Light Guide and Sheets.(Reflector Sheet fixing with one Double Tapes)

> **CAUTION**: *No penetration of foreign body is indispensable with no scratch on the surface of each.*

6. Assembly of Tape adhesive used for Sheets fixing (5Point)

7. Assembly of Board Ass'y

> **CAUTION**: *Pressure or stress should not be given on PCB and TCP.*
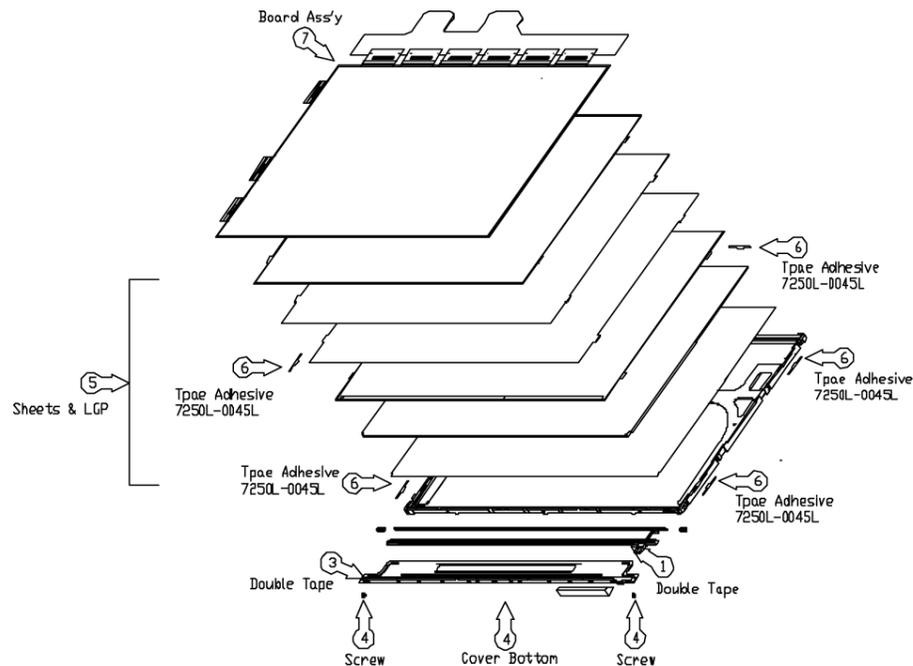
Figure 4-66 Replacing LG.Philips fluorescent lamp (WXGA) (5)

Assembly of Source PCB

1. Assembly of Source PCB

CAUTION*: Stress should not be given on TCP during assembling S/M hook.*

Figure 4-67 Replacing LG.Philips fluorescent lamp (WXGA) (6)

Assembly of Cover Ass'y, Screw, Top Case

1. Assembly of Top Case

> *CAUTION: Pressure should not be given on Gate COF.*
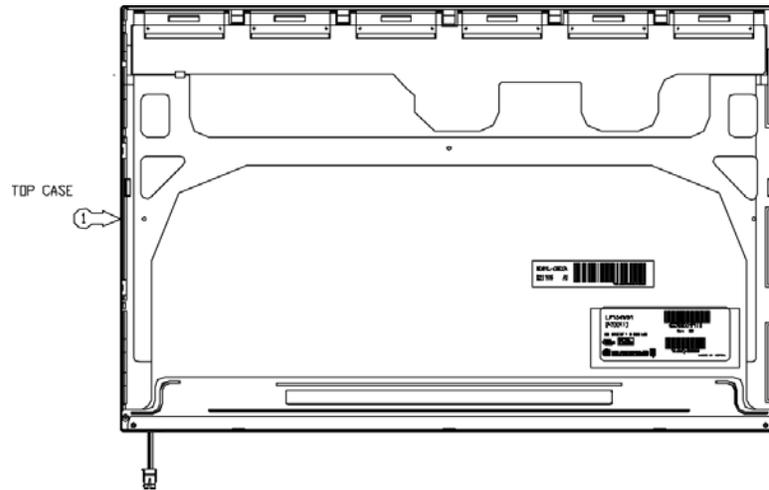
Figure 4-68 Replacing LG.Philips fluorescent lamp (WXGA) (7)

Assembly of outside Tape and Cover shield

1. Assembly of Tape shield and Tape Adhesive used for Top case fixing

   > *NOTE*: *Pressure or stress should not be given on Top case during this process.*

2. Assembly of Cover shield (S)

   > *NOTE*: *Pressure or stress should not be given on control PCB.*
   >
   > *Usage of gloves with anti-electric discharge coating is recommended to eliminate possible damage on circuits occurred by ESC.*

3. Assembly of Cover shield (G)

   > *NOTE*: *Pressure or stress should not be given on Gate COF.*

4. Assembly of Tape adhesive used for B/L Wire fixing

   > *NOTE*: *Pressure or stress should not be given on B/L wire.*

Figure 4-69 Replacing LG.Philips fluorescent lamp (WXGA) (8)

4.29.3 Replacing the 15.4-inch WXGA Samsung Fluorescent Lamp

Disassembling the 15.4-inch WXGA Samsung Fluorescent Lamp

To disassemble the 15.4-inch WXGA Samsung fluorescent lamp, follow the steps below and refer to figures4-70 to 4-74.

1. Remove the PCB cover and COF cover.

2. Remove the lamp wire tape and Al tape.

> *NOTE: Be careful not to damage the COF of S/D or G/D ICs.*
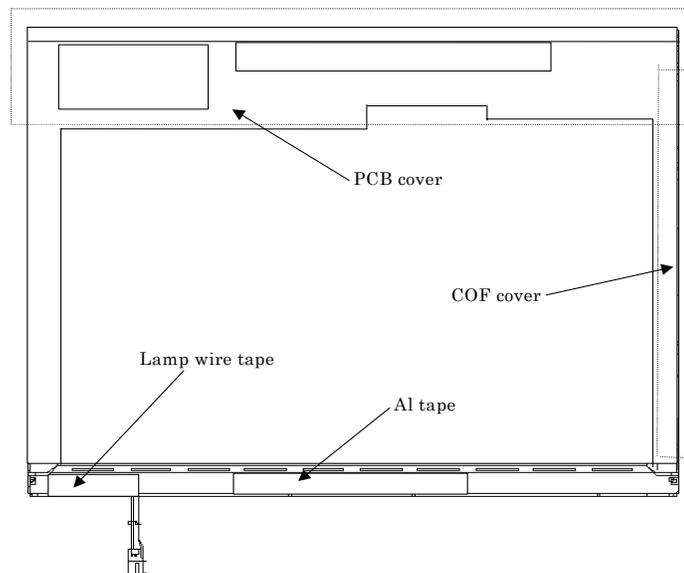
Figure 4-70 Replacing Samsung fluorescent lamp (WXGA) (1)

3.   Remove the two screws from the PCB.
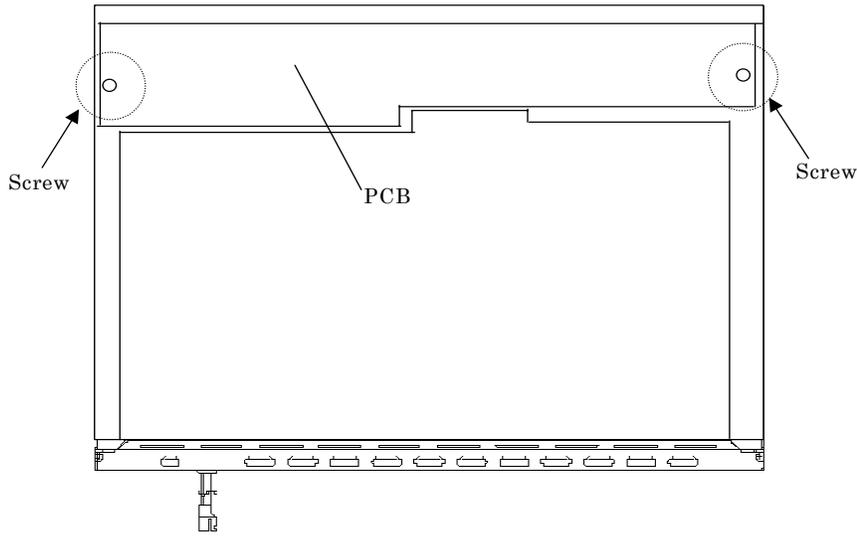
Figure 4-71 Replacing Samsung fluorescent lamp (WXGA) (2)

4.   Remove the four screws from the top chassis.
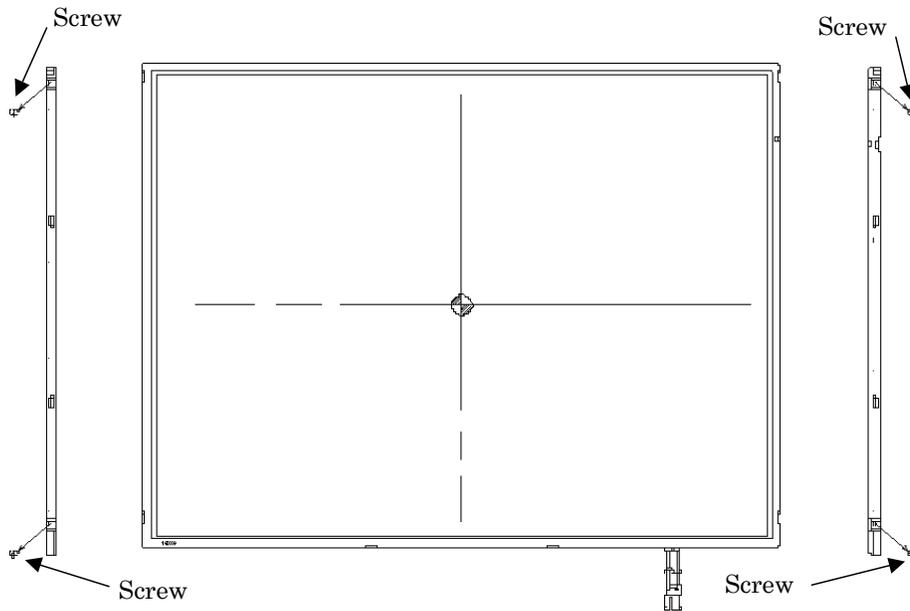
Figure 4-72 Replacing Samsung fluorescent lamp (WXGA) (3)

5. Remove the four bottom hooks and four side hooks (left and right) in the order. Then remove the top chassis from the mold frame.

(2) Side hook

(1) Bottom hook
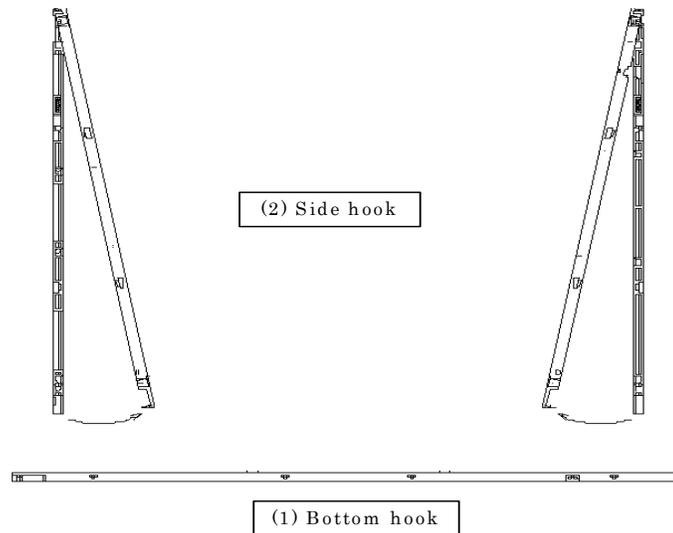
Figure 4-73 Replacing Samsung fluorescent lamp (WXGA) (4)

6. Remove the panel assembly from the BLU.

NOTE: *Be careful not to damage the COF of S/D or G/D ICs.*

Panel assembly

BLU
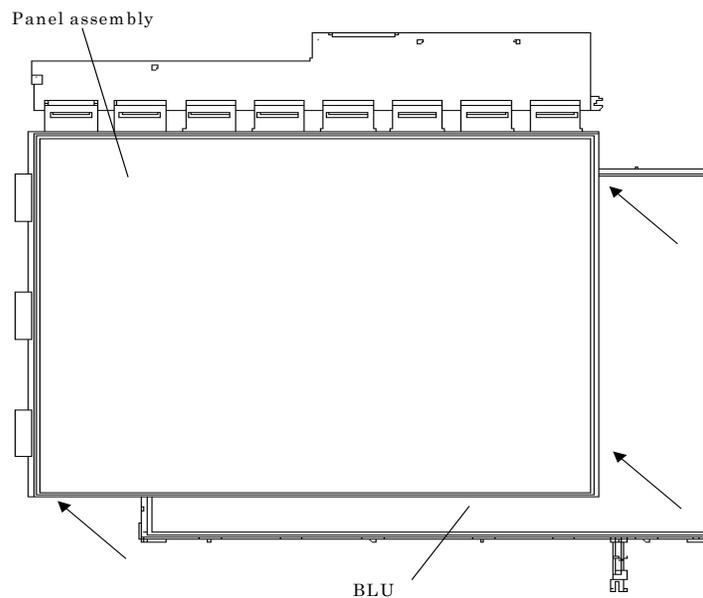
Figure 4-74 Replacing Samsung fluorescent lamp (WXGA) (5)

7. The assembly procedure of the 15.4-inch WXGA Samsung fluorescent lamp is the
    reverse of the above disassembly procedure.

Appendices

Appendix   Contents

Figures

Tables

Appendix A   Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the
following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is
    properly aligned and maximum visibility of the display is maintained.
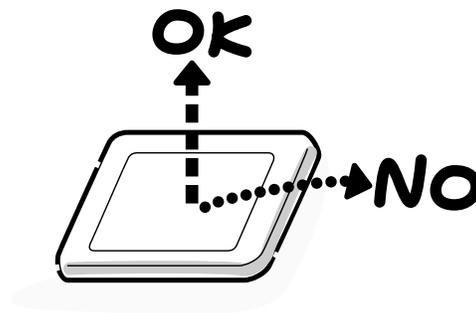
2. For 14.4 inch LCD module, be careful to align the four holes at the right side and left
    side of the LCD module with the corresponding holes in the LCD cover before
    securing the module with four screws.
    Do not force the module into place, because stress can affect its performance.

    Also, the panel's polarized surface is easily scarred, so be carefully when handling it.

3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

    If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.

4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.

5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.
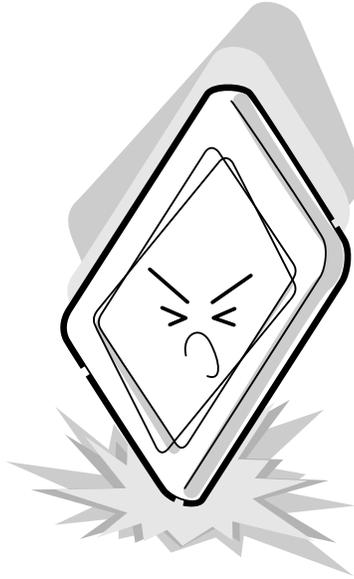
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
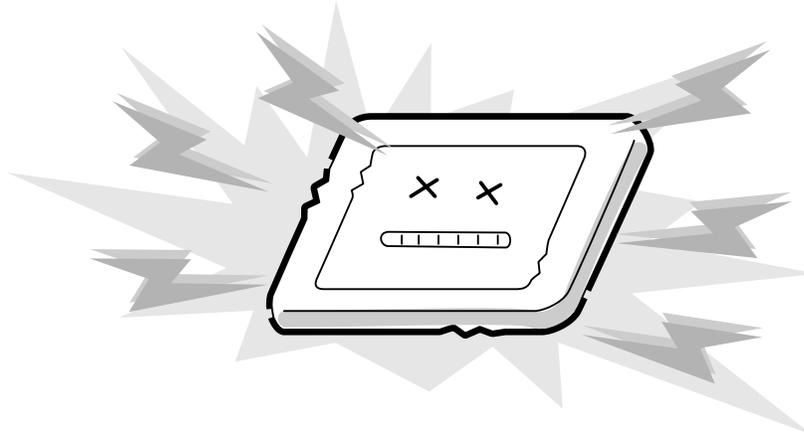
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
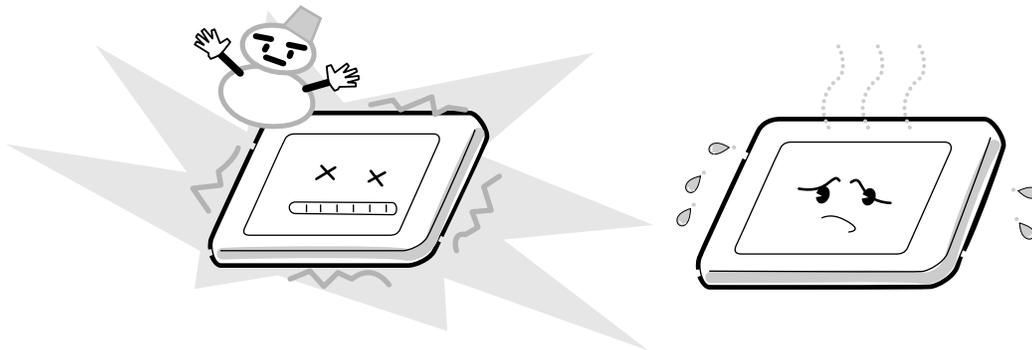
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
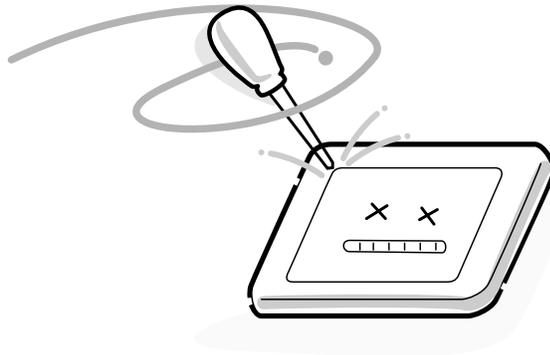
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
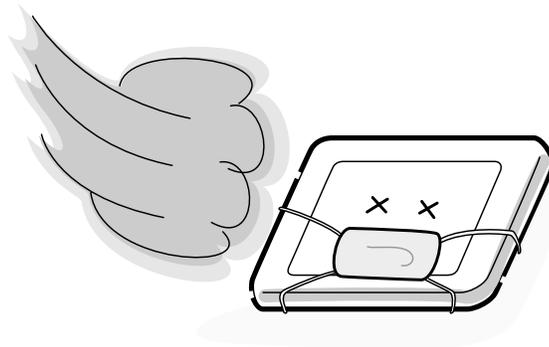
Appendix B   Board Layout

B.1   System Board (FMSSY* 32M) Front View
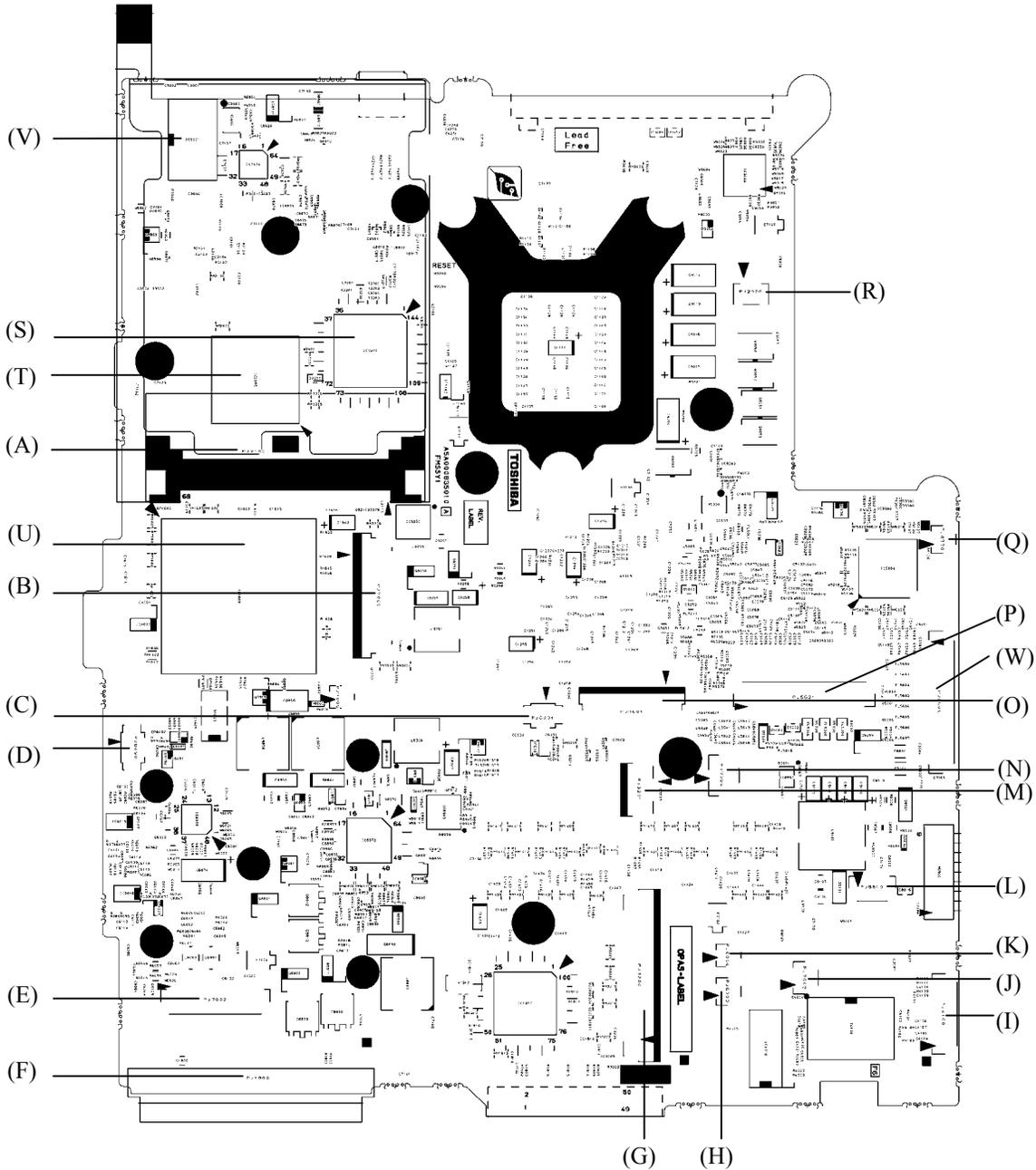
Figure B-1   System board (FMSSY 32M) layout (front)*

Table B-1 System board (FMSSY* 32M) ICs and connectors (front)

Mark	Number	Name
(A)	PJ2100	PC card I/F connector
(B)	PJ7000	CD key I/F connector
(C)	PJ6001	Internal microphone I/F connector
(D)	PJ8490	RTC battery connector
(E)	PJ7002	Sound connector PCB I/F connector
(F)	PJ1800	HDD I/F connector
(G)	PJ3200	Keyboard I/F connector
(H)	PJ6003	Speaker connector (right)
(I)	PJ4100	Network I/F connector
(J)	PJ7003	USB connector PCB I/F connector
(K)	PJ6004	Speaker connector (left)
(L)	PJ8810	1st battery connector
(M)	PJ3201	PAD I/F connector
(N)	PJ7004	Panel switch I/F connector
(0)	PJ7001	Power switch I/F connector
(P)	PJ5621	CRT I/F connector
(Q)	PJ8770	FAN connector
(R)	PJ2000	Debugging port
(S)	IC3200	EC/KBC
(T)	IC2000	YEBISUSS
(U)	IC1600	ICH4-M
(V)	IC3001	FWH
(W)	PJ5600	LCD I/F connector

B.2   System Board (FMSSY* 32M) Back View

Figure B-2 System board (FMSSY 32M) layout (back)*

Table B-2 System board (FMSSY* 32M) ICs and connectors (back)

Mark	Number	Name
(A)	PJ3400	Parallel I/F connector
(B)	PJ3000	MDC I/F connector
(C)	PJ1820	CD-ROM I/F connector
(D)	PJ2200	Mini PCI I/F connector
(E)	PJ4200	1394 I/F connector
(F)	IC5000	NV34
(G)	IC1200	MCH-M
(H)	IS1100	CPU
(I)	IC6008	AN12940
(J)	IS2101	SD card I/F connector

B.3   System Board (FMSMP* 64M) Front View
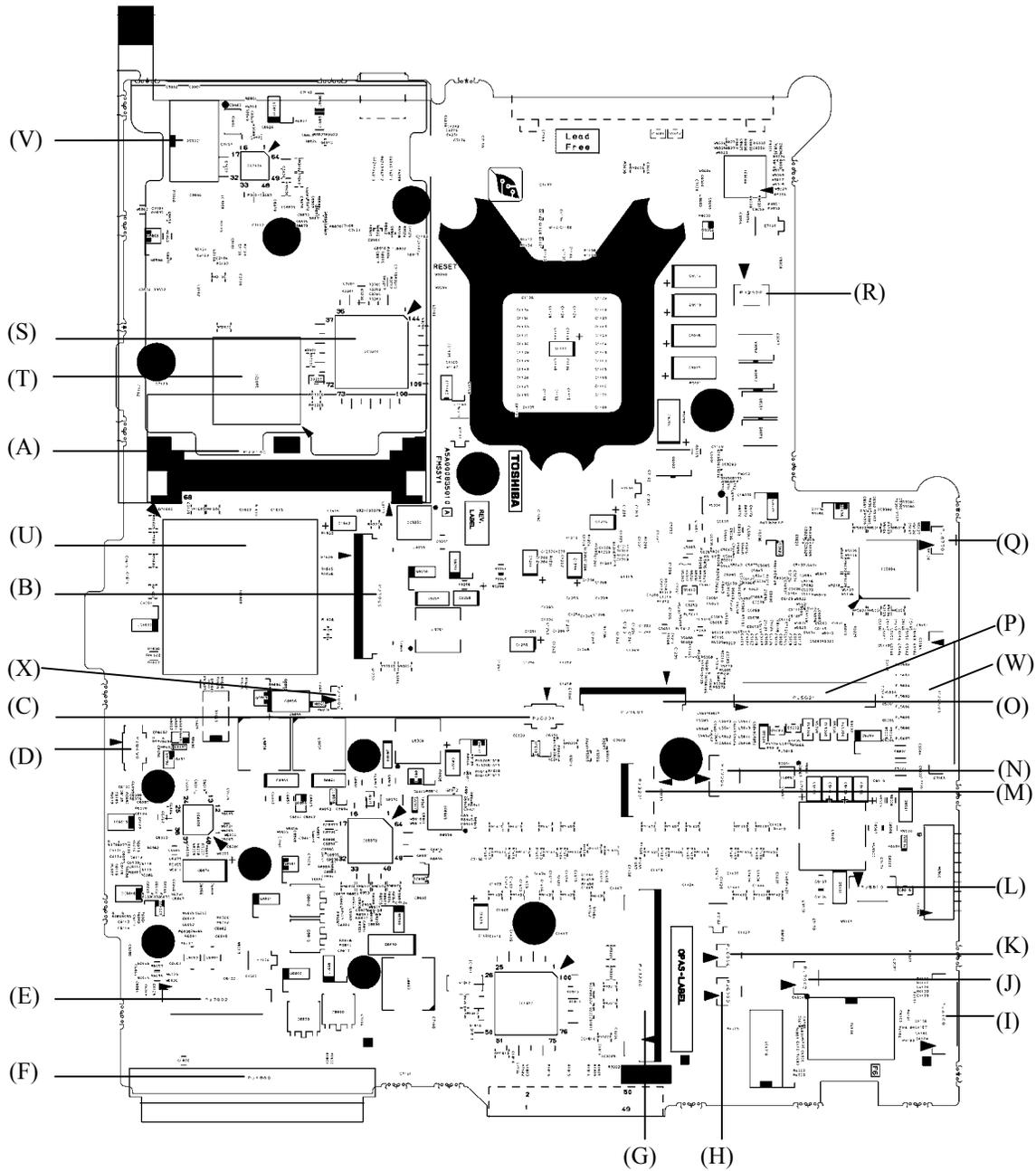
Figure B-3   System board (FMSMP 64M) layout (front)*

Table B-3 System board (FMSMP* 64M) ICs and connectors (front)

Mark	Number	Name
(A)	PJ2100	PC card I/F connector
(B)	PJ7000	CD key I/F connector
(C)	PJ6001	Internal microphone I/F connector
(D)	PJ8490	RTC battery connector
(E)	PJ7002	Sound connector PCB I/F connector
(F)	PJ1800	HDD I/F connector
(G)	PJ3200	Keyboard I/F connector
(H)	PJ6003	Speaker connector (right)
(I)	PJ4100	Network I/F connector
(J)	PJ7003	USB connector PCB I/F connector 1
(K)	PJ6004	Speaker connector (left)
(L)	PJ8810	1st battery connector
(M)	PJ3201	PAD I/F connector
(N)	PJ7004	Panel switch I/F connector
(0)	PJ7001	Power switch I/F connector
(P)	PJ5621	CRT I/F connector
(Q)	PJ8770	FAN connector
(R)	PJ2000	Debugging port
(S)	IC3200	EC/KBC
(T)	IC2000	YEBISUSS
(U)	IC1600	ICH4-M
(V)	IC3001	FWH
(W)	PJ5600	LCD I/F connector
(X)	PJ7005	USB connector PCB I/F connector 2

B.4   System Board (FMSMP* 64M) Back View
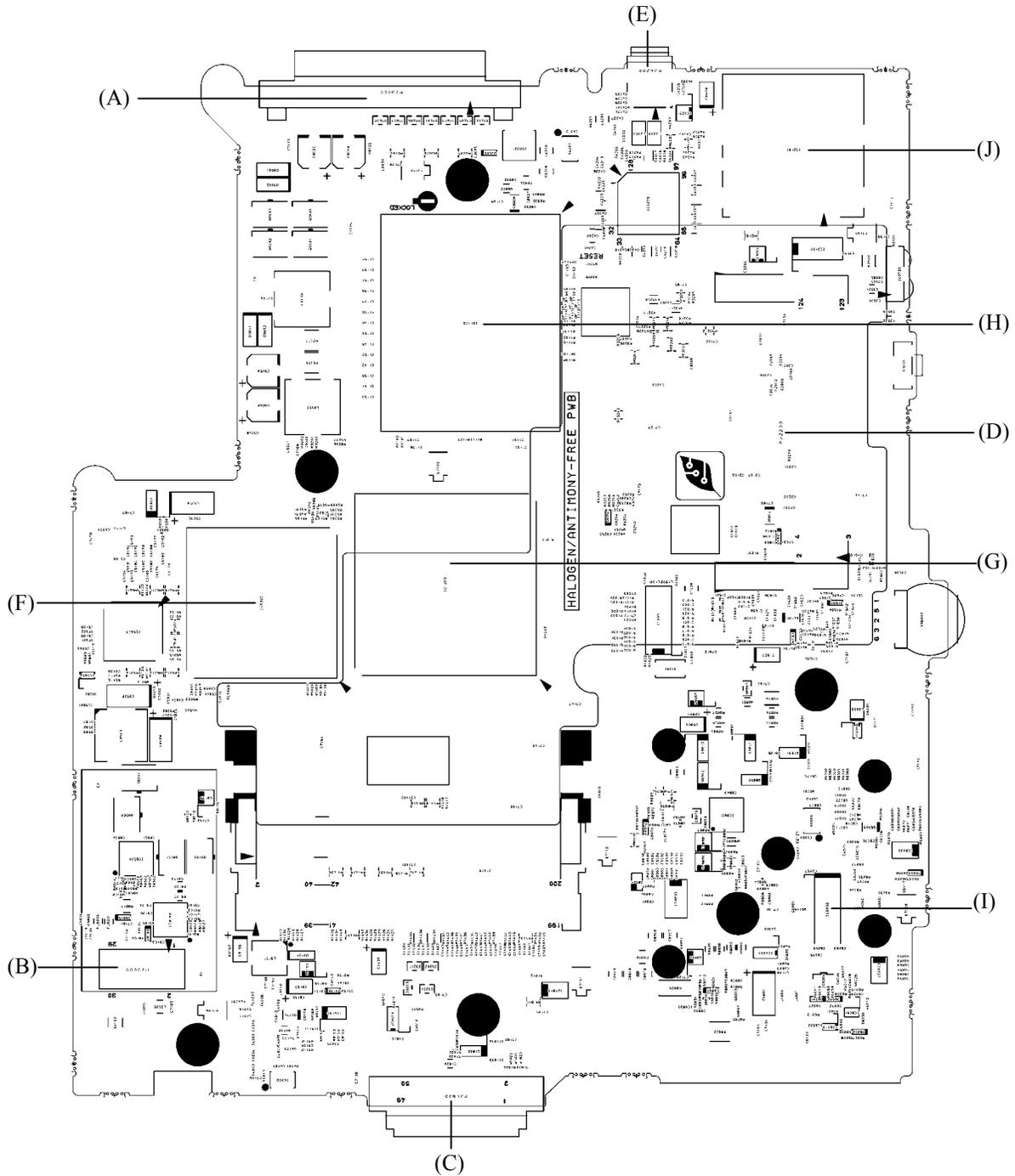
Figure B-4 System board (FMSMP 64M) layout (back)*

Table B-4 System board (FMSMP* 64M) ICs and connectors (back)

Mark	Number	Name
(A)	PJ3400	Parallel I/F connector
(B)	PJ3000	MDC I/F connector
(C)	PJ1820	CD-ROM I/F connector
(D)	PJ2200	Mini PCI I/F connector
(E)	PJ4200	1394 I/F connector
(F)	IC5000	NV64
(G)	IC1200	MCH-M
(H)	IS1100	CPU
(I)	IC6008	AN12940
(J)	IS2101	SD card I/F connector

Appendix C　Pin Assignment

System Board (common to FMSSY* 32M, FMSMP* 64M)

C.1　IS1400/1401　Memory connector (200-pin)

Table C-1　Memory connector (200-pin)(1/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	VREF	-	2	VREF	-
3	GND	-	4	GND	-
5	SDQ00R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ01R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ05R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ03R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ12R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ09R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ15R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK0-B2P	I	36	2R5-B2V	-
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ22R-B2P	I/O
43	SDQ16R-B2P	I/O	44	SDQ21R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ17R-B2P	I/O	50	SDQ19R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18R-B2P	I/O	54	SDQ23R-B2P	I/O

Table C-1 Memory connector (200-pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
55	SDQ25R-B2P	I/O	56	SDQ29R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	GND	-
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ30R-B2P	I/O
67	SDQ27R-B2P	I/O	68	SDQ31R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	N.C	-	86	N.C	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE1-B2P	I	96	SCKEO-B2P	I
97	N.C	-	98	N.C	-
99	SMA12R-B2P	I	100	SMA11R-B2P	I
101	SMA09R-B2P	I	102	SMA08R-B2P	I
103	GND	-	104	GND	-
105	SMA07R-B2P	I	106	SMA06R-B2P	I
107	SMA05R-B2P	I	108	SMA04R-B2P	I
109	SMA03R-B2P	I	110	SMA02R-B2P	I
111	SMA01R-B2P	I	112	SMA00R-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10R-B2P	I	116	SBS1R-B2P	I
117	SBS0R-B2P	I	118	SRASR-B2N	I
119	SWER-B2N	I	120	SCASR-B2N	I
121	SCS0-B2N	I	122	SCS1-B2N	I
123	N.C	-	124	N.C	-

Table C-1 Memory connector (200-pin)(3/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ33R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ32R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ34R-B2P	I/O	136	SDQ39R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ35R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ41R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ45R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ46R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ42R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK1-B2N	I
159	GND	-	160	SCK1-B2P	I
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ54R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ51-B2P	I/O	172	SDQ50R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ52R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	I/O
185	GND	-	186	GND	-
187	SDQ58R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-

Table C-1 Memory connector (200-pin)(4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
195	SMBCLK-P3P	I/O	196	GND	-
197	P3V	-	198	GND	-
199	N.C	-	200	N.C	-

C.2   PJ1800 HDD I/F connector (44-pin)

Table C-2 HDD I/F connector (44-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IDRSTA-P5N	I	2	GND	-
3	PDD07-P3P	I	4	PDD08-P3P	O
5	PDD06-P3P	I	6	PDD09-P3P	O
7	PDD05-P3P	I	8	PDD10-P3P	O
9	PDD04-P3P	I	10	PDD11-P3P	O
11	PDD03-P3P	I	12	PDD12-P3P	O
13	PDD02-P3P	I	14	PDD13-P3P	O
15	PDD01-P3P	I	16	PDD14-P3P	O
17	PDD00-P3P	I	18	PDD15-P3P	O
19	GND	-	20	N.C	-
21	PDDREQ-P3P	I	22	GND	-
23	PDIOW-P3N	I	24	GND	-
25	PDIOR-P3N	I	26	GND	-
27	PIORDY-P3P	I	28	GND	-
29	PDDACK-P3N	I	30	GND	-
31	PDIRQ-P3P	I	32	N.C	-
33	PDA1-P3P	I	34	N.C	-
35	PDA0-P3P	I	36	PDA2-P3P	O
37	PDCS1-P3N	I	38	PDCS3-P3N	O
39	HDDLED-P5N	I	40	GND	-
41	P5V	-	42	P5V	-
43	GND	-	44	N.C	-

C.3   PJ1820 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	CDAUDL-EXP	I	2	CDAUDR-EXP	I
3	CD-GND	I	4	N.C	-
5	IDRSTB-E5N	O	6	SDD08-E5P	I/O
7	SDD07-E5P	I/O	8	SDD09-E5P	I/O
9	SDD06-E5P	I/O	10	SDD10-E5P	I/O
11	SDD05-E5P	I/O	12	SDD11-E5P	I/O
13	SDD04-E5P	I/O	14	SDD12-E5P	I/O
15	SDD03-E5P	I/O	16	SDD13-E5P	I/O
17	SDD02-E5P	I/O	18	SDD14-E5P	I/O
19	SDD01-E5P	I/O	20	SDD15-E5P	I/O
21	SDD00-E5P	I/O	22	SDDREQ-E5P	I
23	GND	-	24	SDIOR-E3N	O
25	SDIOW-E3N	O	26	GND	-
27	SIORDY-E5P	I	28	SDDACK-E3N	O
29	IRQ15-E5P	I	30	N.C	-
31	SDA1-E3P	O	32	N.C	O
33	SDA0-E3P	O	34	SDA2-E3P	O
35	SDCS1-E3N	O	36	SDCS3-E3N	O
37	SDASP-E5N	I/O	38	CD-E5V	O
39	CD-E5V	I	40	CD-E5V	O
41	CD-E5V	I	42	CD-E5V	O
43	GND	-	44	GND	-
45	GND	-	46	N.C	-
47	N.C	-	48	GND	-
49	N.C	-	50	N.C	-

C.4   PJ2100 PC card I/F connector (68-pin)

Table C-4 PC card I/F connector (68-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	ACAD00-BYP	I/O
3	ACAD01-BYP	I/O	4	ACAD03-BYP	I/O
5	ACAD05-BYP	I/O	6	ACAD07-BYP	I/O
7	ACCBEO-BYP	I/O	8	ACAD09-BYP	I/O
9	ACAD11-BYP	I/O	10	ACAD12-BYP	I/O
11	ACAD14-BYP	I/O	12	ACCBE1-BYN	I/O
13	ACPAB-BYP	I/O	14	ACRERR-BYN	I/O
15	ACGNT-BYN	I/O	16	ACTNT-BYN	I/O
17	MCVCCA	I/O	18	MCVPPA	I/O
19	ACCLK-BYP	I/O	20	ACTBDY-BYN	I/O
21	ACCBE2-BYN	I/O	22	ACAD18-BYP	I/O
23	ACAD20-BYP	I/O	24	ACAD21-BYP	I/O
25	ACAD22-BYP	I/O	26	ACAD23-BYP	I/O
27	ACAD24-BYP	I/O	28	ACAD25-BYP	I/O
29	ACAD25-BYP	I/O	30	ACAD27-BYP	I/O
31	ACAD29-BYP	I/O	32	ACD02-BYP	I/O
33	ACCLKR-BYN	I/O	34	GND	-
35	GND	-	36	ACCD1-B3N	I/O
37	ACAD02-BYP	I/O	38	ACAD04-BYP	I/O
39	ACAD06-BYP	I/O	40	ACD14-BYP	I/O
41	ACAD08-BYP	I/O	42	ACAD10-BYP	I/O
43	ACVS1-B3P	I/O	44	ACAD13-BYP	I/O
45	ACAD15-BYP	I/O	46	ACAD16-BYP	I/O
47	ACA18-BYP	I/O	48	ACLOCK-BYN	I/O
49	ACSTOP-BYN	I/O	50	ACDEVS-BYN	I/O
51	MCVCCA	I	52	MCVPPA	I/O
53	ACTRDY-BYN	I/O	54	ACFRAM-BYN	I/O
55	ACAD17-BYP	I/O	56	ACAD19-BYP	I/O
57	ACYS2-B3P	I/O	58	ACRST-BYN	I/O

Table C- PC card I/F connector (68-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
59	ACSERR-BYN	I/O	60	ACREQ-BYN	I/O
61	ACCBE3-BYN	I/O	62	ACAUDI-BYP	I
63	ACSTSC-BYP	I	64	ACAD28-BYP	I/O
65	ACAD30-BYP	I/O	66	ACAD31-BYP	I/O
67	ACCD2-B3N	I	68	GND	-

C.5   IS2101 SD card I/F connector (12-pin)

Table C-5 SD card I/F connector (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SDAT3-B3P	I/O	2	SDCMD-B3P	I/O
3	GND	-	4	SD-B3V	-
5	SDCLK-B3P	O	6	GND	-
7	SDAT0-B3P	I/O	8	SDAT1-B3P	I/O
9	SDAT2-B3P	I/O	10	SDCD-B3N	I
11	GND	-	12	SDWP-B3P	-

C.6   PJ2200 Mini PCI I/F connector (124-pin)

Table C-6 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	PIRQA-P3N	I	18	P5V	-
19	P3V	-	20	PIRQD-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	I	26	PCIRST-P3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I	34	PME-S3N	O
35	AD29-P3P	I	36	N.C.	-
37	GND	-	38	AD30-P3P	O
39	AD27-P3P	I	40	P3V	-
41	AD25-P3P	I	42	AD28-P3P	O
43	N.C.	-	44	AD26-P3P	O
45	CBE3-P3N	I	46	AD24-P3P	O
47	AD23-P3P	I	48	AD26-P3P	O
49	GND	-	50	GND	-
51	AD21-P3P	I	52	AD22-P3P	O
53	AD19-P3P	I	54	AD20-P3P	O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I	58	AD18-P3P	O
59	CBE2-P3N	I	60	AD16-P3P	O
61	IRDY-P3N	I	62	GND	-

Table C-6 Mini PCI I/F connector (124-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	P3V	-	64	FRAME-P3N	O
65	CLKRUN-P3N	I	66	TRDY-P3N	O
67	SERR-P3N	I	68	STOP-P3N	0
69	GND	-	70	P3V	-
71	PERR-P3N	I	72	DEVSEL-P3N	0
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I	76	AD15-P3P	O
77	GND	-	78	AD13-P3P	O
79	AD12-P3P	I	80	AD11-P3P	O
81	AD10-P3P	I	82	GND	-
83	GND	-	84	AD09-P3P	O
85	AD08-P3P	I	86	CBE0-P3N	O
87	AD07-P3P	I	88	P3V	-
89	P3V	-	90	AD06-P3P	O
91	AD05-P3P	I	92	AD04-P3P	O
93	N.C.	-	94	AD02-P3P	O
95	AD03-P3P	I	96	AD00-P3P	O
97	P5V	-	98	N.C.	-
99	AD01-P3P	I	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	B3V	-

C.7   PJ3000 MDC I/F connector (30-pin)

Table C-7 MDC I/F connector (30-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C	-	2	GND	-
3	GND	-	4	N.C	-
5	N.C	-	6	N.C	-
7	N.C	-	8	GND	-
9	N.C	-	10	N.C	-
11	N.C	-	12	N.C	-
13	N.C	-	14	N.C	-
15	GND	-	16	MDC-B3V	I
17	MDC-B3V	-	18	N.C	-
19	GND	-	20	GND	-
21	N.C	-	22	M97SY2-P3P	I
23	M97OT2-P3P	I	24	N.C	-
25	M97RS2-S3N	I	26	M97IN2-B3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BMD-P3P	I/O

C.8   PJ3200 Keyboard I/F connector (34-pin)

Table C-8 Keyboard I/F 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	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	I
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	I
17	KBRT02-S3N	I	18	KBRT03-S3N	I
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	I	22	KBRT05-S3N	I
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	I	26	KBRT07-S3N	I
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	P5V	-	30	N.C	-
31	N.C	-	32	N.C	-
33	N.C	-	34	P5V	-

C.9   PJ3201 PAD I/F connector (8-pin)

Table C-9 PAD I/F connector (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	N.C	-
5	IPDCLK-P5P	I/O	6	IPDDAT-P5P	I/O
7	P5V	-	8	P5V	-

C.10   PJ3400 Parallel I/F Connector (25-pin)

Table C-10 Parallel I/F connector (25-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	STROB-P5N	I	2	PDB00-P5P	I/O
3	PDB01-P5P	I/O	4	PDB02-P5P	I/O
5	PDB03-P5P	I/O	6	PDB04-P5P	I/O
7	PDB05-P5P	I/O	8	PDB06-P5P	I/O
9	PDB07-P5P	I/O	10	ACK-P5N	I
11	BUSY-P5P	I	12	PE-P5P	I
13	SELCT-P5P	I	14	AUTFD-P5N	O
15	ERROR-P5N	I	16	PINIT-P5N	O
17	SLIN-P5N	O	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	GND	-			

C.11   PJ4100 Network I/F connector (14-pin)

Table C-11-1 PJ4100 Network I/F connector (14-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(RCT)	-	2	(RCT)	-
3	RX-	I	4	(RCT)	-
5	(RCT)	-	6	RX+	I
7	TX-	O	8	TX+	O
9	N.C	-	10	N.C	-
11	ACT-E3N	O	12	(LAN-E3V)	-
13	LNK-E3N	O	14	(LAN-E3V)	-

C.12   PJ4200 1394 I/F connector (4-pin)

Table C-12 1394 I/F connector (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TPB0-P3N	I/O	2	TPB0-P3P	I/O
3	TPA0-P3N	I/O	4	TPA0-P3P	I/O

C.13   PJ5600 LCD connector (41-pin)

Table C-13 LCD connector (41-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BRT0-P5P	O	2	BRT1-P5P	O
3	BRT2DA-S3P	O	4	GND	-
5	TXCK1-P3N	O	6	TXCK1-P3P	O
7	GND	-	8	TXDT4-P3N	O
9	TXDT4-P3P	O	10	GND	-
11	TXDT5-P3N	O	12	TXDT5-P3P	O
13	GND	-	14	TXDT6-P3N	O
15	TXDT6-P3P	O	16	GND	-
17	TXCK0-P3N	O	18	TXCK0-P3P	O
19	GND	-	20	TXDTO-P3N	O
21	TXDTO-P3P	O	22	GND	-
23	TXDT1-P3N	O	24	TXDT1-P3P	O
25	GND	-	26	TXDT2-P3N	O
27	TXDT2-P3P	O	28	PNL0-P3P	I
29	FL-P5V	-	30	FL-P5V	-
31	FL-P5V	-	32	PNL-3V	-
33	PNL1-P3P	I	34	PNL-P3V	-
35	GND	-	36	PNL2-P3P	I
37	GND	-	38	GND	-
39	GND	-	40	GND	-
41	GND	-			

C.14   PJ5621 CRT I/F connector (20-pin)

Table C-14 CRT I/F connector (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	TVLOUT-PXP	O
3	GND	-	4	TVCOUT-PXP	O
5	GND	-	6	N.C	-
7	DDC-P5V	-	8	NVDSCL-P5P	I/O
9	(AVSYNC-P3P)	I	10	(AHSYNC-P3P)	O
11	NVDSDA-P5P	I/O	12	GND	-
13	GND	-	14	CRTBLU-PXP	O
15	VGAGND	O	16	CRTGRN-PXP	-
17	GND	-	18	CRTRED-PXP	O
19	GND	-	20	GND	-

C.15   PJ6001 Internal Microphone connector (2-pin)

Table C- 15 Internal Microphone connector (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(MICIN-PXP)	I	2	A-GND	-

C.16   PJ6004 Speaker Connector (left) (2-pin)

Table C- 16 Speaker Connector (left) connector (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	SPKOTL-EXN	O	2	SPKOTL-EXP	O

C.17   PJ6003 Speaker Connector (right) (3-pin)

Table C-17 Speaker connector (right) pin assignment (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPKOTR-EXN	O	2	N.C	-
3	SPKOTR-EXP	O			

C.18   PJ7000 CD key I/F connector (18-pin)

Table C-18 CD key I/F connector (18-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	M5V	-	2	MP3MOD-E5N	O
3	CDMODE-E5N	O	4	MODBTN-S3N	I
5	CDPREV-S5N	I	6	CDNEXT-S5N	I
7	CDPLAY-S5N	I	8	CDSTOP-S5N	I
9	GND	-	10	BAT102-M5N	O
11	BAT1B2-M5N	O	12	M5V	-
13	PWLE02-M5N	O	14	PWLEB2-M5N	O
15	M5V	-	16	DCINO2-M5N	O
17	DCINB2-M5N	O	18	M5V	-

C.19   PJ7001 Power switch I/F connector (15-pin)

Table C-19 Power switch I/F connector (15-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PWLEB3-M5N	O	2	M5V	-
3	BTLED2-P5N	O	4	P5V	-
5	ODLED2-M5N	O	6	M5V	-
7	GND	-	8	TVOBTN-S3N	I
9	ITCBTN-S3N	I	10	INETBTN-S3N	I
11	PWRSW-S3N	I	12	SDLED2-P5N	O
13	P5V	-	14	HDLED2-P5N	O
15	P5V	-			

C.20   PJ7002 Sound connector PCB I/F connector (20-pin)

Table C-20 Sound connector PCB I/F connector (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	HPL-EXP	I/O
3	A-GND	-	4	HPR-EXP	I/O
5	HPIN-E4N	I	6	A-GND	-
7	MVREF2-P2V	-	8	MIC-PXP	I
9	A-GND	-	10	MVREF1-P2V	I
11	MICIN-P4N	I	12	A-GND	-
13	GND	-	14	USBP1C-S3N	O
15	USBP1C-S3P	O	16	GND	-
17	USBPOC-S3N	O	18	USBPOC-S3P	O
19	USBOPS-E5V	O	20	USBOPS-E5V	O

C.21　PJ7004 Panel switch I/F connector (2-pin)

Table C-21 USB connector PCB I/F connector (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PNLOFF-S3V	I	2	GND	-

C.22　PJ8810 1st Battery connector (7-pin)

Table C-22 1st Battery connector (7-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BTMP1	O	2	(DCHG)	-
3	(M5V)	-	4	PSCL-S5P	I/O
5	PSDA-S5P	I/O	6	GND	-
7	DBT10V-S5N	O			

C.23　PJ8490 RTC Battery Connector (3-pin)

Table C-23 RTC Battery connector pin assignment (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	(R3V)	-	2	N.C	-
3	GND	-			

C.24　PJ8770 FAN connector (3-pin)

Table C-24 FAN connector (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FAN VCC	-	2	GND	-
3	FANG-P3P	I			

C.25　PJ2000 Debugging port (4-pin)

Table C-25 Debugging port (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	-

(only for FMSSY* 32M)

C.26   PJ7003 USB connector PCB I/F connector (4-pin)

Table C-26 USB connector PCB I/F connector (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USB1PS-E5V	O	2	USBP2C-S3N	O
3	USBP2C-S3P	O	4	GND	-

(only for FMSMP* 64M)

C.27   PJ7003 USB connector PCB I/F connector 1 (4-pin)

Table C-27 USB connector PCB I/F connector 1 (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USB1PS-E5V	O	2	N.C	-
3	N.C	-	4	GND	-

C.28   PJ7005 USB connector PCB I/F connector 2 (2-pin)

Table C-28 USB connector PCB I/F connector 2 (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USBP2C-S3N	I	2	USBP2C-S3P	I

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 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break	Note
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 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break	Note
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 Make				Code set 1 Break				Code set 2 Make					Code set 2 Break				
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	E0	12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA	E0 B6
	E0 2A	E0 36
Set 2	E0 F0 12	E0 F0 59
	E0 12	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1								Code set 2								
		Make				Break				Make				Break				
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0 12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0 12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0 12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0 12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0 12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0 12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0 12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0 12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0 12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0 12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0 12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1				Code set 2				
		Make		Break		Make		Break		
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
121	ARROW	45		C5		77		F0	77	
122	NUMERIC	45		C5		77		F0	77	
123	Scrl	46		C5		7E		F0	7E	

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2		
			Make	**Break**	**Make**	**Break**	
09	8	(8)	48	C8	75	F0	75
10	9	(9)	49	C9	7D	F0	7D
11	0	(*)	37	B7	7C	F0	7C
23	U	(4)	4B	CB	6B	F0	6B
24	I	(5)	4C	CC	73	F0	73
25	O	(6)	4D	CD	74	F0	74
26	P	(−)	4A	CA	7B	F0	7B
37	J	(1)	4F	CF	69	F0	69
38	K	(2)	50	D0	72	F0	72
39	L	(3)	51	D1	7A	F0	7A
40	;	(+)	4E	CE	79	F0	79
52	M	(0)	52	D2	70	F0	70
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0 4A	

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		**Break**		**Make**		**Break**	
Prt Sc	Common	E0 2A E0 37		E0 B7 E0 AA		E0 12 E0 7C		E0 F0 7C E0 F0 12	
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt +	54		D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2						
		Make						Make						
Pause	Common *	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E		

*: This key generates only make codes.

Appendix E   Key Layout

E.1   United Kingdom (UK) Keyboard
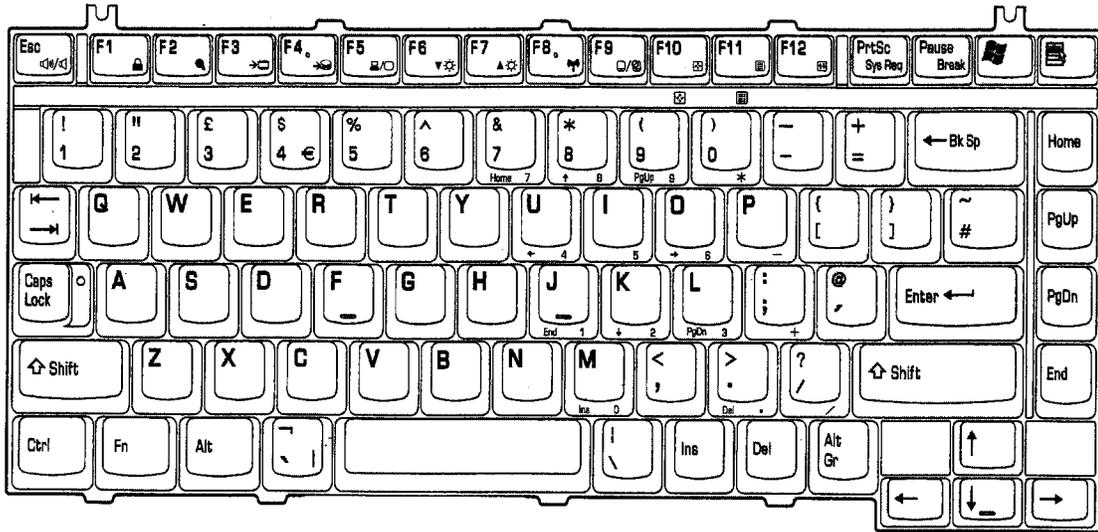
Figure E-1 UK keyboard

E.2   United States (US) Keyboard
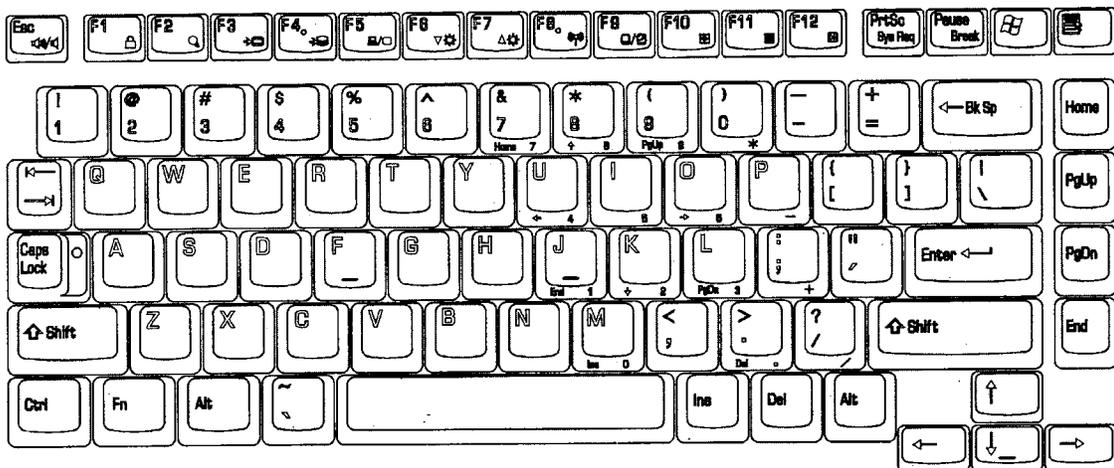
Figure E-2 US keyboard

Appendix F   Wiring Diagrams

F.1   Parallel Port Wraparound Connector

```
(9)  +PD7 ─────────────────────────────── (15)   --ERROR
(8)  +PD6 ─────────────────────────────── (14)   --AUTFD
(7)  +PD5 ─────────────────────────────── (13)   -SELECT
(6)  +PD4 ─────────────────────────────── (16)   -PINT
(5)  +PD3 ──────────────┐                  (1)   --STROBE
                        └───────────────  (10)   --ACK
(4)  +PD2 ─────────────────────────────── (12)   +PE
(3)  +PD1 ─────────────────────────────── (17)   --SLIN
(2)  +PD0 ─────────────────────────────── (11)   +BUSY
```
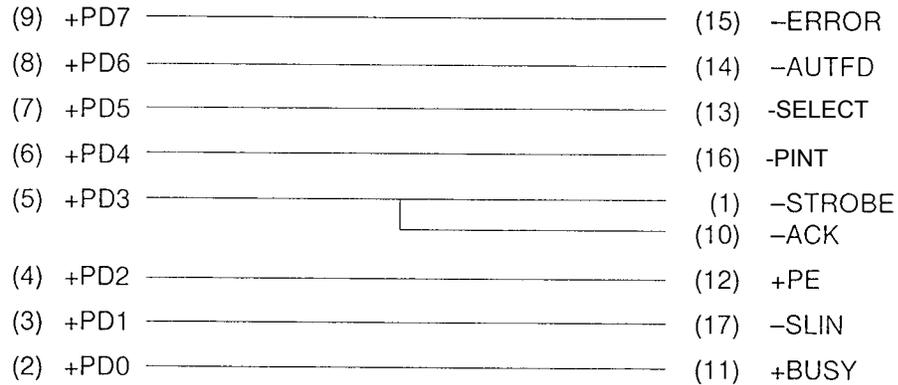
Figure F-1 Parallel port wraparound connector

F.2   LAN Loopback Connector

```
(1) BIBAP (TX+)   ─────────────────────── (3) BIDBP (RX+)

(2) BIDAN (TX-)   ─────────────────────── (6) BIDBN (RX-)
```
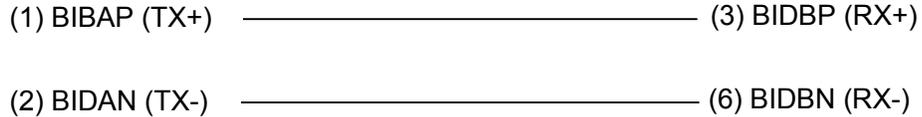
Figure F-2 LAN loopback Connector

Appendix G   BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

❑ BIOS/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Connect an external FDD and insert the BIOS/EC/KBC rewriting disk into either the external FDD.
5. Turn on the power while holding down the No. 01 key.

For example

 (US Keyboard)

 (UK Keyboard)
(Keep holding down the key until a message appears on the screen.)
The BIOS rewriting starts.

6. When the process is completed, eject the BIOS/EC/KBC rewriting disk and the system is automatically reset.

Appendix I   Reliability

The following table shows MTBF (Mean Time between Failures).

Table I-1 MTBF

MTBF	Time (hours)
VRAM32MB (FMSSY* board) model	7323.49
VRAM64MB (FMSMP* board) model	7341.30

Appendix J   SETUP

This function displays the current system setup information. The options are listed blow.

1. Main
    - (1) Total Memory
    - (2) System Date
    - (3) System Time
    - (4) BIOS Ver.
2. Advanced
    - (1) Power On Display
    - (2) LCD Display Stretch
    - (3) TV Type
    - (4) Dynamic CPU Freq Mode
    - (5) Built-in LAN
    - (6) Network Boot Protocol
    - (7) Wake-up On LAN
    - (8) Internal Pointing Device
    - (9) Parallel Port Mode
3. Security
    - (1) Power on Password
4. Boot
    - (1) Hard Drive
    - (2) Removable Devices
    - (3) CD/DVD-ROM Drive
    - (4) Network Boot
5. Exit
    - (1) Exit Saving Changes
    - (2) Exit Discarding Changes
    - (3) Load Setup Defaults
    - (4) Discard Changes
    - (5) Save Changes

To access the SETUP display, power on the computer and while "TOSHIBA" logo is displayed, press **[F2]**. Then, the main menu similar to the one blow appears.
There are five tabs (Main, Advanced, Security, Boot and Exit) in the SETUP menu. To move between the tabs, press ← or →. Each option is displayed on the menu by selecting a tab. "Item Specific Help" on the right of the menu describes each option.

```
                           PhoenixBIOS Setup Utility
      Main      Advanced      Security      Boot      Exit

                                                          Item Specific Help

        Total Memory:     256MB
                                                    <Tab>,<Shift-Tab>, or
        System Date:      [01/03/2000]              <Enter> selects field.
        System Time:      [17:50:55]

        BIOS Ver.         v1.00








      F1   Help    ↓↑   Select Item    F5/F6    Change Values      F9   Setup Defaults
      Esc  Exit    ↔    Select Menu     Enter    Select Sub-Menu    F10  Save and Exit
```

Figure J-1 Main menu

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

Main
   1. Total Memory

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

      This option is used to set the date of the computer. To change the value, press **[F5]** or **[F6]** and press **[Enter]** to select the value.

            System Date   Sets the date.

   3. System Time

      This option is used to set the time of the computer. To change the value, press **[F5]** or **[F6]** and press **[Enter]** to select the value.

            System Time   Sets the time.

   4. BIOS Ver.

      This option displays the BIOS version of the computer. You cannot change this value.

Advanced
1. Power On Display

    [Auto-Selected]   If any external display is connected, the power on display will be in analog RGB only mode. Otherwise it will be in LCD only mode.

    [LCD+Analog RGB]   Display both the integrated LCD screen and analog RGB screen mode.

2. LCD Display Stretch

    [Enabled]   LCD display stretch is enabled.

    [Disabled]   LCD display stretch is disabled.

3. TV Type
    This option sets the TV type options.

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

    [NTSC (JAPAN)]   TV in Japanese system

    [PAL]   TV in Europe system

4. Dynamic CPU Freq Mode

    [Switchable]   CPU frequency is dynamically switchable.

    [Always High]   CPU frequency is always high.

    [Always Low]   CPU frequency is always low.

5. Built-in LAN

    [Enabled]   Built-in LAN is enabled.

    [Disabled]   Built-in LAN is disabled.

6. Network Boot Protocol

    [PXE]   Network boot by the PXE protocol.

    [RPL]   Network boot by the RPL protocol.

7. Wake-up On LAN

    [Enabled]   Wake-up is enabled from Built-in LAN.

    [Disabled]   Wake-up is disabled from Built-in LAN.

8. Internal Pointing Device

    [Enabled]   Internal pointing device is enabled.

    [Disabled]   Internal pointing device is disabled.

9. Parallel Port Mode
    This option sets the mode for the parallel port using options.

    [ECP]   Sets the port type to Extended Capabilities Port (ECP). For
                              most printers, the port should be set to "ECP." (Default)

    [Bi-derectional]   This setting should be used with some other parallel devices.

Security
1. Power On Password
    To set a new user password, press **[Enter]** and enter the new password twice.

    [Not Registered]   The password has not been registered.

    [Registered]   The password has been registered.

Boot
This option displays boot sequence of devices of the computer.

    Hard Drive   mainly for HDD

    Removable Devices   mainly for FDD

    CD/DVD-ROM Drives   mainly for CD/DVD-ROM

    Network Boot   mainly for LAN

Exit
1. Exit Saving changes
    Exit System Setup and save your changes to CMOS.

2. Exit Discarding Changes
    Exit utility without saving Setup changes data to CMOS.

3. Load Setup Defaults
    Load default values for all Setup items.

4. Discard Changes
    Load previous values from CMOS for all Setup Items.

5. Save Changes
    Save Setup data to CMOS.